



GOVERNMENT OF MAHARASHTRA

WORKING PLAN

VOLUME-I

FOR

THE FORESTS
OF

ALLAPALLI FOREST DIVISION

(SOUTH CHANDRAPUR CIRCLE)

FOR THE PERIOD 2004-05 TO 2013-14

BY

DR. S. S. SRIVASTAVA, IFS
DEPUTY CONSERVATOR OF FORESTS
WORKING PLAN DIVISION-II
CHANDRAPUR



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**DR.S.S.SRIVASTAVA, IFS
DEPUTY CONSERVATOR OF FORESTS
WORKING PLAN DIVISION-II
CHANDRAPUR**

STATE LEVEL COMMITTEE FOR APPROVAL OF DRAFT WORKING PLAN FOR
ALLAPALLI FOREST DIVISION.
(Meeting held on 8th March 2004 at Van Bhavan, Nagpur)




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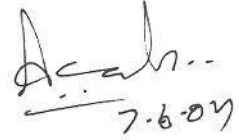
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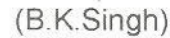


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INTRODUCTION

This Working Plan for Allapalli Forest Division replaces the earlier Working Plans for Allapalli range by Shri S.A.H.Qureshi (1985-86 to 2000-01), for Ghot range by Shri K.N.Khisti (1977-78 to 1991-92), for Markhanda range by Shri Dashputre (1954-55 to 1973-74), for Pedigudam range by Shri Chandras & Gujar and for Aheri and Pirimili ranges by Shri A.P.Deshmukh (1990-91 to 1999-2000). The present working plan for Allapalli Forest Division, Allapalli is the first consolidated plan for the entire division comprising of six territorial ranges viz Allapalli, Pirimili, Ghot, Markhanda, Aheri and Pedigudam. The total forest area of the division is 291151.428 ha and the present working plan covers 217942.685 ha of forest area and the remaining area 35635.764 ha. and 12065.619 ha. has been handed over to Forest Development Corporation of Maharashtra, Ltd. and Chaprala Wildlife Sanctuary respectively for specific management purposes and 25507.360 ha as a disforest area. The present working plans covers 181000.105 ha of Reserved Forest, 23533.290 ha of Protected Forest and 13409.290 ha of Unclassed Forest.

The forest of Allapalli Forest Division, Allapalli comprises of 3B-South Indian Moist Deciduous Forest and 5A-Southern Tropical Dry Deciduous Forest as per the revised classification of H.G.Champion and S.K.Seth. The vegetation mainly consist of Teak and Teak-miscellaneous forest. Bamboo is another important species found growing luxuriantly. The main associates of teak are Ain (*Terminalia tomentosa*), Tendu (*Diospyros melanoxylon*), Rohan (*Soymida febrifuga*), Aowla (*Emblica officinalis*), Bhirra (*Chloroxylon swietenia*), Lendia (*Lagerstroemia parviflora*), Dhaora (*Anogeissus latifolia*), Mowai (*Lannea coromandelica*), Mahau (*Madhuca longifolia*), Salai (*Boswellia serrata*)(c), Kusum (*Schleichera trijuga*), Mokha (*Schrebera swietenoides*), Palang (*Heterophragma roxburghii*), Anjan (*Hardwickia binata*). The site quality varies from I to IVb. The natural regeneration is satisfactory. The crop density varies from less than 4 to more than 6. The biotic pressure is more near the villages.

The preparation and revision of Working Plan for Allapalli Forest Division, Allapalli was started in 1998 and the tree enumeration works of Allapalli Forest Division were completed in 1999 and thereafter the analysis of the tree enumeration data was done and on the basis of data collected, the Preliminary Working Plan Report was prepared and discussed in the First State Level Committee meeting held on 3rd May 2001 at Nagpur under the Chairmanship of Shri S.K.Bali the then Principal Chief Conservator of Forests, M.S. Nagpur and the P.W.P.R. for Allapalli Forest Division was approved by the Committee vide Conservator of Forests, Working Plan Circle, Nagpur's office letter No. D-1/TA/CR-34/76/2001-02 dated 23rd May 2001 and after approval of the aforesaid P.W.P.R. the Final Draft Working Plan for Allapalli Forest Division has been completed.

The present Draft Working Plan has proposed for some organizational changes in order to supervise the various forestry activities effectively. It is therefore proposed that the Allapalli Forest Division be bifurcated into two Territorial divisions with their headquarters at Allapalli and Ghot and subsequently the Ghot Range be divided into three Territorial ranges namely Chamorshi, Ghot and Regadi and similarly the Pirimili range be divided into Gurupalli and Pirmili territorial ranges and

the newly created territorial division with its headquarter at Ghot will comprise of Chamorshi, Ghot, Regadi, Gurupalli and Mulchera territorial ranges and the remaining area of the present Allapalli Forest Division will form part of the new Allapalli Forest Division with its headquarter at Allapalli.

The Working Plan for Allapalli Forest Division encompasses the ideas of National Forest Policy of 1988 and therefore lays more emphasis on conservation, preservation and protection of Forest, Wildlife and Environment. This Working Plan has prescribed for the formation of Teak Plantation Working Circle for plantation of teak on suitable sites by overwood removal, recognizing the fact that teak is a light demander species and comes up very well after clear felling and removing the overwood. The present Draft Working Plan for Allapalli Forest Division, Allapalli after taking into consideration, the crop density and composition, forest type and the data collected after tree enumeration of the forest, has prescribed for the management of the forest in to different working circles viz Selection-Cum-Improvement W.C., Improvement W.C., Teak Plantation W.C., Afforestation W.C., Protection W.C., Bamboo (overlapping) W.C., Non-wood Forest Produce (Overlapping) W.C. and Wildlife (overlapping) W.C. for the better scientific management of the forest areas in order to meet the ever growing demand for large size timber and the small size timber for construction of houses, agricultural implements, firewood and fodder requirements. In addition to this a chapter on Miscellaneous Regulations has been added in order to provide for guidelines on the subjects which are not covered under the various working circles. The present working plan also offers greater employment opportunities to the local people in forestry operations.

This working plan has for the first time has suggested prescriptions for identification, multiplication and marketing of medicinal plants in the forest areas in order to increase the potential of growth and harvesting of medicinal herbs in the forest areas as well as to provide employment to the local people in the field of marketing of natural herbs and medicines.

This working plan has also suggested for establishment of Eco-tourism in the forest areas on the lines of National Policy on Eco-tourism of Govt. of India in order to educate the people and to create awareness among the citizens visiting forest areas about the conservation, preservation and protection of natural resources including wildlife.

The management maps and stock maps have been prepared using GIS technology through Geo-media Software in the office of the Conservator of Forests, Working Plan Circle, Nagpur and the same will be supplied with this working plan by the office of the Conservator of Forests, Working Plan Circle, Nagpur.

I am highly obliged to Shri B.K.Singh, IFS, Principal Chief Conservator of Forests, M.S. Nagpur for providing me an opportunity to undertake this responsible task of preparation and revision of first consolidated Working Plan for Allapalli Forest Division which is considered as the most valuable and prestigious division in the State.

I am highly grateful to Shri J.N.Saxena, IFS, Managing Director, FDCM Ltd. whose encouragement inspired me to think and incorporate innovative ideas in the preparation of this working plan. I am also thankful to Shri K. Subramanian, IFS, Principal Chief Conservator of Forests (Wildlife), Maharashtra State, Nagpur for his valuable guidance in the preparation of this working plan.

I am extremely thankful to Shri Jwala Prasad, IFS, Addl. Principal Chief Conservator of Forests (Production & Management) M.S. Nagpur for his kind interaction, valuable guidance and supervision in the preparation and revision of this working plan.

I am highly grateful to Shri Shailendra Bahadur, IFS, Conservator of Forests, Working Plan Circle, Nagpur for extending his kind cooperation and valuable guidance in the preparation and revision of this working plan.

I am also thankful to Shri V.T.Patki, IFS, and Shri B.S.K. Reddy Conservator of Forests, South Chandrapur Circle, Chandrapur and Shri B.S.Hooda, IFS, Shri B.R.Pachpor, IFS and Shri A.R.Mande, IFS, Deputy Conservator of Forests, Allapalli Forest Division, Allapalli for extending their full support and cooperation in the preparation of this working plan.

I am personally thankful to the staff of this working plan division who have made it possible to complete this working plan and have put in their best endeavour in the preparation and revision of this working plan and therefore S/Shri M.B.Jawade, RFO, R.G.Bisen, RFO, M.K.Shabir, RFO, B.S.Padwe, RFO M.T.Nandpurkar, RFO, B.E.Nandanwar, Ranger Surveyor, Surveyors S/Shri S.R.Mohkar, G.T.Kalambe, E.N.Pakmode, P.Y.Mahitkar, V.G. Gurav, K.D.Dhakate, D.A. Landge deserve appreciation. I am also thankful to Shri Waghade, RFO Allapalli Range and Shri Pandhare, RFO Pedigudam Range for their kind co-operation and valuable support.

I am extremely thankful to the administrative staff of this division and Shri R.G.Muraskar, Steno-typist who has taken keen interest and extra pains to prepare this working plan and therefore the staff of this working plan division associated with the preparation of this working plan deserve appreciation for their sincere and dedicated efforts.

Chandrapur.

Dated 20th January 2004

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SUMMARY OF THE WORKING PLAN FOR ALLAPALLI FOREST DIVISION, ALLAPALLI.

(2004-05 TO 2013-14)

NAME AND SITUATION:- Allapalli Forest Division lies between 79° 42' 30" to 80° 23' 50". North latitudes and 19° 17' 15" to 20° 03' 00". East longitudes.

The boundary of the division in the North is bounded by Gadchiroli Forest Division and Wainganga River and in the East by Bhamragarh Division and Bandia River and in the west by Pranhita and Wainganga River and in the south by Sironcha Forest Division and Zamela Nala.

The total forest area of Allapalli Forest Division is 291151.428 ha. The present working plan covers an area of 217942.885 ha of forest area of Allapalli Forest Division. Out of this 181000.105 ha is reserved forest, 23533.290 ha is protected forest and 13409.290 ha is unclassed forest. An area of 12065.619 ha has been transferred to Chaprala Wild Life Sanctuary. An area of 35635.764 ha has been transferred to Forest Development Corporation of Maharashtra Ltd. for specific management purposes.

CONFIGURATION OF THE GROUND:- The Forest areas of the Allapalli Forest Division are mostly plain however some undulating and hilly terrain is also present such as Bhimaram hills.

GEOLOGY ROCK AND SOIL:- The tract comprises of archean age of rocks which are rich in lime stone, clays, granites, gneisses, quartzites, magnesites, laterites, sandstones etc. The soils are red as well as black soils.

CLIMATE:- Climate is hot summer with well distributed rainfall during south-west monsoons. The mean daily maximum temperature in May is 47.06 degree centigrade and mean daily minimum is 22.86 degree centigrade. The humidity exceeds 70% in the South-West monsoon season.

WATER SUPPLY:- Gadchiroli District fall within Wainganga and Pranhita river drainage and the whole district is covered by important rivers like Wainganga, Pranhita, Indrawati and Godavari etc. and nalas which supply water throughout the year.

RIGHTS AND CONCESSIONS:- There are no rights in the Reserve Forest except right to way and access to water however the nistar rights are fulfilled from Protected Forest Areas. Grazing settlement has not been done so far in this division and therefore grazing units are not formed.

TYPE OF FORESTS:- According to H.G.Champion and S.K.Seth, the forest type is 3B-South Indian Moist Deciduous Forest and 5A-Southern Tropical Dry Deciduous Forest. Teak is the important timber species and its associates are bija, dhaora, ain, semal, moha, tendu, lendia, kullu, siras, haldu, salai, moyen, bhirra, aonla, gongal,

hirda, kumbhi, bamboo etc. The important grasses are kushal, chir, bhurbhushi, mushan etc.

INJURIES TO WHICH THE CROP IS LIABLE:- The forests are liable to injuries due to fire, illicit felling, encroachments, grazing by domestic and wild animals, insects and fungal attack, climbers and weeds, parasites and epiphytes, wind and drought. The drought is common.

UTILISATION OF THE FOREST PRODUCE:- The local people depend on the forest particularly for small timber, firewood, bamboos, thatching grass, fodder, fruits and flowers, fibers, etc. The total number of villages in the Gadchiroli District is 1679 and out of this 163 are deserted villages.

STAFF AND LABOUR:-The head of the territorial division is Deputy Conservator of Forests who is assisted by three Assistant Conservator of Forests. The labour required for forestry operations come from adjoining villages.

PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS:-The forest of the tract dealt with form the parts of ex-Aheri Zamindari till 1951. The first working plan was written by Shri Cluttabuck was implemented in year 1895 for Allapalli Range

GENTLE' PLAN (1930 TO 1946):

This was perhaps the first scientific management plan for the tract and was prepared after recording observations of growth parameters and enumeration and also the factors which included in the composition and growth of natural forests. Not only this but also the supply / demand of locals were also considered along with economics of forest and its utility.

The main objects of management were to bring about overall improvement of forests for producing large sized timber. In order to meet this object "Conversion to uniform" a high forest system with regeneration by compartments. Natural regeneration was to be supplemented by artificial regeneration. These prescriptions were applied to teak bearing areas only i.e. forests containing 20% or more of teak. Mixed forest areas containing patches of teak could not be considered due to lack of staff and labour, for further improvements in favour of teak. There appeared to be no significant demand for other forest produce such as bamboo, lac etc. and therefore they were not considered. The main Working Circles constituted were viz Bhimram Hills Working Circles, Plains-Elchil Working Circles, Mixed Forests Working Circle and Miscellaneous Working Circle.

T.Mc. DONALD AND MUJUMDAR's PLAN (1947 to 1961):

This was the third plan which came into effect in 1947 and was extended upto 1965. This plan included one more working circle i.e. bamboo overlapping working circle in addition to plain felling series and Bhimaram Working Circle. The bamboo working circle was added with an objective to meet the demand of Ballarpur Paper Mill. In this plan also conversion to uniform system continued.

CHANDRAS AND GURJAR'S PLAN (1965 TO 1984) :

The working plan dealt with the compact block of Allapalli and Pedigundam ranges. The general objects of management were to satisfy all the local demand for forest produce and conserve as far as possible those tree species which produce edible fruits and flowers for the benefit of the aboriginal population in times of

scarcity, to manage the forest on commercial lines to get optimum profit, to manage the forest as high forest under intensive working with the object of producing teak trees upto 2.13 m.(7') in girth at b.h.,to maintain a judicious mixture of superior miscellaneous species with teak in the growing stock and a suitable understory to protect and improve the soil, to increase the rate of conversion so as to complete the conversion program in the remaining period of conversion, to manage the working of bamboo on a sustained basis so as not to interfere with growth of tree species, to maintain adequate cover on the steeper slopes by judicious and conservative felling in order to prevent soil wash, to aim at the creation of a normal forest and all that it implies, to maintain a continued production of large sized timber of teak and other superior species on the basis of sustained yield, to rigidly fire protect the forests in order to conserve valuable timber and in order to meet the above objects of management the forest area divided into Teak Conversion Working Circle, Plantation Working Circle, Hill Working Circle, Khorgaon Working Circle, Mixed Forest Working Circle, Miscellaneous Working Circle and Bamboo (overlapping) Working Circle.

S.A.H. QURESHI'S PLAN (1985-86 TO 2000-2001) :

This plan dealt with Allapalli Range of Allapalli Forest Division, and covered an area of 189.20 sq.km. spread over 81 compartments. The area has been under scientific management for the last one hundred years. The main objects of management were, to satisfy all the local demand for forest produce and conserve as far as possible those tree species, to manage the forest on commercial lines to get optimum profit, to manage the forests as high forests under intensive working with the object of producing teak trees upto 2.13 meters (7') in girth at breast height, to maintain a judicious mixture of superior miscellaneous species with teak in the growing stock and suitable understory to protect and improve the soil, to maintain and improve the forests on steep and precipitous hill slopes by judicious and conservative felling in order to prevent soil wash off, to maintain the enhanced rate of conversion so as to complete the conversion program in the remaining period of conversion and to progressively convert the areas containing mixed forest to more valuable forests, so as to utilize the optimum capacity of land.

The reserve forests of Allapalli Range were stock-mapped on 4"=1 mile map. The whole forest comprised of 'A' class reserve forests in Allapalli Range. The forest area was divided into, Protection Working Circle, Teak Conversion Working Circle Miscellaneous Working Circle, Biosphere Reserve Maintenance Working Circle and Wildlife (overlapping) Working Circle.

A.P.DESHMUKH AND S.P. JOSHI'S WORKING PLAN FOR PIRIMILI AND AHERI RANGES (1990.91 To 1999.2000) :

This was the forest working plan for Pirmili and Aheri ranges of the Allapalli Forest Division and covered an area of 54745.433 ha. spread over 142 compartments. The main objects of management were to preserve forests on steep hill slopes and areas stocked with open forest to prevent erosion and rapid run-off and conserve the environment, to conserve remaining existing natural forests, to restock all the understocked and degraded forests, enrich the growing stock and to achieve normality of growing stock in shortest possible time, to give priority to the local demand for forest produce and fodder, to increase production of M.F.P. and to manage the same scientifically, to create grass reserves in the heavily populated

areas where the demand of fodder grass is heavy and improve the quality of grasses and to ensure the maximum sustained yield of the forest produce in demand.

The tract dealt with in this plan was stock mapped on 4" to a mile scale and the total area was divided into two blocks viz. Pirimili block having 138 compartments and Aheri block having 4 compartments. The total forest area was divided into Selection cum Improvement working circle, Improvement working circle and Bamboo under planting overlapping working circle

K.N.KHISTI's working plan(1977-78 to 1991-92) :

This working plan for the Ghot range of Allapalli Forest Division was prepared on the basis of scientific working of forests. The prescriptions have been influenced by the National Forest Policy and the general objects of management were to mitigate the effects of soil erosion and to preserve and promote vegetative cover on steep and precipitous hill slopes, to meet local demand for small timber, firewood and bamboo, to meet the outside demand for large sized timber, firewood and charcoal to the extent the forest can bear, to provide grazing facilities for cattle to the extent compatible with scientific management of these forests, to enhance potential value of the forests by raising plantations of important species particularly teak, to obtain progressively increasing yield of timber and firewood on sustained basis with due regard to silvicultural requirements of the forests, to attain normal forests and consistent with the above, to derive maximum financial benefits.

RESULTS OF PAST WORKING: The prescription provided for scientific management of the forest were examined and it was found that in most of the cases the treatment prescribed were adhered to but in some stray incidents the prescriptions given in the working plans could not be implemented and therefore the forest crop did not respond positively and on the basis of analysis of the past management practices the forest area of the Allapalli Forest Division has been divided into various working circles which are Selection-cum-Improvement W.C, Improvement W.C, Teak Plantation W.C., Afforestation W.C., Protection W.C., Bamboo (overlapping) W.C, Non-wood Forest Produce (Overlapping) W.C. and Wildlife (overlapping) W.C. for better scientific management.

STATISTICS OF GROWTH AND YIELD:-Stem analysis of teak trees was conducted in order to study the growth and yield of teak trees for site quality II, III and IV on the basis of this study the harvestable girth for teak has been fixed as 135 cm. g.b.h. o.b.

.WILDLIFE PRESERVATION:- Wildlife in the division has been managed under various rules and regulations framed from time to time till enactment of wildlife (Protection) Act 1972 which came into existence in the state of Maharashtra w.e.f. June 1, 1973 which has been amended in 1991. In the amended Act the words game reserves, big game and small game have been omitted.

BASIS OF PROPOSALS:-

A) NATIONAL FOREST POLICY OF 1988

The National Forest Policy of 1988 is in force and the basic objects are outlined below :-

(i) Maintenance of environmental stability through preservation and restoration of ecological balance that has been adversely disturbed by serious depletion of the forest 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 represent the remarkable biological diversity and genetic resources of the country.

(iii) Checking soil erosion and denudation in the catchment areas of the 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 forests/trees cover in the country through massive afforestation and social forestry program, especially on all denuded, degraded and unproductive lands.

(v) Meeting the requirements of fuelwood, fodder, minor forests produce and small timber of the rural and tribal population.

(vi) Increasing the productivity of forests to meet essential national needs.

(vii) Encouraging efficient utilization of the forest produce and maximum substitution of wood.

(viii) Creating a massive people's movement with the involvement of all women, for achieving these objects and to minimize pressure on existing forests.

Based on above objects the salient features of 1988 forest policy are severe restrictions on schemes and projects which interfere with forests that clothes steep slopes, catchment of rivers, lakes and reservoirs, no working of forests without the Government having approved the management plan, non-introduction of exotic species without long term scientific species trials, the rights and concessions including grazing always remain related to the carrying capacity of forests, rights and concessions enjoyed by the tribal should be protected and their domestic requirement of the fuel wood, fodder, minor forests produce and timber for construction should be the first charge.

Forest management plans to take special care of the needs of wildlife conservation, effective action should be taken to prevent encroachments on forest land and the existing encroachment should not be regularized, forest based industries should raise the raw material needed by themselves in arrangement with the private cultivators and survey of forest resources to be completed on scientific lines for updating information.

(B) GENERAL OBJECTS OF MANAGEMENT ::

- i) To preserve and enrich the growing stock in natural forests and to restock all under-stocked and degraded areas of the forests with the help of artificial regeneration and soil and moisture conservation measures.
- ii) To improve the quality and to increase the ratio of valuable trees species by encouraging natural regeneration and also by artificial regeneration by way of planting important timber and miscellaneous species.
- iii) To improve the stocking of teak, bamboo and other valuable species in order to produce large size timber to meet the local and commercial demand.
- iv) Preservation and improvement of minor forest to obtain progressively increasing yield of small timber, fire wood, and poles in order to meet the demands of local people and to provide grazing to local cattle.
- v) To combat ill effects of soil erosion wherever it has already started and to prescribe preventive measures.
- vi) To increase the production of non-wood forest produce and medicinal plants, and to manage the same scientifically.
- vii) To increase the productivity and ensure progressively increasing yield of forest produce in demand.
- viii) To achieve compatible wildlife management.
- ix) To encourage active participation of local people in the management, protection, preservation and conservation of wild flora and fauna by forming joint forest protection committees under the Joint Forest Management Programme.

CONSTITUTION OF WORKING CIRCLES:- On the basis of the crop composition, site quality, crop density, type of the forest, soil type, topography and terrain of the area, need of the local population and their dependability on the forest produce, the forests of the Allapalli Forest Division will be managed under the following working circles:

- i) Selection-cum-Improvement Working Circle.
- ii) Improvement Working Circle.
- iii) Teak Plantation working Circle.
- iv) Afforestation Working Circle.
- v) Protection Working Circle.
- iv) Bamboo (Overlapping) Working Circle.
- v) Non-wood Forest Produce (Overlapping) Working Circle.
- vi) Wildlife (Overlapping) Working Circle.

1) SELECTION-CUM-IMPROVEMENT WORKING CIRCLE:-

AREA: 100283.382
 CHOICE OF SPECIES: Teak and other local miscellaneous species such as ain,shisham,haldu,kalam,moha, rohan,lendia,bija etc.

SILVICULTURAL SYSTEM: Selection-cum-Improvement

FELLING CYCLE: 20 years

HARVESTABLE GIRTH

Group-I	Teak,	135 cm
Group-II	Ain,bija,shisham,haldu	120 cm
Group-III	Other timber species	120 cm
Group-IV	Garari and Lendia	45 cm

FELLING SERIES 45
 Regulation of yield By area

PERCENTAGE OF TREES TO BE REMOVED

Group-I Teak	100 % above the harvestable girth class
Group-II Ain,bija,haldu,shisham	70 % of the marked trees
Group-III Other miscellaneous species not included in group II and IV	80% of the marked trees
Group-IV Garari and Lendia	60 % of the marked trees.

2) IMPROVEMENT WORKING CIRCLE:

AREA: 60640.152 ha.
 CHOICE OF SPECIES: Teak and other local miscellaneous species such as ain,shisham,haldu,kalam,moha, rohan,lendia,bija etc.

SILVICULTURAL SYSTEM: Improvement Fellings

FELLING CYCLE: 20 years

FELLING SERIES 16

3) TEAK PLANTATION WORKING CIRCLE:

Area 20978.095 ha
 Silvicultural system Clear felling followed by artificial regeneration.
 Felling Cycle 20 years
 Felling series 16
 Choice of species Teak

4) AFFORESTATION WORKING CIRCLE:

Area	29627.414 ha.
Plantation will be done in two phases viz restorative phase and productive phase.	
Choice of species	Aonla,bija,biba,behead, hirda,jamun,charoli, sitaphal etc.
Plantation series	5
Planting cycle	50 years

5) PROTECTION WORKING CIRCLE:

Area	6413.632 ha.
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6) BAMBOO (OVERLAPPING) WORKING CIRCLE:

Area	12200.473 ha.
Cutting cycle	3 years

Method of treatment:-Crop will be treated on clump basis:

- I) No harvesting works should be permitted between 15th June to 30th September.
- ii) No culms below the age of two years will be felled.
 - (a) Following culms shall be removed from all clumps:-
 - i) All dead, decayed and dry bamboos.
 - ii) Culms whose half or more top part is broken or damaged.
 - iii) Twisted or malformed culms.
 - iv) In a mature clump the following types of culms (green and living) will be retained.
 - All current season's i.e. less than one year old culms.
 - From the rest culms equal in number to the current season's (i.e. less than one year old) culms or eight, whichever is more.
 - (b) The remaining culms will be considered available for harvesting.
- iii) The cutting height of culms will be between 15 cm to 45 cm. above the ground level i.e. above the first internode above the ground. The cut shall be slant with a sharp instrument. In case of any flowering, no culms from flowered clump shall be felled in the year of flowering.
- (iv) No clump should be considered fit for harvesting unless it contains more than 12 mature culms (one year as well as two years old included)
- (v) Harvesting of bamboo shall be done in a manner so as to ensure that the retained culms are evenly spaced and that some mature culms i.e.

more than two years old are retained on periphery for the purposes of support to the new culms.

- (vi) Following Acts will be strictly prohibited.
- a) Digging of rhizome.
 - b) Lopping of bamboo culms for fodder.
 - c) Use of tender bamboo culms for bundling.

(vii) Climbers infesting with growth of bamboo clump shall be cut. After cutting the debris will be removed away from the clumps and will be stacked at a distance not less than 2 meter away from the outer periphery of each clump

BAMBOO FLOWERING :

Flowering is either periodic or annual. It is either gregarious, sporadic or both. Gregarious flowering is usually followed by the death of clumps, but in some cases of sporadic flowering the clumps do not die after flowering. The gregarious flowering proceeds from one end of the forest to another in waves.

TREATMENT OF BAMBOO FLOWERING AREA :

- (a) Collection of seeds and their disposal :

The fresh seeds of bamboo will be collected from the clumps. The seeds will either be sent to the silviculturist for storage and further distribution among various divisions or will be sown, if needed locally, in raised beds of standard size in the last week of May or first week of June. After the rains set in the bamboo seeds will germinate and in the months of October-November. These seedlings will be transplanted in the polythene bags. The seedlings so raised will be utilised for afforestation works and also for raising bamboo plantations.

- (b) Method of harvesting

Immediately after completion of seeding it will be necessary to remove all culms as they get dried. The removal may be done either departmentally or through the agency of Forest Labourers Cooperative Societies or else the standing coupes may be auctioned. The conservator of Forests, will take a decision in this regard.

- (c) Tending Operations

After completion of seeding it is essential to properly look after the young regenerated crop till a time the clump formation starts. The following operations will be carried out depending upon the age of the crop.

A) Crop age between 1 to 3 years :

During this period the area will normally contain thick seedling crop and the clump formation does not start. During this period following tending operations will be carried out.

- i) The area will be thoroughly gone over and 0.6 meter diameter foci at the rate of 300 per hectare will be formed, distributed evenly over the whole area.

- ii) All the rank growth of grasses, weeds and even bamboo seedlings upto a distance of 1.5 meter all around the foci formed as above, will be cleared so that the growth of the bamboo seedlings in the selected foci are not hampered.
- iii) All climbers within and around the foci upto 1.5 meter distance will be completely removed.
- iv) The whole area will be strictly protected from fire and grazing.

B) Crop age between 3 to 8 years. :

During this period the clump formations starts but the crop is yet immature for harvesting. During this period following operations will be carried out.

- i) All badly grown, twisted and damaged culms from the selected foci, will be removed.
- ii) All weeds, grasses and climbers, within and around the foci upto a distance of 1.5 meter, will be completely removed.
- iii) Tree growth of species, others than teak, ain, shisham, bija, tinsa, tiwas , dhaora, haldu, karam, semal, mowai and bhirra over topping the clumps, will be removed.
- iv) The whole area will be strictly protected from fire and grazing.

NON WOOD FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE:-This working circle shall comprise of an area of 217942.685 ha. consisting of management of minor forest produce and medicinal plants.

WILDLIFE (OVERLAPPING) WORKING CIRCLE:- This is also an overlapping working circle and mainly comprises of habitat development works and protection of wild life.

MISCELLANEOUS REGULATIONS:

DEMARCATION OF COUPES:

- i) Annual coupes will be demarcated by clearing 3 meter wide lines and by erecting pillars or posts on the lines.
- ii) Selected trees on the periphery will be given two coaltar bands and a serial number.
- iii) Unworkable areas will be demarcated by giving two geru bands with a cross in geru colour between bands and a serial numbers on selected trees on the periphery.

MARKING TECHNIQUE:

- i) All trees to be felled will be given a geru band and will bear district hammer marks both at breast height and base.
- ii) All valuable trees of 45 cm and over in girth and other species of girth over 60 cm at breast height will bear digit serial number both at breast height and base.
- iii) Remaining trees will be given different series of serial numbers with coaltar.

DISPOSAL OF FOREST PRODUCE: It will be done as per the prescription embodied in the working plan.

IRREGULAR HARVESTING: Removal of dead fallen firewood will be removed. Felling of trees on fire lines will be carried out. Felling of trees for the purpose of growth study will be done.

MAINTENANCE OF BOUNDARIES: The construction of R.C.C. cairn class/ & II will be started on the external boundary of the division. The works of 1/5th boundary demarcation scheme will be followed for other boundaries.

FIRE PROTECTION: Complete fire protection for the whole area has been prescribed.

GRAZING: Worked coupes in all working circles will remain closed for grazing .

SOIL AND MOISTURE CONSERVATION WORKS: Continuous contour trenches, check dams and nala bunding in each working circle have been suggested.

ESTABLISHMENT: A new territorial division with its headquarters at Ghot, comprising of five territorial ranges viz Chamorshi, Ghot, Regadi, Mulchera, and Gurupalli be carved out of the present Allapalli Forest Diivision and the remaining area be placed under the control of existing Dy. Conservator of Forests, Allapalli Forest Division at Allapalli. Additional staff is required for the proper execution of the prescriptions of the plan.

LABOUR: The present labour supply is inadequate.

CONTROL AND RECORDS:

- **CONTROL FORMS:** Separate control forms have been prescribed for each working circle.
- **COMPARTMENT HISTORIES:** Compartment history form No. 1 to 3 will be maintained in the Division and Range Offices in the given proforma.
- **PLANTATION AND NURSERY REGISTERS:** These will be maintained in the standard format.
- **DIVISIONAL NOTE BOOK:** It will be maintained in the standard format.

ABBREVIATIONS USED IN THE PLAN

a.m.s.l.	Above mean sea level
A.C.F.	Assistant Conservator of Forests
b.h.	Breast height
C.A.I.	Current Annual Increment
Cft.	Cubic feet
CM.	Centimetre
Cm ³	Cubic centimetre
Comptt.	Compartment
d.b.h.o.b.	diameter at breast height over bark
d.b.h.u.b.	diameter at breast height under bark
Dy.C.F.	Deputy Conservator of Forests
Dn.	Division.
F.D.C.M.Ltd.	Forest Development Corporation of Maharashtra Limited.
F.L.C.S.	Forest Labourers Co-Operative Society
F.R.H.	Forest Rest House
F.S.	Felling Series
F.S.O.	Forest Settlement Officer
F.V.	Forest Village
F.Y.M.	Farm Yard Manure
F.Y.O.	First Year Operations
g.b.h.	girth at breast height
g.b.h.o.b.	girth at breast height over bark
g.b.h.u.b.	girth at breast height under bark
ha/Ha	hectare
IGF	Inspector General of Forests
IFA	Indian Forest Act.
Km	Kilometre
Kg	Kilogram
m.	Metre
Mm	Milli-metre
M ³ /m ³	Cubic-metre
M.A.I.	Mean Annual Increment
M.F.P.	Minor Forest Produce
M.V.S.S.	Maharashtra Van Sanshodhan Sanstha
P.B.	Periodic Block
P.F.	Protected Forests
P.P.O.	Pre Planting Operations
P.Y.O.	Preliminary Year Operations
P.W.D.	Public Works Department
R.F.	Reserved Forests
R.F.O.	Range Forest Officer
Rs	Rupees
S.C.I.	Selection-Cum-Improvement
Sq.	Square
Sq.km.	Square Kilometre
Spp.	Species

S.R.P.	State Reserved Police
S.Y.O.	Second Year Operations
Sr.No.	Serial Number
T.Y.O.	Third Year Operations
W.C.	Working Circle
IVth Y.O.	Forth Year Operations
Vth Y.O.	Fifth Year Operations
VAM	Vesicular Arbuscular Mycorrhiza

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GLOSSARY OF LOCAL TERMS

LOCAL TERM	MEANING
Adjat species	Miscellaneous species
Bhatti	Local stillery for liquor production
Bidi	Hand made cigarette wrapped in tendu leaf
Bir	An area reserved to grow grass
Burad	A caste whose main occupation is to make Articles from bamboo
Doh	A deep pond in a river or stream
Geru	Red ochre or red earth
Ghani	Local crusher for oil extraction
Ghat	A road with a steep gradient
Gully	Water channel
Jagir	An estate conferred by the state in return for service
Jagirdar	The holder of jagir
Jimindari	An estate belonging to a zamindar
Jhiras	Temporary small wells dug in nalas During summer
Juar	A cultivated millet(Sorghum vulgares)
Kacha(roads)	Temporary(roads)
Kankar	Lime nodules
Karka	Whippy bamboo
Katha	Catechu
Kharif	Monsoon crop
Khasara No.	Serial number given to any portion of land entered in land records.
Khories	Valleys in between two hills or hillocks
Malguzari	Land tenure system which existed in Vidarbha.
Malki Land	Lands belonging to private individuals.
Mouza	A village area
Murum	A reddish hard soil
Myrabolons	Aonla,harra and beheda
Naka(Forest)	Barrier on road for checking forest produce in transit.
Nala	A water course
Nistar	Forest produce required for bonafide agricultural or domestic Purposes.
Nistar Patrak	Record of rights on Government Land.
Occupational-Nistar	The nistar granted to village craftsman i.e.Nistar mahars,blacksmiths,chamars etc.at concessional rate For their craft purposes.
Paidawar	Wild edible flowers, fruits or roots
Patwari	Village Officer(Sub-ordinate of Revenue Department)
P.C.No.	Patwari Circle Number
Pre harvestable girth	One girth class below exploitable girth class
Pucca	Permanent Construction
Pulla	Bundles of cut grass
Rabi	Winter Crop

Rahadari	Transit
Raiyatwari	A form of land tenure, applied to land in raiyatwari tenure and to villagers.
Regur	Block cotton soil.
Rith	A deserted village site
Satkatha	Miscellaneous tree species
Seri-culture	Rearing silk/tussar worms.

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**LOCAL AND BOTANICAL NAMES OF PLANTS
OCCURRING IN ALLAPALLI FOREST DIVISION**

A. TREES

LOCAL NAME	BOTANICAL NAME	FAMILY
Achar	<i>Buchanania lanzan</i>	Anacardiaceae
Amaltas/Bahava	<i>Cassia fistula</i> , Linn	Caesalpiniaceae
Amta	<i>Bauhinia malabarica</i> , Roxb	do
Anjan	<i>Hardwickia binata</i> , Roxb	do
Apta	<i>Bauhinia racemosa</i> , Lamk	do
Aonla	<i>Phyllanthus emblica</i>	Euphorbiaceae
Arjun	<i>Terminalia arjuna</i>	Combretaceae
Babul	<i>Acacia nilotica</i> Linn	Mimosaceae
Bud/Wad	<i>Ficus bengalensis</i> , Linn	Moraceae
Beheda	<i>Terminalia bellirica</i> ,	Combretaceae
Bel	<i>Aegle marmelos</i> (L)	Rutaceae
Bhirra	<i>Chloroxylon swietenia</i>	do
Biba/Bhilwa	<i>Semecarpus anacardium</i> , Linn	Anacardiaceae
Bija	<i>Pterocarpus marsupium</i> , Roxb	Fabaceae
Bistendu	<i>Diospyros montana</i> , Roxb	Ebenaceae
Bor/Ber	<i>Zizyphus mauritiana</i> , Lamk	Rhamnaceae
Chichwa	<i>Albizia odoratissima</i> , Roxb	Fabaceae
Dhaman	<i>Grewia tilifolia</i> (vahl)	Tiliaceae
Dhaora	<i>Anogeissus latifolia</i> (R.Br.exDC)	Combretaceae
Dhoban/Satpuda	<i>Dalbergia paniculata</i> , Roxb	Fabaceae
Dikamali	<i>Gardenia resinifera</i> , Roth	Rubiaceae
Garari	<i>Cleistanthus collinus</i> , Roxb	Euphorbiaceae
Ghogar/papda	<i>Gardenia latifolia</i> Ait	Rubiaceae
Ghoti/Ghot	<i>Zizyphus glaberrima</i> (Sedgw)	Rhamnaceae
Gongal	<i>Cochlospermum religiosum</i> Linn	Cachlospermaceae
Haldu	<i>Adina cordifolia</i> Roxb	Rubiaceae
Hingan	<i>Balanites aegyptica</i> (L)Del	Balanitaceae
Hiwar	<i>Acacia leucophloea</i> Roxb Willd	Mimosaceae
Hirda/Harra	<i>Terminalia chebula</i> Getz	Combretaceae
Imli/Chinch	<i>Tamarindus indica</i> Linn	Caesalpiniaceae
Jambhul/Jamaun	<i>Syzygium cumini</i> Linn	Myrtaceae
Kakad	<i>Garuga pinnata</i> Roxb	Burseraceae
Kala-umber	<i>Ficus hispida</i>	Moraceae
Kakai	<i>Flacourtia indica</i> (Burm.f)Mer	Flacourtiaceae
Kamala	<i>Mallotus philippensis</i>	Euphorbiaceae
Karai	<i>Miliusa velutina</i> H.F.& Thoms	Anonaceae
Kalam	<i>Mitragyna parviflora</i> Roxb	Rubiaceae
Karanj	<i>Pongamia pinnata</i> (L)Pierre	Fabaceae
Kateyen/Kasai	<i>Bridelia retusa</i> spreng	Euphorbiaceae
Kawith	<i>Limonia acidissima</i> Lorr	Rutaceae
Khair	<i>Acacia catechu</i> willd	Mimosaceae

Khirni	Manilkara hexandra Roxb	Sapotaceae
Kullu	Sterculia urens Roxb	Sterculiaceae
Kumbhi	Careya arborea Roxb	Lecythidaceae
Kusum	Schleichera oleosa Lour Merr	Sapotaceae
Lasora/Bhokar	Cordia dichotoma Forst.f.	Boraginaceae
Lendia/sehna	Lagerstroemia parviflora Roxb	Lythraceae
Lokhandi	Ixora arborea Roxb	Rubiaceae
Maida-Lakri	Litsea glutinosa	Lauraceae
Medshing	Dolichandron falcata Seem	Bignoniaceae
Moha/Mahuwa	Madhuca longifolia Koen	Sapotaceae
Mokha	Schrebera swietenoides Roxb	Aristolochiaceae
Moyen/mowai	Lannea coromandelica Hoult Merr	Anacardiaceae
Neem	Azadirachta indica A.Juss	Meliaceae
Padar	Stereospermum suaveolens DC	Bignoniaceae
Pair	Ficus rumphii	Moraceae
Palas	Butea monosperma Lamk Taub	Fabaceae
Pangara	Erythrina variegata Linn	do
Papra	Holoptelea integrifolia	Urticaceae
Rankela	Dillenia pentagyna	Magnoliaceae
Rohan	Soymida febrifuga(A.Juss)	Meliaceae
Sagwan	Tectona grandis Linn	Verbenaceae
Saja/ain	Terminalia alata Heyne	Combretaceae
Salai	Boswellia serrata Roxb	Burseraceae
Semal	Bombax ceiba L.	Malvaceae
Shisham	Dalbergia latifolia Roxb	Fabaceae
Shivan	Gmelina arborea Linn	Verbenaceae
Siras-black	Albizia lebbek L.willd	Mimosaceae
Siras-white	Albizia procera Roxb	do
Sitaphal	Annona squamosa L.	Annonaceae
Suriya	Xylia xylocarpa Roxb.	Mimosaceae
Tendu	Diospyros melanoxylon Roxb.	Ebenaceae
Tiwas/Tinsa	Ougeinia oojeinensis Roxb.	Fabaceae
Umbar/Gular	Ficus recemosa Linn	Moreaceae
Warang/Baranga	Kydia calycina Roxb	Malvaceae

B. SHRUBS AND HERBS

Aal	Morinda citrifolia(Lin)	Celastraceae
Aghada	Achyranthes aspera(Linn)	Amarantaceae
Akola	Alangium salvifolium(Thwaites)	Cornaceae
Ban rahar	Flemingia semialata(Roxb)	Fabaceae
Baibirang	Embelia ribes	Myrsinaceae
Bankapas/Rankapas	Thespesia lamps	Malvaceae
Bharati	Maytenus emarginata(Benth)	Celastraceae
Chind/Sindhi	Phoenix sylvestris Roxb	Palmae
Chipti	Desmodium pulchellum Benth	Fabaceae
Dhawai/Jilbili	Woodfordia fruticosa Kurz	Lythraceae
Dikamali	Gardenia resinifera Roth	Rubiaceae
Gurmukhi/	Grewia hirsuta	Tiliaceae

Gursukri/ Gaturli		
Gokhru	<i>Tribulus terrestris</i> , Linn	Zygophyllaceae
Harsingar/ Kharsui	<i>Nyctanthus arboristis</i>	Oleaceae
Jine	<i>Leea crispa</i>	Leeaceae
Ranbhendi	<i>Dodonea viscosa</i>	Sapindaceae
Koril	<i>Petalidium barlerioides</i> nees	Acanthaceae
Kasterua	<i>Hygrophila auriculata</i> k.Schum	Acanthaceae
Kharoti	<i>Grewia hirsuta</i> vahl.	Tiliaceae
Kudursi	<i>Bridelia hamiltoniana</i> wall	Euphorbiaceae
Kudmudi	<i>Gardenia gummifera</i> Linn	Rubiaceae
Kuda	<i>Holarrhena pubescens</i> (Buch,Ham)	Apocynaceae
Kala kuda	<i>Wrightia tinctoria</i>	do
Kuchala	<i>Strychnos nuxvomica</i>	Strychnaceae
Lokhandi	<i>Ixora arborea</i> Roxb	Rubiaceae
Morarphal	<i>Helicteres isora</i> Linn	Steculiaceae
Maruadona	<i>Carvia callosa</i> Ness	Acanthaceae
Nirmali	<i>Strychnos potatorum</i>	strychnaceae
Neel	<i>Indigofera tinctoria</i>	Papilionaceae
Phetra-safed	<i>Gardenia turgida</i> Roxb	Rubiaceae
Phetra-kala	<i>Randia uliginosa</i> (Retz)	do
Tarwad	<i>Cassia auriculata</i>	Caesalpiniaceae
Tarota	<i>Cassia tora</i> Linn	do
Thuar	<i>Euphorbia tirucalli</i> Linn	Euphorbiaceae
Warangal	<i>Celastrus paniculata</i>	Willd Celastraceae

C. GRASSES AND BAMBOOS

Ghonad	<i>Themeda triandra</i>	Gramineae
Bamboo-karka	<i>Dendrocalamus strictus</i> (Roxb)Nee	do
Bamboo-katang	<i>Bambusa arundinacea</i> (willd)	do
Bhurbhusi	<i>Eragrostis tenella</i> (Roem & Schulf)	do
Godhel	<i>Eragrostis interrupta</i>	do
Katanbahari	<i>Aristida funiculata</i> (Trin.et.Rupa)	do
Kunda/sum	<i>Eulaliopsis binata</i> (Retz.)(Mark)	do
Kusal/ Speargrass	<i>Heteropogon contortus</i> (Linn)Beau	do
Diwartan		
Marvel-small	<i>Dicanthium annulatum</i> (Forsek)Staff	do
Marvel-big	<i>Dicanthium aristatum</i> (poir)	do
Mushan	<i>Iseilema laxum</i> (Hack)	do
Paonya	<i>Sehima sulcatum</i> (Hack)Acamus	do
Sheda	<i>Sehima nervosum</i> (Staff)	do
Tikhadi	<i>Cymbopogon martinii</i> (Roxb)Watson	do
Ukari	<i>Iseilema prostratum</i> Anderss	do
Chir	<i>Imperata Officinalis</i>	do

D. CLIMBERS

Bandke	Dendrophoe falcata(Linn)t	Loranthaceae
Chilar	Caesalpinia ecapetala(Roxb)	Caesalpiniaceae
Chilati	Mimosa hamata(Willd)	Mimosaceae
Chilati badi	Acacia torta(W & A)	do
Dhimarval	Celastrus paniculata(Willd)	Celastraceae
Dudhi/Nagvel	Cryptolepis buchananii (Roem)	Periplaceae
Eroni	Zizyphus oenoplia(Linn)	Rhamnaceae
Gunj	Abrus precatorius(Linn)	Fabaceae
Gulvel	Tinospora cordifolia(Willd)	Menispermaceae
Gurar,Nasvel	Milletia extensa(Baker)	Papilionaceae
Kajkuri	Mucuna pruriens(L)	Fabaceae
Khadyanag	Gloriosa superba	Liliaceae
Khobarvel	Hemidesmus indicus(Linn)	Asclepiadaceae
Kukuranji	Calycopteris floribunda	Combretaceae
Mahulvel	Bauhinia vahlii(Wand A)	Caesalpiniaceae
Musalikand	Dioscorea pentaphylla(Linn)	Dioscoraceae
Papri,Lalvel	Ventilage denticulata(Willd)	Rhamnaceae
Palasvel	Butea superba(Roxb)	Fabaceae
Piwarvel	Combretum ovalifolium(Roxb)	Combretaceae
Ramdaton	Smilax macrophylla(Roxb)	Liliaceae
Shataori	Asparagus recemosus	Liliaceae

E.PARASITES

Amaraval	Cuscuta refferxa(Roxb)	Cuscutaceae
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F.EPIPHYTES

Vanda	Vanda tesellata (Roxb)	Orchidaceae
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G.ENDEMIC/THREATENED PLANT SPECIES

Alichettu	Eonymus godaverensis	Celastraceae
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**COMMON AND ZOOLOGICAL NAMES OF THE
ANIMALS AND BIRDS COMMONLY FOUND IN ALLAPALLI FOREST DIVISION.**

COMMON NAME	SCIENTIFIC NAME
A : ANIMALS	
Tiger	<i>Panthera tigris</i>
Panther	<i>Panthera pardus</i>
Hyaena	<i>Hyaena hyaena</i>
Wild dog	<i>Cuon alpinus</i>
Wolf	<i>Canis lupus</i>
Jackal	<i>Canis aureus</i>
Fox	<i>Vulpes bengalens</i>
Jungle cat	<i>Felis chaus</i>
Bison	<i>Bos gaurus</i>
Sambhar	<i>Cervus unicolor</i>
Cheetal	<i>Axis axis</i>
Nilgai	<i>Boselaphus ragoamelus</i>
Wild boar	<i>Sus cristatus</i>
Sloth bear	<i>Melursus ursinus</i>
Barking deer	<i>Muntiacus muntjak</i>
Common langur	<i>Presbytis entellus</i>
Flying squirrel	<i>Petaurista petaurista</i>
Porcupine	<i>Hystrix indica</i>
Hare	<i>Lepus ruficaudatus</i>
B : BIRDS	
Painted sandgrouse	<i>Pterocles indicus</i>
Common sandgrouse	<i>Pterocles exustus</i>
Pea fowl	<i>Pavo cristatus</i>
Grey jungle fowl	<i>Gallus sonneratii</i>
Painted Partridge	<i>Francolinus pictus</i>
Grey partridge	<i>Francolinus pondicerianus</i>
Blackbreasted quail	<i>Coturnix coromandelicus</i>
Red spur fowl	<i>Galloperdix spadicea</i>
Crane	<i>Grus antigone</i>
Spotted bill duck	<i>Anas poecillorhyncha</i>
Pigeon	<i>Treron phoenicoptera</i>
Dove	<i>Streptopelia spp.</i>
Cotton teal	<i>Nettapus coromandelienus</i>
Whistling teal	<i>Dendrocygna javanica</i>

C : ENDANGERED WILDLIFE

ANIMALS

XXIV

Bison
Wolf
Panther
Sloth bear
Tiger

BIRDS

Pea fowl

CHAPTER - 1

TRACT DEALT WITH



SUMMARY OF FACTS ON WHICH THE PROPOSALS ARE BASED

CHAPTER-1 TRACT DEALT WITH

SECTIONN –1 : NAME AND SITUATION

1.1.1 The Allapalli Forest Division lies between 79°42'30" and 80° 23'50" latitude North and meridian of longitude 19° 17'15" and 20° 03' 00" East. The Forest areas are situated in the Southern part of Gadchiroli District. The Forest areas are more or less in compact block.

1.1.2 This Working Plan deals with the entire forest areas of Allapalli Forest Division which comprises of Allapalli, Pirmili, Pedigundam, Ghot, Aheri and Markhanda Ranges excluding the areas which have been handed over to Forest Development Corporation of Maharashtra Ltd. and to the Chaprala Wild Life Sanctuary for specific management purposes. The Allapalli Forest Division was created in 1966. It was earlier part of South Chanda Forest Division and Central Chanda Forest Division.

1.1.3 The total forest area of Allapalli Forests Division is 291151.428 .ha This Working Plan proposes to include 217942.685 ha .of Forest area of Allapalli Forest Division which comes to 74.87 % of total forest area of the division. The forest areas of Allapalli Forest Division comprises of 181000.105 ha Reserve Forests including 77675.571 ha of New Reserved Forest as per Govt. of Maharashtra Notification No. FLD/3685/9316/CR-42/F-3 dated May 5, 1992, 23533.290 ha of Protected Forests and 13409.290 ha of area is unclassified Forests. The distribution of forest areas in Allapalli Forest Division is illustrated in the following table:

**TABLE-1
DISTRIBUTION OF FOREST AREA IN ALLAPALLI FOREST DIVISION (in ha)**

Range	Reserved Forest	Protected Forest	Unclassified Forest	Area in W.P.	Area transferred to FDCM	Area transferred to Chaprala W.L. Sanctuary	Disforest Area	Total Forest Area
Ghot	54430.341	4444.080	4869.340	63743.761	--	--	11392.320	75136.081
Markhanda	7937.820	1586.220	3173.750	12697.790	13979.455	12065.619	5832.330	44575.194
Pedigundam	17367.437	--	4684.540	22051.977	12490.874	--	8282.710	42835.560
Allapalli	18920.284	--	391.520	19311.804	--	--	--	19311.804
Aheri	18709.503	7985.221	290.140	26984.864	9165.435	--	--	36150.299
Pirmili	63634.720	9517.759	--	73152.479	--	--	--	73152.479
Total	181000.105	23533.290	13409.290	217942.685	35635.764	12065.619	25507.360	291151.428

1.1.4 The boundaries of the tract dealt with are as below:-
North:- Gadchiroli Forest Division and Wainganga River
East:- Bhamragarh Division and bandia river.
West :- Pranhita and Wainganga Rivers.
South:- Sironcha Forest Division and Ghamela nala.

1.1.5 The forest areas of Allapalli Forest Division occur within the territories of present Gadchiroli District and spread over Aheri, Mulchera, Chamorshi and Etapalli talukas . The total geographical area of the district is 1491500 ha. and the area of the Allapalli Forest Division is 291151.428 ha. which is 19.52 % of the district.

SECTION 2:-CONFIGURATION OF THE GROUND:

1.2.1 The areas covered under this Working Plan are mostly plain with gently undulating slopes., The hilly tract occurs in the south West named as Bhimaram hills and in North Central named as Madkaki gatta (426 above MSL), Kalidurg gatta (311 above MSL) in Pedigundam and Ghot Range respectively. The Bhimaram hills rise to its highest point at 488 m. above Mean Sea Level. The slopes on eastern side are more steeper than on the western side. Especially the upper one third portion which is more or less precipitous. The numerous nalas arising out of the Burkulgatta hills run down in every possible direction furrowing the area deeply due to its above action, thereby transferring the area east of the Golamargu nala into multiridged, mildly rugged, uneven country.

SECTION –3 : GEOLOGY, ROCK AND SOIL

1.3.1 Gadchiroli District is endowed with rich minerals deposits. Important economic deposits like iron ore and limestone are found in this district. Apart from these important occurrences minerals like berite, beryl, columbite, tantalite. Lead, zinc, asbestos, sillimanite, kyonite, felspar, quartz etc. are also found in this district. The details of the geological formations and soils and their distribution in ranges of Allapalli Forest Division is given in **Appendix No I and Appendix No II respectively**. The geological map of the Allapalli Forest Division is enclosed as **Appendix No.III**. The economic exploitation of the minerals is yet to be undertaken by the Department.

1.3.2 In addition to the major minerals, minor minerals like murrum, sand which is useful as building materials as well as granite with different colours and shades which can be used as decorative building stones is available in this district.

1.3.3 The entire district except some parts of Sironcha, Aheri and Armori Tahsil comprises rocks of Archaean, Dharwarian sediments, Granites etc. Formations comprising limestone and shales of Cuddapah and Vindhyan system are exposed in Sironcha and Aheri Tahsils. The whole area is dominated by rocks comprising of quartz-felpathic gneisses with blends of hornblende gneisses. These gneisses are very hard and compact.

1.3.4 Allapalli is located about 115 km. to the south east of Chandrapur-Sironcha State High Way and falls in T.S.No. 65 A/1, A/2 & 65 A/3 of the Survey of India sheets of scale 1:50,000. The general trend of rocks in this area is NNW-SSE with 70 to 80 dips towards east. The area shows no damage or effect of accelerated erosion. It has good cover of vegetation.

1.3.5 A general sequence of rock units in order of increasing antiquity is tabulated below.

Recent	Alluvium and soil.
Pleistocene-Recent ..	Laterite
Cretaceous-Eocene ..	Deccan Trap with intertrappeans.
Cretaceous	Lameta beds.

Upper-Carboniferous

To Upper Triassic

Late-Pre-Cambrian ..

Gondwana System.

Vindhyan System.

Cuddapah System.

Archaean

Intrusives (granites and basic dykes).

Granite Gneisses and

Amphibolites, phyllites, quartzites,

Brecciated quartzites and banded

quartz magnetite rocks.

1.3.6 The rocks of Archaean age include granites, gneisses, quartzite, brecciated quartzite and banded magnetic rocks with intrusive. Granites are coarse-grained and light pinkish in colour, primarily composed of biotite, flesh coloured felspar and quartz. Most of the outcrops appear to be highly decomposed, which are intruded by numerous quartz veins and quartz-felspar pegmatite. The gneisses occupy a vast area. They show profound weathering resulting in their forming the plains covered by mantle of soils derived from them. Exposures of these gneissic rocks are sporadic due to their susceptibility to quick weathering. Megascopically, the gneisses are leucocratic and fine to medium grained. They are generally massive and well foliated. Quartz, felspar, muscovite and biotite are easily recognizable. Some gneisses are intersected with thin veins of pink felspar. Amphibolites occur as conformable bands and layers in the gneisses. They are, however, intensely weathered and exposures of fresh rock are rare. Megascopically, the amphibolites are light to dark green in colour but generally altered and soft. Hornblende and feldspars are the only recognizable minerals in hard specimens. Phyllites occur in the extreme north of the area. They are fine grained, compact and generally non-fissile. Two types of phyllites are observed. One variety is pink to greenish gray in colour, comparatively soft and shows faint schistose character. The other variety is dark gray in colour and being micaceous is comparatively hard and compact. The quartzite's and banded quartz-magnetite which appear to belong to one cycle of sedimentation are remnants of the older met sediments (Dharwar) occurring as isolated hills and knolls within the gneisses. The banded quartz-magnetite rocks are composed of alternating layers of ore minerals (both crystalline magnetite and hematite) and quartz. Brecciated quartzites stand out prominent at many points as isolated small hills and are intensely fractured, later filled up by the secondary silica. Granites, granite-pegmatites and basic rocks are intrusive in gneisses and amphibolites and generally occur as thin discordant and concordant bodies. The granites and granite-pegmatites are medium to coarse grained some times with large phenocrysts of feldspars. The other recognizable minerals are quartz and little amount of ferromagnesian minerals. The basic intrusives are melanocratic, medium grained, hard and compact, essentially composed of augites and plagioclase laths with minor amounts of secondary hornblende.

1.3.7 Cuddapah System: - The rocks of this system consists of shale's, limestone and quartzite's. The quartzites are medium to coarse grained and show wide ripple marks at several places. The quartzite are overlain by gray, siliceous, massive, impure limestone . These limestones usually do not show any gradational relation with quartzite, but they probably lie on a disconformable surface above the quartzite. Most of the limestone are lateritic and some are siliceous and dolomite in character. The shale is generally gray to purple in colour.

1.3.8 Vindhyan System :- The Vindhyan rocks of this area comprise sandstones, shales, lime stones and conglomerates. The shales are intercalated with

the lime stones. The most persistent and well defined rock type of the Vindhyan system seen in the area are the vitreous sandstones, which show a wide range in colour especially pink and brownish, compaction and grain size. On account of their relative resistance to weathering they stand out as conspicuous hills and ridges. The most common type of sandstone is light reddish or purple in colour and medium grained. Reddish sandstones are generally coarse grained and open textured. Fine-grained, compact, light coloured sandstones form conspicuous exposures. The shales are generally fine grained, thin bedded, light gray to light reddish in colour with development of a set of close vertical joints which make them fragmental. The limestones are thinly bedded, although in some places they are massive. They have a pale, dark gray to buff or red colour. Some bands of limestone are rich in lime and some in magnesia. The dip of the rocks varies from 15 degree to almost vertical. The conglomerates have a limited lateral and vertical extent and are often partially removed by slumping of the jointed blocks. They may vary from coarse loosely cemented to medium compact and indurate type. Their thickness varies at places. The pebbles are well rounded to sub-angular, ill-sorted and without any preferred orientation. they are mostly of sandstone, vein quartz, quartzite, quartz-magnetite rock and chert fragments. The pebbles of sandstone are mostly light reddish colour, compact and fine grained. The forests found on these formations are mixed teak, mixed, salai, bhirra-ghonal and rohan.

1.3.9 Gondwana system :- The formations belonging to this division are referable to the following groups:-

Chikhiala beds,
Kota Maleri
Kamthi,
Barakars,
Talchirs.

1.3.10 The Talchir series consist of a boulder bed at the bottom, followed by shales and sandstones successively. They occupy only a small area in the division and bear a poor miserable crop. In Barkers, the predominant rocks are the white felspathic sandstone, shales and clays along with coal seams. It has great economic value. The rocks in the Kamthi group are sandstones, shales, clays and conglomerates of which the sandstones and shales form the bulk of the series. The rocks of kotamaleri group comprise sandstone, clays, lime stones in the order of abundance. The Chikhiala beds represent the youngest member of the Gondwanas of the Pranhita-Godavari basin and comprise conglomerates, sandstones, shales and clays.

1.3.11 Lameta Beds:- The group is composed of clays and calcareous white sandstones. The clays are usually white with some reddish shales. The sandstones are loose and purplish-white in colour and are slightly calcareous. They present a sub-vitreous luster on fractured surfaces.

1.3.12 Deccan Traps and Inter trepan:- A considerable part of the area is covered by Deccan Traps and inter trepan beds. The Deccan Traps consist of layers of basaltic lavas, varying from amygdaloidal basalt to fine grained dolerite, at places, the amygdule being filled with various minerals, like quartz amethyst, calcite, agate, chalcedony and jasper. The rocks are generally dark-gray to dark-greenish gray in colour. The non-vesicular types are hard, tough, compact and medium to fine grained breaking with conchoidal fracture. The vesicular types are comparatively soft and break more easily. The trap is a natural home of teak and occurs in pure patches. Even where

a soil depth is less, the teak is remarkably plentiful but of poor quality. The absence of bija is conspicuous.

1.3.13 Inter-bedded with the traps are found at several places thin beds of limestone, sandstones, and shales, which in places have been converted to porcellanite and chert forming the inter-trappean beds. Following are some important minerals occurring in the precincts of the Allapalli Forest area.

1.3.14 LIMESTONE AND DOLOMITE :- Dewalmari-Katepalli limestone deposit is located at about 13 km. SSW of Aheri (T.S.No. 56 M/15, 65 A/3). The limestone deposit has a strike length of about 1 km. and average width of about 100 m. General strike is NW-SE with northerly dips of 40-70. The limestone is gray, pinkish gray and brownish in colour. Another limestone deposit with a strike length of about 2.4 km. and the maximum width of about .7 km. is located near village Katepalli. This band has a strike of NW-SSE with westerly dips of 15 to 50. At places vertical dips are also noticed. The drilling data reveal the presence of limestone beyond 80 m depth. The limestone from both the above said areas are estimated to contain reserves to the tune of 172 million tones with an average CaO content of 45 %. The MgO content of the Magnesium limestone bands ranges from 5 to 15 % and Silica percentage is low.

1.3.15 ASBESTOS / TALC :- In Gadchiroli district amphibolites type of asbestos is reported on the eastern slope of a hill range east schist, talc-tremolite schist, amphibolites and banded hematite quartzite of Precambrian age. The mineral bearing formation is observed below the scarp of boulders over a length of 25 m and 5 m in width. The mineral is brownish to white in colour, soft flexible but of non-spinning type. The occurrence is insignificant and is not exploitable.

1.3.16 QUARTZITES AND PEGMATITES :- Pure white quartz occurring as vein is located near Ghot and Aheri in the Gadchiroli district. Mica, Felspar, Barrette etc. also occur in quartz-pegmatite body located at Gad-Aheri on Aheri-Deolmari road. Columbine and Tantalite minerals are also reported in the Pegmatite body.

1.3.17 Near Ghot, quartz veins of varying dimensions occur in the gneisses. Such quartz veins are fairly common in this area. The swarms of quartz veins are located about 1.6 km. SW and 0.8 km. NW of Ghot. On the basis of surface examination reserves of about 0.38 million tones have been estimated in the area around Ghot.

1.3.18 Another important quartz occurrence in the form of reef is located on Allapalli road in Government Forest area east of Aheri ($19^{\circ} 25'$: $80^{\circ} 0'$). The reef measures about 125 m. in length and 60 to 20 m. in width and height is about 25 m. from ground level. It occurs as intrusion in the country rock. The quartz is milky white with pink shade especially in the central part of the vein. The reserves of quartz in this area have been estimated to be 0.3 M.T.

1.3.19 SILIMANITE :- Insignificant occurrences of Sillimanite corundum rock is located 3 km. SW of Elchil, which is 16 km. NE of Allapalli (T.S.No. 65 A/3). The Sillimanite-corundum rock is found in association with Pyroxene-garnet granulites, in the country rock comprising garnetiferous amphibolites and hornblende garnet gneiss. The NNW-SSE trending zone measures about 350 m. in length and 25 m. in width. Sillimanite occurs in the form of nodules scattered in this zone. The size of nodules varies from 10 m. across. The Sillimanite-corundum nodules are mainly composed of

radiating needles of Sillimanite, corundum and mica with accessories of quartz, magnetite, retilite, muscovite and biotite. The area does not appear to be promising.

1.3.20 Laterite:- Laterite is found in the area at many places capping over the Deccan Traps and the gneisses at places. Laterite is a compact and vesicular rock essentially composed of hydrated oxides of aluminum and iron with small amounts of manganese oxides and titanium. Generally it is reddish brown in colour. The presence of pure patches of garadi are the remarkable features of well disintegrated laterite but the soil derived from laterite decomposition is well stocked both when overlying Kamthi sandy stones and the metamorphic rocks.

1.3.21 Alluvium and Soil:- The bedrocks at several places, specially, the river valley areas of the region are covered by recent alluvium deposited by the streams and different types of soils derived from breaking up of the underlying rocks. At the time of settlement, nine types of soil has been recorded in the district viz. kali, bersi, kanhar, morand, khardi, wardi, retari, bardi, pandhari and kachhar. These are local names of soil types present.

1.3.22 Kamthi formation:-The rock comprising Kamthi formations are (i) grits (ii) sandstone, coarse or fine grained (iii) sandstone argillaceous and ferruginous. The shale of various colours occur intercalated among the sandstone there is generally an easterly dip but not at a high angle and over many miles, the rocks are nearly horizontal. The main type of forests found in these areas are either mixed teak or miscellaneous. The climbers are numerous and dense under growth of bamboo is noticeable.

1.3.23 Metamorphic rocks:- These rocks consist of granite and gneiss. The granite is typically composed of quartz, felspar, mica or hornblende. Gneiss consists of gneiss proper with schist or hornblende. Quartz schist wherever present produces a stony infertile soil and bear scrub jungle. On gneiss with felspar, the forest is thorny conspicuous by the presence of Zizyphus species. The black loam overlying the gneiss and mainly derived from the decomposition of hornblende schist supports the pure teak forests without bamboos.

1.3.24 The typical soil derived from the Deccan trap is "Regur" or black cotton soil. They contain high alumina and carbonate of calcium and magnesium with variable amount of potash, low nitrogen and phosphorus. They are generally porous and swell considerably on addition of water and dry up with cracks on losing the moisture. The black soil areas have a high degree of fertility and do not require manuring for long periods. The black cotton soil is mainly associated with trap where it overlaps trap. The most of the black cotton has been derived from the disintegration of hornblende schist which is basically silica, aluminum, lime and oxides of iron. The black cotton soil or kalli Matti is confined to riverain tracts. It is trap soil of great depth and fertility, without a speck of grit. In the hot weather it is checkered by deep and wide fissures, but with the advent of the rains it is rapidly transformed into a quagmire. It is so retentive of moisture and so heavy that it is impossible to plough it up until the rains are over and this is useless for Kharif Crops.

1.3.25 The gneisses and other rocks of the Archaean age on weathering give rise to "Red Soil" which is most common in the area where those rocks are present. The red soils are less fertile than the black soils.

1.3.26 The forest cover where the underlying rock is metamorphic sandstone, while laterite also occurs frequently; the resulting soil is a sandy loam, changing to brown clay, with alluvium deposits of considerable depth in ravines. Wherever sufficient moisture exists, these soils are capable of supporting fairly dense mixed forests but the excessive it and dryness of the climate control the height growth and the vegetation is confined to monsoon months.

Copper:-

1.3.27 The occurrence of malachite has been recorded at Thanwasana in stray traces in quartz veins, traversing phyllitic quartzites and argillaceous sand stones. As the bulk of this vein-quartz is barren, the occurrence does not appear to be promising. The copper-ore near Govindpur village occurs in a small quartz reef but is not of any economic value.

Lead-ore:-

1.3.28 A few pieces of very small crystal of galena were found on the surface near Padmandadda nala.

Building and Construction materials:-

1.3.29 Granite, Vindhyan sand-stone and quartzite, limestone, Gondwana sandstone and basalts of Trappean age can yield substantial supplies of material for being used in buildings and roads, etc. Vindhyan are a good store-house for building stones in Pipalgaon area. The sandstones are suitable for all sorts of building purposes and are extensively used locally. Brecciate quartzites are good sources for road ballast. Massive lateritic is also used in the area as building stone.

Limestone:-

1.3.30 Limestone occurs 0.4 km. north-north-east of Purkepar village, about 6 km east of Nawargaon. The stone is fine grained and pink in colour. Limestone also occurs at Mardha and Dolomite at Niljai. Limestone extending over several square kilometers in Chandaur district, may yield many million tones, but the limestone does not appear to be of any commercial importance, because of its impure siliceous and lateritic character.

Clay:-

1.3.31 Occurrences of several pits of white clay have been recorded in reserved forest area on both sides of the Chandrapur-Allapalli road, about 1.6 km. east of Kothari. The clay occurs in patches of varying sizes : some of them measure about 83, 613, 33,445, 16,722.5 and 8,361 sq. meters in extent. Another fairly, big patch is seen along the Kulklai nala. The quality of the clay is variable from deposit to deposit. Colour varies from pure white to various tints of brown and red. The pure white variety gives a whitish to grayish colour after firing. The plasticity is variable and the clay stands up to 1300 c. Shrinkage varies from nil to 5 per cent. The reserves are estimated at 921,000 tones. Parts of the area having this clay have been leased out.

SECTION –4 : CLIMATE

1.4.1 Climate of Allapalli areas is hot and dry i.e. tropical type. Broadly speaking there are four seasons, namely, the cold season, the hot season(summer), monsoon season(rainy) and post monsoon season (October/November). The cold season starts from November and continues up to mid February. The cold is mild and the weather is extremely pleasant. It is followed by hot season from the middle of February till onset of monsoon in the middle of June.

1.4.2 During April and May the heat of day is unbearable in spite of the dryness. The monsoon season is from the middle of June to September, October and November are post monsoon months. The climate is humid and hot.

1.4.5 Temperature : The average maximum and minimum temperature and diurnal range during different months from January to December are given below.

TABLE – 2

Month	Maximum	Minimum	Diurnal Ranges
January	32.42	9.70	22.72
February	33.44	11.58	21.86
March	38.37	14.72	23.65
April	44.48	20.32	24.16
May	47.06	22.86	24.20
June	45.26	22.66	22.60
July	40.63	22.12	18.51
August	34.62	23.54	11.08
September	33.52	19.62	13.90
October	36.56	17.26	19.30
November	33.55	12.80	20.75
December	29.77	8.37	21.40

1.4.6 Rainfall :- Some rainfall in the form of pre-monsoon showers occurs in May but the main rainy season i.e. from June to October. Averages for this tract indicates that the rainfall during the month of June to October is about 95 % of the annual rainfall. July and August are the months when maximum down pour is experienced. Average annual rainfall of the tract is 1524mm. Rainguage stations are maintained at Aheri and Sironcha The average data for various season is summarized in Appendix No. IV.

1.4.7 Humidity :- The average monthly relative humidity percentage for the period from 1978-79 to 1987-88 at Rajaram is given in Table V as below:-

TABLE -3

Sr.No	Month	8.30 Hrs.	17.30 Hrs.	Average
1	January	76.4	43.2	59.80
2	February	63.2	53.3	49.25
3	March	43.1	23.6	33.35
4	April	32.6	18.1	25.35
5	May	40.3	21.7	31.00
6	June	63.6	43.6	53.60
7	July	83.1	69.0	76.05
8	August	88.3	79.1	83.70
9	September	91.2	81.3	86.25
10	October	72.4	62.2	67.30
11	November	66.1	51.0	58.55
12	December	73.0	48.3	60.65

The above table indicates that the relative humidity is maximum in the month of August and September and then decreases gradually till April and again increased in June.

1.4.8 Frost :- Frost does not occur here.

1.4.9 Storms and winds :-

The prevailing winds are north-easterly from October to March and south-westerly from April to September. The incidence of storm and wind is uncommon. Winds are generally moderate occasional storms in pre-monsoon period occur. The presence of less fluting in the trees especially teak implies that powerful winds and storms are absent in these areas.

1.4.10 Health condition :-

Owing to the climatic condition and luxuriance of the vegetation, the tract shows unhealthy condition. Malaria used to be very common. It is now in control due to malaria eradication program. For want of clear, portable drinking water at many places, the diseases like diarrhea, dysentery, cholera and many skin diseases are common. The existing medical facilities are inadequate.

SECTION –5 : DRAINAGE AND WATER SUPPLY

1.5.1 (A) DRAINAGE:

The rivers Wainganga and Pranhita forms the Western boundary of this division. Zamela nala lies on Southern boundary of this division. River Dina, Gomni nala, Chchi nala, Binnar nala and River Pathra finally merge into the river Pranhita and flow towards South.

1.5.2 (B) WATER SUPPLY:

There is acute scarcity of water through out the tract during the summer. Perennial rivers flow along the boundary of the tract dealt with. Rain water drains off quickly. Most of the inland nallas go dry from December onwards and water is confined to pools only. There are no small or medium dams or inland water courses. A few anicuts and tanks have been constructed in past with very small capacity to retain water. The ground water is mostly tapped by dug wells and bore-wells. The dug wells ranges in depth from 20 to 25 m. and their yield varies from 45000-50000 liter a day. Most of the wells go dry in March. Bore-wells range in depth from 50 m to 60 m on and their yield varies from 18000 to 25000 liters per day only. Some water also accumulates in riparian zones which is used by wild animals. In big villages, water supply schemes have been started by Zilla Parishad.

SECTION –6 : DISTRIBUTION OF AREA

1.6.1 The total forest area of the division including reserve, protected and unclassified forest is 188609.834 ha. which has been covered under this working plan. The distribution of forest area range-wise is illustrated in the following table.

TABLE-4

Range	Reserved Forest (ha)	Protected Forest (ha)	Unclassed Forest (ha)	Forest Area in W.P. (ha)
Ghot	54430.341	4444.080	4869.340	63743.761
Markhanda	7937.820	1586.220	3173.750	12697.790
Pedigudam	17367.437	--	4684.540	22051.977
Allapalli	18920.284	--	391.520	19311.804
Aheri	18709.503	7985.221	290.140	26984.864
Pirimili	63634.720	9517.759	--	73152.479
Total	181000.105	23533.290	13409.290	217942.685

1.6.2 The forest area of Allapalli Forest Division has been divided in to 1634 compartments for management purposes. Allapalli and Pedigudam ranges, together

formed a compact block of best quality forest and were under scientific management for last 100 years however due to establishment of Forest Development Corporation of Maharashtra Ltd. the areas of Pedigundam range has been leased out to FDCM for management and therefore such areas has been excluded from this working plan during the course of its revision.

1.6.3 Maps for Allapalli Forest Division are available on 4" = 1 mile while 16" = 1 mile and 1:5000 scale village maps of these areas are also available. The protected forest area has been shown on Karwai maps (corrected on Bandobast maps between 1935 to 1952 and on the basis of which the notification of protected forest was affected in the year 1955 and 1959.), Punarmojani maps and then Ekatrikaran maps. There has been some variation in the forest areas during each surveys and this anomaly requires investigation.

SECTION –7: STATE OF BOUNDARIES

1.7.1 The total length of the external boundaries of the forest areas of the division comes to 309.40 km. out of which 200.60 km. is covered by the natural feature i.e. rivers, whereas 108.80 km. is covered by 12 m. wide clear lines with numbered pillars at suitable intervals. Each pillar is surrounded by cairn of stones or earth. Each pillar is placed in the middle of the 12 m wide boundary line. All pillars are serially numbered in anti-clock wise direction. Separate series of numbers are adopted for boundary lines passing through different villages. The position and number of each pillar is shown on the 4" : 1 mile maps. The state of external boundary is extremely poor. The boundary between revenue villages and forest is either absent or in an extremely poor state. Encroachment in the vicinity of villages is not uncommon. Due to absence of proper demarcation on the ground, the forest officers find it difficult to identify the illegal encroachments without the help of the maps and surveyors.

1.7.2 The compartment boundaries at places are yet to be demarcated and the area where the demarcation has been done requires improvement and maintenance. Besides, the areas proposed to be Reserved Forests are not delineated from the Protected Forests as per procedure laid down in the Bombay Forest Manual. As the notification with respect to declaration of part of these areas as Reserved Forest has been issued and therefore, the first and foremost work is to demarcate Reserved and Protected Forests properly and correctly.

SECTION 8: LEGAL POSITION :

1.8.1 The present Allapalli range and the Elchil block of Pediguddam range formed in the past a part of the Aheri Jamindari areas and were actually purchased by the Government between 1873 and 1883 for a total sum of Rs. 1,60,000 and were included in the old Ghot range. After 1883 an area of 766 acres around the Allapalli depot was acquired by way of exchange from the Jamindars.

1.8.2 The areas of the Mirkal and Bhimram blocks purchased earlier i.e. in 1873 were declared reserved under Notification No. 917-G of 24th February 1897 and later in 1887 the rest of the areas purchased in 1883 were notified as reserved under Notification No.4308 of 24th August 1887. The remaining area from the Pediguddam range was declared reserved vide local administrations, Notification No.917 (1) dated 24th February 1879.

1.8.3 The forest of the Ghot range were declared as reserved forest in 1879 vide Notification No. 917 (g) and (i) dated 24th February 1879 under the provisions of Indian Forest Act (vii) of 1878. The original reserves constituted the Initial Ghot range which was divided into Ghot and Markhanda ranges vide letter No. 1812 / XXV – 1 / 108 dated 4th December 1908 from the Under Secretary to Chief Commissioner C.P.& Berar. The Notification No. and date of Notification is given in Appendix No. V.

1.8.4 Under the provision of the M.P. Abolition of Proprietary Rights Act, 1950 (I of 1951) the estate (Ex-Aheri Jamindari) vested in the State Government on March 31,1951. These forests were declared as Protected Forests under Section 29 of Indian Forest Act, 1927 and notified under Ex. M.P. Gazette Notification No. 3056-1216-XI, dated June, 4,1955. Thereafter proposal under section 4 of IFA, 1927 to constitute it into Reserved Forests was initiated vide Gazette Notification No.FLD-1268/II-3314-E, dated May 30,1959. In pursuance of the proposal, the settlement enquiry was conducted by the Forest Settlement Officer and he submitted report with his recommendation to declare the Protected Forests included in the proposal as Reserved Forests under section 20 of IFA, 1927. The Protected Forests, proposed for reservation, have been declared Reserved Forests by the Govt. of Maharashtra vide their Notification No. FLD/3685/9316/CR-42/F-3, dated May 5, 1992 under section 20 of IFA,1927.

1.8.5 Under provisions of Section 30 and 32 certain species were declared reserved vide Notification No. FLD-4657/193064-F, dated 19/12/1959. The details of tree species notified as reserved are given in Appendix No. VI.

SECTION 9: RIGHTS AND CONCESSIONS

(A) PROTECTED FORESTS:

1.9.1 Before the abolition of the Proprietary Rights, all lands belonged to the proprietors. A village administration paper called Wazib-ul-arz was prepared at every settlement and plots of land were separately recorded showing the Khasara number and area which was set apart for a particular purpose., Section 202 of the Central Province Land Revenue Act, 1917, provided penalty for violation of any of the customs. Under the provisions of the Madhya Pradesh Abolition of Proprietary Rights (Estate, Mahala, Alienated Lands) Act, 1950 (I of 1951) all the community and other waste lands became the property of the government while occupied lands, continued to be private. In order to have distinction between the rights existing on the new Government waste land and on the other lands, a provision was made in the new Madhya Pradesh Land Revenue Code, 1957, prescribing the preparation of a Nistar Patrak and Wazib-ul-arz for every village. The nistar Patrak deals exclusively with the management and use of the Government Land while the Wazib-ul-arz deals with community and customs of user over private lands. The typed copy of the vazibul-ul-urz has been reproduced in the Appendix No VII.

1.9.2 The nistar enquiry was conducted during the period 1954-56 and all the villages included in the schemes were covered under it. The nistar officers formed nistar zones and assigned villages to one or the other of these zones surplus villages were clubbed with deficit villages, whereas the self sufficient villages were treated as individuals zones. Villages assigned to a particular zone were to exercise their nistar rights within that zone only. After notification of reservation in 1992, rights and concessions exist in the Protected Forests set aside for a village or group of villages. Details of R.F. and P.F. by villages has been given in **Appendix No VIII.**

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

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

1.9.4 However, the part of the Protected Forests, included in the proposal for reservation, have now been notified as Reserved Forests vide Notification No. FLD/3685/9316/CR-42/F-3, dated May 5, 1992 under Section 20 of IFA, 1927. The rights and concessions over these areas were not recognised by the Forest Settlement Officer. The various notifications issued by the State Government are listed in **Appendix No. V**. The Govt. of Maharashtra has extended the provisions of Bombay Forest Manual III to whole of Maharashtra State. Nistar rates are fixed by the Territorial DCF in consultation with the District Collector. There are 24 erstwhile forest villages in Allapalli Forest Division and these forest villages were permitted to have free grants subject to certain regulations. These forest villages were declared as Revenue Villages vide Govt. of Maharashtra Resolution No FLD-4267-I-Y- dated 2/5/1967 and the Govt. of Maharashtra extended their erstwhile facilities to these newly constituted revenue villages. The free grants are specified in Section 147 of Bombay Forest Manual Volume-III.

(B) GRAZING :

1.9.5 The grazing settlement has not been done so far in this division and so the number of grazing units has not been formed. The grazing is free of cost to all cattle of aboriginal tribals.

The concessions for villagers other than tribal is given as follows:

- i) For villagers having land holding less than 20 acre, 4 cattle units are free for grazing.
- ii) For villagers having land holding more than 20 acre, 8 cattle units are free for grazing. A family having more than the above cattle unit will have to take the grazing permit at the rates decided by the Conservator of Forests, South Chandrapur Circle Chandrapur.

1.9.6 The latest rates sanctioned by the Conservator of Forests, South Chandrapur Circle vide letter No. G-2(3)12648, dated November 16, 1977 are as follows.:

- | | |
|-----------------------------------------------------------------|----------------|
| a) He and she buffalo | Rs. 2/- each. |
| b) Cow and bullock | Rs. 1/- each. |
| c) Calf of buffalo more than 6 months but less than 3 years. | Rs. 1/- each. |
| d) Calf of cow of age more than 6 months but less than 3 years. | Rs. 0.50 each. |

1.9.7 As per directives of the Government contained in Land Reforms Department, Ex-Madhya Pradesh Memorandum No. 1290-1277-XXVIII, dated 4th September, 1953 sheep and goats are not allowed to graze in forests meant for production of big timber or in the forest area where villagers generally exercise their

nistar rights. However it has been modified by the subsequent notification that sheep are also allowed to graze in the forest on conditional basis free of cost on the land specified by the DCF Territorial as provided in para 115 of BFM Volume III.

OCCUPATIONAL NISTARS:

1.9.8 In nistar patraks, occupational rights of the Kumbhars, Chambaras, Gonds, Mahars, Pardhan and Lohar communities have been recorded and recognised in several villages and entries are found in the Wazib-ul-arz of each village.

1.9.9 The nistar is required by the villagers for bonafied domestic and agricultural purposes. Forest nistar generally includes timber of certain species and sizes for agricultural implements; houses and cattle sheds; firewood; bamboo; thatching and fodder grasses; fencing material; bark; fiber, minor minerals and paidawar i.e. edible fruits, flowers and roots; honey wax etc. The rights and concessions are governed as per the provisions made in the nistar patrak for each village, according to which agriculturists and agricultural labourers are entitled to the forest produce for their nistar either free of charge or at concessional rates fixed by the Collector. According to the provisions of Section 161 of Maharashtra Land Revenue Code 1966 the Collector has to prepare the nistar in the village record. The Protected Forest (Vidharbha) Rules 1958 provides for some important regulations which are as follows:

- i) The Divisional Forest Officer subject to some restrictions which he may by special or general order impose in that behalf, every person holding land in the village, the village artisan and agriculturer labourer shall be entitled to collect minor forest produce (other than hirda, lac, rosa grass, tendu leaves and gum) and minor mineral viz grass, moha and teak, bukkal, edible fruits and flowers, sand, clay and stones from the protected forest for the village.
- ii) Nothing in this rule shall debar a person from collecting hirda, lac, rosa grass, tendu leaves and gum and produce of mahua trees found in this own land in the Protected Forest.
- iii) No person shall save as provided in Rule 7 has a right to collect any lac, hirda, tendu leaves, rosa grass and gum which are of commercial value and shall be auctioned by the DCF/DFO. According to the Section 31 of the aforesaid rule 1958, the DCF/DFO in consultation with the Collector will set aside the portion of Protection Forest containing forest produce for the exercise of Nistar in a village or villages adjoining to such Protected Forest and according to Section 164 of Maharashtra Land Revenue Code 1966, the Collector can assign such nistar rights in other villages also if these are insufficient in one area assigned to a village.
- iv) The Govt. of Maharashtra, in pursuance of 73rd Amendment to the Constitution of India has passed an Act by which right to collect minor forest produce in the schedule area lies with the Gram Panchayat. The list of 33 minor forest produce as given in the Maharashtra Act No. 45 of 1997 has been given in the **Appendix No. IX.**

1.9.10 The then Government of Madhya Pradesh, under whose control these forests vested, issued detailed instructions regarding administration of nistar supply of timber etc. to villages (new system) vide Government letter No. 2396/2389-XXVII, dated October 16, 1956. These instructions which listed details about areas from where nistar was to be made available, extent of nistar to different categories, management of nistar and other forests; extraction and distribution of nistar material by the Gram Panchayats; Gram Sabhas or Nistar Panchayats, envisaged that forests would be managed on scientific basis by the Forest Department and communicated to the Village bodies which

would then regulate the supply of nistar as per rules. The quantum of nistar was to be regulated as per the Government order No.336/1606-XXVIII, dated June 19, 1953, which listed the following categories of forest produce and the nistar over the same.

- A. GRAZING:**
- (a) **CULTIVATORS** : Two Plough cattle per plough plus four other including one she buffalo.
- (b) **AGRICULTURALISTS** : Four cattle and four sheep or goats/
house hold, artisans, labourers etc.
- B. TIMBER :**
- AGRICULTURAL IMPLEMENTS:** Eight poles upto 18" girth and timber actually needed for implements.
- MACHAN** : Four poles upto 45 cm girth at every Third year.
- REPAIRS TO HOUSES:** Up to ten poles of satkatha (Misc. Tree species) upto 60 cm. girth, if needed.
- FOR NEW CONSTRUCTION:** As required but on payment and also subject to availability.
- C. BAMBOO :**
- a) **AGRICULTURALIST** 50 bamboos.
(for repairs)
- b) **NON - AGRICULTURALIST** 25 bamboos (subject to availability)
- D GRASS FOR THATCHING:**
- (a) **AGRICULTURALIST:** Four cartloads.
- (b) **NON-AGRICULTURALIST**
- E. MISCELLANEOUS :**
- i) **FUEL** One hundred headloads or five cartloads.
- ii) **THORNS AND BRUSH WOOD :**
- a) **AGRICULTURALIST** : Five cartloads.
- b) **NON-AGRICULTURALIST** : Two cartloads.
- iii) **LEAVES (excluding tendu)** : No limit
BAKKAL
ROOTS
EDIBLE : No limit
PALAS : One headload.
- (vi) **FRUITS & FLOWERS** : No limit
- (vii) **KARAI AND KARKA BAMBOOS:**
- a) **AGRICULTURALIST** : Two cartload.
- b) **NON AGRICULTURALIST** : One cartload.

1.9.11 The Govt. of Maharashtra vide their Resolution No. आबापू-१०९९ / प्र.क.१२८ / एफ-९ दिनांक ३० / ९ / ०३ has provided for supply of 1500 bamboo pieces to each burad family. The rates of each piece of bamboo under nistar shall be fixed by Addl. .PCCF (Production & Management) M.S. Nagpur.

1.9.12 In nistar patrak of each village khasara numbers set aside for nistar are recorded. However, the details regarding quantum of nistar during which it is to be allowed, payment if any, to be made etc. are not given in the nistar patraks in general. Govt. of Maharashtra vide Revenue and Forest Department Resolution No. FCT-1564/2230-Y, Sachivalaya, Bomby-32 dated January 5, 1968, issued a detailed

guideline for Nistar facilities. The details of the Govt. of Maharashtra Resolution dated January 15, 1968, has been reproduced in **Appendix No.X.**

1.9.13 Nistar forest areas were dealt very badly in the past and therefore, the crop condition is very bad especially near the human habitation. These forests suffered considerably due to over harvesting in the past, excess grazing and repeated fires. If the appropriate measures for improvement of the crop is not taken these forests will no longer be able to meet the nistar requirements of the people.

SECTION-10 : LOCAL POPULATION:

1.10.1 The local population consist of aborigines who are derived from the general Dravidian race of Gonds. The local population mostly consists of Madiyas and Gonds. Madiyas use dialect which is influenced by Telegu language. Their diet consist of rice gruel and kodo and kutki. They are used to consume moha and toddy liquor. They also eat fish and meat of wild animals. The state government has taken up special measures to improve the conditions and life style of local population by providing them better health and education facilities.

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CHAPTER - 2

FOREST



CHAPTER-2 FOREST

SECTION – 1 : COMPOSITION AND CONDITION OF THE CROP.

2.1.1. The forest of Allapalli Division dealt under this plan comes under two subgroups 3B-South Indian Moist Deciduous Forest and sub group 5A- Southern Tropical Dry deciduous Forests as per the revised classification of Forest types of India by H.G.Champion and S.K.Seth. Within these main sub types, considerable local variation occur depending mainly upon edaphic and topographic factors. The altitude does not vary considerably and so, it does not influence the distribution of various species on the basis of variations in type and depth of the soil, the composition and quality of the crop vary and therefore the forests of Allapalli Forest Division can be classified as follows.

Forest types:-

- i) Sub Group-3B - South Indian Moist Deciduous Forests.
- ii) Sub Group-5A- Southern Tropical Dry Deciduous Forests

Climax Types

- i) 3B/C1 Moist Teak Bearing Forest
- ii) 3B/C1b Moist Teak Forests
- iii) 3B/C2 Southern Moist Mixed Deciduous Forests
- iv) 5A/C1b Dry Teak Forests
- v) 5A/C3 Southern Dry Mixed Deciduous Forests
- vi) 5/1S1 Dry Tropical Riverian Forest

2.1.2 In Allapalli Range, forests in general are composed of Teak forests in high proportion. Understorey is well defined and shrubby undergrowth, especially in plain areas is quite dense. Bamboo occurs in very few areas and are absent where drainage is bad. The grasses form a thick ground cover wherever the canopy was opened in the past and especially in areas where there are no bamboos. The growth and vigour of grass is phenomenal. In drier locality teak is replaced by Surya while in moist area, it is associated with Kalamb.

2.1.3 In general, the quality of the forest is II to III which improves on loamy well drained soil but degenerates into quality IVa in clayey and ill drained localities. Along the lower slopes and in the plains, the density is good but the forests are rather open on the upper steep hill slopes and plateaus. The natural regeneration of the tree species is mostly deficient especially in case of teak. Crop in general is healthy and vigorous with very small defective stock.

2.1.4 For the purpose of description, Allapalli Range forests are distinguished into the following local sub-types in the types as per Champion and Seth's revised classification of forest types.

Champion & Seth's		Local Sub-type	
Classification			
Group 3		Tropical Moist Deciduous Forests	--
Sub-Group 3B		South Indian Moist Deciduous Forests	--
Climax type		--	--
(1)	3B/C1	Moist Teak bearing forest	A. Teak Forest (a) Plain (b) Bhimram hills
	3B/C1b	Moist Teak Forest	
(2)	3B/C2	Southern Moist mixed Deciduous Forest	B. Mixed forest

A(A) PLAINS :

GENERAL DESCRIPTION :

2.1.5 The flat or very gently undulating areas of the Allapalli range to the north, west and south of Bhimaram hills and also in the narrow strip to the east of these hills, appears this local sub-type. It is characterized by clayey nature of the soil, abundance of grass and weeds and high percentage of teak which forms a pure crop in small pockets. The percentage attained by teak, varies between 50 and 70 %. Ain (*Terminalia tomentosa*) and Kalam (*Mitragyna parvifolia*) are the characteristic associates of teak.

2.1.6 The high quality of teak is attained in this sub-type in Allapalli range where-in site quality is as high as All India II / III. Density of the growing stock is usually 0.8 to 1.00, especially in the areas free from fires. Bamboos are abundant and grow tall. The rock here is metamorphic, mainly granite and gneiss with a trace of intrusion of ligneous rock.

2.1.7 The deep alluvial soil and comparatively higher water table in these areas afford optimum conditions for the luxuriant growth of teak and other species in natural conditions. These soils are, however, prone to water logging on clear felling and thus afford difficulty in artificial regeneration. Repeated burning of these soils cause elimination of silicate gel, leading to rapid laterisation. Repeated burning of grasses, makes the soil rich in potassium and phosphorus but poor in nitrogen. These soils are basaltic in origin in the upper layers and sandy loam is present below clay loam and therefore the growth of the trees is less prominent and picks up after few years when the roots reach strata of sandy loam. The average ph of soil is near neutral.

2.1.8 Teak is the predominant timber species found in this area and is associated with many species of varied importance and is usually associated with metamorphic calcareous, crystalline, phyllite, schists and granite gneiss rocks and deccan trap. It is associated with a rock of volcanic origin as these are rich in calcium. Teak is absent from sedimentary rock due to leaching of calcium. The chemical property of the soil is very important for the growth of the teak rather than a structural geology of the soil. Teak is usually absent in sand stone belt and trap-gondwana boundary line is a perfect match between teak and non-teak demarcation. Teak is present in such alluvium deposits which are rich in lime. The trap in this region contain 46.4 % felspar It is found growing best in the ph between 6.5 to 7.5 where subsoil acidity is not a dominating factor for the presence of teak. Teak is a calcium accommodating plant. Teak is found in soils with high moisture retention capacity. In the swampy condition, teak is replaced by *Lagerstroemia parviflora* and in lateritic soil by *Xylia xylocarpa*.

REPRODUCTION :

2.1.9 Reproduction of teak and other species is very sparse over most of the hills especially in the western side as a result of the thick carpet of *Petalidium sp.* and dense bamboo. Conditions are rather better in the north and east owing possibly to the fact that *Petalidium sp.* has yet to spread in this area sufficiently deep, and some regeneration has come up as a result of past openings.

2.1.10 The eastern slopes are generally very steep and dense bamboos extend almost to the foot of the hill. Here in some places the crop may be said to be of scattered teak and a few miscellaneous species with no reproduction. This is due to steep terrain and shallow soil. The growth of bamboos is remarkable in the valleys where the soil is rich. There is an addition of nearly 10 to 15 new culms to each clump annually. The bamboos on the slope with shallow soil are thin and of inferior quality. and are marked by switchy growth. There is a congestion in clump due to bad soil as rhizome is unable to expand exterior and culms grow in upward direction. The recruitments in such areas are very poor.

B. MIXED FOREST :

GENERAL DESCRIPTION :

2.1.11 The mixed forest local type is mostly confined to the periphery of the Allapalli range and is limited to the flatter areas. Teak appearing in this type is unhealthy in appearance and slow growing. The soil is clayey with an admixture of sand and forms a hard crust. It is badly drained and is unsuitable to good forest growth. Density and quality is below All India Quality IV. The density is less and soil quality is IVa (Maharashtra) This type of forest is present in areas unsuitable for growth of Teak due to absence of loam or due to defective drainage. The species usually associated here are *Gardenia lucida*, *Gardenia turgida*. Bija is also found associated, but less in number in patches with loam and with defective drainage.

FLORISTICS :

2.1.12 I – TOP CANOPY

Ain (*Terminalia tomentosa*), Tendu (*Diospyros melanoxylon*), Rohan (*Soymida febrifuga*), Aowla (*Emblica officinalis*), Bhirra (*Chloroxylon swietenia*), Lendia (*Lagerstroemia parviflora*), Dhaora (*Anogeissus latifolia*), Mowai (*Lannea*

coromandelica), Moha (*Madhuca longifolia*), Salai (*Boswellia serrata*), Kusum (*Schleichera trijuga*), Mokha (*Schrebera swietenoides*), Palang (*Heterophragma roxburghii*), Anjan (*Hardwickia binata*).

2.1.13 II – SECOND STOREY :

Achar (*Buchanania lanzan*), Khair (*Acacia catechu*), Gondal (*Cochlospermum gossypium*), Palas (*Butea frondosa*), Garari (*Cleistanthus collinus*), Ghoti (*Zizyphus jujuba*), Amti (*Bauhinia malabarica*) Gardenia spp., Dekamali (*Gardenia gummifera*).

2.1.14 IIa – BAMBOO

Bans (*Dendrocalamus strictus*)

2.1.15 III – SHRUBS

Dhawai (*Woodfordia floribunda*), Neel (*Indigofera arborea*), Phoenix *acaulis*

2.1.16 IVa – HERBS

Chirchira (*Achyranthes aspera*).

2.1.17 IVb – GRASSES

Grasses are very abundant in open areas. Jalarm (*Sorghum halepense*) and *Imperata sp.* are found only in the south and west of Allapalli range in appreciable quantities. Elephanta grass (*Pennisetum purpureum*) is also present in moist areas.

2.1.18 V – CLIMBERS

Ramdatun (*Smilax zeylanica*), Malkamni (*Celastrus paniculata*), Palasbel (*Butea superba*), Ironi (*Zizyphus oenoplia*),

NATURAL REPRODUCTION OF TEAK

2.1.19 No sure method has, however, been devised by which natural reproduction of teak could be induced in the area where it is desired. The following factors are usually considered to be adverse for the establishment of teak reproduction.

- (a) Too dense an underwood and undergrowth usually of bamboo or garari (*Cleistanthus collinus*) and *Petalidium*,
- (b) Insufficient high shade which does not keep down the amount of undergrowth.
- (c) Clayey soils and poor drainage which encourage jalaram (*Sorghum halepense*) and *Imperata* grass.
- (d) Repeated burning of the area.

2.1.20 *Petalidium* is tolerant of high shade and forms a dense mass of undergrowth particularly where drainage is good near nalla. Efforts to eradicate *Petalidium* have proved to be unsuccessful in the past.

2.1.21 Teak regeneration is usually noticed in the areas not covered by either bamboos or *Petalidium*. Thinnings in some parts of Plains Felling Series have been heavy in the past and have consequently induced dense growth of grass. This has inhibited teak reproduction. The die-back phenomenon has also been noticed at places. After initial years of less growth, the teak suddenly picks up the growth after three to four years. There is no problem with the quality of the seeds and each fruit has enough seeds to germinate.

2.1.22 Recruitment has been generally poor and production remains seriously lacking in the Bhimaram hills. In the *Petalidium* and bamboo infested areas no regeneration has come up. On the eastern slopes, however, the regeneration has appeared in patches as a result of past heavy openings in the non-bamboo and *Petalidium* areas.

NATURAL REPRODUCTION OF OTHER SPECIES

2.1.23 Over the greater part of the tract, reproduction of the more valuable species is sparse but the reproduction of surya (*Xylia xylocarpa*) is abundant on drier soil. Other species having abundant reproduction are, garari (*Cleistanthus collinus*), tendu (*Diospyros ebenum*), lendia (*Lagerstroemia parviflora*), bharanga (*Kydia calycina*). Haldu and semal reproduction is observed in the plantations to some extent.

2.1.24 In Markhanda Range occurrence of dry teak forest is confined to the banks and basin of the river Wainganga. In Ghot Range this type occurs along the hill slopes from the north-east of Ghot. Isolated patches of this type are seen along the hill slopes and plains to the south and south-west of Ghot. Depending upon the stability of soil and biotic influence, teak is seen gradually extending further into the mixed forests all over the tract.

2.1.25 The tract over which this type occurs has a topography varying from plain to undulating ground and hills of low medium height. Altitude ranges from 200 m. to 580 m. above M.S.L. Altitude ranges from place to place.

2.1.26 The site supports mostly quality III teak with 0.7 to 0.8 density. Main associates of teak in the top canopy are-

Ain (*Terminalia tomentosa*), Dhaora (*Anogeissus latifolia*), Mowai (*Lannea coromandelica*), Tendu (*Diospyros melanoxylon*), lendia (*Lagerstroemia parviflora*), bija (*Pterocarpus marsupium*), haldu (*Adina cordifolia*), semal (*Salmalia malabarica*), shisham (*Dalbergia latifolia*), karam (*Mitragyna parvifolia*), khair (*Acacia catechu*), Bhirra (*Chloroxylon swietenia*), hiwar (*Acacia leucophloea*) and mahuwa (*Madhuca indica*). Though the middle storey is not usually distinguishable, the following are occasionally seen as codominated species, garari (*Cleistanthus collinus*), aonla (*Emblica officinalis*), palas (*Butea monosperma*), dhaman (*Grewia tiliaefolia*), apta (*Bauhinia racemosa*), ghoti (*Zizyphus xylopyra*), medsing (*Dolichandrone falcata*), and bel (*Aegle marmelos*).

2.1.27 Regeneration of teak and other important species is scanty. However in patches advance growth of teak is noticed.

2.1.28 Undergrowth is practically wanting or sparse. Wherever present, the following shrubs constitute the same dikamali (*Gardenia lucida*), ber (*Zizyphus jujuba*), kuda (*Holarrhena antidysenterica*), neel (*Indigofera pulchella*). Weeds are few. Bulk of the ground floor wherever weeds exist is covered by tarota (*Cassia tora*) and kutra

(*Achyranthes aspera*). Grasses met with are bhurbhushi (*Eragrostis tenella*), kushal (*Heteropogon contortus*) and mushan (*Iseilma laxum*). Common woody climbers are palasbel (*Butea superba*), waghatai (*Capparis sp.*), eroni (*Zizyphus oenoplea*), kukranj (*Calycopteris floribunda*) and lal-vel (*Ventilago calyculata*).

2.1.29 Bamboo :- Few clumps of katang bamboos (*Bambusa arundinacea*) are seen on the fringes of nallas to the south-east of Markhanda. These bamboos are having flowering cycle of sixty years and are yet to flower.

HILL TEAK FORESTS OF GHOT RANGE

2.1.30 Low hill forests of Ghot viz. the Jamgiri block and the hill forests extending from Jambia hill to the South-west of Ghot to the hill ranges to the north-west in anti clockwise direction have teak in patches. The soil in plains in Jamgiri block is black clay and supports poor quality (IVa) stands. Teak forms about 40 to 60 per cent of the growing stock with 0.6 to 0.7 density. Teak is mostly branchy malformed and unsound. Regeneration is scanty. Teak along the hill slopes attains quality III with fairly well grown teak though large number of teak trees are unsound. Teak forms about 10 to 20 per cent of the growing stock and is usually classified as teak bearing forests. density of the stands varies between 0.5 to 0.7 Floristic composition of these forests is as under.

2.1.31 The top canopy consists of teak (*Tectona grandis*), shisham, bija, semal, karanj, dhoban, mowai, khair and mokha.

2.1.32 Second storey is usually distinguishable and consists of tendu, kudursi, hiwar, bel, koshimb, medshingh, palas, ghot and apta. Babmoos are confined to hill slopes and nalla banks. Understorey consists of gilbilli, dikamali, bharati and occasional bushes of lokhandi.

2.1.33 Weeds of common occurrence are tarota and menduli. Grasses, common in the tract are bhurbhushi and chir grass. Climbers met with are ironi, ramdaton and kukadranj. Regeneration of teak is scanty.

2.1.34 According to the classification of the Forest Types of India by Champion and Seth, the forest of Perimilli and Aheri tract fall under the sub group "5-A-Southern Tropical Dry Deciduous Forests"

It is further classified into—

- A) "5A / C1b : Dry teak forests"
- B) "5A / C3: Southern dry mixed deciduous forests"

2.1.35 The variation in the composition distribution and stocking of the Pirimili and Aheri forests is not very significant, as practically identical climatic and topographical condition prevail in the tract dealt with. The edaphic and biotic factors are seen to exert considerable influence on these forests. The forest in the near vicinity of densely populated villages viz. Gurupalli, Uderay, Bidri, Kondoli, Pirimili etc. have been virtually reduced to scrub type and even grassy blanks. The types as distinguished above and their occurrence in relation to geological formation are described below.

(A) 5A / C1b: Dry Teak Forests.

This type of forest occurs along hill slopes of Pedigudam, Kondewahi, Paima, Gurjka, Medpalli, Mirkal, Karram Villages and in some isolated patches in between.

2.1.36 In Aheri Range, it occurs near villages Mosam and Chandra, Underlying geological formation is of Archaean type gneiss and granites. The soil is coarse, stony, infertile, sandy and moderately deep, with less water holding capacity.

2.1.37 Site Quality of the crop varies from IVa to III and at places it is II depending upon the depth and fertility of the soil. Natural regeneration of teak is poor and scanty.

2.1.38 Regeneration of other species is generally satisfactory. Density of the crop varies from 0.4 to 0.6 (and at places upto 0.8). Crop is mainly middle aged with scattered, mature, malformed or overmature trees.

2.1.39 FLORISTIC COMPOSITION :-

- i) Teak (*Tectona grandis*), Dhaora (*Anogeissus latifolia*), Ain (*Terminalla alata*), Bija (*Pterocarpus marsupium*),
- ii) Tendu (*Diospyros melanoxylon*), Salai (*Boswellia serrata*), Khair (*Acacia catechu*).
- iiia) Bamboo (*Dendrocalumus strictus*),
- iiib) Jilbil (*Woodforida fruticosa*), Dikamali (*Gardenia resinifera*), Bharati (*Gymnosporia montana*).
- iva) Tarota (*Cassia tora*), Morrphalli (*Helicteres isora*).
- ivb) Mushan (*Iseilma laxum*), Kusal (*Heteropogon contortus*).
- v) Palasbel (*Butea superba*), Ironi (*Zizyphus oenoplia*). Chilati (*Mimosa hamata*).

(B) 5A / C3 : SOUTHERN DRY MIXED DECIDUOUS FORESTS.

2.1.40 This type occurs as under :-

- a) Ain-Dhaora type
- b) Ain-Garari type
- c) Rohan-bhirra-khair type.

(a) Ain-Dhaora type :- This sub-type is chiefly noticed in the bulk of the area of Pirmili Range and in Aheri(P) range. This sub-type occurs over both the geological formations noticed in the area. General quality of the crop varies from IVa to III but in fertile locality like that of Karram, Pedigundam, Mirkal, Tadguda, Gattepalli etc. quality II crop is noticed at place. In places where the patches of shallow murumy soil occur, the crop deteriorates to IVb quality . Density varies from 0.4 to 0.6 in inferior quality areas

while that in quality III areas it is 0.5 to 0.8. The crop is generally young to middle aged with scattered mature trees. These forest have a dense bamboo under growth.

FLORISTIC COMPOSITION:-

- 2.1.41**
- I) Ain (*Terminalia alata*), Dhaora (*Anogeissus latifolia*), Lendia (*Lagerstroemia parviflora*), Bija (*Pterocarpus marsupium*), Semal (*Bombax ceiba*), Mahua (*Madhuca longifolia*), Tendu (*Dispyros melanoxylon*), Moyen (*Lannea coromandelica*), Karram (*Mitragyna parvifolia*) etc.
 - II) Achar (*Buchanania lanzan*), Palas (*Butea monosperma*), Aonla (*Phyllanthus emblica*), Salai (*Boswellia serrata*), Bhirra (*Chloroxylon swietenia*).
 - III) Jilbil (*Woodfordia fruticosa*), Dikamali (*Gardenia resiferaa*). Bharati (*Gymnosporia montana*).
 - IV)
 - a) Tarota (*Cassia tora*), Marorphalli (*Helicteres isora*).
 - b) .Mushan (*Iseilma laxum*), Kusal (*Heteropogon contortus*), Bhurbhusi (*Eragrostis tenella*).
 - c) Palasbel (*Butea superba*), Ironi (*Zizyphus oenoplia*), Chilati (*Mimosa hamata*).

a) Ain-Garari type :-

2.1.42 This sub-type is generally seen over more clayey soils and with poor drainage and occurs in part of Tatigundam, Pandewahi, Burgi, Abanpallia, Udera, Gurupalli, Yarminar, Kusumaplli etc. Quality ranges from IVa to III. At places it is IVb also. Density varies from 0.4 to 0.6 in IVb areas and improves to 0.6 to 0.8 in quality IVa and III forests. The crop is young to middle aged with scattered mature trees. Garadi tends to become hollow with age.

2.1.43 Main difference in Ain-Dhaora sub-type and Ain-garari sub-type is that the later occurs on heavier soils with poor surface and sub-soil drainage and occasionally in water logged areas. Dense understorey of garari gives it a characteristically different appearance.

FLORISTIC COMPOSITION :-

- 2.1.44**
- I) Ain (*Terminalia alata*), Tendu (*Diospyros melanoxylon*), Dhaora (*Anogeissus latifolia*), Mowai (*Lannea coromandelica*), Maha (*Madhuca longifolia*), Karram (*Mitragyna parvifolia*) etc.
 - II) Garari (*Cleistanthus collinus*), Achar (*Buchanania lanzan*), Aonla (*Phyllanthus emblica*), Safed Phetra (*Cerescoides turgida*), Lokhandi (*Ixora arburea*) etc.
 - III) Kuda (*Holarrhena pubescens*), Jilbil (*Woodfordia fruticosa*),
 - IV)
 - a) Tarota (*Cassia tora*), Marorphalli (*Helicteres isora*).

b) Mushan (*Iseilma laxum*), Kusal (*Heteropogon contortus*), Bhurbhusi (*Eragrostis tenella*).

V) Palasbel (*Butea superba*), Ironi (*Zizyphus oenoplia*), Kukranji (*Calycopteris floribunda*).

2.1.45 Rohan-Bhirra-Khair type.

This sub-type occurs on eroded lands and degraded soils of forests of Gurupalli, Mirkal, Jawali, aldandi, Wedampalli, Mungutta, Karrampalli, Karam and Mosam villages. These forests are generally understocked. The crop is mostly young to middle aged. Bhirra is usually associated with Goghal and Rohan is associated with lime rich water logged areas or on loamy areas, which have been under cultivation.

FLORISTIC COMPOSITION :-

2.1.46 I) Rohan (*Symida febrifuga*), Bhirra (*Chloroxylon swietenia*), Khair (*Acacia catechu*).

II) Generally absent.

III) Bharati (*Maytenus emerginata*).

IVa) Tarota (*Cassia tora*)

IVb) Kusal (*Heteropogon contortus*), Bhurbhusi (*Eragrostis tenella*)

V) Palasbel (*Butea superba*)- sparse.

SECTION-2:- INJURIES TO WHICH THE CROP IS LIABLE.

2.2.1 ILLICIT FELLING :-

The damage is done to these forests due to illicit felling and removal of valuable trees are frequently seen around densely populated villages and forest bordering the (densely) populated tracts. The offences of the illicit cutting are on the increase since last ten years. The extent of illicit cutting in Allapalli Forest Division in the last ten years given in the **Appendix No. XI**.

2.2.2 FIRES :-

Periodic fires in the summer are usually set to the forests by the villagers for numerous reasons viz. I) For collection of Mahua fruits, flowers and Achar fruits etc. , ii) To get new flush of tendu leaves after coppicing the same, iii) to get succulent shoots of grass after the first showers of rain. These fires are ground fires and do not result into outright death of big trees but the base of the trees get scratched resulting into hollowness and fire scorching in the bole. Damage to the young regeneration is much severe. Repeated fires reduce the fertility of the soil, by, destroying the humus. Top soil is exposed and lost due to erosive processes. Fires taking place by the end of the winter and at the beginning of the summer are not severe. Late fires in coupes close to grazing are vary damaging. The damage is serious when the freshly felled material is lying in the coupe and when it is regenerated. The young regeneration suffers a lot and the crop like teak gets killed in the form of die-back. The corky bark of full grown teak tree prevents damage to the timber due to fire. The number of fires which occurred in Allapalli Forest Division in the last ten years has been given in the **Appendix No.XII**.

2.2.3 ENCROACHMENTS:

Encroachments are quite common in Allapalli Forest Division mostly in forest areas which are adjacent to villages and taluka places especially for agriculture. The encroachments are common on protected forest areas. The rangewise details of forest areas under encroachment is illustrated in the following table:-

TABLE-5
RANGEWISE FOREST AREAS UNDER ENCROACHMENT
IN ALLAPALLI FOREST DIVISION

Sr.No.	Name of the range	No. of Cases	Area under encroachment in ha.		
			R.F.	P.F.	Unclassed
1	2	3	4	5	7
1	Ghot	714	600.28	615.30	00
2	Markhanda	59	0.60	5.20	56.40
3	Pedigundam	235	121.40	0.00	138.67
4	Allapalli	70	78.28	0.00	0.00
5	Pirmili	420	0.00	1212.25	.0.00
6	Aheri	432	75.52	626.54	0.00
	Total	1930	880.08	2459.29	195.07

2.2.4 The large scale encroachment is seen in Ghot, Pirmili and Aheri ranges. The extent of land under encroachment is 3534.44 ha. in Allapalli Forest Division as confirmed by Dy.Conservator of Forests, Allapalli Forest Division, Allapalli vide his letter No. कक्षा-४/सर्वे/२८७० दिनांक २९-१-२००३. The Government of India has issued the directions to all the State Governments including State of Maharashtra to remove all the encroachments on forest lands but the State Government has granted stay on the process of eviction of encroachments on forest lands for Adivasis, Scheduled Castes, O.B.C. and family below poverty line till further orders. The State Government has granted the power under section 53, 53A and 54 of the Maharashtra Land Revenue Code 1966 to Forest Officers above the rank of Range Forest Officer to summarily evict the encroachments on the forest land. The proposals to regularize the encroachments on forest lands for the period 1972 to 1978 is pending with the Government of India. As per State Governments own policy and also as per Government of India's directives all encroachment after 1st April 1978 respectively to be removed. The Hon'ble Supreme Court in year 1995, further directed the State Government to reinvestigate the cases of encroachment by Adivasis, subject to prevailing Govt. order (Prabhu Judgement). The details of encroachment of forest areas are given in **Appendix No.....**

2.2.5 Grazing by cattle:

This is another damaging element destroying young regeneration, plantations and soil texture by trampling. It is common near the villages. Unauthorized grazing is common. Number of cattle grazing on this forest are exceeding 1.30 lakhs.

The over and illicit grazing have become a great threat to the forest here. The maximum depletion occurs when the forests are near to a large habitation. The tribals are in the habit of keeping a large herds of cattle. They are taken regularly to the forests for grazing. Since they do not milk the cows, they can hardly afford to stall feed them. Grasses soon dry out by December and are lost in fire. This reduces the carrying capacity of the forests considerably. There is a large degree of unauthorized grazing. After the depletion of the grasses, grazier starts lopping green foliage, especially of ain (*Terminalia tomentosa*), Sissoo (*Dalbergia sissoo*), Apta (*Bauhinia recemosa*), Kuhu (*Terminalia arjuna*) in the month of February when new foliage arrives. There is no practice of stall feeding of grasses. The lopping of trees like ain, kadaka, Ficus sp. and apta has led to a degradation of the forests. The seedling and sapling crop of these fodder tree species have been almost eliminated from certain areas. Continuous and heavy grazing not only prevents regeneration of tree species, but also the young regeneration obtained during the period of closure, is lost soon after the area is opened to grazing. In areas with clayey soils, the trampling by cattle results in hardening of soil and a reduction in the soil aeration. In sandy soils, heavy grazing results in accelerated erosion and denudation. The grazing on undulating lands loosen the soil, which results in the soil erosion. The problem of migration of cattle is still severe. Practice of providing tags on the ears of cattle has not proved to be effective. According to the directives issued by the Government contained in the land reforms Department Ex-Madhya Pradesh memorandum No. 1290-1227-XXVIII dated 4th September 1953, sheep and goats are not allowed to graze in forests meant for production of timber or in the forest areas where villagers generally exercise their nistar rights. But by a subsequent modification, the sheep grazing has been permitted in the specified area by the State Government free of cost and it is not uncommon to see goats grazing in timber forests. The goat and sheep grazing is prohibited because of their close level grazing in which the seedling or grass rhizome is uprooted.

2.2.6 Wild animals:

Chital damages the bark of young growth by rubbing their antlers. Chital, Sambhar and Nilgai browse seedling and coppice shoots. Bisons are more destructive, as they break sapling and poles in order to reach the first foliage. Some damage is caused by wild boar by uprooting young seedling and bamboo clumps. The plantation of bamboo is severely affected by wild boar. Even covering of bamboo rhizome by stones is not effective. Putting neem cake in the soil has acted as repellent to these wild boars. Damage by porcupine is also reported. They usually eat outer bark of Haldu, Moha, Bhilawa and Amaltas near the base of the tree. Monkeys cause damage to flower and fruit trees and to succulent bamboo culms in the forests. Chital eats bark of Shivan at the base thereby girdling the tree which results in death. Sometimes only the outer bark and cambium are eaten and the cambium is seldom entirely removed, few trees are killed but the grazing causes the scars and rough protuberance found on the base of nearly large Haldu and Moha and is partly responsible for unsoundness of these trees near the base. Bear dig the soil near the root of the tree in search of rodent. They also kill many amaltas trees digging of their roots for food in the hot season.

2.2.7 Insects and fungi:

The attack of teak-skeletonizer (*Hapalia machaeralis*) and teak-defoliator (*Hyblaea puera*) are common in teak patches and occur almost every year during the month of July and August. The life cycle of these insects is very small. It has been

pointed out by champion in his book "The problems of pure teak plantation" that the estimated loss of increment because of defoliation is about 10% in these forests. The leaves which suffer attack during early part of the season, are soon replaced by the new leaves and the trees remains in foliage for a longer time. *Anogeissus latifolia*, *Careya arborea*, *Cassia fistula*, *Garuga pinnata*, *Grewia tilifolia*, *Helicteres isora*, *Lagerstroemia parviflora*, *Xylia xylocarpa* and *Terminalia tomentosa* harbour parasites which feed on these two pests viz. Teak defoliator and Teak skeletonizer and therefore these species should be retained as a means of biological control for these pests. *Vitex negundo* is the alternate hosts of the aforesaid two pests. In very dry locality, the teak trees develop hollowness at the base which may go upto 2 to 4 mt. in height in the heart wood and is caused due to the decay action by fungus *Fomes lividus* and *Polyporus zonates*. The attack of *Dihammus cervinus* (Cankar grub) is not seen in teak here. Often dying back of leading and lateral shoots of *Tectona grandis* is seen here. It is due to the insect called *Alcidodes ludificator* which tunnels several inches down the pith of a leading shoot and often kill the plant. The hollowness of teak is more because of fire than boarer. Termites are found to attack the young seedling at the base of the collar especially in the degraded areas. Termites also attack the young pole crop of Dhaora (*Anogeissus latifolia*) and Aonla (*Emblica officinalis*) by girdling them at the base, Dhaora (*Anogeissus latifolia*) is attacked by bark eating caterpillars, *Indarbela quadrinotata*. It also has a tendency to become hallow which subsequently are colonized by a white insect. *Acacia leucophloea* is attacked by *Hapalophraginium ponderosum* causing woody galls. Teak seedlings in the nursery are attacked by white grub on a large scale. Termites also attack nursery seedling on large scale and should be killed by putting 50% B.H.C. powder in their dome by braking it. The dried bamboos are attacked by ghun. In monsoon the bamboos in the depot should be kept erected so to prevent the loss due to rains.

2.2.8 Climbers and weeds:

These are common and infesting almost all the areas. Common amongst them are Mahul (*Bauhinia vahlii*), Palasbel (*Butea superba*), Nagbel (*Cryptolepis buchani*), Gorari (*Milletia auriculata*), Chilati (*Acacia pinnata*), Banda (*Clematis triloba*), Malkangni (*Celastrus paniculata*), Rhet bel (*Combretum ovalifolium*), Kharbel (*Ventilago madraspatane*), Kumbera (*Vitex auriculata*) and gorbel (*Pueraria tuberosa*). The climbers girdle the timber trees destroying their market value.

2.2.9 Parasites and epiphytes:

The following are the important epiphytic species present in this division *Visum articulatum*, *Cusenta speciosus*, *Crinum species.*, *Gloriosa superba*, *Nictetiana splumbaginifolia*, *Waltheria Indica*, *Smithia bigemna*. The loss caused by them is not substantial.

2.2.10 Frost:

Frost does not occur here.

2.2.11 Wind:

The damage is significant. On an average 1/10 of the yield of timber and firewood is contributed annually from wind fall material. Isolated trees get uprooted while large scale uprooting occurs in some pockets. teak is a shallow, rooted species

and is unable to sustain wind pressure. The extent of damage to the forest due to wind is given in the **Appendix No.XIII.**

2.2.12 Drought:

It is common. It destroys young regeneration, especially teak seedlings which have a long growing season and need moisture to survive and grow. Much of the drought is physiological drought as rainfall is rarely tapped. These forests suffer much damage due to frequent droughts during the hot season. The damage is particularly seen in sandy soil of which the water retention capacity is poor.. The trees with shallow root system suffer much damage as transpiration is at its highest stage and soil moisture being at its lowest level. Severe heat retards growth of vigorous saplings and young regeneration suffer from die back.

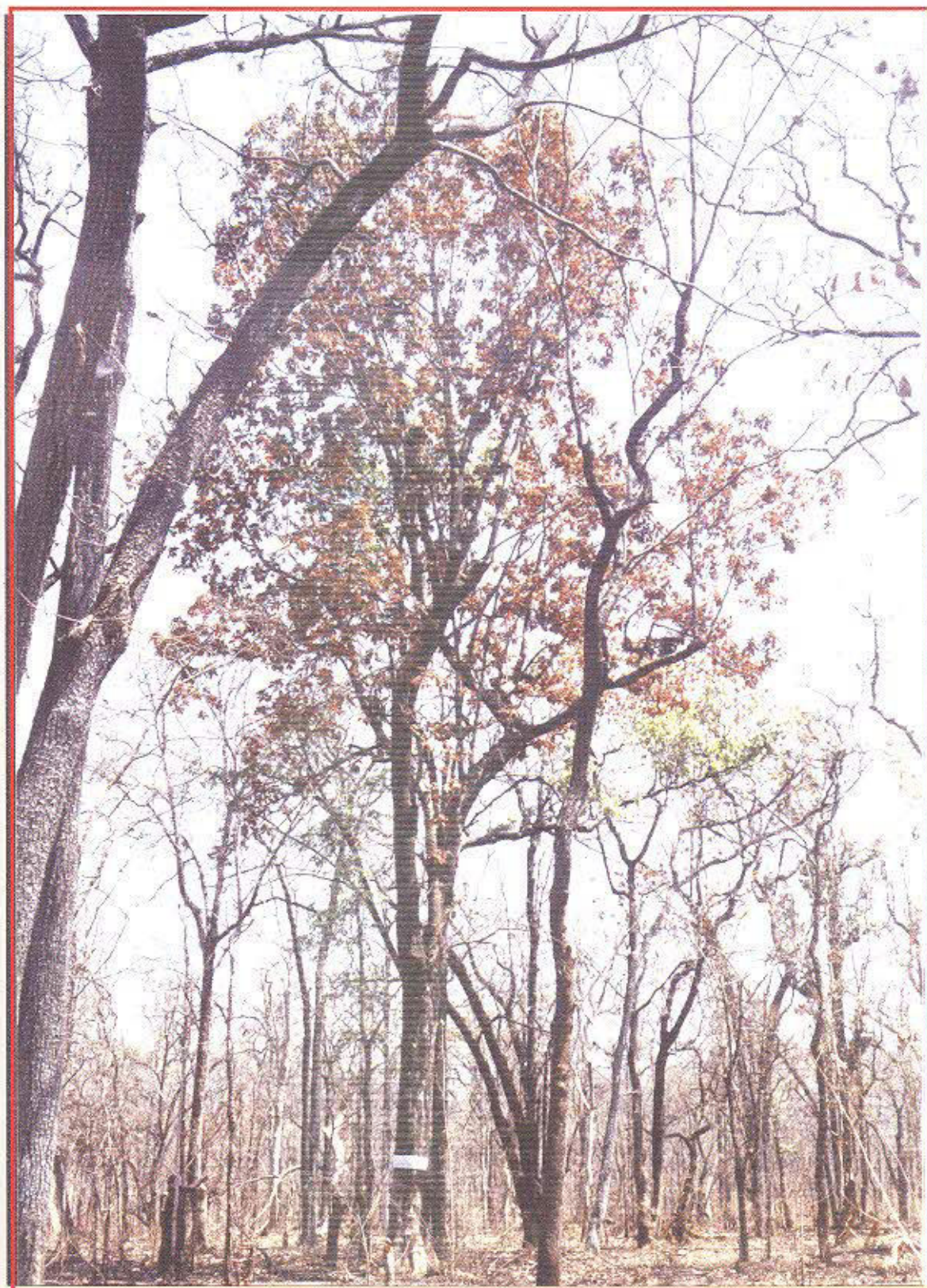
SECTION-3: SOIL EROSION.

2.3.1 Due to indiscriminate felling of trees in the past and periodic fires, the soil has been deprived of its protective influence over the vegetation. In rains, the rain water washes away the top soil which is rich in humus and other plant nutrients. Due to percolation of muddy water containing silt and soil, porosity of the soil is reduced resulting into rills and gullies. Gully erosion has been noticed in several areas near villages at Mirkal, Sakingatta, Aronda, Pirmili, Chaudampalli, Gatteepalli, Kachlar, Weadampalli, Kondoli, Uderaa, Karram etc. Gully erosion is common in hills. Erosion on banks of water courses is commonly seen. Sedimentary rocks get eroded easily.

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CHAPTER - 3

UTILIZATION OF FOREST PRODUCE



CHAPTER – 3

UTILIZATION OF FOREST PRODUCE

SECTION– 1: AGRICULTURAL CUSTOMS AND NEEDS OF THE POPULATION

3.1.1 These forests are situated in Aheri Tahsil, Etapalli Tahsil and Chamorshi Tahsil of Gadchiroli District. The tract is sparsely populated. It is inhabited by Gond, Maria, Harijan, Novbudhas, (New Budhists), Kunbi, Komti, Dhiwar, Madgi, Muslim, Chamar, Bengali etc. Caste people who have settled in some of the villages.

3.1.2 Adiwasis like Marias and Gonds practice cultivation of primitive type. They still stick to their ancestral methods of cultivation. During non-agricultural season, they depend mainly on forest labour. Their hardiness earns for them a considerable remuneration through forestry works. Their living condition in recent years has improved substantially, though more efforts are needed to improve their socio- economic status. Electrification of all villages has been undertaken. In some villages people go for lift irrigation. Paddy is the main crop and once it is harvested, the fields are left fallow for the remaining period of the year. Department of Agriculture has introduced some improved methods of cultivation, use of better quality seeds manure etc. in this area. In some village like Yarminer, Chandra, Palley, use of solar cooker and Gobargas(Biogas) is in practice. Most of the people live in the thatched roof-huts built from stout posts of ain, garari or miscellaneous species and plastered with mud and cowdung.

3.1.3 Population : The demographic status of the talukas covered under Allapalli Forest Division is presented in the following table-6 (1991 census). The total population of the Gadchiroli Districts is 969960 spread over an area of 15433.80 SqKm. and distributed in twelve talukas. The rural population is 67250 spread over an area of 66.13 SqKm. and the urban population is 902710 spread over an area of 15367.67 Sqkm. The scheduled caste population is 34.70 % and scheduled tribe population is 12.00 %. 36.97.% of the population is labour, out of this 56.11 % are agriculturalist, 28.77.% are agricultural labourers, 15.12 % are small artisans and 13.24 % are engaged in other activities. There are major and medium length project in the Division. Chenna Nadi Project involving a diversion of new 300 Ha. of forest land is under consideration.

TABLE-6

Taluka	Area (Sq.km)	Population density (In Thousand)	No .of villages	
			Inhabited	Deserted
Etapalli	3954.70	706.41	188	9
Aheri	2723.74	1035.02	158	26

Chamorshi	1023.31	1655.18	182	22
Mulchera	163.39	396.00	66	2

continued....

Taluka	No.of Houses	No.of Families	Population in thousands		
			M*	F**	Total
Etapalli	10000	10000	357.84	348.57	706.41
Aheri	16000	17000	522.63	512.39	1035.02
Chamorshi	23000	28000	838.99	816.12	1655.18
Mulchera	7000	7000	202.27	193.73	396.00

M* - Male

F** - Female

3.1.4 The Gadchiroli district is having an area of 15433.80 Sq.km and out of this 13889.70 Sq. km area covered under forest i.e. 90 % area of the district is covered under forest. The total number of villages 1679 and out of this 163 are deserted villages 15.87 % of the land under cultivation is used for producing food crops particularly Rice i.e. 69.89 % and the area under Jwar cultivation is 5.41 % and that under cotton production is 0.08 %.

3.1.5 The irrigation facilities in the district need to be improved by taking up small to medium irrigation tanks. According to 1998-99 figures, irrigated land under cultivation was 55798 ha i.e. 26.35 % of the land under cultivation is irrigated. The large irrigation tanks usually benefit distant areas.

3.1.6 As per the 1997 live stock census the live stock population of district is 972588 out of this 60.36% are cows and bullocks, 9.60 % are buffalos, sheep and goats 26.30 % and others 3.65 %. The population density of live stock is 63.01 per Sqkm.

3.1.7 The majority of the population of the district resides in rural areas which consists chiefly of agriculturalist and agricultural labourers, Most of the agriculturalist are small and marginal farmers. The forest play an important role in their daily lives for meeting their daily requirement of fire wood, fodder, building materials and other saleable minor forest produce.

3.1.8 Main requirements for which the people depend on the forests are as under :-

- i) **Small timber-** Poles of ain, dhaora, garari, dhaman, tendu, shiwan etc. are extensively used for construction of huts and agricultural implements.

- ii) **Fire wood** – The demand for firewood is considerable, as it is used for providing light as well as warmth in the hut. Firewood is essential for cooking purpose. Fire is kept burning in and around the hut throughout the night, as a practice to keep the hut warm and keep away the wild animals. It is estimated that 380 kg of fuel wood per person per month is required in the villagers which is met from the neighboring forest areas.
- iii) **Bamboos** – These are used for preparation of mats, basket and construction of huts It is also used for fencing..
- iv) **Thatching grass**- This is commonly used for thatching the roofs of the huts.
- v) **Grazing**- Cattle from the village resort to daily grazing in the adjoining forest. Grazing incidence is light in eastern part which is thinly populated. Incidence is moderately heavy in the forest bordering the thickly populated villages.
- vi) **Fruits, flowers and leaves** – Majority of the inhabitants being poor, resort to collection of mahua flowers and fruits of tendu, khirmi and achar for their bonafide consumption. Palas and Mahua leaves are used for preparation of patrawalies (leaf plates) and dona (Cups) either for bonafide use during their religious and customary functions or for sale to earn their livelihood.
- vii) **Fibers** – Palas roots are dug and cured to obtain fibre for making ropes. Twining climbers and their bark are also put to similar use.
- viii) **Other Products** – Edible tubers and roots are obtained by adiwasis for consumption. Tendu leaves are used for preparing chutta or bidi for local use. Tendu leaves are collected departmentally auctioned.

SECTION – 2 : MARKET AND MARKETABLE PRODUCTS

Market

3.2.1 Local demand for various forest products is limited. Main market for the forest products particularly timber is at Ballarshah, which is nearly 100 km. From Allapalli. It is linked by an all weather road with Allapalli. Ballarshah is a railhead on the Chennai-Delhi Railway line. This facilitates quick and cheap transport of timber to various timber consuming centers. Due to rise in the cost of charcoal, it is manufactured extensively and is transported to Ballarshah and Chandrapur for sale to outstation customers.

3.2.2 In the Government Timber Depot at Ballarshah and Allapalli the timber is graded into trade qualities on the basis of length, girth and quality. Timber of various trade teak, ain, bija, haldu is also sold here in public auction. Auctions are held four times in a year.

3.2.3 The forest produce in demand in these areas is as under :-

- i) **Teak** – Teak timber is in great demand in all sized. It is basically required for making furniture and constructions of house.
- ii) **Semal** – Demand exists for timber over 121 cm. In girth.
- iii) **Ain, bija, haldu, shisham** – Demand exists for timber over 121 cm in girth and length above 2 m.
- iv) **Firewood** – There is considerable demand of firewood for charcoal manufacture. Charcoal is manufactured in convenient localities near the coupe site and then transported to Ballarshah and Chandrapur. Chalk timber is also largely in demand.
- v) **Tendu leaves** – There is a keen demand of Tendu leaves for bidi manufacture.
- vi) **Other Products** – Gum, honey, wax are collected for trade. Barak, roots, medicinal plants are extracted either for local consumption or for minor trade. Mahua flowers and fruits of tendu, khirni, achar are collected for bonafide consumption or for sale.

3.2.4. The major forest produce for which the people of the forests depend are as under.

i) **Timber:-** Teak is the most valuable timber for building purposes, but due to its prohibitive cost or non-availability in sufficient quantity, other species such as bija, ain, tiwas, dhaora, bhirra, lendia, haldu, kalam and bamboo are generally used. The demand is maximum near townships. For agricultural implements, such as ploughs, cartwheels; species like tiwas, shiwan and khair are preferred. Dhaman and dhaora are used for making handle of the axe and semal for dug out. The demand of teak can be assessed by the fact that even a piece of 15 cm. girth and of 0.3 metre length can be readily sold in the market. The same is true for other species as well. With the arrival of imported timber from the adjacent countries, the prices of timber especially of non teak has stabilised.

ii) **Fuel wood:-** There is a great demand for fire wood all over the area. The fire wood is the only source of energy for most of the villagers . In some heavily populated area the people some time depend on the agricultural waste. Kukrangi has the tremendous usage as a fuel wood. Chalk timber is used for making small furniture and for railway sleepers. The following table shows quantity of fuel wood and charcoal obtained and revenue realised:

TABLE-7

Teak , mixed & other fuel stack's revenue realised

Year	Forest Produce	Quantity (In M ³)	Amount Rs.	Forest Produce	Quantity In (Beats/	Amount Rs.

	(Timber)				M ³)	
1992-93	Teak/ Non-teak	10571.702	58039366	Fuel beat	6468.00 15523.20	2199120
1993-94	Teak/ Non-teak	10936.623	79935806	Fuel beat	10995.00 26388.00	4398000
1994-95	Teak/ Non-teak	3193.593	33216452	Fuel beat	4037.25 9691.80	1211400
1995-96	Teak/ Non-teak	5580.643	52644479	Fuel beat	11538.50 27692.40	4038475
1996-97	Teak/ Non-teak	6704.490	59909552	Fuel beat	7321.11 2489.17	2928444
1997-98	Teak/ Non-teak	3837.005	37188270	Fuel beat	5516.39 1875.57	1930736
1998-99	Teak/ Nontek	6690.551	45067923	Fuel beat	7286.0 2477.24	2914400
1999-2000	Teak/ Nontek	2407.633	26146802	Fuel beat	3794.50 1290.13	1707525
2000-01	Teak/ Non-teak	3882.955	48474792	Fuel beat	1705.75 579.95	767588
2001-02	Teak/ Non-teak	3003.545	35882210	Fuel beat	2039.75 693.52	917890

3.2.6 Non-timber forest Produce :- The following are the important non-timber forest produce.

1) Bamboo :- Bamboo (*Dendrocalamus strictus*) is the major species of bamboo found here and harvested. It is scattered throughout the division. The bamboos are used by the burads for making mats, baskets and boxes. The bamboos are also utilized by the local people for fencing the agricultural field and kitchen garden. The usual life of bamboo is eight years in protected condition and 3years in open use. Treatment has enhanced its life. The bamboo are also supplied to Ballarpur Paper Mills on commercial terms. The quantity of bamboo extracted and revenue realised is given in the following table.

TABLE-8**Bamboo Extracted & revenue realised**

Year	Forest Produce	Quantity in No.	Amount Rs.
1992-93	Bamboo	656957	3288797
1993-94	-do-	347165	2598161
1994-95	-do-	837571	8375715
1995-96	-do-	763677	6349437
1996-97	-do-	944646	8842936
1997-98	-do-	1147946	11282880
1998-99	-do-	1020636	10776584
1999-2000	-do-	1330106	15542940
2000-01	-do-	--	--
2001-02	-do-	411770	4775130

Katang bamboo (*Bambusa arundinacea*) is also present in some pockets mostly along nala beds but the quantity obtained is very less and therefore has no appreciable commercial value. Being a hallow bamboo, it is mostly used for making pulp.

(2) Tendu Leaves:- There is a large demand for tendu leaves for bidi manufacturer. The figures for sale of tendu units, Revenue and expenditure during the last Ten years is given in the following table. The most of the unit are sold outside the State.

TABLE-9**Tendu leaves – Production and Revenue Realised**

Sr.No.	Year	Target (Std bags)	Production (Std.bags)	Revenue (Rs.)
1	2	3	4	5
1	1993-94	80000	77893-031	22629015
2	1994-95	71400	73774-114	25485402
3	1995-96	71100	76383-464	24900488
4	1996-97	72800	78963-789	23983659
5	1997-98	48500	55022-626	13975837

6	1998-99	69300	61544-021	16738060
7	1999-00	73600	82424-220	24627430
8	2000-01	75700	80800-499	27688872
9	2000-02	70800	75190-371	22086218
10	2000-03	80200	84475-616	21505674

3) Moha flower and seeds: There are plenty of Moha trees in the Allapalli Forest Division . The moha flowers are used for making wine and if crushed, it is used as flour by the tribals during the period of scarcity. The seeds are used for extracting oil. The flowers are collected in the month of March-April and seeds in the month of June and July . The oil extracted from moha is used in soap industry. The monopoly trade of moha is with Tribal Development Department. The trade of moha is governed by Excise Department vide Government Resolution No. TDC-1087/Cr-150/D-3 dated 12.8.87 and No. TDC-1087/CR-306/D-3 dated 25.2.88. The quantity extracted and Revenue realised during last Ten years is given in table below.

TABLE-10

Moha flowers & fruits - Production & revenue realised

Year	Forest produce	Quantity (in Qtl).	Amount (in Rs.)	Forest produce	Quantity (in Qtl)	Amount (In Rs.)
1992-93	Moha flowers	5599.39	27996.95	Moha seeds	177.83	889.18
1993-94	-do-	35.93	179.65	-do-	21.86	109.30
1994-95	-do-	2426.95	12134.75	-do-	506.45	2532.00
1995-96	-do-	2352.37	11761.85	-do-	15.63	78.15
1996-97	-do-	5380.89	26902.97	-do-	3843.03	19218.18
1997-98	-do-	172.29	861.45	-do-	33.57	167.88
1998-99	-do-	2617.00	13085.00	-do-	222.65	1113.25
1999-2000	-do-	6071.87	30359.35	-do-	496.34	2466.70
2000-01	-do-	---	---	-do-	--	---
2001-02	-do-	803.82	4019.00	-do-	13.62	68.00

4) Gum: The division as a whole is a unit where it is sold by public auction. The gum of various species is now a days is used for various purposes- kulu (*sterculia urens*) is of commercial importance while dhaora (*Anogeissus latifolia*), is of medicinal importance. The tapping technique used by the labourers is not destructive. The quantity extracted and revenue realised during last ten years is shown in table –11.

6	Behada	7	35	20	100	1	5	12	60	0	0
7	Chinch	3	15	4	20	0	0	0	0	0	0
8	Chinch seeds	0	0	5	25	0	0	0	0	0	0
Total		3000	15000	6763	33815	245	1225	968	4840	62	310

SECTION – 3 : LINES OF EXPORT

3.3.1 Timber extracted, at present is dragged to jungle depot, conveniently located along road side and then directly transported to Allapalli or Ballarshah. At Allapalli, mill class timber is converted in a Saw Mill of the Forest Department while jungle class timber is sold in open auction. Mode of transport is by truck. Transport of timber and other forest produce of the department is carried out by the government trucks of Transport and Marketing Division. Some of the important roads and cart tracks in these forests are noted below :-

TABLE –13

Name of the road or cart track	Length In km.	Remarks
Aheri-Allapalli PWD road	6.41	All weather tar
Allapalli-Ghot PWD road	70	-do-
Allapalli-Bhamragarh road	27.47	-do-
Allapalli-Chandrapur road	115	-do-
Elchil-Etapalli road (from Guddinaka to Dumme nala)	9.6	-do-
Allapalli-Sironcha road	90	-do-
Etapalli-Burgi-Kandoli Bidri carat track	22.72	Fair whether Murum
Udera-Yemali-Koreli Cart track	22.18	-do-
Kandoli-Chandraa-Yarminar Cart track	17.76	-do-

SECTION – 4 :- METHODS OF EXPLOITATION :

3.4.1 Agency of exploitation- Timber and fuel is extracted departmentally and through societies. Felling and logging is done with cross cut saw. In some hilly portion the dragging is done by men, bullocks and buffaloes. In the interior areas, which are not served by good roads, timber is transported by bullock-carts. At places, Government trucks extract timber from forests to Ballarshah and Allapalli. A mechanised logging unit at Allapalli serves various needs of logging and transport. Firewood is stacked in or out of the coupe or in depot in stacks of size 2m x 1.2m (where billet length is 1,2 m) and its multiples.

3.4.2 Departmental harvesting is carried out in case of timber and firewood . Felling, logging, stacking and other works are done by department or through forest labourer's co-operative society members, as the case may be. Harvesting of Non-timber Forest Produce(NTFP) is done either through Forest or Tribal Department or agencies of contractors as the case may be. The kurans are allotted to institutions and public bodies according to the following order of priorities fixed by Government in Revenue and Forest Department G.R.No.SLF-1091/P/X/119191/F-11,dated the 16th March 1992.

Village Panchayat

Public bodies including dairy societies

Forest labourer's co-operative societies.

Kurans not allotted to any of the above bodies are sold by open auction.

3.4.3 METHODS OF FELLING AND EXTRACTION:

- (I) Usually marking is completed upto the end of previous year and the felling starts after end of rainy season. Timber and poles are felled first. Cutting of trees and conversion into timber and poles is done by saw. Firewood is prepared with saw and axe. Dragging or carting of timber, poles and firewood upto jungle depot is done by bullock carts and tractors. Transport of the timber and pole from jungle depots to sale depots is done by Govt. haulage.
- (II) Firewood is cut into billets and stacked in the coupe itself in the form of beats of size 2.0 m x 1.20 x 1.0 m It is stacked in the sale depot in appropriate lines of 1 m height and is recorded in terms of number of beats. Thick billets are stacked separately and sold as chalk timber.
- (III) The trees are marked as timber or fuel depending upon the capability of producing timber, pole or firewood. The estimates of volume for timber and firewood are prepared by using local form factors. After approval of the estimates by the Conservator of Forests concerned, felling operations start.
- (IV) After felling and conversion into logs and poles, measurements are taken and are embossed at the butt end of the logs, with digit nails, along with the tree numbers and number of log. Besides, the marking of passing hammer is also made. Poles are classified into girth classes and their average volume is taken.
- (V) After arrival of the logs in the sale depot, they are given serial number and measured again. The difference between measurements at the jungle depot and at the sale depot are reconciled.

- (VI) All the logging operations are done by engaging local labourers in the departmental working and by the member of the FLCS in case of coupes worked by FLCS. Most of the items of work are done by job rates.

3.4.4 Maintenance of registers in depots:

(i) **The rules regarding the carting of timber:-** The material is transported by the truck carrying three copies of carting challans (Form No.9 –(A)-122). The carting challan carries the details like felling series, coupe number, species, measurement of logs, its volume, the truck number and name of the driver. In case of poles, only the number of poles and species, its girth class is written. The driver carrying the three copies of carting challan (Second, third and fourth) will hand over them to the depot officer. The depot officer, then verifies the receiving material and acknowledges the receipt in all three copies. The depot officer, then returns the fourth copy, while he retains the second and the third. The depot officer then makes the relevant entries in his register. The logs are re-measured in the depot and its entries are recorded against the old entries. Any discrepancy is reported to the field officer.

3.4.5 (ii) **The rules regarding the maintenance of register:-** The following registers are maintained in the depot.

- (a) **Daily receipt register :-** It contains details of daily receipt. It has the entries as stated in the carting challan.
- (b) **Depot measurement register :-** This contains the entry of the measurement of lots done in the depot.
- (c) **Lot register :-** The lot register contains details about the lots. The logs with same specification like grade, length class, girth class, species etc. are put in the same lot.
- (d) **Sale register :-** This register contains details about the sale at the depot. It will contain the details like the name of purchaser, earnest money deposited, the balance to be paid.
- (e) **Dispatch register :-** It has the daily entry of the material being dispatched outside the depot.
- (f) **Daily balance register :-** This register records the daily balance of the material in the depot.
- (g) **The register for departmental supply :-** The register contains the following details.
 - (i) Supply to government agency.
 - (ii) Supply to co-operative society.
 - (iii) Supply to government saw mills.
 - (iv) Supply to Forest based industries.

3.4.6 The unified sale condition :- The sale at the depot and *in situ* are governed by the unified sale condition. It requires that no person shall be allowed to bid unless he has made in earnest money deposit at the rate of 10% of the amount up to which the bidder desires to bid, provided that this 10% is not less than Rs. 500/- Once the bid is accepted, the timber in depot will lie at the risk of purchaser. Sales in the Depot are governed by Section 82 & 83 of I.F.A. 1927. The payment will be made in two phases.

- (a) 1/4 of the sale price along with a proportionate amount of Forest Development Tax within 7 days from the date of auction or date of communication of acceptance. An extension of further 23 days will be made to the purchaser, for which he has to pay an interest of 18% per annum.
- (b) The balance 3/4 of the sale price along with the proportionate amount of the Forest Development Tax plus the entire amount of sale tax shall be paid within sixty days from the date of auction or date of communication of acceptance by the competent authority. A further grace of thirty days will be given for which the bidder with an interest of 18% on the amount thereon for late payment. In case the purchaser fails to pay 1/4 within the stipulated period extended, the above differentiation goes away and he is required to pay all dues in one installment.

If the auction purchaser fails to make the payment, as given in above schedule, Deputy conservator of Forests, may cancel such sale. The amount deposited by the auction purchaser either as earnest money deposited or 1/4 or F.D.T. shall be forfeited to the government. The material will then be put to resale at the risk and cost of the initial bidder.

3.4.7 Grading rules :- The material brought to the depot are graded. There are three plywood qualities, P1, P2 and P3 and six trade quality grades viz. 1,2,3,4,5 & 6. They are distinguished from each other on basis of 12 criteria, namely length, girth, knots, bends, etc. These grading rules are different than the standard fixed by Indian Standard Institution.

3.4.8 Sale of firewood for charcoal manufacture:- The Chief Conservator of Forests, (Production) M..S.Pune has fixed the Additional Sale Conditions of Fuel Beats, vide his office letter No. Desk-9/MHP/C-283/85-86/172-C dt. 17-2-1987.

3.4.9 UNIFIED DEPOT SALE CONDITIONS:

- (a) The auction purchaser who intends to manufacture charcoal from the fuel wood beats purchased will be allowed to make payment in the following way.
 - (i) 1/2 of the sale price along with the proportionate amount of Forest Development Tax within 7 days from the date of auction/date of communication of acceptance by the competent Authority as the case may be. PROVIDED, however that if the Auction Purchaser makes payment of the said 1/2 sale price along with the proportionate amount of Forest Development Tax at any time there after but before the expiry of further 23 days, then he shall have to pay interest thereon at the

rate of 18% per annum. For the extended period after 7 days but before the expiry of further 23 days on the amount that is required to be paid.

- (ii) After payment of the above $\frac{1}{2}$ sale price along with the proportionate Forest Development Tax, the Auction purchaser will be allowed to manufacture charcoal from the fuel wood beats purchased by him but he will NOT be allowed to remove the charcoal from the prescribed depot until full payment along with the tax etc., is made by him.
- (iii) Out of the balance $\frac{1}{2}$ of the sale price he shall pay $\frac{1}{4}$ sale price along with the proportionate amount of Forest Development Tax within 60 days from the date of auction/date of communication of acceptance by the competent Authority as the case may be.
- (iv) Balance $\frac{1}{4}$ of the sale price alongwith the proportionate amount of the Forest Development Tax and all other taxes, rates and duties as are leviable thereon within 120 day from the date of auction /date of communication of acceptance by the Competent Authority as the case may be.
- (v) The Auction Purchaser will NOT be allowed to burn charcoal kilns in the Forests and that the kiln sites should be away from forest land so as NOT to cause any damage to forests and forest land.
- (vi) The Auction purchaser will be required to obtain certificate from the local territorial Range Forest Officer in whose jurisdiction charcoal kiln/s is/are situated regarding the bonafides of the fuel wood intended to be converted into charcoal in a kiln before the kiln is made.

(b) In the event of the auction purchase failing or neglecting to make payment of $\frac{1}{4}^{\text{th}}$ of the sale price or $\frac{1}{2}$ of the sale price in case fuelwood as mentioned in conditions No. 12(c) (i) or $\frac{3}{4}^{\text{th}}$ of the Sale price of balance $\frac{1}{4}$ the of the sale price in case firewood as mentioned in condition No. 12(c) (iii) plus sales, tax Forest Development Tax and all other taxes, rates and duties without or with interest or any part thereof as provided in condition 12 above or in the event of auction purchaser committing a breach of any of the Terms & Conditions hereof the Divisional Forest Officer/Sub-Divisional Forest Officer, of Independent Sub Division may, without prejudice to any other rights, remedies and Power of the Government the amount deposited to the Auction Purchaser as Earnest Money and the said amount of $\frac{1}{4}$ sale price or $\frac{1}{2}$ sale price and balance $\frac{1}{4}$ the sale price in the case of fuel-wood as mentioned in the conditions No. 12(c)(i) and (iii) and interest and forest Development Tax if paid, shall forthwith stand forfeited to the Government on cancellation of such sale the Divisional Forest Officer/Sub-Divisional Forest Officer of Independent Sub-Division shall in his absolute discretion if he so think fit, be entitled to forthwith and without any further notice resale either by Public auction or by private contract on account and at the risk of the auction purchaser the lot/s for which the bid of the auction purchaser was accepted and cancelled as aforesaid.

PROVIDED, however that if before the actual resale of the material at the risk and cost of the auction purchaser, the auction purchaser pays under intimation to the Divisional Forest Officer/Sub-Divisional Forest Officer of Independent Sub-Division

the sale price or three fourths of the sale price as the case may be (defaulted amount) in full along with interest sales tax, Forest Development Tax and all other taxes, rates and duties as foresaid and also penalty at the rate of 10% of the price offered by him, the Divisional Forest Officer/Sub-Divisional Forest Officer of Independent Sub-Division shall set aside the cancellation of the sale and permit the auction purchaser to remove the material sold to him as provided in clause 14 thereof.

3.4.10 The auction Purchaser shall be liable to pay Government in the event of resale of the amount of the loss, if any, sustained by the Government as a result of such resale but he shall not be entitled to any profit arising as a result thereof. The Auction purchaser shall forthwith on demand by the Divisional Forest Officer/Sub-Divisional Forest officer of the Independent Sub-Division pay to the Government the amount of such loss. The amount of such loss shall be deemed to be the arrears of land revenue and without prejudice to any other rights, remedies and powers of the Government, the Government shall be entitled to recover the same from the auction purchaser as arrears.

3.4.11 Exploitation of fire wood consists of two operations felling and billeting.

Felling is done with axe. Billets of length 1.20m are prepared and stacked in to 2m x 1.2m size stacks. Firewood is sold at coupe site and normally converted into charcoal by the purchasers. Charcoal manufacture is not allowed in forest area. It has to be done in private land, duly approved from competent authority It has been estimated that 2.40 M³ charcoal is manufactured from one fuel beat of 2 X 1 X 1.20 Meters size which contains three to three and half bags of charcoal and a quarter bag of charcoal powder.

3.4.12 The Govt. of Maharashtra vide its Revenue and Forest Department Resolution No. NAP-1087/16203/CR-1128/L2 dated 19/2/1992 has given powers to Collector under Section 44 of the Maharashtra Land Revenue Code 1966 to grant permission to the owners of the charcoal factories on non-agriculture land after obtaining the no-objection certificate from the forest department. Under Rule 88 of Bombay Forest Rules, no person can manufacture charcoal within limits of any Reserved or Protected forest without obtaining permission of the Divisional Forest Officer as per Govt. of Maharashtra, Revenue and Forest Department No. MSC-1087/78252/CR-296/F6 dated 21st June 1995. The Govt. of Maharashtra vide its Revenue and Forest Department Resolution dated 19/2/1992 has further directed that permission under Section 44 of Maharashtra Land Revenue Code, 1966 can be granted subject to certain conditions which are as follows:-

- i. No objection certificate of the Forest Department be obtained for the manufacturer of the charcoal.
- ii. Charcoal manufacture should be done at a distance of 10 km. from the Protected and Reserved Forests.
- iii. Charcoal should not be transported during the rainy season.
- iv, Non-agriculture permission shall be given for a year only.
- v. License be obtained for manufacture of charcoal similar to the license necessary for Saw Mills from the forest department.

- vi. The owners will have to plant, double the no. of trees felled for manufacture of charcoal.
- vii. The charcoal manufacture shall be done at a distance of 25 km. from the sensitive and most sensitive areas with respect to environment.

3.4.13 While granting permission for the non-agriculture the Conservator of Forest / the Collector shall take necessary action to avoid any damage to the forest in consultation with the Forest Department.

3.4.14 Disposal of Adiwasi Malki cases

The disposal of adiwasi malki cases is done as per provisions contained in Maharashtra Act No. XXIII of 1969 as modified from time to time which provides for Maharashtra sale of trees by occupants belonging to schedule tribes (Regulation) Act, 1969. The following table illustrates the details of Adiwasi Malki Cases disposed of by the Allapalli Forest Division during the year 1998-99 to 2002-03.

TABLE-14

सन १९९८-९९ ते २००२-०३ या वर्षात निकाली काढलेल्या आदिवासी मालकी प्रकरणांची माहिती

अ.क्र.	वर्ष	निकाली काढलेल्या आदिवासी मालकी प्रकरणांची संख्या	प्रकरणात प्राप्त झालेले उत्पादन				माल विक्री झालेनंतर प्राप्त रक्कम (रुपये)	त्यावर झालेला खर्च (रुपये)	आदिवासी स्वसंसाधन विकास दिली गंलंली रक्कम (रुपये)
			साग		इतर प्रजाती				
			नग	घ.मी.	नग	घ.मी.			
१	२	३	४	५	६	७	८	९	१०
१	१९९८-९९	-	-	-	-	-	-	-	-
२	१९९९-२०००	-	-	-	-	-	-	-	-
३	२०००-२००१	-	-	-	-	-	-	-	-
४	२००१-२००२	१	७२०	५१,२४६	-	-	८९०१०० /-	107245	
		-	७२.००	साग बिट	-	-			
५	२००२-२००३	-	-	-	-	-	-	-	-

3.4.15 Tendu leaf trade has been nationalized since 1969. Now the leaves are rarely collected departmentally and auctioned. Tendu leaf trade in the state is now regulated as provided under the Maharashtra Forest produce (Regulation of Trade) Act, 1969 and/or Maharashtra Forest Produce (Regulation of Trade in Tendu leaves)

Rules 1969 and as per detailed notifications issued by Govt. of Maharashtra every year inviting offers for permission to collect and Remove Tendu Leaves from the notified Tendu units.

3.4.16 Tendu leaves are collected and tied into a puda or bundle each containing 70 leaves. These are then brought to the Phadi and handed over to the Phadi munshi. He, in turn pays the wages, as per rates approved by the Government from time to time, for 100 numbers of Pudas are then arranged into lines for drying and then recorded, bagged and transported to the godown with valid permit.

SECTION: 5 COST OF HARVESTING :

3.5.1 Exploitation of timber consists of two main operations viz; felling and logging. Felling is done by saw and axe. Power-chain saw are not used. Trimming of branches and knots is done by axe. Cross cut saws are also used for logging the poles. Timber logs are dragged to the road-side depot and then transported to sale depot. The unit cost of exploitation for the timber is furnished in the following table:

TABLE-15

सन १९९८-९९ ते २००२-०३ या वर्षात साग व सागेत्तर प्रजातीचे झालेले प्रत्यक्ष उत्पादन झालेला खर्च व प्राप्त महसुलाची माहिती						
अ. क्र.	वर्ष	विवरण	प्रजाती	प्रत्यक्ष उत्पादन (रुपये)	झालेला खर्च (रुपये)	प्राप्त महसुल (रुपये)
१	२	३	४	५	६	७
१	१९९८-९९	विभागीय रित्या हवेने पडलेला व अवैध तोडीपासून उत्पादित थिनिंग कुपातील उत्पादन	साग प्रजाती इमारती (घ.मी.) इतर प्रजाती इमारती (घ.मी.) फाटे (नग)	२२८१.९४७ २४०८.६०४	१७४६७२८/- १३९७९४३/-	७४९३७९९९ /- २३३२०८३/-
		विभागीयरित्या हवेने पडलेल्या व अवैध तोडीपासून उत्पादित निस्तार बांबु पातन श्रेणी मधील उत्पादन	साग बिट (थप्पी) जळातु बिट (थप्पी) लांब बांबु (नग) बांबू बंडल्स(नग)	७०७८७ ७११.२७ ७२८६.०० १०२०६३६ १८१७१७	३१९२२७१/-	११३९०७८०/-
		एकूण :-	-	-	६३३६७४२ /-	६८६७८७८२ /-
२	१९९९-२०००	विभागीय रित्या हवेने पडलेला व अवैध तोडीपासून उत्पादित थिनिंग कुपातील उत्पादन	साग प्रजाती इमारती (घ.मी.) इतर प्रजाती इमारती (घ.मी.) फाटे (नग)	१२२६.८३८ ११८०.७९७ ७४८९१	१९९७०९७/- ६९४४७९/-	७०४३८७८८/- २३००८२२/-
		विभागीयरित्या हवेने पडलेला	साग बिट (थप्पी) जळातु बिट (थप्पी) लांब बांबु (नग)	१८०.७० ३७९४.७० १३३०१०६	३६३८७०८/-	१०४७७१२८/-

		व अवैद्य तोडीपासून उत्पादित निस्तार बांबु पातन श्रेणी मधील उत्पादन	बांबू बंडल्स(नग)	१२७२०९		
		एकुण :-	-	-	६३२८२६२ /-	८३२१४७३८ /-
३	२०००-०१	हवेने पडलेला व अवैद्य तोडी पासून उत्पादित. थिनिंग कुपातील उत्पादन हवेने पडलेला व अवैद्य तोडीपासून उत्पादित. निस्तार बांबु पातन श्रेणी मधील उत्पादन	साग प्रजाती इमारती (घ.मी.) इतर प्रजाती इमारती (घ.मी.) फाटे (नग) साग बिट (थप्पी) जळतु बिट (थप्पी) लांब बांबु (नग) बांबू बंडल्स(नग)	२७२६.९७८ १३७७.९९७ १०७०२ १८८.७७ १७०७.७७	१०६९१७३ /- ७११३४८/- ३७३३९३७/-	४७२७४७४८ /- १०९२१२३ /- ७४७६७०३ /-
		एकुण :-	-	-	७३१४४३८/-	७१८०३३७४ /-
४	२००१- ०२	हवेने पडलेला व अवैद्य तोडी पासून उत्पादित.	साग प्रजाती इमारती (घ.मी.) इतर प्रजाती इमारती (घ.मी.) फाटे (नग) साग बिट (थप्पी) जळतु बिट (थप्पी) लांब बांबु (नग) बांबू बंडल्स(नग)	१८१४.३०३ ११८९.२४२ ४९१ ९१३.०० २०३९.७७ ४११७७० २६७१०	८७६८९८/- २४११९१/- १३७२८७४/-	७१२८२४०९/- ४३२४७७/- ३४६७४४१/-
		एकुण :-	-	-	२४९०९४३/-	७७९१८०३०७/-
७	२००२-०३	हवेने पडलेला व अवैद्य तोडी पासून उत्पादित. थिनिंग कुपातील उत्पादन हवेने पडलेला व अवैद्य तोडीपासून उत्पादित. निस्तार बांबु पातन श्रेणी मधील उत्पादन.	साग प्रजाती इमारती (घ.मी.) इतर प्रजाती इमारती (घ.मी.) फाटे (नग) साग बिट (थप्पी) जळतु बिट (थप्पी) लांब बांबु (नग) बांबू बंडल्स(नग)	२११८.४९३ १४४०.२१० २७२७९ ११२२.०० १९०७.७० ३७७८७७ २७६७७	१७९६३१४/- ४३६७२९/- १७३९६९९/-	६३११७१०८ ७६७०४१/- २२०३७३७/-
		एकुण :-	-	-	३७७२७४२/-	६६०८७६८६/-

3.5.2 Cost of exploitation varies according to season or time of working. During agricultural season the labour supply is poor. Rates of daily wages/works are sanctioned by Govt. of Maharashtra while items for which no rates have been sanctioned by Govt. of Maharashtra, the rates are decided by the committee on wage board presided over annually by the Conservator of Forests, South Chandrapur Circle, Chandrapur and the details of Wage Board Rates fixed by the Committee are furnished in **Appendix NoXV**. There are separate rates for certain forestry items for taking up works under Employment Guarantee Scheme of Govt. of Maharashtra. The rate structure for the plantation activity are decided as per Ghanekar Committee's Report.

SECTION – 6 : PAST AND CURRENT PRICES

3.6.1 Market conditions-

For all kinds of forest produce there is a great demand. Wide gap between supply and demand results into keen competition amongst the purchasers. All the timber species are in good demand and their rates are increasing day by day, same is the case with charcoal and other forest products.

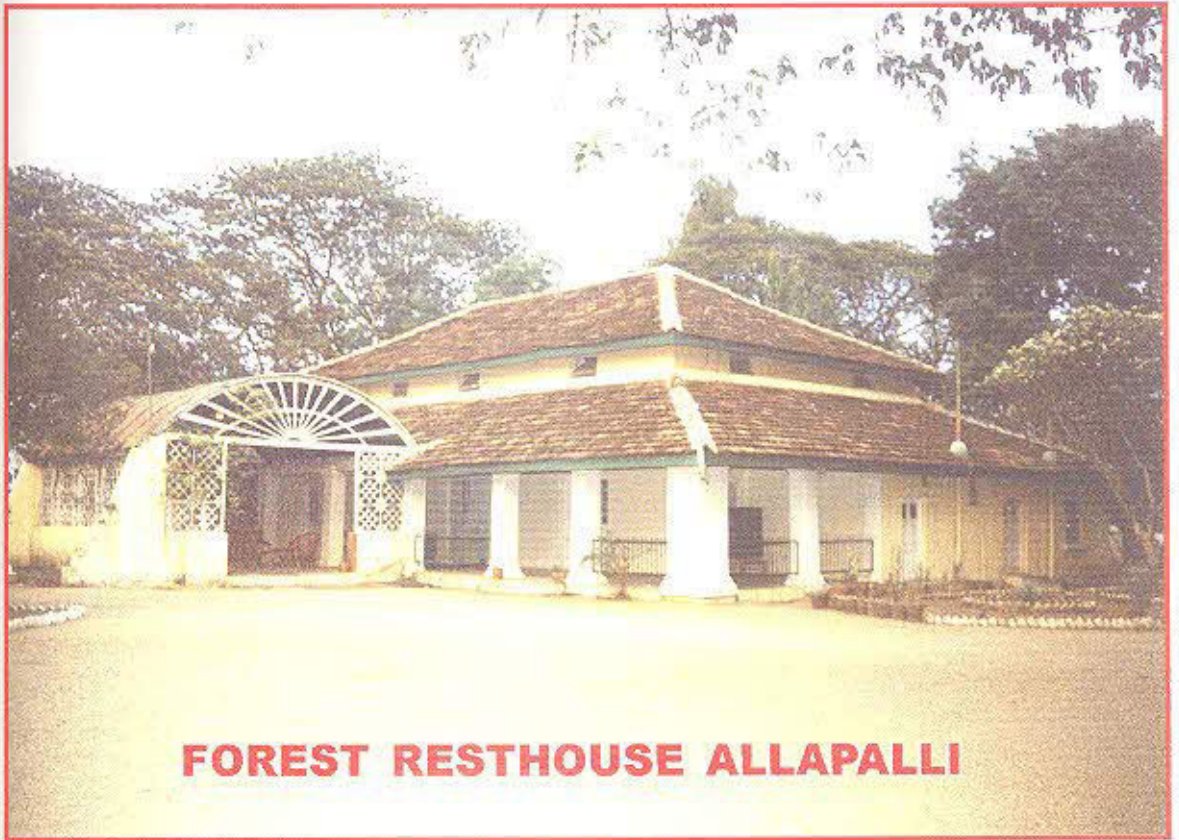
3.6.2 The Revenue realized from timber during the last ten years is given in the following table:-

**Table No.-16
Timber (Teak and Non-teak)- Production & Revenue obtained**

Sr.NO	Year	Quantity (Cum.m.) Teak	Value (in Rs).	Quantity (Cum.m.) Non teak	Value (in Rs).
1	2	3	4	5	6
1	1992-93	3995.916	39959160	6575.786	18080206
2	1993-94	5367.422	60115126	5569.201	19820680
3	1994-95	1790.166	27747573	1403.427	5468879
4	1995-96	2656.131	41170030	2924.513	11474449
5	1996-97	3615.053	50610742	3089.437	9298810
6	1997-98	2184.025	30576350	1652.980	6611920
7	1998-99	2281.947	34229205	2008.604	10838718
8	1999-2000	1226.838	20242827	1180.795	5903975
9	2000-01	2526.958	41694807	1355.997	6779985
10	2001-02	1814.303	29936000	1189.242	5946210

CHAPTER - 4

STAFF AND LABOUR SUPPLY



FOREST RESTHOUSE ALLAPALLI

CHAPTER – 4 STAFF AND LABOUR SUPPLY

SECTION – 1 : STAFF

4.1.1 In 1966, reorganization of erstwhile Chanda circle took place and Allapalli Division was created. The Allapalli Forest Division comprises of six territorial ranges, 29 forest rounds and 141 beats. The details of ranges, rounds and beats are given in the following table.:

TABLE –17

Sr.No.	Name of Range	Ranges Headquarter	No.of Rounds	No. of Beats	Area in ha.
1	Markhanda	Markhanda	3	13	12697.790
2	Ghot	Ghot	7	38	63743.761
3	Aheri	Aheri	5	19	26984.864
4	Allapalli	Allapalli	4	17	19311.804
5	Pedigundam	Pedigundam	4	15	22051.977
6	Pirmili	Pirmili	6	39	73152.479
Total	6	6	29	141	217942.685

4.1.2 The following is the detailed statement of permanent and temporary staff in Allapalli Division as on 1.4.1998.

TABLE – 18

Sr. No.	Category	No.of posts			Pay scale
		Permtt	Temp	Total	
1	2	3	4	5	6
I	<u>GAZETTED</u>				
1.	Dy.Conservator of Forests	1	-	1	10,000-325-15200
2.	Sub Divisional Forest Officer	1	-	1	7450-225-44500
3.	Asstt.Conservator of Forests	1	-	1	7450-225-11500
4.	Logging Officer	1	-	1	7450-225-11500
5.	Workshop Superintendent	1	-	1	6500-200-10500
6.	Sawmill Engineer	1	-	1	6500-200-10500
7.	Asstt.Sawmil Enginner	1	-	1	4500-125-7000

8.	Medical Officer	-	1	1	8000-275-13500
9.	Range Forest Officer	8	6	14	6500-200-10500
II NON-GAZETTED:					
1.	Chief Accountant	1	-	1	5500-175-9000
2.	Accountant	4	10	14	4500-125-7000
3.	Clerk	31	11	42	3050-75-4590
4.	Forester	41	19	60	4000-100-6000
5.	Forest Guard	141	67	208	2750-70-4400
6.	Driver	13	16	29	3050-75-4590
7.	Mahawat	8	-	8	3050-75-4590
8.	Grass-Cutter	8	-	8	2750-70-4400
9.	Surveyor	2	-	2	2610-60-4000
10.	Jr. Statistical Asst.	1	-	1	5500-175-9000
11.	Police Constable	-	1	1	4000-100-6000
12.	Machinist	2	2	4	3050-75-4590
13.	Store keeper	1	-	1	4000-100-6000
14.	Compounder	2	1	3	4000-100-6000
15.	Nurse	2	-	2	3050-75-4590
16.	Lady Doctor	1	-	1	4500-125-7000
17.	Electrician	1	-	1	4500-125-7000
18.	Auto Electrician	1	-	1	3200-85-4900
19.	Sawmill Constable	2	-	2	3050-75-4590
20.	Fire man	2	-	2	3050-75-4590
21.	Engine Driver	1	-	1	3050-75-4590
22.	Oil Man	1	-	1	2610-70-4000
23.	Sharpener	1	1	2	4500-125-7000
24.	Latheman	1	-	1	500-125-7000
25.	Welder	2	-	2	3050-75-4590
26.	Fitter	1	-	1	3050-75-4590
27.	Boiler Fitter	1	-	1	3050-75-4590
28.	Asstt.Fitter	1	-	1	3050-75-4590
29.	Asstt.Medical Officer	1	-	1	5500-175-9000
30.	Head Sawyer	1	-	1	4500-125-7000
31.	Asstt.Sawyer	10	-	10	4500-100-6000
32.	Sawyer	2	-	2	4000-100-6000
33.	Mali	2	-	2	2550-55-3200
34.	Log lifter	1	-	1	2610-60-4000
35.	Black smith	1	-	1	3050-75-4590
36.	Khalashi	-	6	6	2550-55-3200
37.	Sweeper	-	1	1	2550-55-3200
38.	Wardboy	7	12	19	2550-55-3200
39.	Cleaner	1	-	1	2550-55-3200
40.	Daftari	7	2	9	2610-60-4000
41.	Peon/Naik	11	1	12	2550-55-3200
42.	Choukidar	1	-	1	2610-60-4000
43.	Dak-runner	1	-	1	2550-55-3200

4.1.3 The Govt. of Maharashtra in General Administration Department vide its Resolution No. 2000/ प्र.क.३ /बारा दिनांक ६ ऑगस्ट २००२ has provided for certain incentives to the Govt. employees working in the Naxalite affected areas and has also issued guidelines for their appointment in these areas and as such the Govt.

employees are being paid additional allowances and higher pay scales alongwith other facilities.

TABLE-19
STATEMENT SHOWING THE LIST OF OFFICERS WHO HELD THE CHARGE OF
ALLAPALLI FOREST DIVISION.

Sr. No.	Name of the officers	Rank	Period	
			<i>From</i>	<i>To</i>
1	Shri. V.K. Sarwate	I.F.S.	01.04.1965	17.07.1968
2	Shri. R.L. Choudhari	I.F.S.	18.07.1968	04.10.1969
3	Shri. S.K. Mitra	I.F.S.	05.10.1969	31.12.1969
4	Shri. S.K. Kale	I.F.S.	01.07.1970	13.06.1971
5	Shri. M.H. Khedkar	I.F.S.	08.07.1971	19.07.1973
6	Shri. P. Keswani	I.F.S.	21.07.1973	25.06.1975
7	Shri. S.K. Bhargarva	I.F.S.	26.06.1975	04.08.1976
8	Shri. K.K. Chauhan	I.F.S.	05.08.1976	03.07.1978
9	Shri. B. Mazumdar	I.F.S.	04.07.1978	19.03.1979
10	Shri. A.B. Bhangare	I.F.S.	19.03.1979	16.07.1979
11	Shri. Jwala Prasad	I.F.S.	17.07.1979	21.08.1981
12	Shri. D.C. Pant	I.F.S.	22.08.1981	16.06.1982
13	Shri. A.K. Joshi	I.F.S.	21.06.1982	08.11.1984
14	Shri. P.C.S. Singh	I.F.S.	09.11.1984	02.07.1988
15	Shri. J.S. Grewal	I.F.S.	26.07.1988	05.11.1989
16	Shri. G. Ramakrishanarao	I.F.S.	06.11.1989	18.01.1993
17	Shri. N. Vasudewan	I.F.S.	19.01.1993	26.11.1996
18	Shri. B.S. Huda	I.F.S.	27.11.1996	26.06.2000
19	Shri. B.R. Pachpor	I.F.S.	26.06.2000	31.01.2003
20	Shri A.V.Mardikar	I.F.S.	01.02.2003	26.06.2003
21	Shri A.R.Mande	I.F.S.	27.06.2003	

REST HOUSE:

4.1.4 There is only one rest house in Allapalli Forest Division which was constructed in 1902 and has sufficient capacity for the touring forest officers. The maintenance of the rest house needs to be given priority in order to encourage the field officers to regularly tour their areas. Besides this, there are four inspection huts at Ghot, Markhanda, Pirmili and Chamorshi which also require regular maintenance.

COMMUNICATION LINES:

4.1.5 The Divisional Headquarter is well connected with its ranges through network of tar roads which are maintained and it is also connected with some range headquarters through telephone lines.

SECTION – 2 : LABOUR

4.2.1 All developmental activities including important forestry operations

depend on labour supply in adequate numbers and in time, so as to make the project in hand a success. Without adequate and timely supply of labour, forestry activities will be jeopardized to a great extent and especially in important areas like that of Allapalli Division. There are two major sources of labour at present. Internal source is from the villages in the Allapalli Forest Division and external source is from outside the area.

INTERNAL LABOUR

4.2.2 Taking into consideration the then difficulties of working these important and valuable forests, forest settlements in form of Forest Villages were purposely established in the range. In the earlier days, around 1895 onwards, forestry operations were few and simple and were restricted over a small part of the year and were unable to support the labour all around the year. Therefore, the labour were supplied with land for cultivation as an incentive for them to stay at site (villages) and as a measure of additional economic support. The inadequacy of labour available was felt as early as at the time of drafting of 1930 plan and necessity for increasing the number of forest villages was stressed accordingly. However, attempts to that affect yielded little success except during the early and middle thirties, when economic conditions were bad. On the other hand, the forestry works increased manifold and that naturally increased the pressure on the limited source of forest village labour. With the introduction of artificial regeneration operations, the forestry works largely interfered with the agricultural operations. Carting season came in conflict with the rich harvesting season of the forest villagers. This resulted in desertion of the villages by many inhabitants.

4.2.3 The general census was carried out in the year 1981, population figures of which were collected and produced above. During the period from 1965 to 1980, there is a rise of 34.44 % in the population of the forest villages in the Allapalli range. Thus, there has been a definite increase in the labour availability and the activities of the department have also increased simultaneously.

EXTERNAL LABOUR

4.2.4 During non-agricultural season, labour for forest works are available in

Adequate quantity. Acute shortage is however, felt for planting and weeding when the labour from villages gets locally employed for attractive wages for paddy transplanting, weeding and other agricultural operation. The tract is sparsely populated. Gonds and Madias form bulk of the unskilled labour in this tract.

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CHAPTER - 5

PAST SYSTEMS OF MANAGEMENT



CHAPTER – 5

PAST SYSTEMS OF MANAGEMENT

SECTION-1: GENERAL HISTORY OF FORESTS:

5.1.1 The forest dealt with under this tract remained under the Zamindari rights till the year 1951. The Zamindari system was abolished in the year 1951 under the provisions of Madhya Pradesh Abolition of Proprietary rights Act, 1951.

5.1.2 The tract dealt with was formerly a part of the Ex-Aheri Zamindari of Chanda District. The Zamindari remained under the ownership of the Gond Kingdom of the Chanda till 1303. The Zamindari was granted to Manubapu by the Gond Raja of Chanda for retaining land, extending cultivation and maintaining security. In the year 1303 the area came under the Muslim Rule, then under the domain of the Telangana Kings and again under the Muslim Rule of Delhi. The authentic history of lineage can only be traced to the days of Ramsha (1672 to 1735 A.D.) In the year 1698 the area was donated to Shri Jagpatirao and full proprietary rights over the area was donated to Shri Jagpatiroa and full proprietary rights over the area were given to him. In the year 1703 it was bestowed to Koksha. During his period the Zamindari was extended to Bhimrao or Venkatrao, who succeeded Koksha and held Zamindari from the year 1772 to 1818. Mussamatbai succeeded Bhimrao and Bhujangrao succeeded Mussamatibai. The tenure of Bhujangrao commenced with crisis and there was a general revolt. The Bhujangrao succeeded by his son venkateshwarrao who died in 1851. The next successor was Laxmibai, widow of Bhimrao, who ruled firmly until her death in 1861. The successors of Laxmibai were Mangarao (1861 to 1866), Savitribai (1866 to 1871), and Dharmarao (1873 to 1893). After the death of Dharmarao the estate descended to Bhujangrao in 1893. Bhujangrao proved to be incapable of managing the affairs of the estate and so in 1902, the estate was taken over by the court of Wards for management and it was subsequently handed over to Zamindars. The last Zamindar was Dharmarao Bhujangrao. In the year 1951, on passing the M.P. Abolition of Proprietary Rights Act of 1950 (Act-1 of 1951), the ownership of these forests was vested in the State Government.

5.1.3 After passing of M.P. Abolition of Proprietary Rights Act, the forests were vested in the Government and were taken over by the Revenue Department. On September 6, 1952 the same were transferred to the Forest Department for management. In the year 1955, a portion of the forests in surveyed villages were declared as Protected Forests under section 29 of the Indian Forest Act, 1927, vide Notification No. 3056-1216-XI, dated June 4, 1955. Remaining portion of the forests in surveyed and unsurveyed villages were declared as Protected Forests in the year 1959, vide Notification No. FLD/4659-3313-E, dated April 23, 1959. Further under section 4 of IFA 1927 the Government decided to constitute these forests as Reserved Forests and accordingly, proposals were formulated vide Gazette Notification No. FLD/1258-II, 3314-E, dated May 30, 1959. The proposed area was declared as Reserved Forests vide Gazette Notification No. FLD/3685/9316/CR-42/F-3, dated May 5, 1992 under section 20 of IFA, 1927.

SECTION-2: PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS:

5.2.1 The forests of the tract dealt with under this plan, were managed during the Zamindari area without any systematic working system. Selection felling and shifting cultivation were carried out till the year 1902. Which resulted in heavy damage to the forests due to felling cultivation and annual fires. In the year 1902 Aheri estate was kept under the control of Court of Ward, and the shifting cultivation was stopped but owing to the poor financial condition of the estate, the heavy exploitation of forests for revenue continued till 1916.

1. CLUTTARBUCK' PLAN (PRIOR TO 1903):

5.2.2 This was the first plan prepared for the Allapalli Range and was implemented in the year 1895. In this plan mainly selection fellings were carried out. The plan divided the forest of Allapalli Range into two Working Circles Viz. No.I and No.II. In Working Circle No.I Selection system was prescribed under which all teak trees of 24" and above in diameter were to be removed alongwith all unsound teak trees between 18" and 24" diameter at breast height. All trees of other species of diameter 24" and above were also to be exploited if marketable. Girdling or cutting of other trees interfering with young teak regeneration was prescribed. The Working Circle No.2 comprised of all the poorer and degraded forests in which cultural operation were prescribed. Felling cycle was fixed at 40 years. No teak tree below 24" diameter at d.b.h. was to be removed unless showed signs of decay. Even this was to be retained, if there was no other seed bearer tree in the vicinity. Later in 1920, an order was passed which said that 30% of the best teak trees of 24" and above diameter at d.b.h. which were vigorous and growth was taking place and were likely to grow till the next felling, were to be retained. Improvement felling combined with cleaning and thinning operation were prescribed over the whole forest areas under Working Circle No.I and No.II on ten years cycle. A further prescription was added by Shri A.V.Monro, Conservator of Forests that unsound and badly grown trees above 16" diameter at d.b.h. may be removed where the regeneration had been completed and was assured. This operation was to be confined to two of the four coupes of the year in the Working Circle I and II. Besides these prescriptions, there were other treatments suggested but were not implemented.

5.2.3 The result of the above management were not very inspiring. The regeneration which existed in non-bamboo areas was converted and grew upto a part of forest as it stood in 1930. However, the openings, which resulted due to the prescriptions, encouraged establishment and growth of undergrowth. Establishment of further percentage of teak greatly increased due to removal of inferior species and previously suppressed regeneration became part of canopy. As a result of opening bamboos regeneration was widely observed when last general flowering occurred around 1900 in Bhimram hills and Mirkalu block. However in such areas natural regeneration of teak was very poor. At the time of introduction of Cluttarbuck'Silvicultural system plan, there was a fair amount of teak regeneration in bamboo areas which grew into a pole crop and in 1930 it formed the youngest age class. Exploitation felling were heavy in these hills and lack of regeneration produced a crop which was deficient in teak. In plains, however the results were better due to less intensity of bamboo. Though increase in undergrowth was a hindrance to the establishment of regeneration. The removal of unsound and malformed trees and the

opening of canopy by removal of inferior species greatly benefited the young and middle aged teak crop. In 1930, the forests consisted mostly of pole and middle aged teak with some scattered old trees. The teak percentage was deficient.

2. GENTLE' PLAN (1930 TO 1946):

5.2.4 This was perhaps the first scientific management plan for the tract and this was prepared after recording observations of growth parameters and enumeration and also the factors which included in the composition and growth of natural forests. Not only this but also the supply demand of local were also considered alongwith economics of forest and its utility.

5.2.5 The main objects of management were to bring about overall improvement of forests for producing large sized timber. In order to meet this object "Conversion to uniform" a high forest system with regeneration by compartments. Natural regeneration was to be supplemented by artificial regeneration. Trees upto 6' girth can be grown in most of the plain areas of these forests without falling off in diameter increment whereas in hills trees upto 5' girth can be profitable. These prescriptions were applied to teak bearing areas only i.e. forests containing 20% or more of teak. Mixed forest areas containing patches of teak could not be considered due to lack of staff and labour, for further improvements in favour of teak. There appeared to be no significant demand for other forest produce such as bamboo, lac etc. and therefore they were not considered.

5.2.6 The main Working Circles constituted were

- i) Bhimram Hills Working Circles.
- ii) Plains-Elchil Working Circles.
- iii) Mixed Forests Working Circle
- iv) Miscellaneous Working Circle.

The details of the Working Circles are stated below: These working circles are for both the ranges Allapalli and Pedigundum which formerly constituted a compact block.

i) Bhimaram Hill Working Circle : In this were placed all the teak bearing areas in the Bhimaram Hills of Allapalli range and all the exploitable teak bearing areas in the old hill felling series of the Pedigundam range .

ii) Plains-Elchil Working Circle : In this were placed all the exploitable teak areas in the rest of the Allapalli range and similar areas in the Elchil felling series of the Pedigundum range.

iii) Mixed Forest Working Circle : In this were placed areas in both ranges containing mixed forests and also isolated teak areas which by virtue of inaccessibility, smallness or quality of growing stock were not worthy of exploitation and tending under the prevailing conditions.

iv) Miscellaneous Working Circle : In this were place forest areas and areas handed over to the Public Works Department.

i) BHIMARAM HILL WORKING CIRCLE :

5.2.7 The working circle comprised of two felling series Bhimaram Hills in Allapalli range and the Hill felling series in Pedigundam range constituting of better

quality of A' Class, Forest. But these two felling series were considered not fit for immediate introduction of system of concentrated regeneration felling. In Bhimaram felling series teak natural regeneration was very poor due to heavy growth of Bamboo and upper hills slope of under growth near foot hills. In Hill felling series of Pedigundam range the natural regeneration of teak was fairly established, in better quality areas. Bamboos were not abundant, and under-growth was very light. Therefore the crop was quite dissimilar in this working circle in the two felling series.

SILVICULTURAL SYSTEM :

5.2.8 On the basis of crop composition in both the felling series the silviculture system applied was selection-cum-improvement system. The legitimate yield was to be removed through selection felling.

5.2.9 The felling rules provided for a felling cycle of 30 years and a selection diameter limit of 20" was fixed for as it was considered that the site quality was not good enough to maintain a satisfactory annual increment after that size had been reached. However the unsound teak below 20" limit could be removed. The annual coupe was defined as an area over which a prescribed number of teak trees of 20 inches and over in diameter was found. The area and total outturn from all sizes and species therefore varied considerably from year to year. Immediately after the selection felling, subsidiary cultural operations were to be done. These included improvement felling, cutting back operations, thinning, cleanings, climber cutting and clear felling of bamboos. A similar operation was also prescribed for the rest of the area of the felling series on a 10 year cycle except for clear felling of bamboos. In this operation, all trees over 8" diameter except teak, ain, shisham, haldu, bija, tiwas and siwan occurring in a teak area were to be felled and teak was to be favoured amongst these species. Their removal was prescribed only where necessary. Where good stands of well grown dominant trees was to be carried out. All badly grown teak trees below 8" diameter were to be felled, if conditions were favourable for development of good coppice. The whole area of felling series except the areas under actual exploitation has to be burnt for five years annually to secure and establish regeneration of teak and to reduce the amount of under growth. Burning was to be continued beyond five years in exploited areas, until the reproduction was considered full enough to restock the area.

5.2.10 The above felling prescriptions were followed till 1934. When it was realised that the felling of all inferior species of 8' diameter and over resulted in excessive opening of the canopy and the under growth further encouraged. Therefore the prescriptions were modified. The annual burning was found to be more harmful and caused considerable damage to the existing regeneration and also to the older trees. The annual burning was therefore discontinued and burning was limited to one year after the completion of main felling or subsidiary cultural operations. Teak established regeneration in a group was to be freed by clear felling the over wood. Plantations were to be raised at suitable places after clear-felling at the Conservator's discretion. Bamboo cuttings suffered due to lack of labour and was never seriously or thoroughly undertaken. Conditions favourable for recruitment of teaks were never produced.

ii) **THE PLAIN – ELCHIL WORKING CIRCLE :**

5.2.11 This working circle comprised of the plain felling series of the whole of the Allapalli range.

SILVICULTURAL SYSTEM:

5.2.12 The silviculture system applied clear felling for conversion to uniform.

5.2.13 The working rules prescribed for formation of six periodic blocks of twenty years each. The exploitable diameter was fixed at 24" at breast height over bark which was attained in 120 years. Annual coupe for exploitation and regeneration was the area in which a given number of teak trees of 24" and above in diameter at breast height was available. A heavy crown thinning on a ten year cycle was prescribed in periodic block II to favour the dominant trees. All unsound trees unlikely to survive the regeneration period were removed. All other trees except Ain, Shisham, Haldu, Bija, Shivan over 8" diameter were to be removed, which caused heavy openings. All other remaining periodic blocks were treated under uniform silvicultural prescriptions, to benefit the future crop and to improve the growing stock. The above working rules proved unsatisfactory and therefore successive regeneration felling were discontinued and the clear felling system was adopted. In the unallotted periodic block the removal of inferior species over 8 inches diameter at b.h. was stopped. The best sound teak was retained for future yield which resulted in creating a healthy well grown crop.

3) **T.Mc. DONALD AND MUJUMDAR's PLAN (1947 to 1961):**

5.2.14 This was the third plan which came into effect in 1947 and was extended upto 1965. This plan included one more working circle i.e. bamboo overlapping working circle in addition to plain felling series and Bhimaram Working Circle. The bamboo working circle was added with an objective to meet the demand of Ballarpur Paper Mill. In this plan also conversion to uniform system continued.

i) PLAINS FELLING SERIES :

5.2.15 Working rules prescribed formation of 6 periodic blocks of twenty years each and conversion period was fixed at 120 years. The areas allotted to this working circle were good teak bearing areas. Periodic block-I was exploited on volume control basis. Separate prescriptions for areas carrying natural regeneration of teak and those without such natural regeneration of teak were given. Complete burning in area to be regenerated artificially proved to be beneficial. Operations like climber cutting, removal of all dead trees, cutting and burning of bamboos in the following years in promising area where no teak was noticed, cutting of dense under growth of Garari in the first cycle and uprooting and burning of Petalidium on a five year prescribed.

ii) BHIMARAM WORKING CIRCLE:

5.2.16 In this working circle selection-cum-improvement silviculture system was undertaken. The felling cycle prescribed was 30 years. Exploitable diameter of teak and superior injaili was fixed 24 inches and above. Subsidiary cultural operations were prescribed on a 10 year cycle. The object of management was inducement and establishment of natural regeneration of teak and improving the growing stock of teak.

iii) **BAMBOO WORKING CIRCLE;**

5.2.17 Bamboo working circle was formed in 1959 in order to meet the demand of Ballarpur Paper Mill. Two felling series in Allapalli range viz. Patanil and Talawada and three in Pedigundam range were formed. Four annual coupes were formed in each felling series. Bamboo working rules were prescribed. Bamboo on upper hills of Bhimaram were left out from working by the Paper Mill on economic ground.

4) **CHANDRAS AND GURJAR'S PLAN (1965 TO 1984) :**

5.2.18 The working plan dealt with the compact block of Allapalli and Pedigundam range. The general objects of management were as follows:

- a) To satisfy all the local demand for forest produce and conserve as far as possible those tree species which produce edible fruits and flowers for the benefit of the aboriginal population in times of scarcity.
- b) To manage the forest on commercial lines to get optimum profit.
- c) To manage the forest as high forest under intensive working with the object of producing teak trees upto 2.13 m.(7') in girth at b.h.
- d) To maintain a judicious mixture of superior miscellaneous species with teak in the growing stock and a suitable undersotrey to protect and improve the soil.
- e) To increase the rate of conversion so as to complete the conversion program in the remaining period of conversion
- f) To manage the working of bamboo on a sustained basis so as not to interfere with growth of tree species.
- g) To maintain adequate cover on the steeper slopes by judicious and conservative felling in order to prevent soil wash.
- h) To aim at the creation of a normal forest and all that it implies.
- i) To maintain a continued production of large sized timber of teak and other superior species on the basis of sustained yield.
- j) To rigidly fire protect the forests in order to conserve valuable timber.

5.2.19 In order to meet the above objects of management the following working circles were formed.

- i) Teak Conversion Working Circle.
- ii) Plantation Working Circle.
- iii) Hill Working Circle.
- iv) Khorgaon Working Circle.
- v) Mixed Forest Working Circle.
- vi) Miscellaneous Working Circle.
- vii) Bamboo (overlapping) Working Circle.

i) **TEAK CONVERSION WORKING CIRCLE.:**

5.2.20 All exploitable teak forests in the plains and mirkalu areas of Allapalli range and similar compartments in the portion lying to the South of the main internal fire line in the pedigundam range, were kept in this working circle. The plains and mirkalu areas of the Allapalli range formed the plains felling series and the allotted

compartments of the Pedigundam range formed the Elchil felling series. The erstwhile Bhimaram Working Circle was also put under this Working circle.

5.2.21 SPECIAL OBJECTS OF MANAGEMENT :

- 1) To manage the forest as high forest under intensive working with the object of producing large sized and plywood quality timber of teak.
- 2) To increase the rate of conversion so as to complete the conversion program in the remaining period of conversion.

i) SILVICULTURAL SYSTEM:

5.2.22 The silviculture system applied was conversion to uniform, The clear felling was to be supplemented by artificial regeneration of teak. The entire forest area was divided into six period blocks of 20 years each corresponding to the rotation of 120 years in the plains felling series, and five period blocks of 20 years each in the Elchil and the Bhimaram felling series corresponding to the rotation of 100 years. In the plains felling series periodic block I,II,V and VI allotted while III and IV are combined to form one unallotted block. In the Elchil felling series all the periodic blocks are now differentiated. In the Bhimaram felling series periodic blocks I and II only are allotted whereas periodix block III, IV and V are combined into one periodic block unallotted.

5.2.23 The working Rules provided for clear felling in PB I areas and planting of teak stumps was followed after working the areas. The conversion working circle was to be closed for grazing. The plantation coupe was to be rigidly fire protected for a period of 6 years from the time of planting by clearing bushy growth and grass on a line 10 m wide all around it and burning the same before the onset of summer.

ii) PLANTATION WORKING CIRCLE:

5.2.24 This working circle comprised of mixed forests with general site quality III. Only one felling series i.e. plantation felling series was formed.

OBJECTS OF MANAGEMENT :

5.2.25 The main object was to convert the existing unproductive mixed forest of good quality of the erstwhile Hill Working Circle into valuable teak forest.

SILVICULTURAL SYSTEM :

5.2.26 The forest under this working circle was to be treated under clear felling system followed by artificial regeneration of teak in order to convert the unproductive mixed forests into valuable teak forest.

5.2.27 The working rules prescribed that the coppice and the natural seedlings of the superior miscellaneous species was to be favoured to form mixture with teak in the understorey. Weedings were to be carried out to eliminate unwanted growth. In the areas infested with bamboo, frequent cutting of bamboos was

necessary so as to gain ascendancy for teak over bamboo. Climber cutting was to be done at frequent intervals. Teak was to be favoured.

5.2.28 However coppice and natural seedlings of the superior species was to be favoured in understory to form a suitable mixture with teak the whole felling series was divided into 20 annual coupes for working. The area was to be demarcated and a detailed treatment map was to be prepared followed by marking of the trees for felling above 50 cm. diameter at breast height in case of teak and 60 cm diameter at b.h. in case of miscellaneous species. In the above areas all dead, half dead, overmature and vary unsound Trees were to be marked for felling. The remaining areas were marked for clear felling. The plantation operation included burning of the areas and then planting of the teak was to be under taken. The spacing of 2m x 2m. was prescribed.

5.2.29 The subsidiary cultural operations included clear felling of bamboo, removal of inferior species over topping teak, cutting back of saplings seriously damaged by insects or wild animals, cutting of climbers, reduction of multiple shoots to one in the natural regenerated areas.

iii) HILL WORKING CIRCLE :

5.2.30 The working circle included all the compartments containing exploitable teak forests in the Pedigundum range which lie north of the main internal fire line which runs from pillar no. 71 on the Western external boundary line to a point between pillars numbering 59 and 60 on the eastern external boundary line.

OBJECTS OF MANAGEMENT :

- 5.2.31**
- a) To increase the proportion of teak by freeing up existing teak reproduction and encouraging the spread of teak into good quality mixed forests.
 - b) To establish small groups of teak over the greater part of the area so that the future crop will have the effect of a group selection wood.

SILVICULTURAL SYSTEM :

5.2.32 The silviculture system applied was clear felling system.

5.2.33 The forest of the hill felling series comprised of the poor to good quality mixed forest containing no teak. The quality varies according to the plains and hills. Extensive grassy blanks on flat areas revealing water logging and scattered tree growth. In some patches good quality mixed forest containing scattered teak and superior miscellaneous species were found. In some areas good quality even aged pole crop of teak with scattered matured teak trees along the foot hills were also found.

5.2.34 The working rules prescribed for formation of only one felling series i.e. hill felling series. Rotation was fixed at 100 years and a felling cycle of twenty five years prescribed. 25 annual coupes of equi-productive areas were formed. Semal and Khair trees were to be retained except when they were not to be reserved on silvicultural grounds. All dead decaying mal-formed trees were to be removed.

5.2.35 Subsidiary cultural operations in the year of main felling were, all the damaged trees to be felled and all the damaged advanced growth and coppices to be cut back. In the sixth year all bamboos interfering with teak reproduction and advanced growth was to be clear felled. Trees of inferior species standing over established teak reproduction and advanced growth was to be removed, groups of teak saplings which would develop after the first cycle of operations was to be tended, all climbers were to be cut except in extensive area of poor mixed forest.

5.2.36 In areas where plantations had been taken up, three weedings in the 1st year, two in the 2nd year and one in the subsequent year were prescribed. Casualty replacement was to be done in the 1st and 2nd year following plantations. Mechanical thinning was to be carried out in the fifth and the tenth year.

iv) KHORGAON WORKING CIRCLE :

5.2.37 This Working Circle comprised of all the teak and major part of the adjoining better stocked mixed forest of the Khorgaon block of the Pedigundam range.

OBJECTS OF MANAGEMENT :

The following objects of management were enunciated:-

- 5.2.38**
- A) To promote the growth of regeneration and advance growth of teak and other valuable species and to accelerate the spread of teak in the mixed forest.
 - B) To exploit the mature stock of valuable species.

SILVICULTURAL SYSTEM:

5.2.39 The silviculture system applied was selection-cum-improvement felling.

5.2.40 The working rules provided for formation of only one Felling series i.e. Khorgaon Felling Series. The forests are predominantly mixed type. The site varies quality from IVa to III. The important associates of teak were ain, haldu, dhaoda, kalam, tendu, semal, shisham and salai. The exploitable girth for teak and other superior miscellaneous species was fixed at 120 cm. The subsidiary cultural operations included cutting back of any reserved trees or poles damaged badly during the course of felling, cutting back of coppice shoots damaged due to extraction. The coupes were to be closed to grazing for five years after working. The whole felling series was kept under special forest protection class.

v) MIXED FOREST WORKING CIRCLE.

5.2.41 The composition of the forest in this Working Circle had a preponderance of inferior miscellaneous species of mostly IVb quality and the density was poor. Large grassy blanks is a common feature. This working circle was confined to Pedigundam range only.

OBJECTS OF MANAGEMENT:

5.2.42 The main object of management was to improve the conditions and composition of the forest. The working rules provided for taking up plantations in better quality sites of the mixed forest working circle.

vi) **BAMBOO (OVERLAPPING) WORKING CIRCLE :**

5.2.43 This was an overlapping working circle spread over ninety three compartments having a total area of 23913.32 ha. The hill portion was well stocked with dense bamboo as a result of the constant dahiya cultivation.

OBJECTS OF THE MANAGEMENT:

- 5.2.44**
- i) To meet the requirement of the cultivators of adjoining villages lying within a vicinity of 10 miles from the boundaries of the two ranges by setting apart suitable number of compartments to be distributed into Nistar bamboo felling series to be worked separately.
 - ii) To obtain the sustained yield of bamboo by working the crop on scientific principles.
 - iii) To work the remaining compartments for commercial exploitation.

5.2.45 The working rules provided for formation of Nistar and commercial bamboo felling series. The felling cycle of three years was prescribed, and each felling series was divided into three coupes, one of which will remain open for extraction. The working rules for bamboo felling series were given in detail in the Plan. Digging of rhizomes was prohibited. Cutting of tops of bamboo for fodder and culm at a point higher than 45 cm. or below the first node from the ground level was strictly prohibited. All climbers infesting the bamboo clumps were to be removed., The tending operations were to be taken care of.

5) **S.A.H. QURESHI'S PLAN (1985-86 TO 2000-2001) :**

5.2.46 This plan dealt with Allapalli Range of Allapalli Forest Division, and covered an area of 189.20 sq.km. spread over 81 compartments. The area has been under scientific management for the last one hundred years.

OBJECTS OF MANAGEMENT:

- 5.2.47** The following objects of management were considered:-
- i) To satisfy all the local demand for forest produce and conserve as far as possible those tree species, which produce edible fruits and flowers for the benefit of the aboriginal population in times of scarcity.
 - ii) To manage the forest on commercial lines to get optimum profit.
 - iii) To manage the forests as high forests under intensive working with the object of producing teak trees upto 2.13 meters (7') in girth at breast height.

- iv) To maintain a judicious mixture of superior miscellaneous species with teak in the growing stock and suitable understorey to protect and improve the soil.
- v) To maintain and improve the forests on steep and precipitous hill slopes by judicious and conservative felling in order to prevent soil wash off..
- vi) To maintain the enhanced rate of conversion so as to complete the conversion program in the remaining period of conversion.
- vii) To progressively convert the areas containing mixed forest to more valuable forests, so as to utilize the optimum capacity of land.
- vii) To manage the working of bamboo on a sustained basis so as not to interfere with the growth of tree species.
- ix) To maintain a continued production of large sized timber of teak and other superior species on the basis of sustained yield.
- x) To rigidly fire-protect the forests in order to conserve valuable timber and to check deterioration of site.
- xi) To protect and maintain the wildlife and thereby the whole ecosystem.
- xii) To preserve a part of original crop to avoid destruction of species, the use of which is not known at present and thus to safeguard the gene-pool.
- xiii) To aim at the creation of normal forest and all that it implies.

5.2.48 The reserve forests of Allapalli Range were stock-mapped on 4"=1 mile map. The whole forest comprised of 'A' class reserve forests in Allapalli Range. The details of the working circle are given in the following table-

TABLE-20

Sr. No.	Working Circle	Area (ha)
1	Protection Working Circle.	1127.460
2	Teak Conversion Working Circle.	16383.713
3	Miscellaneous Working Circle.	770.117
4	Biosphere Reserve Maintenance Working Circle	639.00
5	Bamboo (overlapping) Working Circle.	4598.851
6	Wildlife (overlapping) Working Circle.	18920.284

i) PROTECTION WORKING CIRCLE:

5.2.49 The working circle comprised of all the compartments of Bhimaram felling series containing some areas of steep to vary precipitous slopes of 25° and above. The main objects of management were to maintain and improve the

adequate soil cover on the steep and precipitous hill slopes as a safe guard against soil erosion and rapid run off of water to give rest to these forests from exploitation activities and to promote and maintain a permanent soil cover. The forests allotted to this working circle are well stocked and mostly of site quality III though few patches of site quality II were also present. Teak was predominant and formed 93.76% of the growing stock by area and appeared best on gently sloping and well drained soil.

SILVICULTURAL SYSTEM :

5.2.49 No working was prescribed in this working circle except essential cultural operation like climber cutting and removal of dead trees and fire protection.

5.2.50 The object was aimed at maintaining and improving adequate soil cover and to give rest to these areas from exploitation activities and therefore no silviculture system was applied. Bamboo which formed understorey and their removal would not have resulted in generally disturbing the protective functions and hence bamboo exploitation as per silvicultural prescriptions was allowed. Only dead trees were allowed to be removed and therefore no specific rotation was required as the same would be different for each individual tree. One felling series with felling cycle of 20 years and divided into 20 annual coupes was prescribed. All climbers were to be cut and all dead trees were to be marked for felling. The whole area was to be closed for grazing in order to avoid loss of top soil erosion and the entire area was to be strictly fire protected.

ii) TEAK CONVERSION WORKING CIRCLE :

5.2.51 Better quality exploitable teak forests areas were included in this working circle in order to manage the forest as high forest under intensive working with the object of producing large sized timber and plywood quality timber, to maintain the increased rate of conversion to increase the stocking of teak and to obtain maximum supply of teak timber. The forest was generally well stocked and mostly of site quality III and teak formed 30.82 percent. Teak was followed by ain in plains and surya in Bhimaram hills. Lendia and Shisham also occurred in fair quantity. Garari in the understorey was abundant.

SILVICULTURAL SYSTEM :

5.2.52 The silviculture system applied to these forest in this working circle was clear felling system with periodic blocks in order to convert the existing irregular forest into a normal forest in one rotation.

5.2.53 The working rules aimed at converting the existing irregular forest into a normal forest in one rotation. Reliance was placed on artificial regeneration of teak however advantage was taken of natural regeneration wherever it existed in the forest . Regeneration blocks were selected in the plain and bhimaram felling series taking into consideration the maturity and incidence of teak in the stand. Teak was the principal species and other superior species were retained in the understorey to form a mixture. Pure stands of teak were not favoured instead Teak Miscellaneous was preferred. The yield on volume basis could not be accurately predicted and

therefore expected yield and actual yield showed great variance. The whole area allotted to this working circle was closed for grazing. Fire protection measures were to be strictly followed. In the year 1987, the Govt. of India issued instructions to all the States completely banning the green felling in the forest and therefore the entire area put under the Teak Conversion Working Circle was left unworked in the remaining period of the last plan. It is also noted that no effort was undertaken to manage the same under the Selection-cum-Improvement Working Circle.

iii) MISCELLANEOUS WORKING CIRCLE :

5.2.54 The forest included in this working circle comprised of all areas of village Forest and small areas of Allapalli forest village handed over to the Public Works Department.

5.2.55 There were three forest villages in Allapalli Range namely Allapalli, Talwada and Zamela which were declared as Revenue villages vide Govt. of Maharashtra, Revenue and Forests Deptt.' Resolution No. FLD-4267-I-Y dated May 2,1967. Government further sanctioned disforestation of forest villages in Chanda district vide Govt. of Maharashtra letter No.FLD-3669/214491, dated June 4,1970. It was further ordered that the control over the land should remain with the Forest Department. The Government of Maharashtra vide its resolution No. FLD-3675/87579-F-6 dated August 24,1977 ordered that administration of these forest villages be handed over to Revenue Department w.e.f. September 1,1977 and therefore villages and the areas disforested were handed over Revenue Department viz.Allapalli (119.47 ha.) in comptt.No. 81, Talwada (36.80 ha.) in comptt.No. 65 and Zamela (15.73 ha) in comptt.50.

5.2.56 The main object of this working circle was to provide Nistar to forest villages. The working rules prescribed, aimed at allowing free Grazing Policy laid down by the Government, supply of forest produce viz. thorns, wood and grasses for bonafide agricultural use and timber for house building repairs, wood for fuel, bamboos and leaves for thatching etc. and edible roots and fruits for domestic purposes was permitted, lopping of trees was prohibited. The Divisional Forest Officer, Allapalli was empowered to permit exploitation of any timber in forest village areas for departmental construction work.

5.2.57 The other miscellaneous regulations such as fire protection, maintenance of boundaries, roads, grazing control, climber cutting, buildings, communications, water supply, control and records, survey and demarcation were put in this working circle.

iv) BIOSPHERE RESERVE MAINTENANCE WORKING CIRCLE :

5.2.58 Allapalli Forests were a compact block of high quality forests which was endowed with wide variety of naturally occurring wild life both flora and fauna, insects and micro organisation and therefore it was realised to preserve some of the areas as Biosphere reserve and the working rules prescribed no exploitation in such areas in order to avoid elimination of valuable gene pool of the area and whose utility is of utmost importance.

v) **BAMBOO (OVERLAPPING) WORKING CIRCLE :**

5.2.59 This working circle was overlapping the other working circles namely the protection working circle, teak conversion working circle and the miscellaneous working circle. The quality and growth of bamboo varies vastly from one area to the other depending upon the quality and composition of the soil.

5.2.60 The special objects of management were to meet the local demand of the villagers, to obtain sustained yield of bamboos and to meet the commercial demand of bamboos for Ballarpur Paper Mills.

5.2.61 The working rules prescribed formation of Nistar and commercial felling series. The felling cycle of 3 years was prescribed and each felling series was divided in to 3 annual coupes one of which remained open for extraction in cycle. The commercial felling series was leased to Ballarpur Paper Mills for exploitation on long term lease. The remaining areas were to be exploited departmentally . Culms, 2 years of age or below, culms from under developed clumps (clumps having less than ten culms) were prescribed not to be felled. All the dead, crooked and malformed bamboos were prescribed to be removed. No bamboo was to be felled below 15 cm. height and above 30 cm. from the ground level. At least eight major well grown culms per clump were required to be retained, digging of rhizome was prohibited.

5.2.62 The areas included in this working circle comprised of important wild animals which were fairly distributed over the entire range of Allapalli forests. The past history of management of these forests revealed that no scientific management throughout was attributed to the wild life management and therefore indiscriminate poaching of wild animals by local people continued for a long time. The area allotted to this working circle overlaps the areas of other working circles in the Allapalli range. The range is fully forested with 63%, Teak, 31% mixed and miscellaneous species and about 6% of the area constituted forest villagers cultivation and blanks.

OBJECTS OF MANAGEMENT:

5.2.63 The special objects of management were:-

- 1) To preserve and enhance the present wildlife in the range.
- 2) To manage the wildlife on scientific basis.
- 3) To carry out scientific studies consistent with the object of management.

5.2.64 In order to achieve the aforesaid objectives the plan prescribed for preparations of Range inventory by identifying and listing all fodder and forage species which are grazed and browsed by wildlife herbivores and this needed to be quantified by laying down sample plots and the data so collected was to be computed statistically. The animal census was to be carried out every year and the animal behaviour studies were to be done including the wildlife habitats and their habit of food, shelter and reproduction. The other important activities were the improvement of wildlife's habitats. This included constructions of small check dams along the nalas, provisions for salt licks near water holes, erecting watch towers near water points for study and observation of wild animals. Grassy blanks were to be

provided and Jawar and Maize along with other palatable grasses were to be seed sown as a measure to improve habitat. Hunting of wild animals was completely banned.

5.2.65 The local people needed education for protection of wildlife and so the staff deputed for training in wildlife management who will guide the local people in matters of wildlife management. The roads and communication network was prescribed to be improved in order to undertake the management of wild life in the range.

5) **A.P.DESHMUKH AND S.P. JOSHI'S WORKING PLAN FOR PIRIMILI AND AHERI RANGES (1990.91 To 1999.2000) :**

5.2.66 This was the forest working plan for pirmili and Aheri ranges of the Allapalli Forest Division and covered an area of 54745.433 ha. spread over 142 compartments.

OBJECTS OF MANAGEMENT :

- 5.2.67**
- i) To preserve forests on steep hill slopes and areas stocked with open forest to prevent erosion and rapid run-off and conserve the environment.
 - ii) To conserve remaining existing natural forests.
 - iii) To restock all the understocked and degraded forests, enrich the growing stock and to achieve normality of growing stock in shortest possible time.
 - iv) To give priority to the local demand for forest produce and fodder.
 - v) To increase production of M.F.P. and to manage the same scientifically.
 - vi) To create grass reserves in the heavily populated areas where the demand of fodder grass is heavy and improve the quality of grasses.
 - vii) To ensure the maximum sustained yield of the forest produce in demand.

5.2.68 The tract dealt with in this plan was stock mapped on 4" to a mile scale and the total area was divided into two blocks viz. Pirmili block having 138 compartments and Aheri block having 4 compartments. The total forest area was divided into following three working circles namely:

TABLE-21

Sr.No.	Felling Series	Area in ha.
1	Selection cum Improvement working circle.	47234.291
2	Improvement working circle.	7011.162
3	Bamboo under planting overlapping working circle	1208.443

i) SELECTION CUM IMPROVEMENT WORKING CIRCLE:

5.2.69 Teak is generally absent and other important species are Ain, Haldu, Tendu, Shisham, Semal, Mahua and Garari. Crop density varies from 0.5 to 0.7 and

site quality is III and IV a and Ivb. The whole working circle was divided into seven felling series with felling cycle of 30 years.

SILVICULTURAL SYSTEM.

5.2.70 The forests of this working circle are situated either along slopes or on sandy soil., The silviculture system adopted is selection-cum-Improvement working system. The choice of species in order of importance are teak, bija, semal, shisham, ain haldu, salai, dhaora, tendu, lendia, bhirra and garari. Healthy and fruit bearing trees such as achar, aonla, chinch, khirni, mahua, mango etc. was to be retained. The harvestable girth decided for important species were as follows:

TABLE- 22

Sr.No	Name of the species	Prescribed exploitable girth at b.h.o.in cm.
1.	Teak	120
2.	Bija, ain, haldu, semal	135
3.	Tendu, bhirra, dhaora & other miscellaneous species other than khair and garari.	120
4.	Khair, garari and other species of middle storey.	45

5.2.71 The working rules prescribed, aimed at production of large sized timber. The rotation was fixed at the average age at which individual tree reaches the diameter of girth required by the objects of management. The rotation for teak and other species of under storey was fixed at 120 years where as for the middle storey species like khair and garari, the rotation was fixed at 50 years. The felling rules provided for preparation of treatment map showing details of areas in each coupe. The areas on slopes of 25° and above and all areas 20 mts. wide strips along river and nalah banks and 100 meter wide belt around banks of perenial tanks was to be protected and no felling prescribed. The natural blanks and areas having density below 0.4 with minimum area of 0.4 ha. and understocked areas with density 0.4 below and including half a chain wide strip surrounding such areas, were required to be artificially regenerated. The remaining areas were to be worked which were fit for harvesting.

5.2.72 The subsidiary cultural operations included following:

a. **Cutting back operation:** In the following year of main felling, the following operation were carried out departmentally.

- i. All the standing trees marked for felling, but not felled were to be felled.
- ii. All badly damaged trees with broken tops were to be felled.
- iii. All malformed advance growth of trees shall be cut back and the inferior growth likely to interfere with the established natural regeneration will be cut to free the same for future crop and congestion removed with care.
- iv. Active gullies will be plugged.

- v. All woody climbers will be cut.
- b. **Cleaning:** Cleaning operations shall be carried out in the 6th year of main felling. The operations shall be carried out as under:
 - i) All climbers shall be cut.
 - ii) Damaged and malformed saplings and coppice shoots shall be cut back and natural regeneration freed from competition.
 - iii) Multiple coppice shoots shall be reduced to two, retaining the most vigorously growing ones.
- ii) **IMPROVEMENT WORKING CIRCLE :**

5.2.73 Protected forests and occupied areas were kept under this working circle basically with an objective to meet the nistar requirements of the village population.

5.2.74 The composition of the forests is of miscellaneous type and crop density is mostly below 0.4 and site quality is IVa to IVb. The composition of the soil has also deteriorated over the years due to loss of tree cover.

5.2.75 The special objects of management were to carry out improvement of forests in terms of quality and quantity.

SILVICULTURAL SYSTEM :

5.2.76 The silviculture system adopted is improvement system and prescribed removal of dead, dying and diseased trees followed by planting of suitable species in blanks and understocked areas.

5.2.77 The working rules prescribed formation of 55 felling series distributed in 55 compartments over the area 7011.162 ha. the working rules prescribed no fixed rotation. All areas were kept under strict fire protection vigil. All current coupes were to be closed for grazing for seven years. The villages were not allowed to harvest their nistar requirements themselves. The available Nistar material was to be extracted by the department and was to be distributed to the villagers according to the Nistar Patrak. However grass was allowed to be cut and removed. Nistar rights of the people over the remaining area except the area under working, was to be closed under section 30 of Indian Forest Act, 1927 for period of 30 years. Nistar rights were to be made available from the area under the current coupe only and no additional area was to be exploited to meet the deficit, if any, in respect of Nistar. However the deficit in Nistar could be met from current coupes of nearest felling series under selection-cum-Improvement working circle. The quantity of Nistar material to be supplied was to be determined on the basis of number of family members per house hold in respect of fuel wood at the rates specified by the competent authority.

iii) BAMBOO UNDER PLANTING (OVER-LAPPING) WORKING CIRCLE :

5.2.78 This overlapping working circle constituted of teak plantations raised in the past on site quality III. The Bamboo under planting was prescribed in the 3rd year of main planting of the Teak.

SPECIAL OBJECTS OF MANAGEMENT.

- 5.2.79** Special objects of management are-
- i) To raise bamboos to meet local demand,
 - ii) To attain maximum utilisation of the area under plantation (maximum utility of the land)
 - iii) To provide employment to local population.

5.2.80 The working rules prescribed selection of site and raising of planting stock two years in advance in the nurseries. The bamboo under planting was to be done in a spacing of 6 m x 6m which required about 200 polypots per hectare. Bamboo plantation were expected to reach harvesting stage after 6 years and a cutting cycle of 4 years was prescribed.

6) K.N.KHISTI's working plan(1977-78 to 1991-92) :

5.2.81 This working plan for the Ghot range of Allapalli Forest Division was prepared on the basis of scientific working of forests. The prescriptions have been influenced by the National Forest Policy and the general objects of management are outlined below:-

- a) To mitigate the effects of soil erosion and to preserve and promote vegetative cover on steep and precipitous hill slopes.
- b) To meet local demand for small timber, firewood and bamboo.
- c) To meet the outside demand for large sized timber, firewood and charcoal to the extent the forest can bear.
- d) To provide grazing facilities for cattle to the extent compatible with scientific management of these forests.
- e) To enhance potential value of the forests by raising plantations of important species particularly teak.
- f) To obtain progressively increasing yield of timber and firewood on sustained basis with due regard to silvicultural requirements of the forests.
- g) To attain normal forests.
- h) Consistent with the above, to derive maximum financial benefits.

5.2.82 In order to meet the above objectives following working circles have been constituted.

TABLE-23

Sr.No.	Working Circle	Area in ha.
1	Selection-cum-Improvement Working Circle	15777.640
2	Coppice with Reserve Working Circle	6261.902
3	Plantation Working Circle.	1307.136
4	Miscellaneous Working circle.	16665.563
5	Bamboo (overlapping) Working Circle.	9223.196

i) SELECTION-CUM-IMPROVEMENT WORKING CIRCLE:

5.2.83 The Forest of this working circle are found on hilly to undulating terrain. The working circle comprises of teak forest, miscellaneous forest with low proportion of teak and miscellaneous forest devoid of teak. Teak forms about 40 to 60% of the growing stock. Density of the crop ranges between 0.5 and 0.7. The site quality varies from IVa to III. The teak trees of site quality III is fairly straight. Natural regeneration of teak was scanty to poor. The other main associates of teak in overwood are ain, dhoda, shisham, karam and bija and semal. The underwood is formed of tendu, bel, khair and medsing. The undergrowth consists of gilbili, dikamali, lokhandi and bamboos.

OBJECTS OF MANAGEMENT:

5.2.84 The objects of management were :-

- i) To preserve vegetative cover and to protect hill slopes and unstable soil liable to denudation.
- ii) To improve the condition and value of the forests.
- ii) Consistent with the above to exploit mature trees of marketable species on sustained yield basis.

SILVICULTURAL SYSTEM.

5.2.85 The silviculture system applied was selection-cum-Improvement felling system. The selection felling of exploitable marketable species to the extent prescribed in order to safeguard future yield. Improvement felling were prescribed for removal of dead, moribund trees, trees of inferior species, coming in the way of proper development and reproduction of important species.

5.2.86 The working rules prescribed for formation of two felling series namely Ambela felling series and Garanji felling series. The exploitable girth for teak, bija, semal was fixed at breast height over bark as 140 cm., 150 cm. and 135 cm. respectively. Whereas for ain, haldu, shishamn, it was 125 cm. and for siwan and tinsa, it was 90 cm. The rotation period was fixed at 100 years and a felling cycle of 20 years was adopted.

5.2.87 The subsidiary cultural operations included cutting back operation, cleaning and thinning in plantation areas. The working coupes of all the felling series to be closed to grazing for a period of five years, after main felling.

ii) COPPICE WITH RESERVES WORKING CIRCLE :

5.2.88 The forest included in this working circle are low quality forest born on undulating terrain. The grown stock consisting predominantly of miscellaneous forest with scattered occurrence of teak in very low proportion and teak forest in small patches. The quality of the crop varies from III to IVb with preponderance of IVb quality areas. There are small patches of quality III forests confined particularly to the nalla banks. The density of the crop ranges between 0.4 and 0.6. The crop in general is branchy, malformed and unsound. The crop in better quality areas is however straight though, some trees to be externally unsound. The reproduction of

important timber species is scanty. The growing stock is characterised by the presence of ain, dhaoda, tendu, moha, rohan and teak in the overwood and khair, bhirra, garari in the underwood. The undergrowth is sparse.

OBJECTS OF MANAGEMENT

The objects of management are as follows:-

- 5.2.89**
- 1) To maintain and improve conditions of the site and to provide adequate vegetal cover in vulnerable areas.
 - 2) To improve the conditions, composition and density of the tree crop and ensure adequate regeneration by appropriate silvicultural system.
 - 3) Consistent with the above, to obtain maximum outturn of small sized timber and firewood not only to meet the local demand but also for export of surplus forest produce;.

SILVICULTURAL SYSTEM.

5.2.90 The silviculture system was coppice with reserves.

5.2.91 The working rules provided for reservation of trees of valuable species and retention of vegetative cover in the areas eroded or liable to erosion, and with a view to increase the proportion of teak forests. The coppice with reserve system is combined with clear felling of suitable areas for raising teak plantations. The teak was the most favoured species followed by bija, ain, shisam, haldu, tinsa and karam. The rotation of the coppice was fixed at 45 years corresponding to the size of poles of 45 to 60 cm. girth at breast height which is attained in 40 to 50 years. The yield was to be regulated by area by laying out 45 annual coupes, in each felling series.

5.2.92 The subsidiary cultural operations included weeding and replacement of casualties in plantations and cutting back operations and thinning and cleaning. The worked coupes were to be closed for grazing and areas worked were to be protected completely from fire.

iii) PLANTATION WORKING CIRCLE :

5.2.93 In order to remove the deficiency in the recruitment of seedlings of valuable species particularly teak in good quality forest, this working circle was constituted in Ghot Range. The composition of crop is teak and miscellaneous forest. The quality of forest varies from IVb to III. The important species found are teak, ain, dhaoda, tendu, haldu and rarely shisham. The density varies from 0.5 to 0.7.

OBJECTS OF MANAGEMENT:

- 5.2.94** The objects of management are as follows:-
- a) To counter balance paucity of natural regeneration by raising plantations of economically valuable species particularly the teak.
 - b) To augment resources in softwood species.
 - c) To increase the value of the growing stock.

SILVICULTURAL SYSTEM

5.2.95 The Silvicultural system prescribed was clear felling followed by artificial regeneration.

5.2.96 The working rules prescribed planting of teak followed by plantation of semal as softwood species. The subsidiary cultural operations included three weedings in 1st year, two in second year and one in subsequent year. In the fourth year cleaning operations such as climber cutting, cutting inferior growth and bamboo interplanting with growth of planted crop was to be carried out. The thinning operations were prescribed in the 7th year, 15th year and thereafter in a 10 year cycle.

5.2.97 The area planted was to be closed for grazing for ten years and was to be completely protected from fire.

iv) MISCELLANEOUS WORKING CIRCLE :

5.2.98 This working circle comprised of very much understocked, extensively eroded areas and forest villagers. The crop was very poor in density and quality Site quality being generally IVb.

5.2.99 The basic objects of this working circle to improve the site quality and growing stock and therefore improvement felling were prescribed for removal of dead, dying, overmature and hollow trees which were silviculturally available.

5.2.100 No regular working was prescribed. The irregular exploitation was permitted on silvicultural grounds to meet the bonafide requirements of local people.

v) BAMBOO (OVERLAPPING) WORKING CIRCLE :

5.2.101 This working circle comprised of areas bearing bamboos in selection-cum-improvement working circle. C.W.R. Working circle and Miscellaneous working circle.

5.2.102 The *Dendrocalamus strictus* is the only species reported in this tract. The bamboo forms an undergrowth in better quality areas. The quality and growth of bamboo varies according to variation in soil, altitude and drainage.

OBJECTS OF MANAGEMENT :

5.2.103 The objects of management were as follows:-

- i) To exploit bamboos on scientific lines.
- ii) To obtain maximum yield on sustained basis.
- iii) To meet local demand of bamboos.

5.2.104 The felling cycle of 3 years was prescribed. The working rules prescribed for exploitation of bamboo, are outlined below:

- 1) Bamboo extraction will not be permitted during the monsoon period i.e .from 15th June to 30th September as this is the period of formation of new culms.
- 2) In every bamboo coupe, the following kinds of bamboo culms must, without exception, be removed irrespective of whether the clump is mature and whether there are any other green (living) culms available for exploitation as per the prescribed rules or not:-
 - a) Dead and decaying.
 - b) Culms where the growing shoots have been cut to a length of more than 1/3 of the normal length or the culms which are badly damaged and rendered unsound.
 - c) Twisted, bent or otherwise malformed culms.
- 3) A clump will not be considered mature for exploitation unless it contained more than 8 mature (more than 1 season old) culms.
- 4) In a mature clump, the following types of culms (green and living) will be retained:-
 - a) All current seasons i.e. less than 1 year old culms.
 - b) From the rest, culms equal in number to the current seasons (less than 1 year old) culms or eight whichever is more.
- 5) Culms to the extent available for exploitation after retention as per rule (4) above should be exploited in such a manner that the clump is evenly worked through out and that the bamboos to be retained are evenly spaced out in the clump.
- 6) The clumps on the periphery of the clump should not be removed except where absolutely necessary to facilitate working in the interior portion of the clump.
- 7) The height at which the culms shall be cut must not be lower than 6" (15 cm.) and more than 18" (45 cm.) from the ground level but in any case, not higher than the second internode and lower than the first internode.
- 8) In case of flowering clumps, exploitation should be deferred till the seeding is completed.
- 9) The following acts should be strictly prohibited:-
 - a) digging of rhizomes.
 - b) Cutting of tops of bamboo for fodder.
 - c) Use of tender bamboo for bunding.
- 10) Use of sharp instruments should be insisted upon during extraction.
- 11) All climbers infesting the bamboo clumps should be removed.

SECTION 3: ANALYSIS OF RESULTS OF PAST SYSTEMS OF MANagements :

5.3.1 The present working plan is the first consolidated and comprehensive working plan for Allapalli Forest Division. Which replaces Shri S.A.H.Qureshi's Working Plan for Allapalli Range, Shri A.P.Deshmukh and Shri S.P.Joshi's working plan for Pirmili and Aheri range and Shri K.N.Knisti's Working Plan for Ghot Range.

5.3.2 The tract dealt with in each working plan was divided into working circles as the working circle is the unit of management in each range. The analysis of prescriptions of past working plans and their results are discussed below:

i) TEAK CONVERSION WORKING CIRCLE:

5.3.3 The main object of this working circle was to transfer/convert the miscellaneous forest with inferior species into even aged crop with high percentage of teak and to manage the forest as high forest. For this purpose two felling series were identified plain felling series and Bhimaram felling series. The plain felling series were having six periodic blocks of 20 years each corresponding to the rotation of 120 years and in Bhimaram felling series, five periodic blocks of 20 years each were formed corresponding to the rotation of 100 years. In the plain felling series P.B. I,II, IV, V and VI were allotted while P.B.III remained unallotted area. In the Bhimaram felling series, the periodic blocks-I, II and V were allotted and P.B.III and IV were combined periodic block unallotted. The P.B.I. area was divided into 20 annual coupes. In P.B.I. clear felling and planting of teak stumps was prescribed.

5.3.4 The results of plantations are very good. The areas under this working circle have maintained their diversity with high percentage of teak. The natural regeneration of teak is very poor as also that of miscellaneous species. The forest is however well stocked in some areas artificial regeneration of teak is a failure due to lack of proper identification of planting site for teak. However the anticipated growth is by and large absent. In remote areas and upper slopes in Bhimaram hills the congestion and unsound inferior species are common. The bamboo undergrowth is also very congested in few pockets. Through these areas have been worked under the conversion to uniform system since 1930 but due to silvicultural reasons and change in National Forest Policy, whole of these areas could not be clear felled after 1988. The PB I areas of Allapalli range as per working plan of Shri Qureshi could be worked up to coupe No. 5. The teak plantations raised on clear felled areas have come up very well except in small patches where growth of teak is poor due to poor edaphic conditions. These plantations have grown very tall and the canopy is closed. Even in patches, where teak plants have not come up, the other miscellaneous species have closed the canopy. Thus no permanent gaps have been noticed in the canopy. Due to non working of PB I coupes after coupe No.5, most of the standing crop in the PB I area is either mature or over mature and due to repeated fires and strong winds during summer and pre-monsoon period, many of the mature and over mature trees either fall or are seen in tilted condition and such trees are finally uprooted. In view of this, it is necessary that the remaining coupes of PB I areas should be clear felled and planted with teak.

5.3.5 The forest in PB II areas due to non working have also become mature and over mature and these areas are potentially good for supporting teak plantations after removal of over-wood. In the remaining PB areas, no thinning has been carried out as prescribed in the previous working plans due to which congestion in the crop is noticed. Therefore these areas are proposed to be worked under S.C.I. felling circle as they have potentiality of producing large size of timber of teak and other miscellaneous species on sustained basis.

ii) **SELECTION CUM IMPROVEMENT WORKING CIRCLE :**

5.3.6 The main object of this working circle was the productions of large sized timber of valuable species. This working circle comprised of good quality Teak and Teak-Miscellaneous forest. The site quality is generally III to IVa.

5.3.7 The prescription aimed at improvement of growing stock and increase in the proportion of economically valuable species by giving preferential treatment. Teak was chosen as most favoured species.

5.3.8 The operations to achieve the objectives set under this working circle required main felling, improvement felling soil and moisture conservation works. By and large, the main felling of sound mature and marketable timber species was carried out as per prescriptions in the working plan but the improvement felling and soil and moisture conservation works were not given due care which resulted in poor improvement of growing stock and soil cover also did not improve as envisaged. Teak plantation in each annual coupe could not be taken as prescribed in the plan. Silvicultural operations could not be undertaken resulting in congestion and growth of unsound and unmarketable mature and overmature trees. Tending of natural regeneration could not be paid due attention and therefore the crop resulted in crooked and malformed undergrowth. The harvesting of superior marketable species was preferred. The felling was quite conservative and the dense crop were not thinned in order to promote natural regeneration which was suppressed due to paucity of light falling on the surface / ground It has been observed that for such areas the best working circle is selection-cum-improvement if the prescriptions are followed meticulously. The productivity of the area can be increased by some manipulations at the time of marking and giving preferential treatment to the natural regeneration. The extent of felling are proposed to be decided on the basis of site quality and normal stand table. Coupe working should include year wise phased program of soil and moisture conservation works. All the plantation raised in S.C.I. areas in the past shall be put under a separate working circle i.e. Teak Plantation working circle.

iii) **PROTECTION WORKING CIRCLE :**

5.3.9 This working circle comprised of all hill area of Allapalli forest division such as Bhimaram hills in Allapalli Range which had areas of very steep to precipitous slopes of 25° and above. The main objectives set were to improve the soil cover on steep and precipitous hill slope in order to check soil erosion and to give rest to these forest from exploitation activities. Forest were generally well stocked with site quality III to II. Regeneration is very poor. No subsidiary silvicultural operations were prescribed. The removal of dead trees could not be taken care of and fire protection measures which were necessary to protect the area, were also not successfully employed. The silvicultural operations like climbers cutting etc. were not under taken seriously. The removal of bamboos could not be given due care and therefore annual fires could not be effectively controlled which resulted in hardening of top soil.

iv) **PLANTATION WORKING CIRCLE :**

5.3.10 Teak plantations were undertaken in this tract under selection-cum-Improvement working circles and also in Teak Conversion Working Circles but a separate plantation working circle was prescribed in Ghot Range by Shri K.N.Khisti for all those areas where there was deficiency in the recruitment of seedlings of valuable species particularly Teak in good quality forest and which were kept unallotted in the past. The working circle comprised of mostly site quality III teak and miscellaneous forest more or less in two compact blocks. In some patches site quality IVa areas were also included. The crop density was between 0.5 to 0.7.

5.3.11 The objectives set under this working circle to increase the area under teak by raising plantation and increase the value of growing stock. Teak was favoured as most economically valuable species followed by softwood like semal.

5.3.12 The operations required to be followed to meet the above objectives were demarcation of areas and marking of trees. The felling rules provide for retention of trees except mature and overmature all along nala banks on 20 meters wide strip. The advance growth of teak and other valuable species of bija, shishan, ain, was to be retained patches of pole crop of more than 0.5 hectare were to be retained and due silviculture treatment was to be provided and the rest of the area was to be clear felled and planted.

5.3.13 The subsidiary silvicultural operation suggested were three weedings in the first year, two weedings in the second year, one weeding in the final year, cleaning operations in fourth year and thinnings were provided in the 7th and 15th years and thereafter on a 10 year cycle. But these operations could not be undertaken with proper care. Therefore the crop showed congestion and malformed tree growth resulting in poor quality growing stock. The area was to be rigidly protected from fire which could hardly be done and therefore annual fire caused heavy damage to the crops and resulted in deterioration of soil cover and site quality. Grazing was to be closed for ten years which could not be controlled.

5.3.14 The present working plan prescribes for inclusion of all such old plantations under a separate working circle i.e. Teak Plantation Working Circle in order to prescribe for preferential treatment to teak and further to provide proper silvicultural treatment to the crop.

v) **COPPICE WITH RESERVE WORKING CIRCLE:**

5.3.15 This working circle was formed by Shri K.N.Khisti in Ghot Range for all such areas which were under-stocked and un-allotted in the previous plan but were now sufficiently stocked. The forest are mostly located on undulating terrain and are of low quality. This working circle comprised of two felling series viz. Bolepalli and Dakadi.

5.3.16 The objectives set were to maintain and improve conditions of the site and provide sufficient vegetal cover in vulnerable areas, to improve the condition and composition of the crop and to ensure adequate regeneration of important species and further to obtain maximum outturn of small sized timber and firewood not only to meet local demand but also for export of surplus forest produce.

5.3.17 The operations required to achieve the objectives set prescribed for working these forest under coppice with reserves systems. The system provided for reservation of trees of valuable species and retention of vegetal cover in the areas eroded or liable to erosion. In order to increase the proportion of teak forest, coppice with reserves system was combined with clear felling of suitable sites for raising teak plantation. Teak was most favoured species followed by bija, ain,shisham, haldu and karam. Subsidiary cultural operations prescribed weeding, replacement of casualties, cutting back operations were to be meticulously followed but they were not under taken seriously as suggested in the plan.

5.3.18 The results of this working circle were not very encouraging as most of the compartments under this working circle were near human settlements so excessive biotic pressure, heavy grazing, illicit felling and frequent fires resulted in poor composition of the soil. In most of the areas coppice shoots did not come up and whatever regeneration came up in the areas, died back before they got established. The species which did not coppiced were eliminated. No attempt was made to encourage side shoots over callous shoots with the result the disease of parent trees were carried over. In many areas forests are completely opened without much undergrowth resulting in exposure of soil and soil erosion. The coppice shoots were not singled and therefore more than one coppice shoots got established from the same stool in some areas which resulted in further degradation of growing stock. These areas have now been included in the Improvement Working Circle.

vi) MISCELLANEOUS WORKING CIRCLE :

5.3.19 This working circle was proposed by Shri S.A.H.Qureshi in his working plan for Allapalli Range for the forest villages and a small area handed over to the public works department. The basic objective of this working circle was to provide Nistar to the forest villagers. The miscellaneous working circle proposed by Shri K.N. Khisti in his working plan for Ghot Range comprised of understocked areas, extensively eroded areas and forest villages. The forest were poor in quality and quantity. Site quality was miscellaneous IVb. The objective set was to provide Nistar requirement to the villagers. In order to meet the objectives set, the working rules provided for improvement felling and removal of dead, dying, hollow, overmature, malformed trees if silviculturally available. But no improvement felling were carried out and silviculture prescriptions were also not carefully followed which resulted in further deterioration of crop. Illicit cutting and grazing were also not controlled which opened the area and soil cover has been exposed. Therefore these areas are now proposed to be undertaken under Improvement Working Circle Improvement felling and thinning is required in such areas and the material so obtained, will meet the Nistar requirements. There is need to take back these areas under the possession of the forest department.

vii) BAMBOO OVERLAPPING WORKING CIRCLE :

5.3.20 The bamboo overlapping working circle was constituted with an objective to meet the demand of bamboo for Ballarpur paper Mill and to meet the local demand of villages. Therefore two felling series viz. Nistar and commercial were formed.

5.3.21 The Ballarpur paper Mill in the beginning harvested only those commercial felling series which were easily accessible due to extraction cost of labour which resulted in congestion of crop in hilly tracts and interior areas.

5.3.22 The coupes of nistar felling series which were near villages were over harvested and badly hacked by the villages to meet their demand and those which were in remote areas, remained un-worked resulting in congestion. Such areas needed special attention otherwise bamboo crops will suffer a heavy damage due to these irregular and uncontrolled exploitation.

5.3.23 The villagers hardly take bamboo at nistar rates but they exploit bamboo from the forests free of cost to meet their local demand. Nistar felling series near the villagers have been very badly treated.

5.3.24 Commercial felling series are being worked by BILT, Ballarpur. The felling rules provide that each clump should have at least 8 mature culms and was to be maintained but in practice it was rare which has resulted in irregular exploitation of bamboo in both Nistar and commercial felling series which is not favourable for bamboo growth in these areas. These areas have now been included in the Bamboo (overlapping) Working Circle.

5.3.25 Based on the results and analysis of Past Systems of Management prescribed under various Working Plans / Schemes, the following working circles have been proposed in the present working plan for Allapalli Forest Division as given in the following table:

**TABLE-24
DISTRIBUTION OF FOREST AREA IN WORKING CIRCLES.**

Sr. No.	Working Circle	Area (ha)	Percentage Area of the Division.
1	Selection-cum-Improvement W.C.	100283.382	46.02
2	Improvement W.C.	60640.152	27.83
3	Teak Plantation W.C.	20978.095	09.63
4	Protection W.C.	6413.632	02.94
5	Afforestation W.C.	29627.414	13.60
6	Bamboo (Overlapping) W.C.	12200.473	05.60
7	Wildlife (Overlapping) W.C.	217942.685	100.00
8	Non-wood Forest Produce (Overlapping) W.C.	217942.685	100.00

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CHAPTER - 6

STATISTICS OF GROWTH AND YIELD



CHAPTER – 6

STATISTICS OF GROWTH AND YIELD

SECTION – 1 : STATISTICS OF RATE OF GROWTH OF TEAK AND MISCELLANEOUS:

6.1.1 GROWTH OF TEAK : The study has been conducted by the office of the Dy. C.F. Working Plan No.2, Chandrapur in respect of Allapalli Forest Division in all the six ranges of Allapalli Division viz. Allapalli, Pirimilli, Ghot, Markhanda, Pedigundam and Aheri. Stem analysis comprised of 17 teak trees from site quality I, II, and III areas spread over the above six ranges. The results are summarised in the following table.

TABLE – 25
GROWTH DATA FOR TEAK (Site quality I)

Age in years	Height in mt.	D.B.H. (o.b.) in cm.	D.B.H.(u.b.) in cm.	G.B.H. (o.b.) in cm.	MAI in M ³	CAI in M ³	Stem Timber volume (cu.m.)
10	5.80	6.10	5.50	19.30	0.00102	0.00265	0.0102
20	11.20	11.60	10.80	36.71	0.00266	0.00750	0.0532
30	15.90	19.10	18.00	60.44	0.00533	0.0717	0.1599
40	19.80	24.50	23.20	77.53	0.01019	0.0257	0.4074
50	23.00	30.10	28.60	98.42	0.0135	0.0273	0.6749
60	25.40	34.50	32.60	109.18	0.0159	0.0367	0.9542
70	27.20	37.90	35.80	119.94	0.02013	0.0279	1.4092
80	28.20	40.70	38.50	128.80	0.0184	0.0222	1.5118
90	--	43.00	40.60	136.07	0.0204	0.0214	1.8358
100	--	44.20	41.70	139.87	0.0170	0.0260	1.7043
110	--	47.20	44.60	144.37	0.0182	--	2.0027
120	--	50.30	47.50	159.18	0.0202	--	2.4246

TABLE – 26

GROWTH DATA FOR TEAK (Site Quality II)

Age in years	Height in mt.	D.B.H. (o.b.) in cm.	D.B.H. (u.b.) in cm.	G.B.H. (o.b.) in cm.	MAI in M ³	CAI in M ³	Stem Timber volume (cu.m.)
10	5.45	2.80	2.30	8.86	0.0004	0.0006	0.0040
20	9.80	6.60	5.70	20.89	0.0006	0.0027	0.0126
30	13.70	12.40	10.90	39.24	0.0019	0.0075	0.0574
40	17.20	19.20	17.30	60.56	0.0041	0.0031	0.1633
50	20.40	25.50	23.40	80.70	0.0064	0.0183	0.3192
60	23.10	28.60	26.50	90.51	0.0088	0.0217	0.5293
70	25.45	32.20	30.10	101.90	0.0108	0.0196	0.7534
80	--	37.10	35.10	117.40	0.0094	0.0280	0.7536
90	--	41.70	39.90	131.96	0.0096	--	0.8651

TABLE – 27

GROWTH DATA FOR TEAK (Site Quality III)

Age in years	Height in mt.	D.B.H. (o.b.) in cm.	D.B.H. (u.b.) in cm.	G.B.H. (o.b.) in cm.	MAI in M ³	CAI in M ³	Stem Timber volume (cu.m.)
10	7.10	6.50	5.70	20.60	0.0002	0.0026	0.00102
20	12.00	13.30	12.00	42.09	0.0082	0.0081	0.05228
30	15.40	20.00	18.30	63.29	0.0055	0.0097	0.1647
40	17.30	24.00	22.10	57.95	0.0062	0.0125	0.2481
50	--	31.10	27.90	98.42	0.0083	0.0126	0.4148
60	--	31.80	29.50	100.63	0.0083	0.0072	0.5003
70	--	33.30	31.00	105.38	0.0080	0.0049	0.5984
80	--	34.90	32.50	110.44	0.0075	0.0044	0.6494
90	--	37.30	34.80	118.04	0.0072	--	--
100	--						
110	--						

6.1.2 The growth rate indicates that teak plant takes 5 years to establish and attains diameter (o.b.) of 43.50 cm. in 100 years and 46.00 cm. in 120 years. The

average CAI/MAI curves intersects at the age of 100 years (figure-10) and thereafter the teak trees show decline in growth. The age-height curve, age-volume curve and age-CAI/MAI curves for site quality I, II, and III are given in figure No.1 to 9. The details of figure 1 to 10 are given in Appendix No.XVI. The criteria for deciding all India site quality is given as under:

Sr.No	Site Quality	Height at the age of 50 years (in mt)
1	I	30 - 39
2	II	24 - 30
3	III	18 - 24
4	IV	12 - 18

6.1.3 GROWTH OF AIN : Growth data of ain given in the Working Plans of East Chanda and Bhandara divisions and results of stem analysis of Jimalgatta range are reproduced below :-

TABLE – 28

Age in years	Mean g.b.h. (O.b.) in cms.		
	East Chanda	Bhandara	Jimalgatta
10	11.0	011.9	012.20
20	21.0	026.7	027.40
30	30.0	038.5	039.60
40	39.0	050.3	052.20
50	49.0	059.7	060.10
60	58.0	(070.2)	072.30
70	67.5	(080.0)	083.15
80	78.0	(091.0)	093.23
90	88.0	(102.0)	104.53
100	99.0	(112.0)	120.27

6.1.4 Growth of bhirra, dhaoda, tendu and haldu:-

The results of stem analysis of bhirra, dhaora and haldu carried out by Kartar Singh during the preparation of working plan of East Chanda Division is reproduced below :

TABLE – 29

Species	Girth b.h. in cm.	Diameter b.h. in cm.	Age in year
1	2	3	4
Bhirra	015	04.8	012
	030	09.5	024
	045	14.3	033
	060	19.1	043
	070	23.9	055
	090	28.6	063
	105	33.4	079
	120	38.2	092
	135	43.0	108
	150	47.7	124
Dhaora	015	04.8	016
	030	09.5	028
	045	14.3	040
	060	19.1	052
	075	23.9	066
	090	28.6	080
	105	33.4	093
	120	38.2	107
	135	43.0	123
	150	47.7	142
Tendu	015	04.8	012
	030	09.5	026
	045	14.3	039

	060	19.1	052
	075	23.9	066
	090	28.6	081
	150	33.4	098
	120	38.2	120
	135	43.0	154
	150	74.7	--

6.1.5 GROWTH OF SEMAL : Stem analysis of 29 trees was carried out by Kartar Singh while preparing working plan for East Chanda division. Trees which were selected of girth between 105 and 150. It was obtained that the curves of C.A.I. and M.A.I. tend to intersect beyond 150 cm. g.b.h. Below mentioned table indicates the results of stem analysis.

TABLE – 30

Age in years	Height in m.	G.B.H.in cm.	Std. stem Timber Volume in cu.m.
10	05.18	018.76	0.0064
20	08.99	037.89	0.0329
30	12.50	057.05	0.0329
40	15.24	074.61	0.2234
50	17.88	091.77	0.4138
60	20.12	104.93	0.6068
70	22.25	116.99	0.7723
80	23.77	127.67	0.9730

6.1.6 GROWTH OF BIJA :- Growth data obtained from stem analysis of Bhandara carried out by Sardar during the preparation of working plan of Bhandara are reproduced below:-

TABLE – 31

Age in year	Height in mt.	Dia ub.bh.	Dia ob.bh.	Std. stem timber	C.A.I. cu.m.	M.A.I. cu.m.
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		Cm.	Cm.	volume (M³)		
1	2	3	4	5	6	7
10	03.00	02.70	04.00	0.002	0.0002	0.00020
20	05.90	08.00	10.00	0.015	0.0013	0.00075
30	08.50	13.22	15.70	0.055	0.0040	0.00183
40	11.10	18.20	20.90	0.130	0.0075	0.00325
50	13.30	23.00	25.90	0.237	0.0107	0.00474
60	15.60	27.75	30.80	0.385	0.0148	0.00642
70	17.75	32.02	35.20	0.598	0.0213	0.00854
80	(19.80)	35.58	38.80	0.788	0.0190	0.00985
90	(21.80)	37.90	41.20	0.900	0.0112	0.00100

6.1.7 GROWTH OF SHISHAM :- Stump analysis that was carried out in Jimalgatta range in 1990. The results are given below:-

TABLE – 32

Age in years	D.B.H.(o.b.) in cm.
10	04.15
20	07.23
30	11.21
40	14.56
50	17.37
60	19.72
70	22.53
80	25.55
90	29.15
100	33.23
110	38.14
120	42.60

Above this diameter trees showed signs of hollowness in more than 80 % of trees.

SECTION – 2 ESTIMATION OF GROWING STOCK :

(I) GENERAL VOLUME TABLE :

6.2.1 Forest Survey of India has conducted the Forest Resources Survey of Ballarshah catchment areas during 1971-75. During this survey data for felled tree volume of teak and miscellaneous species was calculated and on the basis of which general volume equations were derived for the species for which felled tree data of at least 30 trees were available. Data of rest of the species were pooled together and one equation was derived for them.

The following types of regression equations were tried :

- i) $V = a + b D^2 H$
- ii) $V/D^2H = a + b/D^2H$
- iii) $V = a + b D^2 H + c (D^2H)^2$
- iv) $\text{Loge } V = a + b \text{ Loge } D + c \text{ Loge } H$
- v) $V/D^2 = a + b/D^2 + cH^2$

Where $V =$ Volume (in cum under bark) upto 5 cm top over bark diameter.

$D =$ Diameter (m.) at breast height (1.37 m from ground)

$H =$ Height in metres.

6.2.2 Since the tract dealt with comes within the Wadsa catchment of the above study, the general volume and local volume equations derived by them are reproduced as follows :

(I) The following general volume equations shown in table-29 were selected taking into consideration, the standard error of the estimate, the multiple determination coefficient, applicability of the equation and meaningful interpretation of the equation for different species :

TABLE-33

S.N.	Species	General Volume Equations
1	Tectona grandis(37)	$V/D^2H = 0.30446 - 0.0023/D^2H$ for $D^2H < 1.5$
2	Terminalia alata(41)	$V = 0.08758 + 0.24432 D^2H$ for $D^2H > 1.5$

		$V = 0.00012 + 0.20302 D^2H$
3	Pterocarpus marsupium(42)	$V = 0.03611 + 0.33714 D^2H$
4	Diospyros melanoxylon(34)	$V/ D^2H = 0.38217 - 0.00856/ D^2H$
5	Anogiessus latifolia (30)	$V = 0.00931 + 0.38507/ D^2H$
6	Phyllanthus emblica (23)	$V = 0.0124 + 0.34322 D^2H$
7	Lagerstroemia parviflora(26)	$V/ D^2H = 0.35949 - 0.00088/ D^2H$
8	Boswellia serrata (36)	$V/ D^2H = 0.36068 - 0.00761/ D^2H$
9	Lannea Coromandelica(33)	$V = 0.35751 D^2H$
10	Madhuca latifolia (43)	$V/ D^2H = 0.36089 - 0.00951/ D^2H$
11	Buchanania lanzan	$V = 0.01475 + 0.29820 D^2H$
12	Cleistanthus collinus	$V = - 0.00185 + 0.32352 D^2H$
13	Rest of species (111)	$V/ D^2H = 0.33352 + 0.00042/ D^2H$

6.2.3 Figures in brackets after the name of species denote the number of trees on which the equations are based.

6.2.4 On the basis of the above equations the general volume tables prepared for all above mentioned species are given in **Appendix No.XVII**.

6.2.5 (II) LOCAL VOLUME TABLE :- Forest survey of India, during their survey, volume of each sample tree was estimated using the general volume equation selected for a species. Taking this volume as dependent variable and the diameter at breast height (1.37 m above ground level) or its function as independent variable. The following types of regression equations were tried:

$$V = a + bD^2$$

$$V = a + bD + cD^2$$

$$V = a + bD + cD^2 + dD^3$$

$$V = a + bD$$

$$V/D = a + b/D + cD$$

$$V/D = a + b/D + cD + dD^2$$

$$V/ D^2 = a + b/ D^2$$

$$V/ D^2 = a+b/ D^2+c/D$$

$$V/ D^2 = a+b/ D^2+c/D + dD$$

$$\text{Loge } V = a + b \log D$$

6.2.6 The following local volume equations shown in the following table were selected for different species taking into consideration the same criteria as for general volume equations :

TABLE-34

S.N	Species	Local Volume Equations
1	Tectona grandis(30)	$\sqrt{V} = - 0.106720 + 2.562418 D$
2	Terminalia alata(266)	$V/D = - 0.397340+0.011283/D$ $+ 4.704700D+2.369640 D^2$
3	Pterocarpus marsupium(59)	$V = 0.107059 - 1.010240D$ $+ 7.685670 D^2$
4	Diospyros melanoxylon(140)	$V/D = - 0.975148 +$ $0.033867/D + 8.255412D$
5	Anogiessus latifolia (112)	$V/D = - 0.36762 -$ $0.006854/D+4.5577D+5.25567D^2$
6	Phyllanthus emblica (49)	$V/ D^2 = 5.000428-0.013485/ D^2$
7	Lagerstroemia parviflora(39)	$\sqrt{V} = - 0.130340 + 2.824203 D$
8	Boswellia serrata (38)	$V/D = - 2.641645 + 0.153684/D+$ $15.056400D - 6.2061 D^2$
9	Lanea Coromandelica(44)	$\sqrt{V} = - 0.138286 + 2.729368D$
10	Madhuca latifolia (78)	$V= 0.074069 -1.23002D+7.726902D^2$
11	Buchanania lanzan (67)	$V = - 0.00767+0.2654D+1.0385 D^2$ $+ 7.527 D^3$
12	Cleistanthus collinus (320)	$V = - 0.019404+3.80207 D^2$
13	Rest of species (402)	$V/D = - 0.610255 +$ $0.020853/D+6.10823D+$ 0.637781

		D ²
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Where **V = volume in cum.**

D= DBH in meter.

6.2.7 Figures in brackets after the names of species denote the number of observations on which the equations for the species are based.

6.2.8 The conversion factors for drawing volume content in Allapalli Forest Division Allapalli for Teak, Teak-Miscellaneous and Miscellaneous Forest are given in **Appendix No XVIII, Appendix No. XVIII(a), Appendix No XIX, and Appendix No XX** respectively in Volume II of the plan.

SECTION –3 : ENUMERATION :

6.3.1 Tree enumeration of the growing stock of the tract dealt with has been carried out by Forest Resources Survey Scheme Unit at Chandrapur. 1% point sampling method has been adopted by laying down plots of 60 m x 60 m at a distance of 600 m x 600 m. All the tree species have been enumerated separately at an interval of 15 cm girth classes. The results of the enumeration has been summarized working circle wise and is reproduced in **Appendix No.XXI**. Comprises from earlier enumeration done during Qureshi's plan.

SECTION – 4 : ESTIMATION OF YIELD :

6.4.1 Estimation of yield has been calculated on the basis of enumeration data, stock mapping reports stump analysis and the laying of coupes etc. for Selection Working Circle and in the remaining working circle, it is only symbolic. The same has been reproduced in the **Appendix No.XXII**.

SECTION-5: PRESERVATION PLOT AND SAMPLE PLOT:

6.5.1 Maharashtra Van Sanshodhan Sansthan, Chandrapur has laid out 29 sample plots and 4 preservation plots in Allapalli Forest Division. The list of sample plots and preservation plots is furnished in **Appendix No.XXIII**.

6.5.2 The preservation plots are maintained in compartment No. 39 and compartment No. 76 in Allapalli Range. The preservation plot in compartment No.39 was established in 1946 at Burkulgatta and covers an area of 4.00 ha. The three preservation plots in compartment No. 76A cover an area of 6.00 ha., 5.00 ha. and 5.00 ha and were established in 1953, 1991 and 1996 respectively in Allapalli Range. The preservation plot established in 1953 in compartment Nos. 76A is popularly known as **Glory of Allapalli**. The main object of establishing the preservation plot was to study the crop under natural conditions.

6.5.3 The Glory of Allapalli is situated at an altitude of 750 ft. above mean-sea-level. Aspect-level, Rock-Archaeon gneisses and granites with a few intrusions of pegmatite. Soil-clayey loam. Humus depth variable from 1" to 4". Drainage good. Climate-extreme temperatures in summer and winter. Frost absent. Rainfall between 60" and 70" mainly during July-October. The plot was formed in the year 1953. The plot has been demarcated and important tree species 3' and above in girth at breast height are recorded. The species in top canopy in order of abundance

are *Tectona grandis*, *Terminalia tomentosa* , *Madhuca latifolia*, *Adina cordifolia*, *Stempegyne paryifolia*, *Diospyros melanoxylon*, *Schleichera oleosa*, *Diospyros montana*, *Dalbergia latifolia*, *Careya arborea*, *Tamarindus indica*, *Legerstroemia parviflora*, *Salmalia malabarica*, *Pterocarpus marsupium*, *Albizzia odoratissima* and *stereospermum suavellens* etc. The details of tree species and their girth at breast height (g.b.h. in cm) is furnished in **Appendix No.XXIV**.

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CHAPTER - 7

WILD LIFE PRESERVATION



CHAPTER –7 WILDLIFE PRESERVATION

SECTION-1: HISTORY AND WILDLIFE PROTECTION :

7.1.1 The tract dealt with has been an ideal natural habitat for the important wildlife flora and fauna. The forests are mainly of Teak and Teak-Miscellaneous species which are dense and rich so far as diversity of species are concerned. As per records a good varieties of wild animals inhabited the tract, but due to indiscriminate shooting, poaching and shikar by the local people and tribals mainly Madias, the wild animals in most part of this tract have almost disappeared despite having beautiful natural vegetation and an ideal habitat.

(I) DISTRIBUTION OF WILDLIFE:

7.1.2 The fauna was widely distributed in areas adjoining rivers. The wild animals commonly found in the past and rarely at present in this tract are as follows:

A – CARNIVORA:

Tiger (*Panthera tigris*), Panther (*Panthera pardus*), Hyaena (*Hyaena hyaena*), Wild Dog (*Cuon alpinus*), Wolf (*Canis lupus*), Jackal (*Canis aureus*), Fox (*Vulpes bengalensis*), Jungle Cat (*Felis chaus*).

B – HERBIVORA :

Bison (*Bos gaurus*), Sambhar (*Cervus unicolour*), Cheetal (*Axis axis*), Nilgai (*Boselaphus tragocamelus*), Wild Boar (*Sus cristatus*), Sloth Bear (*Melursus ursinus*), Barking Deer (*Muntiacus murtjak*), Langur (*Presbytis entellus*), Hares (*Lepus nigricollers*), Hare, $\frac{1}{4}$ *Lepus reficaudatus* $\frac{1}{2}$

C – RODENTS :

Flying Squirrel (*Petaurista petaurista*), Porcupine (*Hystrix indica*),

D- WILD BIRDS:

Painted Sand Grouse (*Pterocles indicus*), Common Sand Grouse (*Pterocles exustus*), Pea Fowl (*Pavo cristatus*), Grey Jungle Fowl (*Gallus sonneratii*), Painted Partridge (*Francolinus pictus*), Grey Partridge (*Francolinus pondicerianus*), Black Breasted Quail (*Coturnix coromandelicus*), Red Spur Fowl (*Galloperdix spadicea*), Crane (*Grus antigone*), Spotted Bill Duck (*Anas poecilorhyncha*), Pigeon (*Treron phoenicoptera*), Dove (*Streptopelia spp*), Cotton Teal (*Nettapus coromandelianus*), Whistling Teal (*Dendrocygna javanica*) Cuckoo (*Cuculus varius*), Snipe (*Capella galliachges*) etc.

The tract dealt with is situated in the interior most part of the district and away from town. Due to this, the wildlife was having least disturbances. Besides, with the existence of perennial water courses in the form of three main rivers and stagnant pools formed the area highly suitable for supporting a variety of wild animals and birds.

(II) CONCENTRATION OF WILD ANIMALS:

7.1.3 Areas known for the concentration of the wild animals in the past are as follows:

Villages- Nander, Bhimara, Zamela, Talwada, Bhavnil, Karampani,

Elgurtola, Chichela, Marpalli, Deshbandhugram, Mahindram, Kudirampalli, Mulchera, Mukdi, Bhavanipur, Elchil, Jeoli, Marpalli, Tonder, Wasamundi, Paima, Kondawahi, Koreli, Udera, Tadguda, Pirmilli, Kanargaon, Chandankhed, Jairampur, Rampur, Yenapur, Rengewahi, Kohra, Dina River, Yenkapalli, Ramannapeth, Wadiapeth, Sandra, Pusukpalli, Yenkatrapeth, Apalli, Visapur, Adhyal, Bhikshi, Narendrapur, Garani, Madeamgaon, Gatta, Botepalli, Kothari, Rajangatta, Mudholi.

(III) SHOOTING AND GAMES:

7.1.4 The wild animals were classified for the purpose of shooting in to three categories viz. I) Very big game, ii) Big game and iii) Small game. The details of which are as follows:

(A) VERY BIG GAME

Bisen (*Bos gaurus*):

They were occurring in small herds in the hilly region. During summer they were frequently seen in the plain forests along the main rivers and the main watercourses. Stray herds were noticed occasionally.

(B) BIG GAME

(i) Tiger (*Panthera tigris*):

Tiger (Sher) was occurring in moderate number. During summer they usually remained confined to the watercourses. A few migratory ones, occasionally used to enter into this tract from Bastar District of Madhya Pradesh. Presently, Tigers are confined to only a part of the tract. Tiger is sighted in Allapalli, Pedigudam and Ghot Ranges.

(ii) Panthers (*Panthera pardus*):

They were less common in this tract. They were seen frequently only around the villages. Sometimes they used to enter into villages and do considerable damage to the cattle.

(iii) Sambhar (*Cervus unicorn*):

Cheetal (*Axis axis*), Blue bull (*Boselaphus tragocamelus*): They were confined in the foothills only.

(iv) Barking Deer (*Muntiacus muntjak*):

They were found all over the tract.

(v) Sloth Bear (*Melursus ursinus*):

The people are very much afraid of this animal as it attacks unprovoked. Therefore, they are still available in this tract in good number.

(vi) Wild Boar (*Sus cristatus*):

They are very common all over the area.

(vii) Wild Dog (*Canis lupus*):

They move over in pack and do considerable damage to the wild animals. These packs are seen moving in the forests. However, the exact location can not be given

(C) SMALL GAME:

The malabar squirrel (*Sciurus spp*), Flying squirrel, jackal (*Canis aureus*), Hyena (*Hyaena hyaena*), Porcupine (*Hystrix indica*), Langur monkey (*Presbytis entellus*) were common all over the tract.

(IV) BIRDS:

7.1.5 Pea fowl (*Pavo cristatus*), Grey jungle fowl (*Gallus sonneratii*) are common. Ducks are commonly found in the rivers. Titar (*Francolinus pondicerianus*), Bate (*Coturnix coromandelicus*), Saras crane (*Antigone antigone*) are common in the tract.

(V) SNAKES :

7.1.6 The ancient rulers were Gond Rajas and they worshiped the snakes particularly Cobra as they considered it the image of Mahadeo. The snakes are commonly seen in the forest and villages and also near the human habitats.

(a) Non poisonous snakes : Typhlops sp., Eryx conicus (Dutondyaon or Malvan), Eryx johny (Sandboa), Lycodon, Oligodon, Python (Ajar), Ptyas mucosus (Dhaman), Natrix piscator, Natrix stoleta, Dryophis nasutus (Harantal or Yelhi or sarpatol)

(b) Poisonous snakes: Naja naja (Cobra), Bungarus caeruleus (Dandekar or Manyar), Bungarus fasciatus (Aharj) , Vipera russella (Ghonas), Echis carinatus (Dhul nagin), Trimeresurus gramineus (Leaf green snake).

7.1.7 The tribal people (Madia) eat, lizards, red ants and many other animals which are not poisonous. Village patel used to do shikar and distribute the meat to the villagers. The results of animals census carried out in the year 2001 in Allapalli Forests Division is given in the following table:

TABLE-35
POPULATION ESTIMATION OF MAJOR WILD ANIMALS

Sr. No.	Species Local Name/ Scientific Name	Total Number	Sex Ratio				Remarks (Estimation method-Water hole/Block Count/ any other)
			Male	Female	Younger	Sex not Identify	
1	BARKING DEER	111	27	26	11	47	Water Hole
2	BAT	48	7	20	-	21	---“--
3	CHITTAL	503	123	194	109	77	---“--
4	CHOWSINGHA		-	-	-	-	-
5	CRESTED SERPENT EAGLE	2	1	1	-	-	Water Hole
6	CREASTED HAWK EAGLE	-	-	-	-	--	---“--
7	CROCODILE	-	-	-	-	-	-
8	FLYING SQUIRREL	7	1	1	-	5	Water Hole
9	GAUR	9	4	3	2	-	----“--
10	HAYNA	7	3	1	-	3	---“--
11	HARE	123	22	12	3	86	---“--
12	INDIAN FOX	140	26	12	2	100	---“--
13	JUNGLE CAT	32	7	8	5	12	---“--
14	JUNGLE FLOW	93	6	44	39	4	---“--
15	LANGOOR	241	45	58	45	93	---“--
16	LEOPARD CAT	-	-	-	-	-	-
17	MONGOOSE	39	6	3	3	27	Water Hole
18	NILGAI	105	46	44	8	7	---“--
19	OWL	58	12	8	-	38	---“--
20	PANGOLIN / ANTEATER	1	1	-	-	-	---“--
21	PANTHER LEOPARD ANTEATER	1	1	-	-	-	---“--
22	PORCUPINE	1	-	-	-	1	---“--
23	PEACOCK	170	59	86	16	9	---“--
24	PYTHON	2	2	-	-	-	---“--

25	RATEL	-	-	-	-	-	-
26	RUSTY SPOTTED CAT	3	1	2	1	-	Water Hole
27	SAMBER	97	41	29	10	17	---“---
28	SLOTH BEAR	14	2	-	-	12	---“---
29	SMALL INDIAN CIVET	-	-	-	-	-	-
30	TIGER	3	2	1	-	-	Water Hole
31	WILD DOG	28	19	4	1	4	---“---
32	WILD BOAR	470	58	101	155	156	---“---
33	WOLF	102	33	21	9	39	---“---

7.1.8 The population estimate of major wild animals for which estimate can not be adequately represented in number is given in the following table:

TABLE-36
POPULATION ESTIMATION OF MAJOR WILD ANIMALS
(Census figures April 8, 2001 & May 7, 2001)

Sr. No.	Species Local Name/ Scientific Name	Abundance (Abundant/Commonly/ Seen/Rate)	Distribution (Uniform / Localized)	Remarks
1	2	3	4	5
1	Barking Deer	Rear	Uniform	
2	Bat	Commonly seen	Localised	
3	Chittal	---“---	Uniform	
4	Crested Serpent Eagle	Rear	Localised	
5	Flying Squirrel	---“---	---“---	
6	Gaur	---“---	---“---	
7	Hyena	---“---	---“---	
8	Hare	---“---	---“---	
9	Indian Fox	Commonly seen	Uniform	
10	Leopard Cat	---“---	---“---	
11	Jungle Fowl	Rear	Localised	

12	Langoor	---“---	---“---	
13	Mongoose	Commonly seen	Localised	
14	Nilgai	Rear	Localised	
15	Owl	---“---	Uniform	
16	Pangolin / Anteater	---“---	Localised	
17	Python	---“---	---“---	
18	Peacock	---“---	---“---	
19	Samber	---“---	Uniform	
20	Sloth Bear	---“---	---“---	
21	Tiger	---“---	Localised	
22	Wild Dog	---“---	---“---	
23	Wild Boar	Commonly seen	---“---	
24	Wolf	Rear	---“---	

7.1.9 The wildlife count shows the following number of wild animals present in the areas of Allapalli Forest Division. The perusal of the following table shows that there is a sharp decreases in the no. of the important wild animals during the period 1993 to 2001 and therefore the wildlife preservation, conservation and protection has to be dealt very seriously and the projects should be taken up to increase their number by providing them complete protection and a suitable habitat.

TABLE-37

WILD ANIMALS AND THEIR POPULATION.

अं.क्र.	वर्षवार						
	वन्यप्राण्यांची नावे	1993	1994	1995	1997	1998	2001
1	2	3	4	5	6	7	8
1	वाघ	23	17	14	7	12	3
2	बिबट	9	2	4	3	3	1
3	चोर किर्बीन	—	—	—	—	—	1
4	क्रेस्टेडससेट इगल	—	—	—	—	—	2

5	गौर	7	—	—	21	—	9
6	सांबर	126	—	—	236	—	97
7	चितल	232	—	—	563	—	503
8	निल गाय	12	—	—	155	—	105
9	डुक्कर	170	—	—	531	—	—
10	जंगली कुत्रे	24	—	—	58	—	28
11	भेडकी	56	—	—	179	—	—
12	मोर	200	—	—	144	—	17
13	अस्वल	—	—	—	111	—	14
14	हरीण	—	—	—	—	—	—
15	वाईल्ड बोअर	—	—	—	—	—	470
16	तडस	—	—	—	19	—	7
17	कोल्हे	—	—	—	141	—	140
18	वानर	—	—	—	79	—	—
19	चौसिंगा	—	—	—	16	—	—
20	लंगुर	—	—	—	245	—	241
21	खवले मांजर	—	—	—	7	—	1
22	भुईचर	—	—	—	5	—	—
23	रान मांजर	—	—	—	29	—	32
24	बट	—	—	—	—	—	48
25	साथक	—	—	—	10	—	—
26	मेकर	—	—	—	—	—	111
27	ससा	—	—	—	112	—	123
28	मसण्या उद	—	—	—	1	—	—
29	अजगर	—	—	—	2	—	2

30	मुंगुस	—	—	—	19	—	39
31	सुरेवाला गरुड	—	—	—	4	—	—
32	वट वागुड	—	—	—	200	—	—
33	वाधाटी	—	—	—	—	—	3
34	रान कोंबडी	—	—	—	86	—	93
35	घुबड	—	—	—	49	—	58
36	सर्प गरुड	—	—	—	6	—	—
37	उडती खार	—	—	—	21	—	7
38	लांडगा	—	—	—	—	—	102
	एकूण	859	19	18	3069	15	2257

SECTION-2: SHOOTING BLOCKS:

7.2.1 Following shooting blocks were identified in which shooting was permitted on licences:

TABLE – 38

Block	Range	Area in Sq.Km.
Allapalli	Allapalli	181.200
Elchil	Pedigundam	080.290
Pedigudam	Pedigundam	271.950
Haldi	Ghot	150.837
Regadi	Ghot	236.552
Ghot	Ghot	195.112

SECTION-3 : PAST MANAGEMENT OF WILDLIFE AND ITS RESULTS:

7.3.1 Before the forests were reserved in 1879, the local population indulged in unrestricted hunting over extensive areas. Attempts to regulate shooting in these forests were made as early as 1905. Special permits were issued from time to time for the hunting of carnivora. The forests were divided into regular shooting blocks in 1907. The Wild Birds and Animals Protection Act of 1912 was amended in 1935 and

was applied to these areas. With the division of the forest into shooting blocks and limitation of the number of animals to be shot in each block destruction of animals was controlled. The C.P Game Act, 1935 was promulgated with a view to conserve game and gave adequate power to Forest, Police and Revenue Officials to deal with offences. Crop protection guns issued after 1936 increased illicit shooting in the vicinity of the villages. Action for illicit hunting could also be taken under section 26 (1) (1),32 (1) and 76 (d) of Indian Forest Act. of 1927 as far as the reserved forests were concerned. But these rules offered no protection to the wildlife outside these areas. This lacuna was removed after the enactment of Bombay Wild Animals and Wild Birds Protection Act. No. XXIV of 1951.

7.3.2 Prior to the abolition of proprietary rights in 1951, there existed no rules for the regulation of hunting in these forests and the killing of animals for pleasure as well as for the sport was common. Subsequent to the abolition of proprietary rights in 1951, the then Madhya Pradesh Government framed rules for regulating shooting in the village forests in the year 1953.

7.3.3 Subsequently when these forests were notified as Protected Forests under Section 29 of the Indian Forest Act,1927, the management of wildlife came to be regulated as per the rules framed under Section32(J) of the Act together with the prevalent rules under C.P. and Berar Games Act, 1935 and the Game Block Rules as specified in Madhya Pradesh Forest Manual Volume II.

7.3.4 In October 1961, the Government of Maharashtra clarified that the Rules were framed under Bombay Wild Animals and Wild Birds Protection Act of 1951. That Act was superceded by the Wildlife (Protection) Act, 1972 which came into force from June 1, 1973 and Rules, 1975. Hunting of animals had been completely banned except for the shooting permission given to the cultivators during the harvesting season to shy away wild boars.

SECTION-4: LEGAL POSITION:

7.4.1 The provisions in Berar Forest Law, 1886 was passed on October 22,1886. No separate Act about the wildlife was in vogue at that time. However, under section 3, sub rule (7), the definition of the forest produce included "skins, tusks, bones and horns". Under Section (8) of the said Act, " any person who acts in contravention of the said Act in the State Forests was punishable with the fine which may go upto fifty rupees or when the damage resulting from his offence amounts to more than twenty five rupees, to double the amount of such damage "Under section 10, sub section (4) of the said Act," the residency by orders may regulate any part of the State Forests for the hunting, shooting, fishing, poisoning water and setting trap or snares."

7.4.2 The Berar Law, 1886 was amended by the Berar Forest Law, 1891. Here the scope of the Act was extended. The section 7(b) states that forest produce includes the following when found in, or brought from a forest, that is to say: wild animals, skins, tusks, horns, bones, silk cocoons, honey and wax and all other parts or produce of animals or forest produce. Section 7(2)(b) states that offences were punishable with the fine which may extend upto fifty rupees or when the damage resulting from the offence amounts to more than twenty five rupees, to double the amount of such damage. The section 10(4)(iii) empowered the resident to frame the

rules regarding regulation of hunting, shooting, fishing, poisoning water and setting traps and snares.

7.4.3 In the year 1911, vide Notification No. G.I.F.D. No. 2197-1-B, dated October 13, 1911 the Indian Forest Act, 1878 was made applicable. The section 2(b)(iii) included the wildlife in its definition of the forest produce. Under section 25(l) of the said Act, any person in contravention of any rules which the local Government may time to time prescribe, kills or catches elephants, hunts, shoots, fishes, poisons water or set traps or snares shall be punishable with imprisonment for a term which may extend to six months or with fine not exceeding five hundred rupees, or with both, in addition to such compensation for damage done to the forest as the convicting court may direct to be paid

7.4.4 The Bombay Wild Animals and Wild Birds Protection Act, 1951, for the protection of wildlife, was extended to Vidarbha region with effect from June 1, 1961. Though this Act did not propose a significant change in the management of game in Reserved and Protected Forests, yet it was important as it operated in areas outside Reserved and Protected Forests also. Under the provision of this Act, arms license holders for sports were to register themselves with the Wildlife Preservation Officer. This Act prescribed a closed season for hunting and classified games into four categories, viz. small game, big game, special big game and pet animals. It also sought to control transaction in trophies and other wildlife products. The statutory Wildlife Advisory Board was constituted under this Act to advise the Government on various important matters concerning wildlife.

7.4.5 The Indian Board of Wildlife was constituted in 1952 with the main object of devising ways and means for Conservation of wildlife through coordinated legislative and practical measures and sponsoring the resetting up of National Parks and Wildlife Sanctuaries. A comprehensive and unified National and State Park Act, 1971 was passed which provided for appointment of an Advisory Committee to advise in constitution and declaration of National Parks and Sanctuaries and formulation of administrative policy. The parliament then enacted the wildlife (Protection) Act, 1971, which came into force in the State of Maharashtra with effect from June 1, 1973. From the commencement of this Act, every other Act relating to any matter, contained in this Act and in force in the State stood repealed. The subsequent rules made under the Act are as follows:

- i. The Wildlife (Stock Declaration) Rules, 1973 (became effective in Maharashtra with effect from June 1, 1973).
- ii. The Wildlife (Transactions and Taxidermy) Rules, 1973 (became effective in Maharashtra w.e.f. June 1, 1973).
- iii. Wildlife (Protection) Rules, 1975 (became effective from March 6, 1975).
- iv. The Wildlife (Protection) Licencing (Additional matters for consideration) Rules, 1983 (became effective w.e.f. April 14, 1983)
- v. The wildlife (Protection) Act, 1972 is a piece of comprehensive

legislation which provides for effective protection and preservation of wildlife restriction on hunting and regulation of trade in wild animals articles made out of wild animals.

7.4.6 Hunting of wild animals is strictly prohibited under this Act unless it is specially permitted. Wild animals have been categorised in five schedules and animals included in schedule-I and part II of schedule-II received the privilege of strict protection. Animals specified in these schedules are permitted to be hunted if they are threat to or cause damage to life or property, and animals in schedule-II has become so disabled or diseased as beyond recovery.

7.4.7 Animals specified in schedule-II (Part-I), III & IV were prohibited from hunting, except under and in accordance with specific license issued under that Act or it had become dangerous to human life or property or had become diseased or disabled beyond recovery. Only vermin included in schedule-V, had been excluded from strict protection.

7.4.8 Hunting of young and female of any wild animals other than vermin, or any deer with antlers in velvet is strictly prohibited unless specially permitted (Section-15). The Act specifically requires declaration to be furnished by the individuals as well as trophies etc in their control, custody or possession.

7.4.9 The Government of India, vide letter dated September 18, 1975 stated that the control over tanks and rivers in National Parks and Sanctuaries should be vested with management authorities and not with the fisheries or irrigation department.

7.4.10 Government of India, vide letter No. 1 E-11011/3/75/FRY-9-(WLF), has clarified that the certificate of legal procurement to be issued by the Chief Wildlife Warden is not necessary where an animal is not included in any schedule of the Wildlife (Protection) Act, 1972. The export will be regulated by the Ministry of Commerce.

7.4.11 Subsequently, the delegation of power and duties of the Chief Wildlife Warden to the Police Sub-Inspector for the Purpose of section 41(1) and section 55 of the Wildlife (Protection) Act, 1972 was granted by Government Resolution No. WLP-1973/197578-FI dated April 5, 1976.

7.4.12 The schedules are revised by the Government on and off as it was required under section 61 of the Wildlife (Protection) Act, 1972. The Government of Maharashtra, under section 64 of the Wildlife (Protection) Act, 1972, framed Rules vide letter No.WLP-1679/95507/F-5. These Rules were amended further by the Wildlife (Protection), Maharashtra Rules, 1975.

7.4.13 The wildlife Protection Act was again amended to be called as Wildlife (Protection) Amendment Act, 1986 and it came into force from November 25, 1986. Under Section-44 of the Wildlife (Protection) Act, 1972, the Government vide letter No.WLP/1682/100208/CR-43 (1)/F-5 permitted the trapping of cobra and Russell vipers by a licensed dealer for the purpose of extracting venom. Under the power conferred under sub section (1) and sub section (2) of the section 64, the Government of India vide letter no. WLP/1682/10020(iii)/F-5 framed the new rules called Wildlife (Frog Leg Industry) Rules, 1987 and it came into force from

November 25, 1987. The Government of India vide letter no. F-No.1-2/91/WL/1, dated October 21, 1991, further amended the Wildlife (Protection) Act, 1972. The following are the important amendments.

- (a) The plants have also been included under the purview of this Act.
- (b) The zoo and circus have been defined and included under this Act.
- (c) The game reserves have been dropped.
- (d) Section 9 of Wildlife (Protection) Act, 1972 has been amended and there is a total prohibition of hunting of animals specified in schedule II III IV & I except as provided under section 11 and 12.

7.4.14 The following are the restrictions on hunting as per section 17 of Wildlife (P) Act, 1972. The following acts are prohibited, i.e.

- 1) Hunting any wild animal, from or by means of a wheeled or mechanically propelled vehicle on water or land or by aircraft.
- 2) Use of mechanically propelled vehicle for the purpose of driving or stampeding any wild animals;
- 3) Use of chemical, explosive, pitfalls, poisons, poisoned weapons, snares or traps, except in as far as these relate to the capture of wild animals under a Wild Animals Trapping License;
- 4) Hunting of special game or big game other than with a rifle, unless specially authorised by the license;
- 5) Setting fire to vegetation for the purpose of hunting.
- 6) Using artificial light for the purpose, of hunting except when specially authorised to do so under a license in the case of carnivora over a kill;
- 7) Hunting during night, except when specially authorised.
- 8) Hunting any animals on water holes or a salt-lick or other drinking places or on path or approaches to the same, except water-birds and sand-goose;
- 9) Hunting any wild animal on any land not owned by Government without the consent of the owner, or his agent or lawful occupiers of such claim.
- 10) Hunting during closed period as per section 16;
- 11) Hunting with the help of dogs, any wild animals, except water-bird, chakor, partridge or quail.

7.4.15 In 1991, the Government of India has passed the Wildlife (Protection) Amendment Act, 1991, which came into force with effect from October 2, 1991, except the Sections 35, 44, 55(c), Chapter III A and Chapter IVA. The salient features of this amended Act in brief are as follows;

- I The words "game reserves, big game and small game" have been omitted from the Act.
- ii Hunting the wild animals specified in Schedule I, II, III and IV of the Act has been banned, except as per the provisions of section 11.
- iii A new chapter III-A has been introduced for the protection of specified plants. The specified plants have been included in a new schedule.
- iv Section 29 of the Act has been amended and like National Parks no wildlife can be exploited or removed from a Sanctuary too. This means all concentrated felling and collection of minor forest produce from Sanctuaries would be stopped.
- v A new section has been added in the Act to provide that no new arm licences shall be issued within 10 km of a Sanctuary without prior concurrence of the Chief Wildlife Warden of the state.
- vi A ban has been imposed on dealing with the imported ivory and articles made therefrom.
- vii A new chapter, IVA has been introduced to provide for central Zoo Authority and reorganisation of zoos.
- viii. Commercial felling and exploitation of wildlife (Flora and Fauna) has been banned in Wildlife Sanctuaries just as it is in National Parks.
- ix The penalties for wildlife offences have been enhanced substantially. Section 39 of the Act has been amended to the effect that have been used for committing an offence and have been seized shall become the property of the Government
- x. Section 48 A has been introduced which provides for restriction on transportation of wildlife i.e. no person shall accept any wild animals (other than vermin) or any animal article, or any specified plant or part or derivative thereof, for transportation except after exercising due care to ascertain that permission from the Chief Wildlife Warden or any other officer authorized by the State Government in this behalf has been obtained for such transportation.
- .xi. Trade in imported ivory and products carved from it has been banned with effect from 2nd April 1992. Thus will plug the loophole some dealers have been using to cover up acquisition of illegally obtained ivory of Asian elephants. Thus the trade in ivory and its carvings has been totally banned. Even their display in commercial establishments has been banned. However or some ivory traders continue to illegally sell and display ivory. Public vigilance is needed to apprehend them.

- xii Section 55 of the Wildlife Protection Act has been amended and the power to investigate into the wildlife offences by the Police has been taken away unless specifically authorized by the Chief Wildlife Warden or by the State Government in this behalf and further Section 55 (C) has been added which says that “ Any person who has given notice of not less than sixty days in the manner prescribed, of the alleged offence and of his intention to make a complaint, to the Central Government or the State Government or the Officer authorised as aforesaid.
- xiii Section 61(I) of the Act has been amended and now the power to make any change in the schedules of the Act vests only with the Central Government.

SECTION-5: RIGHTS AND CONCESSIONS:

7.5.1 No rights and/or privilege are granted to any person over wildlife. But a member of schedule tribes can subject to the provisions of Chapter IV of Wildlife Protection Act, pick collect or possess in the district he resides any specified plants or plant derivative thereof for his bonafide personal use. However, permits can be granted by the Chief Wildlife Warden with prior approval of the State Govt. for the special purposes or education, scientific research and collection of specimen for recognised zoos, museums and similar institutions.

SECTION-6: OTHER MEASURES ADOPTED FOR PROTECTING WILDLIFE:

7.6.1 Besides the legal provisions under the Wildlife (Protection) Act, 1972, amended from time to time and the various rules made thereunder, following measures have been taken to protect the wildlife.

- i. Compensation is paid to the owner whose cattle are killed by a tiger in the forest areas as per the provisions contained in Govt. Resolution No. WLP/1570/224482-X-II, dated September 30, 1971, No. MSC-1075/113554/F-1, dated March 25, 1977 and No. WLP/1579/6200/4/F-1, dated May 29, 1979. This provision was extended to the cattle killed by panther also and the killing by tiger or panther outside the forest areas also was included vide Govt. Resolution No. WLP/1581/116974/F-5, dated August 22, 1984. The Government in Revenue and Forest Department, Maharashtra vide Resolution No. WLP/1002/CR-258/F-1 dated January 17, 2003 have modified the amount of compensation to be paid to the cattle owners in the event of injury or death of the live stock subject to certain conditions laid down in the aforesaid G.R. dated January 17, 2003 and shall be applicable to all such cases which occur on or after 17 January, 2003.
- ii. Government of Maharashtra, Revenue and Forest Department Resolution No. WLP/1002/CR-258/F-1 dated January 17,2003, the Government has decided that in the event of attack by Tiger, Panther, Bear, Bison, Wildboar, Wolf, Jackal, Hyaena, Wild dogs and on the death or permanently handicapped adult

person supporting family shall be paid a compensation of Rs. 2,00,000/- and to the person below eighteen years of age, shall be paid Rs. 1,00,000/- In case of serious injury Rs. 50000/- and in case of minor injury the victim should be paid the expenses of his medical treatment if the victim gets treatments in private hospital, the limit of the expenses to be paid shall be limited to 7500/- subject to the conditions laid down in detail in the above Government Resolution. This Govt., Resolution has come into effect from 17/1/2003 and shall be applicable to all such cases which occur on or after January 17, 2003.

- iii. The Govt. of Maharashtra vide its Resolution No. WLP1002/CR-258/F-1 dated 20/5/2003, in supersession of its even no. Resolution dated 17/1/2003, has further directed that legal heir of the deceased irrespective of his/her age, shall be paid an amount of Rs. 2 lacs. as compensation in the event of death caused due to attack by the wild animals such as tiger, panther, bear, bison, wild dog, wolf, jackal and hyaena.
- iv. In 1972, with a view to check illicit shooting of wild animals, the State Government sanctioned the grant of reward to the informants in respect of unlicensed shooting provided that the information is found to be valid and leads to the conviction of the offender. In addition, the State Government has decided to sanction the rewards equal to 50% of the compensation actually recovered from the offender for illicit shooting to the Gram Panchayat or its office bearers or individuals who render cooperation in detecting such illicit shooting.

7.6.2 Besides, the above mentioned legal provisions for protection of wildlife, public awareness for protection and preservation of wildlife is created through the celebration of wildlife week from October 2, every year since 1951.

7.6.3 The details of compensation given to the victim family for cattle lifting, injury or killing caused to human being shall be given in the **Appendix No.XXV**.

SECTION-7 : INJURIES TO WILDLIFE:

7.7.1 The following agents are mainly responsible for the destruction of wildlife in Allapalli Forest Division.:

i. POACHING/SHIKAR: Poaching and shikar by tribals though not recorded but this is the most important reasons for destruction and depletion of the wild animals in this. The local tribal, particularly Madia is highly fond of meat and shikar. They go for shikar resulting into the fact that not even a monkey is seen in most part of this tract. Besides, in the past some poachers from outside the tract have also damaged the wild animals to a great extent. Presently, the threat to the wild animals is only from local Madia and other tribals

ii. WILDLIFE AND DISEASES : Wildlife flora and fauna are susceptible to various diseases caused due to bacteria, viruses, mycoplasma, fungi, protozoans and various other invertebrate and vertebrate parasites. The occurrence of diseases

in wildlife has been an important factor in the disappearance of wildlife population of many important animal species from their natural habitat. Some of the important diseases commonly found in the wild animals are described below:

- a) **Tuberculosis:** It is a bacterial diseases which is chronic, contagious and is not diagnosed at early stage but causes damage in its late stage in the animals when it is almost incurable.
- b) **Pasteurellosis:** It is another acute septicemic bacterial disease and usually affects cervids and bovids. The elephants and rhinos are also susceptible to this disease. The infection takes place through the respiratory tract.
- c) **Anthrax :** It is also an acute septicemic and contagious bacterial disease which causes death of the wild animals within few hours. The carcasses of animals should not be opened as the disease is equally harmful to the human beings. The most effective drug used for the treatment of this disease is penicillin and vaccines are also recommended for treating this disease.
- d) **Foot and mouth disease:** It is one of the most important and rampant viral disease among the bovids and cervids including the domestic cattle. The disease involves the foot and mouth. Vesicles appears in the mouth and on the coronary band of the foot sores resulting in lameness of the animal, coupled with froth from the mouth. This diseases may prolong upto two weeks and may cause death of the young animals due to cardiac failure.
- e) **Rinderpest:** It is another important viral disease which is spread in the wild animals from the domestic animals which graze in the forest. The preventive cure is the vaccination of the domestic animals living in or near the fringes of the forest. This disease is very harmful and may cause large scale mortality of the young and the adults.
- f) **Rabies:** It is viral disease causing loss to the animals as well as human beings. The infection takes place through the animals bite in the human beings or the animals. The animals which are rabies positive or small rodents, bats and mongoose . It is dangerous to live stock and human beings. Hydrophobia is the common symptoms of this diseases. Prophylactic vaccination is recommended for the felids. The disease is mostly transmitted by the domestic dogs, wild dogs, jackal, hyaena, fox, panther, bear etc. The animal shows profound biting tendency and fails to recognize familiar objects.
- g) **Feline enteritis:** This occurs in the felids and characterized by loose motion with blood stain and mucous followed by high temperature. Vitamins and minerals should be supplied with the food for the captive animals and regular de-worming of the animals be done before the onset of monsoons.

- h) **Trypanosomiasis:** This is a protozoan disease commonly found in tigers, elephants and rhinos.
- i) **Coccidiosis:** This is a protozoan disease causing diarrhoea in the animals.

iii. **FIRE :** The entire forest burns annually. Some areas might be exception to it but the remote areas, which are the ideal habitat, burns annually. The forest fire damages the natural habitat and drives animals towards human habitation to take shelter and thereby they become easy prey to poachers and local villagers. Due to occurrence of annual fires, every year large scale mortality of the avian eggs of important species and young ones of the wild animals takes place. But some positive aspects of annual fires is seen in the case of smoke-beetle which lays its eggs only in the burnt logs and this is an important biological control for many important pests.

iv. **WATER :** Water is another important factor for the survival of the wild life in nature. In Allapalli Forest Division, most of the streams, except a few big rivers, become dry during summer and because of this the wild animals faced scarcity of water for their daily intake. Therefore, animals have to visit waterholes which are found at very long distances. Some times the wild animals reach the villages in order to quench their thirst which makes them vulnerable for falling an easy prey to the villagers and poachers. During the summer season, the wild animals are seen dying due to scarcity of water in the forest areas.

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CHAPTER - 8

BASIS OF PROPOSALS



CHAPTER-8 BASIS OF PROPOSALS

SECTION-1 : NATIONAL FOREST POLICY :

8.1.1 National Forest Policies for India were enunciated in the years 1894, 1952 and 1988. The changes in the policy were brought about according to prevailing national needs and public requirements both local and general.

FOREST POLICY 1894 FOR INDIA :

8.1.2 Basic thrust of this policy was on public benefit both local and general. Preservation of climatic and physical conditions of the country, and conservation of forests is necessary for general well being of the country.

NATIONAL FOREST POLICY OF 1952 :

8.1.3 The main thrust of the Policy was on balanced and complementary land use, checking of denudation in mountain regions, erosion along water courses, sustained yields of forest products, to meet the local demands and realization of maximum revenue in perpetuity.

NATIONAL FOREST POLICY OF 1988 :

8.1.4 Presently, National Forest Policy of 1988 is in force and the basic objects are outlined below :-

- (i) Maintenance of environmental stability through preservation and restoration of ecological balance that has been adversely disturbed by serious depletion of the forest 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 represent the remarkable biological diversity and genetic resources of the country.
- (iii) Checking soil erosion and denudation in the catchments areas of the 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 forests/trees cover in the country through massive afforestation and social forestry program, especially on all denuded, degraded and unproductive lands.
- (v) Meeting the requirements of fuelwood, fodder, minor forests produce and small timber of the rural and tribal population.
- (vi) Increasing the productivity of forests to meet essential national needs.

- (vii) Encouraging efficient utilization of the forest produce and maximum substitution of wood.
- (viii) Creating a massive people's movement with the involvement of all women, for achieving these objects and to minimize pressure on existing forests.

8.1.5 The basic emphasis of the policy is on the management of the existing forests and forestland keeping in view the protection, and conservation of biodiversity by strengthening network of National parks and Sanctuaries. Based on above objects the salient features of 1988 forest policy are as follows:-

- (i) Severe restrictions on schemes and projects which interfere with forests that clothes steep slopes, catchment of rivers, lakes and reservoirs.
- (ii) No working of forests without the Government having approved the management plan
- (iii) Non-introduction of exotic species without long term scientific species trials.
- (iv) The rights and concessions including grazing always remain related to the carrying capacity of forests.
- (v) Rights and concessions including grazing always remain related to the carrying capacity of forests.
- (vi) Rights and concessions enjoyed by the tribal should be protected. Their domestic requirement of the fuel wood, fodder, minor forests produce and timber for construction should be the first charge.
- (vii) Forest management plans to take special care of the needs of wildlife conservation.
- (viii) Effective action should be taken to prevent encroachments on forest land and the existing encroachment should not be regularised.
- (ix) Forest based industries should raise the raw material needed by themselves in arrangement with the private cultivators.
- (x) Survey of forest resources to be completed on scientific lines for updating information.

SECTION-2: FACTORS INFLUENCING THE GENERAL OBJECTS OF MANAGEMENT:

8.2.1 The main factors influencing the objects of management are illustrated below:

(i) Large tracts of forest which were managed under the coppice with reserve system of previous plans and scheme have suffered due to heavy grazing, illicit felling and lack of coppice regeneration, with the result that bulk of forest areas have become under stocked and open and failed to regenerate. These forests may respond if they are restocked under afforestation scheme coupled with soil and moisture conservation works.

ii) The forest areas are capable of producing large size timber and therefore all the areas which were placed under teak conversion working circle in the previous plans, need to be put under separate teak plantation working circle in order to take up artificial regeneration of pure teak by clear felling the areas having potential to support good quality teak forest.

iii) The increasing demand by local population for fire wood, small timber and fodder grass in thickly populated areas. Adequate Provisions have to be made in the plan for meeting the demands.

iv) The state of natural regeneration of teak and miscellaneous is satisfactory in interior areas of the tract, where as it is unsatisfactory in plains, and nearby human habitations. New recruits are not established due to frequent fires, soil compactness and excessive biotic pressure. Provisions will have to be made in the plan for soil working and tending and protection of young natural regeneration, which would help them to establish.

v) The forest tract of thickly populated area are opened, under stocked and degraded which need improvement in their stocking by tending natural regeneration supplemented by artificial regeneration.

vi) The forest areas of steep slopes, undulating areas and along water courses are liable for soil erosion hence provisions to be made in the plan to check the same.

vii) The forest areas are rich in non-wood forest produce and various important medicinal plants which are either locally consumed or sold in the market at a very cheaper rates and therefore scientific management of these resources should be taken up on priority to provide the employment to the local people in order to alleviate their poverty.

viii) The forest areas are capable of growing better quality bamboos which are needed by local people for their domestic and agricultural purposes.

ix) Restoration of degraded environment as a national object.

x) Conservation and protection of wild flora and fauna.

SECTION – 3 : GENERAL OBJECTS OF MANAGEMENT :

8.3.1 i) To preserve and enrich the growing stock in natural forests and to restock all under-stocked and degraded areas of the forests with the help of artificial regeneration and soil and moisture conservation measures.

ii) To improve the quality and to increase the ratio of valuable trees species by encouraging natural regeneration and also by artificial regeneration by way of planting important timber and miscellaneous species.

iii) To improve the stocking of teak, bamboo and other valuable species in order to produce large size timber to meet the local and commercial demand.

iv) Preservation and improvement of minor forest to obtain progressively increasing yield of small timber, fire wood, and poles in order to meet the demands of local people and to provide grazing to local cattle.

v) To combat ill effects of soil erosion wherever it has already started and to prescribe preventive measures.

vi) To increase the production of non-wood forest produce and medicinal plants, and to manage the same scientifically.

v) To increase the productivity and ensure progressively increasing yield of forest produce in demand.

vi) To achieve compatible wildlife management.

SECTION 4 : ANALYSIS AND VALUATION OF THE CROP :

8.4.1 The enumeration of the growing stock has been done by Survey of Forest Resources Unit at Chandrapur. 1% point sampling has been done by taking up plots of 60 mt x 60 mt at a distance of 600 mt. The result of tree enumeration done in Allapalli Forest Division has been reproduced in **Appendix No. XXI**.

SECTION-5 : CLASSIFICATION OF FORESTS :

8.5.1 The State Government vide G.R. No. MEP-1365/132211-Y, dated December 6, 1968 classified the state forests into following classes on functional basis.

i) PROTECTION FORESTS :-

This category includes forests on very steep slopes, 45° and over, along river banks, forest that have depleted through mal-treatment and further harvesting will accelerate soil erosion and adversely affect the productivity of agricultural lands in the lower regions. The management shall aim at soil and moisture conservation.

ii) TREE FORESTS :-

This includes forests that are situated in remote areas, prominently suited for growing a large sized timber and other products of commercial value.

iii) MINOR FORESTS :-

It includes forests that are honey combed with cultivated lands capable of producing small timber and providing grazing to local cattle.

iv) PASTURE LANDS :-

This category includes open and under stocked forests and the lands that have ceased to yield even small timber but these are conveniently suitable for grazing to the local cattle.

(v) MISCELLANEOUS FORESTS :

- a) Grass reserves:-** Open forests that are interspersed with cultivated lands mainly suitable for producing of fodder, are included in this category.
- b) Remaining areas:-** Areas needed for other works.

SECTION – 6 : GRAZING POLICY:

8.6.1 The Government of Maharashtra vide R & F. D. Resolution No. MFR-1368/132-ii Y dated 6.12.1968 formulated the grazing policy for the entire state, with an objective to have an uniform grazing policy throughout the state (**Appendix No.XVI**). The policy aims at providing ideal pasturage within the available resources in the state forests without letting the resources impair or deteriorate. In view of the above, the Government of Maharashtra vide Revenue and Forest Department Resolution No.MFP-137/237035-z dated November,3,1973 promulgated the grazing rules to illustrate the regulatory character of the forests grazing (**Appendix No. XVII**). The important features of the grazing rules are as below.

- (i) All grazing in the forest (whether free or other wise) would be on permit only.
- (ii) Each forest division will be divided into grazing units and the issue of license is subject to such definite allotment of villages to a particular grazing unit, to such limitation on the number of cattle grazed in any such units, as may have been ordered by the Government after special enquiry and also to such closure to grazing as may be enforced in accordance with the prescriptions of sanctioned working plan.
- (iii) For excess cattle, license at prescribed rates may be taken out for any grazing unit, provided there is a room in that grazing unit.
- (iv) For free grazing of cattle of cultivator family and others, issue of licenses are limited to the period of June 15 to July 31 only.
- (v) A grazing license can be refused over a period of one year to any individual, who has been guilty of persistent illicit grazing by the order of the Conservator of Forests Government otherwise may refuse grazing license for a community whose members have been guilty of persistent illicit grazing.
- (vi) Computation of cattle units are made as per the following table-32.

TABLE-39

Sr. No.	Cattle	Equivalent cattle unit	Grazing fees
11	Adult buffalo	2	2.00
22	Adult cows, bull or bullock	1	1.00
33	Buffalo calf (less than a year, but more than 6 months old)	1	1.00
44	Cow calf (less than 3 years, but more than 6 months old)	½	0.50

- (vii) Essential cattle, subject to a maximum of two plough units per cultivator family, should be allowed free grazing in forests. 2 plough unit shall mean 4 cattle unit.
- (viii) The patwari / Talathi / Gramsewak shall issue a certificate on demand to all cultivator families entitled to graze cattle free.
- (ix) Each grazing unit and the villages served by it shall constitute a grazing circle. There will be a licensed vendor to issue passes.

8.6.2 The following is the maximum permissible grazing incidence permitted in each category of forests as stated in the functional classification.

(a) Protection forests: Because of steep and precipitous nature of forests, grazing should altogether be prohibited here, except in exceptional cases, where too the incidence should not exceed one cattle unit for 4 hectare (10 Acre).

(b) Tree Forests: The grazing incidence of these forests should be one cattle unit for 1.2 ha. Minor Forests: The grazing incidence for these forests should be one cattle unit for 0.6 to 0.8 ha.

(c) Pasture Land : The grazing incidence for these lands should be one cattle unit per 0.4 ha.

(d) Grass Reserve: The grazing is completely eliminated from these areas, but cutting of grasses should be permitted

8.6.3 The distribution of the forest area in ha. in various class of forest is given in the following table:

TABLE-40
Distribution of Forest area and type of forest in Allapalli Forest Division.

Sr.No.	Class of Forests	Forest Area in Ha.				Percentage
		R.F.	P.F.	Unclassed	Total	
1	Protection Forest	6413.635	--	--	6413.635	2.94
2	Tree Forest	164041.336	9932.570	7927.73	181901.636	83.48
3	Minor Forest	10545.134	13600.720	5481.560	29627.414	13.60
TOTAL		181000.105	23533.290	13409.290	217942.685	

SECTION-7: METHOD OF TREATMENT

8.7.1 It is influenced by situation and condition of the forests, condition of regeneration of the crop, needs of local people and availability of labour, staff and resources.

i. PROTECTION FOREST:-The areas will be excluded from the commercial felling. Preservation of tree growth and to conserve soil and moisture is paramount need for these forests. To increase the stocking, plantations are prescribed in these areas.

ii. TREE FORESTS :- Better quality forests capable of producing large timber away from human settlements included in this category. These areas have been managed under conversion system of Qureshi's plan. Selection-cum-Improvement system of K.N.Khisti' plan.,Deshmukh and Joshi's plan ,Chandras and Gurjer's plan and Improvement Working Circle areas of Aheri and Pirimili Ranges. Steep slopes shall be excluded from harvesting. Tending of natural regeneration wherever it is adequate, soil and moisture conservation works wherever necessary and plantation of timber species in the areas where natural regeneration is inadequate will be taken. Gap planting of teak will be taken in suitable areas in such a way that the over all percentage of the teak becomes 10 to15 % in the resultant crop. These areas will be treated under S.C.I. W.C. The unconverted area under conversion working circle of Qureshi's plan is potentially fit for teak plantation with mostly matured and over matured crop. This will be treated by taking up teak plantation after removal of over wood in the growing stock.

The objective of National Forest Policy has been achieved by conserving the natural forest and extracting the yield on sustained basis. The large size timber to meet the national demand, will be obtained from these areas. The

small size timber, to meet the local demand will be met either through nistar or through sale in the depots of the material obtained after thinning or opening of the congested crop. In the present working plan, a separate working circle for pure teak plantation has been prescribed after clear felling and canopy removal, leaving behind 60 trees / hectare. This is in conformity with the latest guidelines issued by Govt. of India .Soil conservation works have been prescribed in order to promote the fertility of the soil and loss of vegetation cover.

iii. MINOR FORESTS:- Poor quality of forests with density less than 0.4 subjected to heavy biotic pressure are included in these category. Soil and moisture conservation works, plantation of indigenous species specially for small timber, poles, fodder and fire wood will be taken to meet the local demand. Tending of existing natural regeneration will be taken up. These areas shall be treated under afforestation working circle.

SECTION-8 :FORMATION OF WORKING CIRCLES :

8.8.1 Keeping in view the objects of the management and the methods of treatment, the following working circles have been prescribed in this working plan.

- i. Selection-cum-Improvement Working circle.
- ii. Improvement Working Circle.
- iii. Teak Plantation Working Circle.
- iv. Afforestation Working Circle
- v. Protection Working Circle.
- vi. Bamboo (Overlapping) Working Circle.
- vii. Wildlife (Overlapping) Working circle.
- viii. Non-wood Forest Produce (Overlapping) Working Circle.
- ix. Miscellaneous Working Circle.

8.8.2 The distribution of forest area and compartments allotted to various working circles is given in the following table:

TABLE—41

Distribution of forest area and compartments in various working circles

Working Circle	Reserved Forest (ha)	Protected Forest (ha)	Un-classed Forest (ha)	Total Forest area (ha)	Percent of Forest	Compartments
Selection-cum-Improvement. Working Circle	95351.802	2469.110	2462.470	100283.382	46.02	581 and 47 pt.

Improvement Working Circle	50730.602	7463.450	2446.100	60640.152	27.83	
Teak Plantation Working Circle	20978.135	--	3019.160	20978.095	9.63	86 and 86 pt
Afforestation Working Circle	10545.134	13600.72	5481.560	29627.414	13.16	577 and 1 pt
Protection Working Circle	6413.632	--	--	6413.632	2.94	18 and 10 pt
Bamboo (Overlapping) Working Circle	12200.473	--	--	12200.473	5.60	117
Wildlife (Overlapping) W.C.	181000.105	23533.290	13409.290	217942.685	100	
N.W.F.P. (Overlapping) W.C.	181000.105	23533.290	13409.290	217942.685	100	

The distribution of forest area in each range and in respective working circles is given in the following table

TABLE – 42

Distribution of forest area in various ranges and working circles.

Sr. No.	Name of Range	S.C.I. W.C.	Improv. W.C.	Teak Plantation W.C.	Affores. W.C.	Prot. W.C.	Bamboo. (Overlapping) W.C.
1	2	3	4	6	5	7	9
1.	Ghot	33240.949	17520.263	1219.303	11763.246	--	3968.743
2.	Markhanda	7702.110	1509.870	110.00	3375.810	--	--
3.	Pedigudam	13141.531	--	4408.159	--	4502.287	3551.93
4.	Aheri	--	11156.616	3942.951	11885.297	--	--
5.	Allapalli	5562.832	581.534	10329.362	926.731	1911.345	4679.800
6.	Pirmilli	40635.960	29871.869	968.320	1676.330	--	--
	TOTAL	100283.382	60640.152	20978.095	29627.414	6413.632	12200.473

SECTION-9: BLOCKS AND COMPARTMENTS :

8.9.1 The area of reserved forests of Allapalli Forest Division. is 181000.105 ha. including the additional area of 77675.571 ha. of Protected Forest which has been declared as Reserved vide Govt. of Maharashtra, R.& F.D.Notification No. FLD/3685/9316/CR-42/F-3 dated May 5, 1992. and the balance area of the protected forests is 23533.290 ha. and unclassed forest is 13409.290 ha. The total number of compartments in Allapalli Forest Division are 1813 Out of 1813 compartments, 120 compartments spread over Markhanda, Pedigundam and Aheri ranges have been transferred to Forest Development Corporation of Maharashtra Ltd. and 59 compartments of Markhanda Range have been transferred to Chaprala Wildlife Sanctuary for specific management purposes.

SECTION-10: PERIOD OF THE PLAN

8.10.1 The period the plan is fixed for 10 years from 2004-2005 to 2013-2014.

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CHAPTER - 9
SELECTION-CUM-IMPROVEMENT W.C.



CHAPTER-9 SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

9.1.1 This working circle includes better forest areas i.e. all felling series worked under S.C.I. in the previous working schemes. This working circle includes the areas which have i) Teak in very good proportion but which can not be worked under concentrated regeneration operations due to hilly terrain. ii) areas with low proportion of teak and iii) areas with mainly miscellaneous species. The second and third type of areas are on sandy soils and if worked under concentrated regeneration i.e. teak conversion working circle may lead to soil erosion. The forest are of III to IV quality which reaches to quality II on good soil. The quality IV patches lie scattered all over the area. The forest areas suitable for timber harvesting if otherwise available are included in this working circle based on enumeration data and vegetation pattern. The classification of compartments to this working circle has been done on the basis of basal area of the compartment obtained from the tree enumeration data. The compartments having basal area of more than eight meter square have been included in this working circle with some modifications in some compartments in order to have a continuous felling series.

9.1.2 The S..C.I. Working Circle is the biggest working circle and covers 46.02 % area of the division spread over 581 and 47 part compartments which includes 431 and 47 part compartments in Reserved Forest, 135 compartments in Protected Forest and 15 compartments in un-classed forest. The total area included in this working circle is 100283.382 ha. The distribution of the area in the five ranges is given in the following table:

TABLE – 43

S.C.I. WORKING CIRCLE.

Sr.No.	Name of Range	Reserved Forest	Protected Forest	Unclassed Forest	Total
1	2	3	4	5	6
1.	Ghot	33240.949	--	--	33240.949
2.	Markhanda	7296.540	--	405.570	7702.110
3.	Pedigundam	11476.151	--	1665.380	13141.531
4.	Aheri	--	--	--	--
5.	Allapalli	5171.312	--	391.520	5562.832
6.	Permilli	38166.850	2469.110	--	40635.960
	Total	95351.802	2469.110	2462.47	100283.382

SECTION 2: GENERAL CHARACTER OF THE VEGETATION :

9.2.1 It comprises of good quality of teak and teak-miscellaneous forests, with dense bamboo and forests that are situated mostly on hills and in interior areas. These forests exhibit a great genetic diversity, crop density varies from 0.6 to 0.8 and the site quality is between II and IV a and rarely IV b. However the site quality in some compartments in Allapalli Range reaches to I. Bamboo forms understorey and considerable degree of congestion in the clumps is noticed particularly in the areas of Nistar Bamboo F.S. The quality, density and composition of the crop changes from place to place and within short distances. The status of natural regeneration of some of the miscellaneous species is satisfactory. Therefore, the advantage of this situation will be taken to regenerate the area. Although the growing stock mainly consists of miscellaneous species. Patches of well drained soils and undulated area support the growth of the teak. To increase the value of the growing stock, teak will be introduced in suitable patches by way of gap planting, so that the resultant crop will have 10 % to 15% of teak.

The forest allotted to this working circle belongs to the following types;

- i) 5A / Cib - Southern tropical dry teak forests.
- ii) 5A / C3 - Southern tropical dry mixed forests.
- iii) 3B / Cib - South Indian moist deciduous forests.

9.2.2 The forest is generally well stocked and of quality III and IV. On flat tops of hills and in places where underlying rock is exposed and the proportion of sand is less, the overwood consists of Ain, Dhawara, Lendia, Salai, Mowai, Tendu, Achar, Semal, Bija, Tinsa, Bhirra, Rohan, Karam and Anjan haldu etc. with varying proportion of teak. In teak areas, teak forms 20 to 25 % of the crop. High quality mixed teak forests occur in patches on flat as well as gentle slopes where quality improves from III to II. Dense understorey of bamboo is present at places.. The crop is generally young to middle aged with sprinkling of mature and overmature trees, Fires are common in these areas and incidence of Phetra indicates drier sites. On drier slopes salai, kulu and chiwada, are seen. Along nala banks Jamun, kusum arjun and bistendu are present. In the low lying and some what moist areas, the regeneration of ain is good. Regeneration of teak is found in the form of scattered seedlings on gentler slopes with well drained and deep soils. No regeneration is noticed in areas infested heavily with climbers.

SECTION :3 SPECIAL OBJECTS OF MANAGEMENT.

9.3.1 The special objects of management are:-

- (i) To improve the quality and to increase the proportion of valuable species by giving preferential treatment to naturally regenerated seedlings and by planting timber species mainly teak and its associates.
- (ii) To produce large size timber by utilizing the full potential of the site.
- (iii) To increase the stocking of Teak, bamboo and other valuable species.

- (iv) To promote and tend the available regeneration of all the valuable species
- (v) To maintain and improve adequate soil cover in the forest areas as a safeguard against soil erosion and rapid runoff of the rain water by soil and water conservation measures on the basis of watershed.
- (vi) To attain normality in the forest.

SECTION 4 : ANALYSIS AND VALUATION OF THE CROP.

9.4.1 i. STOCK MAPPING: The entire area of this working circle has been stock mapped through satellite imageries in the office of the Conservator of Forests, Working Plan Circle, Nagpur.

9.4.2 ii. DENSITY AND AGE CLASSES: The crop is mostly young to mature trees with scattered overmature trees. Density generally varies from 0.6 to 0.8. Some understocked and blank patches of more than one hectare are also included. They are present in parts in coupes and therefore can not be separated.

9.4.3 iii. REGENERATION: The overall regeneration status of miscellaneous species like ain, dhaoda, garari, lendia, tendu etc. is satisfactory. The regeneration status of other superior miscellaneous species like bija, Shisham, haldu, etc. is not satisfactory. The regeneration of teak is very poor due to its silvicultural character. A large extent of area of the Allapalli Range which was allotted to Teak Conversion Working Circle, remained unworked due to instructions issued by the Govt. of India imposing complete ban on green felling and therefore the seedlings of teak which is a light demander species failed to establish due to congestion in the crop. Coppice regeneration of garari and lendia is profuse.

9.4.4 iv. ENUMERATION: Enumeration of the growing stock of the tract dealt with, has been done by Survey of Forest Resources Unit Chandrapur. 1% point sampling method has been used to record the tree enumeration data and the same has been analyzed manually and the results of the analysis of the data has been given in the following table:

TABLE-44
Distribution of trees per hectare girth class-wise in SCI, WC

Group	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151up	Total	r1	r2	r3
Group1	9.98	8.17	7.34	5.93	4.89	3.85	2.54	1.8	0.97	0.02	45.48	89.33	44.22	24.17
Group2	7.62	5.29	4.03	3.3	3.04	2.77	2.16	1.44	0.81	0.02	30.48	206.37	106.85	37.96
Group3	3.31	2.4	1.68	1.17	0.85	0.61	2.43	0.25	0.13	0.02	10.85	62.95	26.49	9.8
Group4	34.2	27.1	16.63	9.6	4.94	1.91	0.6	0.2	0.05	0.03	95.26	292.3	186.22	70.9
Total	55.11	42.96	29.68	20	13.72	9.14	7.73	3.69	1.96	0.09	182.07	650.95	363.78	142.83

The percentage crop composition derived from the enumeration data is given in the following table:

TABLE-45

Percentage crop composition derived from enumeration data.

Species	Stems								
	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	135/ above
Group-1	18.14	19.02	24.73	29.65	35.64	42.12	44.33	48.78	48.29
Group-2	13.67	12.31	13.58	16.50	22.16	30.31	37.70	39.02	40.49
Group-3	6.02	5.59	5.66	5.85	6.20	6.67	7.50	6.78	7.32
Group-4	62.17	63.08	56.03	48.00	36.00	20.90	10.47	5.42	3.90
Total	100	100	100	100	100	100	100	100	100

9.4.5 v. Analysis :- Teak occupies about 24.98 %, Non-teak timber species (Ain,Bija,Haldu,Shisham,) occupy about 16.47 % and other non timber species occupy about 58.30 % of the crop, taking all girth classes together. On the basis of tree enumeration results it is inferred that the area has the potential to grow better quality teak forest and therefore it is suggested that the percentage of teak and other timber species should be increased in order to meet the growing demand of timber for the local market and to earn the revenue by selling the important timber obtained from these forests.

SECTION 5: SILVICULTURAL SYSTEM ;

9.5.1 Based on the objects of management, site quality and composition of the crop, the silvicultural system to be followed is Selection-cum-Improvement felling. Natural regeneration will be encouraged by way of subsidiary silvicultural operations and rigid protection from fire and grazing. In suitable areas gap plantation of teak and superior species will be taken upto to improve the quality of crop. Bamboo plantations will be raised on suitable sites in the fourth year, in teak plantation areas.

9.5.2 It is fortunate that the Forest of Allapalli and Pediguddam Range is very close to the ideal condition. Deviation is slight and within control, which can be removed very easily and a state of normal forest can be achieved. As in case of all-aged normal forests, trees of all ages (and sized) are found mixed together on every smallest unit of area. Smaller and younger trees occur either under older and larger trees or in gaps or opening of the upper canopy. The oldest and largest trees are scattered everywhere. Under such circumstance the only answer to harvesting is the selection. This selection is altogether different form the traditional one. Thinning can not be separated from felling, because of the fact that the felling is not meant only for regeneration rather for improvement of the crop as well which is the objective of thinning. Therefore, all felling are nothing but a continuous process of thinning a perpetual forest by selection of individual trees for felling. The role of yield table for thinning in even-aged forests will be performed by the structure (normal stand table) so developed for the given normal

forest. As in case of thinning there is no room for reservation and so in this selection system, reservation will not be made. On the contrary, the reservation will act to destabilize the normal state of forests. Besides, the reservation is a safeguard for future stand as an optimum model can not be visualized for the stem density for a given forest type & composition of the crop. The structure i.e. normal stand table developed gives the optimum number of stem which can be supported by the given site. Increasing the population beyond this limit will adversely affect production, quality of produce and site too (in the long run). It will give a normal increment.

9.5.3 A normalcy of increment/yield can not be achieved in the existing forest where the composition is highly heterogeneous, as each species has its varying growth potential with the age and net result is that the increment varies over the year. The crop will therefore never put up a normal increment. However the normalcy of number will be achieved in the present model of working. The structure of all aged single species normal form yield table for site quality III is given in the following table.

TABLE-46

All aged single species normal form yield table for site quality III

Sr.No.	Diameter (Inch)	Girth (Cm)	No. of stem per Acre.
1	2.5	19.94	54.999
2	3.7	29.50	29.750
3	4.9	39.08	18.625
4	5.8	46.26	13.937
5	6.7	53.44	10.745
6	7.5	59.82	8.937
7	8.2	65.40	7.812
8	9.0	71.78	6.937
9	9.7	77.36	6.321
10	10.4	82.95	5.812
11	11.1	88.53	5.375
12	11.8	94.11	5.062
13	12.5	99.70	4.684
14	13.1	104.48	4.375
15	13.8	110.06	4.125
16	14.5	115.65	3.937
	Total		191.437

TABLE-46-A

Girth Class	Stem per Acre	Stem per hectare	Average Girth in cm	Average diameter in cm
1	2	3	4	5
16-30	55.2757	136.5891	23	7.32
31-45	40.2297	99.4097	38	12.10
46-60	29.2793	72.3507	53	16.88
61-75	21.3095	52.6569	68	21.66
76-90	15.5091	38.3238	83	26.43
91-105	11.2875	27.8920	98	31.21
106-120	8.2151	20.2999	113	35.99
121-135	5.9789	14.7742	128	40.76
135-Above	4.3515	10.7528	143	48.54
Total	191.4363	473.0491		

TABLE-47

Structure of all aged miscellaneous normal forest for SCI W.C. in Allapalli Division

Species	Stems								
	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	135/above
Group-1	24.777	18.908	17.892	15.613	13.659	11.748	8.999	7.207	5.193
Group-2	18.672	12.237	9.825	8.688	8.493	8.454	7.653	5.765	4.354
Group-3	8.223	5.557	4.095	3.080	2.376	1.860	1.522	1.002	0.787
Group-4	84.917	62.708	40.538	25.275	13.797	5.829	2.125	0.801	0.419
Total	136.589	99.410	72.350	52.656	38.325	270.891	20.299	14.775	10.753

SECTION : 6 NORMAL FOREST:

9.6.1 Forest Managers have been striving hard to achieve normality in the forest as their main object since the scientific management of forest started. Normality in the forest is an ideal state perfection in all its parts w.r.t. the objects of management. In simplest form normality means an even distribution of stems by areas of each age or age-classes. With reference to the yield, normality implies sustained yield. In a natural forests, crop composition and its growth are the function of site quality and species; and

the production is the function of site quality and age. The productivity of a given site is the element of objects of management which determines the species and their distribution in the crop. With the change in any of the above mentioned parameters, the structure of the normal forest or normal forest will change and therefore, the concept of normality is not an absolute. For a given site, given distribution of age-classes and given objects of management, there will be a normal forest which will be an ideal and ultimate forest with above reference. Thus for a set of variables, as mentioned above, a normal forest is an ideal state of forest condition which serves as standard for comparisons with an actual forest state, so that the deficiency of the latter are brought out for the purpose of sustained yield management. From such a forest, annual or periodic yield equal to the increment can be realized indefinitely, without endangering future yields and without detriment to the site. A normal forest is a forest where the mean annual increment is equal to current annual increment through out the period of rotation.

Normal state of a forest, under a given set of conditions (variables), thus includes three attributes :

- i) A normal series of age-classes.
- ii) A normal increment.
- iii) A normal growing stock.

NORMAL SERIES OF AGE-CLASSES :

9.6.2 This implies the presence of all age-classes from one year old to rotation age in the forest. When the trees of each age occur on separate areas, they constitute a series of age-gradations. When trees falling within certain age limits occur mixed together on the same area, they form a age-classes; in such cases the sign of normality is the proper distribution of trees of all ages.

NORMAL INCREMENT :

9.6.3 It is the optimum increment per unit area available by a given species/crop for a given rotation on a given site. It means that $MAI=CAI$, through out the period of rotation.

NORMAL GROWING STOCK :

9.6.4 It is the volume of the stand in a forest with normal age-class and a normal increment.

STRUCTURE OF NORMAL FOREST :

9.6.5 The object is to bring a forest to a normal productive state and therefore, the felling, thinning and regeneration operations have to be so regulated that all undesirable irregularities persisting in the natural forests are smoothed out so that the forests correspond to a properly balance normal forests. This can not be done till we know what a normal forest should be. Thus at first we should have a structure of a normal forest with reference to a given set of conditions. The structure implies the distribution of stems among different girth classes and species. The fundamental characteristic of the normal forest is that the general form of the distribution i.e.

structure follows an inverse J-shaped curve. This means that the number of trees decreases as diameter/girth increases. The slope of the curve and numerical values will be different for different normal forests but the shape remains the same.

9.6.6 According to the theory of De Liocourt, in a fully stock selection forest i.e. the normal growing stock of the uneven-aged forest, number of stems fall off from one diameter class to the next higher diameter class in a geometrical progression with a constant ratio, which means that the percentage reduction in the stem number from one diameter class to the next, is constant i.e.

$$N_1/N_2 = N_2/N_3 = \dots = N_8/N_9 = K$$

9.6.7 Where N represents the Number of stems in lowest diameter class and K is the constant i.e. common ratio of the geometrical progression. The theory was initially applied to the forest of temperate region but it was subsequently found by G.S.Mathauda, Asstt. Silva, FRI, Dehradun that this formula/ theory also holds good for tropical forests while calculating the yield by Brandis method and the crop will be reduced hypothetically to the normal forest.

9.6.8 The areas under S.C.I.Working circle of Allapalli Forest Division mainly lie between site quality II to III with few patches of site quality I in Allapalli Range. From yield table for site quality II to III corresponding to 16 ages starting from 5 and ending to 80, values of average crop girth and corresponding total volume were taken. Now, the decision for maintaining 9 girth classes was taken. These are 15 U 30, 30 U 45, 45 U 60, 60 U 75, 75 U 90, 90 U 105, 105 U 120, 120 U 135, 135 U 150 cms. A curve was drawn between the mid girth of diameters and it was reduced to girth only and the distribution was distributed accordingly. The normal distribution was distributed among the various species according to weightage, it has derived from the existing stand.

9.6.9 The basic information about the stand has been drawn from the volume table. By and large the site quality of the Allapalli Division is III and hence the yield table corresponding to site quality III has been chosen. A graph is drawn between the diameter and number of trees. Since this distribution is not normal, it is harmonized by a linear equation. In the yield table, there are 16 girth/diameter shown and this has been reduced to nearly 8 diameter cross as required for the yield calculation. The normal stand distribution chart is then used to distribute the various species in the same proportion as in the normal distribution. The composition can be change depending on the preference of the species but it has not been tried here. The percentage distribution has been maintained.

9.6.10 The curve so obtained is inverted-J shape as expected. Francois De Lallement De Liocourt also advocated the same form of structure of a curve exclusively on the observations in the selection forests of the France comte in France. There is no theoretical basis to it. H.A. Meyer also supported the De Liocourt's law and a step ahead he suggested a form of exponential curve, $Y = Ke^{-ax}$ where k and a are constant and y and x are no. of stems and dbh in inches.. respectively. In the structure the percentage deduction in number of stems from one diameter/girth class to the next is constant. this means that the survival percentage of stems in each girth for passing from one diameter class to the next is constant. But this dose not conform with the silvicultural character of the tree species as well as the observation. The mortality in the lower girth class is more as compared to that in higher girth classes.

SECTION 7 : CHOICE OF SPECIES.:

9.7.1 Teak is the most valuable species and therefore it will be given top priority wherever it occurs. Miscellaneous species to be favoured in the existing crop are bija, shisham, haldu, ain, kalam, tiwas, dhaora, khair, garadi, rohan and lendia. semal and khair will be reserved from felling apart from edible fruits and flower yielding species.

SECTION 8: HARVESTABLE GIRTH :

9.8.1 The study of growth pattern for teak has been done and summarized in Chapter VI of this working plan. On the basis of analysis of growth of teak and other species , harvestable girths has been fixed as shown in the following table:

TABLE-48

Sr.No.	Group	Species	Harvestable girth (in cm)
1	I	Teak	135
2	II	Ain,bija,shisham and haldu	120
3	III	Other timber species	120
4	IV	Garari, lendia	45

9.8.2 However harvestable girths in traditional sense has not much relevance in the present silvicultural system. In this system, felling may take place in any girth classes in which number of stems per hectare exceeds to that of normal stand table, thus all girth classes in traditional sense may be harvestable or may not be, depending upon number of stems per hectare. Here the emphasis is on ultimate girth, This is important because this determines the composition of the crop and therefore the structure of the normal forests. The ultimate girth of any species in a given site quality is the maximum achievable girth in sound condition by a healthy tree of that species

TABLE - 49

Sr.No.	Group	Species
1	I	Teak
2	II	Ain, bija, haldu, shisham
3	III	Other species not included in group I, II and IV
4	IV	Lendia and garari

9.8.3 On the basis of field observations, ultimate girth classes decided for different site qualities are as follows.

TABLE-50

Site Quality	Ultimate girth class (cm)	No. of girth classes to be maintained
I	165-180	11
II	150-165	10
III	135-150	9
Iv(a)	120-135	8
Iv(b)	105-120	7

9.8.4 These girth classes correspond to Group I,II and III species. While marking species of group II and then group III should be marked first and then against balance surplus stumps group I should be marked up to 45 U 60 girth classes species of all groups will be given equal weight-age.

SECTION 9: BLOCKS AND COMPARTMENTS:

9.9.1 This working circle includes a total of 581 compartments and 47 part compartments. Out of these 431 and 47pt compartments are in reserved forest,135 compartments are in Protected Forest and 15 compartments in un-classed forest. The details of the compartments allotted to this working circle is given in **Appendix No.XXVIII.**

SECTION 10 : FELLING CYCLE :

9.10.1 The felling cycle has been fixed as 20 years.

SECTION 11: FORMATION OF FELLING SERIES AND COUPES :

9.11.1 This working circles has been divided into 45 felling series and each felling series has been divided into 20 annual coupes. The sequence of working has been given in **Appendix No. XXX.** The details of the felling series and compartments allotted to each felling series has been given in the **Appendix No.XXIX.**

SECTION 12 : REGULATION OF YIELD :

9.12.1 The annual yield will be regulated by area by making coupes as far as possible equi-productive in each felling series. The coupes of 100 to 125 ha has been laid down. The details of annual coupes and their working has been given in **Appendix No.XXX.**

9.12.2 In a balanced normal forest, the yield always remains sustained. The normality is achieved after a rotation in general. However, looking into the crop composition and statistics of growth, it is quite possible that the forests of this working circle can be brought to normalcy within two/three felling cycles with some efforts. The annual yield will be regulated by area by making coupes as far as equi-productive in each felling series.

YIELD CALCULATION:

9.12.3 The yield has been calculated separately for different groups species. No method is available for yield calculation for such type of management. However, taking the help of K.P. Sagreiya's modification of smithies formula, effort have been made for yield calculation. As the over all quality of forest included in SCI corresponds to II/III. The yield calculations has been done taking all girth classes as harvestable as thinning is to carried out in each girth class. The procedure followed for yield calculation is as follows.

Group -1: The harvestable girth for group 1 species has been fixed as 135 cm. at dbh and the yield calculation is given as under:

TABLE-51

Girth Class in Cms.		Stem per ha.	Stem/ha as per De Liocourt	% of survival	Stem/ha. reaching harvestable size (3x5)	Years required to pass over next girth class	Average annual recruitment
1	2	3	4	5	6	7	8
I	15-30	9.98	10.57	16.46	1.64	9	0.1822R1
II	30-45	8.17	8.44	20.61	1.68	10	0.168R2
III	45-60	7.34	6.73	25.85	1.90	11	0.173R3
IV	60-75	5.93	5.37	32.40	1.92	12	0.16R4
V	75-90	4.89	4.29	40.56	1.98	13	0.152R5
VI	90-105	3.85	3.42	50.88	1.96	15	0.131R6
VII	105-120	2.54	2.73	63.74	1.62	17	0.095R7
VIII	120-135	1.80	2.18	79.82	1.44	17	0.085R8
IX	135above	.0.97	1.74	100	0.99	16	0.062R9
X	Above						
		45.48					

$$\begin{aligned}
 r &= \frac{(9.98 + \dots + 1.80)}{(8.17 + \dots + 0.99)} \\
 &= \frac{44.50}{35.51} \\
 &= 1.253 \\
 a &= \frac{5 [r (n-1) (r-1)]}{r^n - 1}
 \end{aligned}$$

$$\begin{aligned}
&= 45.48 \left[\frac{1.253(1.253-1)}{1.253-1} \right] \\
&= 45.48 \left[\frac{6.076(0.253)}{7.613-1} \right] \\
&= 45.48 \left[\frac{1.537}{6.613} \right] \\
&= 10.571
\end{aligned}$$

The no. of trees which will be recruited during felling cycle of 20 years is given below

$$\begin{aligned}
FR_1 &= 16 R_9 + 4 R_8 = 0.992 + 0.34 = 1.332 \\
FR_2 &= 13 R_8 + 7 R_7 = 1.105 + 0.665 = 1.77 \\
FR_3 &= 10 R_7 + 10 R_6 = 0.95 + 1.31 = 2.26 \\
FR_4 &= 5 R_6 + 13 R_5 + 2 R_4 = 0.665 + 1.976 + 0.32 = 2.951 \\
FR_5 &= 10 R_4 + 10 R_3 = 1.6 + 1.73 = 3.33 \\
FR_6 &= 1 R_3 + 10 R_2 + 9 R_1 = 0.173 + 1.68 + 1.639 = 3.492
\end{aligned}$$

Felling cycle

Realisable recruitment

$$\begin{aligned}
a &= \frac{Rx}{f} \frac{a^2}{2} \\
&= \frac{R_9}{40} \times 16^2 \\
&= \frac{0.062}{40} \times 16^2 \\
&= 0.3968 \\
b. &= \frac{a \cdot b \cdot Rx}{f} + \frac{b^2 \cdot R_{x-1}}{2f} \\
&= \frac{16 \times 4 \cdot R_9}{20} + \frac{4^2 \cdot R_8}{40} \\
&= \frac{16 \times 4 \times 0.062}{20} + \frac{4^2 \times 0.085}{40} \\
&= 0.1984 + 0.034 \\
&= 0.2324
\end{aligned}$$

$$(a) + (b) = 0.3968 + 0.2324 = 0.6292$$

Accumulating recruitment

$$\begin{aligned}
Ra &= f r_n - R_r \\
&= 1.332 - 0.6292 \\
&= 0.7028
\end{aligned}$$

2nd felling cycle

Realizable recruitment

$$a = \frac{Rx \cdot a^2}{40}$$

$$\begin{aligned}
 &= \frac{13^2 R 8}{40} \\
 &= \frac{13^2 \times 0.85}{40} \\
 &= 0.3591
 \end{aligned}$$

$$\begin{aligned}
 \text{b.} &= \frac{a \cdot b R x}{20} + \frac{b^2 R x-1}{40} \\
 &= \frac{13 \times 7 R 8}{20} + \frac{7^2 R 7}{40} \\
 &= \frac{13 \times 7 \times 0.085}{20} + \frac{7^2 \times 0.095}{40} \\
 &= 0.3868 + 0.1164 \\
 &= 0.5032 \\
 \text{(a) + (b)} &= 0.3591 + 0.5032 \\
 &= 0.8623
 \end{aligned}$$

l) Accumulated recruitment

$$\begin{aligned}
 R_a &= \int r n - R_2 \\
 &= 1.77 - 0.8623 \\
 &= 0.9077
 \end{aligned}$$

3rd Felling cycle

Realisable recruitment

$$\begin{aligned}
 \text{a} &= \frac{R x a^2}{40} \\
 &= \frac{10^2 R 7}{40} \\
 &= \frac{10^2 \times 0.95}{40} \\
 &= 0.2375
 \end{aligned}$$

$$\begin{aligned}
 \text{b.} &= \frac{a \cdot b R x}{f} + \frac{b^2 R x-1}{2 f} \\
 &= \frac{10 \times 10 x R 7}{20} + \frac{10^2 R 6}{40} \\
 &= \frac{10 \times 10 \times 0.095}{20} + \frac{10^2 \times 0.152}{40} \\
 &= 0.475 + 0.38 \\
 &= 0.855 \\
 \text{(a) + (b)} &= 0.2375 + 0.855 \\
 &= 1.0925
 \end{aligned}$$

II) Accumulated recruitment

$$\begin{aligned}
 R_a &= \int r n - R_r \\
 &= 2.26 - 1.0925 \\
 &= 1.1675
 \end{aligned}$$

4th Felling cycleRealizable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R x}{40} \\
 &= \frac{5^2 x R 6}{40} \\
 &= \frac{5^2 x 0.131}{40} \\
 &= 0.0819 \\
 b &= \frac{a \cdot b \cdot R x}{f} + \frac{b^2 \cdot R x - 1}{2 f} \\
 &= \frac{5 \cdot 13 x R 6}{20} + \frac{13^2 \cdot R 5}{40} \\
 &= \frac{5 \cdot 13 x 0.131}{20} + \frac{13^2 \cdot x 0.152}{40} \\
 &= 0.4258 + 0.6422 \\
 &= 1.068 \\
 c &= \frac{a \cdot c \cdot R x}{f} + \frac{b \cdot c \cdot R x - 1}{f} + \frac{c^2 \cdot R x - 2}{2 f} \\
 &= \frac{5 x 2 \cdot R 6}{20} + \frac{13 \cdot x 2 \cdot R 5}{20} + \frac{2^2 \cdot R 4}{40} \\
 &= \frac{5 \cdot 2 x 0.131}{20} + \frac{13 \cdot x 2 \cdot x 0.152}{20} + \frac{2^2 \cdot x 0.16}{40} \\
 &= 0.0655 + 0.1976 + 0.016 \\
 &= 0.2791 \\
 (a) + (b) + (c) &= 0.0819 + 1.068 + 0.2791 \\
 &= 1.429
 \end{aligned}$$

Accumulating recruitment

$$\begin{aligned}
 R_a &= \int r_n - R_r \\
 &= 2.951 - 1.429 \\
 &= 1.522
 \end{aligned}$$

5th Felling CycleRealizable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R x}{40} \\
 &= \frac{10^2 x R 4}{40} \\
 &= \frac{10^2 x 0.16}{40} \\
 &= 0.40 \\
 b &= \frac{a \cdot b \cdot R x}{f} + \frac{b^2 \cdot R x - 1}{2 f}
 \end{aligned}$$

$$\begin{aligned}
 &= \frac{10 \times 10 \times R^4}{20} + \frac{10^2 R^3}{40} \\
 &= \frac{10 \times 10 \times 0.16}{20} + \frac{10^2 \times 0.173}{40} \\
 &= 0.8 + 0.4325 \\
 &= 1.2325. \\
 (a) + (b) &= 0.40 + 1.2325 \\
 &= 1.6325
 \end{aligned}$$

Accumulating recruitment

$$\begin{aligned}
 Ra &= \int r n - Rr \\
 &= 3.33 - 1.6325 \\
 &= 1.6975
 \end{aligned}$$

6th Felling Cycle

Realizable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R x}{40} \\
 &= \frac{1 \cdot R^3}{40} \\
 &= \frac{1 \times 0.173}{40} \\
 &= 0.0043 \\
 b. &= \frac{a \cdot b R x}{f} + \frac{b^2 R x - 1}{2f} \\
 &= \frac{1 \times 10 R^3}{20} + \frac{10^2 R^2}{40} \\
 &= \frac{1 \times 10 \times 0.173}{20} + \frac{10^2 \times 0.168}{40} \\
 &= 0.865 + 0.42 \\
 &= 0.5065 \\
 c &= \frac{a \cdot c \cdot R x}{f} + \frac{b \cdot c \cdot R x - 1}{f} + \frac{c^2 R x - 2}{2f} \\
 &= \frac{1 \times 9 R^3}{20} + \frac{10 \times 9 R^2}{20} + \frac{9^2 R^1}{40} \\
 &= \frac{1 \times 9 \times 0.173}{20} + \frac{10 \times 9 \times 0.168}{20} + \frac{9^2 \times 0.1822}{40} \\
 &= 0.0779 + 0.756 + 0.3690 \\
 &= 1.2029
 \end{aligned}$$

$$\begin{aligned}
 (a) + (b) + (c) &= 0.0043 + 0.5065 + 1.2029 \\
 &= 1.7137
 \end{aligned}$$

Accumulating recruitment

$$\begin{aligned}
 Ra &= \int r n - Rr \\
 &= 3.492 - 1.7132 \\
 &= 1.7783
 \end{aligned}$$

			Hence available in cycle
1 st felling cycle	Realisable	0.6292	0.6292
	Accumulate	0.7028	
2 nd felling cycle	Realisable	0.8623	1.5651
3 rd felling cycle	Accumulate	0.9977	2.0002
	Realisable	1.0925	
4 th felling cycle	Accumulate	1.1675	2.5965
	Realisable	1.429	
5 th felling cycle	Accumulate	1.522	3.1545
	Realisable	1.6325	
6 th felling cycle	Accumulate	1.6975	3.4112
	Realisable	1.7137	
Accumulata		1.7783	

The average annual volume available in the felling cycles is given in the following table:

TABLE-52

felling Cycle	Hence Available in cycle	Annual average recruitment	Annual average Vol (m ³)
1st	0.6292	0.0315	0.0324
2nd	1.5651	0.0783	0.0806
3rd	2.0002	0.10001	0.1030
4th	2.5965	0.1298	0.1337
5th	3.1545	0.1577	0.1624
6 th	3.4112	0.1706	0.1757

Annual Realisable Yield in cycles is given in the following table:

TABLE-53

Stock in hand	I	II	III	IV	V	VI
1 st cycle	0.0810	0.0783	0.10001	0.198	0.1577	0.1706
2nd cycle	0.0797	0.0797	0.10001	0.1298	0.1577	0.1706
3rd cycle	0.0865	0.0865	0.0865	0.1298	0.1577	0.1706
4th cycle	0.0973	0.0973	0.0973	0.0973	0.1577	0.1706
5th cycle	0.1094	0.1094	0.1094	0.1094	0.1094	0.1706
6th cycle	0.1196	0.1196	0.1196	0.1196	0.1196	0.1196

Yield in first 6 filling cycles

$$\begin{aligned}
 \text{a} \quad \text{Total Realisable trees} &= 0.99 + 0.6292 \\
 &= 1.6192 \\
 \\
 \text{b} \quad \text{Total Prescribed Trees} &= 0.1196 \times 20 = 2.392 \\
 \text{Percentage Removal} &= \frac{2.392 \times 100}{1.6192} \\
 &= 147\%
 \end{aligned}$$

Hence all trees marked in the girth class shall be removed in group 1 species
Group -2

Harvestable Girth 120 Cms Yield calculation for Ain, bija, Haldu, Shisham
TABLE-54

Girth Class in Cms.		Stem per ha.	Stem/ha as per De Lio court	% of survival	Stem/ha reaching harvestable size (3x5)	years required to pass over next girth class	Average annual recruitment
1	2	3	4	5	6	7	8
I	15-30	7.52	7.60	16.83	1.27	9	0.1411 R1
II	30-45	5.29	5.89	21.71	1.15	10	0.115 R2
III	45-60	4.03	4.57	28.01	1.13	11	0.1027 R3
IV	60-75	3.30	3.54	36.16	1.19	12	0.099 R4
V	75-90	3.04	2.74	46.72	1.42	13	0.1092 R5
VI	90-105	2.77	2.13	60.10	1.66	15	0.1107 R6
VII	105-120	2.16	1.65	77.58	1.68	17	0.0988 R7
VIII	120-135	1.44	1.28	100	1.44	17	0.0847 R8
IX	135above	0.83	0.99	100	0.83	16	0.0510 R9
X	Above						
	Total	30.38					

$$\begin{aligned}
 r &= \frac{(7.52 + \dots + 1.44)}{(5.29 + \dots + 0.83)} \\
 &= \frac{29.55}{22.86} \\
 &= 1.29 \\
 \text{a} &= 5 \left[\frac{r^{(n-1)} (r-1)}{r^n - 1} \right] \\
 &= 30.38 \left[\frac{1.29^8 (1.29-1)}{1.29^9 - 1} \right] \\
 &= 30.38 \left[\frac{7.67(1.29 - 1)}{9.89 - 1} \right] \\
 &= 30.38 \left[\frac{7.67 \times 0.29}{8.89} \right] \\
 &= 7.60
 \end{aligned}$$

The no. of trees which will be recruited during felling cycle of 20 years is given below

$$\begin{aligned}
 FR_1 &= 17 R_8 + 3 R_7 = 1.4399 + 0.2964 = 1.7363 \\
 FR_2 &= 14 R_7 + 6 R_6 = 1.3832 + 0.6642 = 2.0474 \\
 FR_3 &= 9 R_6 + 11 R_5 = 0.9963 + 1.2012 = 2.1975 \\
 FR_4 &= 2R_5 + 12 R_4 + 6R_3 = 0.2184 + 1.188 + 0.6162 = 2.0226 \\
 FR_5 &= 5 R_3 + 10 R_2 + 5 R_1 = 0.5135 + 1.15 + 0.70553 = 2.369
 \end{aligned}$$

1st Felling cycle

Realisable Recruitment

$$\begin{aligned}
 a &= \frac{R_x}{f} \frac{a^2}{2} \\
 &= \frac{17^2 R_8}{40} \\
 &= \frac{17 \times 0.0847}{40} = 0.6120 \\
 b &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{17 \times 3 R_8}{20} + \frac{3^2 R_7}{40} \\
 &= \frac{17 \times 3 \times 0.0847}{20} + \frac{3^2 \times 0.0988}{40} \\
 &= 0.2160 + 0.0222 \\
 &= 0.2382 \\
 (a) + (b) &= 0.6120 + 0.2382 \\
 &= 0.8502
 \end{aligned}$$

Accumulating Recruitment

$$\begin{aligned}
 R_a &= f r_n - R_r \\
 &= 1.7363 - 0.8502 \\
 &= 0.8861
 \end{aligned}$$

2nd felling cycle

Realizable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{14^2 R_7}{40} \\
 &= \frac{14^2 \times 0.0988}{40} = 0.4841 \\
 b &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{14 \times 6 R_7}{20} + \frac{6^2 R_6}{40} \\
 &= \frac{14 \times 6 \times 0.0988}{20} + \frac{6^2 \times 0.1107}{40}
 \end{aligned}$$

$$\begin{aligned}
 &= 0.4150 + 0.996 \\
 &= 0.5146 \\
 \text{(a) + (b)} &= 0.4841 + 0.5146 = 0.9987
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 R_a &= f r_n - R_r \\
 &= 2.0474 - 0.9987 \\
 &= 1.0487
 \end{aligned}$$

3 rd felling cycle

$$\begin{aligned}
 \text{a} &= \frac{a^2 R_6}{40} = \frac{9^2 R_6}{40} \\
 &= \frac{9^2 \times 0.1107}{40} \\
 &= 0.2242 \\
 \text{b} &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{9 \times 11 R_6}{20} + \frac{11^2 R_5}{40} \\
 &= \frac{9 \times 11 \times 0.1107}{20} + \frac{11^2 \times 0.1092}{40} \\
 &= 0.5480 + 0.3303 \\
 &= 0.8783 \\
 \text{(a) + (b)} &= 0.2242 + 0.8783 \\
 &= 1.1025
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 R_a &= f r_n - R_r \\
 &= 2.1975 - 1.1025 \\
 &= 1.095
 \end{aligned}$$

4 th felling cycle

Realisable recruitment

$$\begin{aligned}
 \text{a} &= \frac{a^2 R_x}{40} \\
 &= \frac{2^2 R_5}{40} \\
 &= \frac{2^2 \times 0.1092}{40} \\
 &= 0.0109 \\
 \text{b} &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{2 \times 12 R_5}{20} + \frac{12^2 R_4}{40} \\
 &= \frac{2 \times 12 \times 0.1092}{20} + \frac{12^2 \times 0.099}{40} \\
 &= 0.1310 + 0.3564 \\
 &= 0.4874
 \end{aligned}$$

$$\begin{aligned}
 c &= \frac{a.c Rx}{f} + \frac{b.c Rx-1}{f} + \frac{c^2 Rx-2}{2f} \\
 &= \frac{2 \times 6 \times R_5}{20} + \frac{12 \times 6 \times R_4}{20} + \frac{6^2 \times R_3}{40} \\
 &= \frac{2 \times 6 \times 0.1092}{20} + \frac{12 \times 6 \times 0.099}{20} + \frac{6^2 \times 0.1027}{40} \\
 &= 0.655 + 0.3564 + 0.0924 \\
 &= 0.5143 \\
 (a) + (b) + (c) &= 0.0109 + 0.4874 + 0.5143 \\
 &= 10.0126
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 Ra &= f r_n - R_r \\
 &= 2.0226 - 1.0126 \\
 &= 1.01
 \end{aligned}$$

5 th felling cycle

$$\begin{aligned}
 a &= \frac{a^2 Rx}{40} \\
 &= \frac{5^2 R_3}{40} \\
 &= \frac{5^2 \times 0.1027}{40} \\
 &= 0.0642 \\
 b &= \frac{a.b Rx}{f} + \frac{b^2 Rx-1}{2f} \\
 &= \frac{5 \times 10 R_3}{20} + \frac{10^2 R_2}{40} \\
 &= \frac{5 \times 10 \times 0.1027}{20} + \frac{10^2 \times 0.115}{40} \\
 &= 0.2568 + 0.2875 \\
 &= 0.5443 \\
 c &= \frac{a.c Rx}{20} + \frac{b.c Rx-1}{20} + \frac{c^2 Rx-2}{40} \\
 &= \frac{5 \times 5 \times R_5}{20} + \frac{10 \times 5 \times R_2}{20} + \frac{5^2 \times R_3}{40} \\
 &= \frac{5 \times 5 \times 0.1027}{20} + \frac{10 \times 5 \times 0.115}{20} + \frac{5^2 \times 0.1411}{40} \\
 &= 0.1284 + 0.2875 + 0.0882 \\
 &= 0.5041 \\
 (a) + (b) + (c) &= 0.0642 + 0.5443 + 0.5041 \\
 &= 1.1126
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 Ra &= f r_n - R_r \\
 &= 2.369 - 1.1126 \\
 &= 1.2564
 \end{aligned}$$

		Hence available in cycle	
	Realisable	0.8502	0.8502
1 st felling cycle	Accumulata	0.8861	1.8848
2 nd felling cycle	Realisable	0.9987	
	Accumulate	1.0487	2.1512
3 rd felling cycle	Realisable	1.1025	
	Accumulate	1.095	2.1076
4 th felling cycle	Realisable	1.0126	
	Accumulate	1.0100	2.1226
5 th felling cycle	Realisable	1.1126	
	Accumulate	1.2564	

The average annual yield in M³ is given in the following table:

TABLE-55

Felling Cycle	Hence Available in cycle	Annual average recruitment	Annual average Vol (m ³)
1st	0.8502	0.0425	0.0383
2nd	1.8848	0.0942	0.0848
3rd	2.1512	0.1076	0.0968
4th	2.1076	0.1054	0.949
5th	2.1226	0.1061	0.955

Annual Realisable Yield in cycle

TABLE-56

Stock in hand	I	II	III	IV	V
1 st cycle	0.1560	0.0942	0.1076	0.1054	0.1061
2nd cycle	0.1251	0.1251	0.1076	0.1054	0.1061
3rd cycle	0.1193	0.1193	0.1193	0.1054	0.1061
4th cycle	0.1158	0.1158	0.1158	0.1158	0.1061
5th cycle	0.1139	0.1139	0.1139	0.1139	0.1139

Yield in first 5 felling cycle

$$\begin{aligned}
 \text{a. Total Realisable trees} &= 2.27 + 0.8502 \\
 &= 3.1202 \\
 \text{b. Total prescribed trees} &= 0.1139 \times 20 = 2.278 \\
 \\
 \text{Percentage Removal} &= \frac{2.278 \times 100}{3.1202} \\
 &= 73.0 \%
 \end{aligned}$$

Hence 7 trees out of 10 marked trees in the girth class shall be removed in group 2 species

Group -3

Harvestable Girth 120 Cms Yield calculation for other miscellaneous species (Other than group 1,2 and 4)

TABLE-57

Girth Class in Cms.		Stem per ha.	Stem/ha as per De Lio court	% of survival	Stem/ha reaching harvestable size (2x4)	year required to pass over next girth class	average annual recruitment
1	2	3	4	5	6	7	8
I	15-30	3.31	3.35	8.66	0.2866	14	0.0205 R1
II	30-45	2.40	2.36	12.29	0.2950	13	0.0227 R2
III	45-60	1.68	1.66	17.47	0.2935	14	0.0210 R3
IV	60-75	1.17	1.17	24.79	0.2900	13	0.0223 R4
V	75-90	0.85	0.82	35.37	0.3006	13	0.0231 R5
VI	90-105	0.61	0.58	50.00	0.3050	12	0.0254 R6
VII	105-120	0.43	0.41	70.73	0.3041	13	0.0234 R7
VIII	120-135	0.25	0.29	100	0.2500	16	0.156 R8
IX	135above	0.15	0.20	100	0.1500	--	
	TOTAL	10.85					

$$\begin{aligned}
 r &= \frac{(3.31 + \dots + 0.25)}{(2.40 + \dots + 0.15)} \\
 &= \frac{10.70}{7.54} \\
 &= 1.42 \\
 a &= S \frac{r^{(n-1)}(r-1)}{r^n - 1} \\
 &= 10.85 \frac{(1.42)^8 \times (1.42-1)}{(1.42)^9 - 1} \\
 &= \frac{16.53 \times 0.42}{10.85} \quad 23.47-1 \\
 &= \frac{16.53 \times 0.42}{10.85} \quad 22.47-1 \\
 &= 3.35
 \end{aligned}$$

The no. of trees which will be recruited during felling cycle of 20 years is given bellow

$$FR_1 = 16 R_8 + 4 R_7 = 0.2496 + 0.0936 = 0.3432$$

$$FR_2 = 9 R_7 + 11 R_6 = 0.2106 + 0.2794 = 0.49$$

$$FR_3 = 1 R_6 + 13 R_5 + 6 R_4 = 0.0254 + 0.3003 + 0.1338 = 0.4595$$

$$FR_4 = 7 R_4 + 13 R_3 = 0.1561 + 0.273 = 0.4291$$

1st Felling cycle

Realisable recruitment

$$\begin{aligned} a &= \frac{a^2 R_x}{2f} \\ &= \frac{16^2 \times R_8}{40} \\ &= \frac{16^2 \times 0.0156}{40} \end{aligned}$$

$$= 0.0998$$

$$b. = \frac{a \cdot b \cdot R_x}{f} + \frac{b^2 \cdot R_{x-1}}{2f}$$

$$= \frac{16 \times 4 \times R_8}{20} + \frac{4^2 \cdot R_7}{40}$$

$$= \frac{16 \times 4 \times 0.0156}{20} + \frac{4^2 \times 0.0234}{40}$$

$$= 0.0499 + 0.0094$$

$$= 0.0593$$

$$(a) + (b) = 0.0998 + 0.0593$$

$$= 0.1591$$

Accumulating recruitment

$$R_a = f_m - R_r$$

$$= 0.3432 - 0.1591$$

$$= 0.1841$$

2nd felling cycle realizable recruitment

$$a = \frac{a^2 R_x}{2f}$$

$$= \frac{9^2 \cdot R_7}{40}$$

$$= \frac{9^2 \times 0.0234}{40} = 0.0474$$

$$b. = \frac{a \cdot b \cdot R_x}{f} + \frac{b^2 \cdot R_{x-1}}{2f}$$

$$= \frac{9 \times 11 \cdot R_7}{20} + \frac{11^2 \cdot R_6}{40}$$

$$= \frac{9 \times 11 \times 0.0234}{20} + \frac{11^2 \times 0.0254}{40}$$

$$= 0.1158 + 0.0768$$

$$= 0.1926$$

$$(a) + (b) = 0.0474 + 0.1926 = 0.2400$$

Accumulated Recruitment

$$\begin{aligned} R_a &= f r_n - R_r \\ &= 0.49 - 0.2400 \\ &= 0.25 \end{aligned}$$

3 rd felling cycle

$$\begin{aligned} a &= \frac{a^2 R_x}{2f} \\ &= \frac{1^2 \times R_6}{40} = \frac{1^2 \times 0.0254}{40} \\ &= 0.00064 \end{aligned}$$

$$\begin{aligned} b &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\ &= \frac{1 \times 3 \times R_6}{20} + \frac{13^2 R_5}{40} \\ &= \frac{1 \times 3 \times 0.254}{20} + \frac{13^2 \times 0.0231}{40} \\ &= 0.00381 + 0.0976 \\ &= 0.1014 \end{aligned}$$

$$\begin{aligned} c &= \frac{a \cdot b R_x}{f} + \frac{b \cdot c R_{x-1}}{f} + \frac{c^2 R_{x-2}}{2f} \\ &= \frac{1 \times 6 \times R_6}{20} + \frac{13 \times 6 \times R_5}{20} + \frac{6^2 \times R_4}{40} \\ &= \frac{1 \times 6 \times 0.0254}{20} + \frac{13 \times 6 \times 0.0231}{20} + \frac{6^2 \times 0.0223}{40} \\ &= 0.00762 + 0.0901 + 0.0201 \\ &= 0.1178 \end{aligned}$$

$$\begin{aligned} (a) + (b) + (c) &= 0.00064 + 0.1014 + 0.1178 \\ &= 0.2198 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned} R_a &= f r_n - R_r \\ &= 0.4595 - 0.2198 \\ &= 0.2397 \end{aligned}$$

4 th felling cycle

Realisable recruitment

$$\begin{aligned} a &= \frac{a^2 R_x}{40} \\ &= \frac{7^2 R_4}{40} \\ &= \frac{7^2 \times 0.0223}{40} \\ &= 0.0273 \\ b &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \end{aligned}$$

$$\begin{aligned}
 &= \frac{7 \times 13 R_4}{20} + \frac{13^2 R_3}{40} \\
 &= \frac{7 \times 13 \times 0.0223}{20} + \frac{13^2 \times 0.0210}{40} \\
 &= 0.1015 + 0.0887 \\
 &= 0.1902 \\
 (a) + (b) &= 0.0273 + 0.1902 \\
 &= 0.2175
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 R_a &= f r_n - R_r \\
 &= 0.4291 - 0.2175 \\
 &= 0.2116
 \end{aligned}$$

			Hence available in cycle
1 st felling cycle	Realisable	0.1591	0.1591
	Accumulata	0.1841	1.4241
2 nd felling cycle	Realisable	0.2400	
	Accumulate	0.25	0.4698
3 rd felling cycle	Realisable	0.2198	
	Accumulate	0.2397	0.4572
4 th felling cycle	Realisable	0.2175	
	Accumulate	0.2116	

TABLE-58

felling Cycle	Hence Available in cycle	Annual average requitment	Annual average Vol (m ³)
1st	0.1591	0.0080	0.0012
2nd	0.4241	0.0212	0.0032
3rd	0.4698	0.0235	0.035
4th	0.4572	0.0229	0.0034

Annual Realisable Yield in cycle

TABLE-59

if Stock in hand	I	II	III	IV
1 st cycle	0.0280	0.0212	0.0235	0.0229
2nd cycle	0.0246	0.0246	0.0235	0.0229
3rd cycle	0.0242	0.0242	0.0242	0.0229
4th cycle	0.0238	0.0238	0.0238	0.0238

Yield in first 5 felling cycle

$$\begin{aligned}
 \text{a. Total Realisable trees} &= 0.40 + 0.1591 \\
 &= 0.5591 \\
 \text{b. Total prescribed trees} &= 0.0238 \times 20 = 0.476 \\
 \text{Percentage Removal} &= \frac{0.476 \times 100}{0.5591}
 \end{aligned}$$

Hence 8 trees out of 10 marked trees in the girth class shall be removed in group 3 species.

Group –4

Harvestable Girth 45 Cms :- Yield calculation for Group 4 (Garadi, Lendia)

TABLE-60

Girth Class in Cms.		Stem per ha.	Stem/ha as per De Lio court	% of survival	Stem/ha reaching harvestable size (2x4)	year required to pass over next girth class	Average annual requirement
1	2	3	4	5	6	7	8
I	15-30	34.20	34.83	41.08	14.05	1.6	0.8781 R 1
II	30-45	27.10	22.33	64.08	7.37	20	0.8685 R 2
III	45-60	16.63	14.31	100	100		
IV	60-75	9.60	9.17	100	100		
V	75-90	4.94	5.88	100	100		
VI	90-105	1.91	3.77	100	100		
VII	105-120	0.60	2.42	100	100		
VIII	120-135	0.20	1.55	100	100		
IX	135above	0.08	0.99	100	100		
	TOTAL	95.26			100		

$$\begin{aligned}
 r &= \frac{(34.20 + \dots + 0.20)}{(27.10 + \dots + 0.08)} \\
 &= \frac{95.18}{61.06} \\
 &= 1.56 \\
 a &= S \frac{r^{(n-1)}(r-1)}{r^n - 1} \\
 &= 95.26 \frac{(1.56)^8 \times (1.56-1)}{(1.56)^9 - 1} \\
 &= 95.26 \frac{35.07 \times 0.56}{54.72 - 1} \\
 &= 34.83
 \end{aligned}$$

The no. of trees which will be recruited during felling cycle of 20 years is given bellow

$$\begin{aligned}
 FR_1 &= 20R_2 &= 17.37 \\
 FR_2 &= 16R_1 + 4R_2 &= 14.05 + 3.474 = 17.524 \\
 FR_3 &= 16R_2 + 4R_1 &= 13.90 + 3.51 = 17.41 \\
 FR_4 &= 7R_4 + 13R_3 &= 0.1561 + 0.273 = 0.4291
 \end{aligned}$$

1st Felling cycle

Realisable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} = \frac{1}{2} f r_n - o \\
 &= \frac{1}{2} (17.37) \\
 &= 8.685
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 Ra &= f r_n - R_r \\
 &= 17.37 - 8.685 \\
 &= 8.685
 \end{aligned}$$

2nd Felling cycle

Realizable Recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{16^2 R_1}{40} = \frac{16^2 \times 0.8781}{40} \\
 &= 5.6198 \\
 b &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{16 \times 4 R_1}{20} + \frac{4^2 \times R_2}{40} \\
 &= \frac{16 \times 4 \times 0.8781}{20} + \frac{4^2 \times 0.8685}{40} \\
 &= 2.8099 + 0.3474 \\
 &= 3.1573 \\
 (a) + (b) &= 5.6198 + 3.1573 \\
 &= 8.7771
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 Ra &= f r_n - R_r \\
 &= 17.524 - 8.7771 \\
 &= 8.7469
 \end{aligned}$$

3rd Felling cycle

Realizable Recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{16^2 R_2}{40} + \frac{16^2 \times 0.8685}{40} \\
 &= 5.5584 \\
 b &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{16 \times 4 \times R2}{20} + \frac{4^2 \times R1}{40} \\
 & \frac{16 \times 4 \times 0.8685}{20} + \frac{4^2 \times 0.8781}{40} \\
 & = 2.7792 + 0.3512 \\
 & = 3.1304 \\
 (a) + (b) & = 5.5584 + 3.1304 \\
 & = 8.6888
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 Ra &= f m - Rr \\
 &= 17.41 - 8.6888 \\
 &= 8.7212
 \end{aligned}$$

		Hence available in cycle	
1 st felling cycle	Realizable	8.685	8.685
	Accumulata	8.685	7.4621
2 nd felling cycle	Realisable	8.7771	
	Accumulate	8.7471	17.4357
3 rd felling cycle	Realisable	8.6888	
	Accumulate	8.7212	

TABLE-61

Felling Cycle	Hence available in cycle	Annual average recruitment	Annual average Vol (m³)
1st	8.685	0.4343	0.0195
2nd	17.4621	0.8731	0.0393
3rd	17.4357	0.8718	0.0392

Annual Realizable Yield in cycle

TABLE-62

Stock in hand	I	II	III
1 st cycle	2.1323	0.8731	0.8718
2nd cycle	1.5027	1.5027	0.8718
3rd cycle	1.2924	1.2924	1.2924

Yield in first 3 felling cycle

a)	Total realizable trees	=	33.96 + 8.685	=	42.645
b)	Total prescribed trees	=	1.2924 x 20	=	25.848
	Percentage of removal	=	$\frac{25.848 \times 100}{42.645}$		
		=	60.612 %		

Hence 6 trees out of 10 marked in the girth class shall be removed in group 4 species.

9.12.5 The yield calculated is the average yield for the whole felling cycle based on the average site quality II/III of the working circle. However, the actual annual yield will be the function of the site quality and the crop composition. Therefore, the annual yield during the felling cycle will be distributed around average value in such a way that the sum of difference is zero. The actual calculation of yield at any point of the time can be have from the structure of uneven-aged normal forests (normal stand table) for different types of site qualities.

9.12.6 The year of passing from one girth class to another girth class is also approximate. It is not possible to have the same period of time for all species to pass from one girth class to another as the rates of growth of different species are different even at a given girth. There is very little statistical with respect to the study of growth of miscellaneous species in nature condition of the forest. But the accurate prediction of future growth is based on the growth study only. Therefore, so long as the growth study is not conducted perfectly, the correct prediction of future yield is not possible. But the application of the structure of uneven-aged normal forest of miscellaneous species will make the existing forest normal and then the yield will be sustained. This will become a true base for future predication of yield even in absence of growth study (from the observation of past yield) The improvement in yield calculation method itself has much scope, because for such type of system there is no reference for yield calculation. Calculation done presently is the 1st effort in this direction.

SECTION 13 : AGENCY FOR HARVESTING :

9.13.1 The areas allotted to this working circle will be worked through J.F.M. Program by involving local people or departmentally or through F.L.C.S.

SECTION 14 : DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAPS AND MARKING TECHNIQUES:**(A) DEMARCATION :**

9.14.1 Coupes will be demarcated one year in advance of the main felling.

(B) PREPARATION OF TREATMENT MAP :

9.14.2 The demarcation of the area shall be shown on the management maps generated through geographical information system (GIS) in the office of the Conservator of Forests, Working Plan Circle Nagpur and the treatment map shall be prepared by an officer not below the rank of R.F.O. after thorough inspection of the

area as per working plan maps. It will be verified on the ground and approved by the A.C.F. in charge. The treatment map will show the following details.

TYPE A - PROTECTION AREA :-

9.14.3 It includes the following area

- (i) Areas with steep slopes more than 25°
- (ii) Areas eroded or liable for erosion.
- (iii) 30 meter wide strip on either side of banks of the water course
- (iv) Riparian Zones
- (v) Sacred Groves.

TYPE-B : UNDER STOCKED AREAS:

9.14.4 It includes the areas with crop density less than 0.4 but exceeding 5 ha. in extent at one place.

TYPE-C : GROUP OF YOUNG POLES :-

9.14.5 It includes patches of well grown pole crop of teak and other miscellaneous species suitable for retention as a future crop in addition to old plantations. The patch will not be less than half hectare. These patches will be spaced out for healthy growth.

TYPE – D- WELL STOCKED AREAS :

9.14.6 Areas with crop density above 0.4 included in this category.

TREATMENT :

9.14.7 Treatment map shall be generated in the office of the Conservator of Forests, Working Plan Circle, Nagpur through Geographical Information System (GIS) showing the following features

Protection Area which includes the steep slopes above 25 degrees, areas likely to erode and a strip of 30 t around nala banks.

Under-stock area less than 0.4 density.

Well stocked areas more than 0.4 density.

The C type area which can not be identified by the satellite through N.D.V.I will be assessed by visiting sites. The treatment map will be checked by the ACF before proceeding with the final felling.

9.14.8 Nala bunding and gully plugging shall be done over the complete area of the coupe as per the treatment map. The area wise treatments proposed are as follows :

(i) **Type A - Protection Area :**

Felling is not prescribed.

(ii) **Type B – Under-stocked Area :**

Teak and suitable miscellaneous species shall be planted. Malformed trees will be cut back.

(iii) **Type C – Pole Crop :**

No planting will be done. Thinning will be done in the young pole crop to 1/3 of the height. Teak plantation areas shall be treated as per prescriptions provided for old teak plantations working circle of this plan and such type of areas have been excluded from this working circle.

(iv) **Type D - Well Stocked Areas :**

No planting will be done. Felling will be carried out as provided under Marking Rules.

MARKING RULES AND MARKING TECHNIQUES :**Marking Rules:**

9.14.9 Marking will be done in the same year in which demarcation will be done. Before actual marking, sample plots of size 60mX60 m with intensity 5 to 10 % in each section of coupe will be taken. Sample plots should not be at the edge of the coupe. The distance between the centers of two sample plots should not be less than 200 m. In sample plots complete enumeration will be done and the data will be compiled in the same format as is given in enumeration data analysis results. From this, the distribution of stems among different species and girth-classes can be known. In case if it is not practical to do the enumeration, the existing enumeration data shall be used for deciding the deficit or excess.

9.14.10 Then the site quality will be determined. In the same coupe, if a patch of more than 5 ha. Is having different quality, the enumeration data should be collected separately. The abstract of enumeration data will be prepared site qualitywise. Thereafter, the normal stands table for uneven-aged normal forest for the above site qualities will be taken and comparison will be done. The surplus number of stems/ha will be marked for felling against concerned girth classes as is done in the case of thinning in even-aged forests with the help of yield table. The surplus number of stems/ha is to be removed from respective girth classes. Then the no. of stems to be removed from harvestable girth class is determined on the basis of groups of different species. In marking of the above surplus and mature trees, silvicultural, social and financial aspects of the species should be taken into account. In deciding the preference of removal, if the crop composition has teak more than 20% then only the teak trees will be removed and miscellaneous non teak trees will be retained. In case, the crop has less than 20% teak then teak shall be retained. In main felling coupes, thinning felling will be done after execution of felling of mature trees, because in felling, some of small trees are damaged and they are to be removed. In order to compensate this unforeseen loss, the same number of trees, in respective girth classes are retained

from the list of thinning marking. If there is no surplus stems in the girth class in which damage has been caused, the retention, from the nearer lower girth class in which surplus is there, will be done. For such type of retention basal area or volume should be the basis. Loss in higher girth class will be compensated with larger number from lower girth class and vice versa.

9.14.11 Besides, in each sample plot at any corner 20 m x 20 m plot is taken in that plot and the regeneration survey is carried out. For this survey, data for different species are to be collected in the following proforma.

TABLE-63

Species	No. of seedlings Of height >30 cm and < 1.37 m	No. of seedlings in Girth class 0 U 15

9.14.12 The required number of seedlings of height more than 30 cm and up to 1.37 meter for a given site quality and with reference to the existing crop composition can be had from the normal stand table. If the number observed is less than the table value, the regeneration status is not up to the mark and accordingly decision for planting is to be taken and nursery activity should be started to have seedlings for planting in gap where oldest trees will be felled. Planting of natural and endemic species whose nursery technique is established will be preferred. Efforts to change the composition of the crop can be started with one or two favoured species in appropriate proportion by taking plantation in gaps created by felling. Proportions and species will be decided as per site quality.

Marking techniques has been described in detail in chapter on Miscellaneous Regulations.

9.14.13 The marking rules for each type of area is prescribed as follows-

TYPE – A- PROTECTION AREAS :

9.14.14 No marking shall be done as felling is not prescribed. Dead trees will be removed leaving two dead trees per hectare to act as snags and dens. The root suckers will be encouraged. Bush sowing of neem and maharukh will be carried out by the beat guards/van majoors

TYPE – B- UNDERSTOCKED AREAS:

9.14.15 Marking will not be carried out except-

All the dead trees after retaining two dead trees per ha.

(ii) All live high stumps to be cut as close to the ground as possible and dressed.

(iii) All coppice shoots of valuable species except one or two vigorously growing shoots per stool. Valuable species includes teak, ain, bija, dhawda, mowai etc.

Malformed seedlings to be cut back, flush to the ground.

TYPE –C – POLE CROP :

9.14.16 The pole crop of not less than 0.5 hectares shall be spaced out in such a way that an average spacing of 1/3 of height of poles shall be maintained between two rows. The healthy poles will be preferred while retaining

TYPE – D- WELL STOCKED AREA:-

- 9.14.17**
- i) All edible fruit yielding trees will be reserved from felling. All the trees of selection girth and approach class will be enumerated before marking in 15 cm. girth classes.
 - ii) Climbers will be cut.
 - iii) All trees in the preharvestable girth class will be enumerated. iv) The entire multiple coppice tree or pole crops will be marked to reduce the number of stems or poles to one per stool retaining the most promising one.
 - v) No tree will be marked for felling unless it is silviculturally available.
 - vi) Only that number of teak trees preferably of coppice origin and that of harvestable girth and above will be marked for felling as prescribed under yield regulation. Those harvestable teak trees which are preventing the development of the seedling regeneration of the desired species, will be removed in preference to others. Otherwise felling of trees from these girth classes will be first from the highest girth class and then next below and so on. Due care should be taken to remove teak trees of coppice origin while retaining the teak trees of seedling origin as far as possible. The trees which are not likely to survive till the next felling cycle will be preferred for removal. In addition to that the excess trees/poles from each girth class as determined in earlier sections will be removed so as to achieve a normal forest in terms of its distribution. Based on the yield calculation for different group of species, the percentage of trees to be removed / harvested after marking is given in the following table.

TABLE-64

PERCENTAGE OF TREES TO BE REMOVED

Sr.No.	Group	% of trees to be removed
1	I (Teak)	100 % above the harvestable girth class
2	II (Ain,bija,haldu,shisham)	70 % of the marked trees
3	III (Other miscellaneous species)	80 % of the marked trees

	not included in group II and IV	
4	IV (Garari and lendia)	60 % of the marked trees

9.14.18 All malformed and dead trees will be marked for felling, retaining two dead trees per hectare. To avoid the reckless felling, it is prescribed that malformed trees having straight clear bole exceeding 2.5 meter in height from the ground level will not be felled. In addition to trees above exploitable girth as enunciated in table 64, the excess No. of poles/trees (or basal areas) from each girth class as explained in sub-chapter of normal forest shall also be removed to achieve normalcy. In the deficit class nothing will be done. There is no need to reserve the corresponding trees/poles from the lower girth class, for that basal area as it is not required for achieving normalcy. It has been found that the normalcy by the above method will be achieved after one or two rotations.

SECTION-15 : SOIL AND MOISTURE CONSERVATION WORKS :

9.15.1 The soil and moisture conservation works shall be taken along with marking and completed before onset of monsoon in the next financial year. The soil and moisture conservation works shall include intensive soil working like contour, trenching along with gully plugging and nala bunding. These works shall be taken up after preparation of a detailed treatment map of the area. No soil and moisture conservation works will be done in D type areas.

SECTION-16 REGENERATION :

(a) NATURAL REGENERATION:

9.16.1 It is the best source for getting growing stock provided the available natural regeneration is well protected from its worst enemies mainly fires, grazing and weeds. Weeds in natural regeneration areas will cause inter specific competition which will result in improper growth of desirable species. These areas can be categorized into two groups.

i) AREAS WITH ADEQUATE REGENERATION:

9.16.2 Regeneration will be treated as adequate if the area contains more than 625 seedling per ha. Natural regeneration areas, the next year of main felling systematic weeding should be carried out and continued thereafter until the plants are free from the risk of competition., These areas will be rigidly protected from fires, by resorting to rigid fire protection scheme applicable to current coupe of working. The order of preference for favouring miscellaneous species is bija, shisham, haldu, ain, kalam, tiwas, dhaoda, bhirra, rohan, and lendia. For all purposes natural regeneration seedling should be treated at par with the planted seedlings.

ii) AREAS WITH INADEQUATE REGENERATION :

9.16.3 In these areas planting will be done apart from tending of available natural regeneration in the next year of main felling. In plantations 10 to 15 % of teak shall be introduced on suitable sites and rest of the species will be of suitable superior miscellaneous species i.e. basically local species.

(b) ARTIFICIAL REGENERATION :

9.16.4 The areas which are deficient in natural regeneration shall be supplemented by planting suitable species of teak and other important misc. species such as Dhaoda, charoli, Moha, Hirda, Behada, Ain, Arjun, Tiwas, Sivan, Chinch, Jamun, Ber, Kulu, Biba, Anjan, Apta, Amba etc. The ratio of the speices shall be teak miscellaneous each fifty percent. Teak plantations shall be raised by stumps and miscellaneous plantations shall be raised by using seedlings raised in polypots / root trainers.

(c) METHOD OF PLANTING :

9.16.5 In the type B area of this W.C. well spaced natural regeneration seedlings and rooted stock is expected to be of the order of 200 per ha. on an average. This should be taken advantage of. The intention is to have an overall plant population of 2500 plants per ha. Hence the whole area of these category should be marked with lime at 2 m. x 2 m. This marking should be done on the map too. There after each of the mark should be examined as to whether a pit is to be dug there or not based on the following criteria:

9.16.6 Pit not to be dug –(a) If within a radius of one meter a seedling of natural origins exists. OR (b) If the mark comes within the influence zone of a standing tree. Influence zone for various size trees may be taken as given in table below:-

TABLE-65

Sr.No.	Girth Class in Cms.	Influence zone in mt.
1	15-30	3
2	31-45	4
3	46-60	5
4	61-75	6
5	76-90	7
6	> 90	8

All the marks where pits are not to be dug should be crossed on the treatment map. Pit of the of the size 45 cm x 45 cm x 45 cm should be dug at other points. Not more than 10 percent of the coupe area will be planted every year.

SECTION – 17: SUBSIDIARY SILVICULTURAL OPERATIONS:

9.17.1 These works shall be carried out in the subsequent years of the main felling. These works will be carried out departmentally.

CUTTING BACK OPERATION (C.B.O.):

9.17.2 C.B.O. shall be carried out in the next year of main felling. The operations will be confined only to D type areas. These operations are listed below:-

- i) All standing trees marked for felling but not felled shall be felled.
- ii) All damaged trees which are not likely to recover shall be cut back.

- iii) All climbers interfering the growth shall be removed.
- iv) All growth of inferior species which likely to interfere with the growth of teak and valuable miscellaneous shall be cut.
- v) All malformed, suppressed and damaged advanced growth shall be cut back.

CLEANING:

9.17.3 These operations shall be carried out in the sixth year of main felling. The following operations are carried out.

- (i) Climber cutting.
- (ii) All dead, badly damaged and uprooted trees should be cut.

Cutting coppice shoots except one vigorously growing per stump where there is absence of advance growth of seedling origin (natural or planted).

SECTION-18: OTHER REGULATIONS:

PROTECTION FROM FIRE :

9.18.1 Protection is of paramount important for obtaining natural regeneration. These areas will be rigidly protected from fire, grazing and illicit felling.

GRAZING CONTROL:

9.18.2 The areas after main felling shall remain closed to grazing for a period of five years. The closed areas shall clearly be mentioned in grazing licenses and people shall be made aware about closure of the coupes. In order to increase the carrying capacity of the area palatable grasses shall be sown and villagers will be motivated to harvest the fodder for stall feeding. . Rotational grazing will be followed based on the carrying capacity of the area.

PARTICIPATION:

9.18.3 The local people shall be made aware of the importance of protection to the forests from fire, illicit grazing, illicit cutting and encroachment. Participation of local people shall be encouraged in protection and Afforestation of forests. For this purpose, regular camps shall be arranged to explain the people about the importance and benefit of regeneration and protection of forests. Village forest protection committees will be formed under Joint Forest Management Program wherever possible and a comprehensive forest protection scheme will be undertaken.

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CHAPTER - 10

IMPROVEMENT WORKING CIRCLE



CHAPTER – 10

IMPROVEMENT WORKING CIRCLE

SECTION – 1 : GENERAL CONSTITUTION OF THE WORKING CIRCLE:

10.1.1 The following areas are proposed to include in the working circle:-

- (i) The areas which were managed under improvement working circle of Shri. A.P.Deshmukh
- (ii) Miscellaneous working circle areas of Ghot Range of Shri. K.N.Khisti's plan.
- (iii) Miscellaneous Working Circle Areas of Allapalli Range in Shri. S.A.H.Qureshi's plan.
- (iv) The remaining areas of C.W.R. system of Shri. K.N.Khisti which have not been included in afforestation working circle in this plan.
- (v) Protected Forests and Un-classed Forest areas which are fit to be retained under this Working Circle .

10.1.2 The improvement working circle covers 27.83 % or 60640.152 ha area of the division. This area is distributed in 297 and 4 part compartments which include 50730.602 ha of Reserved Forest, 7463.450 ha of Protected Forest and 2446.100 of Un-classed Forest This working circle has been constituted in order to serve as transition for the future S.C.I. Working Circle and Improvement Working Circle includes forests which need rest for some time, the pole crop and the old teak plantations which have not been covered in the Teak Plantation Working Circle. This working circle includes the forest areas which are capable of producing large size timber but are not fit for harvesting in this plan period. The main criteria among others for classification of area in this working circle has been the basal area of the compartment derived from the enumeration data. The compartments having basal area ranging from 4 to less than 8 m² have been included in this working circle. These forests are surrounded by heavy population and, therefore, these areas are subjected to heavy biotic pressure.

Range-wise distribution of area under this working circle is given in the following Table

TABLE-66

Range	Reserved Forest in ha.	Protected Forest in ha.	Unclassed Forest in ha.	Total Forest in ha.
Ghot	16562.233	--	958.030	17520.263
Markhanda	21.800	--	1488.070	1509.870

Pedigundam	--	--	--	--
Allapalli	581.534	--	--	581.534
Pirmili	24499.550	5372.319	--	29871.869
Aheri	1623.304	2091.131	--	11156.616
Total	50730.602	7463.450	2446.10	60640.152

SECTION – 2 : GENERAL CHARACTER OF THE VEGETATION :

10.2.1 Most of these areas are with teak and teak - inferior miscellaneous species of stunted growth which require silvicultural operation and a good growing space. The forest is open, soil is shallow liable to erosion. The status of regeneration is poor. The density varies from 0.4 to 0.6. Site quality varies from III to IVa. The crop consisting of mainly garadi, ain, mohua, aonla, salai, khair, bel, tendu, lendia, achar with patches of bija, rohan, dhawada and teak appears in some patches over better soil. Hingan, bharati, lokhandi, dikamali, kharata appear as shrubs. Common climbers are chilati, ironi, kukranji. The general condition of the crop is good and can be used as a future crop to be tackled under Selection-Cum-Improvement W.C. if the adequate scientific management methods such as climber cutting, tending and cleaning and thinning operations are timely carried out and the general and specific protection measures are taken. The quality and composition of the crop is not fit to be harvested and therefore the forest included in this working circle requires silvicultural rest.

SECTION – 3 : SPECIAL OBJECTS OF MANAGEMENT :

- 10.3.1**
- i. To maintain and improve the vegetation over.
 - ii. To improve stocking, composition and condition of the growing stock
 - iii. To help natural regeneration of various species to establish and supplement the same by taking up afforestation works in under stocked areas.
 - iv. To check soil erosion for increasing the productive capacity of the soil and maintaining the same.
 - v. To meet the local demand for firewood, building material and agricultural equipments through nistar.

SECTION – 4 : ANALYSIS AND VALUATION OF THE CROP :

- 10.4.1**
- i. **Stock mapping:** It has been done with the help of satellite imageries in the office of the Conservator of Forests, Working Plan Circle, Nagpur. The density slicing has been done after adequate ground verification.
 - ii. **Age:** The crop is generally young to middle aged.
 - ii. **Density:** It varies from 0.4 to 0.6 along with scattered natural blanks, barren patches and under stocked areas.

- iv. **Enumerations:-** One percent enumerations have been carried out by SOFR Unit at Chandrapur. The details of analysis of enumeration data are given in the **Appendix No.XXI**. The following table shows the girth class wise distribution of the species and the regeneration status in this working circle. The group 1 includes teak, group 2 includes ain, haldu, bija, shisham, group 3 includes other miscellaneous species not included in group 2 and 4 and group 4 includes garadi and lendia.

TABLE-67**Trees per hectare in Improvement Working Circle**

Group	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151up	Total	r1	r2	r3
Group1	5.24	4.24	2.66	2.25	1.52	1.4	1.22	0.71	0.65	0.02	19.9	35.32	16.12	10.65
Group2	8.73	4.42	3.21	2.46	2.18	1.78	1.42	0.86	0.54	0.02	25.62	221.59	116.51	43.48
Group3	3.46	1.87	1.2	0.78	0.56	0.39	0.26	0.19	0.15	0.01	8.89	60.41	28.38	9.76
Group4	22.44	13.14	8	4.36	1.97	0.91	0.25	0.02	0	0	51.1	188.6	140.14	59.11
Grand Total	39.87	23.67	15.07	9.85	6.23	4.48	3.15	1.78	1.34	0.05	105.51	505.92	301.15	123

ANALYSIS:

10.4.2 The analysis of the tree enumeration data shows that there are 18.86% teak, 24.28 % group 2 major timber species, 8.42 % other miscellaneous species and 48.43 % group 4 species i.e. garadi and lendia. The analysis shows that there are 3.16 trees per hectare above 120 cm girth class where as the majority of the trees are falling under the girth class 16 to 60 cm which shows that most of the trees are in the younger to middle-aged group and fairly distributed over the whole working circle and therefore these compartments have been included in the improvement working circle in order to prepare this young crop to reach harvestable size and to improve the edaphic and ecological conditions of the forest. The percentage of teak in the forest is 18.86 % which shows that the composition of the forest is mainly teak forest whereas the non teak (Ain, Bija, Haldu and Shisham) is 24.28 % and the remaining 56.86 % are inferior miscellaneous species and therefore efforts are needed to take up the hygienic Sylvicultural and tending operations and also taking up artificial regeneration of various species which will improve the quality and composition of the forest as a future crop to be worked under Selection-cum-Improvement Working Circle.

SECTION-5: SYLVICULTURAL SYSTEM :

10.5.1 To achieve the special objects of management, "Improvement fellings supplemented by planting and tending of the crop " shall be adopted.

SECTION-6: FELLING CYCLE & HARVESTABLE GIRTH:

10.6.1 Felling cycle has been fixed at 20 years. In this working circle, only improvement fellings are prescribed which will include removal of all such trees which are not likely to survive full felling cycle. There is no need for fixing the separate harvestable girth for this working circle and therefore the same harvestable girth as

those prescribed for Selection-cum-Improvement Working Circle will be adhered to. Marking will be thinning marking and therefore from all girth classes surplus trees will be removed.

SECTION-7: BLOCKS AND COMPARTMENTS

10.7.1. The details of compartments allotted to this working circle are given in **Appendix No.XXXI.**

SECTION-8: FELLING SERIES AND COMPARTMENTS :

10.8.1 The areas have been divided into 29 felling series having 20 annual coupes in each Series. Average area of the coupe is 100 ha. to 150 ha. The details of the felling series and sequence of working are given in **Appendix No. XXXII.**

SECTION-9: CHOICE OF SPECIES.

10.9.1 The species to be favoured in order of preference are Teak, Bamboo, Ain, Bija, Tiwas, Dhawada, Charoli, Moha, Aonla, Hirda, Behada, Lendia, Rohan, Bhirra & Kalam.

SECTION :10: REGULATION OF YIELD:

10.10.1 The crop is generally young to middle aged. The fellings are limited to improvement of the crop and the removal of trees above exploitable girth classes in the dense patches provided these trees are available silviculturally. The thinning will be done in the dense pole crop. Therefore the yield will vary and consist of small wood, poles and firewood only. Hence no yield regulation is prescribed.

SECTION :11 AGENCY FOR HARVESTING:

10.11.1 The demarcation and marking of the coupes will be done departmentally. Felling and disposal of the forest produce shall be done departmentally or through F.L.C.S. under the prevailing system. The small timber, poles and firewood will be made available to the local people on priority and the balance shall be sold in open auction departmentally. The areas allotted to this working circle can also be undertaken under Joint Forest Management as per guidelines issued by the State Government from time to time. But the overall supervision of the works shall be of the Forest Department.

SECTION :12 DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP AND MARKING RULES:

DEMARCATION

10.12.1 It will be done one year in advance.

PREPARATION OF TREATMENT MAP :

10.12..2 A broad treatment map will be generated in the office of the Conservator of Forests, Working Plan Circle, Nagpur using G,I.S. Software showing the following details.

- i. The protection area i.e. areas having slopes greater than 25⁰

and width of 30 m along the nala banks.

- ii. Area with crown density less than 0.4.
- iii. Teak plantation, sample plots and preservation plots.
- iv. Areas with the density more than 0.4.

Besides the aforesaid areas on the treatment map, the following shall be included.

TYPE – A : PROTECTION AREAS :-This will include the following areas:

- (i) The area having steep slopes i.e. more than 25°.
- (ii) Eroded or liable for erosion.
- (iii) 30 meter wide strip on either side of water courses.
- (iv) Riparian Zones
- (v) Sacred groves

TYPE – B : UNDERSTOCKED AREAS :- The forests having density less than 0.4 are included in this category. It will include :-

- (i) Areas having adequate rooted stock i.e. 625 seedlings per hectare.
- (ii) Areas without adequate rooted stock.

TYPE – C : GROUPS OF YOUNG POLES:- The group of young poles in patch of 0.5 hectare will be identified.

TYPE – D : WELL STOCKED AREAS:- The areas having forests more than 0.4 density are included in these areas. In such areas felling is envisaged.

SECTION 13 : MARKING RULES:-

10.13.1 Marking will be done in the same year in which demarcation will be done. Soon after the receipt of approved treatment map, marking will be done. The marking technique is described in detail in the miscellaneous regulations. The common prescriptions for all types of areas are given below :

- i. The climber cutting operations will be taken up in the entire area.
- ii. Soil and moisture conservation works such as continuous contour trenches, check dams, gully plugging etc. will be taken up.
- iii. Dressing of high stumps: The high stumps of the coppice species will be enumerated and measured and separate record will be prepared. The high stumps will be felled after approval from the Dy. Conservator of Forests. The felling should be 30 cm above ground level in order to promote lateral shoots instead of callous shoots.

- iv. The multiple shoots will be singled out into one and the lateral shoots shall be preferably retained. The malformed poles shall be flush to the ground.
- v. The dens and snags will be retained preferably two dead non-teak trees will be retained as snag trees along with two fallen logs per hectare of non-teak species.
- vi. Thinning will be done in the bamboo clumps falling in these coupes outside the regular bamboo coupes according to silvicultural prescriptions.
- vii. The congestion in the crop will be removed in order to promote healthy growth of the preferred species. The best poles will be retained as a future crop. The multiple poles from a single tree will be reduced to one.
- viii. The removal of non-wood forest produce in a non destructible manner will continue.

10.13.2 The marking rules for each type of area, will be as follows:

TYPE A : PROTECTION AREA :

No marking will be done. The dead trees will be removed and the blank patches will be planted with species like neem, sissoo, shivan , siras etc.

TYPE B : UNDERSTOCKED AREA:

All edible fruit and flower yielding trees will be reserved from felling. The following trees will be marked for felling:

- i) All dead and malformed trees after retaining two dead trees/ha.
- ii) All but one vigorously growing coppice shoot per stool.
- iii) All live high stumps.
- iv) All edible fruits and flowers yielding trees will be reserved from felling.

TYPE C: GROUPS OF YOUNG POLES:

10.13.3 Silvicultural thinning shall be done as per yield table. The patches of not less than 1 hectare shall be identified having advance growth of any species and it shall be spaced out to one third of the top height, while retaining the vigorous and straight poles. The thinning shall be done in such a manner that epicormic branches do not come up. In the natural young crop thinning marking will be done on the basis of weighted average g.b.h and site quality with the help of yield table or normal stand table as described in Teak Plantation Working Circle of this plan. In the plantation, thinning will be done as per the procedure prescribed in Teak Plantation Working Circle.

TYPE D : WELL STOCKED AREA :

All edible fruit and flower yielding trees such as moha, char, tendu, aonla, chinch, bel, sitafal, and trees of kulu will be reserved from felling. The species having their population less than 1 tree per hectare on the basis of tree enumeration data, will not be felled. The important tree species which should be reserved are haldu, sissou, shivan, tiwas, alonla, hirda, behada, dhaoda etc.

SECTION 14 : REGENERATION.**(A) Natural Regeneration.**

10.14.1 Area containing good natural regeneration will be identified in the coupe and will be protected from fire and grazing.

(B) Artificial Regeneration:

10.14.2 Areas which are deficient in natural Regeneration shall be supplemented with artificial regeneration. Suitable well drained areas preferably of site quality III & Iva having deficient natural regeneration will be selected for improving the stocking will artificial regeneration. This artificial regeneration will be restricted to 10 % of the coupe area. The plantation will be done in a single phase as the soil is good and does not require restoration.

SECTION-15: SOIL AND MOISTURE CONSERVATION WORKS.

10.15.1 Soil and moisture conservation works will be carried out after the preparation of treatment map and is approved by the Deputy Conservator of Forests. Works shall be completed before the onset of Monsoon. Gully plugging and nala bunding WATs shall be done as per hectare or as per the treatment prescribed after actual inspection. The design of the nala bunds has been described in **Appendix No. XXXIII**. The nala bund will be designed taking into consideration the catchment area, intensity of the rainfall and run off using Dunken's formula.

SECTION –16 : SUBSIDIARY SYLVICULTURAL OPERATIONS :**(A) CUTTING BACK OPERATIONS :**

10.16.1 The following operations will be carried out in the next year of the felling in the D type area.

- (i) all badly damaged trees not likely to recover will be cut.
- (ii) all climbers will be cut.

(B) CLEANING :

10.16.2 Cleaning operations will be carried out in the Sixth year of the main felling in D type areas.

- (i) All climbers will be cut.
- (ii) Coppice shoots will be reduced to one or two per stool.
- (iii) Inferior growth which may interfere with the teak or miscellaneous species will be removed.
- (iv) Damaged and malformed poles will be cut back.

(C) WEEDING:

10.16.3 Weeding will be carried out in the plantation in order to boost up the growth of natural and planted seedlings.

SECTION-17: OTHER REGULATIONS.**(i) Grazing :**

10.17.1 Coupes will remain closed to grazing for a period of 10 years from the year of main planting. While raising plantations in the under stocked areas, palatable fodder grasses like sheda and paonea will be seed sown so that at the end of 10 years when the coupe will be opened for grazing the villagers will have enough fodder for the their cattle on rotational harvest basis from such coupes.

(ii) Fire Control :

10.17.2 The areas shall be protected from fire. Annual fire fighting schemes shall be implemented in order to protect the areas from annual fires.

(iii) Participation :

10.17.3 The local people shall be made aware of the importance of protection to the forests from fire, illicit grazing, illicit cutting and encroachment. Participation of local people shall be encouraged in protection and Afforestation of forests. For this purpose, regular camps shall be arranged to explain the people about the importance and benefit of regeneration and protection of forests. Village forest protection committees shall be formed and a comprehensive forest protection scheme shall be undertaken.

CHAPTER - 11

TEAK PLANTATION W.C.



CHAPTER – 11

TEAK PLANTATION WORKING CIRCLE.

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

11.1.1 The working circle includes 20978.095 ha area. The teak plantations taken up in the current coupes of previous working plan as per the prescription contained in them have been included in this working circle. Shri S.A.H.Qureshi prescribed teak planting in PBI areas of teak conversion working circle. Shri K.N.Khisti proposed a teak plantation working circle in Ghot Range and PBI areas of conversion working circle and plantation working circle and all the areas planted with teak as per prescription given by Chandras and Gurjar in Pedigudam Range. Therefore area of this working circle is not in consolidated patch, rather in scattered patches spread over entire division. In addition to this, this Working Circle includes the unclassified forest areas of Pedigudam Range and better quality Teak forest of Allapalli and Aheri Ranges which were included in Teak Conversion Working Circle in the earlier working plans. But due to ban on felling of forest. the areas of PB-I, which could not be tackled, have now been included under this Working Circle and all such areas will be clear felled and replanted with pure teak of genetically superior quality raised from seeds of selected clones. The remaining areas of earlier Teak Conversion Working Circle or Selection-Cum-Improvement Working Circle have been included in Selection-Cum-Improvement Working Circle in this plan to be managed under high forest system. All successful old teak plantations have also been included in this working circle.

11.1.2 The range-wise distribution of the area allotted to this working circle is furnished in the following table:

TABLE-68

Sr .No.	Name of the range	Area of the range(ha)	Area of the Working circle(ha)		
			Old teak plantations	Teak Plantations	Total
1	Ghot	63743.761	1219.303	--	1219.303
2	Markhanda	12697.790	110.00	--	110.00
3	Pedigundam	22051.977	1388.999	3019.160	4408.159
4	Aheri	18262.782	--	3942.951	3942.951
5	Allapalli	19311.804	4843.281	5486.081	10329.362
6	Pirmili	52541.720	968.320	--	968.320
	Total	188609.834	8529.903	12448.192	20978.095

SECTION-2: GENERAL CHARACTER OF THE VEGETATION:

11.2.1 The forest included in this working circle are mostly of overmatured and matured teak and its associated miscellaneous species such as ain, dhawda, bija, aonla, tiwas moha, charoli, lendia, garari, etc. which has come up naturally or as an understorey. The site quality is II to III with few patches of site quality I and the

crop density is 0.5 to 0.8. The natural regeneration of teak is scanty and the crop is young to middle aged in the old teak plantations and it is mature to over mature in the Teak Conversion Working Circle areas of earlier working plans which could not be worked due to ban on clear felling. Such areas are more susceptible to fire and damages caused due to strong winds in the pre-monsoon season which uproot such trees and lead to loss of best quality timber every year therefore if in such areas overwood is not removed and replanted with teak, there is every possibility of the degradation of site quality and losing most valuable forests of India.

11.2.2 The plantations are mostly successful. The site quality varies from II to III. The area is fully stocked. Due to non observance of the subsequent Silvicultural operations after planting, the proportion of misc. species in the plantation is high. Therefore, the growth parameters expected as per yield table is not found in general. Plantation areas where thinning and other Silvicultural operations were carried out in the past, the expected growth parameters are found close to those of yield table.

SECTION-3: SPECIAL OBJECTS OF MANAGEMENT.

11.3.1 The objects of management in this working circle are listed as under.

- (i) To utilize the maximum production capacity of forest.
- (ii) To obtain maximum sustained yield.
- (iii) To carry out thinning as per the yield table on the basis of age and site quality.
- (iv) To save the forest from degradation.
- (v) To improve the crop by carrying out required silvicultural operations so as to achieve growth parameters comparable to those in the yield table.
- (vi) To involve the local people through J.F.M. Committees in the management and protection of the forest.

SECTION-4: ANALYSIS AND VALUATION OF CROP.

11.4.1 The analysis and valuation of the crop has been assessed as under.

(a) Stock map : These forest have been stock mapped by Geographical Information System (GIS) on the map of 4" = 1 mile. The standard symbols have been used in the preparation of stock maps, site quality, density and important species have been given in **Appendix No. XXXIV**. All plantation has been shown on stock maps in a 1: 50000 and 1: 20000 scale.

- (b) Density:** Generally the crop is fully stocked.
- (c) Site Quality :** The site quality of the working circle is II to III.
- (d) Tree enumeration :** 1% tree enumeration has been done by the Survey of Forest Resources Unit Chandrapur The results of

tree enumeration has been given in **Appendix No.XXI**. The distribution of stems/ha girth class wise is given in the following table:

TABLE-69**Species and girth distribution in the Teak Plantation Working Circle**

Group	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151up	Total	r1	r2	r3
Group1	9.21	12.22	14.18	14.36	14.73	11.04	8.69	5.36	3.3	0.16	93.25	185.41	67.01	33.61
Group2	3.9	2.96	2.69	2.39	2.23	1.72	1.59	1.26	0.67	0	19.41	236.29	85.01	43.8
Group3	1.57	1.1	0.93	0.64	0.52	0.39	0.3	0.17	0.13	0	5.76	41.67	13.23	4.69
Group4	20.35	14.76	8.5	3.39	1.94	0.44	0.12	0.03	0.01	0	49.55	212.38	98.64	28.99
Grand Total	35.03	31.04	26.3	20.78	19.42	13.59	10.7	6.82	4.11	0.16	167.97	675.75	263.89	111.09

(e)Analysis :

The analysis of data shown in the table above shows that Teak occupies 55%, non-teak timber species (ain, bija, haldu and sisham) 11.55% and other miscellaneous species occupy 3.42%. Therefore it is found that the percentage of teak in the area is very good for regenerating the area under the over wood removal system by raising pure teak plantations of genetically superior variety in order to convert the area into pure teak forest.

SECTION-5: SILVICULTURAL SYSTEM.

11.5.1 Consistent with the objects of the management of this working circle the Silvicultural system will be Conversion to Uniform System with supplemental Artificial Regeneration of Genetically Superior Stock of teak in the teak plantation working circle. The plantations will be subjected to thinnings and the first two thinnings will be done in the 10th year and in the 15th year and the subsequent thinnings at every 10 years. It has been found that the difference between two thinnings should be of 10 years as it takes 5 years to close the canopy opened due to thinning and another 5 years are required to kill the branches which have grown on the stem due to opening of the canopy.

SECTION- 6: FELLING CYCLE.

11.6.1 The planting period will be of 20 years and the forest area proposed for teak plantation in this working circle shall be divided into 20 annual coupes. The plantations will be subjected to thinning according to Silvicultural thinning regime and will be strictly in accordance with F.R.I. Publications No.1957 Volume 9 No.4. The rotation of 100 years has been fixed and no plantations included in this working circle are old enough to complete rotation. The crop completing rotation will be clear felled and planted with teak.

SECTION – 7: AGENCY FOR EXECUTION OF WORKS.

11.7.1 The coupes shall be worked through J.F.M. Committees or departmentally however thinning will be done exclusively by the department.

SECTION – 8: PLANTATION SERIES.

11.8.1 This working circle comprises of 16 plantation series for raising up teak plantations in 12448.192 ha spread over in 68 and 14 part compartments of Allapalli and Aheri and Pedigundam Range. the balance area of this working circle comprises of old teak plantations in all the ranges which require Silvicultural operations such as cleaning, thinning and tending. The thinning operations are prescribed for old teak plantations as well as newly raised plantations as per thinning schedule given in **Appendix No. XXXV**. The compartments allotted to the teak plantation working circle and their sequence of working is given in the **Appendix No. XXXVII and XXXVI**.

SECTION -9 : SILVICULTURE OF TEAK:

11.9.1 Teak (*Tectona grandis Linn.f.*) belongs to the family **Verbenaceae** and is mostly distributed in the Peninsular and Southern parts of India. The first teak plantations were raised in 1846 in the state of Kerala popularly known as Conolly's teak plantations. The tree is a pronounced light demander. It does not tolerate suppression at any stage of its life and requires complete overhead light as well as fair amount of side room for its proper development. The leading shoot is intolerant of irritation of any sort. There seems to be certain relationship between light and growth, branching and flowering of teak. Single tree or trees bordering the plantations produce profuse branching. In close stands, flowering occurs only in dominant and co-dominant trees, and is confined to the upper parts which are exposed to bright sunlight; the trees do not produce inflorescence on the lower parts which are inaccessible to sunlight. Curtailment of light results in the delay of not only the initiation of flower buds, but also their development into fruits. Seedlings require an intensity of light to the tune of over 90 per cent. Saplings are often found growing under the light shade of bamboos, and even to some extent under other trees, but the growth of such plants is generally found to be slower than of the plants with complete freedom overhead. Saplings growing under bamboos endeavor to make their way through, are often found to have their leading shoots damaged or killed, since bamboo acts as a 'whip', thus the leading shoot of the teak is very intolerant of irritation of any kind.

11.9.2 The tree is capable of thriving on variety of soils and geological formations, but requires good sub-soil drainage. The teak produces a large deep root-systems. At first a long thick tap root is formed; this may persist or may disappear, but in either case strong lateral roots are produced. Teak is sensitive to frost, seedling and coppice-shoots being particularly liable to injury. In its natural habitat, severe frost seldom occurs, poles being killed at the top or down to ground-level; experiments carried out for five years subsequently showed that trees badly damaged by frost were capable, when coppiced, of producing vigorous stool-shoots. Teak is also sensitive to drought. In the abnormal droughts which occurred from time to time in the Peninsula it suffered more severely than any other species.

11.9.3 Teak coppices and pollards vigorously, and sometimes retains the power of coppicing to a considerable size. All the coppice shoots originated in one of two ways – (1) callus growth developed inside the bark and situated between the bark and the wood at the edge of the cut surface, or (2) from the side of the stool below the cut surface, the shoots appearing through the bark. The former, which may be termed as ‘callus shoots’ are of adventitious origin, while the latter, which may be termed ‘side shoots’, appear to arise from dormant buds. High coppicing appears to prevent the formation of callus shoots owing to the rapid drying and shrinking of the wood at the cut surface, causing separation from the bark; also that, subject to further confirmation, present evidence seems to show that it is the best to coppice teak low shortly before the commencement of vegetative activity, when as little of the dry season as possible remains, or if felling must be done in the season of rest, high felling may be preferred so that the base of the stump will still remain alive if the upper part dies.

FLOWERING, FRUITING AND SEED SET IN TEAK:

11.9.4 Flowering in teak is always terminal and limited only to sunlit branches. The species is naturally adapted with very low fruit to flower ratio and seed to fruit ratio. Basically the flowers are bisexual, however there are clear functional and structural differences. Fruiting is mostly limited to 1-3% and seed filling is limited to 1-2 seeds per drupe. This is basically a complex biological adaptation to procure highly out-crossed seeds. Thus there are limitations in improving fruit set. There are no significant differences between natural and breeding populations.

11.9.5 Most of the early produced flowers within an inflorescence result in better fruit and seed set. Thus in single tree ramet collections meant for genetic gain trials fruit extraction in harvest can be limited to first three inter-nodes of the inflorescence. Thus the most out crossed seed could be obtained.

11.9.6 Flowering in teak is basically of two major types. The first type is inflorescences are in different age groups that mature differentially. The second type is all inflorescences within a crown are of the same reproductive age and mature simultaneously.

11.9.7 Between trees also there are clear male and female functions. Thus while managing breeding populations such as CSOs and SSOs it is important to quantify reproductive output on a clone or family basis. This aspect is extremely important as it results in fertility variation within orchards.

11.9.8 Seed emptiness is mainly due to self-pollination that occurs within a crown. A major reason for high abortiveness is due to endosperm related abnormalities. This problem is inherent physio-genetic and cannot be overcome.

11.9.9 Synchrony in flowering between clones need to be worked on the basis of number of flowering days overlapping between clones.

11.9.10 A minimum espacement of 10M x 10M, application of nitrate fertilisers for at least 4-5 years (100-250 gms of urea/plant with 2 waterings; application is recommended during pre-monsoon showers) In general, larger inflorescence sizes lead to exponential increase in pollen production. In general, activities related to pollarding the main stem result in physiological shock.

REGENERATION OF TEAK

(A) NATURAL REGENERATION:

11.9.11 In the moist type of forest where the canopy is complete, teak forms a small proportion of crop along with tall well formed scattered clumps of bamboo, the natural regeneration teak is poor or wanting in the dry type where teak is found with *Anogeissus latifolia*. The factors affecting natural regenerations are climate, altitude and aspects, the capacity of the seed for ready germination, the conditions favourable for establishment of seedlings and the method of management. The climate in India, is distinguish into dry and wet seasons and therefore it is beneficial for the regeneration of teak because the seeds which are shed in drier seasons, soaks in the premonsoons of April and May and again dries up in the Monsoon break and again get soaked in the monsoon and because of this, the hard seed coat gets broken and the seeds germinate.

11.9.12 The physical structure of the soil especially its porosity, is responsible for success of natural regeneration. Granite, gneiss and trap formations produce favourable soils, basalt and sandstone develop adequately porous soils but the humus disintegrates very rapidly on such soils. Teak regeneration does not thrive on laterite because humus is rapidly leached out and also due to highly acidic nature of the soil. In endoyenamorphic soils, which are mostly present in this area, the characteristic of the rock beneath plays an important and decisive role in determining the nature of surviving forest and the future crop. Trap is a natural home of teak and this soil is present at many places. Teak grows well when the soil conforms to certain physical and chemical properties and therefore the soil should be tested before taking up teak plantations. Teak prefers slightly basic to neutral soils with high exchangeable calcium and magnesium. Teak grows well in humus reach sandy loam soils due to plasticity index. Teak grows well on northern and eastern aspects.

11.9.13 In moist deciduous forests, the forest floor is covered with dense undergrowth and therefore prevents the radicle to reach the ground and thus the seedlings fail to establish. The opening of the forest canopy may lead to increase in the growth of grasses and other weeds, which will again prevent establishment of natural regeneration.

11.9.14 In natural forest, the annual ground fires scorches the seeds and helps in natural regeneration. The establishment of teak seedlings depends especially on light however the sudden influx of light may cause death of young seedlings. The drip from the trees also adversely affects the young plants. The early development of strong tap-root requires a soft friable soil or the seedlings will remain weak and small and incapable of surviving the ensuing dry season.

11.9.15 The natural regeneration of teak is better on cooler northern and eastern aspects than on southern and western aspects. Deficiency of soil moisture is one of the hurdle in the establishment of natural regeneration and similarly and weed growth and ground vegetation are also the greatest obstacles in the establishment of natural regeneration.

11.9.16 Seedling shoots are killed by frost but the root stock is not killed and therefore a stronger shoot is formed each season until it is able to rise above the ground level.

(B) ARTIFICIAL REGENERATION:

11.9.17 The artificial regeneration of teak will be done by planting root shoot stumps prepared from the seedlings raised from quality teak seeds collected and marketed by FDCM Ltd.

SECTION –10: CHOICE OF THE SPECIES.

11.10.1 The teak will be the principal species to be planted at a spacing of 2 mX2 m. The standard nursery and planting techniques for raising teak shall be adopted. Every year about 250 hectares of area shall be selected for canopy removal and after removal of canopy it will be planted with 'A' grade stumps raised from seeds obtained from F.D.C.M. Ltd. Each patch shall not exceed 20 hectares and in between two patches a natural strip of 20 meters will be retained on each side of the planted area. In this strip of 20m width, the forest will be managed as per prescriptions given for Selection-Cum-Improvement W.C. The site selected for teak plantation shall be rich in sandy loam soil or a well drained clayey loam soil with high degree of exchangeable calcium. The clay or red soil, lateritic soil and water logged areas should be avoided for raising teak. Debudding should be carried out in the plantations in the following 2 to 3 years after plantation.

SECTION –11: REGULATION OF YIELD.

11.11.1 Yield shall be regulated at the basis of area, though the annual coupes will be equal in extent, the annual yield is bound to vary because of irregular nature of crop.

SECTION –12: DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAPS AND MARKING TECHNIQUES:

i) Demarcation:

11.12.1 The main annual felling coupes shall be demarcated one year in advance along with other coupes due for cleaning and thinning

.ii) Preparation of treatment map:

11.12.2 The treatment maps shall be prepared through GIS system in the office of the Conservator of Forests, Working Plan Circle and these maps will be used for treatment.

iii) Marking techniques :

11.12.3 The standard marking techniques which have been prescribed in the Chapter on Miscellaneous regulations shall be followed and adopted.

SECTION –13: METHOD OF EXECUTING THE FELLINGS :

Marking rules:-

11.13.1 The guidelines issued by Govt. of India in the Ministry of Environment and Forest, New Delhi vide their letter No. 6.5/2000 9ROHQ dated 2/8/2001 and G.O.I., MOEF, New Delhi letter dated 11/9/2003 addressed to the Managing Director, Forest Development Corporation of Maharashtra Ltd., has been incorporated here for the Teak Plantation Working Circle. Marking will be done under the close supervision of the Range Forest Officer and will be verified by an Officer not below the rank of Asstt. Conservator of Forests. The marking rules are as follows:

- i) Growth to the extent of 30 m width along either banks of nalas , streams and rivers should be retained and therefore no felling shall be done in this area..
- ii) Patches containing advance growth of teak will be retained after removal of overwood if any. Malformed advance growth will be cutback.
- iii) Patching containing pole crop will be retained after subjecting them to thinning of suitable grade provided they are not less than 0.5 ha in extent.
- iv) All young to middle aged fruit bearing trees upto 20 trees per hectare should be retained.
- v) Young to middle aged trees of semal, khair, rosewood and other superior miscellaneous species.like bija, shisham ain, haldu, kalam shivan, dhaoda etc. up to 20 trees per hectare uniformly spread over the area should be retained.
- vi) The plantation area constituting a section shall not exceed 20 hectare at one place.
- vii) 20 m wide strip of natural forest should be retained on all sides of the section.
- viii) Improved and genetically superior planting stock shall be used in order to increase the productivity.
- ix) Trees of *Cassia fistula* will not be felled as they act as biological control against teak defoliators and teak skeletonizers

SECTION –14: SUBSIDIARY CULTURAL OPERATIONS.

11.14.1 These operations shall be carried out departmentally and will include:

Thinning:

11.14.2 Thinning in plantation areas will be carried out at 10th year, 15th year and thereafter on a 10 years cycle. The first thinning will be mechanical. During first mechanical thinning trees in alternate diagonal lines will be removed The

subsequent thinnings will be Silvicultural aiming at the spacing in congested crop equivalent to 1/3 of the average height of the stems. The sequence of subsidiary cultural operations is given in **Appendix No. XXXVIII.** and the sequence of thinnings in existing plantations is given in **Appendix No XXXV.**

Thinning in teak plantation:

11.14.3 Teak is most widely planted species, mainly due to its ever increasing economic value. The species is very versatile in its presence, starting from Western Aravallis to East of Mahanadi and in practically all along the Indian Peninsula and occasionally pure in composition, mainly due to pre-climax attended due to edaphic or biotic conditions. It finds easy to establish in many adverse conditions, though the growth is lesser. It thrives the best in well drained sandy loam soil and clayey loam soil, with high exchangeable Calcium ions (Ca⁺⁺) and good aeration and low Carbon/Nitrogen (C/N) ratio preferably less than 20. It fails miserably in clayey soil and fails badly in lateritic soil. Due to its long growing period varying from February to November, it thrives well in the soil with high water holding capacity. The nursery technique and art and science of raising teak plantation has been standardized for almost a century.

(A) Mechanical thinning:

11.14.4 Teak is traditionally planted at a spacing of 2m x 2m i.e. 2500seedlings per hectare and in ideal conditions, would have required a thinning at a age of 5 years of its formation as at that age, the canopy starts interfering and accordingly, two mechanical thinning of removing alternate rows were prescribed in the earlier text, before the start of Silvicultural C (low) grade thinning. The Indian Forest Record 1957 has prescribed for two mechanical thinnings at plantation age of 5 and 10 years. It prescribed following standard:

<u>Year</u>	<u>No./ha. (for site quality –III)</u>	<u>Spacement</u>
1 st Year	2500	2m x 2m
5 th year	1767 (after 1 st Mechanical thinning of removing alternate digonal)	2 x 2x2 m
10 th year	1250 (after 2 nd Mechanical thinning of removing alternate digonal)	2x2 x 2x2 m

11.14.5 It has been found, through the experience, that the teak plantations do not follow the growth in a copy book fashion. The plantation of teak which is supposed to have survived 100% till its 5th year of existence, survives by only 65-75% and the rest of the seedlings are eliminated in its race for survival. The canopy competitions really does not start at this stage. There are limiting factors due to moisture and root completion. Referring to the sigmoid growth curves of teak, between Age (X) and Volume (Y), it will be observed that the growth follows a moderate slope till 10th year and then picks up a steep growth in next 50 years and hence a first mechanical thinning at the age of 10 years of the plantation has been prescribed. The end result of this thinning would be that the poles in the plantations are free from canopy interference. At this stage, the poles are even saleable.

(1) Demarcation, preparation of treatment map and cleaning :

11.14.6 (a) Demarcation : The thinning area should be properly demarcated.

(b) Treatment Map : Treatment map will be prepared, showing the extent of area, to be thinned, and the understocked area, which is not to be thinned.

(c) Cleaning : Teak is highly susceptible to root competition and hence it is essential that the thinning area is cleansed of all unwanted root competition. The removal will also allow the productive capacity of soil, distributed in few promising and potential stems rather than distributed in many unpromising stems. The plantation at that stage contains lot of bushes and weeds and these are invariably required to be removed, and therefore, a cleaning of these plantations will be required and rate of such cleaning will be fixed by Conservator of Forests (Territorial). The cleaning of plantation should include the removal of –

- i) Bushy weeds.
- ii) Garadi, lendia or any other pioneering species. Trees/poles of spp. Amaltas will not be removed as this is the natural biological parasites of teak-defoliators and teak-skeletonisers
- iii) Damaged or badly shaped poles/trees will be flushed to the ground.
- iv) Climber cutting:- The climber will be cut at two places,. The cleaning will be done only in the areas of the plantation, under thinning, as these are usually devoid of under growth, mainly due to closed canopy and often due to un-established allopathic effect where it is required. The cleaning may not be required in older plantations.

(2) Procedure for Mechanical thinning :

11.14.7 Three Triangular rows will be considered and one out of three poles (if surviving), which is the least promising shall be removed, provided it is not going to leave a permanent gap in the canopy. If one of these three poles, is not surviving, no pole will be removed. This way a mechanical thinning will be carried out. While removing coppice shoots, poles of less important economic value, will be removed first. The wolf, forked and poles of less important economic value, will be removed first. The wolf, forked and poles with epicormic branches and deformed poles will be preferred while removing. If the initial survival is 75%, the removal of 1/3 poles will leave nearly 1256 poles after 1st mechanical thinning. At the end of this thinning each pole will have a free canopy around it. The poles will be serially numbered. Those marked for felling will be given the digital number and properly recorded. The marketable poles should be brought to depot for sale. The area should be strictly fire protected,. At the stage of its formation, the canopy run parallel and differentiation in the canopy had not started and hence a mechanical thinning is sufficient to provide the growth stimulation. However, at subsequent stage, it will be observed that the canopy starts distinguishing themselves as predominant, co-dominant, dominated

suppressed whips and hence all subsequent thinnings will be Silvicultural thinnings and will be of C-grade thinnings. Thinning in good quality may proceed by 2 to 3 years, but in the poorer quality, it should be done at the age of 10 years.

(B) Silvicultural thinning :

11.14.8 This low grade thinning shall be done after 1st mechanical thinning carried out in 10th year of its formation. C-Grade ordinary (low) thinning will be carried out. It will require the removal of all diseased, dead and mori bund trees, suppressed trees, dominated trees, whips, trees with defective stems and crowns. Only trees with normal crown development and good stem forms should be retained. All coppice crop should be removed, if Silviculturally available and if all coppice crop is required to be retained, it should be of side origin and not of callous origin. The C-grade thinning includes removal of dominated suppressed, diseased, dead and mori bunds, and also the removal of dominated trees with defective stem and crown. This is needed to promote a mixed undergrowth beneath the crown, so that the soil is protected. When thinning is completed, all crowns should have as far as possible, a clear space all around them. The first Silvicultural thinning will be at the age of 15 years and then after every ten years. However in poor site quality, it may be deferred if it is not corresponding a required basal area at that age with the yield table.

(1) Demarcation, preparation of treatment map and cleaning :

(a) Demarcation :

11.14.9 The thinning area should be properly demarcated.

(b) Treatment Map :

11.14.10 Treatment map will be prepared, showing the extent of area, to be thinned, and the understocked area, which is not to be thinned.

(c) Cleaning :

11.14.11 Teak is highly susceptible to root competition and hence it is essential that the thinning area is cleansed of all unwanted root competition. The removal will also allow the productive capacity of soil, distributed in few promising and potential stems rather than distributed in many unpromising stems. The plantation at that stage contains lot of bushes and weeds and these are invariably required to be removed, and therefore, a cleaning of these plantations will be required and rate of such cleaning will be fixed by Conservator of Forests (Territorial). The cleaning of plantation should include the removal of –

- i) Bushy weeds.
- ii) Garadi, lendia or any other pioneering species. Trees/poles of spp. Amaltas will not be removed as this is the natural biological parasites of teak-defoliators and teak-skeletonisers
- iii) Damaged or badly shaped poles/trees will be flushed to the ground.

- iv) Climber cutting:- The climber will be cut at two places,. The cleaning will be done only in the areas of the plantation, under thinning, as these are usually devoid of under growth, mainly due to closed canopy and often due to un-established allelopathic effect where it is required. The cleaning may not be required in older plantations.

(3) Procedure of carrying out Silvicultural thinning.

11.14.12 The following shall be the procedure of carrying out Silvicultural thinning.

a. Removal :

11.14.13 The average diameter of the crop should be calculated, by taking all trees in plot (5 chain x 2 chain). At the time of removal, the maximum number of removal should be from the trees below this average girth. All suppress, dominated and coppice should be removed first, if they are Silviculturally available. Trees above the average diameter should be least removed. While removing, non teak coppice irrespective of species will be marked first, followed by coppice teak and then non teak species of seed origin. The fruit trees will not be marked. Subsequently seed origin teak poles/tree. Trees/ poles and norms of C-grade thinning of higher diameter should always be retained. This may cause a normal increase in the basal area. The number of trees should be then reduced, but the basal area should be protected. The end result of thinning would be that each tree should have a clear crown around it, but not enough to activate a dormant epicormic shoot.

b. Subsequent thinnings - Third Thinning :

11.14.14 Third thinning will be after 25th year of the formation of plantation, and fourth thinning will be carried out at the age of 35 years, i.e. at an interval of 10years till 60 years. This is done after analyzing sigmoid growth curve, which indicates that the growth is very steep during the period till 80 years and then stabilizes to some extent.

c. Thinning in very old plantation :

11.14.15 Heavy thinning should be avoided in very old plantation (Age 60 years) These plantations are near almost to exploitable size and heavy thinning may lead to epicormic branching, which will devalue the timber. Thinning in such plantations should therefore consists of removing all suppressed, dominated trees. Among dominants, only those dominants should be opened, which have got a well developed crown and which is not likely to produce any epicormic branches. In very old plantation, therefore, a light thinning should be carried out.

(4) Cleaning:

11.14.16 A cleaning operation will be carried out in the 5th year commencing from the year of main felling.

- (i) All climbers will be cut over the whole are of the coupe, if necessary.

- (ii) Damaged and malformed sampling and coppice shoots will be cut back.
- (iii) Multiple coppice shoots will be reduced to two or three per stool. Shoots to be retained should be most vigorous, well growth and well spaced. Persistent side branches will be cut 15 cm away from the plant without damaging the stem.
- (iv) Fast growing inferior species and bamboo interfering or likely to interfere with the reproduction of teak and other valuable species will be cut.
- (v) In thick patches of teak advance growth and established regeneration of other valuable species, a spacing between samplings to be retained, should vary from 2 meter to 2.59 meter depending on the height growth.

SECTION -15: OTHER REGULATIONS:

(i) FIRE PROTECTION :

11.15.1 Plantations will be rigidly protected from fire. Local people should be persuaded to ensure success through Joint Forest Management Committees.

(ii) GRAZING:

11.15.2 The local people will be persuaded to graze their cattle in areas other than closed areas. For cooperation extended by them in protecting area from grazing, they should be allowed to cut grasses from the closed coupes free of cost. Repeated dialogue with the local villagers should be continued to have better understanding with them.

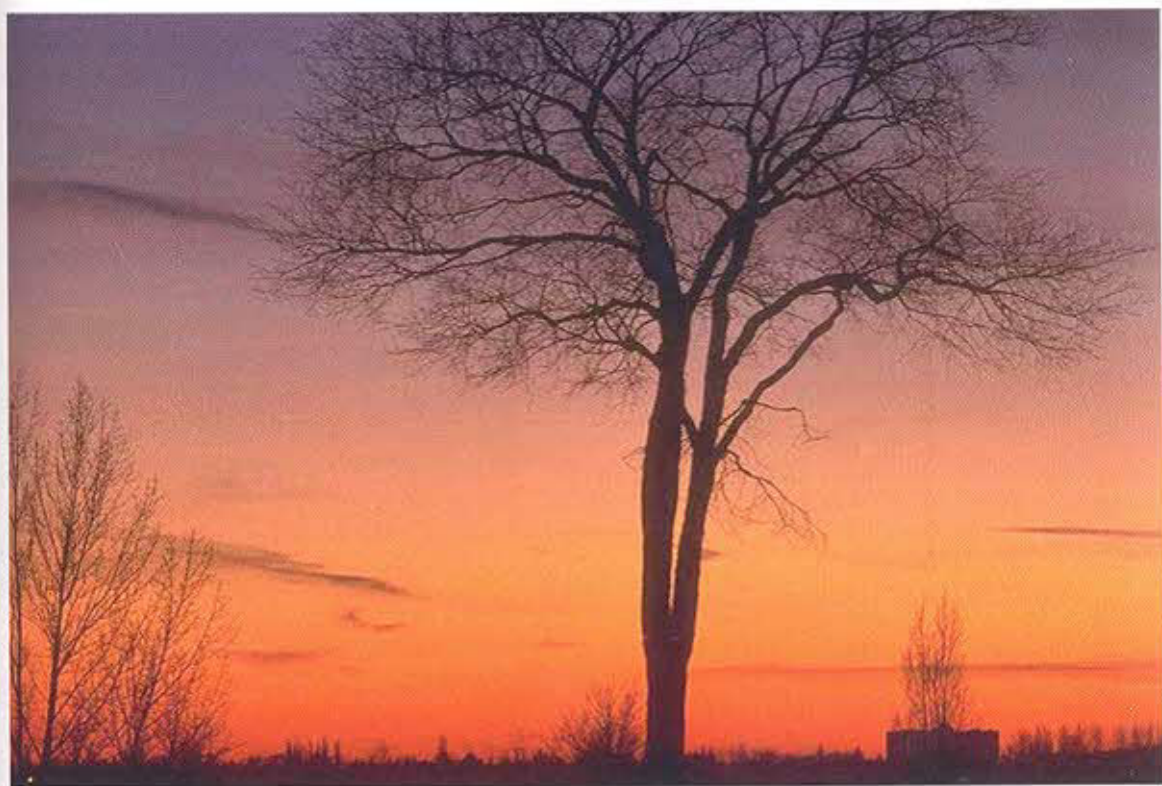
(iii) PARTICIPATION:

11.15.3 The local people shall be made aware of the importance of protection of the forests from fire, illicit grazing, illicit cutting and encroachment. Participation of local people shall be encouraged in protection and afforestation. For this purpose, regular camps shall be arranged to explain the people about the importance and benefit of regeneration and protection of forests. Village forest protection committees shall be formed and a comprehensive forest protection scheme shall be undertaken under the Joint Forest Management Program.

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CHAPTER - 12

AFFORESTATION WORKING CIRCLE



CHAPTER – 12

AFFORESTATION WORKING CIRCLE.

SECTION-1 : GENERAL CONSTITUTION OF THE WORKING CIRCLE:

12.1.1 The areas allotted to this working circle are mostly open, degraded having density below 0.4 and the site quality ranging from IVa to IVb and at some places site quality III is also present. The areas included in this working circle comprise of some of the compartments of coppice with reserve working circle of Shri. K.N.Khisti's plan which are not included in improvement working circle and the earlier B-Class reserved forest areas along with un-classed forest areas and all such areas of protected forest having density below 0.4. The basal area of the compartments has been calculated from the enumeration data collected by the SOFR Unit, Chandrapur and the compartments having basal area less than 4 m², have been classified in this working circle. The total area included in this working circle is 29627.414 ha. and the range-wise distribution of area is given in the following table:

TABLE –70
Distribution of forest area in ha.

Range	Reserved Forest	Protected Forest	Unclassed Forest	No. of Comptts.	Total
Ghot	3407.856	4444.080	3911.310	137	11763.246
Markhanda	509.480	1586.220	1280.110	74	3375.810
Pedigundam	--	--	--	--	--
Allapalli	926.731	--	--	3 and 1 part	926.731
Pirmili	--	1676.330	--	68	1676.330
Aheri	5701.067	5894.090	290.14	296	11885.297
Total	10545.134	13600.720	5481.560	578 and 1 pt.	29627.414

SECTION-2: GENERAL CHARACTER OF THE VEGETATION:

12.2.1 Most of the areas allotted to this working circle is degraded and open with sparsely scattered middle aged and matured trees. Due to intensive biotic pressure, the vegetation, in these areas is reduced to shrubby growth. Some of these areas are subjected to heavy soil erosion. The state of natural regeneration is very poor. However, in some patches very good miscellaneous crop is noticed with a density of 0.5. The site quality varies from III to IVb. The soil is very rich and has the potential of supporting good vegetative growth.

SECTION-3: SPECIAL OBJECTS OF MANAGEMENT :

- 12.3.1**
- i) To reclaim the area by intensive soil and moisture conservation works.
 - ii) To increase the percentage of vegetation growth.
 - iii) To increase the productivity of the forest land.
 - iv) To check soil erosion and
 - v) To maintain and preserve the biodiversity of the area by encouraging the plantation of indigenous species.

SECTION 4: BLOCKS AND COMPARTMENTS:

12.4.1 Compartments allotted to this working circle are 578 and 1 part and which comprise of 113 and 1 part compartments of Reserved Forest, 336 compartments of Protected Forests and 129 compartments of unclassed forest spread over 5 ranges Allapalli, Pirmilli, Aheri, Markhanda and Ghot.

SECTION 5: ANALYSIS AND VALUATION OF THE CROP:

- 12.5.1**
- i. **Stock mapping:** It has been done with the help of satellite imageries in the office of the Conservator of Forests, Working Plan Circle, Nagpur
 - ii. **Age:** The crop is generally reduced to shrubs with occasional tree growth. The crop is mostly young to middle aged.
 - iii. **Density:** It is below 0.4 alongwith scattered natural blanks, barren patches and under-stocked areas.
 - iv. **Enumerations:-** One percent enumerations have been carried out by SOFR Unit at Chandrapur. The details of analysis of enumeration data are given in the **Appendix No.XXI**. The following table shows the girth class wise distribution of the species in this working circle.

TABLE NO-71
No. of stems per hectare girth class wise

Group	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151up	Total	r1	r2	r3
Group1	9.08	8.36	4.41	3.14	3.11	2.42	2.32	1.46	1.01	0	37.32	133.44	60.6	32.52
Group2	7.07	4.49	2.98	2.02	2.29	1.81	1.68	1.3	1	0.06	24.7	165.48	90.95	43.86
Group3	3.83	2.32	1.58	0.92	0.79	0.63	0.45	0.32	0.25	0.02	11.12	53.96	31.99	13.84
Group4	26	13.48	8.36	3.12	1.43	0.63	0.21	0.06	0.06	0	53.36	283.6	240.16	117.98
Grand Total	45.98	28.65	17.33	9.2	7.62	5.49	4.66	3.14	2.32	0.08	126.5	636.48	423.7	208.2

- v. **ANALYSIS:** Analysis of results of enumeration given in the aforesaid table shows that no. of stems per hectare are present in negligible number in each group. The group 1 species i.e. teak is almost absent, the group 2 species i.e.

ain, bija,haldu, shisham and group 3 species i.e. other miscellaneous species, are also present in very negligible number and therefore the area is highly degraded which implies that in order to regenerate and rehabilitate this area, the intensive artificial regeneration program by raising plantations of indigenous species should be encouraged and promoted on a large scale which will help in increasing the vegetation cover of the soil and will arrest the soil erosion also and in turn will promote the water regime of the area.

SECTION – 6:- FORMATION OF PLANTATION SERIES AND COUPES:

12.6.1 The Total area of this Working Circle has been divided in to 5 Plantation series having 50 annual coupes each. The details of the Plantation series and the compartment allotted to each plantation series has been given in **Appendix No. XXXIX and Appendix No. XL.**

SECTION – 7 : REGULATION OF YIELD :

12.7.1 Most of the areas allotted to this working circle are degraded and no appreciable yield shall be available. However, the small timber, fire wood etc. removed during the working shall be made available to the members of Forest Protection Committee at concessional rates.

SECTION-8: IMPLEMENTING AGENCIES :

12.8.1 Considering technical nature of the operations, the works shall be carried out departmentally by involving Forest Protection Committees in protection and plantation works.

SECTION–9 : DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP AND MARKING TECHNIQUES :

12.9.1 (1) DEMARCATION OF COUPE :

Demarcation of coupes will be carried out one year in advance of main felling.

12.9.2 (2) PREPARATION OF TREATMENT MAP :

Treatment map shall be prepared by R.F.O. and verified by concerned A.C.F. after thorough inspection of that area. The treatment map will clearly indicate the following areas:-

TYPE–A : PROTECTION AREAS:- These will include:-

The treatment map will clearly indicate the following areas:

- (i) Steep slopes above 25°
- (ii) 30 meter – width on the either side of water courses.
In these areas no tree will be marked for felling.

TYPE-B : UNDERSTOCKED AREA:- It includes the forest below 0.4 density.

- (i) In these areas all dead trees will be marked for felling except two per hectare.
- (ii) All live stumps will be marked.
- (iii) The treatment shall be provided as prescribed in section 6 above.

TYPE-C : GROUP OF YOUNG POLES.

It includes patches of well grown pole of Teak and other species suitable for retention as a future crop. The congested crop will be subjected to thinning to maintain a distance of 1/3 of its height.

TYPE – D : WELL STOCKED AREAS: These areas include the forests above 0.4 density. The exploitable girth as given in Selection-cum-Improvement Working Circle will be adhered to. Trees of species teak, ain, bija, shivan, garari and khair shall only be marked for felling whose population is more than 1 %. The species having population less than 1 % will not be marked for felling.

12.9.3

(3) 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 will be done under the closed supervision of the RFO and constant guidance of the ACF concerned. The DCF will himself inspect most of the coupes to impart proper guidance and instructions to the staffs as well as to guard against excessive marking if any

TYPE-A : PROTECTION AREAS:- No tree will be marked for felling.

TYPE-B:- UNDERSTOCKED AREA:-

- (i) No tree will be marked for felling.
- (ii) The live high stumps will be cut back as well as the multiple coppice shoots and poles will be reduced to one per stool retaining the vigorous ones.
- (iii) The undesirable undergrowth which is preventing or likely to prevent the development of the regeneration of the desirable species, will be removed.
Thus all efforts shall be made to protect and develop the rooted stock.

TYPE-C:- GROUP OF YOUNG POLES.

- i) The congested young poles will be marked for thinning to a spacing of 1/3 of the height of the tree. The dead, dying, diseased and malformed poles will be marked first for thinning. The multiple poles will also be thinned to one pole per stool retaining the most promising one.
- ii) Care should be taken to remove the poles of coppice origin first while retaining the poles of seedling origin.
- iii) The undesirable undergrowth which is preventing or likely to prevent the development of regeneration of the desired species will be removed.
- iv) Rooted stock:- The following prescriptions will be followed:
 - a. Singling of coppice shoots. One healthy and promising coppice shoot will be retained and the rest will be removed. However coppice shoot interfering with promising sapling of seed origin should be removed.
 - b. All saplings and poles upto 45 cm at best height having 1/3 of the stem damaged and malformed shall be coppiced by cutting flush to the ground

TYPE-D:-WELL STOCKED AREAS:

- (i) In these areas edible fruits and flower yielding trees shall be reserved.
- (i) All dead, trees shall be marked for felling except two per hectare.
- (ii) If the trees are available for marking, the marking will be carried out as per the procedure laid down in S.C.I. working circle..

SECTION-10 : REGENERATION:

12.10.1 The under stocked areas will be regenerated artificially. Young recruits of Teak and other species, though noticed in patches at certain places, usually die before getting established mainly due to highly compact soil structure with bad drainage and bad aeration along with the high incidence of cattle grazing and recurrent fires.

SECTION- 11: METHOD OF TREATMENT FOR ARTIFICIAL REGENERATION:

12.11.1 As these areas have been subjected to intensive biotic pressure, the primary object is to restore the fertility and productivity of the area. Therefore, intensive soil and moisture conservation works will be taken up along with afforestation of these areas with suitable species. Site specific treatment maps need to be prepared. It has been decided to treat the area in two phases viz. Restorative phase and productive phase.

(A) Restorative phase:- The area of the coupe shall be completely

protected from biotic interference by digging T.C.M. During this phase following works shall be taken up:

- (i) Digging of TCM around the coupe.
- (ii) Nallah bunding and gully plugging will be done wherever necessary.
- (iii) Digging of LCTs (long continuous trenches) of size 0.60 m wide x 0.30 m deep. The total length of LCTs may vary from 800 running meters to 1000 r.m.t. depending upon slope and topography.
- (iv) Sowing of seeds of Gliricedia, Khair, Neem, Babul, Siras, Subabool and other local species on the mound of LCTs and TCM.
- (v) Singling and cutting back of the rooted stock.
- (vi) The villagers and local people shall be motivated to actively participate in the regeneration and rehabilitation of degraded areas under the Joint Forest Management program and the micro plan for the concerned village will be prepared by the Territorial division in consultation with local villagers.
- (vii) The villagers shall be allowed to cut grass for stall feeding their cattle.

(B) Productive phase: The treatment map shall be prepared after thorough inspection of the area in the fourth year of the restorative phase by the A.C.F. concerned in the forest division. The A.C.F. will consult the local villagers as regards selection of species for plantation. The productive phase shall be of seven years and will comprise of following works.

- (i) Preparation of treatment map in the 4th year.
- (ii) Repairs to TCM. as per treatment map in the 4th year.
- (iii) Repairs to nalla bunding and gully plugging in the 4th year.
- (iv) Singling and cutting back of the rooted stock.
- (v) Plantation will be taken up in the 5th year in that portion of the LCTs where seedlings of seed origin are not seen over length of 2 m.
- (vi) Spacing out the seedlings of seed origin in the LCTs.
- (vii) Maintenance and protection of the plantation from 5th to 10th year.

SECTION – 12:-CHOICE OF SPECIES:

12.12.1 The choice of the species should be on the basis of the edaphic and other ecological factors. Some species show preference for a particular type of soil and therefore they grow very vigorously on particular type of soil of their preference. The following table shows the type of soil and suitable species which can be planted in such type of soils.

TABLE-72

Sr.No.	Soil type	Suitable species
1	2	3
1	Sandy loam soil	Grewia, Ber, Kala Siris, <i>Albizzia odoratisima</i> , <i>Tamarindus indica</i> , <i>Dalbergia sisoo</i> , <i>Pongamia pinnata</i> , <i>Anthocephalus kadamba</i> , Ain, Shiwan, Teak.
2	Clayey Loam soil	Kala Siris, <i>Dalbergia latifolia</i> , <i>Pterocarpus marsupium</i> , <i>Adina cordifolia</i> , <i>Mitragyna parviflora</i> .
3	Black Cotton soil	Neem, <i>Soymida febrifuga</i> (Rohan) <i>Buchanania lanzan</i> . <i>Acacia auriculiformis</i> , Khair, Hiwar (<i>Acacia leucophloea</i>), <i>Acacia nilotica</i> , Kala Siris, <i>Albizzia procera</i> , <i>Dalbergia latifolia</i> , <i>Quenia oogenensis</i> , <i>Lagerstroemia parviflora</i> ,
4	Stiff Clay soils	<i>Aegle marmelos</i> , <i>Semicarpus anacardium</i> , <i>Cassia fistula</i> , <i>Cassia siamea</i> , <i>Adina cordifolia</i> , Mahua.
5	Riverain soil	<i>Xylia xylocarpa</i> , <i>Dalbergia sisoo</i> , <i>Bombax ciba</i> .
6	Sandy soil	Khair, <i>Terminalia arjuna</i> , <i>Casuarina sp.</i>
7	Hilly tract with good soil	<i>Prosopis juliflora</i>
8	Water logged Area	<i>Terminalia arjuna</i> , Jamun
9	Hilly tract with poor soil	<i>Ailanthus excelsa</i> , <i>Melia azadirach</i> , <i>Buchanania lanzan</i> .
10	Gravelly soil	Rohan, <i>Acacia auriculiformis</i> , Khair, Mahua, <i>Annona squamosa</i> , Dhawda, <i>Bauhinia variegata</i> , <i>Cassia siamea</i> , <i>Terminalia chebula</i>
11	Shallow soil	<i>Sterculia urens</i> , <i>Ailanthus excelsa</i> , <i>Melia azadirach</i> Khair, Hiwar, <i>Xylia xylocarpa</i> , <i>Bauhinia variegata</i> , <i>Cassia fistula</i> , <i>Cassia siamea</i> , <i>Hardwickia binnata</i> , Dhawda, <i>Terminalia chebula</i>
12	Lateritic soil	<i>Accacia auriculiformis</i> , <i>Xylia xylocarpa</i> , <i>Terminalia belerica</i> , <i>Terminalia chebula</i> , Neem, Karanj, Mahua (oil bearing seeds).
13	Swampy soil	<i>Acacia nilotica</i> , <i>Albizzia procera</i> , <i>Samania saman</i> , <i>Mitragyna parviflora</i> , <i>Terminalia arjuna</i> .
14	Grassy Blank soil	<i>Samania saman</i> , <i>Bombax ceiba</i>

12.12.2 Local edible fruit and flower yielding trees upto 15% like aonla, biba, bel, bherra, behada, jamun, moha, charoli, bor, sitaphal etc. in addition to neem, khair and other suitable miscellaneous species will be planted. Eucalyptus may be planted as one of the species provided the clones which are suitable to area and seedlings are raised with the clonal material obtained from FDCM Ltd. or ITC, Bhadrachalam (AP). The evaluation reports of the C.F. Evaluation, M.S. Nagpur will be taken as guideline for deciding the choice of species. Pure bamboo plantations on suitable sites should also be raised as the area has good potential for it. Katang bamboo plantations should be raised in moist areas.

SECTION – 13– OTHER REGULATIONS:

12.13.1 FIRE PROTECTION : - These areas will be rigidly protected from fire for a period of five years from the year of main felling. Forest protection committees may be made responsible for protection of these areas. Separate fire tracing will be done for plantation areas. Effective fire protection measures shall be taken during the period February 15 to June 15 each year in order to ensure survival and establishment of NR of all species for developing into the future growing stock. Village Forest Protection Committee's under the Joint Forest Management will be formed and comprehensive fire scheme will be chalked out wherever it is possible.

12.13.2 GRAZING:- The areas will be closed for grazing for a period of ten years from the first year of restorative phase. Raising of fodder shall be under taken in the fourth year of closure of each coupe and the seeds of fodder grasses shall be broadcasted to increase the ground cover and to meet the local demand for fodder. Local people shall be made aware of forest protection from fire, grazing and illicit felling and they will be involved actively in the afforestation and protection works by forming village forest protection committees. Women shall be given due representation in these committees. The local staff shall be directed to pursue the local people and to explain them about the benefits of afforestation and importance of forest protection.

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CHAPTER - 13

PROTECTION WORKING CIRCLE



CHAPTER-13

PROTECTION WORKING CIRCLE

SECTION – 1 : General constitution of the Working Circle :

13.1.1 In the previous working plans the Bhimaram hills of Allapalli range and Madkaki gutta, Kalidurg gutta hill areas of Pedigundam range were considered fit for conservation activity and hence after prescribing certain relevant prescription, plantation activities were taken up. It was though conceded that these hills contain some very precipitous and hilly slopes where no clear felling was prescribed above 25° slope. However, in practice it was noted that generally this prescription was not followed and as a result, heavy soil erosion took place in this area. Practically every compartment contains some areas of slopes of 25° and above. It was thus imperative to safeguard this loss of very valuable top soil and also to give rest to these forest which were reported to have been worked heavily in the past. Hills were under selection working from 1930, the first systematic working plan was prepared by Clutterbuck and the working continued during the period of McDonald and Majumdars plan of 1946, upto 1965.

13.1.2 This working circle includes all the compartments of hilly areas containing some areas of very steep to precipitous slopes of 25° and above and the areas under preservation plots, sample plots and the whole area included under Biosphere Reserve Working Circle of Allapalli Range in Shri. S.A.H.Qureshi's plan. The extent of area covered by this working circle is 6413.632 hectares. The rangewise distribution of area under this working circle is furnished in the following table:

TABLE-73

Sr. No.	Name of Range	Area of W.C. (ha)	% of the area of the range	% of the area of the division.
1	2	3	4	5
1	Ghot	--	--	--
2	Markhanda	--	--	--
3	Pedigundam	4502.287	20.46	2.06
4	Aheri	--	--	--
5	Allapalli	1911.345	9.90	0.88
6	Pirmili	--	--	--
		6413.632		

SECTION - 2: SPECIAL OBJECTS OF MANAGEMENT

13.2.1 The special objects of management in constituting this working circle are

- i) To maintain and improve the adequate vegetation cover on the steep and precipitous hill slopes as a safe-guard against soil erosion and rapid run off of water.
- ii) To give rest to these forests from exploitation activities.
- iii) To promote and maintain a permanent vegetation cover.
- iv) To preserve the available rich genetic biodiversity in the natural forests in the form of nature reserves.

SECTION - 3: GENERAL CHARACTER OF THE VEGETATION.

13.3.1 The general description of the forest allotted to this working circle is given under Chapter II of this working plan. The forests are generally well stocked and mostly of III quality though few patches of II quality are met with on lower slopes. Teak is the principal species and appears at its best on gently sloping and well-drained soils. It is generally young to middle-aged with sprinkling of older trees. Regeneration is poor. Surya occurs in good quantity and generally replaces Ain. The density of the crop varies from 0.6 to 0.8. Understocked patches are also common. The good crops are in depression and in southern aspects where there are mesic sites. The areas near to habitation are severely affected. The growth of the crop is stunted and malformed. The soil is shallow and bouldery. The top canopy includes Teak, Surya, Shisham, Achar, Lendia, Bija, Semal, Kakad, Moha, Rohan, Arjun, Chichwa, Gular and the second storey is comprised of Teak with associates like Garari, Ghoti, Aonla, Tendu, Hiwar, Lokhandi, Bamboos, the prominent shrubs are Dikamali, Karse, Anjan etc. The common herbs are Chirchira, Lotan and Jalaram. The climbers seen are Palasbel, Papri, Kukuranji, Khobrael, Gunjl, Eroni, Chilalti, Dhimarwel, Nagvel, Gudvel, Ramdatun and Kawith.

SECTION - 4: ANALYSIS AND VALUATION OF THE CROP.

13.4.1 i. **STOCK MAPPING:** The entire area of this working circle has been stock mapped through satellite imageries in the office of the Conservator of Forests, Working Plan Circle, Nagpur.

13.4.2 ii. **ENUMERATION:** Enumeration of the growing stock of the tract dealt with, has been done by Survey of Forest Resources Unit Chandrapur. 1% point sampling method has been used to record the tree enumeration data and the same has been analyzed manually and the results of the analysis of the data has been given in the **Appendix No.XXI**.

13.4.3 iii. **DENSITY AND AGE CLASSES:** The crop is mostly young to mature trees with scattered overmature trees. Density generally varies from 0.6 to 0.8. Some understocked and blank patches of more than one hectare are also included.

Analysis :-

SECTION - 5: METHOD OF TREATMENT:

A. AREAS UNDER NATURE RESERVES:

13.5.1 The forest in Allapalli range are the only high quality teak bearing forest famous for its quality and density in the whole of state and in order to preserve the rich genetic diversity and the gene pool it is necessary to reserve some of the promising areas of teak forest as a future stock without disturbing its natural growth and complexity . In such areas no exploitation or any other type of work shall be carried out so to preserve the ecosystem in its natural state. The biosphere reserve will include the following areas as given in the table:

TABLE-74

Sr. No.	Type of Forests	Champion & Seth's Classification	Comptt. No. allotted	Area in Ha.
1	Teak Plains	3B/C1b – Moist Teak Forest	6	199.915
2	Teak Bhimaram Hills	3B/C1b – Moist Teak Forest	24	184.537
3	Mixed Forest	3B/C2 – Southern Mixed deciduous Forest	72	254.548
TOTAL				639.000

These areas will require following regulations:

- i. A sign board, showing the compartment No., original felling series and the area along with the year of formation/reservation as nature reserves shall be exhibited on the boundary of the compartment at prominent places.
- ii. A separate journal will be maintained showing the list of the species, their botanical name and local name and the girth at breast height.
- iii. The compartments included in the nature reserves shall remain closed to grazing and strict fire protection measures shall be taken to prevent any fire and therefore compartment boundary line shall be cleared of all bushy growth and grasses and all such inflammable material which may caused damaged due to fire shall be removed from the compartment before fire season.
- iv. A close monitoring of the growth and reproduction of all such species and the regeneration percentage shall be done in coordination with the Director, M.V.S.S., Chandrapur and all the necessary steps shall be taken to preserve the genetic biodiversity of these compartments.

B. AREAS OTHER THAN NATURE RESERVE

13.5.2 The main objects of the management is to maintain and improve the adequate vegetation cover and to give rest to these forests from exploitation activities. Therefore, no working in this forests is prescribed except essential cultural operations like climber cutting and removal of dead trees for fire protection. Bamboos form an understory and its removal will generally not disturb the protective functions and hence bamboo exploitation as per the silvicultural prescriptions has been allowed. No specific system of management is prescribed nor any one is required under the present objects of management. However collection of minor forest produce and medicinal plants has been permitted in accordance with prescriptions given under Non-Wood Forest Produce (Overlapping) working circle of working plan.

13.5.3 The forests under this working circle need special treatment in the form of soil and moisture conservation works and therefore special schemes should be prepared to treat this area in order to check soil erosion and loss of vegetation cover. Dibbling of seeds of suitable species in under stocked and blank areas should be done on regular basis through the concerned beat guards and their results should be evaluated periodically. Bush sowing should also be encouraged. Bush sowing of neem and maharukh has been found to give better results.

13.5.4 The road repair works in the areas under this working circle should be taken up very carefully and before the onset of monsoon cross drains should be put up on the roads and for repair of the roads, murum should be brought from outside and no digging of borrow pits should be allowed in the area.

SECTION - 6: SILVICULTURAL SYSTEM:

13.6.1 No specific silvicultural system has been prescribed.

SECTION - 7: ROTATION:

13.7.1 Consistent with the objects of management, no rotation is required to be fixed. Only dead trees and bamboos are required to be removed.

SECTION - 8: FORMATION OF FELLING SERIES AND FELLING CYCLE.

13.8.1 The area included in this working circle excluding the areas of the nature reserves has been divided into three felling series and each felling series is divided into 20 annual coupes and compartments covered under each felling series have been given in the **Appendix No. XLI**. Felling cycle of 20 years is prescribed as the same is convenient The sequence of working has been given in **Appendix No.XLII**.

SECTION -9: REGULATION OF YIELD.

13.9.1 Yield will be insignificant except of bamboos which is prescribed to be removed. Yield from minor forest produce shall be monitored as prescribed under NWFP working circle of this working plan.

SECTION -10: AGENCY FOR EXECUTING THE TREATMENT:

13.10.1 No exploitation except of bamboos is prescribed. However the medicinal plants and its parts of medicinal value will be permitted to be removed by the local villagers in a manner which is not injurious to the growth and development of the particular medicinal plant or tree preferably under the guidance of local staff of the forest department. All the cultural operations will be carried out departmentally. Bamboos will be exploited by lessees or departmentally as the case may be.

SECTION - 11: METHOD OF EXECUTING THE TREATMENT:

A) DEMARCATION:

13.11.1 All annual coupes will be demarcated one year in advance of main working as per the general guidelines. The treatment map showing steep slopes, erodable areas, roads and understocked areas shall be made available in the maps which are being generated by the Geomedia Cell in the office of the Conservator of Forests, Working Plan Circle, Nagpur

The following areas will be demarcated:

- i) Eroderable areas
- ii) Understocked areas

The erodable areas and understocked areas will be demarcated by painting a geru ring on trees at breast height standing on the periphery at suitable intervals.

B) TREATMENT:

In areas (i) : Nala bunding and gully plugging should be carried out with the help of local material in the area.

13.11.2 In areas (ii) Seeds of neem, maharukh, salai, dhaora, sitaphal and other local species should be dibbled at a spacing of 2 m x 2m just before the onset of monsoon, preferably from 15th march to April end. The same should be collected. The results of the work should be evaluated in the following year. This work should be done by the Beat-guard/Vanmajoor himself and no expenditure should be incurred on it. In addition, bush sowing shall be carried out simultaneously and results evaluated in the following years. In the blank areas or in the understocked area, the stump planting of one year old root-shoot of following species will be carried out. It will be done through the existing Vanmajoor/Beat-guard.

- i) Azadirachta indica. (Neem)
- ii) Delbergia sissoo (Sissoo)
- iii) Albizia lebek (Kala siras)
- iv) Gmelina arborea (Shivan)

13.11.3 The medicinal herbs and shrubs will be permitted to be removed in a non-destructive manner with the prior sanction of the territorial Dy. Conservator of

Forests by the villagers for their bonafide needs or by the society or any other agency formed by the Govt. in this behalf.

13.11.4 No further silvicultural treatment is required as it is likely to affect the soil equilibrium. The bush sowing of Neem has been found to give better results.

MARKING:

13.11.5 No marking rules have been prescribed.

SECTION 12: SUBSIDIARY CULTURAL OPERATIONS.

13.12.1 No subsidiary cultural operations are prescribed nor they are necessary.

SECTION 13 : OTHER REGULATIONS :

FIRE PROTECTION :

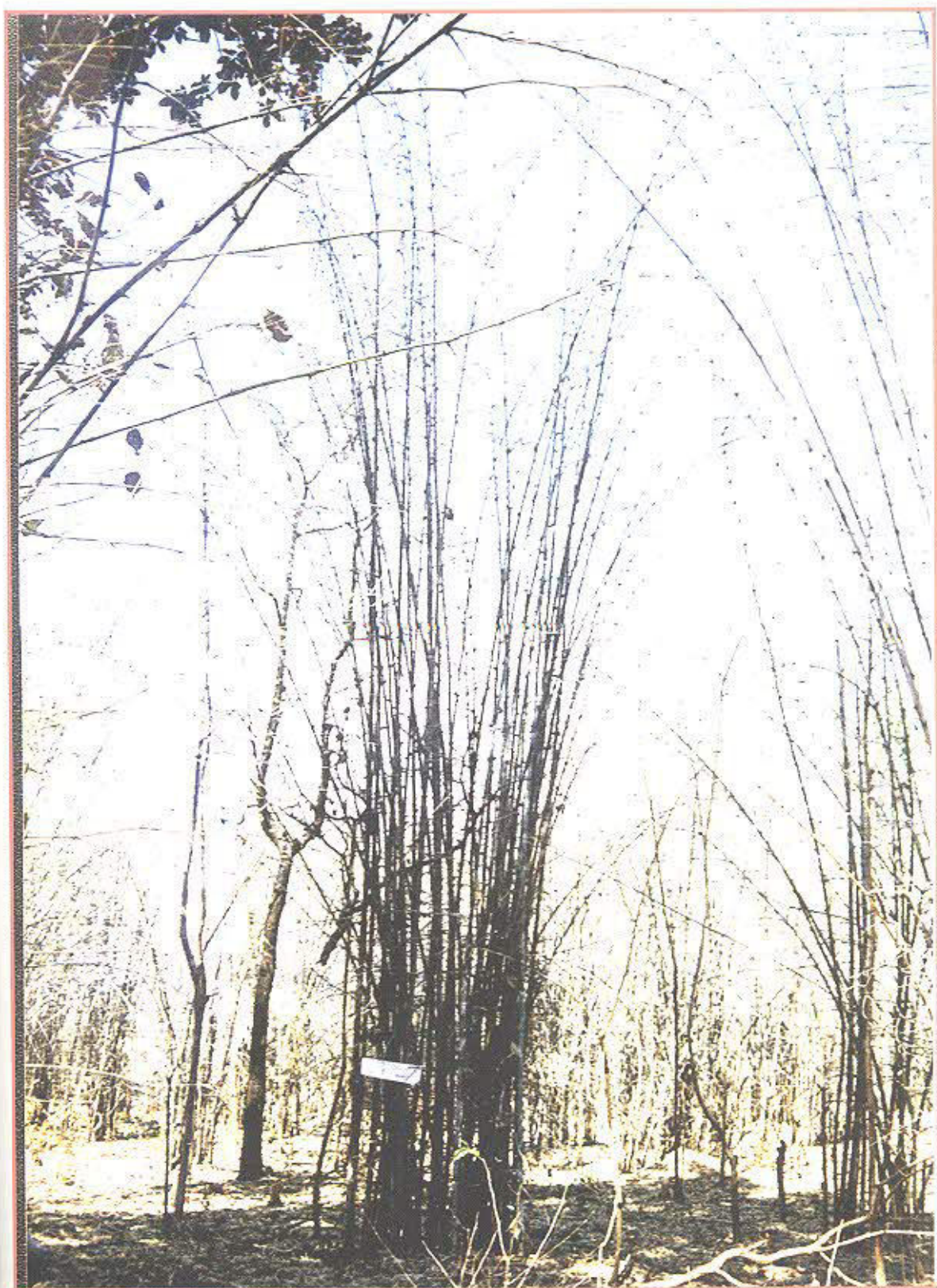
13.13.1 The areas covered under this working circle shall be rigidly protected from fire. All precautionary and preventive measures in respect of fire as provided under Chapter on Miscellaneous Regulations shall be taken up in order to ensure that no fire breaks out in these areas. The Dy.C.F. (Territorial) will take necessary steps to form Forest Protection Committees under the Joint Forest Management Programme in order to protect these areas from fire and illegal felling and the members of the committee or the villagers/local people who are involved in the protection of these areas will be benefited in terms of collection of N.W.F.P. or medicinal plant/tree or its produce.

GRAZING :

13.13.2 All areas of this working circle will be permanently closed for grazing.

CHAPTER - 14

BAMBOO (OVER LAPPING) W.C.



CHAPTER – 14

WORKING PLAN FOR BAMBOO (OVERLAPPING) WORKING CIRCLE

SECTION- 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE

14.1.1 This working circle includes all the bamboo bearing forests both natural and planted of all other working circles. Total area under this working circle is 12200.473 ha. The range-wise distribution of area is given in the following table -

TABLE-75

Distribution of forest area under Bamboo (Overlapping) W.C.

Sr.No.	Name of Range	Area of working circle (ha)				No.of Comptt.	% of the area of the Range	% of the area of the Division
		R.F.	P.F.	Un.F.	Total			
1	2	3	4	5	6	7	8	9
1	Ghot	3968.743	--	--	3968.743	48	6.22	1.82
2	Markhanda	--	--	--	--	--	--	--
3	Pedigundam	3551.93	--	--	3551.93	40	16.10	1.63
4	Aheri	--	--	--	--	--	--	--
5	Allapalli	4679.80	--	--	4679.80	29	24.23	2.15
6	Pirmili	--	--	--	--	--	--	--
	TOTAL	12200.473	--	--	12200.473	117		

The criteria for the inclusion of the area under this working circle is as follows:

The compartment should have more than 10 clumps per hectare of area. But the available bamboo culms are quite high in these compartments.

- i. The compartments should not be a part of the Protected area buffer.

SECTION – 2 : GENERAL CHARACTER OF THE VEGETATION:

14.2.1 The common variety of bamboo occurring in this tract is *Dendrocalamus strictus*, forms an understorey in the better quality of forests. Quality of bamboo varies with the drainage, soil, density of the tree cover and past treatment. Bamboos occupy mostly hilly slopes and moist, sheltered areas and along nalah banks. Katang bamboo (*Bambusa arundinacea*), another species of bamboos occurs in few patches

on the banks of nalahs and on the mesic sights. The regeneration is scanty in adjacent to the these areas due to its gigantic size. There is formation of a mat of rootlets around its clumps which prevents any arboreal shrubby or herbaceous growth in the vicinity of one to two meters. The bamboo raised by way of plantations or congested due to non attendance. The clump on the poorer soil are congested or culms tend to grow inside the clump due to hard soil outside.

SECTION – 3 : LOCAL AND COMMERCIAL DEMAND :

14.3.1 Bamboos are used for making baskets, tattas temporary walls and variety of other items by locals and burads and for making pulp and paper by paper mills. The tribal community i.e. Burads need one year old bamboos called karka bamboo for making flexible mats, baskets etc. Their demand is met mostly from the first and second year bamboo which are soft and poorly lignified. The first and second year bamboo are highly brittle and vulnerable to fungus attack. Apart from local consumption and Ballarpur Paper Mill consumption, Chandrapur, Nagpur, Yeotmal and Nashik are the main consuming centers for bamboo of the tract.

14.3.2 Considering the local demand and extensive bamboo areas, the surplus of bamboo potential is available and hence with a view to utilize the maximum potential of the bamboo forests, the bamboo production areas are divided into Nistar bamboo felling series and commercial bamboo felling series in order to utilize the optimum potential of bamboo forests on silvicultural lines.

14.3.3 Bamboo felling Series. (B.F.S.): - The nistar felling series were intended to meet the requirement of nistar and commercial requirements either free, or at concessional and commercial rates. The tenders are invited by the State Govt. for the commercial exploitation of commercial bamboo felling series. Considering the local demand for nistar, occupational and commercial requirements etc., every year few N.B.F.S. coupes are being worked departmentally and rest coupes under N.B.F.S. are allotted to the Paper Mill for working on payment of royalty.

14.3.4 Considering the nistar, occupational and local commercial requirements, N.B.F.S. and C.B.F.S., both types of felling series mentioned above would continue to exist and the old nomenclature would continue. Further, the local requirement for nistar, occupational and commercial purposes should be fully met with first by departmental working of N.B.F.S. coupes and only after satisfying fully these requirements, the surplus N.B.F.S. coupes will be disposed off as per Govt. instructions / procedure in vogue.

SECTION – 4 : SPECIAL OBJECTS OF MANAGEMENT :

- 14.4.1**
- (i) Management of bamboo areas on scientific lines to obtain maximum sustained yield.
 - (ii) To meet the nistar demands of local population and commercial demand of village industries.
 - (iii) To fulfill the commercial requirements of paper and pulp industries and other bamboo based industries.
 - (iv) To regenerate the bamboo clump naturally.

SECTION – 5 : ANALYSIS AND VALUATION OF THE CROP:

14.5.1 The bamboo crop in the tract has not been enumerated during the course of tree enumeration of Allapalli Forest Division and therefore the results are not available.

SECTION – 6 : METHOD OF TREATMENT :

14.6.1 The bamboos are in great demand and it will be harvested under periodic thinning in the clumps. A cutting cycle of 3 years has been fixed as it has been found that the yield reduces considerably at a short rotation of 2 years 1st and 2nd year bamboo culms provide food and nourishment to the rhizomes under soil and should not be cut. They are also deficient in lignifications and are brittle and highly vulnerable to fungal attack. Only 3rd year culms are fit for harvesting.

SECTION-7: SILVICULTURAL SYSTEM:

14.7.1 The silvicultural system to be followed for the management of bamboo working circle will be Coppice Selection System. The culms here may be compared to the coppice shoots. The coppice power of the clump is not lost with the time but is lost one for at the time of gregarious flowering when the entire clump dies. The concept of harvesting bamboo clumps, is to remove as much clumps as are being recruited annually in the subsequent year and if the recruitment falls below harvest in the subsequent year, it means that the clump has been over harvested and therefore removal of culms be checked

SECTION – 8 : CUTTING CYCLE :

14.8.1 Cutting cycle will be three years. Each cutting series will be divided into three coupes approximately as equi-productive as possible.

SECTION - 9 : FORMATION OF CUTTING SERIES:

14.9.1 Statement showing the constitution of commercial bamboo cutting series is given in **Appendix No XLIII and XLIV.**

14.9.2 Statement showing the constitution of nistar bamboo overlapping working circle is given in **Appendix No. XLV and XLVI.**

SECTION-10: REGULATION OF YIELD:

14.10.1 It is regulated by area.

SECTION -11 : IDENTIFICATION OF AGE OF BAMBOO:

14.11.1 Since the marking of bamboo is highly selective, it is necessary to distinguish, current year, previous year and mature culms from one another.

- a) **CURRENT YEAR** : Culm sheath is present on lower half of the culm, branches are present throughout the length of the culm and bloom (White powdery dust) is present abundantly and comes off easily when touched.

- b) **SECOND YEAR** : Culm sheath absent, branches are present practically at all nodes. Bloom is patchy and does not come off easily.
- c) **THIRD YEAR** : Culm sheath absent branches are present practically at all nodes, white bloom is absent and it becomes blackish grey.

SECTION- 12 : AGENCY FOR HARVESTING

14.12.1 The commercial felling series are being sold as per guidelines issued by Govt. of Maharashtra through open auction. The nistar felling series will be worked through J.F.M. Committees or departmentally.

SECTION-13: METHODS OF EXECUTING THE TREATMENT

14.13.1 The coupe due for working will be demarcated in April/May (before onset of monsoon) in the year in which they become due for harvesting by giving three geru bands at 15 cm intervals on the trees selected at intervals or by erecting poles. On the trees selected / poles, compartment number, coupe No. and name of cutting series will be written. Soon after the demarcation, the entire coupe due for working will be thoroughly inspected by the R.F.O and 10% checking will be done by an A.C.F. The inspection will be carried out compartment wise and the area containing Bamboo will be shown on the map. In this area sample enumeration will be done and on its basis, estimate of bamboo clumps will be prepared. As per the enumeration the estimate of various works and yield of bamboos will be prepared. The enumeration will be done in one hectare plot for every 100 hectare of area under bamboo at random on map delineating the area and then demarcated on the ground. The clumps will be then enumerated in the following categories of culms:

- i. Current year culms (n)
- ii. The previous year's culms (n_1)
- iii. The rest year's culms (r)
- iv. The dead culms (d)

The annual yield will be calculated by using formula:

$$\text{Annual yield} = (n+n_1+r-d) \times \text{cl} \times A + d \times \text{cl} \times A$$

Where- cl is the total clumps per hectare

A is the area under bamboo

SECTION- 14 : METHODS OF WORKING :

14.14.1 Present practice of working bamboo forests areas on three years felling cycle shall continue.

- i. No harvesting works should be permitted between 15th June to 30th September i.e. no bamboo exploitation will be permitted during the monsoon season as this is a period of formation of new culms. As far as possible the cutting of bamboo should end by March when the

culms are almost devoid of starch and therefore attract less insects borer.

- ii. No culms below the age of two years will be felled.
- iii. In a mature clump the following types of culms (green and living) will be retained.
 - a) All current season's (i.e. less than one year old) culms.
 - b) From the rest culms equal in number to the current season's (i.e. less than one year old) culms or eight, whichever is more.
- iv. Following culms shall be removed from all clumps:-
 - a) All dead, decayed and dry bamboos.
 - b) Culms whose half or more top part is broken or damaged.
 - c) Twisted or malformed culms.
 - d) The remaining culms will be considered available for harvesting. The cutting height of culms will be between 15 cm to 45 cm. above the ground level i.e. above the first inter-node above the ground. The cut shall be slant with a sharp instrument. In case of any flowering, no culms from flowered clump shall be felled in the year of flowering.
 - e) No clump should be considered fit for harvesting unless it contains more than 12 mature culms (one year as well as two years old included). The clumps having culms less than 12 will not be harvested only broken, dead, dry, badly damaged or over-matured bamboo will be felled. A failure to do that will cause congestion in the clump. Clear felling of the clump is never advisable. A minimum of 8 should be there wherever possible.
 - f) Harvesting of bamboo shall be done in a manner so as to ensure that the retained culms are evenly spaced and that some mature culms i.e. more than two years old are retained on periphery for the purposes of support to the new culms. The culms on the periphery of the clump will not be removed except where absolutely necessary to facilitate working in the interior portion of the clump.
 - g) The leading exterior culms may not be cut under any circumstances even if they are malformed, as their retention is in the interest of outward growth of rhizome and clump and to support new culms.

In order to make all portion of the clump accessible for marking ,

iv) In a mature clump the following types of culms (green and living) will be retained.

- a) All current season's (i.e. less than one year old) culms.
- b) From the rest culms equal in number to the current season's

(i.e. less than one year old) culms or eight, whichever is more. iv) In a mature clump the following types of culms (green and living) will be retained.

- c) All current season's (i.e. less than one year old) culms.
- d) From the rest culms equal in number to the current season's
- e) (i.e. less than one year old) culms or eight, whichever is more., the clear felling in the form of a wedge may be permitted so that the opening of the wedge shall not be more than one meter wide. The depth and width at the narrow end of the wedge should be less than 2 meter wide all around.

v. Following Acts will be strictly prohibited.

- a) Digging of rhizome.
- b) Lopping of bamboo culms for fodder.
- c) Use of tender bamboo culms bundling
- d) No grazing will be permitted during the rains in the bamboo forest which have been worked in the previous open season..

vi. A clump will be distinguished as an independent clump where its periphery is easily discernible from the adjacent clump irrespective of its distance from the other. Where such a distinction is not possible, two clumps within 1 meter distance will be considered as one.

vii. The exposed bamboo rhizome on the periphery should be covered with the slash and earth to provide nourishment to the spreading rhizome and thus promoting peripheral growth of the culms.

14.14.2 Climbers infesting with growth of bamboo clump shall be cut. After cutting, the debris will be removed away from the clumps and will be stacked at a distance not less than 2 meter away from the outer periphery of each clump

SECTION-15: SILVICULTURE OF BAMBOO:

14.15.1 In India bamboos are distributed from the sea level in the South, to 3700 m altitude in the Himalayas. More than 50% of bamboo species occur in Eastern India. *Dendrocalamus strictus* is the most commonly found bamboo in India upto 1000 m in the hills. In Maharashtra, the three main species of bamboos viz.

Dendrocalamus strictus, *Bambusa Bambos* and *Pseudooxytenanthera ritcheyi* are found. Out of these, the first two species are found in Allapalli Forest Division. The total area under bamboo cultivation in Maharashtra is estimated to be about 0.85 Million ha. Bamboos occur as an understorey and the *Dendrocalamus strictus* is the only species which is harvested on a commercial basis and is particularly used in Paper Mill and other small Cottage Industries for making bamboo articles, mats etc. Bamboos occupy a wide range of climate and edaphic formations with rainfall, one of the most important limiting factors. Champion (1936) referred to bamboo brakes found in Moist Tropical Forest, Dry Tropical Forest and Montane Temperate Forest almost as a pure crop mixed with some other timber species.

14.15.2 Bamboos prefer regions of high rainfall ranging from about 1270 mm to 6350 mm though they also occur in dry deciduous forest with rainfall as low as 762 mm to 1016 mm. and therefore rainfall plays an important role in both the distribution and growth of different species of bamboo. In the high rainfall areas, the growth is rapid. Besides rainfall, temperature, humidity, soil structure, soil drainage, soil moisture, altitude and physiography play an important role in the distribution and growth of the species.

14.15.3 Bamboos grow luxuriously on deep loamy soils, sandy loams and fertile clay loams. Some species however also occur on depleted soil layers on hill tops and plateaus. Bamboos prefer well drained soils though they also occur along river banks, talas, low-level depressions, beds of streams and other moist sites. The most common bamboo i.e. *Dendrocalamus strictus* prefer well drained hill-slopes, bouldery and stony sites while *Bambusa bambos* prefer low level areas, river and talas banks and moist sites.

14.15.4 Bamboos belong to family *Poaceae* or *Gramineae* and are perennial grasses of extremely gregarious habits in which the woody stems arise from woody rhizomes which are true underground stems. The stems are called culms and their joints, nodes. A scaly rhizome or underground stem is produced from the base of the seedling plant which after growing vertically downwards for a short distance, curves up again and appears as a small culm. Further rhizome sections develop in succession from first and follow the same course, penetrating deeper into the soil till the optimum depth of 30 cm is reached sending up successively larger culms. Full size culms are produced after 4 to 12 years depending on the species and conditions. The rhizomes often branch, two or more club shaped lengths, each ending in a culm or culm bud, developing from bud on a single older length. Growth normally tends to be peripheral, but rhizomes sometimes grow towards the centre, especially if conditions are unfavourable. In *Dendrocalamus strictus*, the culms are solid which is probably an inherited character. The new culms arise from the rhizomes in rainy season, appearing above the ground in the form of tender pointed cones covered with imbricate sheaths at the nodes. The culms elongate rapidly, reaching full height, as a rule in two to four months.

INJURIES CAUSED TO BAMBOOS:

The main injuries which are caused to bamboos are either due to insect pests or the diseases caused by fungus:

(a) Insect pests of bamboo: Bamboos suffer from insect damage in varying degrees right from the seed to the finished products and have quite a rich

spectrum of insect fauna including borers, defoliators, culms and shoot borers and sap suckers. Some of the important insect pests of bamboo are given below:-

- i. **Bamboo seed bug** (*Ochrophora montana*) :The bug occasionally feeds on the developing seeds and has been reported to attack the seeds of *Dendrocalamus strictus*. In order to control this bug fumigating the seeds with Carbon disulphide or Methyl bromide is under taken.
- ii. **Nursery pests:-** The main nursery pests are termites (*Odontotermes spp.*), Chafer-grubs (*Holotrichia consanguinea*), Grass hoppers (*Hieroglyphus banian*) etc. The termites have been observed causing direct injury to the roots of germinating seedlings and rhizomes of bamboos. The termites eat away the fibrous roots, leading to drying up of the young seedlings. The chaffer grubs eat away the developing rhizomes. The nymphs and adults of grass hoppers defoliate the leaves of *Dendrocalamus stricuts* in the initial stage. The termites and white grubs can be prevented by the application of Thimet 10 G @ 200 gm. The defoliating grass hoppers and their nymphs can be controlled by spraying 0.2 % water emulsion of Folithion 50 EC.
- iii. **Insects pest of plantations and natural stands of bamboos:-** The important insects pests of plantations and natural stands of bamboos are white grubs, termites , culm and shoot borers (*Cyrtotrachelus dux* and *Estigmene chinensis*). The culmine shoot borers damage is characterised by a long larval tunnel starting beneath on near the culm sheath passing internally through several internodes by perforating each node and ending in a hollowed and dead terminal shoot. A single larva is capable of destroying a culm.
- iv. **Defoliators:-** About 48 species of defoliators are found to attack the bamboo and they cause large damage to bamboo leaves. The important defoliators are *Pyrausta bambucivora*, *Calamochrous pntasaris*, *Crocidophora ptyophora* etc.
- v. **Sap suckers :-** These sap suckers feed on the sap under leaf sheath of bamboo.
- vi. **Witches broom:-** it has been reported in *Dendrocalamus strictus* in various areas . The attack occurs on the branches which are coming out of a node and which become slightly swollen at the base and stunted.
- vii. **Insects of felled and stored bamboos:-** The bamboos are liable to massive damage after their felling and during their storage period by a variety of insects and pests. The important among them are *Chlorophorus annularis*, Shot hole borers, *Lyctus africanus*, *Stromatium barbatum*, termites etc. Ghoon borers are the most serious pests of felled bamboos all over the country.

(b) Diseases: The common bamboo i.e. *Dendrocalamus strictus* has been found to attract about 28 fungi and about 2 bacteria which cause disease in them. The number of seed borne fungi are more in *Dendrocalamus strictus* than in *Bambusa tulda* and *Bambusa bambos*. The important fungal species attacking bamboo are *Aspergillus*, *Cephalosporium*, *Chaetomium*, *Fusarium*, *Penicillium* and *Trichoderma* species. The common diseases found in bamboo are Damping off in the seedling stage, *Rhizoctonia* leaf blight resulting complete defoliation and death of young shoots, Rhizome bud rot caused by *Pythium* and *Fusarium* species in Kattang bamboo, Rhizome rot caused by *Ganoderma lucidum* in *Dendrocalamus strictus*, Rhizome decay caused by *Pseudomonas* species, Culm rot caused by *Fusarium* species, *Colletotrichum* sp. in *Dendrocalamus strictus*, culm sheath rot caused by *Glomerella cingulata* in *Dendrocalamus strictus*, leaf rust caused by *Dasturella divina* and leaf spot caused by *Alternaria alternata* in *Dendrocalamus strictus* etc.

SECTION-16: BAMBOO FLOWERING :

14.16.1 Flowering is either periodic or annual. It is either gregarious, sporadic or both. Gregarious flowering is usually followed by the death of clumps, but in some cases of sporadic flowering the clumps do not die after flowering. The gregarious flowering proceeds from one end of the forest to another in waves. In two to three years the entire forest flowers. Because of this phenomenon, bamboo flowering is an important event to reckon with in estimates of sustained supplies. The common bamboo (*Dendrocalamus strictus*) found in this area shows an irregular flowering in which one or few culms in one clump or a few clumps in one locality flower at any one time, while at other times all culms of one clump and all clumps in one district are simultaneously covered with flowers. The physiology of bamboo flowering is still not fully understood. rhizome planted away from the parent rhizome also maintains the physiological cycle of the parent. There is also a belief that bamboo flowering synchronizes with famine year. This is accountable to the fact that drought period hastens up flowering it is also noticed that in the year previous to flowering no new shoots are put up. In case of *Dendrocalamus strictus*, it has been observed that intensity of flowering varies from locality to locality and from year to year in the same locality. If the 50 % of the clumps in the compartment, have flowered the areas should be treated as gregariously flowered. The flowering cycle in *Dendrocalamus strictus* is 30 years whereas in case of kattang bamboo, it is 60 years.

14.16.2 After the gregarious flowering and subsequent death of old bamboos, the profuse regeneration of bamboo comes up. Many a times fallen seeds are attacked by fungus which destroys the seeds and in order to avoid fungus attack, a mild solution of fungicide may be sprayed over the seeds. The viability of the bamboo seeds is for one year and the seeds should be collected and spread manually in the deficient areas. It takes nearly eight years for new regeneration to reach the exploitable size, but often it takes considerably more time.

14.16.3 It is essential to keep a proper record of bamboo flowering. As soon as gregarious flowering occurs in any locality its extent should be found out and recorded in the compartment histories and also in the Divisional Note Book. A report should also made to the Conservator of Forests, Silviculturist, Divisional Forest Officer, Working Plans and Editor of Indian Forester, Dehradun. As soon as

bamboos start flowering gregariously, the whole area will be effectively closed to grazing and strictly fire protected for a period of 10 years so that the seeds falling on the ground can germinate and the seedling so obtained are able to establish and clump formation starts. The dry culms only after flowering and seedling should be cut and disposed off.

TREATMENT OF BAMBOO FLOWERING AREA :

Collection of seeds and their disposal :

14.16.4 The fresh seeds of bamboo will be collected from the clumps. The seeds will either be sent to the silviculturist for storage and further distribution among various divisions or will be sown, if needed locally, in raised beds of standard size in the last week of May or first week of June. After the rains set in the bamboo seeds will germinate and in the months of October-November, these seedlings will be transplanted in the polythene bags. The seedlings so raised will be utilised for afforestation works and also for raising bamboo plantations.

Method of Harvesting

14.16.5 Immediately after completion of seeding it will be necessary to remove all culms as they get dried. The removal may be done either departmentally or through the agency of Forest Labourers Cooperative Societies or else the standing coupes may be auctioned. The conservator of Forests, will take a decision in this regard.

Tending Operations

14.16.6 After completion of seeding it is essential to properly look after the young regenerated crop till a time the clump formation starts. The following operations will be carried out depending upon the age of the crop.

A) Crop age between 1 to 3 years :

14.16.7 During this period the area will normally contain thick seedling crop and the clump formation does not start. During this period following tending operations will be carried out.

- i) The area will be thoroughly gone over and 0.6 meter diameter foci at the rate of 300 per hectare will be formed, distributed evenly over the whole area.
- ii) All the rank growth of grasses, weeds and even bamboo seedlings upto a distance of 1.5 meter all around the foci formed as above, will be cleared so that the growth of the bamboo seedlings in the selected foci are not hampered.
- iii) All climbers within and around the foci upto 1.5 meter distance will be completely removed.
- iv) The whole area will be strictly protected from fire and grazing.

B) Crop age between 3 to 8 years. :

14.16.8 During this period the clump formations starts but the crop is yet immature for harvesting. During this period following operations will be carried out.

- i) All badly grown, twisted and damaged culms from the selected foci, will be removed.
- ii) All weeds, grasses and climbers, within and around the foci upto a distance of 1.5 meter, will be completely removed.
- iii) Tree growth of species, others than teak, ain, shisham, bija, tinsa, tiwas, dhaora, haldu, karam, semal, mowai and bhirra over topping the clumps, will be removed.
- iv) The whole area will be strictly protected from fire.

Cycle of tending operations :-

14.16.9 The operations, as prescribed under (A) and (B) above, will be carried out annually. Where there is not possible due to administrative reasons, these operations, except fire protection, will be carried out on 2 years or at the most 3 years cycle. The territorial Conservator of Forests will decide and tending cycle to be followed in each area. The fire protection operations will be carried out every year and the area will be closed to grazing till completion of clump formation.

Bamboo Plantation :-

14.16.10 This will be carried out in the 4th year as under planting in planted patches of main coupe.

Pre-monsoon Works :-

14.16.11 Demarcation of the patches suitable for existing bamboo plantations will be done in the year of demarcation of the bamboo coupe. Plantable patches not less than 5 ha. in extent of plantable area will bear separate demarcation. Pits will be dug at 6m x 6m and of size 45 cm x 45 cm x 45 cm negotiating the overwood and bamboo clumps etc. to bring up the bamboo population to sufficient extent. Pre-planting operations will be carried out in the year of harvesting the bamboo in the coupe. Planting operations will be carried out in the rains subsequent to bamboo harvesting. In case of under-planting the bamboo, it will be done in the 4th year of main planting. Rhizome planting can also be done from the rhizomes grown in nurseries.

14.16.12 The coupe will be demarcated soon after the rains in the year in which the pre-monsoon works are to be undertaken by erecting posts at suitable intervals. This demarcation will exclude the working coupes of the main working circle to which this working circle overlaps to avoid confusion. On the posts, compartments number, coupe number and name of the planting series should be written with black paint.

METHOD OF EXECUTING THE WORKS.

(a) Collection of seeds :

14.16.13 The seeds as far as possible should be collected directly from the forest or obtained from Silviculturist. Divisional Manager, Seed Unit, FDCM Ltd. seeds can be obtained from the sporadically flowering bamboo clumps or from the gregariously flowered dry deciduous forests. The collected seeds after cleaning can be stored in dry sealed tins or in gunny bags. Normal viability of bamboo seed is one year. There are about 55,000 seeds in a kg. Before seed sowing, the viability of the seeds should be tested by carrying out tetrazolium test which includes the putting of cotyledons in solutions for 24 hours. The viable seeds become red coloured. .

(b) Nursery technique :

14.16.14 The nursery operations will start two years in advance of the planting operations. The following operations are involved.

i) Preparation of mother beds : After thorough cross ploughing the area upto a depth of 30 cm. raised beds of size 12.20 m x 1.20m will be prepared in the month of March-April after allowing the ploughed soil to weather for about a month. All clods on beds should be broken properly before sowing. The height of the beds may vary from 20 cm to 30 cm. The space to be left in between two beds should facilitate sowing watering, weeding and later on pricking out of the seedlings.

ii) Sowing :-As soon as the seed is available May-June, it should be sown in lines in the bed, lines being 10 cm apart. About 1 kg. seed will be required for a bed.

iii) Germination :- After the rains set in, the germination starts within 6 to 7 days and is completed within 3 weeks. Germination is about 60 to 80 %.

iv) Transplantation : As soon as the seedlings are 3 to 5 cm tall, they should be pricked out from the mother beds and transplanted in polythene bags filled with mixture of soil, sand and cow dung manure in the ratio of 1:2:1. At least two to three seedlings should be transplanted together in a bag as it helps the early formation of clumps. A minimum of 10,000 polythene bags can be prepared in this way from one bed. The mixture in the polypots should invariably from soil adjacent to bamboo clumps which contains VAM i.e. Vesicular Arbuscular Mycorrhiza which helps in the healthy growth of rhizome.

v) Watering and shifting:- The seedlings so transplanted together in a bag as it helps in the early formation of clumps. A minimum of 10,000 polythene bags can be prepared in this way from one bed.

(C) Pre-monsoon works :

14.16.15 Immediately after demarcation of the areas at the close of rains a treatment map will be prepared indicating the areas suitable for bamboo underplanting. The premonsoon works will then be taken up in such areas. The include the following works :-

1) Clearing of lines : One meter wide straight lines should be cleared by cutting all brush wood and under growth at intervals of 6 meters over the area. The established regeneration of important tree species such as teak, airo, bija, shisham, haldu, dhaora, bhirra, tinsa and tiwas falling on these lines should not be removed.

2) Digging pits : The pits of size 45 cm x 45 cm x 45cm should be dug on these cleared lines at a spacing of 6 m x 6 m.

3) Soil conservation works : All gullies should be plugged using cut brush wood.

4) Refilling of pits : After the soil gets sufficiently weathered the pits should be refilled with the excavated soil in the month of April. To avoid possible attack of seedlings by white ants a small quantity of 10% B.H.C. powder (about 5 gm.) should be mixed thoroughly in the soil before refilling the pits.

D) Planting operations :

14.16.16 After the first good monsoon showers are received and the soil gets properly soaked upto a depth of 30 cm the nursery raised bamboo seedlings in polythene bags should be planted in these pits after removing the polythene bags. Care must be taken to see that the buds or rhizomes do not get hurt while transporting and planting the seedlings. The rhizome portion should only go completely below the ground level. The soil should be packed thoroughly round the plants and sloped so as to avoid water logging, care must be taken while planting in pits.

E Weeding operations :

14.16.17 Weedings are necessary to save the plants from suppression for first 3 years. In the first year 3 weedings are prescribed. The first weeding should be carried out by the mid of July. Along with this weeding replacement of casualties should also be done. The second weeding should be carried out by the mid of August and the third weeding should be completed by the end of October. The plants should be clean weeded to a distance of 45 cm all round by uprooting. Along with the third weeding it is necessary to do mulching. It is generally seen that mulching work is neglected with the result that moisture conservation in the soil is adversely affected. The soil should be heaped around the plant at the centre. Saucers help in accumulating the late rain water which is very useful for the growth of shallow rooted bamboo. These saucers should be broken in the beginning of rain next year and remade at the last weeding.

14.16.18 In the second year two weedings should be carried out. The first weeding should be carried out in the month of July and along with this weeding casualty replacement should also be done. The second weeding should be carried out in the month of October.

In the third year only one weeding should be carried out in the month of August.

(F) Tending Operations:

All climbers within or around the plants up to a distance of 1.5 meter will be completely removed in the sixth year.

SECTION-17: GROWTH OF SEEDLINGS AND DEVELOPMENT OF CULMS AND CLUMPS.

14.17.1 In the first year the seedlings develop into thin, wiry stem, bearing single foliage leaves arising alternately at the nodes. The stem is sheathed by the bases of the leaves. Meanwhile fibrous adventitious roots develop from the base of young shoot. Successive pointed buds are produced in the rhizomes. From these are developed branch rhizomes which curve first downwards and then upwards and thus successive shoots arise deeper down. Successive shoots as also buds and rhizomes from which they arise become larger and larger. The earlier shoots are thin, wiry and grasslike but subsequently a stage is reached when woody culms are produced. The transition is gradual.

14.17.2 The time taken to form normal culms depends on conditions of growth. Under artificially raised conditions and with regular weeding the stages are -

3 rd Season	:	Whippy culms
4 th Season	:	Fair sized culms
8 th season	:	Large enough bamboos to permit cutting of 1 or 2 culms per clump.

The normal season at which new culms are produced appears to be July to September.

14.17.3 Maturity : A clump is said to have attained maturity when it commences by formation of new branches to the rhizomes and more new culms are produced every year. This increase goes upto a point. Investigation of F.R.I. on all India basis have shown that the life of a culm is about 9 years. (varying from 4 to 14 years).

SECTION – 18 : OTHER REGULATIONS :

14.18.1 FIRE PROTECTION :- Fires cause extensive damage to the new shoots of bamboos and, therefore, these areas will be completely protected from fire.

14.18.2 GRAZING CONTROL:- These areas should be protected from grazing especially after flowering and in the rainy seasons in which the recruitment of new culms will take place.

PARTICIPATION : -

14.18.3 The local people shall be made aware of the importance of protection of the forests from fire, illicit grazing, illicit cutting and encroachment. Participation of local people shall be encouraged in protection and afforestation. Village forest protection committees shall be formed and a comprehensive forest protection scheme shall be undertaken under the Joint Forest Management Program.



CHAPTER - 15

NON WOOD FOREST PRODUCE (OVER LAPPING) W.C.

CHAPTER-15

NON WOOD FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

SECTION-1: GENERAL CONSTITUTION OF THE WORKING CIRCLE :

15.1.1 This is an overlapping working circle covering the entire forest area of the tract dealt with. Thus the total forest area included in this working circle 217942.685 ha. The non-wood forest produce includes both minor forest produce (MFP) and also the medicinal plants found in this tract.

SECTION-2: NON WOOD FOREST PRODUCE OF THE TRACT:

(A) MINOR FOREST PRODUCE:

15.2.1 There are numerous minor forest produce available in this tract and are found in almost all ranges with varying extent. These contribute sizeable revenue to the State exchequers as well as to generate mandays to engage local tribals during which they remain virtually without work. These play an important role in rural economy.

15.2.2 The important minor forest produce, found in this tract are Moha flower and fruits, Bamboo, Tendu, Myrabolons, Gum, Broom grass etc.

(B) MEDICINAL PLANTS :

15.2.3 The tract is rich in variety of medicinal plants which are used for curing various ailments by the local people and therefore medicinal plants occupy an important position in the socio-cultural, spiritual and medicinal arena of local villagers/tribes. Their sustainable management and harvesting can conserve bio-diversity, sustain human and environmental health, generate employment and earn foreign exchange by promoting exports.

15.2.4 The special task force set up by the Planning Commission for Conservation and sustainable use of medicinal plants stressed the need for conservation and preservation of medicinal plants. The per capita annual consumption of drugs of Rs. 125/- in India is the lowest in the world mainly because medicinal plants constitute the principal health care resources for the majority of the population in India. The World Health Organisation (WHO) estimated that 80% of the population of developing countries rely on traditional medicines mostly plant drugs for their primary health care needs. The modern pharmacopoeia still contains at least 25% drugs derived from plants and many others which are synthetic analogues built on prototype compounds isolated from plants. Transition from synthetic analogues built on microbially produced antibiotics to plant based drugs is rapidly gaining acceptance. Global resurgence in the use of plant based drugs is an opportunity for India to attain self reliance and boost the export of herbal

drugs. The demand on plant based therapeutics is increasing in both developing and developed countries due to the growing recognition that they are natural products, being non-narcotic, having no side-effects, easily available at affordable prices and some times the only source of health care available to the poor. The conservation and sustainable use of medicinal plants are issues on which immediate focus is required in the context of conserving bio-diversity and promoting and maintaining the health of local communities, besides generating productive employment for the poor with the objective of poverty alleviation in tribal and rural areas.

15.2.5 At present 90% collection of medicinal plants is from the wild, generating about 40 million mandays employment and since 70% of plants collections involve destructive harvesting, many plants are endangered or vulnerable or threatened. Currently medicinal plants are collected without having a complete knowledge about their maturity and use. They are also not stored properly which results in deterioration of their medical value.

15.2.6 For sustainable and equitable development of medicinal plants it has been realised that medicinal plants conservation areas need to be identified and field surveys and studies are required to be conducted in order to take necessary steps for their *in situ* conservation. The task force had also recommended the establishment of "Vanaspati Van" covering an area of about 3500 to 5000 hectares each for the intensive production of medicinal plants and their propagation which will produce quality herbal products and generate productive employment to the local people specially women who are skilled in herbal production, collection and utilisation. These "Vanaspati Vans" can be managed under Joint Forest Management Programme for benefit sharing to altercate poverty of local people/tribals.

15.2.7 The important medicinal plants which have been identified in this tract have been given in **Appendix No .XLVII.**

SECTION- 3 : SPECIAL OBJECTS OF MANAGEMENT :

15.3.1 As per the National Forest Policy, 1988 the development of minor forest produce (MFP) has been one of the objectives in forest management. Therefore consistent with the above policy, the special objects of management decided are as follows:

- i) To manage MFP and medicinal plants scientifically and to utilise the existing potential optimally and thereby to enhance the productivity and production of the same.
- ii) To take measures for conservation and sustainable use of N.W.F.P.
- iii) To generate mandays for providing work to the local people and thereby improving their socio-economic condition.
- iv) To provide better and improved quality of life and culture supporting items to the local tribals.
- v) To identify and conserve the forest areas rich in M.F.P. and medicinal plants.

SECTION-4: METHOD OF TREATMENT :

(A) MINOR FOREST PRODUCE :

15.4.1 The treatment to be given will be different for different types of minor forest produce. Therefore, each M.F.P. will have separate treatment as follows:

1) MOHA:

i) MOHA FLOWER: USE AND NUTRITIVE VALUE :

15.4.2 Moha flower is a rich source of sugar, vitamins and calcium. The flower, in its ripe form, has almost 73% of all sugar and is, therefore, even a better medium for fermentation than grapes.

15.4.3 Moha flower is eaten raw and cooked. This is eaten also after frying or baking into cakes. More usually, the corolla tubes, after removing the stamens, are boiled for about 6 hours and left to simmer until water evaporates completely. The odour disappears as a result of cooking and the material becomes soft and jelly like. It is eaten with rice, tamarind, sai seeds, grains or other food or as sweet meat. Dried Moha flower is also boiled with rice and mixed with wheat flower and this provides a wholesome food. After drying it becomes valuable food additive to the tribal diet. Moha flower is largely used in the preparation of distilled liquor also. This liquor is actually the beer of India having strong smoky foetid odour which disappears on aging. It is reported to excite gastric irritation and produce other adverse effects. Redistilled and carefully prepared liquor is of good quality without having adverse effects and closely resembles to Irish Whisky. The corollas were, in the past, exported to France for distillation of cheap brandy. However, the French Government in order to protect their home industry prohibited the import of the same. Subsequently, it was imported by Europe for feeding pigs.

15.4.4 Moha spirit prepared by distillation of liquid containing fermented moha flowers is the most important alcoholic drink in many of the tribal areas. It makes a potent drink and efforts are required to be made to refine it in modern distilleries. The flowers are also used for the preparation of certain kinds of non-alcoholic food drinks by some tribes. The flowers are also used for the preparation of vinegar. Moha having appreciable proteins and vitamins has valuable nutrition content. A syrup of good quality is prepared from the corollas by extraction with hot water and clarification with activated charcoal and evaporation under vacuum. The syrup with very high sugar content (61%) has a golden yellow colour with the odour of fresh flower. It is a substitute for honey. Apart from human consumption, moha flower offers an excellent food to the livestock and wild animals as well. Nutritive value of flower showed digestible crude protein 3.08, total digestible nutrients 73.7 and starch equivalent to 55.1 kg/100 kg. The flesh of animals particularly of pigs, fed on moha flowers, acquires a delicate flavors.

15.4.5 Besides, moha trees has an important place in tribal folklore and religious beliefs. For example, moha flowers are used to forecast rain and moha tree is worshiped in the form of deity called "Mahugoria" in parts of Baster district of Madhya Pradesh. The Madias prefer to bury or cremate their dead bodies under a moha tree.

ii) **MOHA FRUIT: USE AND NUTRITIVE VALUE :**

15.4.6 A ripe fruit has cream coloured epicarp, which is edible. Moha berries are eaten raw or cooked. They are also eaten by cattle, sheep, goats, monkey and parrots. They have medicinal value as well. Fruits felled on the ground are easily attacked by insects and ants and thus become unfit for human consumption.

15.4.7 The moha seed yields oil. A thick oil light yellow in colour and extracted from the seeds, is used by forest tribes for cooking purposes, as an illuminance and hair oil. It is also used in the manufacture of soaps, particularly, laundry chips. In many areas, it is also used as an adulterant for 'Ghee' for which it is clarified to buttermilk to mask disagreeable odour. The oil finds use in medicines also.

15.4.8 Crude oil has a deep colour, high acidity, unpleasant odour and bitter test. Refining and hydrogenation yield product similar to mutton fallow or cocoa butters. Oil having acid value below 13 may be refined by treatment with caustic soda and that with higher acid value is extracted with alcohol and further treatment with alkali. Refined oil finds use in the manufacture of lubricating greases and fatty alcohol. The oil is also used for candles, as a batching oil in Jute Industry and as a raw material for the production of stearic acid.

15.4.9 The yield of oil from the seeds depends on the efficiency of the equipments employed for crushing them. It is 20-30% by weight of the kernels when crushed in 'Ghanis', 34-37% in expellers and 40-48% when extracted by solvents.

15.4.10 Moha oil should have a set of characteristics. For this purpose ISI standards have been prescribed which are given in the following table-55.

TABLE-76

Sr.No.	Charectaristics	Grade		
		I	II	III
1	Moisture and insoluble impurities % by mass maximum	0.10	0.25	0.50
2	Colour in a ¼ in cell on the Loviband scale expressed are Y + 5R not deeper than	20	30	50
3	Refractive index at 40 C	1.459	to	1.460
4	Specific gravity at 90/30 C	0.862	to	0.875
5	Saponification	187	to	196
6	Iodine value	58	to	70
7	Unsaponification matter % by mass	2.00	3	3.00
8	Acid value maximum	0.5	20.0	>20

(iii) YIELD :

15.4.11 Moha trees start bearing flowers and fruits between 10th to 15th years of their planting. A study with reference to the yield of moha flowers and fruits has been conducted by the MVSS, Chandrapur in comptt. No. 195 Tadgaon Range of Bhamragarh Forest Division in the year 1992. The trees of different shapes and girth classes were selected for the purpose of this study. The results obtained are given in the following table :

TABLE -77

Sr.No.	G.B.H. in cm.	Weight in Kg.	
		Flower	Seed
1	076-090	08.00	1.20
2	091-105	10.00	1.00
3	106-120	11.25	20.00
4	136-150	13.30	2.75
5	151-175	13.00	3.80
6	176-190	15.00	4.00
7	206-220	20.00	4.30
	Average	12.34	2.72

15.4.12 As the year 1992 was not a good seed year, the average obtained above is on flower side.

(iv) FORMATION OF UNITS AND COUPES:

15.4.13 The range will be the unit of working for the purpose of this working circle. Since operation is to be carried out annually throughout the area and so the unit will be the coupe in this case.

(v) AGENCIES FOR COLLECTION :

15.4.14 The collection of moha flowers and seeds is presently being done by an individuals. Normally they confine themselves around their villages only to collect moha flowers and seeds. For large scale operation of collection may be done by either the FLCs or other agency under terms and conditions as decided by the Government.

(vi) MARKET :

15.4.15 The collection of moha flower and seed is done by the tribals and purchase of the same is done by the TDC which comes under Monopoly Act. For the real and maximum benefit to the tribals, the Govt. should amend the above Act and fix the Agency, allowing it to make use of flowers and seed locally for manufacture of

good quality products using modern technology. Besides, agency should also be allowed to explore the possibility of exporting them in either raw or finished form.

15.4.16 Taking moha liquor is part and parcel of the tribal life. They cannot simply live without it. It can be said that it is one of the life supporting items for the tribals. But the crude spirit, prepared by the tribals in local "Batti" is having a number of health hazardous ingredients, which are bound to lead the poor and unhealthy state of health as well as lower their life expectancy. The comparison of crude liquor with distilled and redistilled liquor forces us to think over an act of welfare for the poor tribals by way of improving the quality of life supporting items. Therefore, it is essential for the Govt. to amend the Monopoly Act and allow to set up modern distillery. The setting up of distillery plants should be at the range level and run by the agency, decided by the Government, under the supervision of the forest department. Similarly, moha oil is the only source of edible oil and illuminance to the poor tribals. But the crude oil is bitter in taste, bad in odour and is having many hazardous ingredients. The comparison of the crude oil with that of ISI mark compels us to do something for the poor people of the forest. This is the first and foremost duty of the department to improve the quality of life supporting items of the local tribals and thereby ensuring to the maximum possible extent the energetic and healthy state of the tribals. Therefore, setting up efficient expeller or solvent plants attached with refining tools is required to be decided without missing an opportunity any further. The installation of the same should be at range level. The regulation of production and distribution etc. should be as per the guidelines decided by the Government. The financial bottleneck should be removed by using 5 % forest grant for the welfare of the tribals.

(vii) OTHER REGULATIONS :

15.4.17 (i) Compartment wise list of moha trees should be prepared and maintained at beat, round, range and division levels.

(ii) As it is a bare fact that one of the important reasons of forest fire is the burning of leaf litter on ground under moha trees by tribals to collect moha flowers and fruits. Therefore, before the start of flowers falling, the ground under the moha tree crown should be cleaned with the cooperation of villagers and choukidars. This may be treated as one of the most important duties of the Beat Guard, failure in it and occurrence of fire should be viewed very seriously.

(iii) The measures for enhancing the production and productivity by local means should be explored and taken. Local people may be of great help in this regard.

(2) GUM :

(i) USE AND VALUE :

15.4.18 Kulu (*Sterculia urens*), dhaora (*Anogeissus latifolia*) and Salai (*Boswellia serrata*) gum are the main sources of gum production in this tract. These are used in medicines, chemicals, cosmetics and food industries. Salai gum is mostly used as an incense and is said to be used in the Indian medicines for

rheumatism and nervous diseases. It has the possibility of becoming an important substitute for imported Canada balsam, used as mounting media in the preparation of microscopic slides. This gum is very similar to turpentine oil. It has also been found suitable in the manufacture of elastic adhesive, lacquers, oil cloth compositions, ink varnish, paints and perfumery. Kulu gum is the costliest gum and is having export potential. Dhaora gum is very good for the preparation of many food articles.

(ii) YIELD :

15.4.19 The range wise distribution of such trees in different girth classes shall be given in the final draft plan. The study of yield of gums has not been done in this tract. The production is low. No scientific method for tapping has been used so far in this area. This field has got potential for employment generation and revenue earning. Besides, the regulations of the collection is very important from protection of forest from fire point of view.

(iii) TAPPING RULES :

15.4.20 The rules for tapping, derived by the FRI, Dehradun, are as follows:

- a) The tapping season will commence from November to end of May each year. No. tree below 90 cm in girth will be tapped.
- b) 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.
- c) Only trees above 90 cm in girth at breast height will be tapped.
- d) Each tree will be tapped continuously for 3 years and will be given a rest for 3 years thereafter. The second tapping cycle will begin in the 7th year after the commencement of tapping season and will continue for another period of 3 years.
- e) 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 adze having 7.5 cm wide blade. the blaze is made 0.6 cm deep in the dark.
- f) Blaze may 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 guggul in the blazed pocket in case initial blazing is done by adze.
- g) The guggul starts oozing out soon after blaze are made and may be collected initially after a month, i.e. about December when the blazes may also be freshened. Subsequent collections and freshening may be done fortnightly upto May. Thus 12 freshening may be required to be made during the year..

- h) In each freshening the lower surface is not to be freshened. The edges may be scraped so that only 3.8 cm increase is on either side in width at the end of 12 freshening. This means that about 0.3 cm should be scraped off either side in width in each freshening.
- i) 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 i.e. at a total height of 1.6 meter from the ground level. the vertical portion of the blaze of upper row will alternate with similar portion of the row and no two blazes of the two rows will be directly one above the other.
- j) The number of blazes to be made on each tree will depend on its girth at breast height as given in the following table:

TABLE-78

Sr.No.	Girth at breast height	Max. no. of blazes to be made on each trees.
1	09. m to 1.3 m	2
2	1.3 m to 2.0 m	3
3	2.0 m to 3 m	4
4	Over 3 m	1 Blaze for every 45 cm girth in addition to category 3 above.

- k) No fresh blaze will be made on the partially healed up surface or old wounds.
- l) Each blaze will be in a shape of parabola with a 2.5 cm side base. The curved side of the parabola will be upwards and of height not more than 7.50 cm and the depth of the blaze will not exceed 0.6 cm in the wood.
- m) 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.
- n) Since the tapping is to be done continuously for three years the total height of the blaze at the end of three years of tapping will be 37.5 cm. the width and depth remaining the same.
- o) In the second cycle i.e. in the 7th year (after three years rest) new blazes will be made in the same way in the unblazed portion, in between the blazed portions of the first cycle. This blazing will continue for another three years in the manner described above and the operations will be repeated till unblazed is fully covered.

(iv) FORMATION OF UNITS AND COUPES :

15.4.21 Range is the unit. Each unit will be divided into three annual coupes details of allotment of compartments to units and coupes and sequence of working shall be given in the final draft plan and the working cycle will be of three years.

(v) AGENCY :

15.4.22 All operations will be carried out either through FLCS or the agency decided by the Government.

(vi) MARKET :

15.4.23 The market is extended by the TDC under the provisions of Monopoly Act. Besides the export of raw or finished goods should also be thought of.

(vii) OTHER REGULATIONS :

- 15.4.24**
- (i) The compartment wise list of such trees should be prepared and maintained at beat, round, range and division levels.
 - (ii) Cleaning around the trees to facilitate gum collection and to avoid fire, should be done.
 - (iii) To increase the population of salai trees soil should be dug up in the from of a ring with a radius of 1.5 times that of crown. By doing so root suckers are injured and from which profuse shoots come out. Singling and tending will increase the population of this species. The same may be tried for Kulu as well.
 - (iv) Gum producing trees should be reserved from felling.
 - (v) Strict watch is necessary to enforce tapping rules and check unauthorised collection of gum and tapping during the period of rest.

(3) TENDU :**(i) USE :**

15.4.25 This is one of the most important minor forest produce of the tract which gives handsome revenue. This is used for manufacture of bidi. Presently people are benefited from it only by way of getting wages for collection of leaves. But by setting a cottage industry for bidi manufacture will provide the maximum benefit from tendu to tribals. Bidi making is such an activity which can be started without any costly infrastructure. Besides, bidi making can be done at any leisure time.

(ii) **YIELD :**

15.4.26 The production of tendu leaves and royalty obtained in the last ten years are furnished in the following table.

TABLE-79

Sr.No.	Year	Yield in std bag	Royalty in Rs.
1	2	3	4
1	1991-92	116645.882	33499336
2	1992-93	127270.254	20630425
3	1993.94	77991.478	22629015
4	1994.95	73774.114	25485402
5	1995.96	76417.418	24900488
6	1996.97	78963.879	23983659
7	1997.98	55022.636	13975837
8	1998.99	61543.455	16738060
9	1999.2000	82424.220	24627430
10	2000.01	80800.499	27688872

15.4.27 No scientific efforts are seen to have been made to augment the tendu leaves production in this tract so far. On the contrary, every year pruning is carried out officially to get good flush of leaves. Besides unofficially burning after pruning is got done by the contractors to get good flush of leaves. Both these operations are detrimental to the future production of the leaves. During pruning all small size plants, whether seed origin seedlings or coppice origin seedlings, are cut every year resulting into threat to future seed bearers. If such type of operations continue, the seed bearer will go on diminishing season after season. Besides, in the greed of flush of leaves, yearly entire forest is burnt which cause much more damage as compared to the benefits obtained out it. This is undisputed fact that this the most important reason of forest fire. The practice for so called augmentation of leaves production is required to be stopped forthwith.

(iii) **FORMATION OF UNITS :**

15.4.28 The tract is already divided into forty tendu units which need not be changed. The details of the existing tendu units in Allapalli Division as notified by Govt. of Maharashtra, Revenue and Forest Department, P.C.C.F. Office tender notice dated 9/12/2002 are given in the following table:

TABLE-80

Sr. No.	Name of the Range	Name of the Unit	No. of Units	Notified yield (Approx) in std.bags
1	Ghot	Wengnoor	I	1500
		Garang		
		Regadi		2200
		Bolepalli		1200
		Dewada		1200
		Gatta	II	2200
		Ambela		
		Potepalli	III	3400
		Makepalli		
		Amgaon		1500
		Jagam		1300
		Ghot		3100
		Mateguda		1600
		Karkapalli		1200
Chamorshi		1200		
Jamgiri		900		
Bhendala	IV	1200		
Haldi				
Sagnapur			2300	
2	Markhanda	Jairampur		1100
		Konsari	V	3300
		Gundapalli		
		Chandankhedi		
		Adapalli		2500
3	Chaudampalli	Rengewahi		1300

		Koparalli		2400
		Laggam	VI	2950
		Bori		
4	Pedigundam	Barsewada	VII	1550
		Mukadi		
		Mulchera		2900
		Moharli		3000
		Gomni		2600
		Elchil		2300
5	Aheri	Elgur		200
		Eta;cjeri		2000
		Rampur		1200
		Aheri		2300
		Indaram	VIII	2300
		Mosam		
6	Allapalli	Allapalli		2300
	Pirmilli	Wedampalli		1400
		Medpalli		1700
		Pirmilli		2100
		Yerminar		1300
		Udera		2800
		Birdi		2600
		Kandoli		1600
		Marpalli	IX	2900
		Dumme		

(iv) AGENCY :

15.4.29 With the enactment of "Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969" the trade in tendu has been Nationalised. Under this Act, tendu units are sold by tender. Prior to 1991 the standard bag system was in practice. But after that the lumpsum system has been adopted. In the new system, the

pronounced illicit cutting of tendu trees has been observed. This is because of the fact that the contractors want to have more and more leaves by hook or crook. Therefore, the present system appears to be detrimental to the forests. In order to get rid of it, instead of selling the units to contractors, the tender should be invited only for collection of leaves. The leaves collected should be brought to the departmental godowns or to the godowns under the control of the department. All the collected leaves should be sold/auctioned as is done in Orissa and M.P. By doing so, the contractor who will collect the leaves will not have extra interest for collecting more by damaging the forests, as it is not certain that the same leaves will be purchased by him. The probability of getting leaves of any unit by any purchaser will be equal. This will solve both major problems of illicit cutting and forest burning and thereby ensuring the better production of leaves in perpetuity.

(v) MARKET :

15.4.30 Under the present system, the units are sold by tender. As per the present proposition under this plan, instead of selling units, units should be auctioned by tender for collection of leaves on commission basis. The final disposal should be done departmentally in open auction or by tender as has been discussed above.

(vi) OTHER REGULATIONS :

15.4.31 (a) To augment the tendu tree population, soil should be dug up

15 to 20 cm deep around the tree, in a circular ring of diameter equal to that of the crown so as to cause injuries to the root suckers. The trees of gbh more than 45 cm should be selected for such operation. This will cause injuries to the root suckers to stimulate growth of seedlings through them. The tending and singling of shoots from root suckers will increase the population of the tendu tree.

(b) Pruning should not be done yearly. It should be done at an interval of 3 years during which some seedlings could establish and become the future seed bearer. Pruning should strictly and exclusively be of branches and not seedlings irrespective of their origin.

(4) BAMBOO :

(i) USE :

15.4.32 This is one of the important minor forest produce of this tract. This is popularly known as poor man's timber. The local people make use of it in a variety of ways. Tribal people eat tender rhizomes as vegetable during the monsoon. Besides, it is used by Burads to prepare bamboos articles and local people in construction of huts, house, cattle sheds and fencing. The bamboo is also used in a number of industries such as Paper and Pulp, Ice cream etc.

(iii) AGENCY :

15.4.33 This has been discussed in detail in the chapter on Bamboo (overlapping) Working Circle.

(iv) VILLAGE INDUSTRIES :

15.4.34 Making bamboo tatta is one of the important and potential propositions. This should be encouraged, along with the other activities by the local people, particularly tribals. There is huge demand of the same in this area by many agencies, one of them is WCL. This will increase sharply the economic status of the tribals. The raw material will be supplied by the department in the manner described in the Chapter on Bamboo (Overlapping) Working Circle.

(v) MARKET :

15.4.35 The general market for the bamboo has been described in detail in Bamboo (Overlapping) Working Circle. So far as 'Bamboo tatta' is concerned, for these, contracts should be made with WCL, by assessing their requirement. The supply to the concern should be made at the rate, terms and conditions as decided by the Government.

(vi) OTHER REGULATIONS :

15.4.36 A list of firms requiring bamboo tatta and its quantity should be prepared and maintained at range and division levels.

(5) MYRABOLONS, DIKAMALI AND NIRMALI FRUITS :**(i) USE :**

15.4.37 These minor forest produce are used in many ways. Hirda, Beheda and Aonla are most common amongst myrabolons. These are of high medicinal value and are used in many Ayurvedic medicines. Hirda and Beheda are given to child in villages invariably for cold, cough and stomach disorder, dikamali and nirmali fruits are used in chemicals and in many other industries.

(ii) YIELD :

15.4.38 So far no study has been conducted to assess the yield of fruits from these tree species. The distribution of such species in different girth classes is given in **Appendix No.XXI**.

(iii) FORMATION OF UNITS AND COUPES :

15.4.39 The range will be the unit. Since working is annual and covers the entire area and so unit will also be the coupe.

(iv) AGENCY FOR HARVESTING :

15.4.40 The units should be given on lease. The lessee will collect the same as per the direction of the Dy. C.F. concerned. The lease period should be from 1st July to 30th June. lease should be given for one year by calling tender at divisional or circle level. On failure of tender, departmental harvesting can be thought, if it is profitable and market is surveyed and assured.

(v) MARKET :

15.4.41 Market should be surveyed in order to have fair assessment of demand and supply so that in case of departmental working the same could be used.

(vi) OTHER REGULATIONS :

15.4.42 (a) The detailed list of such species should be prepared and maintained at beat, round, range and division levels.

(b) These species should be excluded from felling.

(6) KHAIR :

15.4.43 The khair tree is distributed more or less in all ranges of the division and the details are given In **Appendix No.XXI**.

(i) PROPERTIES :

15.4.44 Khair is known to occur on granite, gneiss , schist, quartzite, basalt, trap, limestone, conglomerate and laterite. It grows best on porous alluvium composed of sand and shingle. It also occurs on black cotton soil. Khair is strong light demander. It is capable of growing in dry situations where almost every other species fails to survive. The tree coppices well upto moderate size and produces root suckers, particularly where the roots have been exposed. This character can be used for its propagation as has been suggested for Tendu. Coppice shoots, however, require complete light for their development. Root and shoot cuttings can also be used for the method of propagation.

15.4.45 The wood is very hard and heavy. The average weight at 12% moisture is about 1010 kg/m³ (ranging from 880 to 1170). The density of khair is 0.875. Growth rings are formed and are fairly distinct, demarcated by a fine, interrupted line of parenchyma occasionally accompanied by somewhat larger vessels. The timber is very hard and strong, very steady and moderately tough. The sap wood is not durable. The heartwood is very durable and is described by Pearson "one of the most durable Indian Woods which is seldom, if ever attacked by white ants and fungi".

(ii) USE OF KHAIR :

15.4.46 The khair heartwood is chiefly used for the production of katha and cutch since very long time. It is a valuable structural timber due to its natural durability of heartwood. This species has been classified as "Super Group " timber suitable for large spans more than 12 m and is placed as the first choice of selection for management structure (ISI : 1962). It is eminently suitable for tools and tool handles, specially for mallets and plane bodies. It is used for all kinds of agricultural implements and is excellent for making spokes and hubs of cart wheels. it is used for posts in house construction and for making rice pastels, oil expellers, gun butt etc. The spent heartwood is also used as fuel in the Katha-boiler and Katha bhatties. The charcoal of dead khair wood is much valued and used by goldsmiths. The calorie values of moisture free sapwood and heartwood are 5142 and 4946 calories respectively. The exhausted khair heartwood shavings can economically be

utilized for making partition boards and decorative boards and also can be used as top of table for drawing room.

15.4.47 The results of experiments in Forest Research Institute (FRI), Deharadun. on sapwood and spent heartwood of khair showed the profitable utilization of the same for producing bleached cellulose. which will find use in multifarious cellulose based industries, like carboxy methyl cellulose, cellulose acetate and even for paper and paper boards if made available in large quantities.

15.4.48 Khair gum is considered to be of very good quality and it is a good substitute for gum Arabic. It is advisable that the khair trees should be tapped for some years to obtain gum prior to felling for katha production.

15.4.49 The bark has a stringent taste and it is useful in the treatment of snake bites and the paste of the bark is also useful for conjunctivitis. The juice of the fresh bark is given with asafoetida in haemoptysis (spitting of blood).

15.4.50 The khair is the species mainly of degraded miscellaneous forests. The no. of stems/ha (khair) and its distribution among different girth classes shall be given in final draft plan. The yield of khair has not been estimated separately. This can be done from the tables for different sites.

(7) KATHA AND CUTCH :

15.4.50 Khair heartwood yields and astringent extract composed chemically of two primary constituents :

- (i) **KATHA (KATECHIN)** :A crystalline substance, of pale brown colour, soluble in hot water, but insoluble in cold water, sweetish in taste.
- (ii) **CUTCH (CATECHU TANNIC ACID)**: A non crystalline substance, of dark brown colour and soluble in cold water and contains insoluble and some of gummy waters,.

15.4.51 Katha samples produced by different methods contain catechin content 30 to 70% and water soluble substance 5 to 7% Generally the extract (mother liquor) of heartwood is found to contain the following ingredients:

1.	Catecu tannic acid (cutch)	8.10 %
2.	Catechin (katha)	2.6%
3.	Mucilage	6.8%
4.	Residual matters.	5.7%

(iii) USE OF KATHA :

15.4.52 Katha is used in pan (Betel) for chewing purposes. It is a principal ingredient in the preparation of pan. Besides, it has many, medicinal uses. In Ayurvedic and Unani systems of medicine, cooling, digestive, useful in relaxed condition of throat mouth gums; and also in cough and diarrhoea. Externally, it is

used as an stringent and as a cooling application to ulcer boils and eruption of the skins.

(iv) USE OF CUTCH :

15.4.53 It is extensively used as a tanning material, for dyeing purposes and as a preservative for fishing net to impart them long life. It is also used for treating ropes and fabrics, which are liable to come in contact with sea water such as sailing ropes, sails, tents, canvas, mail bags etc. It is also used mostly as mordant in dyeing leather and as a retaining material. It is also used in the manufacture of stencil and printers, ink, in oil well drilling operations for reducing the viscosity of drilling mud (ONGC).

(v) METHOD OF EXTRACTION OF KATHA :

15.4.54 The prevalent methods for extraction of katha & cutch from khair wood are by the factories and small scale manufacturers in the forests. The local people must be encourage to set up Katha industries as small scale industries in their area with the help of District Industries Centre. The main role in this regards can be played by the Project Officer of the area.

(vi) DESCRIPTION OF INDIGENOUS METHOD OF KATHA MANUFACTURING :

15.4.55 The indigenous process which is commonly known as "Handi" method for the manufacture of edible katha is being followed in the India since centuries. In this process generally earthen vessels are used for various operations, viz extraction, evaporation, crystallisation etc. This method was having a number of defects, which were removed by improved indigenous method devised by FRI, Dehradun. Outlines of the improved method of katha & cutch manufacturing are as follows.

(vii) PREPARATION OF CHIPS :

15.4.56 The khair logs, after being removed of their bark and sap wood, are converted into thin chips by trained labourers by means of hand axes.

(viii) EXTRA CTION OF CHIPS :

15.4.57 The heartwood chips are boiled in the extractors of aluminium keeping the chips in the cages (basket) made of aluminium wire in order to avoid direct contract of the chips with heat. Each case takes a charge of about 12 kg of chips and are extracted with about 36 litres of water for about 2 hours in first stage at boiling temperature (chips and water should be in the ratio 1:3). The extraction is repeated second time with fresh water giving a boil for about 2 hrs. A third extract may also be taken if necessary in the same conditions. The extract (mother liquor) of the same chips is used for extracting a fresh batch of the chips.

(ix) CONCENTRATION OF MOTHER LIQUOR :

15.4.58 These extracts are filtered through marking cloth and are collectively concentrated in open aluminium cauldrons (karahis) by boiling with steam or with direct heat (Bhatties) to the requisite density of 1:08 to 1:113 depending upon the

quality of heartwood and the weather conditions. Each charge is completed (concentrated within about 3 hrs.)

(x) CRYSTALLIZATION :

15.4.59 After completion of concentration to the requisite density, the concentrated mother liquor is transferred in the aluminium crystallizer and allowed to stand aside in shade for slow crystallization of katha for about 2-3 days or more as the case may be depending upon the season. Seeding of cooled and concentrated liquid (mother liquor) with some crystals of good quality katha always accelerate the crystallization and separation of katha from the crystallized solution. The crystals of katha separate out on the button and the thick mass crystallized katha is separated from the mother liquor, which may again be seeded, if necessary, for a second crop of katha.

(xi) FILTRATION :

15.4.60 The crystals of katha thus separated into a thick mass (like thick curd) are diluted with requisite amount of cold water and pumped through a hand operated filter press fitted with canvas cloth to separate the katha from the mother liquor. A couple of washings with fresh old water may be necessary to obtain fairly good quality of katha. Now the filtered mass katha is scraped off the canvas and put again under a hand screw press (book binder type). The last traces of tan liquor are thus drained out.

(xii) TABLETING PROCESS :

15.4.61 The katha plate of about 2 cm thick is taken out from the wooden frame and cutter, made of copper or aluminium wire, with wood plate. These tablets are allowed to dry under shade, as open sun drying is injurious to the catechin which gets decomposed and blackened.

(xiii) CUTCH :

15.4.62 The mother liquor (cutch solution) obtained after separation of katha is further concentrated to a suitable consistency (when it gives a thread, while hot, lifting by means of a stick) so as to give a solid product of cutch on being poured into wooden frames or cakes of suitable sizes. The cutch naturally takes longer time to dry. It should also be dried under shade.

(8) FORMATION OF UNITS :

15.4.63 The range will be the unit.

(9) AGENCY :

15.4.64 The harvesting of khair will not be done separately. With the main felling as per the prescription in the working plan, khair will be harvested. The harvesting will be done either through FLCS or department. The material harvested will be reserved for such cottage industries.

15.4.65 The cottage industry should be set up by FLCS under the guidance of the Forest Department and Tribal Development Department. These two departments should have coordinated efforts to achieve the objectives. The process

of manufacturing should be supervised by the Project Officer. The Forest Department will have the control over the supply of raw material and finished goods. Forest Department headed by the Dy. Conservator of Forests, Project Officer and Chief Executive Officer, Z.P. should jointly prepare the draft of terms and conditions to regulate the same and the draft should be discussed among the Deputy Conservator of Forest, Collector and C.E.O. to give the final shape to it. Then if needed, the approval of higher authority should also be obtained.

(10) MARKET :

15.4.66 TDC should explore the market. TDC should receive the produce at the rate fixed by the Government or the officer authorised in this behalf by the State Government.

(11) OTHER REGULATIONS :

15.4.67 (i) To increase the population of trees in the suitable sites, circular ring around the tree of radius 1.5 times the crown radius should be made. The depth of the ring should be such that roots are exposed so that shoots come out from root suckers. Singling and tending of such shoots will increase the stocking of this species without spending much.

15.4.68 The record of production of khair should be maintained at Beat, Round, Range and Division levels. The record of supply of khair wood to the small scale industry should be maintained at Range and Division levels. The Conservator of Forests will decide the form in which records are to be maintained.

15.4.69 In this working circle, subject has been written in short. The objective is to draw the attention towards this and to translate into reality. By doing this the importance of N.W.F.P's will increase and eventually they will be managed in better way and the economic status of the poor tribal will be elevated.

(B) MEDICINAL PLANTS:

(I) ANALYSIS AND VALUATION OF THE MEDICINAL PLANTS :

15.4.70 Methodology for studying the medical plants-Survey etc: In order to assess the potential of areas rich in medicinal plants the field surveys are required to be conducted at the range level and the promising areas need to be identified for the establishment of "Vanaspati Vans" and also for the *in situ* conservation and sustainable use of medicinal plants available in the division. The objectives of vegetation studies are to assess the species diversity and distribution, density of trees; to estimate the basal area of the trees, diameter at breast height (d.b.h.) and size distribution of trees; to assess the extent of regeneration to seedlings and coppice root stocks and the regeneration potential of different species; to understand the existing and potential end uses of species; to understand the stages of forest succession and estimate the standing growing stock and productivity.

15.4.71 The methodology adopted for conducting this type of study is known as tree quadrat method in which a sample plot of 50 m x 20 m is laid and the number of plots is decided on the basis of crop/species composition and the area of the study. In each quadrat data on stems measuring >30 cm gbh is enumerated and

identified and recorded and this data is used for calculating species richness, size class distribution, height class distribution etc and is essential to understand the sustainability of natural resource extraction and the spatial and temporal changes due to the impact of extraction. The plot size for shrubs is 5 m x 5 m. and all stems measuring a girth of >3 cm but with girth > 30 cm or a height >140 cm are enumerated. To make qualitative and quantitative assessment of herbs plots are required to be randomly located inside the shrub quadrat and the plot size for herbs is normally 1m x 1m . The control plots are also required to be laid in order to study the comparison and the identical sampling methods need to be adopted. In each sample plot the medicinal plant species shall be identified with the help of taxonomist and desired data will be recorded.

(II) MANAGEMENT OF THE AREA:

15.4.72 The medicinal plants conservation areas (MPCA) and (MPDA) medicinal plants development areas shall be managed within the N.W.F.P. overlapping working circle and its boundaries shall be co-terminus with N.W.F.P. areas.

15.4.73 The management plan of MPCA and MPDA areas shall be worked out by the territorial Deputy Conservator of Forests after conducting the desired vegetation studies and surveys. These activities can be taken up as part of the Joint Forest Management Programme. The necessary financial requirements shall be made available as part of the annual budget.

(III) METHOD OF TREATMENT :

15.4.74 The territorial division shall endeavor to establish MPCA, MPDA and NWFP areas and each one of them shall be managed as a unit. Each JFM area shall be a unit of its own and JFM areas shall not be excluded from NWFP areas. Non JFM forest areas will be conveniently divided into appropriate lease units preferably in tune with NWFP units which cover some medicinal species also.

(a) Treatment for MPCA areas:-

- (i) Selection of sites, that cover the range of forest types, altitudes, areas of known species richness and medicinal plants presence. Sites having RL (Red listed plants such as *Michelia champaca*, *Drosera indica* etc.) species populations should also be considered.
- (ii) Conducting ethno botanical studies in partnership with Bare Foot Botanists (BFBs) from local communities. Documentation of all plant taxa occurring in MPCA with herbarium records, systematic estimation of plant populations and regeneration distribution patterns, association, micro habitat and cultural information related to the plants collected, needs to be carried out.
- (iii) Records about the MPCA such as the year of formation, extent, forest type, works carried out etc. shall be maintained at the divisional level.

- (iv) A map demarcating the boundaries of the MPCA in the RF map concerned should be prepared and maintained and the boundaries of the MPCA shall be clearly demarcated by planting boundary pillars at each survey station and numbering it. The boundaries can as far as possible be natural features and the area a mini water shed.
- (v) Taking efficient measures to protect sites from fire and other biotic pressures. Grazing shall not be allowed within the MPCA. Rigid protection from biotic interference shall be given and this can be achieved through forest protection committees/local management committee.
- (vi) Locating breeding populations of RL(Red listed) and economically valuable species and at a subsequent stage develop a suitable species recovery program for critically endangered species and enrichment planning programme for economically valuable species.
- (vii) Except for the collection of seeds/ propagules for multiplication either for research or development elsewhere, no other removal shall be permitted.
- (viii) The endangered and valuable vulnerable species spotted in the MPCA can be multiplied in the nursery and planted in the vicinity where such species are found
- (ix) Establishing a network of nurseries around selected MPCA to supply planting material of those plants available in the MPCA network and demanded by both non-commercial and commercial user groups.
- (x) Establishing signage and demonstration plots in selected MPCAs for education of local people and visitors. Important species can be labelled around the demonstration plot.
- (xi) Building and strengthening community institutions for long term management of the sites.
- (xii) Fencing of the MPCA area shall be done on priority basis and necessary funds should be made available for the same.

(b) Treatment for MPDA areas :

In these areas the eco-restoration and biological upgradation of degraded forest is to be resorted using the JFM concept and the following prescriptions need to be followed :

- (iii) Selection of suitable degraded forest areas for MPDA programme.
- (iv) Involve a competent local NGO for organising the community.

- (v) Selection of species to be raised in the MPDA from those indigenous to the region, a mix of trees, shrubs and herbs that are native, relatively easily grown and are marketable.
- (vi) Establishing a system of sustainable harvest based on collection guidelines for specific species that are informed by “conservation science”.
- (vii) Joint management of MPDA by the local Forest Department and local communities. Proceeds of the harvest of medicinal plants from the MPDA (in the form of raw material) to be shared under the JFM framework.
- (viii) Creation of market links & buy back guarantees for sale of produce at the outset of the programme.
- (ix) Building and strengthening community institutions for sustainable management.

(C) Treatment for NWFP areas:-

- (i) Selection of suitable non-degraded areas where medicinal plant collections are already underway.
- (ii) Involvement of a competent local NGO for organising the community.
- (iii) Establishing a system of sustainable harvest based on collection guidelines for specific species that are informed by “conservation science”.
- (iv) Joint management of forest sites by the local Forest Department and organised local communities. Assign specific forest areas to specific local village communities with clear delegation of responsibilities, privileges and full accountability. Proceeds of the harvest of medicinal plants to be shared under the JFM framework.
- (v) Creation of market links for sale of produce at the outset of the programme.
- (vi) Building and strengthening community institutions for sustainable management.
- (vii) Only such plants/parts of the plant specified for each species whose medicinal values is recognised should be collected e.g. fruits and seeds of neem tree.
- (viii) Removal of plants or plant parts of species other than the specified ones shall be totally prohibited.
- (ix) Lopping of branches to gather buds, fruits or leaves shall be totally prohibited.

- (x) Fruits and seeds that have fallen to the ground alone are to be collected. May be the branches can be gently shaken to facilitate the shading of fruits and seeds.
- (xi) For each medicinal plant/tree species about 1-2 % of the population shall be left as seed bearers for encouraging natural regeneration and also seed collection. These trees shall be numbered and ring marked and no collection shall be done from these seed bearers.
- (xii) Species to be raised for use in Primary Health Care, trade in the RF/PF/buffer areas will be listed out categorywise, well in advance to facilitate nursery operation. Information already generated on nursery and plantation techniques for the chosen species, will be used for artificial regeneration.
- (xiii) Based on the outcome of the survey of the vegetation, the proportion of medicinally important tree species shall be increased while taking up reforestation works under eco-restoration and water augmentation programmes.
- (xiv) Tending of coppice shoots/root stocks of existing trees shall be taken up and the natural regeneration shall be encouraged.
- (xv) Seeds/seedlings shall be sown/planted in the barren patches and in the weeded and soil worked areas around the tree saplings. Medicinal plant species of the nature of the climbers can be planted close to the naturally existing trees and shrubs or their natural hosts
- (xvi) If contour trenching is carried out, the species mentioned in the previous para can be raised on the mounds in the first year and in the trenches during the next year when some slit gets deposited in them.
- (xvii) At convenient contour intervals, say 30 m. shrubs like Kumari (*Aloe barbadensis*), Adhatoda (*Justicia adhatoda*), Nirgudi (*Vitex negundo*) and Vettiver (*Vetiveria zizanioides*) can be raised as vegetative barriers along the contour. These species can also be planted along the RF boundary. This will incidentally facilitate demarcation of the RF from the buffer zone.
- (xix) In the swamps, along the stream banks and on the waterspread areas and aprons of check dams and percolation ponds, hydrophytes like Neerbrahmi (*Bacopa monnieri*), Vallarari (*Centella asiatica*), Vasambu (*Acorus calamus*), Arathai (*Alphinia calcarata*) etc. can be planted.

2) Sustainable harvest :

15.4.75 Information suggesting norms for sustainable levels of harvest shall be worked out by the territorial Deputy Conservator of Forests after taking into consideration the results of vegetation survey and availability of medicinal plants

species and the parts of the plant or tree used for medicinal uses. Untimely harvesting should not be permitted otherwise natural regeneration will be affected. In case where the roots/tubers/rhizomes or the specific plant parts used in medicine, the natural regeneration of these species shall be ensured by leaving well distributed and adequate numbers of seed bearers. An alternative would be to replant the area after harvest. Destructive collection should be prohibited. In some plants whose leaves are used for medicinal purposes, it is common practice to uproot the whole plant and therefore in such cases only the leaves should be allowed to be collected. In case of vetiver, the roots alone are used in medicine. Since it is raised as a soil binder and vegetative barrier, harvesting can be taken up only when the slips establish, produce tillers and the clumps form a thick barrier. At this stage, leaving a strip of grass barrier on the uphill side tillers can be uprooted on down hill side. Similarly in case of *Cymbopogon* species leaves are to be harvested every quarter. On no account should the clumps be allowed to set fire to, to encourage growth and development of new and young shoots. In this case if the clumps lie scattered, the harvesting will be done only once a year and that too well after the plants flower and seed dispersal has taken place.

SECTION-5 : RESEARCH WORKS :

15.5.1 There are so many minor forest produce in the forest which are unidentified and untapped. The efforts of the department should be to explore them and manage them scientifically. The identification of medicinal plants is the field to be taken for study immediately. This has wide scope in future. Dr. M.N.Padhye of Nagpur and his team have been conducting a survey of medicinal plants in the forests of Gadchiroli and Chandrapur Districts. Over 150 such plants have been identified so far. This is not the exhaustive list of medicinal plants. It is open to add more names of such plants. Besides, identification and localization of the same are the field for future study. Innovation and research works should always be carried out and the same be recorded and reported properly so that those could be of use to those who come next.

15.5.2 The following are the important rules :

- i) the annual estimates of collection of N.W.F.P. shall be based upon the experience.
- ii) The annual estimates of collection of N.W.F.P. shall be approved by the Conservator of Forests.
- iii) The Range Forest Officer of the respective range shall issue the passes for collection of N.W.F.P. to the lessees and keep record of the collection etc.
- iv) The non wood forest produce lease units shall have distinct boundaries.
- v) N.W.F.P. collection estimates shall be based upon the inventories of forests resources.
- vi) Scheme shall be formulated for improving yield of N.W.F.P. e.g. plantations, protection against disease etc.

- vii) Measures shall be taken to maintain and improve the present output of the N.W.F.P.
- viii) The MPCA areas shall be accorded the status of a “preservation plot” and documentation shall be done by opening plot files.
- ix) The Territorial DCF will maintain a record of NWFP harvested legally or illegally from the forest along with the quantities and the collection charges paid to the labourers.
- x) The Territorial DCF will select the representative area in each beat comprising of around one hectare and will visit this plot every month and will identify and will record the occurrence of flora alongwith flowering and fruiting periods.
- xi) The Territorial DCF will select plus trees / stand / seed plots of trees, climbers, shrubs, herbs and rhizomes and tuber species of NWFP/Medicinal plant commonly used by the local people for their livelihood and food vegetable and commercially traded in Maharashtra.
- xii) The Territorial DCF will collect the information regarding all types of forest produce, their quantities and the sale price during the weekly bazar days throughout the year. The help local schools situated at bazar places may be taken to collect the said information at beat, round, range and division level.
- xiii) The Territorial DCF will collect and document the traditional knowledge about the use of wild plants / animal products by the locals / tribals as traditional medicine / food / fruits / vegetable etc.
- xiv) The Vanmajoor and forest guards should collect minimum 100 kgs. of seeds in a year of the most traded and economically important medicinal plants and will use these seeds for bush sowing/sowing in blank areas in the beat, without involving any extra cost and arranging SHRAMDAN at least once in day as prescribed vide Govt. of Maharashtra Resolution No.MSC/2000/C. No.143/F-1 dated 25/04/2003.
- xv) The Territorial DCF will take initiative and efforts to maintain a register at every beat, round, range and division level noting the present unscientific and destructive harvesting practices and to collect the information regarding correct scientific harvesting of NWFP for sustainable production from various journals and Institutions within and outside Maharashtra State like IIFM Bhopal; CIMAP, Lucknow; CDRI, Lucknow; ITRC,Lucknow; ICFRE, Deharadun etc.
- xvi) The Territorial DCF will maintain a register at every village level regarding the domestic consumption of NWFP familywise in order to accurately assess the production and requirement of NWFP at the State level through a computerised program to

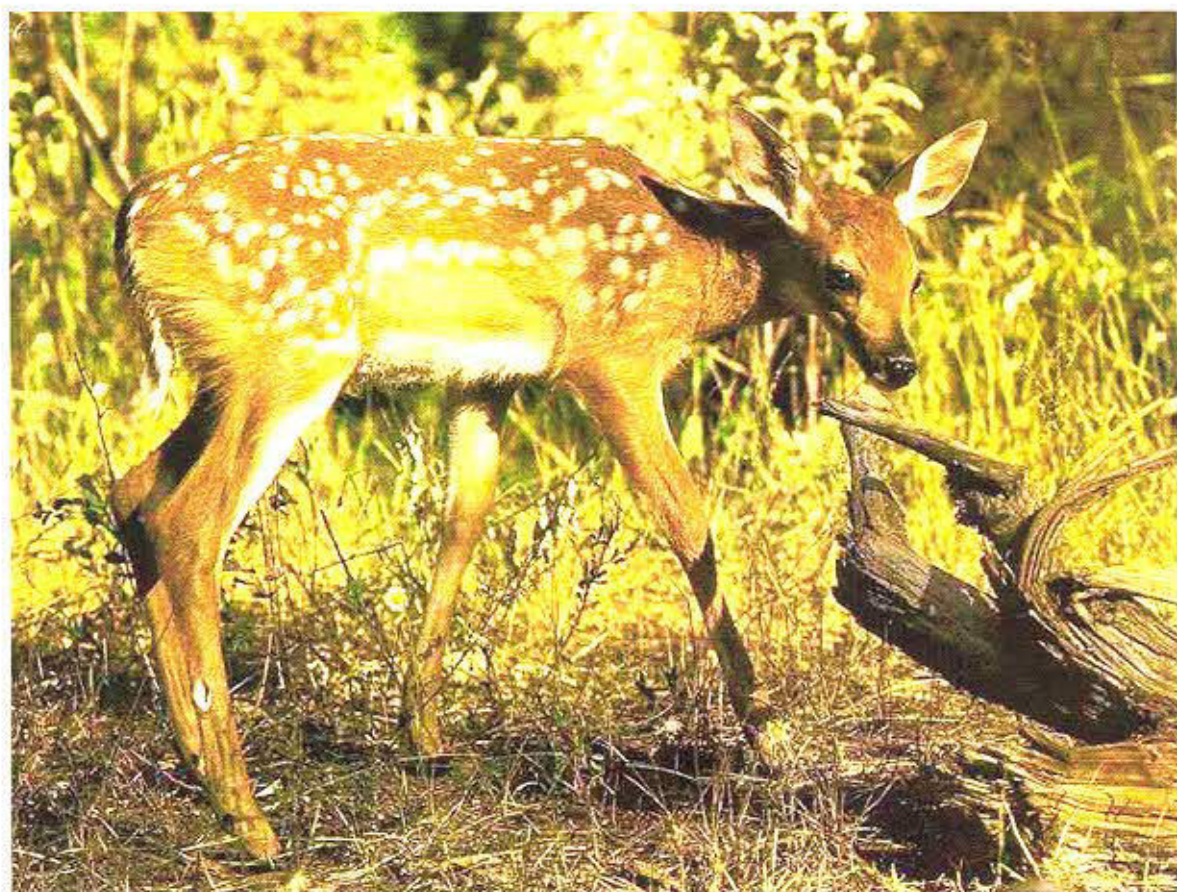
take corrective measures to streamline the production as a action point under Biodiversity Act 2003.

- xvii) The Territorial DCF will maintain a register of all the vendors, purchasers, manufacturers, stockiest of NWFP including medical plants by prescribing fees and format as being done in Thane Circle.
- xviii) The Territorial DCF will prescribe a register to be maintained by the purchaser at every collection center compiling information on full name of the collectors of the forest produce, approximate place of collection, village, name of forest produce, quantity, rate at which forest produce sold to vendor/purchaser, name of purchaser and all other forward linkages.

15.5.3 The forest geneticist/silviculturist shall be made the nodal officer for collection, processing and certification of seeds. The forest geneticist/silviculturist shall develop in consultation with territorial Dy. Conservator of Forests cost effective propagation technique for the medicinal plants and minor forest produce and will also study the economics of medicinal plants and minor forest produce found in the division.

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CHAPTER - 16
WILD LIFE (OVER LAPPING) W.C.



CHAPTER – 16

WILDLIFE (OVERLAPPING) WORKING CIRCLE

SECTION-1: GENERAL CONSTITUTION OF THE WORKING CIRCLE :

16.1.1 This is an overlapping working circle and covers the entire area of the division. Thus the total area included in this working circle is 217942.685 ha. The range wise distribution of the area is given in the following table-59

TABLE-81

Sr. No.	Name of the Range	Reserved Forest	Protected Forests	Unclassed Forests	Total Forests
1	2	3	4	5	6
1	Ghot	54430.341	4444.080	4869.340	63743.761
2	Markhanda	7937.820	1586.220	3173.740	12697.790
3	Pedigundam	17367.437	--	4684.540	22051.977
4	Aheri	18709.503	7985.221	290.140	26984.864
5	Allapalli	18920.284	--	391.520	19311.804
6	Pirmili	63634.720	9517.759	--	73152.479
	TOTAL	181000.105	23533.290	13409.290	217942.685

SECTION-2 : GENERAL CONDITION OF FLORA AND FAUNA :

16.2.1 The description of the flora has been given in Chapter II of Part I of this working plan. The forest type as described by the Champion and Seth is Southern dry mixed deciduous forest. The dominant species is teak which is associated with Bija, Dhaoda, Ain, Moha, Aonla, Semal, Tendu, Lendia, Kusum, Haldu, Siras, Salai, Arjun etc. The lower canopy is formed of Young trees of above species alongwith Garari, Achar, Moyen, Bhirra, Bel, Ghoti and Bamboos. The undergrowth consists of Kukaranji, Kuda, Maropthal, Chirchira, Aroni, Chilati .

The details of the forest type is described in Chapter 2 of this working plan.

16.2.2 The general conditions of the wildlife in Allapalli Forest Division is not very satisfactory because of various reasons such as loss of habitat due to encroachment of forest areas for agriculture and grazing which resulted in the

shrinkage of wilderness. Considerable amount of wildlife habitat has been sacrificed in this area for agriculture. Whenever the wild animals move out of their restricted habitat because of their necessity, the wild animals are either killed or hunted by the locals and professional poachers to meet their greed. Another major factors for depletion of wildlife population is the disturbance caused by the forestry activities such as construction of roads for exploitation, harvesting of forest produce, plantations which create monoculture and rights and concessions provided to the local people.

16.2.3 The wildlife population in the division includes tiger, panther, Jungle cat, striped hyena, Jackal, fox, spotted deer, sambhar, barking deer, blue bull, Indian wild boar, common mongoose, common langur, Indian porcupine, Indian hare, etc besides these, large variety of avian fauna is also present in the area.

SECTION 3:- SPECIAL OBJECTS OF MANAGEMENT:

16.3.1 The special objects of management are as follows:

- i) To sensitise the local people about the importance of conservation of wildlife and its habitat.
- ii) To preserve and support the propagation of existing wild animals in this tract.
- iii) To provide ecologically viable habitat for wildlife sustenance.
- iv) To promote the welfare activities for the development and propagation of wildlife.

SECTION-4 : EVALUATION OF WILDLIFE.

16.4.1 The wildlife evaluation will be conducted for herbivores and carnivores by the territorial division every year. The figures for different wildlife species commonly found in the Allapalli Forest Division are not very satisfactory due to illegal hunting and poaching of animals for their meat and other body parts such as horns, skins, bones etc and also due to shrinkage of wild life habitat on account of illegal encroachment for agriculture purposes. These illegal activities promoting encroachments should immediately be banned and no further permission under Forest Conservation Act 1980 be given for further diversion of forest land for non forestry purposes.

SECTION - 5 : METHOD OF TREATMENT.

16.5.1 (A) No regular schemes are being prescribed for the management of wild animals in this tract. But following prescriptions are being made for the protection of wild animals, creation of environment of security to them, increasing infrastructure for wildlife management and trying to restore the status of wild animals in this tract.

- i) People should be made to realize the reasons of depletion of wild animals to such an extent in this tract and the way to restore the status through repeated dialogue with them.

- ii) Teaching and motivating them for principle of conservation. This principle should be taught to them through stories like the teaching in Panchatantra to bring attitudinal change. This will be more effective because they are not educated to read and understand any literature. How the wrong doings of them is affecting adversely to their life and life style is to be stressed and they should be made convinced.
- iii) The phases and modes of teaching will be as follows:
 - (a) Almost all villages are having school and so there is at least one teacher in each village. Teacher lives in that village and has become a part and parcel of the village. People listen to him and he is always available in village. Therefore, teachers/opinion makers will first be taught and convinced through dialogue, movie etc and in the second phase teacher will teach the people the lesson of self realization and thereby they will understand their wrong practices and improve themselves. Forest officers should frequently visit the villages to have an open dialogue with the people. Teaching and motivating people for conservation and protection of wild animals will take time and so the implementing agency should have patience to a great extent, with full confidence to achieve it.
 - (iv) Soon after achieving the environment of security for the wild animals, the planning for introduction of wild animals will be started. This will be implemented through Gram Panchayat. In the first phase of implementation of the above plan, any one village will be selected as a test case and getting the positive results, this will gradually be extended for other villages also. But at a time not more than two pairs of any wild animals be released. Yearly census will be conducted to evaluate the combined results of teaching and introduction of the wild animals. Gradually the number of species of the wild animals will be increased and monitored.
 - (v) Besides, by persuading, teaching and motivating people should be made aware of the Acts and their coverage for the protection of the wild animals. Gram Panchayat will give the name of offender who will be prosecuted under the provisions of the Acts. People will be made aware of the penalties for which offenders can be liable.
 - (vi) The provisions contained in the Wildlife (Protection) Amendment Act, 1991 and further Amendment of 2003 will be enforced rigidly.
 - (vii) The villagers as well as our people will keep a vigilant watch over poachers. As soon as any incidence of poaching in this tract is noticed all possible measures will be taken to completely

close the door for poachers. Poachers from outside will not dare to enter in this area if the protection is done jointly by villagers and our staff.

- (viii) Strict checking at the checking gates erected to check or prevent illicit transport of forest produce.
- (ix) The provisions of rewards to the informed or informer in respect of unlicenses or without permit shooting are required to be followed and payment of reward should be made promptly. Besides, giving two advance increment to the staff as a reward is also being proposed.
- (x) For development of basic amenities for wild animals the following works of habitat improvement will be carried out:
 - (a) While preparing the treatment map of a coupe for felling in any of the working circles potential habitat of wild animals and existing waterholes will also be identified and will be shown on the treatment map.
 - (b) Marking of dead trees in any felling coupe will be done only if their number is more than 2 ha. These trees will be required to provide snag and den trees for nesting and resting of the wild animals. Trees of commercially low utility may be used for this purpose.
 - (c) During harvesting, some unsound and hollow logs of commercially low utility, not exceeding 3 per ha, will be left in the forest to serve as shelter for wild animals.
 - (d) In the plantation, few fruit trees will also be planted to provide food to the wild animals. The choice of species will be the discretion of the Dy. Conservator of Forests.
 - (e) The waterholes which are frequently visited by wild animals will be excluded from grazing by making a special mention of such areas in the grazing permit license.
 - (f) The existing waterholes will be maintained and at possible sites new waterholes will be created to make the waterholes distributed evenly throughout the tract so far as possible.
 - (g) Suitable locations will be identified where forest tank will be constructed to provide water to the wild animals.
 - (h) Hoarding on the importance of wild animals and its protection will be exhibited at strategic locations.
 - (i) The labour camps and transit depots will be established away from the areas having high density of wild animals.

- (j) Salt licks will be developed.
- (B)** The forest of Allapalli forest division are very rich in wildlife and variety of flora and fauna exist in this division and the habitat is also very much suitable for their propagation and therefore an area of about 5 km in width around Chaprala Wildlife Sanctuary may be declared as buffer zone to provide safe corridors for wildlife movements. For the conservation and protection of wild life, constant patrolling is required and therefore the division should be provided at least one Jeep for each range along with wireless sets etc. The patrolling staff should be fully trained and equipped in dealing with wildlife management and protection.
- (C)** The territorial division should also be provided with trapping cages in order to catch the stray wild animals which some times enter into the neighboring villages and towns and may cause damage and injury to the human beings.
- (D)** The wild animals which may enter into the human settlements such as villages and towns and are trapped in the cages for releasing them into the jungles, should be tagged so that it may not be wrongly declared as man eater or threat to live stock and therefore may not be killed without any reasonable evidence and cause.
- (E)** The territorial Dy. Conservator of Forests may take up a project for the breeding of / introduction of wild animals which are normally found in this habitat but their number has decreased due to various reasons in consultation with the local veterinary Doctor / Wildlife Scientist. This will help in restoring the animal population at the optimum level.
- (F)** The territorial Dy.C.F. will ensure that the green foliage is available to the herbivorous species. One tree per hectare of pole size of apta, dhaman, ain, kasai, ghat bor or any other fodder species will be pollarded at breast height in the working coupe so that the green foliage in the month of March and April can sustain wildlife. Such pollarded tree / pole should be capable of yielding 30 kg of fodder. Three to four culms in a mature clump will be cut at a height between 3rd to 4th internodes from the ground so as to give green flush of leaves for wild animals to eat.
- (G)** The territorial Dy.C.F. will take necessary steps to improve the wildlife habitat including projects on improvement of fodder grass and harvesting of water resources
- i. Fodder Development:- The development of food resources will be carried out by raising fodder plantations, increasing mast and fruit production. The fodder development will include introduction of better varieties of palatable grasses along with local grasses. The dietary requirement of wild animals has been estimated

as 70% cereal and 30% legumes and therefore cereal crops be planted with legumes as mixed crops. The cereal grasses such as *Schima nervosum*, *Schima sulcatum*, *Dicanthium annulatum* should be planted along with legume grasses like *Atylocia scorboides* and *Alysicarpus rigosus*

Some improved variety of cereal grasses like *Pennisetum pedicellatum*, *Cenchrus ciliatus* should be included in natural meadows along with legume grass *Stylo hamata*. *Deshmanthes virgatus*, *Schima nervosum*, *Schima sulcatum* are best suited as fodder grasses. It is in protein and easily digestible. *Stylo hamata* and *Pennisetum pedicellatum* remain palatable till December while *Dicanthium annulatum* remain green till early summer.

At places especially near river beds, the seeds of herbaceous plants should be sown. Some seeds of maize, jowar, grass etc will be mixed with the grass mixture and sown in meadows as a lure crop.

ii. Development of Water Resources:- The territorial division will take necessary steps to increase the availability of water to the wild animals and in order to achieve this, the following measures will be taken up:

- a. Deepening of existing water holes: The desalting of existing water holes will be done regularly in order to increase their water holding capacity.
- b. Zhara Opening : Zhara will be opened during the summer season in the important river beds at a distance of about 3 to 4 Km. in order to make water available to the wild animals which regularly visit the river beds for their water needs.
- c. Improvised use of hume pipes: Where the water flow beneath the river is deep, much beyond the reach of the wild animals, and improvised method of collecting water by using hume pipes will be undertaken. It should be done in the month of February. The hume pipes of 1 mt. length be dug vertically inside the river bed and sand be removed from inside the pipe to allow the water to flow upwards
- d. Anicuts: Small anicuts on nala or water storage be built.

These prescriptions will be explained to the field staff and will be followed while doing the regular working in respective working circles.

SECTION- 6: LEGAL PROVISIONS FOR THE PROTECTON OF WILDLIFE.

16.6.1 The legal provisions for the protection of wildlife are given in Chapter VIII of this plan.

SECTION -7: GENERAL MEASURES FOR PROTECTION :

- 16.7.1**
- i) Area will be strictly and effectively fire protected.
 - ii) Constant vigilance will be kept on the waterholes during summer where animals expose themselves as easy prey due to shortage of water.
 - iii) Every person residing in or within 10 km. Of these forests and possessing a fire-arm will register his name with the Deputy Conservator of Forests.
 - iv) Adequate provisions should be made in the budget for payment of compensation to the villagers on account of killing of or injury to any person or his livestock and the Deputy Conservator of Forests concerned shall not make any delay in payment of compensation to the affected people.
 - v) The village forest protection committees under Joint Forest Management Programme shall be made accountable for detection of offences related to the wildlife.
 - vi) The territorial field staff of the division shall identify the vulnerable spots under his jurisdiction where the wild animals are likely to be hunted or fall prey to the illegal poachers and shall keep a constant vigil over the area and shall take all preventive steps to check the wildlife offences and shall promptly report the offence cases to his superiors without any delay.
 - vii) Hoarding on wildlife importance and preservation should be exhibited at strategic places. Other publicity media should be explored to educate public for preserving the wildlife. These means should be imaginative, informative and inspiring.

SECTION -: 8 WILDLIFE AND ECO-TOURISM

16.8.1 Eco-tourism is emerging as an important component of the Indian Tourist Industry in general and Maharashtra State Tourism in particular. The term eco-tourism is most popularly used but it is necessary to distinguish this from the general mass tourism. Eco-tourism has been considered here as a sustainable, equitable, community based endeavour for improving the living standards of indigenous host communities.

16.8.2 Eco-tourism can be defined as sustainable, nature tourism involving the indigenous stake holders, while forging partnership with the existing tourism

industry. The World Tourism Organization defines eco-tourism as “tourism that involves travelling to relatively undisturbed natural areas with the specified objects of studying, admiring and enjoying the scenery and its wild plants and animals, as well as any existing cultural aspects (both of the past or the present) found in these areas”. Eco-tourism and Nature-tourism is distinguished from resort tourism or mass tourism by requiring lesser infrastructure development and lower impact on environment. The key elements of the eco-tourism are as follows:

- 1) Existence of National Park/Sanctuary/natural environment as a prime, star attraction.
- 2) Should be ecologically socially, culturally and economically sustainable.
- 3) Should have participation of the local stake-holders (host community)
- 4) Should be a low profile venture.
- 5) Should be capable of dove-tailing in the existing tourism of the State.

16.8.3 The National Eco-Tourism Policy and Guidelines.(1998), after considering the National Policy on Tourism has identified cardinal principles for the development of Eco-tourism which are given in **Appendix No.XLVIII**. The Territorial DCF Allapalli will take necessary steps to identify the Eco-tourism areas, historical sites etc. in his division.

CHAPTER-17 ESTABLISHMENT AND LABOUR

SECTION-1: STAFF :

17.1.1 The details of the organization and staff have been given in Chapter No. 4 of this plan. The existing ranges, rounds and beats have been given in **Appendix No. XLIX.**

17.1.2 The total area of the Allapalli Forest Division is 217942.685 ha. and on an average, the area of the beat is 1550 ha. which shows that the degree of work load on the executive staff is much more than he can actually undertake. The executive responsibility of forest protection, conservation, execution of working plans and various other plan and non-plan works are mainly shared by the field staff i.e. Range Forest Officers, Round Officers and the Beat Guards. In order to achieve qualitative and quantitative targets, it is necessary to assess the actual work load on the executive staff and necessary corrective measures be adopted to complete the works assigned to the field staff in a responsive manner.

17.1.3 The area of the division is very big and mostly compact except in part of the Markhanda, Pedigudam, Aheri and Ghot ranges where most of the villages have settled and due to biotic interference, the forest nearby these villages are exposed to illicit felling, encroachment for agriculture and housing, poaching for local consumption of meat and some times for trade in hides and other animal body parts. It is therefore felt that one Deputy Conservator of Forests with his headquarter at Allapalli can not alone effectively exercise control over the entire division and it is almost impossible to supervise the various forestry activities and protection works, sitting at Allapalli. In order to supervise the various forestry activities effectively it is therefore proposed that the Allapalli Forest Division be bifurcated into two Territorial divisions with their headquarters at Allapalli and Chamorshi and subsequently the Ghot Range be divided into three Territorial ranges namely Chamorshi, Ghot and Regadi and similarly the Pirmili range be divided into Gurupalli and Pirmili territorial ranges and the newly created territorial division with its headquarter at Chamorshi will comprise of Chamorshi, Ghot, Regadi, Gurupalli and Mulchera territorial ranges and the remaining area of the present Allapalli Forest Division will form part of the new Allapalli Forest Division with its headquarter at Allapalli.

17.1.4 The present working plan provides for intensive silvicultural works like over-wood removal, Selection-cum-Improvement fellings, afforestation of degraded areas, management of non-wood forest produce and medicinal plants, protection of wildlife etc. and all these activities are year long works and will require close supervision by the Asstt. Conservator of Forests and Range Forest Officers and therefore it is advised that the headquarters of the A.C.F. be fixed close to the site of the work and therefore it is proposed that one A.C.F. each be posted at Allapalli, Mulchera and Chamorshi taluka places which will also reduce the expenditure being incurred on their touring as well as it will facilitate the close supervision of important forestry activities. The average size of a coupe in clear felling / over-wood removal, in SCIWC, IWC and Afforestation W.C. are 100 ha., 100 -125 ha, 100 -150 ha and 100 – 120 ha. respectively and in addition to this there are several other forestry activities which required to be handled throughout the year. Therefore in order to complete these tasks, the present organizational set up needs to be restructured.

17.1.5 The Govt. of India in the Ministry of Agriculture has laid down the area norms for the constitution of a territorial division based on protection alone. This norm is 500 to 1000 Sq.Km. for hilly terrain and 1000 to 1500 Sq.Km. for plan areas. However no such norms have been fixed for the range, round and beat. In the year 1981, the average area for the beat was fixed by the Govt. as 12 to 20 Sq.Km., for the round 80 to 100 Sq.Km. and for range 600 to 800 Sq.Km. but considering the quantum of work load prescribed in the plan and other activities, these norms fixed by the Govt. are not practical. The present average area of the beat is 1500 ha., of the round is 7500 ha and that of range varies from 12000 to 74000 ha.

The following table shows the staff available against the sanctioned strength:

TABLE--82

Reno.	Post	Sanctioned staff	Staff available	Staff required
1	Dy. C.F.	1	1	--
2	A.C.F.	3	2	1
3	R.F.O.	14	12	2
4	R.O.	62	46	16
5	Beat Guard	221	174	47
6	Accountant	14	12	2
7	Clerk	42	33	9

17.1.6 The perusal of the above table shows that the important post of executive staff i.e. RFO, RO and Beat Guard are not filled up to the sanctioned strength which adversely affects the forestry activities both qualitatively and quantitatively and therefore necessary steps be taken to provide the sanctioned strength of the executive staff.

SECTION – 2 : LABOUR:

17.2.1 The tract being sparsely populated, labourers are becoming an increasingly a scarce resource with the stepping up of pace of development of this tract. Besides, due to the oppressive climate conditions, low quality of food and drinks, the villagers are lethargic. It is, however, felt that by handling them tactfully and prompt payments, it will be possible to attract labourers on Govt. works. In places where shortage of labourers is acute, the import of labourers from the neighbouring districts can be made. Attractive wages, providing good labour sheds, drinking water facility, easy medical aid, transport facility and provision of consumer's shops are some of the measures to attract the labourers from outside. To lessen the pressure of labour requirement in coupe working mechanized logging methods can be used. Efforts have also been made to scatter the works uniformly over the whole area so that with proper planning labour problem can be over come and all the works can be successfully completed.

17.2.2 The details of labour requirement and the number of mandays to be created in execution of different activities ,proposed in this plan from the year 2004-2005 to 2013-14, are given in Table No.83. Figures given in the table have been worked out on the basis of works norms being followed in South Chandrapur Circle, Chandrapur. In coupe working, mandays required right from demarcation to transportation of timber up to coupe depot,

firewood and bamboo up to sale depot have been taken into account for deciding the work norms. The same norms have been used for wind fallen timber and firewood. For planting, 10 % areas of S.C.I. and Improvement Working Circles have been taken available. Areas available for planting in S.C.I. and improvement Circles will be planted in 20 years.

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Table continued.....

Sr .No.	Item of work & working norms (MD/ha. or MD/M ³)	Period of working	M.D.'s to be created in hundred & Av. L/D required (Taking twenty working days/month)									
			2009-10		2010-11		2011-12		2012-13		2013-14	
			MD	L/D	MD	L/D	MD	L/D	MD	L/D	MD	L/D
1.0	Demarcation & marking (4.5 MD/ha.)	Aug-Oct	866	1438	866	1438	866	1438	866	1438	866	1438
2.0	Coupe Working	Nov-Mar										
	a. Timber (7.7 MD/M ³)		7166	7166	7166	7166	7166	7166	7166	7166	7166	7166
	b. Firewood (4.26 MD/Beat)		986	986	986	986	986	986	986	986	986	986
	c. Bamboo (Nistar)											
	i) Demarcation (1.5 MD/ha)	April-May	150	375	150	375	150	375	150	375	150	375
	ii) Harvesting long bamboo (7.73 MD/100 bamboo)	Oct-Mar	2241	1867	2241	1867	2241	1867	2241	1867	2241	1867
	iii) Bamboo Bundle (13.75 MD/100 B)	Oct-Mar	356	296	356	296	356	296	356	296	356	296
	d. Bamboo (Commercial) (14 MD/100 Bundle)	Oct-May	1400	875	1400	875	1400	875	1400	875	1400	875
3.0	Removal of windfallen	Nov-Feb										
	a) Timber (7.7 MD/M ³)		996	1245	996	1245	996	1245	996	1245	996	1245
	b) Firewood (4.26 MD/Beat)		928	1141	928	1141	928	1141	928	1141	928	1141
4.0	Tendu (13.4 MD/STd Bag)	Apr-15 Jun										
5.0	C.B.O. (6 MD/ha)	Apr-May	301	250	301	250	301	250	301	250	301	250
6.0	Cleaning (8 MD/ha)	Apr-May	193	160	193	160	193	160	193	160	193	160
7.0	Afforestation (MD/ha) Activities MD's											
	a. P.M.W. 219.04	Nov-Mar	2283	2283	2283	2283	2283	2283	2283	2283	2283	2283
	b. F.Y.O. 196.19	Apr-Nov	1420	1420	1420	1420	1420	1420	1420	1420	1420	1420
	c. S.Y.O. 096.31	Jul-Oct	815	815	815	815	815	815	815	815	815	815
	d. T.Y.O. 062.48	Aug-Oct	596	596	596	596	596	596	596	596	596	596
	e. 4 th Y.O. 017.60	Nov-Mar	--	--	--	--	--	--	--	--	--	--
	f. 5 th Y.O. 017.60	Nov-Mar	--	--	--	--	--	--	--	--	--	--
8.0	Collection of MFP's	Nov-Mar	--	--	--	--	--	--	--	--	--	--
9.0	Building Repair	Nov-Mar	1443	1443	1443	1443	1443	1443	1443	1443	1443	1443
10.0	Roads & Bridges	Oct-Dec										
11.0	Boundary Repair	Oct-Jan	--	--	--	--	--	--	--	--	--	--
12.0	Fire Protection	Dec-Jan	1545	1545	1545	1545	1545	1545	1545	1545	1545	1545

<p>CHAPTER -18</p> <p>MISCELLANEOUS REGULATIONS</p>

SECTION - 1 : DEMARCATION OF COUPE AND

PREPARATION OF TREATMENT MAP:

18.1.1 The coupe will be demarcated one year in advance as mentioned under different working circles and a treatment map will be prepared by the R.F.O. which will be verified by the A.C.F. After that a coupe demarcation certificate along with the treatment map will be furnished by the concerned R.F.O. in the following format :

I,-----
 ----,R.F.O.,-----certify that I
 have personally inspected the demarcation of coupe No.----- in
 compartment No.-----of-----F.S.--
 -----W.C. on dated-----month -----year-----
 -----and have prepared the treatment map as per the prescriptions of the working
 plan.

The area of the coupe is-----ha.

Countersigned by

Signature of the RFO with date

A.C.F.

(A) DEMARCATION OF COUPE :

18.1.2 (i) Annual coupe will be demarcated by cutting and clearing bushy undergrowth on 3 m wide line and by erecting pillars or posts in the middle of the line at suitable intervals, except where the coupe boundary runs along a big nala, a fire line or a road, Coupe number, and felling series will be written on the pillars on the side away from the area of the coupe.

(ii) Selected trees at suitable intervals, standing on the periphery of the coupe, will be given two coaltar bands and a geru or red band in between. The lower coaltar band will be at breast height and the other coaltar band will be 15 cm above it. Just below the lower coaltar band serial number in Arabic will be given on the side away from the area of the coupe. The serial numbers of such trees will be maintained in the marking register in the following form:-

Serial No.	Species	Girth at b.h.	Remarks
(1)	(2)	(3)	(4)

(iii) No trees bearing coupe demarcation bands will be marked for felling.

(B) DEMARCATION OF SECTIONS :

18.1.3 (i) To control harvesting, each coupe marked for felling in SCI and Improvement Working Circles will normally be divided into four approximately equal sections. Sections will be demarcated by 1.5 m wide cut lines by clearing brushwood unless the section line runs along a permanent feature, e.g. nala.

(ii) Trees above 45cm girth, selected at suitable intervals on the inner edge of the 1.5 m wide cleared section line will be given two coaltar bands 15 cm apart, the lower coaltar band being at breast height. Just below the lower coaltar band section number will be given on the side away from the area they would denote.

(C) DEMARCATION OF PROTECTION AREAS :

18.1.4 Selected trees, on the periphery of the protection areas will be given two geru bands 15 cm apart, lower band being at b.h. In addition, a cross in geru colour between the bands will also be given on the side away from the protection areas. All those trees will be serially numbered. The serial number will be given just below the lower geru band, on the side bearing the cross. All the protection areas will be numbered in Roman numerals and the trees standing on the periphery of each protection area will be numbered in Arabic, adopting separate series for each area, so that the trees on the periphery of protection area No. I will bear the Sr. No. I/1 and the similar trees on the periphery of protection area No. II will bear the No.II/1 etc. The serially numbered trees will be recorded in the following form.

TABLE-84

Sr.No.	Species	Girth at b.h.	Remarks
1	2	3	4

(D) DEMARCATION OF OTHER AREAS GIVEN IN THE TREATMENT MAP:

18.1.5 The other categories of areas will be marked by giving one geru band and one coaltar band. The geru band will be at b.h. and the coaltar band 5 cm above this.

SECTION : 2 : MARKING TECHNIQUE :

18.2.1 (i) All trees to be marked for felling will be given a geru band at b.h. after removing the bark and will bear marking hammer marks both at b.h. and at the base on a clear blaze of size - (10 cm x 10 cm). It will be given a digital number in a sequence.

(ii) The following trees in addition will bear digital serial numbers both at b.h. and at the base. The trees in the pre harvestable class in the coupe will be enumerated and given a serial number.

(iii) All remaining trees marked for felling will bear serial numbers, which will be given by coaltar. The digit and coaltar numbers will form separate series. Malformed trees alone will be recorded as fuel trees except that of teak. A tree will be classified as fuel tree only when it is incapable of yielding any useful sawn timber or pole. Marking has to be done carefully as the labourers employed in logging go by the marking technique.

(iv) All trees bearing serial number will be individually recorded in marking (recording) book giving following details as shown in the table below :

TABLE -85

Sr.No.		Species	Girth at b.h.o.b.in cm.	Remarks
Digit	Coaltar			
1	2	3	4	5

In the remarks column the type of timber i.e. timber/pole/chalk timber/fuel/stump will be recorded.

(v) Abstract of trees marked for felling will be made in 15 cm girth classes. Timber, poles and firewood trees will be shown separately.

(vi) The number on the trees will be put in the vertical direction as shown below:

3

Tree No. 317-----> 1

7

(vii) The marking will be checked by R.F.O. (five percent) and by A.C.F. (two percent) and duly signed.

(viii) The A.C.F. will explain the marking technique along with the rules for different working circles to the marking parties before the start of the marking in a current coupe.

SECTION-3: MAINTENANCE OF BOUNDARIES.

18.3.1 In general the present state of forest boundaries and their maintenance is unsatisfactory. This work is not being given due attention and the boundary marks are in a neglected state. The Reserved Forests boundaries do not exist at most of the places. The state of maintenance of boundary lines of other Reserved Forests is very poor. Under the Survey and Demarcation Scheme, the ex-proprietary Protected Forests were surveyed and demarcated but the boundaries were not maintained subsequently and hence at present these boundary marks do not exist on the ground and at many places forests areas have been encroached. It is thus necessary that

the whole area should be surveyed and demarcated without loss of time and accurate maps be prepared. Major parts of these protected Forests areas have been declared, as Reserved Forests vide Notification No. FLD 3685/9316/CR-42/F-3, dated 5.5.1992. Therefore, the Dy. Conservator of Forests will prepare a special scheme for five years to demarcate these areas and will prepare the map showing the boundary pillar. One map should be supplied to the Deputy Conservator of Forests, Working Plan Division-II, Chandrapur for his record and for showing the pillar nos. on the master set maintained in his office. This work should be taken up without loss of time as early as possible, latest in very first year of the implementation of this working plan. Besides, the compartment boundaries of these newly created R.F. by 3 meters wide clear line should be made and maintained by cutting under growth regularly. The external boundary demarcation of the forests must be done by R.C.C. cairns of approved designs. The distinction between R.F. and P.F. should be clear. The Principal Chief Conservator of Forests M.S. Nagpur vide his office letter No. वस/शु.अ./६८/२०००-२००१ नागपुर दिनांक २९-५-२००१, has circulated to all Conservator of Forests (Territorial) in the State the design of the R.C.C. pillars for the survey and demarcation of the forest lands in order to observe the uniformity of the boundary pillars in the state. The details of the aforesaid letter dated 29/5/2001 along with the design of the R.C.C. pillars is given in **Appendix No. L**. According to Bombay Forest Manual, the Conservator of Forests, Territorial Circles are competent to take necessary action regarding boundary pillars.

18.3.2 Similarly, remaining Protected Forests also need be surveyed and demarcated on the ground so as to distinguish it from the revenue land. A special scheme should be prepared and the Deputy Conservator of Forests, will prepare a special program for immediate survey and demarcation of these areas also and for preparation of accurate maps of the same. This work can be done simultaneously while doing survey and demarcation of Reserved Forests. A large tract of Protected Forest areas is under encroachment due to lack of demarcation of the forest boundaries. The forest department is considering a proposal to prepare topo-sheets of large scales like 4" = 1 Mile of new Reserve Forests by the Survey of India, Dehradun.

18.3.3 Boundary survey and demarcation should be done very meticulously. A special program will be launched by the Deputy Conservator of Forests, for survey, demarcation and procurement of maps from D.I.L.R. such as Bandobast Maps, Punarmojani or Ekatrikaran maps and the corresponding survey numbers of Forest Department will be shown on the map.

18.3.4 The forest boundaries are not in a proper state of repairs and need improvement. Therefore, a special program should be launched by the Dy. Conservator of Forest for the same as well by preparing a scheme. The work of boundary lines and repair of boundary pillars will be done departmentally.

18.3.5 The external and internal boundaries of the forest will be maintained according to 1/5 boundary demarcation and verification scheme given in **Appendix No.LI**.

18.3.6 The width of the cleared area of the outer boundary of the Govt. forest will be 12 meters. The clearing will consist of cutting down only all the undergrowth that impedes the view, preventing one forest boundary mark being seen from its

neighboring one. Trees on the boundary line will not be cut down so long as they do not obscure the view of the boundary marks one from the other. Except, where natural features form the boundary demarcation will be done by cairns. For erecting boundary pillars, the soil of the pits should be mixed with either charcoal or glass pieces so that the boundary pillars are not shifted illegally. All such cases of illegal shifting of boundary pillars should be dealt severally as provided under the Indian Forest Act, 1927 which provides for an imprisonment of two years for such offences. The inter division/range boundary width will be 12 meters, compartment boundary width 3 meters and the coupe and plantation boundary 6 meters.

18.3.7 The specification about shape, descriptions, foundation, dimension, colour wash etc. of boundary marks are given in the Principal Chief Conservator of Forest's letter dated 29/5/2001 as given in **Appendix No.L.** The boundary marks (cairns) will be placed at visible distance one from the other, so that from any mark it's neighboring one on both sides can be seen clearly. Where there is no change in direction over a large distance, the boundary marks will be erected at intervals not greater than 250 meters. Each cairn will bear a serial number, a fresh series being given for each adjoining village. The numbers inscribed on the boundary pillars of Reserved Forest should tally with the numbers provided in the Survey of India maps. The provisions contained in Bombay Forest Manual, Volume-II in this regard will be strictly maintained.

(A) BOUNDARY MARKS SPECIFICATION :

18.3.8 The specifications of boundary marks

18.3.9 In addition to the boundary marks, tin plates will be fixed on the boundary trees at a height of 3m., preferably at the boundary of two compartments. These plates will indicate the compartment numbers with arrows and below them will be pillar numbers on either side of the plates. The metal plates will be of size 45 cms x 45 cms. They will be painted white and compartment number and boundary pillar number will be written in red.

18.3.10 While carrying out annual maintenance, the following points need special attention:-

- i) that the pillars are correctly located as per map and demarcation register,
- ii) that the forest boundary is cut to the required width,
- iii) that the repairs to the cairn is done and the wooden post is replaced where necessary,
- iv) that the boundary posts bear the correct number and the same is engraved and written with coaltar or paint,
- v) that there are no encroachments. If there are any encroachments or are suspected, the matter should be pursued and the encroachments got removed as provided under section 53, 53A and 54 of Maharashtra Land Revenue Code .

(B) RULES FOR INSPECTION AND MAINTENANCE OF

FOREST BOUNDARY MARKS :-

18.3.11 i) The forest guard of the beats will be responsible for the maintenance and protection of all the boundary marks in the forests of his beat. He himself will colour wash them annually after rains and will make a special report of having preformed this work. Each forest boundary mark in his beat will be specially inspected by the beat guard at least once every year, and a record of his inspection will be entered in his diary.,

ii) The Round Officer will be responsible for the maintenance and protection of all the boundary marks in the forests of his round and he will see that they are maintained properly, repaired and colour washed by the beat guard, as directed. The Round Officer will check all the boundary marks in a year which come up for maintenance and repair as per the 1/5 the boundary demarcation scheme. A mention of this will be made by him in his diaries. The Round Officer will annually submit to the Range Forest Officer a certificate in the following form :-

"I, -----
certify that the annual length of boundary lines in my jurisdiction as prescribed under the scheme given in _____ of the working plan for the forests of Allapalli Forest Division has been verified by me personally on _____ and that boundary lines and marks and pillars are found to be correct as per the demarcation registers and maps. I, further, certify that next cairn on either side of a cairn is visible and they are in proper condition and bear correct serial number. There are no encroachments or encroachments are as detailed below:-

The Range Forest Officer will check at least 25% of the annual boundary line as per the 5 year program and 5% verification will be carried out by the ACF.

(C) MAINTENANCE OF COMPARTMENT BOUNDARIES :

18.3.12 The compartment boundaries will be cleared to a width of 3 meters, except where the same runs along big nala, or road. Rectangular tin plates of size 30 cm x 30 cm will be fixed with nails on the trees at 3 meter height standing on the boundary of the compartment at regular intervals of 250 meters and also at all the corners. After painting the tin plates white, the compartment numbers will be written on them with red paint. The compartment boundaries will also be maintained as fire lines.

(D) LEGAL PROVISIONS AVAILABLE FOR PROTECTION OF THE BOUNDARY MARKS :

18.3.13 Under section 26(c) of the I.F.A., 1927 altering, moving, destroying or defacing any boundary marks of any forests 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 of the above Act. This legal provision should be made use of at all levels by the field staff.

Strict watch will be kept on the persons who do so and they should be booked under the above provisions contained in I.F.A., 1927.

18.3.14 Area register shall be maintained in the office of the Deputy Conservator of Forests Territorial and shall be updated every year after execution of survey and demarcation works described as above.

18.3.15 The Deputy Conservator of Forests Territorial shall supply a copy of the corrected maps and area register to the Deputy Conservator of Forests, Working Plan Division every year in the month of June. The Deputy Conservator of Forests Territorial shall take all preventive steps and legal steps to prevent illegal decision and use of Forest areas. The Deputy Conservator of Forests territorial shall be bound by law to prevent encroachment of Forest areas. The National Forest Policy, 1988 prohibits the regularization of any further encroachments on forest lands.

SECTION – 4 : HARVESTING AND DISPOSAL OF FOREST PRODUCE :

(i) TIMBER AND FIRE WOOD :

18.4.1 Harvesting will be done either by department or by forest labour co-operative societies. All timber and firewood will be extracted to the established Government depots for sale in open auction. The quantity of timber, poles and firewood, to be given on nistar at concessional rates, will be kept separately in these depots.

(ii) TENDU LEAVES :

18.4.2 Tendu is one of the most important non-timber forest produce that contributes bulk of the revenue to the Govt.. The collection of tendu leaves and manufacturing of bidis will generate lot of employment to the local tribals. For the purpose of collection, the entire division is divided into units which will be disposed of by calling tenders. If the tenders are not received, then the units are sold by negotiations. Modified lumpsum system has been in operation since 1993. The collection of tendu leaves is regulated by Maharashtra Forest Produce (Regulation of Trade) Act-1969 and Maharashtra Forest Produce (Regulation of Trade in tendu leaves) Rules-1969.

(iii) BAMBOOS :

18.4.3 It is commonly called as poor man's timber. Local people use bamboos for various purposes such as making baskets, tattas, fencing, temporary walls etc. Details are discussed in the Bamboos overlapping working circle. Bamboo will be harvested in accordance with the prescriptions laid down in Bamboo overlapping Working Circle. After harvesting, the bamboos will be brought to the various depots set up for distribution of bamboos to Burads and agriculturists at the rates fixed by the competent authority. The excess of unlifted bamboos will be sold in open auction.

(iv) GRASS :

18.4.4 Disposal of grass from closed coupes will be done as per instructions contained in Govt. Resolution No. MFP 1169/118931 - (6) – F2, dated 29-10-1976 i.e. grass from closed coupes will annually be offered on cutting terms to the Gram

Panchayats or public bodies or F.L.C.S. in the neighbouring area at a reasonable price to be fixed by the Department, considering the availability of grass and current market trend. If the concerned Gram Panchayat or the other public bodies are not coming forward to take those areas, then grass may be disposed off either by public auction or by rated passes. In order to persuade the villagers for stall feeding, the grass may be allowed to be removed free of cost without damaging the forest.

(v) MAHUA FLOWERS AND FRUITS :

18.4.5 Mohua flowers is important source of food for tribals particularly in the off season. They also brew liquor from mohua flowers. These flowers are collected by local people on behalf of Tribal Development Corporation or for their own consumption.

(vi) MOHUA SEEDS :

18.4.6 Mohua seeds are used for extraction of oil which forms an important edible oil for the tribals.

(vii) GUM : USE AND VALUE :

18.4.7 Kulu (*Sterculia urens*), dhora (*Anogeissus latifolia*), are the main sources of gums of this area. These gums are basically used in medicines, chemicals cosmetics and food industries. No scientific methods have been used for tapping of gums in this area. Gum tapping is a potential field for employment generation and revenue earning.

(viii) MYRABOLONS, DIKAMALI :

18.4.8 These N.W.F.P. are collected by appointing an agent through open tenders. Myrabolons and dikamali are commonly used in chemical and medicine industries. Most of the non wood forest produce in this tract collected and marketed by Tribal Development Corporation.

(ix) HONEY, WAX, BROOM GRASS :

18.4.9 There are not much quantities available of these items. They may be allowed to be removed by local villagers either free or at nominal rates.

(x) GENERAL :

18.4.10 Sound and young growth of all important species yielding minor forest produce such as moha, charoli, harra, aonla, tendu fruits etc. will be retained in areas earmarked for harvesting in such a manner that they are suitably dispersed and would also serve as a subsidiary crop to main species and would constitute a source of availability of minor forest produce to the tribals and local people.

SECTION – 5 : IRREGULAR HARVESTING :

18.5.1 Irregular harvesting of timber, firewood and other minor forest produce is prohibited, except in the following cases :

- (i) Removal of dead fallen timber and firewood and trees uprooted by wind or storm from all parts of the forests, except the coupes due for

working, will be done in the following manner. Every year in the month of October each beat guard report compartment wise the availability of dead fallen firewood and trees uprooted by wind or storm to the concerned R.F.O. The R.F.O. will then prepare compartment wise estimates for such material by marking these trees. Marking in a compartment will be done only if the number of such trees is more than 2 per ha as this much number will be required to be left in the forest to decay in order to benefit the wildlife in the forest. After the approval of estimates by the Dy. C.F., harvesting will be done and the material will be taken out of the compartments. This material may be given to the Gram Panchayats or Forest Protection Committees at concessional rates approved by the Conservator of Forests. Further distribution will be done by the Gram Panchayat or Committees under the supervision of the concerned R.F.O. Where there is no demand for this material, it will be brought to the sale depot and sold in open auction. The details of material obtained from each compartment, number of beneficiaries and revenue realized from it will be entered in the respective compartment history form.

- (ii) Approval of felling of trees on the fire lines will be given by the Dy. Conservator of Forests, without reference to the Conservator of Forests.
- (iii) Approval of felling of trees under electric and telephone lines existing prior to coming in force of Forest Conservation Act, 1980 may be given by the Dy. C. F. as they do not come under the purview of the Forest Conservation Act, 1980 and are covered under section 11 of Indian Telegraph Act.
- (iv) Felling of trees on forest land required by the other departments such as irrigation, PWD. etc will only be undertaken after the proposals for the use of forest land for non-forestry purposes are approved by the Govt. of Indian under the provisions of Forest Conservation Act, 1980. The material obtained from such harvesting will be brought to the depots and will be disposed of along with regular coupe material.
- (v) The disposal of forest produce obtained from submergence areas of dams and tanks, from construction of roads etc. will be carried out according to the orders, issued by the competent authority, in writing, in case of sanctioned projects.
- (vi) No irregular harvesting for the purpose of undertaking plantations/a forestation work under schemes outside the scope of this working plan will be taken up in any of the areas under this working plan.
- (vii) The felling of trees for the purpose of growth study, volume table or yield table to be carried out by the working plan division will need no permission, except giving the details of the plan of work to the concerned Dy.C.F. well in advance. Felling should be strictly as per the objectives of the work.

- (viii) Removal of High stumps – The high stumps left over by the illicit removers shall be cut and flushed to the ground. The timber will be harvested but before harvesting an inventory of such high stumps duly verified by ACF shall be prepared.
- (ix) Removal of dangerous trees_– The trees leaning dangerously on the road or on the public or private property likely to cause injurious damage can be removed and shall constitute an irregular harvesting.
- (x) The removal of trees for the construction of extraction path in area outside the current coupes will be permitted.
- (xi) Bamboo outside the Bamboo overlapping working Circle; bamboos outside the Bamboo overlapping Working Circle will be removed or harvested on the basis of silvicultural lines in order to meet the local demand of Nistar at the time of main felling and cleaning.

SECTION – 6 : FIRE PROTECTION :

18.6.1 The forests are valuable and need careful fire protection over the entire area. Due to fire a considerable damage is caused to the timber besides causing long range effects on the soil fertility, young crops and regeneration. The special and determined efforts are needed to enforce the proper fire discipline which has undoubtedly slackened in recent part. For the purpose of fire protection the areas are classified as follows-

18.6.2 Class I- Forests completely protected:-

This class will include-

- i) All plantations
- ii) All forests of Protection W.C. and all main felling and thinning coupes of selection cum improvement working circle, teak plantation working circle and Improvement W.C.
- iii) All regenerated coupes of all working circles till, the young crop has attained an age of 10 years.
- iv) All areas of the proposed Sanctuary.
- v) All Government timber depots.
- vi) Any other areas of special importance ordered by the Conservator of Forests.

18.6.3 All areas in this class will be isolated by means of fire lines and cut guidelines and will be patrolled by fire watchers. Any fire occurring in them will be a calamity and must be reported to the D.F.O. immediately in writing giving the details of area burnt and the various types of losses occurred to the forest crop.

18.6.4 Class-II – Forest generally protected:-**a) This class includes-**

- i) The remaining areas of Improvement Working Circle and Selection-cum-Improvement working circle.
- ii) Such other areas as the Conservator may for special reasons direct.

b) All areas in this class will be isolated from the surrounding country by means of external fire lines and will be divided into convenient blocks of interior fire lines. No guidelines will be cut.

c) Fire watchers may be engaged for patrolling in this area if sanctioned by the Conservator of Forests.

18.6.5 Class- III- Forests protected by law only:-

a) All other forests not included in the above two classes, are included in this class.

b) In forest of this class deliberate burning is prohibited but no special measures of protection will be undertaken. The following lines will be maintained as fire lines and will be kept clear of all growth and kept clean of combustible material during the fire season:

- i) All external reserve forest boundary lines to a width of 12 meters.
- ii) 6 meter wide lines around all plantations up to 10 years from the year of planting.
- iii) 3 meter wide coupe lines which from the boundary between class I areas and areas of class II and III for period of 10 years from the year of main felling.
- iv) 6 meter wide line on both sides of all roads and Cart tracks passing through the forests.
- v) 40 meter wide line on all sides of the timber, bamboo and fire wood depots.

18.6.6 To reduce the possibility of forest fires following should be observed:-

- (i) The cutting and cleaning of fires lines should be completed by the end of December and burning should be completed before the end of February.
- (ii) 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 and burnt before the fire season starts. But the burning of such material on the fire lines after the hot weather has commenced, is strictly prohibited.

- (iii) Except with the express order of the Divisional Forest Officer, no fire lines shall be burnt after the end of February. If such a permission is granted, the burning should be done in the presence of the R.F.O. at his risk and cost.

1. Legal Provisions available:-

(A) Provisions contained in the I.F.A. 1927-

(a) Reserved Forests;

18.6.7 .The various legal provisions to protect the forest from fire contained in the following sections of the Indian Forest Act, 1927. The following acts are prohibited under these sections in the reserve forest areas or in areas notified under section 4 of the I.F.A. 1927:-

- (i) Section 26(l) b – to set fire to a reserve forests.
- (ii) Section 26(l) c - Kindling, keeping and carrying any fire except at such seasons as the forest officer may notify in this behalf.
- (iii) Section 26 (l) g – Burning of lime or charcoal.
- (iv) Section 26 (3) – The State Government may suspend the exercise of all rights of pasture or to forest produce in the reserve forest/protected forest or a portion there of whenever the fire is caused willfully or by gross negligence for such period as it thinks fit.

(b) Village forest :

- (v) Section 28(3) – All the above provisions apply in case of a village forest also.

(c) Protected forests :

- (iv) Any persons who commits any of the following offences under section 33(l) (a), (b), (d) and (e) namely, burns any tree reserved under section 30, burns any lime or charcoal contrary to prohibition under section 30, sets fires to such forests or kindles a fire without taking all reasonable precautions to prevent its spreading on any tree reserved under section 30 and leaves burning any fire kindled by him in the vicinity of any such tree or closed portion under section 30, shall be punishable with imprisonment for a term which may extend to one year or with fine which may extend to two thousand rupees or with both.

(B) Provisions contained in the Maharashtra Forests

(Protection of Forests from fire) Rules 1982:-

18.6.8 The Government of Maharashtra vide Notification No.1074/252 359/F6, dated February 14,1982 under sections 32 (6) and 76(l) (d) of the I.F.A.1927, made the rules for the protection of protected forests from fire called "The Maharashtra Forest (Protection of forest from fire), Rules 1982". The various provisions made under rules 3 to 7 are given as under:-

Rule 3:- A ban is placed on kindling of fire within a distance of one kilometer from the boundary of the forest.

Rule 4:- Under this rule any person desirous of clearing by fire any standing forest or grass land beyond a distance of one kilometer from the boundary of the forest shall observe the following rules:-

- (i) He shall clear a fire belt at least 10 meter wide on the side of the area which he proposes to burn which is nearest to the boundary of the forest in such a manner that no fire can spread across such belt.
- (ii) He should keep a watcher to see that the fire does not spread in the forest area.

Rule 5:- Under this rule any person desirous of burning "Rab" or clearing land by burning the growth on it near the forest boundary, should inform the nearest forest officer at least one week in advance of his intention to so do. A clean belt of at least 10 m width should be left in between the boundary of the forest and the place where the rab is to be burnt so that the fire does not spread in the forest and while burning the rab, he should make such arrangements so that the fire does not spread in the forest area.

Rule 6:- Under this rule any person collecting inflammable forest produce such as grass, firewood, leaves, bamboos on land adjoining the forest land, and holder of a permit to collect such produce from the forest area, shall stock it in an open space at such reasonable distance from the forest as the Divisional Forest Officer may by general or special orders prescribed, and shall isolate the stacks in such manner that if they catch fire the fire shall not be able to spread to the surrounding areas or endanger the forests.

Rule 7:- Under this rule all camping places along the boundary of and within the limits of the forest area will be cleared and will be set apart by the Divisional Forest Officer for the use of visitors. A list of all such camping places will be published annually and except on such camping grounds no fires shall be lighted within or along the boundary of the forest. All persons using these camping grounds shall light any fire they make for cooking or other purposes in such a way as not to endanger the forest or any buildings, sheds or other property on the camping grounds and before leaving they shall collect in the center of the camping ground all inflammable material which is to be left behind and shall carefully extinguish all fires.

Rule 8:- Rule 3 to 7 will be relaxed during the rainy season i.e. from June 15 to October 31 every year.

(C) Provisions contained in the Bombay Forest Manual – Vol.-II, Part-VI.

(i) Rule 152:- Fire offences should not as a rule be compounded.

18.6.9. In cases involving injury to forests by fire the provisions of s.68, I.F.A., should only be applied cautiously and for very special reasons ; any action which might tend to foster in the minds of an ignorant population the idea that firing of the forests, whether of set purpose or through culpable negligence, is not a serious offence, or one which in the opinion of Government calls for vigorous suppression, is manifestly to be deprecated. S.68 was enacted to meet the case of petty offences, like the illicit removal of forest produce ; but cases in which considerable damage is caused by fire to reserved forests certainly do not fall within this category.

(ii) Rule 153 :- Duties of Magistrates when trying offenders in forest fire case-

18.6.10 The following instructions are laid down for the guidance of all Magistrates in the Province :-

- (1) The setting fire to a reserved forest is a very serious offence, and as such merits severe notice. It is not the actual damage caused at the time that is to be considered, but the injury caused to Government and the people in general by the destruction of the young forest growth and the consequent delay in afforesting the treeless reserves.
- (2) There is reason to believe that some Magistrates consider the offences a venial one owing to the absence of any 'intention' on the part of the offender. It is not necessary, however, under the Forest Act that intention should be proved. Carelessness in the use of fire by which a reserve is burnt is equally an offence, but in the meting out of punishment a distinction can be made if the Magistrate sees fit.
- (3) All Magistrates should be careful in dealing with such forest cases. Forest fires are unhappily but too frequent, and in most cases it is very difficult to discover their origin, but when an accused has been convicted, the above-stated considerations should not be lost sight of, and when the circumstances establish either deliberate intention or very gross carelessness and disregard of ordinary precautions, it is obvious that the punishment awarded should be adequate.

(iii) Rule 154:-Regarding findings of Magistrates in fire cases.

18.6.11 The statistical information furnished as regards punishments awarded by the Magistracy for forest offences requires explanation. It has been pointed out by Government that the principal factor in determining the gravity of a forest offence is not the extent of damage committed but the degree of malice or culpable negligence disclosed, and it has been directed that the classification of offences of incendiarism should be based on the Magistrate's opinion. Government trusts that in

reporting results the orders of Government will be more closely followed, and that the statistics supplied will be compiled more intelligently.

(iv) Rule 157:- Continuous protection of valuable forest from fire.

18.6.12 The success of fire protection must depend to some extent on the nature of the tract, the attitude of the people and the season. The characteristics of the system of fire protection in this Province as compared with other Provinces are a very low rate of expenditure per square mile, a high percentage of area attempted and high proportion of failure to that area. The successful protection for a term of years of a comparatively small area of valuable forest appears to the Government to be of greater importance than imperfect protection of a large area, of which perhaps only an inconsiderable portion enjoys continuous immunity for any length of time. Information on this point should be given in the annual administration reports. It should be stated for each circle what area has been completely protected for seven years or more.

(v) Rule 158:- Communal punishment for bad fires in exceptional cases.

18.6.13 The system of communal punishment on account of bad fires in villages should be adopted in exceptional cases, and that too with the sanction of Government. Villages in which fires have been frequent or extensive should be selected and the villagers thereof assembled with a view to a formal warning being issued in the first instance by the Mamlatdar or R.F.O. or when possible by the D.F.O. and Sub. D.F.O. in person, to bring home to the village community as a whole its responsibility for the well-being of the forests in its vicinity. In cases where serious and repeated neglect by a village of its responsibilities is proved to the satisfaction of the D.F.O. and the Collector, recommendations should be made to Government to enable them to inflict punishment on the village concerned in such manner as they deem fit.

(vi) Rule 159:-Duties of village officers with regard to fire protection.

18.6.14 The principal hope of fire protection rests in the co-operation of the inhabitants of forest villages, and this co-operation can best be secured through the authority and influence of the village headmen. It is necessary therefore that the assistance of the village headmen should be gained whether through the fear of punishment or the hope of reward. Either punishment or reward should be meted out, and speedily, according to desert. If forest fires are frequent in a village, and if the patel does not lend his personal aid, or require the villagers to assist in extinguishing them, he should be regarded as having neglected the duty incumbent upon him of protecting Government property, and should be punished under section 58 of the Watan Act III of 1874, with fine, suspension or dismissal as the case demands. If, on the other hand, he renders conspicuous service, he should receive a suitable reward in the shape of turban or silver bangle or some other gift likely to be appreciated to be publicly presented to him by the Collector of Assistant or Deputy Collector.,

(vii) **Rule 160:- Rewards for help in fire-protection and powers of officers to sanction them—**

18.6.15 Rewards may be granted to villagers who assist the forest department in protecting the forests from fire. The D.F.O. concerned should submit recommendations to the sanctioning authority regarding the form of reward suitable in each case, within the budget allotment sanctioned for the purpose.

18.6.16 (D) Provisions for fire protection contained in the Wildlife (Protection) Act, 1972.

- (i) Section 17 (I) (e):- Under this section setting fire to any vegetation for hunting purposes is prohibited.
- (ii) Section 27(2) (d) and (e):- Every persons so long as he resides in the sanctuary is bound to extinguish any fire in such sanctuary of which he has knowledge or information and also he will help the forest officer in extinguishing the fire.
- (iii) Section 30:- Setting fire to a sanctuary, or kindling any fire or to leave any fire burning, in a sanctuary by any person so as to endanger such sanctuary, is prohibited.
- (iv) Section 32 :- No person shall use in a sanctuary, chemicals, explosives or any other substances which may cause injury to, or endanger, any wildlife in such sanctuary.
- (v) Section 35(8):- Provision of section 27(2) (d) and (e), 30 and 32 apply in case of a National Park also.

(E) Provisions contained under the “Maharashtra Minor

Forest Produce (Regulation of Trade), 1969:-

18.6.17 In the Agent’s Agreement Form made under the provisions of the above Act as per the terms and conditions Nos. 6(xix), (xx), (xxi), (xxii) and 8, the Agents appointed by the Government for collection of tendu leaves are responsible for any damage done to the forest by their negligence and they have to observe all rules, regulations and orders for the time being in force and made and issued under the Indian Forest Act, 1927. If any damage is done to the forest (which includes fire damage it shall be assessed by the Divisional Forest Officer and his decision shall subject to an appeal to the Conservator of Forests, be final, conclusive and binding on the Agent. As per condition No XII of terms and conditions of the contract for tender for 1993, the licensee, his representatives and munshis and labourers employed by him for collecting tendu leaves shall be bound to assist in putting out any forest fire and to give information of any forest fire in their knowledge or vision to the nearest forest or police officer. The licensee will be held responsible for any fires deliberate or accidental occurring in his unit/Group of units or in its close proximity during the above period for which he will be liable for penal action.

(F) Provisions contained in “The Maharashtra Felling of Trees

(Regulation) Act,1964.-

18.6.18 As per section 2 (e) of the above Act burning trees on private lands is included in the definition of “Felling of trees” and such act on the part of any person without obtaining felling permission from the competent authority i.e. Tree Officer under section 3, is punishable under section 4 of the above Act. The tree officer may award punishment, which may extend up to Rs.1000/- besides the tree so felled is also liable to be forfeited to the Government.

(G) Protection of bamboo areas from fire after flowering:-

15.6.19 The rules and regulations to be followed for protection of bamboo areas from fire by the contractors are given in the draft agreement vide Revenue and Forest Deptt. No. VM/D/1283/77 831/F1, dated 21-7-1983 and contained in the condition Nos. 41(1), 41(2) and 41(3).

2. STEPS TO BE TAKEN TO CONTROL FIRE :

18.6.20 (A) CUTTING AND BURNING OF FIRE LINES :

- (i) The cutting of the lines will be completed by the end of December and burning will be completed before the end of February.
- (ii) Dry leaves and other dry material on fire lines will be collected from time to time and deposited along the edge of fire lines and burnt before the fire season starts.
- (iii) Except with the express permission of the Dy. C.F., no fire lines will be burnt after the end of February. If such a permission is granted , the burning should be done in the presence of the R.F.O.
- (iv) Modern fire fighting tools will be used for extinguishing the fire.

18.6.21 (B) Fire Watchers.

- (i) The fire watchers will constantly patrol the fire lines in the areas assigned to hem. They should keep them entirely free from the inflammable material and prevent the carrying and kindling of fire in the forest area. As soon as a forest fire occurs he should inform the concerned beat guard and assist him in procuring the manpower from the nearby areas and also help in extinguishing the fire. The fire watchers should not leave their areas. The watch towers should be provided at such elevated points from where the fires even at distant places can be easily detected.
- (ii) The persons involved in lighting of fires are mostly local villagers only. Therefore, it is very much essential to have a open dialogue with villagers and they should be made aware of the disastrous effect of forest fire: Repeated dialogue and persuasion can be of great help in solving the problem. Solution should be

asked from them only. After doing all these things, areas vulnerable to fire should be identified around each village and for that area a gang of fire watchers of that village should be employed, who will have the sole responsibility of the fire protection of that area. If the village is big then a list of fire watchers should be prepared after taking meeting of villagers and having dialogue with them and rotational employment of fire watchers should be thought of.

- (iii) Before the fire season starts, a scheme will be prepared in which the strategic locations will be marked on a map at which gang of fire watchers of 5 to 10 will be kept, who will supervise the area around that point and can reach the spot where fire is noticed. Daily reports from the fire watchers should be called for.
- (iv) The staff associated with the fire protection work will monitor the working of fire watchers and will coordinate the working of different gangs located at different points.
- (v) The available vehicles will be deployed at strategic locations which can be approached by any gang, in case of help required by them. These vehicles will help in transport of fire fighting labourers, water and other equipments required for fire fighting.
- (vi) The regeneration area of SCI, Afforestation W.C. and Improvement Working Circles will require special efforts.

(C) Forest Fires.

18.6.22 As soon as the smoke is seen rising anywhere in or near the forest, by any Range Forest Officer or Forester or Forest Guard, he shall at once collect such aid as is immediately available and proceed in person to the spot to extinguish forest fire. If the fire is out-side his own Range, Round or Beat, he will continue there till the fire is extinguished and the concerned R.F.O. or Forester or Forest Guard arrives on the spot. This rule will apply to all the three classes of the forests.

18.6.23 The utmost care should be taken to extinguish the fires and to quench the smoldering material absolutely. Filling earth over such material will be found every effective. No official shall leave the burnt locality till the senior forest officer present on the spot has ascertained and satisfied himself that no smoldering material remains. All men assisting in extinguishing fires in Government forest shall be paid according to the amount of assistance rendered.

(D) Use of wireless :

18.6.24 A scheme should be prepared for establishing the wireless network in the whole division so that the communication becomes easier and faster. This will help not only in the fire protection works but will also be helpful in overall protection of the forest.

3. RESPONSIBILITY:

18.6.25 The Range Forest Officer will be held personally responsible for the efficient fire protection in his range.

18.6.26 Where the forests of two ranges which are to be fire protected adjoin, the responsibility for efficient protection and clearing of common fire line will rest with one of the Range Forest Officer to be selected by the Divisional Forest Officer. In cases of common boundary between two divisions of the same circle, the above responsibility will be fixed by the Conservator on one of the Range Forest Officer and in cases of the common boundary between two divisions of the two different circles, the concerned conservators after mutual consultation, will fix the responsibility on one of the Range Forest Officer.

18.6.27 The Divisional Forest officer will be held personally responsible for carrying out efficiently all protective and prohibitive measures (as envisaged under various acts and rules and regulations made there under) in the areas of his division excepting in areas which have been handed over to the F.D.C.M. Ltd. The responsibility for protecting the forest areas from fire handed over to F.D.C.M. Ltd. will lie with the concerned Divisional Manager of the F.D.C.M. Ltd.

15.6.28 The Divisional Forest Officer must satisfy himself that the exterior fire lines and other fire lines have been properly cleared and burnt thoroughly before the end of February. He must carry out inspections inquire about the implementation for the various prohibitory orders and ensure that sufficient protective staff is available to implement these orders. He must take frequent visits to the areas where the incidences of fire are common.

18.6.29 The Divisional Forest Officer/Dy. Conservator of Forests must, during his tour satisfy himself by constant enquiries and inspections that no fires in forest areas any where have gone unreported, and that the areas of reported fires have been accurately estimated. These checks require extensive and thorough personal inspection by him. A strict watch should be kept on the tendu leave contractors and their agents who engage the local people to put fire to the forest floor in order to get a good flush of tendu leaves. These fires are generally made between 1st of March and 15th of April each year.

4. FIRE REPORTS:

18.6.30 The Range Forest Officer shall report the out break of a fire in his area to the Divisional Forest Officer at once. Special messenger should be used if the fire extends over a large area. The Range Forest Officer must maintain a proper communication and coordination between outbreak of fire by him and further transmitting it to the Divisional Forest Officer. After the fire is extinguished a detailed final report covering the area burnt and other details along with a sketch map should be submitting by the Range Forest Officer to the Divisional Forest Officer within 15 days after thorough inspection of the burnt area by himself.

18.6.31 The Divisional Forest Officer will submit monthly return. (in prescribed proforma Form No. IX-74) to the Conservator of Forests showing therein the serial number of fire, date of occurrence, cause, area burnt, extent of damage and measures taken to extinguish fire. This report will cover:-

- (i) all fires in class I areas,
- (ii) all fires that have occurred in class II areas after the date given for completion for the line burning works prescribed in the previous paragraphs.
- (iii) All fires that have occurred in class II areas before the date fixed for completion of line burning works. All records of fires will be shown on maps of scale 1" to 2 mile and the record of fire will be filled in the concerned compartment history and the map will be attached to it. This work will be done both at the level of R.F.O. and D.F.O.

18.6.32 A fire record will be maintained in the Divisional Forest Officer showing name and the length of fire lines burnt with costs. All fire lines burnt and areas specially Protected shall be indicated on the map. Incidence of fires in class I, II and III areas in each range will be serially numbered in chronological order and the details of areas burnt will be shown on the map.

15.6.33 Areas deliberately burnt for silvicultural reasons e.g. to destroy felling debris or to stimulate reproduction will be excluded from the schemes of fire protection. Such fires will not be reported unless they spread into a protected area. Deliberate burning is only permissible if prescribed in the working plan or sanctioned by the Conservator of Forest. The steps to cut back the badly damaged young regeneration in the naturally and artificially regenerated areas due to fires, should be under taken by the Range Forest Officer in consultation with the Divisional Forest Officer.

18.6.34 Financial loss due to fire will be communicated to the Accountant General as per Appendix-19 of Rule 148 of Bombay Financial Rules, 1959 and B.F.M. Vol. I, Rule 369.

SECTION-7: JOINT FOREST MANAGEMENT:

18.7.1 The National Forest Policy of 1988 stressed upon the need to provide fuelwood, fodder and small timber requirements of the people living in and around Forest areas and therefore it was realised that an approach should be undertaken for facilitating the development of Forest Management partnership between village communities and the Forest Department, granting rights to all Non-wood Forest products and percentage share of final harvest to villagers that will help in protection and regeneration of the degraded forest lands. This approach has been defined as Joint Forest Management. But the Govt. of India vide its circular No. 22.8/2000-JFM(FPD) dated 21/2/2000 and letter no. DO/21.1.7/99/B2 dated 31/5/2002 has issued further instructions to include such other areas also which are not under the control of Forest Department as well as better forest areas also under this program. The Govt. of Maharashtra in persuasion to the Govt. of India's directives, vide its Revenue & Forest Department Resolution No.MSC/2000/CR143/F-2, dated 25/04/2003 has issued fresh guidelines for the benefit of the local people in order to encourage them to participate in joint forest management program.

18.7.2 The Government of India vide letter No. 621/89-PP dated 1st June,1990 conveyed to all the State Governments, a framework for creating massive

people's movement through involvement of village communities for the protection, regeneration and development of degraded forest lands. Govt. of India vide Ministry of Environment and Forests, Forest Protection Division Circulars No. 22-8/98-FPD dated February 11, 2000 and No.22-8/2000-JFM(FPD) dated February 21, 2000 has issued detail guidelines for the Joint Forest Management Programme to be taken up by the States. Government of Maharashtra vide Resolution No. SLF-1091/P.K.119/F-11 Mantralaya, Mumbai dated March 16,1992 realising the fact that illegal felling of Forests can not be controlled and checked without the active participation and cooperation of local people in the management, protection and regeneration of forests, issued guidelines and instructions for the preparation of plans for the management of Forest areas with the active participation and cooperation of local population living in and around Forest areas.

18.7.3 The details of Government of Maharashtra Resolution dated March 16,1992 has been produced in **Appendix No LII**. Therefore the guidelines and instructions contained in the Government of Maharashtra Resolution dated March 16,1992 encouraged the preparation of Management plans for degraded areas in the State involving the local inhabitants from adjoining areas to Forests and seeking their participation through J.F.M.

18.7.4 The selection of areas shall be done on the basis of guidelines and instructions contained in Govt. of Maharashtra Resolution dated march 16,1992. The Deputy Conservator of Forests, Territorial shall take all efforts to motivate villagers to participate in the Joint Forest Management plan. The areas allotted to Joint Forest Management programme shall be understocked mostly open with crop density less than 0.4.

18.7.5 The Government of India vide its subsequent reference No. 22-8/2000-JFM(FPD) dated 21/02/2000 issued further instructions to the State Government mainly related to participation of women in JFM Committees and the extension of JFM programme to the good forest area. The endorsement of the state government, to the above circular, is yet to be issued. The GOI, in the above reference has stated that at least 50% of the members of the JFM general body should be women, and the presence of 50% of woman member is a pre requisite for holdings general body. Besides that 33% of the Executive Committee members should be women. It has further stated that the JFM activities may be extended even to good areas which was till, confined to poor areas only. According to the circular, the JFM activity in good areas is to confine to NWFP activities only, and under no circumstances, the silvicultural prescriptions should be altered. The sharing mechanism should be different, than usual and sharing of profit from timber will be only when the Committee protects the area for at least 10 years and sharing percentage not to exceed 20% of final harvest. The JFM area extending to good forests, shall not exceed 100 Ha. and within 2 Km. It further says that JFM in good area shall be on a pilot basis and should be done, only after the degraded areas have exhausted. The copy of the main circular will be annexed as an **Appendix No. LII**.

18.7.6 The special objects of management have been defined keeping in view the National Forest Policy 1988 and the cost increasing population pressure on the Forest areas resulting in loss of tree over, depletion of soil and soil erosion due to demand for timber and fuel-wood, grazing pressure , fires and the forest land for agriculture, industries and housing etc. In order to check further loss of forest cover

and to regenerate the degraded forest areas the objects of management have been enunciated as follows:

- i) to rehabilitate and regenerate the degraded forest areas,
- ii) to check soil erosion,
- iii) to maintain an optimum level of carrying capacity in the forests,
- iv) to protect the forests and
- v) to utilize the degraded forest areas for productive purposes in order to meet the demand for fuel, fodder and timber and ultimately achieving the integrated development of the adjoining villages with the help of other development agencies.

18.7.7 In areas where the villagers are willing to participate in Joint Forest management plan, the concerned territorial Deputy Conservator of Forests shall prepare a micro-plan for the area to be tackled as provided in the Govt. of Maharashtra Resolution dated March 16,1992. The Micro Plan prepared for the particular village shall coincide with the prescriptions contained in Working Plan in so far as the village is concerned. The micro plan shall be sanctioned by a committee headed by Conservator of Forests.

18.7.8 The execution of works and control shall be exercised strictly in accordance with the guidelines issued by the Govt. of India, Ministry of Environment & Forests letter No. 6-21/89-F.P. dated June 1, 1990 and Govt. of Maharashtra Resolution No.SLF-1091/C.N.119/F-11 Mantralaya, Mumbai dated March 16,1992 as also the various guidelines, circulars and Resolutions issued by the Govt. of India in Govt. of Maharashtra from time to time and as are applicable to the state of Maharashtra.

18.7.9 The micro plan and the Joint Forest Management Scheme shall be implemented through Forest Department or any other agency approved by the Government of Maharashtra.

SECTION—8 : ARTIFICIAL REGENERATION :

(1) PLANTING OF TEAK AND MISCELLANEOUS SPECIES :

18.8.1 In the areas suitable for planting teak and miscellaneous species, planting will be done in the year following the year of main felling. Teak will be planted through stumps and miscellaneous species will be planted through polythene bag plants. The details of various works will be as follows :-

18.8.2 (i) **PREMONSOON WORKS** : They will be carried out in the year of main felling alongwith the felling. They will include following works :

18.8.3 (ii) **FENCING** : The whole coupe if 70% area is to be planted, otherwise compartment will be taken for fencing T.C.M. of standard cross section of 1.90 m x 0.60 m x 1.0 m will be dug where the boundary runs along the contour. No T.C.M. will be dug when the boundary of the coupe runs across the contour or inside the compartment. In that case, live-hedge fencing will be taken. Live hedge fencing

will consist of two outer rows of agave 50 cm apart and 3 inner rows, 50 cm apart, on which sowing of seeds of fast growing thorny trees like *Acacia senegal*, babool etc and planting of cutting of shrubs like vitex, dodonea etc will be done after the monsoon.

18.8.4 (iii) PIT DIGGING : For planting of miscellaneous species pits of size 30 cm x 30 cm x 30 cm will be dug. The dug up soil will be kept on the upper side of the slope. The pit digging will be completed upto March and the soil will be allowed to weather during summer. Pit filling will be done at the end of May. The number of plants of teak and miscellaneous species will be 2500/ha. In the high rainfall areas, pit planting has been prescribed.

(2) NURSERY :

18.8.5 (i) TEAK : Teak stumps will be prepared from one year old seedlings raised in the beds as per standard nursery technique. The stumps should not be below thumb thickness.

18.8.6 (ii) MISCELLANEOUS PLANTS : The miscellaneous plants will be raised in the polythene bags. The standard size of the polybag plants suitable for planting will be when the collar of the plant is approximately thumb thick and is woody in appearance. The height of the plants will vary from species to species. To achieve the optimum sized poly-bag plants, the nursery work will be started latest by October in the previous year of planting. The polythene bags will be done every 15 days, once the height of plants reaches ten cm. Care will be taken that each bag contains only one seedling. During the shifting the bags will be arranged in descending order of plant heights. Suitable fertilizer preferably urea with high nitrogen content and manure will be given to the plants at regular intervals. Before planting, the planting stock will be examined by an ACF and he will certify the suitability of the planting stock. The nursery technique has been described in detail in the chapter on Nursery Techniques in this Plan.

18.8.7 (a) FIRST YEAR OPERATIONS : As soon as the monsoon starts, seed sowing in 3 rows for live hedge fencing, described earlier, will be done by raking the soil along the line 10 cm deep. Planting of agaves on the outer two rows of live hedge fencing at a spacing of 50 cm and planting of shrub cutting on the inner 3 rows, will be done. Teak stump planting in crow bar holes and poly-bag planting in pits will also be done along with the planting on live hedge. The polythene bags will be planted in such a manner that their collars are at the ground level and it will be covered with soil upto a height of 5 cm above collar. All these operations will be completed in not more than 15 days after the break of monsoon.

18.8.8 (b) SUBSEQUENT OPERATIONS : Immediately after the completion of planting, first weeding will be started. Casualty replacement will be done along-with the first weeding. Second and third weeding will be done in the month of September and October respectively. The last weeding will include soil working and mulching to reduce the evaporation losses. One more soil working may be done in the month of January, if there are Winter rains, subject to the availability of funds. Weeding and soil working to the seedlings on live hedge will also be done in order to enhance their growth and survival.

18.8.9 In the second year of plantation, casualty replacement will be completed soon after the start of monsoon. Two weeding will be carried out in the month of August and October respectively. Soil mulching will be carried out at the time of second weeding. Debudding of teak plants will be one in the month of April/May.

In the third year one weeding with soil mulching will be carried out in the month of September. Debudding will be done as in second year.

(3) BAMBOO PLANTING :

18.8.10 Bamboo will be planted, at a spacing of 6m x 6m, in the fourth year from the year of main felling. The details of various works will be as follows:

18.8.11 (i) PREMONSOON WORKS : They will be taken in the third year from the year of main felling. Pits of size 45 cm x 45 cm x 45 cm will be dug before March. The dug up soil will be kept on the upper side of the slope. The pits will be filled in the following year before the onset of monsoon.

18.8.12 (ii) NURSERY : Two years old bamboo seedlings with well developed rhizomes will be used for planting. The best method for preparing the good seedlings will be by establishing rhizomes bank at suitable sites in each range. Bamboo seeds will be sown in beds of size 12 m x 1.2 m x 0.3 m, two years in advance of planting. In the month of February and March of the year of planting, the seedlings from the beds will be transplanted into polythene bags after cutting their branches above 3 to 4 nodes. They will sprout within 15 to 20 days. After sprouting, suitable fertilizers will be given to get the vigorous growth. The naked rhizome will not be planted.

18.8.13 (iii) FIRST YEAR OPERATION : At the onset of the monsoon, the polypot seedlings will be transported to the planting site and will be planted in pits. At the time of planting, suitable fertilizers and insecticides will be given to each plant in the pits. Casualty replacement will be done at the end of July or in the first weed of August, Three weeding and soil working will be done.

18.8.14 (iv) SUBSEQUENT OPERATIONS : Casualty replacement and two weeding with soil working will be done in the second year. One weeding and soil working will be done in the third year. Insecticides will be used if there is termite attack.

SECTION-9: SOIL AND MOISTURE CONSERVATION WORKS:

18.9.1 With the increase in biotic interference in the forest areas, the forests are becoming degraded. The annual fires are enhancing this process. As a result of this, the forest floor is becoming compact and is being exposed to sun and rain, thus becoming vulnerable to erosion. The areas adjoining to human habitation, specially the protected forests, have become devoid of vegetation by way of illicit cutting, heavy grazing and repeated fire. The soil erosion has increased in these areas. In the worked coupes also soil conservation works are, generally, not taken. This also makes them vulnerable to erosion. The intensity of rainfall varies. The greater intensity of rainfall increases the run off from the forest floor. The rain water washes off along with it the exposed top layer of the soil. The compaction of soil reduces percolation and water holding capacity of the soil. This decreases the sub-soil water

level. Extensive silvicultural works have been prescribed in this working plan. In order to ensure the success of these works in improving the forest, soil and moisture conservation works are of prime importance. Unless they are taken, the quality of the forest can not be improved in long run. They will include two main operations namely, contour trenching and nala bunding/check dams.

(A). CONTOUR TRENCHING :

18.9.2 Continuous contour trenches will be taken all over the coupe, due for working, where the density is below 0.4. In areas above 25 degree slope trenches will be dug in accessible area only. The cross section of the trenches will be 45 cm x 30 cm. The soil from the trenches will be heaped on the lower side of the trenches. The boulders from the trenches will also be neatly stacked on the lower side. Grass tussocks planting, sowing of seeds of grasses and local tree and shrub species and planting of cuttings of vitex, dodonea, ipomea and bulbils of agaves will be done on the heaps of the soil for its stabilization. The contour interval between the consecutive trenches will be 1.5 m. Depending upon the slope, the distance between the two consecutive trenches will vary. In order to bring the uniformity in working the distance between consecutive trenches is given in Table below:

18.9.3 However, the actual spacing is to be determined after getting treatment map and doing the following calculations.

$$\begin{aligned} \text{If } a &= \text{Average annual rainfall in mm in a year.} \\ b &= \text{Rainy days in a year.} \\ c &= \frac{a}{b}, \text{ the average rainfall per rainy day in mm.} \\ \text{then } d &= 10c, \text{ is the rain fall in cubic meter/rainy day/hectare.} \end{aligned}$$

For the trench of size = $0.6 \times 0.3 = 0.180$ Sq.mt., the length of trench in meter per hectare required to absorb water pouring per rainy day per hectare completely can be calculated as follows :

$L = d/0.18$ in mt. And accordingly the distance between two consecutive lines can be determined. Taking an example of one hectare the distance between consecutive trenches come to $10,000/L$ in meter.

TABLE – 86

Slope in degree	Distance between consecutive trenches.
Upto 15	8 m
15 to 25	5 m
Above 25	3 m

18.9.4 The trenches near the nalas will be discontinued and will be curved upwards, on both sides of the nala, at an angle of 45 degree. This will prevent the run off of water, stored in the trenches, into the nala. The curved portion will be of 5

m. length on either side of the nala. The alignment of contour trenches may be done by a simple frame called "A" frame made of bamboo. The details of this frame is given in **Appendix No. LIII.**

(B) NALA BUNDING/CHECK DAMS :

18.9.5 The basic aim of nala bunds or check dams will be to reduce the run off and to arrest the silt. Nala bunding will start from the top of nala downwards. The entire catchments will be treated in a sequence. The design of the nalla bunds will depend on the intensity of the rainfall and the total run off by using Dunken's Formula. The nalla bund will be so constructed that the weight of the bund will be more than the force of the water. Nalla bunds/check dams will be prepared from the loose boulders found in or around the nala bed. No digging or blasting will be done. Where sufficient boulders are not available brushwood can also be used. Nala bunds will be prepared on nalas upto 8 m bed width. Beyond that these structures will not be useful and permanent engineering structures will be required. These structures are not being prescribed here. For the design of nala bunds, the nalas have been divided into three categories, namely (i) upto 4 m bed width (ii) between 4 m to 6 m bed width and (iii) between 6 m to 8 m bed width. The details of structure of nala bunds is given in **Appendix No..LIV.**

- i) Nala bunds should be started from one side of the bed.
- ii) Semi circular boulder pitching should be done on the top of the bunds, so that the stones are compact and are not washed away by water.
- iii) The batter on upstream and downstream should be 2/1 and 1/1 respectively.

The distance between the successive bunds will be such that standing on the site of lower bund the base of upper bund should be in line of eye sight of the person, standing on the nala. For general guideline the distance between successive bunds for different slopes will be same as that for contour trenches. The height of nala bunds shall be more than the maximum level of water flow and the nala bunds will be gabian structure.

C) SEDIMENTARY SILTATION TANK (VAN TALAV) :

The sedimentary siltation tank of size not exceeding two hectares of submergence will be constructed at suitable places in accordance with the guidelines issued by the Govt. of Maharashtra in this behalf.

D) BHOOMIGAT BANDHARA :

A large amount of water flows below the surface and to check this flow of ground water it is essential that Bhoomigat Bandharas are constructed as such intervals at suitable places that the flow of ground water is arrested. For the construction of Bhoomigat bandhara, the black cotton soil one meter deep is put horizontally in the nalla, which swells considerably after absorbing the water and thus prevents the flow of water.

SECTION – 10: GRAZING CONTROL :

18.10.1 The success of regeneration will depend upon the effective control on grazing and protection from fire. The cattle population in the villages around the forest area is very large. Due to large population of cattle, the forests are subjected to heavy grazing. Further the cattle population is not uniformly spread over all forest areas, therefore, some areas are more vulnerable to grazing.

18.10.2 A functional classification of the forest is given in section 2 of chapter I, Part II as enunciated in the grazing policy formulated by the Govt. of Maharashtra vide its resolution No. MFP-1385/132211-Y, dated 8-12-1968. Grazing will be controlled as per the prescribed grazing incidence for each class of forest in the interest of forests and pasture. As per the provisions contained in A-259 of B.F.M. Vol.II, Part VI, coupes can be closed to grazing for a period upto 10 years or more where it is difficult to get successful regeneration in shorter period. The grazing settlement has been carried out only in Reserved Forest where the rights have been settled, but no settlement has been done in Protected Forest.

(1) SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

18.10.3 As per functional classification, this working circle comprises of tree forests and the maximum incidence of grazing prescribed for it is 1.2 ha per cattle unit. All main felling coupes will remain closed to grazing for a period of 5 years from the year of main felling. Thus with a felling cycle of 20 years, 5/20th or 1/4th area will remain closed to grazing at any time after 5 years from the commencement of this plan.

(2) IMPROVEMENT WORKING CIRCLE :

18.10.4 This working circle comprises of minor and degraded forest and the maximum incidence of grazing prescribed for it is 0.8 ha per cattle unit. All main felling coupes will remain closed to grazing for 5 years from the year of main felling. Thus with a felling cycle of 20 years, 5/20th or 1/4th area will remain closed to grazing at any time after 5 years from the commencement of this plan.

18.10.5 Thus as per the prescriptions of the working plan 150348 cattle units can graze in the forest area at any time. The remaining cattle can be accommodated by taking the fodder development works in the community lands in these villages with the help of Social Forestry Department, village Panchayat, Forest Protection Committee or voluntary agencies. At the same time the villagers will be persuaded to stall feed their cattle, the grass for which will be allowed to be removed from the closed coupes. They will be made aware of the ill effects of excessive grazing on the forest growth. Besides, the staff should have dialogue with the local villagers to discuss the issue. The Deputy Conservator of Forest should think for rotational grazing in areas, which are not due for working. The experiment of silage preparation should be conducted and through this, staff feeding should be advocated. The preparation of silage will solve the problem completely. People should be motivated for rearing cattle in less number but of better breed to have better return and less problem.

18.10.6 Grazing rules made applicable vide Govt. of Maharashtra Revenue and Forest Department Resolution No. MFP-1371/237035-Z, dated 3rd November, 1973 is given in **Appendix No. XXVII.**

SECTION – 11: ILLICIT CUTTING :

18.11.1 Though there is no problem of large scale organised illicit cutting, except in areas adjoining to village, but the large consumption of forest produce by the local people, as described above, has put tremendous pressure on these forests. This has resulted in deterioration of forests adjoining to the villages. For effective control on illicit cutting two mobile units, consisting of 1 R.F.O., 4 foresters and 8 forest guards each with one vehicle are proposed. These units will continuously patrol the forest areas vulnerable to illicit cutting.

18.11.2 The Government vide letter No. TRS 1087/102380/F-2 R & F.D., dated June 18, 1981 has stated that all illicit cutting valuing Rs. 25,000/- and more at place should be reported to the Government, the Chief Conservator of Forests and the Conservator of Forests by the Dy. C.F. within three days of the receipt of the report of the R.F.O.

18.11.3 The following time schedule has been prescribed for inspection of illicit cutting area by the respective officers :

TABLE - 87

Sr.No.	In situ value of illicit cutting at a place	Designation of the Inspecting Officer.	Period within which inspection should be completed.
1	2	3	4
1	Upto Rs. 25000	R.F.O.	3 days from detection/receipt of intimation of detection.
2	Above Rs. 25000 but not exceeding Rs. 1,00,000	A.C.F.	3 days from the receipt of information.
3	Above Rs. 100000 but not exceeding Rs. 500000	Dy, C.F.	3 days from the receipt of information.
4	Above Rs. 500000	C.F.	7 days from the receipt of information.

18.11.4 Vide letter No. TRS-1082/36/F-6, dated September 8, 1982 the Government has stated that the offence above Rs. 2000/- should be necessarily brought to court for prosecution, unless the prosecution is difficult to succeed. The Govt. of Maharashtra, vide its Revenue & Forest Department Resolution No. TRS-06/2001/CR209/F-6, dated 08/05/2003 has revised its earlier circulars and has approved fresh directives for the forest protection which are given in **Appendix No. LV.**

SECTION 12 : BEAT CHECKING :

18.12.1 To ensure strict protection of forest, it is imperative that the protective staff vigilantly patrol the forest entrusted to their care and the officers concerned exercise effective supervision and control at all levels. It is of the essence that every forest offence is reported with the utmost promptitude whether the offender therein is apprehended or otherwise and whether the forest produce involved therein is recovered or not. As per the standing order 37, Chapter IX, instructions issued for guidance and strict compliance with a view to tighten up the measures in regard to effectual protection of forests are as follows :

18.12.2 The primary responsibility of forest protection devolves on the protection staff, which generally detects and reports the offence. The duties and responsibilities in regard to each category of the staff are broadly specified as below

BEAT GUARD : Every guard must patrol his beat regularly. He will thoroughly inspect the entire forest within his charge every fortnight and issue P.O.R. for all the damage detected in each beat within the first instance.

ROUND OFFICER : Each Round Officer will inspect each beat once in three months. He should verify and enumerate the damage not reported by the beat guard. He will timely submit the report of each area inspected to the Dy. C.F. through the Range Forest Officer.

RANGE FOREST OFFICER : It is the prime responsibility of the R.F.O. to ensure that round officers and guards carry proper patrolling of the forests. He should endeavor to inspect a specific portion of the beats covering at least the 1/4th area of the beat once in six months and report should be submitted to the Dy. C.F. punctually. In case of extensive illicit felling he will take prompt measure to inspect the beat thoroughly.

GAZETTED OFFICERS : Gazetted Officers, during their tours, must inspect specific areas vulnerable to illicit felling. At least one day in a fortnight should be devoted to check the illicit fellings, apart from normal inspection.

SECTION -13 : TRANSIT RULES FOR FOREST PRODUCE :

18.13.1 The transit of forest produce is regulated as per the Bombay Transit of Forest Produce Rules, 1960, which were published by the Agriculture and Forest Department under No. IFA-1057/22947-(VI)-J, dated April 23, 1960.

18.13.2 The Government of Maharashtra vide Notification No. TRS/1083/91822 (ii) CR-87/F-6, dated May 13, 1985 has amended Section 61 of Indian Forest Act, 1927 making the law more stringent. It has authorised certain officers to be called as authorised officer for the purpose of this Act, who will be competent to confiscate the vehicle involved in offence related to the illicit removal of timber and firewood.

18.13.3 To facilitate the issuing of passes, the Government vide TRS/1089/PK-267/89/F-6, dated May 14, 1990 has stated that the decision regarding the issue of passes, to an applicant should be taken within 45 days of the submission.

SECTION -14 : SAW MILLS:

18.14.1 The following are the rules regarding Saw mill given in Bombay Forest Rules, 1942 and revised upto date.

(1) Prohibiting conversion of timber within certain distance of forests :

- (i) Within the limits of any Reserved or Protected Forests (whether in charge of the Forest or Revenue Department) or of any land in respect of which a notification under section 4 of I.F.A. 1927 declaring that is has been decided to constitute such lands Reserved Forest has been issued, and within one mile of such limits, no person shall establish a saw pit for cutting or converting of timber or manufacture charcoal without the previous sanction, in writing of the Range Forest Officer.
- (ii) Within the limits of any Reserved or Protected Forests, or of any land referred to in clause (1) and within 80 Km of such limits, no person shall erect or operate any machinery or saw mill for cutting or converting of timber, without obtaining a license in that behalf.

(2) Any person desiring to establish a saw-pit or manufacture charcoal under clause (i), of sub-rule (1) shall make an application in that behalf to the Range Forest Officer and the Divisional Forest Officer, respectively.

Provided that where within a period of one month from the date of application the application the applicant fails to receive the sanction under clause (i) of sub-rule (1), the applicant may proceed to establish the saw-pit or to manufacture charcoal, but not so as to contravene any of the provision of the Act or any Rules made thereunder.

(3) On receipt of an application under sub-rule (2) the Range Forest Officer, or as the case may be, the Divisional Forest Officer shall make such enquiry as he deems fit and after satisfying himself on the question whether or not there would be any objection to granting the sanction or license applied for, having regard to safeguarding the timber in any Reserved or Protected Forests or in any land referred to in sub-rule (i), may grant the sanction or license in the form in Schedule-E subject to the conditions set out therein, or refuse to grant the sanction license.

(4) Every license granted or renewed under this rule shall, subject to the provision contained in this rule regarding cancellation, be effective for a period not beyond the day of December 31 from next following the date of its issue or renewal.

(5) The Divisional Forest Officer may, on application made to him, renew the license issued under sub-rule (3) with effect the date of its expiry.

(6) An application for renewal of a license shall be made before the expiry of the period of the license and failure to renew will render the licensee liable to punishment for operating the saw mill without a license.

(7) Notwithstanding anything contained in the foregoing sub-rules, the Divisional Forest Officer, may where he has reason to believe a licensee is operating

the saw mill in contravention of the provisions of these rules and conditions of the license or the licensee is indulging in activities prejudicial to the interests of the forest conservancy, at any time, revoke the license granted under this rule.

(8) Where the Divisional Forest Officer refuses to issue, or renew, or revokes, a license granted under this rule, he shall do so by an order communicated to the application or holder, as the case may be, giving reason in writing for such refusal or revocation.

(9) Any person aggrieved by an order made under sub-rule (8), may, within thirty days of the service on him of the orders, appeal to the Chief Conservator of Forests who shall decide the appeal after giving such person and the Divisional Forest Officer making the orders, an opportunity of being heard, and the decision of the Chief Conservator of Forests shall be final.

(10) Nothing contained in this rule shall apply to the ordinary operations of domestic carpentry or to other similar works on a small scale.

18.14.2 Subsequently, the State Government has issued amendment vide notification No. SWM.1081/106836/F-6, dated 16th July, 1981, the state Government put a ban on issue of new license. However, if the applicant has already spent the money and completed the formalities, the licenses can be issued vide SWM 1081/106836 (A)F-6, dated August 18, 1981. The licenses of saw mill can be suspended for three months. Saw mills are required to maintain three registers by the Government Orders No. SWM-1082/CR-20/F-6, R & F. D. dated February 22, 1984 in F.No., I-intake, F.N.2-out-turn, F.No.3-disposal. Vide SWM 1082/2590/CR/F-6, dated December 17, 1986, no saw mill can operate after sunset to sunrise without the written prior permission of the Divisional Forest Officer. The Govt. vide letter No. TRS 1081/102380/F-2. R. & F. D. dated July 18, 1981 has laid down the inspection norms of saw mills by the officers or various ranks. The Range Forest Officer is to inspect-twelve, the Asstt. Conservator of Forests-6 the Divisional Forest Officer-3 and the Conservator of Forests-1 saw mills in a month.

18.14.3 Section 129 Bombay Forest Rules, 1942 states that who so ever contravenes the provisions of Rule 88, shall be punishable with imprisonment for a term which may extend to six months or with fine which may extend to five hundred rupees or both.

SECTION-15 : CHARCOAL KILNS :

18.15.1 No permission to manufacture charcoal to the private person will be given in the Reserved or Protected Forests or in private areas upto 1 km from the boundaries of the forests.

SECTION -16 : ENCROACHMENTS :

18.16.1 The problem of encroachments around the villages is prominent. The proper and correct demarcation and maintenance of the boundaries between Revenue Land and Forest Land is one of the main reasons of encroachments. A special scheme is required to be launched to demarcate Protected and Reserved Forests properly. The maintenance of the boundary will be emphasized. The beat guards will be provided beat maps along-with the instructions in vernacular

language. Records of encroachments will be made compartment-wise in the compartment history forms and will be shown on the map also.

18.16.2 The encroachment on forest land between 1972 to 78 are to be regularised by the Government vide two resolution R & F.D. LEN/1078/3483-G-I, dated December 27, 1978 and R & F.D.-FLD-1079/1366-F-3 dated September 12, 1979. The present Government policy is very clear vide two resolutions R & F.D. No. FLD-1078/144074-F-3, dated March 5, 1980 by which any illegal construction of hut on the forest land should be removed immediately and FLD-1087/PK-397/F-3, dated July 14, 1987 stating that encroachment not likely to be regularized and taken place after March 31, 1978, should summarily be removed. There is a need for a stringent measures against the encroachers. The Govt. of India has now issued the instructions that all encroachments after 1980 shall be removed summarily by 30th September,2002.

18.16.3 Eviction of encroachment - The Govt. of Maharashtra has conferred the power of section 53,54, and 54-A of Land Revenue Code-1966 to Forest Officers for the purpose of removal of encroachments. According to section-262 of Cr.P.C. the offences having penalty upto one year can be tried summarily by the Court and encroachment cases should be dealt accordingly.

SECTION 17 : USE OF HAMMERS.

18.17.1 The territorial Conservator of Forests shall issue guidelines and circulars regarding the shape and size of various types of hammers which will be used for the following works.

- i) Marking of coupes.
- ii) P.O.R. case material to be marked by Forest Guard.
- iii) P.O.R. case material to be marked by Foresters/Round Officers.
- iv) P.O.R. case material to be marked by Range Forest Officers.
- v) P.O.R. case material to be marked by Asstt. Conservator of Forests.
- vi) Marking of material from Jungle Depot to Coupe Depot.
- vii) Marking of material from coupe depot to sale depot
- viii) Marking of sold material.
- ix) Marking of malki materials/ timbers by A.C.F.

SECTION- 18 : SCHEDULE OF RATES FOR OFFENCE

CASES MATERIAL.

18.18.1 The Conservator of Forest (Territorial) shall in the beginning of the financial year circulate the schedule of rates for offence cases material to all the Dy. Conservator of Forests (Territorial) in his circle.

SECTION - 19 : .WORKING PLAN NOTE.

18.19.1 At end of the working plan period working plan note shall be prepared by the Conservator of Forests (Territorial) in consultation with Dy. Conservator of Forests (Territorial) of the concerned division and the note shall be forwarded to the Dy. Conservator of Forests, Working Plan Division for preparation and revision of the working plan of the forest division.

SECTION- 20 : MARATHI TRANSLATION OF THE WORKING PLAN.

18.20.1 The territorial Conservator of Forests, shall entrust the works of translation of current working plans of the division in marathi language to the Assistant Conservator of Forest of the concerned division for supplying a copy of the marathi translated working plan document to the local field staff of the division and no deviation in this regard shall be accepted.

SECTION -21 : DEVIATIONS :

18.21.1 (A) The following works will not constitute as deviation from the plan.

- (i) Removal of dead fallen firewood.
- (ii) Petty fellings carried out as mentioned in para under irregular harvesting.

(B) The following works will constitute a deviation from the working plan.

- (i) The felling and disposal of forest produce from submergence areas of dams, tanks, canal sites, road sides and other cases coming under the purview of the Forest Conservation Act, 1980. The sanction to it will be obtained.
- (ii) All other deviations can be classified into following two categories as per draft amendment to article 191 and 192 of working plan code vide Agriculture and Forest Department Govt. Resolution No. FWP-1062/5625 (ii)-J, dated May 25, 1962.

(1) Deviation which would seek to alter the schedule of working given in the working plan, the examples of which are :

- (i) Both non-working of coupe in the prescribed year or working the coupe in the year not prescribed by the plan.
- (ii) Changes in the areas of coupe on account of disforestation or undertaking areas for execution of any special scheme under plan programme and

(2) Deviations which would involve alteration in the silvicultural treatment, for example:

- (i) Stopping or curtailing fellings for planting because of shortage of labour, funds, material for plantation work, or unsuitability of terrain and soil for undertaking plantations to the extent prescribed by the working plan.
- (ii) Extensive felling of dry trees killed by fire, fungus, insect attack or other natural calamities.
- (iii) Felling of unusual size and extent for special departmental works.
- (iv) Special fellings to meet a sudden new demand of a particular industry.
- (v) Felling involving modifications in the prescribed marking rules.

The sanction to all these deviations will be obtained. Application for sanction to such deviation will be submitted sufficiently in advance, so that such may be received as far as possible before the deviation occurs and without fail before the annual list of deviation is submitted along with the control forms.

(C) PROCEDURE FOR OBTAINING SANCTION FOR DEVIATION

18.21.2 All deviation proposals require the approval of the Director General of Forests as per instructions contained in Govt. of India, Ministry of Agriculture No. 6-14/84/FRY(W.P.) dated August 23, 1984.

18.21.3 The Dy.C.F. territorial will submit 8 copies of the deviation proposals to the Conservator of Forests through the Dy.C.F., Working Plan, who on scrutinizing the proposals will forward them to the Conservator of Forests of the territorial circle with his opinion and report as to the manner the departure decided upon should be recorded. The Conservator of Forests will then pass on the proposals to the Chief Conservator of Forests through the Conservator of Forests, Working Plans Circle with his remarks.

18.21.4 The Government of India has created a working plan cell in the Ministry of Environment & Forests under the Director General of Forests. This cell has to be associated while considering any deviation from the prescriptions of the approved working plans and this deviation will be allowed only after obtaining the approval of the Director General of Forests. All proposals for deviations must be entered in a Register of Deviation maintained by the Division office. The proforma for submission of deviation proposals is given in **Appendix No.LVI**.

SECTION -22 : IMPLEMENTATION OF WORKING PLAN.

18.22.1 The territorial Conservator of Forests shall ensure that the prescriptions of the working plan are meticulously implemented by the territorial Dy. Conservator of Forests and the works shall be inspected as under.

Conservator of Forests	2 %
Dy. Conservator of Forests	5 %
Asstt. Conservator of Forests	20 %

Range Forest officer, Forester & 100%
Forest Guards.

18.22.2 The norms for inspection of works shall be in consonance with various standing orders and circulars issued by the Government of Maharashtra and the Department in this behalf. The responsibilities for any lapses shall be fixed by the disciplinary authority in accordance with law. The Conservator of Forest (Territorial) shall be the competent authority to decide any technical matter prescribed under the working plan and he will guide the subordinates in all such matters.

SECTION -23 : TRIBAL WELFARE :

18.23.1 To ensure a proper environmental and ecological balance, it is essential that the cultural survival and socio-economic well being of tribal is well taken care of. Unless it is done all attempts aiming at protection of forests shall be futile. Thus to ensure this, it is essential that the social and economic stability of tribal through forest based industries/programme, safeguarding their genuine domestic needs of forest produce like bamboo, firewood and constructional timber, is under taken by the forest department. All activities of minor forest produce enshrined in Non-Timber Forest Produce Working Circle will beset up for tribal through forest department. Besides, the tribal can also be encouraged for collection of other minor forest produce which have not been covered under NTFP Working Circle.

SECTION 24 : PRIVILEGES AND CONCESSIONS FOR FOREST PRODUCE :

18.24.1 As per the National Forest Policy of 1988, the first charge on the forest produce is that of tribal and other villagers living in and around the forests. Accordingly, the forest produce obtained from the forests will first be supplied to the local people at the rate fixed by the Conservator of Forests. The arrangement for supply of material will be made in such a way that the people should get the material within a radius of 2 km from their inhabitation. Only the surplus forest produce or the forest produce which is not required by the local people ;will be sold in open auction.

SECTION - 25 : BAMBOO HARVESTING OUTSIDE BAMBOO WORKING CIRCLE.

18.25.1 The bamboo clumps existing outside the bamboo overlapping working circle should be harvested from time to time for nistar supply or for departmental use or for sale by auction or tender. Such bamboo clumps shall be harvested as per directions issued by the concerned territorial Conservator of Forests.

SECTION - 26 : BAMBOO PLANTATION.

18.26.1 Bamboo is a poor man's timber and therefore bamboo plantation must be encouraged all over the division wherever possible and the produce obtained from such areas should be made available to the local people and burads for construction and other cottage industries purposes

18.26.2 In Allapalli Forest Division, the tribals prepare bamboo mats and other articles to earn their livelihood. Bamboos are required by agriculturists also. Their requirements are fulfilled through departmental working of nistar coupes. However,

in the present working plan the requirement is to be met for the supply of bamboos by the agency, who will work. Nistar has now been extended to Reserved Forest also.

SECTION -27 : SMALL TIMBER, POLES AND FIREWOOD :

18.27.1 Small timber and poles for agricultural purposes and repairs to houses and firewood for domestic use will be supplied from the depots at concessional rates, depending upon the availability of these produce. Depots will be opened at suitable places, throughout the division, so that people have to go to minimum possible distance to procure these produce. Range, round or beat head quarters will be chosen for this purpose, so that supervision and maintenance of these depots becomes convenient.

SECTION- 28: REMOVAL OF EDIBLE FLOWERS, FRUITS, SEEDS AND OTHER MINOR FOREST PRODUCE.

18.28.1 Collection of moha flowers and seeds, charoli, tendu fruits, bor and other minor forest produce may be allowed free to tribal and local villagers for their consumption. However, no forest produce will be allowed to be removed free for commercial purpose. During collection of any produce, no felling or hacking of trees will be allowed.

SECTION-29 : FORESTRY EXTENSION.

18.29.1 In order to promote the forestry activity in the division, the forestry extension programme should be taken up by concerned territorial Dy. Conservator of Forests and regular awareness camps at regular intervals all over the division should be taken up with the active participation of local people, gram panchayats and voluntary agencies and the benefits of forestry and forest conservation should be explained to the local people through radio program poster presentation, nature walk and nature studies, forestry lectures, T.V. program etc.

SECTION - 30 : WATER SUPPLY :

18.30.1 Due to erratic rains, water scarcity is felt in the summer during the year in which rainfall is scanty. At some places shortage of drinking water occurs. Adequate arrangements are needed to supply drinking water to staff at such places. The nurseries will be located at such places, where the water availability is sufficient. The augmentation of water supply can be thought of by constructing anicuts at suitable places. Besides, deepening of the existing wells and creating tubewells by using modern machinery available can also be thought of.

SECTION- 31 : CAMPING SITES :

18.31.1 No camping site for the harvesting purpose or for any other produce should be permitted within half a kilometer radius of the existing waterholes. The exhaustive list of such waterholes shall be prepared and maintained at divisional level and the copy of the same shall be provided to the Deputy Conservator of Forests, Working Plans-II, Chandrapur for record.

SECTION-32 : RAIN-GAUGE AND TEMPERATURE RECORDING STATIONS :

18.32.1 Aheri tahsil have facilities for recording rains and temperature. There is no recording station in the interior. It is, therefore, recommended that the rain and temperature recording instruments should be installed at least at Range Headquarters where the forest staff can be trusted with the working of recording the same

SECTION – 33 : BUILDINGS :

18.33.1 The details of buildings are given in **Appendix No .LVII.**

SECTION – 34 : ROADS ,CART TRACKS AND CULVERTS :

18.34.1 The details of roads, cart tracks and culverts are given in **Appendix No.LVIII.** The construction of new roads on the forest lands is not permitted under the Forest Conservation Act , 1980. However, Govt. of India vide recent instructions has permitted the construction of single width road on the forest land by the forest department.

SECTION – 35 : ESTABLISHMENT AND LABOUR :

18.35.1 The forests of the Division are more or less compact and there is no organized illicit felling in this area. However, for better control of all working plan operations, the R.F.Os. and subordinates shall be properly placed. The Dy.C.F. Territorial will fix the headquarters of subordinates staff, according to work load.

(a) Beat Norms :-

- (i) 400 to 800 ha. where the areas with more population, well connected adjoining to cities and industries.
- (ii) 800 to 1100 ha. for other areas.

(b) Round Norms :-

- (i) 2000 – 3000 ha. for populated areas and average area fixed is 3000 to 4000 ha.

(c) Range Norms :-

- (i) 180 to 225 sq. km. in less populated areas.
- (ii) 95 to 150 Sq.km. in thickly populated areas.

18.35.2 As per these norms the number of ranges round and beats will be increased and the existing staff is not sufficient for execution of works. The reorganization of ranges, round and beats is required because some of the areas have been transferred to FDCM and their beat guards are left with no work and therefore the services of these guards may be utilized elsewhere where the beats are vacant for want of postings or new appointments.

SECTION- 36 : MAINTENANCE OF LAND RECORDS :

18.36.1 The land records shall be maintained which will constitute the procurement of

1. 7/12 record of all survey numbers belonging to forests.
2. Village maps on 16"-1Mile and 1:5000 scale of either Ekatrikaran or Punarmojani whichever is later and rectified later.
3. A comparative chart of three surveys i.e. Jamabandi (1911-1921), Punarmojani and Ekatrikaran and difference in area of forest survey numbers in each survey.

SECTION-37 : MUTATION OF LAND RECORDS :

18.37.1 The 7/12 extract of record of right shall be mutated in favour of forest department, where not done earlier. This will prevent any unlawful diversion. In each 7/12 , the following entries will be recorded (in Seven).

Govt. of Maharashtra (महाराष्ट्र शासन)

Forest Department (वनविभाग)

Reserved/Protected Forest (रखीव / संरक्षित वन)

The above entries shall be in a manuscript and no stamps should be used to show these descriptions.

SECTION-38 : TRANSFER OF FOREST LAND TO FOREST DEPARTMENT FROM REVENUE DEPARTMENT:

18.38.1 The transfer of forest land to Forest Department according to statistics, there are still large number of forest areas with Revenue Department, even though State Govt. has issued instructions in 1976 to hand over them to Forest Department. An early action in such matter is required.

SECTION-39 : ABOUT PROTECTED FORESTS , LAND ACQUIRED AND UNCLASS FORESTS:

18.39.1 There is 23533.290 ha. protected forest and 13409.290 ha. un-class land acquired in this division. The compartment numbers have been given to these areas in alpha numeric characters, according to the instructions issued by Chief Conservator of Forests (Production) . Statement showing range, villages & Survey no. wise protected forest is given in **Appendix No.LIX**. The Un-class forests to be taken over from revenue shall be measured after survey and the process of notification of forest as to reserved forests or protected forest shall be completed.

SECTION-40 : MAINTENANCE OF MAP:

18.40.1 The fresh 6 sets of maps (4"=1 mile scale) have been prepared. The distribution of these sets as per standing order No.55 issued by Conservator of Forests, working plan circle, M. S. Pune's No.RS/III/11/1089/75-76 dated 14th August-1975 is as follows-

18.40.2 Map Sets for the Deputy Conservator of Forests working Plans Division.

Rough Set indicating stocking details-

- i) One uncut and mounted set showing the existing compartment boundaries for showing stocking details,

Master Sets

- ii) One uncut and mounted fair set indicating stocking details.
- iii) One uncut and mounted set showing the compartments, coupes, felling series, working circle, Range boundaries and other management details.

18.40.3 Map sets for the Deputy Conservator of Forests (Territorial)-

Management Map

- i) One uncut and mounted set showing the compartments, coupes, felling series, working circles, Range boundaries and other management details.
- (ii) One cut and mounted set showing management details.
- (iii) One cut and mounted set showing management details for distribution amongst R. F. O's.

18.40.4 Any alteration in the map due to afforestation and disforestation will be shown on the uncut set. In addition following copies of management maps, reference maps and grazing maps on 1:50,000 scales are prepared.

The distribution of these maps is as follows-

18.40.5 Management maps-

- 1) Conservator of Forests, working plans circle Nagpur-1 copy.
- 2) Conservator of Forests, North Chandrapur Circle Chandrapur-1 copy.

18.40.6 Reference map: This working plan is accompanied by a reference map on 1: 250,000 scale showing working circle, felling series and Range boundaries, Roads; Railway lines, Rest House, Range Head quarters and division Head-quarters.

SECTION-41: PRESERVATION PLOTS AND SAMPLE PLOTS:

18.41.1 The prescriptions of the working plan for different working circles will not apply to the areas selected for research purposes as preservation plots and sample plots. These areas will be treated as per choice of the research officer for specific research studies.

CHAPTER –19 CONTROL AND RECORDS

SECTION -1 : CONTROL FORMS:

19.1.1 The Deputy Conservator of Forests will maintain the control forms of various forestry operations as below:

- i) Coupe of Main felling.
- ii) C.B.O.(Cut back operation)
- iii) Regeneration(a) N. R.(b) A. R.
- iv) Thinning in old plantation.
- v) 1/5th boundary demarcation
- vi) Fire incidence.
- vii) Grazing.
- viii) Soil and moisture conservation works.

19.1.2 These control forms are given in **Appendix No. LX**. One set will be kept in division office and the other copy called flying copy, will be sent to the working plan office for scrutiny. The Deputy Conservator of Forests, Working Plan will scrutinise it and then along with his remarks send it to territorial Conservator of Forests. This should happen latest by 1st November. The territorial Conservator of forest will send his remarks to the Conservator of Forests working plans. The deviations from the working plan prescriptions will be shown in red ink and approval to the deviation will be sought in advance as far as possible as provided in the working plan code. The deviation forms are given in **Appendix .LXI**.

SECTION-2: COMPARTMENT HISTORIES:

19.2.1 The compartment histories shall be maintained in compartment history forms No.I,II,III,IV & V as below:-

- Form I : Description of growing stock.
- Form II : Records of plantation and changes in the growing stock
- Form III: Records of operation and out turns.
- Form IV : Records of observation.
- Form V : Records of injuries.

19.2.2 The sample compartment history forms are given in **Appendix No LXII**. Each compartment should have a separate file for its records. One copy of the compartment history should be kept in the Division Office and the other in the Range office. Every year in July the RFO should fill in the columns in the compartment history forms and submit the same to the DCF who will get them scrutinised by a Gazetted Officer not below rank of ACF, get them typed and sign them. One copy of the forms will be filled in the division office in the divisional compartment history file and another copy will be returned to the RFO. The copies of the annual compartment history files kept in the division office, after completion will be supplied yearly in the month of August to the DCF Working Plans for filling in the

compartment history files kept in his office. The DCF Working Plans will return them back to the Territorial Division after completion of his records.

SECTION-3: DIVISIONAL JOURNALS:

19.3.1 It is desirable for a Divisional Forests Officer to maintain certain Journal for records and for his ready reference. These journals are important for controlling and monitoring of various activities of expenditure. Few of the forms for these journals have been prescribed here but it is for Dy. Conservator of Forests to add or omit any column if he desire so.

19.3.2 These registers are prescribed below

- i) Nursery Registers
- ii) Plantation register.
- iii) Coupe registers like marking , Jungle felling dragging, register etc.
- iv) Annual plan of operations.
- v) Records of seed years of various species.
- vi) Insect or fungus attack or other injuries to forests.
- vii) Fire in regeneration areas.
- viii) Building registers
- ix) Roads and well register.
- x) Auction result
- xi) Plantation raised under agri-silvicultural operation.

19.3.3 Plantation registers should be maintained for all areas regenerated artificially in the form No.1 to 9 samples of which are given in **Appendix No. LXIII**. Nursery registers should be maintained in Form No.1 to 10 samples of which are given in **Appendix No.LXIV**

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CHAPTER – 20

NURSERY TECHNIQUES

SECTION-1 : INTRODUCTION:

20.1.1 The nursery operations are precursor to the production of good quality seedling stocks to be planted. Hence the nursery operations are mandatory. And as such the nursery practice is regularly resorted to. This practice is so usual that in course of time it has become indispensable routine. However in its routine character, it has failed to attract the special care which it deserves. In fact, it is the nursing aspect that should find its place in nursery.

SECTION – 2 : OBJECTIVES:

20..2.1 The objectives of the nursery technique are:

- i) To obtain the healthy seedlings in given period.
- ii) To obtain such seedlings in adequate numbers.
- iii) The adopt nursery practices in such a way that it obtains the seedlings timely.
- iv) To obtain such seedlings so that they are of standard size capable of successful plantation under given situation etc.

SECTION- 3 : SEEDS MANAGEMENT:

20.3.1 As the seeds are the source of seedlings and the growth of plant is mostly dependent on the seed of origin, it is imperative that seeds are genuine. Hence the special care should be taken as regards to the procurement , storage and utilisation of the seeds etc.

20.3.2. PROCUREMENT

- i) Seeds should be collected from mature and straight mother trees. Select seeds from branches growing in the sun.
- ii) As far as possible do not collect seed, which has fallen on ground; it could be rotten or infected
- iii) Do not spread the newly collected seed in the sun ; the sun heat can kill the seed.
- iv) Do not leave the seed in rain or in wet area. If the seed gets wet, it will rot and die.

20.3.3 STORAGE

- i) Keep the seed in dry and cool place.
- ii) Do not keep the seeds loosely or if kept in a bag, then there should be the minimum inter seed space.
- iii) Use the Savin insecticide for the storage over 1 month and above.
- iv) Do not store the seeds unnecessarily, else it may not be useful for utilisation.

20.3.4 UTILISATION

It is the first step to the actual utilisation of the seed for nursery purpose. Hence it should be attended to-

1) **Seed Identification:** To maintain genetic purity of the plants, one should have knowledge of the seeds such as seed weight, size making and germination percentage etc.

2) **Seed viability Test:** The viability should be determined by the (1) Germination Test (2) Tetrazolium Test.

3) **Pre Germination Test:** Depending upon the seeds of the species, following test shall be carried out:

- a. Mechanical Scarification (or)
- b. Acid Scarification (or)
- c. Stratification(or)
- d. Soaking the seeds in water

4) Seed certification shall be done after the seed procurement as well as before actual utilisation.

Suitable site and soil bed:

20.3.5 A sheltered sunny situation away from big trees but near the water source is an ideal place for preparing the seed beds.

20.3.6 The soil of the seed bed be fine textured, porous and firm to provide good aeration and drainage for better germination and seedling growth. Loam and sandy loam soils with plenty of organic matter are good, provided they are free from disease causing organisms. Seed bed should be of size 300 cm x 100 cm x 10 cm.

Sowing of seeds:-

20.3.7 It may be sown by broadcasting or in rows. Sowing in rows is advantageous.

Depth of sowing :

20.3.8 It depends on the size of seeds. In general, the seed has to be covered to a depth of 4 times of its diameter. Very fine seeds should be covered lightly if at all flat bottom furrow in better than 'V' shaped ones to avoid overcrowding of seeds.

20.3.9 GENERAL CULTURAL TECHNIQUES**1. Watering :**

- (i) Water small seedling with small quantity of water when they need it,
- (ii) Water large plants with more water, more often
- (iii) When nursery is covered or is in shade, water the seedlings less often.
- (iv) Water the plants, which are in the sun, more often.
- (v) Do not water at fixed time each day. Water the plants when they need it.
- (vi) All species do not require the same amount of water.
- (vii) Small seedling don't need much water.
- (viii) Seedling need more water, more often on the hot days.
- (ix) Always check seedling twice a day. Feel the bottom of the root trainer, the soil should be moist to the touch.
- (x) Green moss/algae are seen when you are watering too often.
- (xi) Use clean water Disinfect with chloroxins to remove any disease.

2. Shifting : plants shall be later moved to a large container.

3. Root trainer: The tree seedlings raised in root trainer containers are stronger. It has healthier root system. For every season of use, clean the container with chlorinated water. If chlorine water is not available container should be dropped in solutions of contact insecticide and washed in running water.

4. Advantage of Root trainer:

- i) Easy to fill with soil.
- ii) Easy to check the moisture of foot growth
- iii) Air pruning of roots produces actually growing root tips.
- iv) Plants grow well and have a good root system.
- v) Produces plant that are small, light and easy to transplant.

- vi) Containers are reusable and last 4 to 6 seasons.
- vii) Plastic Sacs(or tubes) shall be used

5. Hardening: In the absence of this, the seedlings turn food which promote development of new roots. Further more hardened plants do not loose water by transpiration so rapidly as those not hardened. Hence these plan to can stand transplanting shock better than those which are not hardened. Hardening shall be done by conditioning to stand adverse conditions.

6. Hygiene : Shall be maintained to avoid the insect attack and retarding infection.

7. Miscellaneous:

1. There shall be a provision for the following in the marked area of nursery:

- i) Preparation of farm yard Manure
- ii) Preparation of compost
- iii) Preparation of super compost
- iv) Preparation of Azo compost

2. Fertiliser application by virtue of soil testing shall be provided for. That is soil testing shall be carried out to ascertain the fertiliser requirement. Use of bio fertiliser shall also be resorted to.

- i). Monitoring and Evaluation
- ii). Nursery Register shall be maintained in the form as per the final draft working plan.
- iii) Inspection of nursery should be in the form as per the final draft working plan.
- iv). Statistical methods of inspection and control should be applied.
- v) Seedling obtained shall be of requisite standard and size depending upon the species.

CHAPTER-21

FINANCIAL FORECAST

SECTION-1: FINANCIAL FORECAST :

(A) FUTURE REVENUE :

21.1.1 National Forest Policy of 1988, lays main emphasis on the maintenance of environmental stability through preservation and restoration of ecological balance and no emphasis is laid on the monetary considerations in the management of the forests. The prescriptions of this working plan conform to these principles. However, scientific management of the forests will permit removal of overwood in the Teak Plantation Working Circle and the area will be artificially regenerated by raising pure teak plantations, and some silviculturally available trees from both Selection-Cum-Improvement and Improvement Working Circles. The major yield will be obtained from Teak Plantation Working Circle and S.C.I. Working Circle. Improvement Working Circle will also contribute to the yield to some extent. The yield from thinning in Improvement and Teak Plantation Working Circles have not been considered. Among the minor forest produce, tendu will be major revenue earning forest produce. Bamboo is excellent in growth and therefore major revenue will be obtained from bamboo too. The table No.88 gives a rough estimate of the future annual yield.

TABLE -88
ESTIMATED YIELD

Sr.NO.	Kind of Produce	Quantity	Remarks
1.	Timber a. Teak b. Miscellaneous	12269 M ³ 49076 M ³	5 % of Timber yield 95. % of Timber yield
2	Firewood a. Teak b. Miscellaneous	3680 beats 14722 beats	30 % of Timber 30 % of Timber
3	Bamboo a. Long b. Bundle	500000 No. 30420	For Nistar For Commercial
4	Tendu	92922 std.bag	For commercial purpose
5	Miscellaneous Hirda,Gum,Moha flower, Moha fruits and etc.	2428 Qtl	

21.1.2 An accurate forecast of revenue is not possible as the prices of timber, firewood and other forest produce are not constant and stable. However, the table below gives a rough estimate of revenue expected from the sale of various forest produce in Allapalli Forest Division, calculated at the current rates.

TABLE-89
ESTIMATED REVENUE

Sr.No.	Kind of Produce	Revenue in lakh	Remarks
1	Tmber' a. Teak b. Miscellaneous	2331 4416	Rs. 19000/ M ³ Rs. 9000 /M ³
2	Firewood a.Teak b.Miscellaneous	58 622	Rs.1600 /Beats Rs. 4500/Beats
3	Bamboo Long Bundles	40 152	Rs.8.00/ Per Rs.401.00/ N.T.
4	Tendu	836	Rs.900/Std.bags

21.1.3 In addition to this the intangible benefits from the forests such as checking soil erosion, improving the water regime, providing employment and recreation, maintaining the ecological balance, etc are many and is difficult to quantify them in terms of money. However, the environmental loss has been calculated by the Ministry of Environment, Govt. of India for the purpose of the proposals under Forest Conservation Act, 1980. On this basis, annual intangible benefits in terms of money is calculated as follows:

21.1.4 From one hectare of fully stocked forests we get the benefits worth Rs 123 .lakhs to be accrued over a period of 50 years. Hence in one year, we will get the benefits worth Rs. 2.46 lakh. And from these forests having average density 0.5, we are getting the benefits worth Rs 1.23 lakh per ha. annually. The forest area included in this plan is 88648.734 ha. Hence the total intangible benefits being accrued from these forests is worth Rs 109037.94 lakh per year.

FUTURE EXPENDITURE :

21.1.5 An approximate estimate of the total annual expenditure from 2004-05 to 2013-2014 on various activities prescribed in this plan excluding proposed establishment has been made. Calculations have been made on the basis of work norms being followed in South Chandrapur Circle, wage board rates, sanctioned rates for planting and rates for miscellaneous items sanctioned by the C.F. South Chandrapur Circle, Chandrapur. The above mentioned rates are for the year 2002-03 From these rates, rates for the year 2003-04 and subsequent years were obtained by increasing 10% in previous year's rates. For bamboo harvesting only departmental expenditure has been taken up. The expenditures on various activities proposed in N.W.F.P. Working Circle have not been calculated. As soon as these activities are approved by the Government, both expenditure and revenue will sharply go up.

COST BENEFIT ANALYSIS :

21.1.6 Without accounting for the intangible benefits, we cannot complete the cost benefit analysis for managing the forest whose prime function is to maintain the ecological balance.

TABLE -90
EXPENDITURE IN THOUSAND

Sr.No.	Item of work	2004-05	2005-06	2006-07	2007-08	2008-09
1	2	3	4	5	6	7
1	Demarcation & Marking 4.5 MD/ha Rs. 144/ha	430	473	520	572	629
2	Coupe Working					
	a. Timber (7.7 MD/M3) Rs. 246/M ³	615	676	743	817	898
	b. Firewood (4.26/MD/Beat) Rs. 136/-beat	592	651	716	787	865
	c. Bamboo (Departmental)					
	i) Long Bamboo (Rs. 2.5/Bamboo)	1345	1479	1626	1788	1966
	ii) Bamboo bundle (Rs. 4.5/bundle)	214	235	258	283	311
3	Removal of windfallen					
	a. Timber (Rs.246/M3) 1000 M3 out-turn	598	657	722	294	873
	b. Firewood (Rs. 136/Beat)	557	612	673	740	814
4	Tendu leaves Collection Rs. 900/-std. Bag					
5	C.B.O. (Rs.192/-ha)	181	199	218	239	262
6	Cleaning (Rs. 256/ha)	116	127	139	152	167
7	Afforestation (Rate/ha) Activities Rs.					
	a. P.M.W. 8077	1370	1507	1657	1822	2004
	b. F.Y.O. 7381	852	937	1030	1133	1246
	c. S.Y.O. 3273	489	537	590	649	713
	d. T.Y.O. 2072	358	393	433	476	524
	e. 4 th Y.O. 563					
	f. 5 th Y.O. 563					

8	Maintenance (Build,Road, Bridges and)	866	952	1047	1152	1267
9	Wages	2186	2404	2645	2909	3200
10	Office Expenses	663	729	802	882	970
11	Petrol/Diesel	851	936	1029	1132	1245
12	Material supply	80	88	96	106	117
13	Salary	43649	48013	52815	58096	63906
14	T.A.	646	710	781	859	945
15	Miscellaneous	927	1019	1121	1233	1356

Table continued.....

Sr.No.	Item of work	2009-10	2010-11	2011-12	2012-13	2013-14
1	2	3	4	5	6	7
1	Demarcation & Marking 4.5 MD/ha Rs. 144/ha	691	760	836	919	1010
2	Coupe Working					
	a. Timber (7.7 MD/M3) Rs. 246/M ³	987	1085	1193	1312	1443
	b. Firewood (4.26/MD/Beat) Rs. 136/-beat	951	1046	1150	1265	1391
	c. Bamboo (Departmental)					
	i) Long Bamboo Rs. 2.5/Bamboo)	1262	2378	2615	2876	3163
	ii) Bamboo bundle (Rs. 4.5/bundle)	342	376	413	454	499
3	Removal of windfallen					
	a. Timber (Rs.246/M3) 1000 M3 out-turn	960	1056	1161	1277	1404
	b. Firewood (Rs. 136/Beat)	895	984	1082	1190	1309
4	Tendu leaves Collection Rs.900/-std. Bag					
5	C.B.O. (Rs.192/-ha)	288	316	347	381	419
6	Cleaning (Rs.	183	201	221	243	267

	256/ha)					
7	Afforestation (Rate/ha) Activities Rs.					
	a. P.M.W. 8077	2204	2424	2666	2932	3171
	b. F.Y.O. 7381	1370	1507	1657	1822	2004
	c. S.Y.O. 3273	784	862	948	1042	1146
	d. T.Y.O. 2072	576	634	697	767	843
	e. 4 th Y.O. 563					
	f. 5 th Y.O. 563					
8	Maintenance (Build,Road, Bridges)	1394	1533	1687	1855	2041
9	Wages	2520	3872	4259	4685	5154
10	Office Expenses	1067	1174	1291	1420	1562
11	Petrol/Diesel	1370	1507	1658	1823	2006
12	Material supply	128	141	155	171	188
13	Salary	70296	77326	85059	93565	102921
14	T.A.	1040	1144	1258	1384	1582
15	Miscellaneous	1491	1641	1805	1985	2184

SECTION-2: COST OF THE PLAN:

21.2.1 The total expenditure incurred on the preparation of this plan is difficult to account for because the office of the Deputy Conservator of Forests, Working Plan Division No.2, Chandrapur has been entrusted with the job of preparation and revision of working plans for Chadrapur Forest Division, Chadrapur; Allapalli Forest Division, Allapalli and Sironcha Forest Division at Allapalli. The preparation and revision of working plans for the aforesaid three divisions has been done in this office simultaneously since September 1998 and therefore no separate expenditure can be worked out for the preparation and revision of this working plan.

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