



GOVERNMENT OF MAHARASHTRA

WORKING PLAN

FOR

THE FORESTS
OF
CHANDRAPUR FOREST DIVISION
(NORTH CHANDRAPUR CIRCLE)

VOLUME-I

BY

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WORKING PLAN DIVISION-II
CHANDRAPUR

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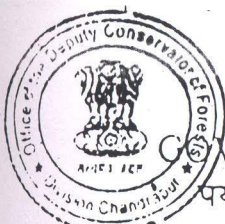
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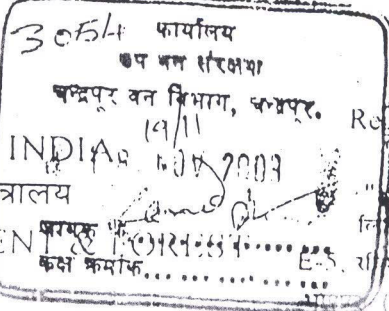
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To:

The Principal Secretary,
Revenue and Forest Department,
Government of Maharashtra,
Mantralaya,
MUMBAI

Sub Approval of Working Plan of Chandpur Forest Division, for the period from 2003-04 to 2012-2013

Ref Govt of Maharashtra letter No. FDM 2003/CR 68/1-2, dated 16.9.2003

Re:

With reference to the above mentioned subject, I have been directed to inform you that after careful examination of the Working Plan of the Chandrapur Forest Division, the Central Government hereby conveys its approval to the said working plan in accordance with the powers vested under Forest (Conservation) Act, 1980 subject to following conditions -

1. Since the working plan has been submitted in September, 2003, the working plan is approved for 2003-04 to 2012-13. Necessary corrections shall be made to this effect in working plan documents.
2. The orders of Hon'ble Supreme Court passed in W.P. (Civil) No. 202 of 1995 in the matter of Godaverman Thirumalkpad Vs Union of India and order passed in related Inter Locutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.
3. Further, orders of Hon'ble Supreme Court's order dated 22.09.2000 in Interlocutory application No. 424 should be complied with by ensuring that regeneration of forests is commensurate with felling carried out under this working plan. To achieve this it must be ensured that no felling be carried out without allocating necessary funds to regenerate the felled areas. In the event of,

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No deviations shall be made from the prescriptions of working plan read with the conditions stipulated herein without prior approval by the Central Government under Forest (Conservation) Act, 1980. Deviation for excess yield in any Working Circle by more than 10% of the approved yield/fellings of that year will also be submitted to this office for approval. However, deviations of positive nature i.e. out of turn plantations carried out outside the worked area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government.

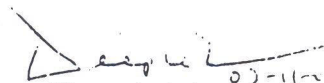
13. The Central Government reserves the right to review, modify, withdraw this approval at any time if any of the conditions of approval are not implemented or relevant modification in the working plan is required so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy

Yours faithfully,

(Deepak Srivastava)
Dy. Conservator of Forests (Central)

Copy to

- 1 The Additional Director General of Forests (ADC), Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi - 110 003.
- 2 The Principal Chief Conservator of Forests, Govt. of Maharashtra, Seminary Hills, Nagpur
- 3 The Divisional Forest Officer, Chandrapur Forest Division, Chandrapur, Maharashtra.


(Deepak Srivastava)
Dy. Conservator of Forests (Central)

FOREWARD

The present Working Plan for Chandrapur Forest Division, Chandrapur prepared by Dr.S.S.Srivastava, IFS, Deputy Conservator of Forests, Working Plan Division-II, Chandrapur envisages to replace the earlier Working Plan of West Chanda Division (1977-78 to 1991-92) by Shri Kartar Singh which included the areas of the present Chandrapur and Bramhapuri Forest Divisions. This Working Plan has been prepared for an area of 88648.734 ha. and it does not include the areas transferred to Tadoba and Andhari Wildlife Sanctuary and Forest Development Corporation of Maharashtra Ltd. for specific management purposes who are having their own management plans for the management of areas under their control.

Dr.S.S.Srivastava, and the esteemed members of his team deserve full appreciation for producing this document which is unique in many sense. The most important feature of this Working Plan, is inclusion of Teak Plantation Working Circle for planting of teak by overwood removal on the same principles of permission granted to Forest Development Corporation of Maharashtra Ltd. by the Government of India. The prescriptions given in this working circle will go a long way in the regeneration of teak because the clear felling and planting of teak is the best silvicultural system possible for establishing teak forest in the area provided the various physical and chemical parameters of soil are compatible for the success of teak in the area. Dr.S.S.Srivastava, Deputy Conservator of Forests has taken due care in the selection of site for this working circle. The stock maps and management maps of this working plan for Chandrapur Forest Division, Chandrapur have been prepared through G.I.S. System using Geo-media Software at Nagpur.

Dr.S.S.Srivastava and his staff have done an excellent work and deserve full praise and appreciation for accomplishing this tasks.

Chandrapur

Date 30th December/2002.

(Shailendra Bahadur,IFS)
Conservator of Forests
Working Plan Circle
Nagpur.

INTRODUCTION

This Working Plan for Chandrapur Forest Division replaces the earlier Working Plan for West Chanda Division by Shri Kartar Singh, D.F.O. Working Plan Division, Chandrapur for the period 1977-78 to 1991-92. The preparation and revision of working plan for Chandrapur Forest Division, Chandrapur was undertaken by Shri B.S.Thengadi, IFS, Deputy Conservator of Forests, Working Plan Division, Amravati in 1996 and the enumeration of growing stock was done by Survey of Forest Resources Unit, Amravati in 1996-97 and partly by the staff of Chandrapur Forest Division in the year 2001-2002. The Preliminary Working Plan Report was submitted before the Committee on May 7, 1996 chaired by Shri B.M.Parab, IFS, the then Chief Conservator of Forests,(Production) Maharashtra State, Nagpur. The Committee approved the P.W.P.R. vide P.C.C.F. Office letter No. Desk-14/WP/269/96-97 Nagpur dated July 2, 1996 and suggested some modifications to be incorporated in the Final Draft Working Plan.

The Conservator of Forests, Working Plan Circle, Nagpur assigned the responsibilities of preparation and revision of Working Plan for Chandrapur Forest Division vide his letter dated November 21, 2000 to the Deputy Conservator of Forests, Working Plan Division No.II, Chandrapur and accordingly the works of preparation and revision of working plan of Chandrapur Forest Division was undertaken by this office in December, 2000.

The present Working Plan for Chandrapur Forest Division, Chandrapur comprises of an area of 88648.734 ha. excluding the areas transferred to Tadoba Andhari Wildlife Sanctuary and Forest Development Corporation of Maharashtra Ltd. for specific management purposes.

The Working Plan for Chandrapur 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 the overwood. The other important working circles are Selection-cum-Improvement Working Circle, Improvement Working Circle, Non-wood Forest Produce (Overlapping) Working Circle, Wildlife (Overlapping) Working Circle and Bamboo (Overlapping) Working Circle which have been prescribed 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, 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 him.

I am highly grateful to Shri M.K.Sharma, IFS, Director General of Forest, and *ex-officio* Secretary to the Govt. of India, Ministry of Environment, Forest and Wildlife, New Delhi whose encouragement inspired me to think and incorporate innovative ideas in the preparation of this working plan. I am also thankful to Shri S.K.Mitra, IFS, Principal Chief Conservator of Forests, Maharashtra State, Nagpur for his kind inspiration and valuable guidance in the preparation of this working plan.

I am extremely thankful to Shri J.N.Saxena, IFS, Additional Principal Chief Conservator of Forests, Maharashtra State, Nagpur for his keen interest and valuable guidance provided in the preparation and revision of this working plan. I am also thankful to him for providing the logistic support i.e. Computer and its peripherals without which it would have been very difficult to accomplish this task. I am also grateful to Shri K. Subramaniam, IFS, Additional Principal Chief Conservator of Forests, Maharashtra State, Nagpur for his kind inspiration and guidance.

I am also highly grateful to Shri Shailendra Bahadur, IFS, Conservator of Forests, Working Plan Circle, Nagpur whose keen interest, valuable guidance and suggestions have helped me to complete this working plan in time. I am also thankful to Shri S.D.Sontakke, IFS, Conservator of Forests, North Chandrapur Circle, Chandrapur and Shri S.P.Thakre, IFS, Deputy Conservator of Forests, Chandrapur Forest Division, Chandrapur for extending their full support and cooperation in the preparation of this working plan.

I am also thankful to Shri T.K.Choubey, IFS, Deputy Conservator of Forests, Working Plan Division-I, Chandrapur for extending his kind co-operation and valuable suggestion in the preparation and revision 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 they have put in their best endeavour in the preparation and revision of this working plan and therefore Shri 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 have put in their sincere

efforts in the completion of this working plan. I am also thankful to Shri R.T.Dhabekar, RFO for completing the working plan maps through G.I.S. system in the office of the Conservator of Forests, Working Plan Circle, Nagpur.

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 26th December 2002.

(Dr.S.S.Srivastava,IFS)
Deputy Conservator of Forests
Working Plan Division-II
Chandrapur.

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

(2002-03 TO 2011-12)

NAME AND SITUATION:- Chandrapur Forest Division lies between 18° 41' 15" to 19° 30' 0". North latitudes and 79° 55' 19" to 80° 22' 30". East longitudes.

The boundary of the division in the North is bounded by Wardha district and in the East by Chandrapur district and in the west by Yavatmal district & Wardha district and in the south by Central Chanda Forest Division.

The total forest area of Chandrapur Forest Division is 165453.122 ha. The present working plan covers an area of 88648.734 ha of forest area of Chandrapur Forest Division. Out of this 65684.724 ha is reserved forest, 22790.900 ha is protected forest and 173.110 ha is unclassified forest land obtained under Forest Conservation Act, 1980. An area of 46368.425 ha has been transferred to Tadoba National Park and Andhari Wild Life Sanctuary which was declared vide Government notification No.WLP/1085/ CR-75/F-5 (iii) dated 25 February, 1986. An area of 29267.740 ha has been transferred to Forest Development Corporation of Maharashtra Ltd. for specific management purposes.

CONFIGURATION OF THE GROUND:- The Forest areas of the Chandrapur Forest Division are mostly plain however some undulating and hilly terrain is also present such as Mul 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 December is 38.6 degree centigrade and mean daily minimum is 23.6 degree centigrade. The humidity exceeds 70% in the South-West monsoon season.

WATER SUPPLY:- Chandrapur District fall within Godavari drainage and the whole district is covered by important rivers like Wardha, Irai 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 5A/C3 Southern-Tropical Dry Mixed Deciduous Forests. 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 Chandrapur District is 1792 and out of this 319 are deserted villages.

STAFF AND LABOUR:-The head of the territorial division is Deputy Conservator of Forests who is assisted by four 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 F.J. Langhorne in 1897 for Mohorli Range and by Shri Poona Swami in 1898 for Warora Range. Improvement fellings were prescribed.

A. Working Plan for North Chanda Forest Division, Central Provinces by Shri S.A.Vahid 1927-1937: This working plan was written for a period of 10 years and this plan was written after carrying out detailed survey and inspection of the forest. The entire forest was divided into 792 compartments distributed in 45 blocks. The main objects of management were to obtain the maximum sustained annual yield of timber and the revenue and in order to meet the above objects the main working circles prescribed were- high forest working circle, coppice with standard working circle, low forest working circle, bamboo working circle and low forest unworked circle.

B. Working Plan for North Chanda Forest Division, Central Provinces and Berar by C.E.Hewetson (1936-37 to 1945-46):- 5.2.15 The general objects of management of the forest under this working plan were to obtain the maximum sustained yield of all classes of forest produce and to meet the local demand. Consequent to this the methods of treatment to be adopted under this plan were, the better quality forest were to be managed for the production of large timber and the rotation period was 80 years and the regeneration was possible when advance growth is established under the mature crop. The poor quality forest were to be managed on rotation period of 40 years for the production of poles and fuels to the local people and the regeneration was to be obtained by coppice. Bamboos were to be worked on 4 year felling cycle. The following working circles were formed:

- (I) THE HIGH FOREST WORKING CIRCLE :
- (II) COPPICE WITH STANDARD WORKING CIRCLE:
- (III) BAMBOO WORKING CIRCLE
- (IIV) MISCELLANEOUS WORKING CIRCLE:

Irregular working removal of dead and dying trees and improvement or selection felling under the orders of the Conservator of Forests was prescribed.

C. WORKING PLAN OF SHRI SINGH AND SHRI MUJUMDAR (1949-50)

In this plan all A class forests were stock mapped showing the quality classes and types of forests. Forests having 15% and over of teak were shown as teak forests and the remaining were shown as mixed forest. Under stocked areas and blanks too were indicated. The forests were classified for the first time on the functional basis in the trees, minor, pasture and miscellaneous forests. An average grazing incidence of 3 cattle units was fixed. Better quality forests of North Sindewahi and South Sindewahi ranges were included in this class. Forests which could not produce large size timber but grow medium sized timber, poles and firewood classed as minor forest. Grazing incidence of 2 cattle units per acre was fixed. Beside, periodic closures were prescribed. Areas having no or little tree growth were classed as pasture. Keeping in view the above classification, the following working circles were formed:

- i) Coppice-with Reserves Working Circle
- ii) Miscellaneous Working Circle.

D. WORKING PLAN OF SHRI. KARTARSINGH (1977-78 TO 1991-92)

This working plan was prepared for 15 years of working spread over 33 blocks divided into 555 compartments running in two series. The one series covered forest of Warora, Chimur, Mohorli, Kolsa, Mul and Chanda ranges and other series comprised of Nagbhid range.

The general objects of management in this plan were: The preservation and improvement of "Tree Forests" for the production of big size timber, specially teak to the extent possible and to provide for the maximum sustained yield. To increase the proportion of valuable species such as teak, semal, bija, shisham etc. by giving preferential treatment and by plantations. The preservation and improvement of "Minor Forests" on the basis of the maximum sustained annual yield of mainly firewood and poles. To aim at the creation of the normal forests. To create grass reserves in the heavily populated areas. To arrest soil erosion. To reboise the understocked patches. Consistent with the above to derive maximum revenue for the state.

In order to meet the above objectives, the following working circles were constituted. (i) Conversion Working Circle. (ii) Coppice With Reserve Working Circle. (iii) Improvement Working Circle, (iv) Kuran Working Circle, (v) Misc. Working Circle. (vi) Bamboo overlapping Working Circle.

RESULTS OF PAST WORKING:-

WORKING PLAN OF SHRI KARTAR SINGH (1977-78 TO 1991-92):

1. In the conversion working circle the conversion period had been kept as 80 years. Therefore the areas could not be as such fully converted. Further the areas to be clear felled were 'C' type fit for clear felling and planting teak and old plantation areas which have failed to establish. In the 'D' type areas of under stocking afforestation was to be carried out. The P.B. unallotted is basically to accord the healthy silvicultural treatment to attain the growth. However only part of it has been covered. Moreover, such conducive treatments have not been scrupulously followed. Therefore, the crop is highly irregular in nature with great variation in ages and sizes and growth pattern. Bulk of these forests were worked under C.W.R. in previous plan with the rotation of 40 years.
2. In coppice with reserve working circle, the areas of forests of inferior quality capable of producing small to medium sized timber, poles and firewood with rotation of 40 years were included and Clear felling in density 0.7 & above capable of restocking the areas after clear felling from the resultant coppice and advanced growth was prescribed. Suitable areas of mixed forests to be felled for teak. Under stocked area (0.4) and below 0.7 for improvement felling. As clear felling had been prescribed in areas of density 0.7 and above the bio-diversity was lost in favour of coppice and miscellaneous species having advance growth only. This lost the opportunity to get the high forest of miscellaneous nature. Obviously due to such felling yield of coppice perpetuated the coppice with decreasing vigour.
3. The Improvement Working Circle comprised of marginal areas which have generally failed to regenerate due to adverse biotic factors in the last plan and included degraded miscellaneous forest and the areas were liable to erosion. These areas have high pressure of grazing & illicit cutting. However, 20 years felling cycle was kept and yield was regulated. In the areas of density below 0.4 climber cutting was prescribed. The brushwood and bamboo were to be cleared to take pits for plantation of ain, sisoo, siris, khair, mahua. In the remaining areas, the improvement fellings were prescribed. Therefore, under stocked areas could not be improved. Further due to practice of calling the whole areas as unworkable the improvement in better areas was arrested.
4. In Kuran Working Circle, the objective of improving the quality & quantity of fodder grasses, could hardly be done.
5. The proposal of converting certain part of the protected forests of Chandrapur division into the Reserve forest was under consideration during the plan period of Kartar Singh in the year 1974 to 1977. But the area was not declared reserved and as such it was not taken in the Kartar Singh's Plan. But the same proposal was accepted in the year 1983 and area of 4519.62 ha. from five ranges, of Chandrapur division was declared as Reserved Forest. The Kartar Singh's Plan had not prescribed any working for the said area.
6. In Bamboo Overlapping Working Circle, the division of areas into Commercial and Nistar Felling Series could not be done on the basis of production and demand.

7. The status of wildlife is very poor and no particular attention was given to the growth and development of wildlife.

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 soil and moisture conservation measures.
- ii) 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.
- iii) To combat ill effects of soil erosion wherever it has already started and to prescribe preventive measures.
- iv) To increase the production of non-timber forest produce 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.
- vii) To maintain and conserve the medicinal plants in the conservation area, to preserve and multiply the endangered species, to ensure sustainable and non-destructive harvest of medicinal plants, to cultivate and harvest medicinal plants in degraded forest treated in the JFM and to motivate the cultivation of medicinal plant

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 Chandrapur Forest Division shall be managed under the following working circles:

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

I) SELECTION-CUM-IMPROVEMENT WORKING CIRCLE:-

AREA:	21747.902 ha.	
CHOICE OF SPECIES:	Teak and other local miscellaneous species ain,shisham,haldu,kalam,moha, rohan,lendia,bija etc.	such
SILVICULTURAL SYSTEM:	Selection-cum- Improvement	
FELLING CYCLE:	10 years	
HARVESTABLE GIRTH		
Teak,ain,bija,shisham,haldu	135 cm	
Other timber species	120 cm	
Garari and Lendia	45 cm	
FELLING SERIES	18	
Regulation of yield	By area	

2) IMPROVEMENT WORKING CIRCLE:

AREA:	60914.062 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:	10 years	
FELLING SERIES	56	

3) TEAK PLANTATION WORKING CIRCLE:

Area	5986.770 ha	
Silvicultural system	Clear felling followed by artificial regeneration.	
Rotation	10 years	
Felling series	4	
Choice of species	Teak	

4) BAMBOO (OVERLAPPING) WORKING CIRCLE:

Area	51546.380 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 88648.734 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:

DEMARCATON OF COUPES:

- i) Annual coupes will be demarcated by clearing 3 metre 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 prescribe.

GRAZING: Worked coupes in all working circles will remain closed for grazing for 5 years,.

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

ESTABLISHMENT: Additional staff is required for the proper execution of the prescriptions of the plan.

LABOUR: The present labour supply is inadequate.

CONTROL: 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.

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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 Increament
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

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
Jigir	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

XIX

Patwari	Village Officer (Sub-ordinate of Revenue Department)
P.C.No.	Patwari Circle Number
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 OCCURING IN CHANDRAPUR FOREST DIVISION

A. TREES

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

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

B. SHRUBS AND HERBS

Aal	<i>Moringa citrifolia</i> (Linn)	Celastraceae
Aghada	<i>Achyranthus aspera</i> (Linn)	Amarantaceae
Akola	<i>Alangium salvifolium</i> (Thwaites)	Cornaceae
Ban rahar	<i>Flemingia semialata</i> (Roxb)	Fabaceae
Baibirang	<i>Embelia ribes</i>	Myrsinaceae
Bankapas/Rankapas	<i>Thespesia lampas</i>	Malvaceae
Bharati	<i>Maytenus emarginata</i> (Benth)	Celastraceae
Chind/Sindhi	<i>Phoenix sylvestris</i> Roxb	Palmae
Chipti	<i>Desmodium pulchellum</i> Benth	Fabaceae
Dhawai/Jilbili	<i>Woodfordia fruticosa</i> Kurz	Lythraceae

Dikamali	<i>Gardenia resinifera</i> Roth	Rubiaceae
Gurmukhi/ Gursukri/ Gaturli	<i>Grewia hirsuta</i>	Tiliaceae
Gokhru	<i>Tribulus terrestris</i> , Linn	Zygophyllaceae
Harsingar/ Kharsui	<i>Nyctanthus arbortristis</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 gummiifera</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>Tamilnadia 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 interapta</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	<i>Dendrophoe falcata</i> (Linn) t	Loranthaceae
Chilar	<i>Caesalpinia ecapetala</i> (Roxb)	Caesalpiniaceae
Chilati	<i>Mimosa hamata</i> (Willd)	Mimosaceae
Chilati badi	<i>Acacia torta</i> (W & A)	do
Dhimarval	<i>Celastrus paniculata</i> (Willd)	Celastraceae
Dudhi/Nagvel	<i>Cryptolepis buchanani</i> (Roem)	Periplaceae
Eroni	<i>Zizyphus oenoplia</i> (Linn)	Rhamnaceae
Gunj	<i>Abrus precatorius</i> (Linn)	Fabaceae
Gulvel	<i>Tinospora cordifolia</i> (Willd)	Menispermaceae
Gurar, Nasvel	<i>Millotia extensa</i> (Baker)	Papilionaceae
Kajkuri	<i>Mucuna pruriens</i> (L)	Fabaceae
Khadyanag	<i>Gloriosa superba</i>	Liliaceae
Khobarvel	<i>Hemidesmus indicus</i> (Linn)	Asclepiadaceae
Kukuranji	<i>Calycopteris floribunda</i>	Combretaceae
Mahulvel	<i>Bauhinia vahlii</i> (Wand A)	Caesalpiniaceae
Musalikand	<i>Dioscorea pentaphylla</i> (Linn)	Dioscoraceae
Papri, Lalvel	<i>Ventilago denticulata</i> (Willd)	Rhamnaceae
Palasvel	<i>Butea superba</i> (Roxb)	Fabaceae
Piwarvel	<i>Combretum ovalifolium</i> (Roxb)	Combretaceae
Ramdaton	<i>Smilax macrophylla</i> (Roxb)	Liliaceae
Shataori	<i>Asparagus recemosus</i>	Liliaceae

E. PARASITES

Amaraval	<i>Cuscuta refterxa</i> (Roxb)	Cuscutaceae

F. EPIPHYTES

Vanda	<i>Vanda cesellata</i> (Roxb)	Orchidaceae

G. ENDEMIC/THREATENED PLANT SPECIES

Alichettu	<i>Eonymus godaverensis</i>	Celastraceae

**COMMON AND ZOOLOGICAL NAMES OF THE
ANIMALS AND BIRDS COMMONLY FOUND IN
CHANDRAPUR 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 bengalensis</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 tragocamelus</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

Bison
Wolf
Panther
Sloth bear
Tiger

BIRDS

Pea fowl

SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED
CHAPTER 1
THE TRACT DEALT WITH

SECTION – 1 : NAME AND SITUATION

1.1.1. This working plan for Chandrapur forest division deals with the entire forest area of Chandrapur Forest Division. It lies between 18° 41' 15" to 19° 30' 0". North latitudes and 79° 55' 19" to 80° 22' 30". East longitudes.

1.1.2. The boundary of division in the North is bounded by Wardha district and in the East by Chandrapur district and in the west by Yavatmal district & Wardha district and in the south by Central Chanda Forest Division.

1.1.3. The total forest area of Chandrapur Forest Division is 165453.122 ha. The present working plan covers an area of 88648.734 ha of forest area of Chandrapur Forest Division. Out of this 65684.724 ha is reserved forest, 22790.900 ha is protected forest and 173.110 ha is unclassified forest land obtained under Forest Conservation Act, 1980. An area of 46368.425 ha has been transferred to Tadoba National Park and Andhari Wild Life Sanctuary which was declared vide Government notification No.WLP/1085/ CR-75/F-5 (iii) dated 25 February, 1986. An area of 29267.740 ha has been transferred to Forest Development Corporation of Maharashtra Ltd. for specific management purposes. Area statement of the division is shown in the following table-1.

TABLE-1

Range	Reserved Forest (ha)	Protected Forest (ha)	Unclassed forest (ha)	Area transferred to FDCM (ha)	Area transferred to Tadoba & Andhari N.P. (ha)	Disforested area (ha)	Balance area in working plan. (ha)
Chandrapur	20720.980	3464.24		14172.31		403.793	9609.117
Mul	31336.283	9625.410	73.690	14341.100	1625.523	96.732	24972.028
Warora	15091.990	5384.680	99.420	754.330	150.050	650.098	19066.612
Mohorli	24640.378	5848.230			16559.578	17.600	13911.430
Shioni	067.161	2100.660			28078.274		21089.547
Total	138856.792	26423.220	173.110	29267.740	46368.425	1168.223	88648.734

1.1.4. The forest areas of Chandrapur Forest Division occur both in compact blocks and scattered patches within the above territories of the Chandrapur Division. The geographical area of the district is 10695 sq. km and thus the forest area of Chandrapur division is about 8.29 %.

SECTION 2 : CONFIGURATION OF GROUND:

1.2.1 The rich and varied topography of the district is almost unparalleled anywhere else in the State and is an outcome of the immense geological variety of the rock formations of the district that range from the archaean basement in the eastern extremes to the most recent tertiary and Pleistocene alluvium in the river valleys, and of the tectonic features of the district that include huge igneous intrusions as well as rifts usurped by large streams. In spite of this geological and hence topographical diversity, a concomitant result of long endured sub-aerial denudation on structures of differing resistance and hardness, the area of the district falls broadly into a series of north-south running river valley strips defined and distinguished from the each other by parallel series of watersheds all the north-south running river valleys terminating in the west to east trending Godavari valley floor. Thus, one can recognise from west to east the Wardha, the Wainganga Pranhita and the Indravati river valleys with well defined north to south trends: the low Chimur, Mul and Parasgarh hills separate the Wardha and Vainganga valleys; the Wainganga-Indravati interfluves lying partly along the eastern boundary of the district also consists of a number of hill ranges that form a tangle of jungle country. In contract to the southern opening river valleys, the Godavari has a west to east valley along the southern boundary of the district. The Penganga valley and its continuation into the Wardha valley till the confluence of the Wardha with the Wainganga has also a entire drainage pattern of the district is strongly suggestive of the structural control of the river valleys- the rivers usurping and flowing in rift valleys of the Mesozoic age.

1.2.2 The hills of the Chandrapur district can be broadly considered as belonging to four groups : (i) the, Chimur-Parasgarh-Nagbhir-Rajoli-Mul-Wamanpalli hills that form a broken series of hills, together constituting the water parting between the Wardha and the Wainganga drainages ; (ii) the hills of the southern and western parts of Rajura tahsil, i.e. the Manikgarh hills; (iii) the southern hills complex in Sironcha tahsil such as the Sirikonda hills, the Bhamragarh, Surjagad, Aheri and Dandakaranya hills; and (iv) the isolated hill masses of the eastern parts of Gadchiroli tahsil, such as the Tipagarh, Palasgarh and Borgaon hills, of them, the hills of Warora, Brahmapuri and Chandrapur tahsils belonging to the first group are low hills rising on an average to about 300 meters

1.2.3 ***Chimur hills:-*** Extending from about 5 kilometres west of Chimur , the Chimur hills run with a north to south strike in the eastern parts of Warora tahsil for a distance of about 32 km with an average of 8 to 10 km. The ridge is flat-topped, with a gentle slope to the east and generally rises about 100 to 150 meters above the general level of the valley floors of the Erai nadi to the west and the Andhari river to its east. The ridge is of a cuesta type with a cliff and scarp slope facing west and a gently dip slope to the east. It is made up of gently eastward dipping sandstone formations of the Vindhyan age. The ridge has been breached in a number of places by streams and gullies that drain to the east and the west resulting in a number of natural depressions which on being bonded at their lower ends have become perennial and semi-perennial tanks.

1.2.4 ***Mul hills:-*** Further south of the Rajoli-Nawargaon hills, and south-east of the Chimur hills, lie the Mul hills about 5 km west of the township of Mul. The hills rise barely to a height of 300 m and are flat topped, consisting of the same sandstones as those of the Chimur and Nagbhir hills; in fact, the Mul hills constitute the south-eastern edge of the Vindhyan outcrops abutting on the archaean terrain. However, the sandstone beds are thinner here and the underlying limestone out-stone outcrops in patches along the slopes. The edge of these flat-topped hills

do not present such imposing scarp faces as those of Chimur and Nagbhir hills.

1.2.5 Wamanpalli hills:-Southwards of the Mul hills, once again, there occur a number of isolated hills masses, striking north-south and rising to elevations of about 250 m barely fifty metres above the level of the adjoining country particularly to the west-north-west and south of the market village Pomurna. These, too, like Lohara and Deulgaon appear to be outcrops of 'Dharwar' formations, belonging to the 'iron-ore' series and are set in a gneissic terrain. Just to the west and south of these hills, in the Kothari, Chanpur, Panchgaon, Dabha and wamanpalli reserved forest areas, there occur vast flat-topped plateau-like hill masses at elevations of 250 m; these, unlike the rounded hills around Pomurna, are formed of red ferruginous 'Kamthi' sandstones, horizontally bedded.

SECTION 3 : GEOLOGY, ROCK AND SOIL

1.3.1 Chandrapur is rich too in mineral wealth; high grade iron ore, gondwana coal, chromite, limestone, clays and building stones are all being mined at present but the mineral of the district await a fuller prospecting and exploitation. Ample hydel power potentials exist in the waters of the Indravati, Pranhita and Wainganga tributaries and await utilization. A proposed highway from Chandrapur to Jagdalpur will also bring better accessibility and prospects of economic development to these underdeveloped eastern tracts of the district.

1.3.2 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	Gondwana System.
Late-Pre-Cambrian ..	Vindhyan System. Cuddapah System.
Archaean	Intrusives (granites and basic dykes). Granite Gneisses and Amphibolites, pyllites, quartzites, Brecciated quartzites and banded quartz magnetite rocks.

1.3.3 The rocks of Archaean age include granites, gneisses, quartzites, brecciated quartzites and banded magnetite rocks with intrusives. 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 felspars 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 grey in colour, comparatively soft and shows faint schistose character. The other variety is dark grey in colour and being arenaceous is comparatively hard and compact. The quartzites and banded quartz-

manganites which appear to belong to one cycle of sedimentation are remnants of the older metasediments (Dharwars) 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 intrusives 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 ferro-magnesian minerals. The basic intrusive are melanocratic, medium grained, hard and compact, essentially composed of augites and plagioclase laths with minor amounts of secondary hornblende.

1.3.4 Cuddapah System: - The rocks of this system consists of shale's, limestone and quartzites. 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.

1.3.5 Vindhyan System :- The Vindhyan rocks of this area comprise sandstones, shales, limestones 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 indurated 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.

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

Chikiala beds,
Kota Maleri
Kamthis,
Barakars,
Talchirs.

1.3.7 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 Barakars, 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, cleays, limestones in the order of abundance. The Chikiala beds represent the youngest member of the Gondwanas of the Pranhita-

Godavari basin and comprise conglomerates, sandstones, shales and clays.

1.3.8 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.

1.3.9 Deccan Traps and Intertrappeans:- A considerable part of the area is covered by Deccan Traps and intertrappean beds. The Deccan Traps consist of layers of basaltic lavas, varying from amygdaloidal basalt to fine grained dolerite, at places, the amygdules being filled with various minerals, like quartz amethyst, calcite, agate, chalcedony and jasper. The rocks are generally dark-gray to dark-greenish grey 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.

1.3.10 Interbedded 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.

1.3.11 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 aluminium 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.

1.3.12 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 have 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.

1.3.13 Kamthi formation:- The rock comprising Kamthi formations are (i) grits (ii) sandstone, coarse or fine grained (iii) sandstone argillaceous and ferruginous. The shales 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.

1.3.14 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 bears 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.

1.3.15 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 especially in Warora Range where it overlaps trap. The most of the black cotton in Chandrapur district has

been derived from the disintegration of hornblende schist which is basically silica, aluminium, lime and oxides of iron.

1.3.16 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.

1.3.17 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.

Coal:-

1.3.18 In the Chanrapur-Wardha valley several coal mines are being worked. Following are the areas where the coal mines are found.

- (1) Chandrapur-Ballarshah area :- The Ballarpur Colliery is working 16 m thick in three sections. The seam trends North-North-East to South-South-West with a dip of 4 towards East to South-East. There is a major dip fault on the eastern side of the area against which the workings terminate. The local reserves have been estimated to be about 262 million tones.
- (2) Warora-Manjri area :- Two seams are known to occur near Warora, the upper one being 4.60 m and the lower 3.00 thick. In the Manjri area there is a 10.00 m thick seam, the bottom (3.70 m.) of which had good quality coal, whereas the upper portion is shaly. The total reserve in the area are estimated to be of the order of 32.5 million tones.
- (3) Ghugus-Telwasa area :- The total thickness of the seam that is being worked at Robertson incline of the Ghugus colliery is 11.21 m. The coal seam trends north-north-east and south-

south-east and dips 8 degree downwards west-south-west. The reserves in this area are estimated to be about 198 million tones.

Besides this, records of earlier drill-holes indicate the existence of a 12.19-21.24 m thick seam between Manjri and Nawkawada. the coal from this area is non-coking and high in moisture.

The coal from this area has high moisture (10.3 to 11.3%) and is of grade

1.3.19 The collieries are raising about 35,560 tones of coal per month.

Copper:-

1.3.20 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:-

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

Building and Construction materials:-

1.3.22 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. Brecciated quartzites are good sources for road ballast. Massive lateritic is also used in the area as building stone.

Limestone:-

1.3.23 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 Chandraur 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:-

1.3.24 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 The climate of this area is characterised by a hot summer, well distributed rainfall during the south-west monsoon season and general dryness except in the rainy season. The cold season is from December to February. This is followed by hot season from March to May. The South

West monsoon season is from June to September, October and November constitute the post-monsoon season.

1.4.2 Temperature -The mean daily maximum temperature in December is 38.6°C and the mean daily minimum 23.6°C . The mean daily maximum in the Southern half of the district is 32.0°C During the cold season, cold spells affect the area in association with the passage of Western disturbances across North India. The minimum temperature on such occasions may go down occasionally to about 3°C in the Northern parts of the district and to about 7.5°C in the Southern parts of the area. Temperature rise rapidly after February till May which is the hottest month of the year. The mean daily maximum temperature in May is about 47.7°C and the mean daily minimum is about 21.3°C . The heat in summer is intense during the day especially in the northern parts of the district. Occasionally the day temperature rises up to 47.8°C The afternoon heat is sometimes relieved by thundershowers. With the onset of the south-west monsoon in the district by about the middle of June the temperature decreases appreciably and the weather becomes more pleasant. Early in October when the south-west monsoon withdraws from the district the day temperature increase a little and a secondary maximum is reached in October. Later both day and night temperature decreases progressively. The decrease in night temperature is rapid.

1.4.3 The mean maximum/minimum temperature from 1990-91 to 1999-2000 for Chandrapur station is given in the **Appendix No I**

1.4.4. Records of rainfall in the area are available for 4 stations for periods ranging from 1990-91 to 1999-2000 for 7 years excluding for the year 1993. The average annual rainfall in the district is 1135.18 mm. The rainfall in the district generally increases from the West towards the East and varies, from 1056.66 mm at Warora to 1182.97 mm at Chandrapur. The rainfall during the south-west monsoon months, June to September, constitutes about 89 percent of the annual rainfall. July is the rainiest month.

1.4.5 The details of the rainfall are furnished in the **Appendix No II**. The heaviest rainfall in 24 hours recorded at any station in the district was 473.6 mm at Chandrapur on July 1998 (This is meant for reference purpose).

1.4.6. Storms and winds : Winds are generally light with some increase in wind force during the later part of the summer season and in the South-West monsoon and seasons. In post monsoon and cold seasons winds blow mostly from directions between north and east. In the first half of the summer season winds gradually change over to direction between east and south and by May winds from directions between south-west and North-west become more common. During the south-west monsoon season the winds are mainly from the South-west.

1.4.7. Humidity-The air is generally dry over the district except during the South –west monsoon season when the humidity exceeds 70 percent. The summer months are the driest when the relative humidity in the afternoons is between 20 and 25 percent. Humidity of Chandrapur station is given in the **Appendix No III**.

SECTION 5 : WATER SUPPLY

1.5.1 Drainage- The entire district falls within the Godavari drainage ; the northern tributaries of the river draining the central Indian hills and the eastern ghats flow through the district, generally with a north to south trend. The major river systems of the district are from west to east : The Penganga, the Wardha, the Waingana and the Indravati. The Penganga flows into the Wardha and the combined water are emptied into the Wainganga which after the confluence is known as the Pranhita. Numerous tributaries of these river systems, most of which rise in the uplands within the district drain the area of the district.

1.5.2 Wardha:- The Wardha river rises in the Multai plateau in Madhya Pradesh and after flowing through the district of Nagpur forms boundary between the districts of Wardha, Amravati and Yeotmal before entering this district at its confluence with the Wunna river. The river flows initially south forming boundary between Yeotmal district on one hand and Warora and Chandrapur tahsils of this district on the other till its confluence with the Penganga on its right bank. After this confluence the river turns east and has a general east-south-easterly course initially, then southerly and once again easterly till its confluence with the Wainganga. This stretch of the course forms initially tahsil boundary and then the State boundary. The river thus flows mostly on the western and southern boundaries of the district. It is a sluggish river flowing through varied geological formations in its course through the district- Deccan trap in the north-west and then through the upper and lower Gondwana formations and the archaeans—one after another, successively. In fact, the course of the river is believed to be occupying a rift valley. The river is full during the rains but dwindles to trickles in hot weather. It flows through a fairly fertile and productive country in the district.

1.5.3 Erai nadi:- The Erai nadi is the principal affluent of the Wardha on its right bank. It pursues its whole course of a length of 80 km within the district, rising in the hills of northern Warora and flowing almost due south till it joins the Wardha a short distance south of Chandrapur. The source of this river is made up of three streams – the Chargaon nadi, the Chambai nadi and the Banaskhundi nadi, all rising on the western slopes of the Chimur hills. The Erai and its tributaries, the Kankiya nadi and the Mothaghat nala drain practically the whole of Warora tahsil and north-eastern Chandrapur. The Erai is non-perennial.

1.5.4 The Tadoba lake lies in a depression within the Chimur hills. Though small, it is set in a romantically picturesque jungle country, overlooking the peak at Sonegaon. It has been developed into Tadoba National Park and Tadoba Andhari Wildlife Sanctuary by the State Government. It is approached either from Bhandak or Chandrapur.

1.5.5 Water Supply : The overall availability of water in the area is scanty, especially during summer season. The drinking water is available through wells and tanks in most of the villages. The list of villages and tanks is given in **Appendix No IV**. Water level in important wells in Chandrapur division is given in **Appendix No. V**

1.5.6 Irrigation : Irrigation in this area is through wells and there are number of irrigation projects which are major as well as minor.

SECTION : 6 : DISTRIBUTION OF AREA

1.6.1. Total forest area of the division included in this plan is 88648.734 ha. distributed over five ranges. The distribution of forest area is as follows :

TABLE-2

Sr. No.	Name of the Range	Area of the Reserved Forest	Area of the Protected Forest	Area of the unclassified forest	Total forest area in ha
1	Chandrapur	6328.017	3281.100	--	9609.117
2	Mul	15332.558	9565.780	73.690	24972.028
3	Warora	14333.232	4633.960	99.420	19066.612
4	Moharli	10691.440	3219.990	--	13911.430
5	Shiwani	18999.477	2090.070	--	21089.547
	Total	65684.724	22790.900	173.110	88648.734

1.6.2 Statement showing the existing Range, Round & Beat is given in **Appendix No VI**

1.6.3 Statement showing range wise distribution of area details is given in **Appendix No VII**

1.6.4 The details of the compensatory land is given in **Appendix No VIII**. The lists of projects where the forest land is diverted for non-forestry purposes is given in **Appendix No IX**

SECTION : 7 : STATE OF BOUNDARIES

1.7.1. The total length of the external boundary of the reserved forests is 435.200 kilometres of which about 48.80 kilometres form permanent natural features. Artificial boundaries are cleared lines 12 meters wide 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 meter 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

1.7.2 The details of the areas demarcated so far are not available in the division office. The boundaries of these forests are not maintained properly. The pillars are missing at a number of places and have not been erected in the five year boundary demarcation programme. At most of the places these pillars do not bear a number. Measures have been prescribed under the chapter on Miscellaneous Regulations for following a uniform pattern for erecting the boundary pillars and also for correcting the miserable state of boundary demarcation and for keeping control on the work. The statement showing extent of natural and artificial boundaries is given in **Appendix No X**

SECTION : 8 : LEGAL POSITION

1.8.1 The forest dealt with under the plan were notified vide the Reserve Forest Act VII of 1879 under the central Provinces Gazette No. 917(I) dated February 14, 1879 and No. 3796 dated August 29, 1895.

1.8.2 The protected forests were declared after the abolition of proprietary rights. Out of these protected forest, some areas were declared as reserved forest under section 20 of Indian Forest Act, 1927 vide Notification no. WS-FOR-1(1975) Desk-9/2 dated February 17, 1983 and vide Notification No. FLD/3685/9316/CR-42/F3 dated May 5, 1992 the details have given in **Appendix No XI** The details of the area disforested vide various State Government Notifications have been given in **Appendix No XII**

PROTECTED FORESTS AND NEWLY RESERVED FORESTS :-

1.8.3 As per section 3 of Madhya Pradesh Abolition of Proprietary Rights (Eastates, Mahals and Aliented Lands) Act of 1950 (I of 1951), the areas formarly belonging to Malguzars vested in the State Government on April 1, 1951 and were taken over by revenue department. Thereafter most of these areas were transferred to Forest Department from time to time as per instructions contained in MP. Revenue Department's No. 2249-286-XII, dated April 6, 1951 and No. 7277-CR.617-XXI, dated December 4, 1951. The transfers of these forests to the forests department was completed by the year 1954. The areas thus taken over by the forest department was 165453.122 hectares.

1.8.4 These forests were then declared as protected forests under section 29 of the Indian Forest Act of 1927 vide Government of Madhya Pradesh Notification No.3057-353-XI, dated June 4, 1955 and Notification No. FLD/4659-3313E-dated May 7, 1959.

1.8.5 In exercise of powers conferred by sections 30 and 32 of the Indian Forest Act, 1927, Notification reserving trees etc, were issued and rules were framed by the Government of Bombay vide its Resolution No. FLD-4657/103065-E, December, 1958 and December CAPut!', 1958 respectively.

1.8.6. Notifications under section 4 of the Indian Forest Act, 1927, were issued in respect of all these forests vide Government of Maharashtra Nos. FLD-1258/II, 3314, E, dated August 20, 1959 and No. FLD-1258/8138-E, dated May 28, 1960.

1.8.7 In 1992 Government of Maharashtra declared 4518.440 hectare, area out of the total 22790.900 hectare of the protected forests, as reserved under section 20 of the Indian Forest Act, 1927 vide notification No. FLD/3685/9316/CR-42 F3, dated May 5, 1992..

TABLE-3

Name of Range	Area declared as Reserved Forest 1992	Balance Protected Forest
1	2	3
Chandrapur	35.030	3281.100
Mul	1210.590	9565.780
Warora	1497.350	4633.960
Mohorli	289.860	3219.990
Shioni	1485.610	2090.070
Total	4518.440	22790.900

1.8.8 A number of alterations and adjustments affecting the area of the reserved and protected forests have subsequently taken place. Full

details of these are recorded in Code form No.1 register of Reserved Forests and Protected forests which also contain number of notification under which they have been affected. There is need to examine the new proposals for declaring protected forest as reserved forests which were earlier omitted by Forest Settlement Officer while preparing the proposals for notification under Section 4 of the Indian Forest Act. By doing so, the protected forest which are rich in vegetation and quality shall be preserved and declared as Reserved.

SECTION- 9 : RIGHTS AND CONCESSIONS.

(A) Reserved Forests.

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

- (i) The grazing of cattle belonging to the agriculturists of certain villages in the vicinity of the reserved forests, in accordance with the grazing rules in force.
- (ii) Agriculturists of villages in the vicinity of the reserved forests are given certain quantity of timber, bamboos and fire wood for their bona fide domestic use at concessional rates from the coupes under working. None of these concessions is a legal right and these can be withdrawn by the Government.

(B) – Protected Forests:

1.9.2 Before the abolition of the proprietary rights all lands belonged to the proprietors. A village administration paper called “Wazibul-az” was prepared at every settlement and plots of land were separately recorded showing the Khasara numbers and area which was set apart for a particular purpose. Under section 202 of the Central Province Land Revenue Act 1917, a provision was also made for punishing the violation of any of the customs. Under the Provisions of the Madhya Pradesh Abolition of Proprietary Rights (Estates, Mahals, Alienated Lands) Act, 1950 (I of 1951), all the communal and other waste land became the property of the Government while occupied lands continued to be private. In order to distinguish 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 Government land while the wazib-ul-arz deals with community and customs of user over private land.

1.9.3 The nistar enquiry had been conducted during the period 1954-56 and all the villages included in this scheme have been covered under it. The nistar officers have formed grazing and nistar zones by clubbing together surplus villages with deficit villages while self sufficient villages have been treated as individual zones. Villages assigned to particular zone can exercise their nistar rights within that zone.

1.9.4 The classification of the villages into surplus, deficit or self sufficient for the exercise 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 considered to be a deficit village.

1.9.5 Misuse of Nistar: The misuse of nistar is prohibited vide section 24(2) of the Indian Forest Act, 1927 and shall be punishable as provided under section 77 of the Indian Forest Act, 1927. However, misuse of nistar from the protected forest areas shall be dealt as per provisions contained in Maharashtra Land Revenue Code 1966.

1.9.6 Grazing : - The basis for forming grazing zones was that each head of cattle in Cotton-Juar tract should have 0.2 hectare grazing area and that in other tracts it should have 0.4 ha. Villages in which the grazing lands are less than the above requirements were clubbed with the neighbouring village area which exceeds the above standard. In villages where grazing land was just sufficient for the needs of the cattle of that village no rights of person residing in other villages to graze their cattle have been recognised ready recorded in the wazib-ul-arz.

1.9.7 The cattle normally feed on palatable grasses but after the reduction in availability of grass after November/December, the graziers start lopping the branches of the trees like ain, sisoo, apta, anjan, ficus etc. which leads to the degradation of the forests. The tribals normally keep large herds of scrub cattle which requires lot of fodder to maintain them and this adversely affect the development of the forest.

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

1.9.9 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 settlement is usually done by a Revenue officer but recently, the proposal to appoint an Asstt. Conservator of Forests as Grazing Settlement Officer has been submitted to the State Government. The decision of the State Govt. is still awaited. The grazing is free of cost to all cattle of

aboriginal tribals. The grazing of sheep and goats was not permitted. The Govt. of Maharashtra vide their subsequent resolution allowed the grazing by sheep in the specified areas.

1.9.10 The Govt. of Maharashtra vide its resolution No FCT/15 64/22-23-Y dated January 15, 1968 has granted the following concessions for villagers other than tribals:

- 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.

1.9.11 The rates sanctioned by the State Government vide No. MFP-1365/132211-Y dated December 6, 1968 as follows.:

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

1.9.12 Animals upto the age of 6 months should be exempted from the payment of grazing fees. The villagers should be listed under each grazing unit to ensure equitable distribution within permissible limits of the number of cattle that may graze. Where the demand for grazing is heavy, the cattle should be admitted in accordance with priorities to be laid down. In any case, cattle over and above the carrying capacity of a grazing unit should not be allowed to graze in the unit.

1.9.13 As per directives of the Govt. contained in Land Reforms Dept. Ex-Madhya Pradesh Memorandum No.1290-1227-XXVII. Dt. 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.

1.9.14 Occupational Nistar:- In nistar patraks, occupational rights of communities have been recorded and recognised in several villages and entries are found in the Wazib-ul-arz for each village.

1.9.15 The nistar is required by the villagers for bonafide and agricultural purposes, forest nistar generally includes timber of certain species and sizes for agricultural implements, houses and cattle sheds, fire wood, bamboos, 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, agriculturalists and agricultural labourers are entitled to following kinds of forests produce for their nistar either free of charge or at concessional rates fixed by the Collector, from their nistar zones only.

a) **Small Timber & Poles :** According to the zonal arrangement made by the nistar officers, the villagers are entitled to obtain their nistar requirements of small timber and poles from the available material either from the forests included in a particular zone or on payment upto a certain quantum fixed by the Collector. In order to meet the demand of the cultivators of the villages which were not included in the zone, the nistar officers have described that in the event of supply being in excess, in a particular zone after meeting the demands of zones on payment at the rates fixed by the Collector.

b) **Timber for construction of new houses from ex-proprietary forests :** M.P. Govt. vide their memo No. 2524/650/C.R. (Land reforms Dept. dated October 29, 1956, it was decided that timber for construction of new houses can be supplied to the agriculturalist on a certificate of the revenue officer at half the market rates.

c) Supply of salai wood in marriage ceremonies-several communities use green salai poles as kham, adam and thuni in marriage ceremonies. The villagers are permitted to remove their requirements upto the maximum limit of 2 trees on permits.

d) Fuel Wood-Free removal of fuel wood from Khasra numbers set aside for nistar is permitted as per rights recorded in nistar Patrakas to the prescribed extent for bonified use of the villagers. In Khasra numbers which are in excess, no such right is allowed.

e) Dry bamboos are allowed to be removed free from the exproprietary forests for bonafide nistar. Green bamboos are permitted on payment of prescribed royalty.

f) Where thorns are not available brush wood such as the lops and tops of the felled trees and of bamboos are permitted to be removed. Where removal of thorns and brush wood is allowed either free or at nominal rates, the existing practice continues.

g) Barks, fibers and roots are allowed to be removed where it is customary to allow their removal for cordage.

h) Moha, Achar, tendu or other edible fruits, flowers and roots are allowed to be removed free of cost from all over the forests for domestic consumption. The removal however, is permitted by head loads only.

i) As regards occupational nistar, ghont, fruit and dhanora leaves are allowed to be removed by the charmakers free of charge. They are also allowed to remove bakkal, and kahu bark on nominal payment from trees marked for felling.

1.9.16 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 :

(a) AGRICULTURAL IMPLEMENTS:

Eight poles upto 18" girth and timber actually needed for implements.

(b) MACHAN

Four poles upto 45 cm girth at every Third year.

(c) REPAIRS TO HOUSES:

Up to ten poles of satkatha (Misc. Tree species) upto 60 cm. girth, if needed.

(d) 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

(a) Hundred head loads 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.

1.9.17 In nistar patrak of each village khasara number set aside for nistar and grazing are recorded. The details regarding quantum of nistar, period during which it is to be allowed, payment if any to be made etc. are not given in the nistar Patrak in general. However, due to over exploitation of the forests for nistar in the past, unchecked illicit felling and over grazing. The ex-proprietary forests are no longer able to meet any of the nistar

requirements of the people . Most of these forests are now in the denuded state and need immediate rehabilitation by placing a ban on all the nistar rights and afforesting them, otherwise these areas will be turned degraded in near future.

1.9.18 Concession to erstwhile forest villagers : Under the rules, framed by the Central Province Government, the forest villages were entitled to certain concessions purely for their bonafide use. However, these concessions are continued, even after they are declared as revenue village vide ADM 22/971 dated 31.4.71. The competent authority, subjected to their power of sanctioning, were competent to sanction free grants. They are eligible for the free supply of following forest produce.

- i) wood and thorn for his agriculture work.
- ii) a reasonable amount wood and grasses for his house building and repairs.
- iii) dead wood for fuel, bamboo and leaves, any edible fruits, flowers and roots required for his domestic purposes.

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CHAPTER--2

THE FOREST

SECTION-1: COMPOSITION AND CONDITION OF THE CROP

2.1.1. According to the revised survey of forest types of India by Harry G. Champion and S. K. Seth, forest dealt with under this plan corresponds to Troupe's tropical dry deciduous forest and sub-group 5A/C3 Southern Tropical Dry Mixed Deciduous Forests which occupy the whole of Chandrapur Division.

2.1.2. Local variations are observed depending upon the soil topography and past treatment. Influence of altitude and aspect is negligible, well drained deep loamy and alluvial soil bear better quality forests. The quality deteriorates where the soil is shallow or water logged. The biotic factors which have often resulted in the degradation of forest are excessive grazing, unregulated fellings and frequent fires. The fellings are often concentrated on the species most valued for timber, furniture industry, building purposes and other important timber based industries. Seedling stages are particularly affected by excessive grazing and frequent fires. The species surviving owing to these biotic factors are resistant ones which can stand grazing and fire.

2.1.3 The forests are distinguished in to the following local sub-types as per Champion and Seth's revised classification of forest types which is illustrated in the following table -4

TABLE-4

Type Rotation	Champion and Seth's classification
Sub-group 5 A. I. Climax types :- (1) 5 A/C1 (i) 5A/Cia (ii) 5A/Cib (2) 5 A/C-3	Southern Tropical Dry Deciduous Forests. Dry teak bearing forest Very dry teak forests Dry teak forest Southern dry mixed deciduous forests
II. Edaphic types :- (i) 5/E-2 (ii) 5/E-4 (iii) 5/E-5	Boswellia forest Hardwickia forest Butea forest
III. Degradion stages :- (i) 5/D S1 (ii) 5/D S2	Dry deciduous scrub Dry savannah forest
IV. Primary serial type :- 5/1S1	Dry tropical riverain forest

5A/C3-SOUTHERN TROPICAL DRY MIXED DECIDUOUS FORESTS :-

2.1.4 The forest type is having a great variety of species distributed throughout the division. The composition, distribution and stocking of the forest are mostly influenced by edaphic and biotic factors as topography and climatic factors are almost identical. The biotic factors seems to have altered composition of the growing stock to a varying extent. The forest in the vicinity of the densely populated village have deteriorated considerably

probably due to heavy harvesting and grazing. The quality of the forests varies from II to IVb and the density of the crop varies from less than 0.4 to 0.7. The forest can be grouped in to following two main groups.

(A) Teak bearing forests with bamboos

2.1.5 The best quality of these forests occur around Kolsa in Shivani Range and between Dewada and Junona Villages in Moharli Range over deep well drained sandy loam or alluvial along Andhari nala in small patches. Teak (*Tectona grandis*) in the overwood generally varies from about 15 to 20% and occurs in association with many other species in various degree of intensity. It is almost pure where conversion operations supplemented with teak plantation were carried out in Wahid's (1927-37) and Hewetson's (1936-46) plans.

2.1.6. This type is also found on hill slopes in Moharli Range and narrow valleys where the percentage of teak varies from 20 to 80. The associates of teak are the same as given above but the quality deteriorates to Maharashtra IV (below 15 metre) to III (over 15 metre to 21 metre) due to shallow soil and comparatively drier conditions. The very areas have stunted bhirra (*Chloroxylon swietenia*), Lendia (*Lagerstroemia parviflora*) gongal (*Cochlospermum gossypium*), salai (*Boswellia serrata*) etc.

All the age classes are represented. Grass is fairly thick in open patches.

2.1.7. Half of the area was worked under simple coppice or coppice with standard from 1927 to 1948 whereas the remaining half was worked under coppice with reserve system from 1949 onwards. Crop is mostly young to middle aged with occasional mature trees.

2.1.8 Best quality of these forests (Maharashtra-III) occur over the deep sandy loam soils of Kolsa, Mul and Moharli Ranges bordered by Pangdi, Karwa, Khatoda, Moharli, Adegaon, Pahmi, Piparheti and Doni

villages which are comparatively moist. Bamboo under lower canopy are of good quality and occupy total growing space to the total exclusion of undergrowth and regeneration. The composition of species is the same as given in I (I) above with lower percentage of teak. Semal grows in good proportion near Pangdi, Kolsa and Doni villages and tends to be gregarious in the forests lying between Pangdi and Doni. It is mostly young to middle aged. All the trees over 135 cm have been practically removed. Seedlings and sapling are scarce. These forests were worked under conversion working circle system in the plan under revision and all the age classes are represented with preponderance of middle aged trees. The quality falls to Maharashtra IV in parts of Moharli, Mul, Kolsa, Chandrapur and Warora Ranges, where these forest grow on dry hill tops and on heavy loamy soils west of Nawargaon Chauki in Moharli Range up to Ordnance Factory Chanda in Warora Range and upto reserved forest boundary adjoining Padmapur village. The main species occurring on heavy soil are Ain, Dhaora, Tendu adjoining Padmapur village. The main spp. occurring on heavy soil are Ain Bel, Khair, Hiwar, Ghoti and Ber, Rohan, Garari and occasional Bija appear on dry hill slopes. Bamboos are of poor quality and thin in size. Climbers such as Kukranji, Eroni and Chilati are common and are a grave threat to regeneration at places. Heavy grazing, frequent fires and illicit felling are changing the vegetation to xerophytic on the fringes of the forest where the crop has become very open and stunted and blanks are created. Khair, Bel, Ber, Hiwar, Palas and Rohan predominate. On black loamy soils Garari appears. Reproduction is scanty. Sheet and gully erosion are clearly noticeable. In such areas Kharata and dikamali occur as the main shrubs.

Floristics :-

2.1.9 i) Top Canopy : Teak (*Tectona grandis*), Bija (*Pterocarpus marsupium*), Dhaora (*Anogeissus latifolia*), Ain (*Terminalia tomentosa*) Semal (*Bombax ceiba*), Mahua (*Madhuca latifolia*), , Tendu (*Diospyrus melanoxylon*), Lendia (*Lagerstroemia parviflora*), kusum (*Schleichera oleosa*), haldu (*Adina cardifolia*) Kullu (*Sterculia urens*), Shirus

(*Albizzia lebbek*) and Salai (*Boswellia serrata*). Koha (*Terminalia arjuna*) occurs along nalas.

2.1.10 ii) Second storey : The second storey is formed of the above species besides patches of garari (*Cleistanthus collinus*), achar (*Bucchanania lanzan*), Moyen (*Lannea grandis*) Bhirra (*Chloroxylon swietenia*), Bel (*Aegle marmelos*), Ghoti (*Zizyphus xylopyra*), Aonla (*Embllica officinalis*), gongal (*Cochlospermum religiosum*), hirda (*Terminalia chebula*), amaltas (*Cassia fistula*), kumbhi (*Careya arborea*).

2.1.11 iia) Bamboo (*Dendrocalamus strictus*). Upper and lower canopies are mostly uneven and merged in each other.

2.1.12 iii/iva) Shrubs/Herbs : Kukaranji (*Calycopteris floribunda*), kuda (*Holorrhæna antidysentrica*), marorphal (*Helicteres isora*), Dikamali (*Gardenia resinifera*), Jilbili (*Woodfordia fruticosa*), Bhuichind (*Phoenix sylvestris*), surya (*Xylia xylocarpa*) chirchira (*Achyranthes aspera* and *Gardenia spp.*) aroni (*Zizyphus oenoplia*),

2.1.13 ivb) Grasses : Kusal (*Heteropogon contortus*), Chir (*Imperata officinalis*), Bhurbhushi (*Eragrostic tenalla*), Mushan (*Iseilema laxum*),

2.1.14 v) Climbers : Palas-bel (*Butea superba*), mahul (*Bauhinia vahlii*), gunj (*Arbus precatorius*), ramdaton (*Smilax macrophylla*), shataori (*Asparagus racemosus*) chilati (*Acacia pinnata*),

. B) Mixed forests without bamboo

2.1.15 These forests occur in Warora Range of Chandrapur Division . The quality varies from place to place depending upon soil and biotic factors which are very pronounced. Mostly the quality is Maharashtra IV improving to Maharashtra III in small pockets in valleys and nalas. The forests are composed of a number of species, important being Bija , Lendia

, dhaora , Shiwan, Aonla, tinsa, Ain, Semal, Mahua, Tendu, Achar and patchy Teak. In these forests grazing is heavy and illicit felling are common. Sheet erosion is in advanced stage and the undulating areas are cut up by nalas. Reproduction is scanty.

2.1.16. B class forests are scattered in small patches and are mostly understocked. Their boundaries are not well defined on the ground. Heavy encroachments for cultivation have taken place in many places

Floristics :-

2.1.17 i) Top Canopy : Teak (*Tectona grandis*), Bija (*Pterocarpus marsupium*), Dhaora (*Anogeissus latifolia*), Ain (*Terminalia tomentosa*) Semal (*Bombax ceiba*) , Mahua (*Madhuca latifolia*), , Tendu (*Diospyrus melanoxylon*), Lendia (*Lagerstroemia parviflora*), kusum (*Schleichera oleosa*), haldu (*Adina cardifolia*) Kullu (*Sterculia urens*), Shirus (*Albizzia lebbek*) and Salai (*Boswellia serrata*) Moyen (*Lannea Coromandelica*), Jamun (*Syzigium cumini*), baranga/bhoti (*Kydia calycina*), Koha (*Terminalia arjuna*) occurs along nalas.

2.1.18 ii) Second storey : The second storey is formed of the above species besides patches of garari (*Cleistanthus collinus*), achar (*Bucchanania lanzan*), Moyen (*Lannea grandis*) Bhirra (*Chloroxylon swietenia*), Bel (*Aegle marmelos*), Ghoti (*Zizyphus xylopyra*), Aonla (*Embllica officinalis*), gongal (*Cochlospermum religiosum*), hirda (*Terminalia chebula*), amaltas (*Cassia fistula*), kumbhi (*Careya arborea*).

2.1.19 iii/iva) Shrubs/Herbs : Kukaranji (*Calycopteris floribunda*), kuda (*Holorrhena antidysentrica*), marorpal (*Helicteres isora*), Dikamali (*Gardenia resinifera*), Jilbili (*Woodfordia fruticosa*), Bhuichind (*Phoenix sylvestris*), surya (*Xylia xylocarpa*) chirchira (*Achyranthes aspera* and *Gardenia spp.*) aroni (*Zizyphus oenoplia*), Neel (*Indigofera tinctoria*)

2.1.20 ivb) Grasses : Kusal (*Heteropogon contortus*), Chir (*Imperata officinalis*), Bhurbhushi (*Eragrostic tenalla*), Mushan (*Iseilema laxum*),

2.1.21 v) Climbers : Palas-bel (*Butea superba*), mahul (*Bauhinia vahlii*), gunj (*Arbus precatorius*), ramdaton (*Smilax macrophylla*), shataori (*Asparagus racemosus*) chilati (*Acacia pinnata*),

(C) Edaphic Type

(i) 5/E 2 Salai forests:- In these forests salai forms an over-wood, sometimes well grown medium to large trees occur on the flatter tops of the hills. It is generally 12-15 m high and 1.2 to 1.8 m in girth, the only species equaling it in size after being kullu. In these forests salai is found with gongal, dhaora, kullu, lendia, mowai and aonla. The type occurs on a variety of rocks, particularly crystalline, sometimes lateritic rocks and trap. The soil is usually bouldery or pebbly, shallow and dry. Hill tops, ridges and spurs, and well drained plateau are the usual sites. Reproduction of salai in such forests is scanty often non extinct.

(ii) 5/E 4- Anjan forests:- This type is found in small patches in the forest area where anjan is the predominant species. The soil is hard and gravelly overlying trap. The other species occurring with it are teak, salai and shisham. Most of the anjan trees are middle aged to mature and the regeneration is absent.

(iii) 5/E 5 – Palas forests:- This sub-type is found in the stiff badly drained clay soils or very dry clayey soils and particularly in black cotton soils in ill drained flats and depressions. On flat ground this type presents a savannah appearance with scattered stunted and very malformed trees or thickets standing over short grass or bare ground.

Teak and Geology:-

2.1.22 The occurrence of teak in the forest of Chandrapur Forest Division are dependent on geological formations. The studies show that the best teak is found on Vindhayan sand stones, shales and to some

extent on Kamthi sand stones. The good teak occurs on metamorphic rocks when capped with laterite. Bamboo occurs only in sand stone areas. On sedimentary rocks other than Vindhayan sand stone the teak is absent. Teak is absent or poor in growth on sandy soils. Teak without bamboo is found where the drainage is good. In poorly drained soils teak is replaced by bamboos.

Species in need of conservation :-

2.1.23 The following species is in need of conservation measures, *Doroxylum indicum*, *Radermachera xylocarba*, *Eriolaena hookeriana*, *Spondias mangifera*, *Careya arborea*, *Ehretia laevis*, *Hymenodictyon Excelsum*, *Litsea gluginose*, *Mallots phillipensis*, *Pterocarpus marsupium*, *Trema politoria*, *Ficus cunia*, *Yaesa indica*.

MEDICINAL PLANTS :-

2.1.24 The important medicinal plants found in this division are *Asparagus racemosa*, *Chlorophytum tuberosum*, *Equisetum sp.*, *Hygrophila auriculata*, *Bauhinia diffusa*, *Terminalia bellerica*, *Terminalia chebula*, *Embllica officinalis*, *Soymida febrifuga*, *Solanum violaceum*, *Glorisa superba*, *Pueraria tuberosa*, *Plumbago zexlamica*, *Iplengenia indica*, *Cassia absus*, *Holarrhena antidysenterica*. *Hemidesmus indicus*, *Helicteres isora*, *Evolculus alsinoides*, *Vernonia cineria*.

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

The forests are liable to the following injuries.

i) Fire:

2.2.1 Dry season from February to June is very long and during which the forests are susceptible to fires. Fires taking place by the end of winter and at the beginning of summer are not severe. Late fires in coupes closed to grazing are very 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 crop like teak gets killed in the form of die back. Severe fires cause scorching leading to unsound and hollow stems which further render them to fungus and insect attack. Fires cause

soil erosion indirectly, by destroying vegetal soil cover. Fires are set by people with an interest to collect flowers, fruits, good tendu flush and grass. Fires cause laterisation of soil due to destruction of silicate gel. The repeated fires have helped the teak in attaining the climax as it survives the low intensity fire while the miscellaneous seedlings are wiped out. The corky bark of full grown teak tree prevents damage to the timber due to fire. But fires cause loss of moisture in the soil which affects the growth and increment of the tree.

The number of fires which occurred during 1990-91 to 1999-2000 is given in the following table -5

TABLE – 5

Sr.,No.	Year	No. of cases.	Area burnt (in ha)
1	2	3	4
1	1990-91	12	3110.00
2	1991-92	27	2367.00
3	1992-93	15	148.00
4	1993-94	81	10835.00
5	1994-95	9	219.00
6	1995-96	8	425.00
7	1996-97	16	345..00
8	1997-98	24	200.00
9	1998-99	17	91.25.
10	1999-2000	38	293.50
11	2000-2001	18	571.00

ii) **Illicit felling:**

2.2.2 Illicit felling for timber, firewood, poles is a very common practice. Adiwasis presume it is their right to cut any tree in the forest. Mostly it is aimed at encroachment for cultivation, an activity to support household a recreational means like passing time while axing a tree and so on. Large scale illicit cuttings are for the benefit of land grab movement.

The people are not interested in wood as such but in the land cleared for cultivation. The extent of illicit cutting in Chandrapur Forest Division is shown in the following table-6

TABLE-6

Type of offence	No.of offence cases	No. of trees	Quantity in M ³	App. cost in lac	Quantity of seized material in M ³	Revenue obtained in lac	Remarks
1	2	3	4	5	6	7	8
1996-97							
Teak	1150	1310	18.231	4.75	18.231	3.66	
Non-teak		3846	22.777	2.18	22.092	1.291	
1997-98							
Teak	918	954	103.863	8.23	51.626	5.48	
Non-teak		2357	145.259	4.84	47.523	3.30	
1998-99							
Teak	610	648	45.272	3.905	38.774	4.221	
Non-teak		1460	137.269	3.387	32.416	0.621	
1999-2000							
Teak	762	636	75.341	7.289	57.372	5.738	
Non-teak		1981	108.018	2.197	27.801	1.61	

2000-01							
Teak	1104	903	111.75	9.19	53.788	5.53	
Non-teak		3602	236.54	4.74	47.626	2.18	

iii) **Encroachments:**

2.2.3 Encroachments are quite common in Chandrapur Forest Division being near to the City as well as due to settlement of villages near and inside the forest areas. The encroachments are common on Protected Forest areas and less on Reserved Forest areas. The large scale encroachment is seen in Chandrapur and Mul ranges. The extent of land under encroachment in Chandrapur Forest Division as on 10-6-2002 as confirmed by Deputy Conservator of Forests, Chandrapur Forest Division, Chandrapur vide his letter No. 699 dated 10-6-2002 is 3320.57 ha. 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 April 78 and 25th October 1980 respectively to be removed. The matter is now subjudice.

iv) **Grazing by cattle:**

2.2.4 This is another damaging elements destroying young regeneration, plantations and soil texture by trampling. It is common near the villages. Unauthorised grazing is common. Number of cattle grazing

on this forest are exceeding 1.30 lakhs. The over and illicit grazings have become a great threat to the forest here. The maximum depletion occurs when the forests are near to a large inhabitation. 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 milch 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, grazer starts lopping green foliage, especially of ain (*Terminalia tomentosa*), Sissoo (*Dalbergia sissoo*), Apta (*Bauhinia recemosa*), Kahu (*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.

v) **Wild animals:**

2.2.5 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.

vi) **Insects and fungi:**

2.2.6 The attack of teak-skeletonizer (*Hapalia machaeralis*) and teak-defoliator (*Hyblaea puera*) are common in teak patches and occur almost every year during that period. 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 remain in foliage for a longer time. 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 hallowness 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 (*Embllica 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 leucopholoea* is attacked by *Hapalophraginium ponderosum* causing woody galls. Teak seedlings in the nursery are attacked by white grub on a large scale. Termite 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.

vii) **Climbers and weeds:**

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

viii) **Parasites and epiphytes:**

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

ix) **Frost:**

2.2.9 Frost does not occur here.

x) **Wind:**

2.2.10 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

xi) **Drought:**

2.2.11 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.

SECTION-3: SOIL EROSION.

2.3.1 It is sheet erosion and very common all over the areas. 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 THE FOREST PRODUCE

SECTION – 1: AGRICULTURAL CUSTOMS AND NEEDS OF THE PEOPLE:

3.1.1 The Chandrapur Forest Division comprises of areas spread over Chandrapur, Mul, Bhadravati, Warora talukas of the districts. It is inhabited by Gond, Madia, Harijan, New Buddhist, Komti, Dhiwar, Madgi, Muslim, Chamar, Bengali who have settled in the villages also

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, 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 Chandrapur Forest Division is presented in the following table-7 (1991 census). The total population of the Chandrapur Districts is 1772000 spread over an area of 10695 SqKm. and distributed in twelve talukas. The rural population is 1275000 spread over an area of 10521 SqKm. and

the urban population is 497000 spread over an area of 174 Sqkm. The scheduled caste population is 16.90 % and scheduled tribe population is 19.09 %. 42.05 % of the population is labour, out of this 32.4 % are agriculturalist, 35.55 % are agricultural labourers, 1.78 % are small artisans and 13.43 % are engaged in other activities.

TABLE-7

Taluka	Area (Sqkm)	Population density (in thousands)	No.of villages	
			inhabited	Deserted
1.Chandrapur	941	499	113	13
2.Bhadravati	1121	118	125	35
3. Warora	1184	132	154	34
4. Mul	495	197	71	36

Table-7 continued.....

Taluka	No.of houses	No.of families	Population in thousands		
			M*	F**	Total
1.Chandrapur	96000	102000	248	222	470
2.Bhadravati	28000	29000	68	64	132
3. Warora	32000	35000	80	76	156
4. Mul	19000	20000	48	49	97

M* - Male

F** - Female

3.1.4 The Chandrapur district is having an area of 10695 Sqkm and out of this 3651 Sqkm area covered under forest i.e. 33.44 % area of the district is covered under forest. The total number of villages 1792 and

out of this 319 are deserted villages 72.36% of the land under cultivation is used for producing food crops particularly Rice i.e. 25.91 % and the area under Jwar cultivation is 15.99 % and that under cotton production is 10.15 %.

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 158528 ha i.e. 30.97% of the land under cultivation is irrigated.

3.1.6 As per the 1992 live stock census the live stock population of district is 1079028 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 105 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 The main requirements for which the people depend on the forest 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.

iii) Bamboos – These are used for preparation of mats, baskets and construction of huts.

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 inhabitant being poor, resort to collection of mahua flowers and fruits of tendu, khirni and achar for their bonafide consumption. Palas and Mahua leaves are used for preparation of patrawalies (leaf plates) and drona (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 and departmentally auctioned.

3.1.9 The per day requirement of households (Families) can be fairly estimated to be 4,56,305 kg/per day of fuel wood apart from the bonafide requirement of the wood from the forests. Obviously such gigantic requirement can not be met from the forest. Further, fodder requirement also cannot be met. Therefore integrated approach in consonance with social forestry need to be undertaken with special emphasis on people's participation.

SECTION 2: MARKET AND MARKETABLE PRODUCE:

3.2.1 The main consumption of the timber is in Chandrapur from where it is distributed elsewhere in the state. Most of the minor forest produce is consumed locally.

3.2.2 Marketable produces: Teak is the main timber in demand along with ain, kalam, salai, babul, behada, dhaora, mango. The other marketable produces are bamboo, tendu leaves, fruits, honey, gum, ber, mahua flowers and fruits, aonla, char, bel, and leaves for fodder such as anjan.

3.2.3. The forest department has established depot at Chichpalli, Chandrapur and Agarzari. The average lead from forests to this depot is about 20 to 30 km.

3.2.4. Besides agriculture, there are some small occupation/ industries in the villages and townships which depend on the forests. The important ones are given below :-

- a) Fabricating bamboo articles:- The bamboo is required for making baskets, mats and other articles. This work is mostly done by Burads.
- b) Veneer and plywood factory: The timber from good quality teak and miscellaneous species is used for manufacturing plywood.
- c) Saw mills:- There are number of saw mills depending largely on forest material. List of saw mills is given in **Appendix No. XIII.**
- d) Furniture industries:- There are number of furniture shops in Chandrapur, Warora, Bhadrawati, Mul which depend on this division for supply.

3.2.5. 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.

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 .Kukranzi has the tremendous usage as a fuel wood. The following table-8 shows quantity of fuel wood and charcoal obtained and revenue realised:

TABLE-8
Teak , mixed & other fuel stack's revenue realised

Year	Forest produce	Quantity in No.	Amount Rs.	Forest Produce	Quantity In Qtl.	Amount Rs.
1990-91	Stacks	2098	757969	Charcoal	1823	61366
1991-92	-do-	1593.5	3162900	-do-	5910.5	207629
1992-93	-do-	6309	1912496	-do-	1392	49416
1993-94	-do-	4534	883107	-do-	5875	246750
1994-95	-do-	624.5	361662	-do-	4065	181966
1995-96	-do-	479.5	182715	-do-	-	-
1996-97	-do-	357	299275	-do-	-	-
1997-98	-do-	222	161360	-do-	-	-
1998-99	-do-	42	73800	-do-	-	-
1999-2000	-do-	161	182715	-do-	-	-

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 bamboo are also supplied to Ballarpur Paper Mills on commercial terms. The quantity of bamboo extracted and revenue realised is given in table -9

TABLE-9
Bamboo Extracted & revenue realised

Year	Forest Produce	Quantity in No.	Amount Rs.
1990-91	Bamboo	235061	635056
1991-92	-do-	366002	1227423
1992-93	-do-	286214	1450912
1993-94	-do-	236589	843749
1994-95	-do-	470273	1404766
1995-96	-do-	412827	1584000
1996-97	-do-	315013	1556135
1997-98	-do-	195448	8960181
1998-99	-do-	101952	493170
1999-2000	-do-	210086	1090293

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.

(2) Tendu Leaves:- There is a large demand for tendu leaves for bidi manufacturer. The figures for sale of tendu units during the last Ten years is given in table-10

TABLE-10
Tendu leaves std. Bags extracted & revenue realised

Year	Forest produce	Quantity No. of std.bags	Revenue realised Rs.
1991-92	Tendu leaves	71385.703	21900996
1992-93	-do-	93659.475	35291928
1993-94	-do-	39564.805	28807512
1994-95	-do-	43907.170	32103207
1995-96	-do-	46280.701	36045655
1996-97	-do-	44528.786	35596348
1997-98	-do-	43707.720	31671143
1998-99	-do-	35950.519	23543065
1999-2000	-do-	44589.480	33396298
2000-2001	-do-	41951.435	34535547

(3) Grasses : The grasses are the indispensable association of any dry deciduous species. The Chandrapur division has plenty of grasses and fodder species. They are used mostly by the local villagers either for feeding cattle or thatching. Grasses are also supplied to District Collector during the period of scarcity. Marvel (*Dichanthium annulatum*), Paona, (*Schima asculatum*) kunda (*Ischaenum pilosum*), Mushan (*Iseilema laxum*) are used as fodder. Kusal (*Heteropogon contortus*), Ghondad (*Themeda ciliata*) are used for thatching. Although the grasses are in plenty, yet there are no established kurans in the division. The quantity of grass extracted and revenue realized during last ten years is given in table-11

TABLE-11
Grass carts extracted & revenue realized

Year	Forest produce	Quantity in carts/ Metric tonnes.	Revenue in Rs.
1990-91	Grass	5 M.T.	36000
1991-92	-do-	--	11200
1992-93	-do-	--	--
1993-94	-do-	-	-
1994-95	-do-	-	-
1995-96	-do-	112 Carts	1120
1996-97	-do-	46 Carts	460
1997-98	-do-	-	-
1998-99	-do-	-	-
1999-2000	-do-	-	-

Seeing the importance and necessity of Fodder grasses the planting of such species is recommended. Strains of grass particularly leguminous grasses which have high nutritive value are suitable for planting under different soils and climatic conditions and is detailed in **Appendix No. XIV**.

4) Moha flower and seeds: There are plenty of Moha trees in the Chandrapur 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-12
Moha flowers & fruits extracted & revenue realised

Year	Forest produce	Quantity (in Qtl).	Amount in Rs.	Forest produce	Quantity (in Qtl)	Amount In Rs.
1991-92	Moha flowers	117360	121825	Moha seeds	1651.68	82584
1992-93	-do-	--	--	-do-	-	-
1993-94	-do-	--	--	-do-	-	-
1994-95	-do-	--		-do-	--	--
1995-96	-do-	58	58333	-do-	108	54308
1996-97	-do-	343	17132	-do-	--	--
1997-98	-do-	--	--	-do-	-	-
1998-99	-do-	--	--	-do-	-	-
1999-2000	-do-	--	--	-do-	-	-

5) 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 –13.

TABLE-13
Gum extracted & revenue realised

Year	Forest produce	Quantity (Qtl.)	Amount Rs.
1990-91	Gum	179.10	41000
1991-92	-do-	319.10	50000
1992-93	-do-	--	--
1993-94	-do-	--	--
1994-95	-do-	-	-
1995-96	-do-	40	86700
1996-97	-do-	145	52000
1997-98	-do-	-	-
1998-99	-do-	-	-
1999-2000	-do-	-	-
2000 -2001	-do-	72.63	22000

(6) **Other forest produce:** Charoli, Honey, wax, Hides and horns, edible fruits, roots, bark, leaves of mahua, fencing material ,silt, murrum, stones etc. are the other produces derived and obtained from forest

The information regarding the prices of forest produce realised is given in **Appendix No. XV.**

SECTION-3 : LINES OF EXPORT:

3.3.1 The mode of transports are by railway and roads. Well knitted, all weather roads are presently serving the tract.

Railways

Chandrapur – Nagpur

Chandrapur – Gondia

Chandrapur – Kazipeth

Roads:

State Highways

Nagpur – Chandrapur Road

Major District Road

- 1 Warora – Chimur Road
- 2 Chandrapur – Rajura-Asifabad
- 3 Chandrapur – Mul – Gadchiroli
- 4 Chandrapur - Rajura-Adilabad

Other District Roads.

1. Chandrapur-Tadoba
2. Chandrapur- Ballarpur-Allapalli

3.3.2 The roads are maintained by P.W.D. Forest Department is also maintaining the roads. All these roads and rail lines have important role in transportation of Forest material to the main market centers.

Appendix No. XVI shows the list of existing road in Chandrapur division.

SECTION - 4 : METHOD OF HARVESTING

3.4.1 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.

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 pole 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 done by job rates.

Maintenance of registers in depots:

3.4.2 (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 acknowledge 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.

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

- (a) **Daily receipt register :-** It will contain details of daily receipt. It will have the entries as stated in the carting challan.
- (b) **Depot measurement register :-** This will contain the entry of the measurement of lots done in the depot.

- (c) **Lot register :-** The lot register will contain 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 will contain 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 will have 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 will contain 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.

3.4.4 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 $\frac{3}{4}$ 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 $\frac{1}{4}$ 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 $\frac{1}{4}$ 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.

3.4.5 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.

3.4.6 Tendu leaf trade is nationalized since 1969. Now the leaves are rarely collected departmentally and auctioned. There are separate rules for sale of tendu leaves. Tendu leave 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.

3.4.7 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. Various operations of harvesting are carried out either on daily wages or on a fixed quantum of work basis. These fixed rates are to be paid on quantum basis for different forestry operations and are sanctioned every year by the circle wage board committee presided over by the Conservator of Forest, North Chandrapur Circle and is detailed in **Appendix No. XVII.**

SECTION 6 : PAST AND CURRENT PRICES:

3.6.1 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 realised from timber during last ten years is given in table .14.

TABLE-14

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	1990-91	623.652	3711942	1895.02	3483124
2	1991-92	3429.109	17145545		
3	1992-93	1198.249	1999869		

Table continued.....

1	2	3	4	5	6
4	1993-94	869.94	2515360		
5	1994-95	383.669	2548405		
6	1995-96	116.279	1527905	206.559	358680
7	1996-97	114.859	1468280	145.008	442362
8	1997-98	58.093	688825	97.294	365295
9	1998-99	111.521	1604165	169.749	566257
10	1999-2000	82.288	1252635	149.081	903352

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CHAPTER-4

STAFF AND LABOUR SUPPLY

SECTION-1 : ADMINISTRATIVE SET UP

4.1.1. The Government of Maharashtra vide resolution No. FDM/1880/1/F2 dated August 29, 1983 created North Chandrapur Circle with its headquarter at Chandrapur comprising of four territorial divisions viz Bramhapuri, Wadsa, Gadchiroli and Chandrapur Forest Division. The Chandrapur Forest Division with its headquarter at Chandrapur comprises of ranges viz Chandrapur, Mul, Shioni, Warora and Mohorli. The following table-15 illustrates the set up of organisation in Chandrapur Forest Division.

TABLE-15

Sr.No.	Name of the Range	Range Headquarter	Rounds	Beats	Area in ha
1	Chandrapur	Chandrapur	3	11	9609.117
2	Mul	Mul	4	19	24972.028
3	Shioni	Shioni	5	13	21089.547
4	Warora	Warora	2	11	19066.0612
5	Mohorli	Mohorli	3	9	13911.430

4.1.2 Staff:- The Deputy Conservator of Forests is in charge of the forest division. The existing staff in the Chandrapur forest division and number of post alongwith their pay scales is given in the following table-16

TABLE-16			
STATEMENT SHOWING THE POSITION OF STAFF			
Sr. No	Category	No.of post	Pay Scale
1	2	3	4
GAZETTED			
1	Dy. Conservator of Forests	1	10000-325-15200
2	Asstt. Conservator of Forests	4	7450-225-11500
3	Range Forest Officer	11	6500-200-10500
NON-GAZETTED			
1	Chief Accountnat	1	5500-175-9000
2	Accountant	10	4500-152-7000
3	Clerks	21	3050-75-3950
4	Forester	55	4000-100-6000
5	Forest Guard	186	2750-70-3800
6	Forest Surveyor	1	4000-100-6000
7	Jr. Statistical Assistant	1	4000-100-6000
8	Wireman	1	3200-85-4900
9	Police	1	3050-75-3950
10	Doctor	1	6500-10500
11	Compounder	1	4500-7000
12	Nurse	1	3050-4590

Table-16 continued.....

1	2	3	4
13	Driver	8	3200-85-4900
14	Naik	1	2610-60-2960
15	Peon	3	2550-55-2660
16	Chioukidar	4	2610-60-2960
17	Dak-runner	1	2550-55-2660
18	Swipper	1	2550-55-2660
19	Daftari	1	2610-60-2960
20	Wardboy	1	2610-4000
21	Cleaner	2	3050-4590

4.1.3 The officers who have held the charge of the Deputy Conservator of Forests/Divisional Forest Officers of Chandrapur Forest Division are listed in the following table-17

TABLE-17

Sr. No.	Name of Officers	Period
1	Shri.Chandrashekhar Joshi	1.9.1983 To 30.4.1985
2	Shri. P.P. Ghule	1.5.1985 To 30.6.1985
3	Shri. B.R. Pachpor	1.7 1985 To 1.7.1987
4	Shri. S.D. Sontakke	2.7.1987 To 16.4.1990
5	Shri. N.B. Mujumdar	17.4.1990 To 17.7.1993
6	Shri. Samir Sahay	18.7.1993 To 9.8.1993
7	Shri. Dilip Singh	10.8.1993 To 8.10.1995
8	Shri. Dr. V.D.Chafekar	9.10.1995 To 12.4.1999
9	Shri. S.P. Thakare	13.4.1999

4.1.4 Rest House: There are five rest houses at Chandrapur, Tembhurda, Moharli, Chichpalli and Karwa, three inspection huts at Ghanta-Chouki, Mul, Chichpalli. The rest houses are in bad condition. The rest houses need to be maintained properly in order to encourage the field officers to discharge their functional responsibilities properly.

4.1.5 Forests Communication: Internal communication is by a network of fair weather roads. Bus service is adequate. Telephone communication is available at almost all range head quarters.

4.1.6 Control of Forest Offences: There is one mobile squad to control forest offences. It consists of one R.F.O.(M.S.), one Constable of police, one Forest guard and one Driver, for the jeep assigned to the squad for effective control of forest offences. One pick-up-van (Mini truck) has also been provided for the protection work in the division. Forest custody need to be established with the provision of lockup and custody facilities. The mobile squad works under dual control of D.C.F. Chandrapur Forest Division and C.F. North Chandrapur Circle, Chandrapur through D.F.O. Vigilance.

SECTION-2 : LABOUR SUPPLY

4.2.1 Most of the labour required for forestry works is obtained from adjoining villages. Departmental works such as working of coupes, cutting back operations, 5 years survey and demarcation, road repairs, fire protection and plantation works are mostly carried out through the labourers of the villages adjoining the forest reserves. These labourers are quite skilful in such works. Large number of labourers come from other states also. During summer large number of labourers come from M.P. (Particularly Balaghat Distt.) for plucking tendu leaves. The labour camps and other welfare activities need to be taken up for the labourers working in the divisions. There is no paucity of labourers in the division.

CHAPTER – 5

PAST SYSTEM OF MANAGEMENT

SECTION- 1 : GENERAL HISTORY OF THE FORESTS

(A) MANAGEMENT OF FOREST BEFORE 1951

5.1.1 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 ther 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 untill 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.

5.1.2 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 for 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.

5.1.3 The forests dealt with under the plan were reserved in 1879. No description of the forest at the time of reservation is available but the absence of large sized, trees as observed by Shri.C.E.Hewetson in his plan 1936-37 to 1945-46, shows that the forests were subjected to maltreatment by shifting cultivation and illicit felling for meeting the local demand. Fire protection was introduced in 1879 and gradually extended.

5.1.4. Commutation system was introduced after reservation was in force upto 1888. The commuters could remove their requirements from any part of the forests convenient to them. Thereafter it was replaced by extraction on licenses. The license holders selected cut material from any part of the forest till 1893 after which timber, green fuel and bamboo were felled from local areas. Grass, dry fuel, and minor forest produce could be obtained from the forest, in general.

(B) MANAGEMENT OF FOREST AFTER 1951:

5.1.5 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.

5.1.6 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 :

5.2.1 The reservation and commutation system was in force until 1888 thereafter it was replaced by the licence system. Upto 1893 purchasers were permitted to visit any parts of the forest and to select and cut their own material. From 1893 onwards, these indiscriminate felling were put a stop to and fellings of timber green fuel and bamboos were permitted only from the restricted areas while other produce such as grass, dry fuel and minor produce could be collected from the forest in general.

5.2.2 The preparations of working plans started at 1895 The first working plans were prepared for ranges, by the following officers and introduced between 1897 and 1900.

Shri. F. J. Langhorne (1897)	- Moharli Range (Part of Chimur Range)
Shri Poona Swami (1898)	- Warora Range

All the working plans had prescribed improvement felling. Forests were worked by petty purchasers who could remove trees not marked for reservation.

5.2.3. In 1900 the system in most of the felling series was changed to Coppice-with-Standards, but the felling of the inferior trees was not enforced except in coupes where the demand was keen. Several felling series originally proposed in old working plans could not be worked due to lack of demand and labour problems. Only few felling series of Moharli and Haveli ranges could be worked completely. From 1924 onwards much cutting back, thinning and climber cutting was done.

5.2.4 The forest in present Moharli and Chanda ranges were regularly worked. The improvement fellings prescribed in the working plans failed to achieve the objectives set for but the system of improvement fellings certainly improved the crop by opening up the congested crops and removing over mature trees.

**(1) WORKING PLAN FOR NORTH CHANDA FOREST
DIVISION,
CENTRAL PROVINCES BY SHRI S.A. VAHID, IFS
(1927-1937)**

5.2.5 The working plan was written for a period of 10 years and the fundamental principles of management were-

- (i) to attain normalcy in the forest and
- (ii) to establish the regeneration to the normal extent

5.2.6 This was the first plan prepared after carrying out detailed inspection of forest, its classification into forest types and quality classes and showing the same on topo-sheets for prescribing intensive management. The entire forest area consisted of 45 blocks and the area was divided into 792 compartments comprising of two series namely eastern and western. The western series included the present Warora, Mohorli, Chanda and Mul ranges and consisted of 519 compartments. The compartment boundaries mostly followed natural features. The forest was divided into four main types viz. teak, bija, bhirra and mixed and these types were further subdivided into four quality classes viz. I, II, III & IV. The last quality class was again subdivided into IVa & IVb.

5.2.7 The principle object of management of these forest were on financial basis in order to secured the maximum revenue from these forest but at the same time it was also considered that the requirements of local people for timber, fuel, grazing and minor forest produce should also be satisfied. The conservation of water was also given priority and the general objects of management of the forest were-

- (i) To obtain the largest possible sustained annual yield.
- (ii) To supply the local demand.
- (iii) To maintain the forest as a forest in the interest of the water-supply.
- (iv) To gain at the creation of a normal forest with a normal series of age classes and with normal regeneration.
- (v) With the minimum damage to the forest and the minimum hindrance to the realization of the above objects to provide grazing for local cattle.

5.2.8 In order to meet the above objects of management the following working circles were constituted:-

- (i) High Forest Working Circle
- (ii) Coppice-with-standard Working Circle
- (iii) Low Forest Working Circle
- (iv) Bamboo Working Circle
- (v) Low Forest Unworked Circle

(i) High forest working circle :

5.2.9 The best quality teak, bija and ain forest capable of growing timber trees were placed under this working circle to be worked under conversion to uniform system. Nine felling series covering parts of existing Moharli Range and part of the Chimur Range were created.

(ii) Coppice-with Standard working circle :

5.2.10 Forest of medium quality having bija and occasional teak were allotted, to coppice-with-standard working circle on 30 years's rotation. Teak, bija, ain, and haldu were prescribed as the most suitable standards. Eight felling series covering parts of existing Ranges were formed.

(iii) Low-Forest working circle :

5.2.11 Remaining areas excluding unworkable areas were allotted to this working circle. These were teak and mixed forests, considered unfit for large size timber production. Rotation of 30 and 40 years was fixed. Thirty eight felling series were formed. Prescription was clear felling where existing reproduction and resultant expected coppice were likely to restock the area. Provision was made to retain tree growth along nalas and over areas liable to erosion.

(iv) Bamboo working circle :

5.2.12 Sixteen overlapping felling series were created with felling cycle of 4 years. No felling of culms under one year was prescribed. Bamboo were

to be felled from the height of above 30 cm (12") but below 61 cm (24"). These rules were modified in 1930 in which the maximum height at which a culm was to be cut was kept 45 cm (18") and retention of 8 culms of over one year age was made obligatory. All dead bamboo were to be removed.

(v) Low forest unworked circle :

5.2.13 Remaining poor areas and forest village areas were allotted in which no regular working was prescribed.

**(2) WORKING PLAN FOR NORTH CHANDA FOREST DIVISION,
CETNRA PROVINCES AND BERAR BY C.E. HEWETSON,
IFS (1936-37 TO 1945-46)**

5.2.14. Shri. Vahid's Plan which was drawn up for 10 years was introduced in the year 1927-28 and was revised by Shri. Heweston after it has run its course for eight years. The revised plan was brought into force in 1936-37.

5.2.15 The general objects of management of the forest under this working plan were to obtain the maximum sustained yield of all classes of forest produce and to meet the local demand. And consequent to this the methods of treatment to be adopted under this plan were –

- (i) The better quality forest were to be managed for the production of large timber and the rotation period will be 80 years and the regeneration will only be possible when advance growth is established under the mature crop.
- (ii) The poor quality forest were to be managed on rotation period of 40 years for the production of poles and fuels to the local people and the regeneration was to be obtained by coppice.
- (iii) Bamboos were to be worked on 4 year felling cycle

5.2.16 In the 1927 Vahid's Plan high forest working circle was proposed for Warora, Bramhapuri and Sindewahi Ranges aimed at the production of large size timber but it was found that only a small area was suitable for this purpose where as in Chanda, Moharli and Mul ranges the better quality forest formerly in the coppice with standard were capable of producing large size timber and therefore these areas had been placed under high forest working circle in this plan . Based on these observations the following working circles were formed :

(I) THE HIGH FOREST WORKING CIRCLE :

5.2.17 This working circle comprised of all compartments of Moharli, Mul and Chanda ranges with higher quality forest alongwith few compartments of Warora range. The silvicultural systems adopted was conversion to normal. The rotation period was fixed as 80 years. The subsidiary silvicultural operations included thinning, cutting back operations and removal of dead and malformed trees

(II) COPPICE WITH STANDARD WORKING CIRCLE:

5.2.18 Shri. Hewetson, brought all the forests allotted to High Forest and Low Forest Working Circle under Coppice-with-Standard Working Circle. The object was to meet the local demand for small timber and fuel. Rotation of coppice was fixed for 40 years; whereas no rotation for standards was fixed. Standards of semal and bija 120 cm (4') girth and teak, ain, shisham, siwan, bhirra and tinsa of 45 cm. to 60 cm (15"to 24") in girth were prescribed to be retained for the production of large timber.

(III) BAMBOO WORKING CIRCLE

5.2.19 Poor and under stocked areas, steep slopes, areas liable to erosion and strips along water courses were not to be worked. The remainder was to be clear felled in non bamboo forests. Bamboo felling,

three years before the coupes was due for working was prescribed in forests having bamboo with experimental burning of bamboo to stimulate reproduction. Over wood was to be retained in the areas deficient in reproduction to hold the soil and to keep the bamboo in check. Reservation of saplings below 9" (22.86 cm) was enforced from 1943 C.B.O. was to be done after the contractor relinquished the coupe, climber cutting and C grade thinning were to be done at the age of 15 years.

(IIV) MISCELLANEOUS WORKING CIRCLE:

5.2.20. Irregular working removal of dead and dying trees and improvement or selection felling under the orders of the Conservator of Forests was prescribed.

5.2.21. Some of the areas allotted to the miscellaneous working circle were worked as per the method of working approximated to the coppice-with-standard system.

(3) WORKING PLAN OF SHRI SINGH AND SHRI MUJUMDAR (1949-50)

5.2.22. Under this plan all A class forests were stock mapped showing the quality classes and types of forests. Forests having 15% and over of teak were shown as teak forests and the remaining were shown as mixed forest. Quality classes were fixed on the arbitrary limits or the heights. Under stocked areas and blanks too were indicated. The toposheets however, did not give any indication of density of the crop and the condition of regeneration

5.2.23. The forests were classified for the first time on the functional basis in the trees, minor, pasture and miscellaneous forests. Tree forests were those which could produce timber, fuel and other forest produce and were main source of revenue. An average grazing incidence of 3 cattle units was fixed. Better quality forests of North Sindewahi and South Sindewahi ranges were included in this class. Forests which could not produce large

size timber but grow medium sized timber, poles and firewood classed as minor forest. Grazing incidence of 2 cattle units per acre was fixed. Beside, periodic closures were prescribed. Areas having no or little tree growth were classed as pasture. Keeping in view the above classification, the following working circles were formed as far as the Reserved forests of the Chandrapur division concerned.

- i) Coppice-with Reserves Working Circle
- ii) Miscellaneous Working Circle.

(i) Coppice-with-Reserves Working Circle :

5.2.24 This working circle covered practically the whole of the workable areas of the division. The forests are much varied in composition density and quality of growing stock. Few “minor forests” and few “trees forests”, which could not be conveniently separated for management were allotted to this working circle. In all, twenty four felling series were kept more or less the same as in the low forest Working Circle of Shri. Hewetson’s plan except that a few more felling series were constituted out of the unallotted compartments in old Bairagarh range. The chief object of management was to supply small timbre poles, firewood, fodder and grazing. Rotation was fixed at 40 years and regulation of yield was by area.

5.2.25 The prescriptions consisted in excluding from working steep and precipitous slopes, under stocked areas with density below 0.4 and one chain wide strips along main water sources. Dead, dying and over mature trees were however allowed to be removed from these areas.

5.2.26 Trees bearing edible fruits and flowers, *Gardenia latifolia*, all semal and bija below 4’-6’ (137 cm) in girth at breast heights, all advance growth below 9” (23 cm) at B.H. except garari were to be reserved all over. Besides, at least 30 reserves per acre up to 2’ to 3’ girth were to be retained in the well stocked areas, and their number was to be 40 to 50 per acre in the medium and low stocking forests. Thinning at the time of main

felling in the patches containing pole crop was to be done In the areas having bamboo, Felling of bamboo three years in advance was prescribed to help the existing reproduction to establish. Density of over wood was to be kept dense where the reproduction was scanty to keep down bamboo, weeds and grass.

5.2.27 C.B.O. was prescribed in the year following the main felling. Cleanings in the 8th year after the working of the coupe and thinning were prescribed in the better quality teak and mixed forest in the 20th year after the main felling.

5.2.28 All coupes were closed to grazing for a period of seven years after main working. Further in moderately grazed areas three years closure was prescribed after the mid rotation. In heavily grazed areas, besides the above closures, monsoon were prescribed.

(4) WORKING PLAN OF SHRI. KARTARSINGH (1977-78 TO 1991-92)

5.2.29 This working plan was prepared for 15 years of working spread over 33 blocks divided into 555 compartments running in two series The one series covered forest of Warora, Chimur, Mohorli , Kolsa, Mul and Chanda ranges and other series comprised of Nagbhid range.

The general objects of management in this plan were as follows:

- (i) The preservation and improvement of “ Tree Forests” for the production of big size timber, specially teak to the extent possible and to provide for the maximum sustained yield.
- (ii) To increase the proportion of valuable species such as teak, semal, bija, shisham etc. by giving preferential treatment and by plantations.

- (iii) The preservation and improvement of "Minor Forests" on the basis of the maximum sustained annual yield of mainly firewood and poles.
- (iv) To aim at the creation of the normal forests.
- (v) To create grass reserves in the heavily populated areas.
- (vi) To arrest soil erosion.
- (vii) To reboise the understocked patches.
- (viii) Consistent with the above to derive maximum revenue for the state.

5.2.30 Under this plan, the forests were managed under three categories:

- (a) The marginal areas prone to adverse biotic influence whereby resulted in the failure of regeneration and liable to erosion were worked under Improvement felling.
- (b) These areas also included the class of forests which were having malformed tree growth and unrestricted grazing.
- (c) The better stocked forests which have been well regenerated under the past C.W.R. continued under the same system of management.

In order to meet the above objectives following working circles were constituted.

(i) Conversion Working Circle.

5.2.31 It covered the parts of Chandrapur and Moharli ranges. The main object was to convert the uneven aged and irregular mixed forest to uniform even aged crop of valuable species mainly teak. The natural regeneration of teak was inadequate and hence it was prescribed to have

clear felling and artificial regeneration, taking the advantage of advanced growth. Conversion period of 80 years was fixed which was divided into four periodic blocks of 20 years each. The silvicultural system followed was conversion to uniform by clear felling and raising teak plantations all over the area. The yield was regulated by area. Separate marking rules were provided for each of the periodic blocks. The subsidiary silvicultural operations included weeding and replacement of casualties in the plantations, cleaning, thinning, removal of dead and dying trees, removal of diseased and unsound trees if silviculturally available and are not likely last till the next felling cycle. The soil conservation measures for like gully plugging and construction of check dams was also prescribed.

(ii) Coppice With Reserve Working Circle.

5.2.32 Bulk of these forest were worked under C.W.R. working circle with rotation of 40 years. It covered the areas capable for producing small to medium sized timber, poles & firewood. The main object of constituting this working circle was production of firewood and small timber to the maximum possible extent. The choice of the species was teak followed by tendu, dhawda, garari, lendia and aonla. The subsidiary cultural operations included cutting back operations, cleanings and thinnings. The felling prescriptions provided for "B" and "C" type areas were different.

Area B : Clear felling in density 0.7 & above with certain reservations. **Area C** : Clear felling all trees except semal for raising teak

(iii) Improvement Working Circle.

5.2.33 The areas allotted to this working circle were marginal areas which had failed to regenerate during the previous working plans due to heavy biotic pressure. The forest are degraded and liable to erosion. The forest areas are surrounded by heavy population and therefore illicit felling and grazing were rampant. Intention was to rehabilitate the degraded areas due to insufficient protection from grazing, fires & illicit cutting. The

silvicultural system were improvement felling followed by artificial regeneration and tending operations. No rotation was fixed for this working circle. The subsidiary silvicultural operations prescribed were weeding and thinning.

The felling cycle was of 20 years and therefore 20 annual coupes were formed. In well stocked areas, following prescriptions were given.

- 1) All dead, dying and unsound hollow trees shall be marked for felling irrespective of their girth.
- 2) Patches containing advanced growth of teak over at least 1 or 2 ha. will be opened up by removal of over head canopy except that of semal.
- 3) Harvestable girth for Garari was 45 cm at b.h.

(iv) Kuran Working Circle.

5.2.34 In this working circle, the grass reserves were prescribed to be formed. It was devised for meeting the local fodder demands. These grass reserves mostly lie near the metal road because easy transportation of grasses during the rainy season may be possible. The general character of the vegetation was of low quality and mostly miscellaneous species of varying composition. The main species found in these areas were ain, moyan, lendia, tendu, rohan, achar, dhawda, bija and few patches of teak, bharati, lokhandi, dikamali, kharata and jilbili. The main grass found are bhurbhusi (*Andropogon contortus*), paonia, pelki etc. The main objects of forming this working circle were to improve the quality of fodder grasses and to increase their yield and also to arrest the soil erosion by maintaining the adequate soil vegetation cover. Each kuran was divided into five coupes and every year one coupe was to be taken up for treatment. On the treatment map three types of areas were demarcated as follows:

- (a) Areas suitable for introducing better fodder grasses. These types of areas well drained plain to gently sloping with 15 cm of depth of

soil not less than 2 ha. in extent at one place and such type of areas were mostly understocked or blank.

(b) Areas in which heavy opening of trees needs to be done. such type of areas had dense growth of trees and shrubs.

(c) Protection and unworkable areas : These included sloppy areas, nala banks and areas likely to be eroded.

The methods of treatment provided for seed sowing and soil and moisture conservation works in the coupe along with silvicultural operations like removal of dead trees etc. The areas treated were closed for grazing and strict fire control measures were to be taken.

(v) Misc. Working Circle.

5.2.35. It covered remaining areas which were not included in any of the previous working circles and such areas which were under the process of disforestation. No particular treatment was prescribed for this working circle.

(vi) Bamboo overlapping Working Circle:

5.2.36 This was an overlapping working circle comprising of areas spread over Warora, Chimur, Moharli, Kolsa, Mul and Naghib ranges. The entire working was divided into 11 nistar felling series and 2 commercial felling series. Some of the areas allotted to FDCM Ltd. from the bamboo bearing areas were excluded from working under this plan. The common variety of bamboo occurring in this division is *Dendrocalamus strictus* which forms understorey in the better quality forest and sometimes it is injurious to the establishment of teak regeneration. The objects of the management of this working were to meet the local as well as commercial demand of bamboo and the management of bamboo on scientific lines. The felling cycle of three years was provided and each felling series was divided into 3 annual coupes. The yield was to be regulated by area.

SECTION-3 RESULT OF WORKING DURING THE PREVIOUS WORKING PLANS.

(1) WORKING PLAN FOR NORTH CHANDA FOREST DIVISION, CENTRAL PROVINCES BY SHRI S.A. VAHID, IFS (1927-1937)

5.3.1 In the working plan of Shri Vahid the forest were to be managed under high forest working circle, coppice with standard and low forest working circle. In all the three working circles main fellings were prescribed in 69 coupes, preparatory fellings in 11 coupes and thinnings in about 1500 acres of high forest and in 58 coupes in coppice with standard and low forest working circle, and total of 149 coupes under working each year. This was a large programme and therefore it could not be implemented as it was impractical also.

5.3.2 In this working plan, the high forest working circle included five felling series in the Warora, Bramhapuri and Sindewahi Ranges but after review it was found that only a small area was suitable for the growth of large timber and therefore these areas should have been placed under coppice with standard working circle. In Chanda, Mohorli and Mul Ranges, the better quality forest allotted to coppice with standard working circle was fit to be retained in the high forest working circle because of its capacity to grow large size timber.

5.3.3 The heavy program of working in the high forest, Coppice-with standard and low forest working circle could not be fully implemented. Hardly one third of the total area to be regenerated in P.B.I. (A) during 10 years from 1927 to 1936 could be regenerated till 1936. In P.B.I.(B) certain coupes were worked but the interpretation of felling rules were varied from heavy felling of over wood to light felling of under wood or bamboo. Thinning in other PBs were very light and selection felling over 3 feet girth were carried out.

5.3.4 In the coppice with standards and low forest working circle, main felling were carried out completely except in one coupe due to civil disobedience movement in 1930 and slump in fuel trade in 1931-32. No thinning was done since the results were not required and the demand for timber too, was sufficient

**(2) WORKING PLAN FOR NORTH CHANDA FOREST
DIVISION, CENTRAL PROVINCES AND BERAR BY
SHRI C.E. HEWETSON , IFS (1936-37 TO 1945-46)**

(i) The high forest working circle:

5.3.5 In this working conversion to a normal series of age classes could not be completed and therefore the objectives set apart were not fully achieved. The subsidiary silvicultural operations could not be adhered to as per schedule and therefore the regeneration of the forest suffered. The operations in the unallotted block like thinnings combined with selection felling were not completed. in a 20 years cycle as prescribed. The preparatory fellings in order to encourage the advance growth were not completed and therefore the regeneration could not establish.

(ii) Coppice with standard working circle:

5.3.6 The coupes could not be regenerated successfully with few exceptions. The dense understory of bamboo discourage the coming up regeneration and therefore coppice reproduction was less than as expected. As the nature of the crop was irregular with varying proportion of different species the coppices could not respond well as respected. Due to bamboo infestation younger age classes could not come up and the advance growth was already deficient. and therefore this system could not succeed properly. The rotation period was too long to achieve the satisfactory results and to review the silvicultural system

(iii) Bamboo working circle:

5.3.7 As this was an overlapping working circle each felling series comprised of several compartments and therefore it was very difficult for the subordinate staff to supervise the felling rules as per prescriptions and monitor control over the same. The clear felling of bamboo was prescribed in the high forest working circle and coppice with standard working circle but due to large areas clear felling of bamboos could not be completed which resulted in poor regeneration of other species. Results were satisfactory in the non bamboo forests.

5.3.8 The silvicultural operations were not meticulously followed and taken up. C.B.O. and thinning after 15 years were not carried out properly.

(3) WORKING PLAN OF SHRI SINGH AND SHRI MUJUMDAR (1949-50) COPPICE WITH RESERVE WORKING CIRCLE:

(I) COPPICE WITH RESERVE WORKING CIRCLE.

5.3.9 The irregular and uneven aged nature of the forest with varying composition of species proved detrimental to the establishment of coppices. The areas were badly hacked by the local people in order to meet their daily requirement of fuel wood from the neighbouring forest areas. The dense crop of bamboos also discouraged the coming up of natural regeneration and its establishment. Moreover grazing and fire could not be kept under check and therefore large areas were destroyed and coppices failed to come up. The areas were also rich in chital population who kept on browsing the coppices and therefore the coppices could not establish because of these biotic factors.

(II) MISCELLANEOUS WORKING CIRCLE :

5.3.10 Cleanings in the 8th year are not being done. This has not materially affected the miscellaneous crop which is to yield fuel, but timber species have suffered. The silvicultural prescriptions and fire and grazing control could not be exercised and therefore the objectives were not achieved.

(4) WORKING PLAN SHRI KARTAR SINGH (1977-78 TO 1991-92):

(I) CONVERSION WORKING CIRCLE :

5.3.11 In the conversion working circle the conversion period had been kept as 80 years. Therefore the areas could not be as such fully converted. Further the areas to be clear felled were 'C' type fit for clear felling and planting teak and old plantation areas which have failed to establish. In the 'D' type areas of under stocking afforestation was to be carried out. The P.B. unallotted is basically to accord the healthy silvicultural treatment to attain the growth. However only part of it has been covered. Moreover, such conducive treatments have not been scrupulously followed. Therefore, the crop is highly irregular in nature with great variation in ages and sizes and growth pattern. Bulk of these forests were worked under C.W.R. in previous plan with the rotation of 40 years. There has been no clear felling and planting due to ban imposed by the Govt. of India on clear felling in natural forest after 1987.

(ii) COPPICE WITH RESERVE WORKING CIRCLE (CWR) :

5.3.12 Area A :-It covered the areas of forests of inferior quality capable of producing small to medium sized timber, poles and firewood with rotation of 40 years with the following treatments.

Area B:- Clear felling in density 0.7 & above capable of restocking the areas after clear felling from the resultant coppice and advanced growth already present.

Area C Suitable areas of mixed forests to be felled for teak.

Area D:- under stocked area (0.4) and below 0.7 for improvement felling.

5.3.13 As clear felling had been prescribed in areas of density 0.7 and above the bio-diversity was lost in favour of coppice and miscellaneous species having advance growth only. This lost the opportunity to get the high forest of miscellaneous nature. Obviously due to such felling yield of coppice perpetuated the coppice with decreasing vigour.

5.3.14 Further suitable areas of mixed forest have been clear felled except semal for raising teak, which have been mostly successful. However, it will take very long period to restore the status of the site, which otherwise would have been improved. In the under stocked areas dead, dying and unsound trees were to be removed. Improvement felling did not help to improve these areas.

(iii) Improvement Working Circle.

5.3.15 This working circle comprised of marginal areas which have generally failed to regenerate due to adverse biotic factors in the last plan and included degraded miscellaneous forest and the areas were liable to erosion. These areas have high pressure of grazing & illicit cutting. However 20 years felling cycle was kept and yield was regulated. In the areas of density below 0.4 climber cutting was prescribed. The brushwood and bamboo were to be cleared to take pits for plantation of ain, sisoo, siris, khair, mahua. In the remaining areas, the improvement fellings were prescribed. Therefore, under stocked areas could not be improved. Further due to practice of calling the whole areas as unworkable the improvement in better areas was arrested.

(iv) Kuran working circle:-

5.3.16 Kuran Working Circle had the objective of improving the quality & quantity of fodder grasses, which could hardly be done.

(v) Protected Forests :

5.3.17 The proposal of converting certain part of the protected forests of Chandrapur division into the Reserve forest was under consideration during the plan period of Kartar Singh in the year 1974 to 1977. But the area was not declared reserved and as such it was not taken in the Kartar Singh's Plan. But the same proposal was accepted in the year 1983 and area of 4519.62 ha. from five ranges, of Chandrapur division was declared as Reserved Forest. The Kartar Singh's Plan had not prescribed any working for the said area but now when it is a reserved forest and compartments are being carved out of the reserved forest, the working in this area has been proposed.

5.3.18 The reserve area to the tune of 4519.62 ha. has been distributed in all five ranges of the division. The earlier stock mapping of the area carried out during 1975 to 78 shows that these compartments have mostly mixed forest with certain u/s. patches and the underlying crop of Bamboo of qt. II. The study of the stock maps then prepared show's that of the total area. the mix III forest is 100 ha. and mix IV a comprises around 1234.286 ha and mix IV-b constitutes 1680.206 ha. and the remaining areas to tune of 851.184 ha. is the u/s. area. The major species occurring being sisam, bija, Khair, bhirra, teak, garari etc. The ground canopy in 2500 ha. is a qt. II- Bamboo crop which was quite dense. The crop in the total area is young to middle age gradation. The protected forest areas having good crop only seems to have been made reserved and this area has been divided in five ranges of Chandrapur division. The crop density study of the Reserve Forests shows that during the period 1975-1980 the crop density in various compartments was ranging from 0.4

to 0.6 and 60% of the crop being of density above 0.6 which shows that quite dense forest existed in the reserved area. The comp. No's. 231 (a), 235 (a), 232 (a) are in continuation to the already existing compartments of R..F. and as such they are proposed to be included in the original earlier compartments as 231, 235 & 232, increasing their area and changing the compartment boundary to form a continuous patch of compartment. At present in general, the density has improved.

SECTION-4: SPECIAL WORK OF IMPROVEMENT UNDERTAKEN

5.4.1. A large number of plantations have come up all over the division during the previous years till date. Besides, new buildings, roads, wells and anicuts have been constructed at various places.

SECTION - 5 : PAST YIELD

5.5.1. The statement showing the annual outturn from major and Non-timber Forest produce for the year 1990-91 to 1999-2000 is given in **Appendix No.XVIII.**

SECTION - 6 : PAST REVENUE AND EXPENDITURE

5.6.1. The figures for the gross revenue from 1990-91 to 1999-2000 is given in **Appendix No. XIX.** Year wise expenditure under Plan & Scheme from 1990-91 to 1999-2000 is given in **Appendix No. XX** while **Appendix No. XXI** shows the expenditure under Non Plan for the year 1990-91 to 1999-2000.

CHAPTER – 6

WILD LIFE PRESERVATION

SECTION 1 : DISTRIBUTION OF WILD LIFE

6.1.1. In Chandrapur District large areas are covered with forest which form undisturbed tracts with a very sparse population, mostly of aboriginals. Naturally this forest with the luxurious vegetation are a favourable haunt of a large variety of wild animals. However the wildlife habitat is being sacrificed in the name of expanding coal industry and also due to illegal encroachments for agriculture by the neighbouring villagers which adversely affects the propagation of wild animals in the non protected areas. Some times the villagers also kill the wild animals in order to protect their domestic cattle. The division is rich in wild life. It is observed more frequently around Moharli, Kolsa, Chandrapur-Mul Road areas where the disturbance from the human population is comparatively less. This is also facilitated due to corridor adjoining Andhari Wild Life Sanctuary and Tadoba National Park. The following categories of animals are generally noticed to occur.

A. Carnivora :

i) Tiger (*Panthera tigris*) :

6.1.2 These are found in the forest of Moharli, Mul & Kolsa. Their number in the recent past been fast decreasing due to illegal hunting by the poachers and also on account of killing by the villagers to protect their livestock.

(ii) **Panther or leopard (*Panthera pardus*) :**

6.1.3 These are numerous than tigers and are generally seen all over the division.

(iii) The other wild animals found in the Chandrapur Division are :

Jungle cat (*Felis Chaus*)

Striped Hyena (*Hyena hyen(v)*)

Jackal (*Canis aureus*)

Fox (*Vulpes banghalensis*)

Sloth bear (*Melursus ursinus*)

Wild dogs (*Cuon alpinus*)

B. Herbivora

The following are the herbivorous animals which inhabit these forests.

Flying squirrels (*Petromys fimbriatus*)

Three striped palm squirrel (*Funambulus palmarum*)

Spotted deer (*Axis axis*)

Mouse deer (*Moschiola Memira*)

Sambar (*Cervus unicolor*)

Muntjac or barking deer (*Muntiacus muntjak*)

Blue bul (*Bosephalus tragocamelus*)

Indian wild boar (*Sus scrofa*)

Common mongoose (*Herpestes edwardsi*)

Pangolin (*Manis crassicaudata*)

Indian porcupine (*Hystrix Indica*)

Indian hare (*Lepus nigricaudis*)

Common langur (*Presbytis entellus*)

Indian ratel (*Mellivora capensis*)

Bison (*Bibos gaurus*)

Wild buffalo (*Bubalus bubalis*)

(C) Snakes :

6.1.4 The ancient rulers of Chandrapur district 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

- i) Typhlops sp.
- ii) Eryx conimo (Dutondyaon Malvan
- iii) Eryx john (Sandlora)
- iv) Lycodon
- v) Oligodon
- vi) Python (Ajgar)
- vii) Ptyas mueosus (Dhaman)
- viii) Natrix piseata
- ix) Natrix staleta
- x) Dryophis nasutus (Harantal or Yelhi or sarpatol

(b) Poisonous snakes

- i) Naja naja (Cobra)
- ii) Bungarus calrulens (Dandekar or Manyar)
- iii) Bangarus fasciatus (Ahirj)
- iv) Vipera russella (Ghonas)
- v) Echis carinatus (Dhul nagin)
- vi) Trimeresurus granimous (Leaf green snake)

(D) Avifauna

6.1.5 This division is a heaven for migratory birds. The presence of big water bodies like Erai dam , Chandai project, Chargao , Moharli , Junona, Naleshwar tanks are the main visiting places for these winter visitors. The prominent visitors are coots ,teals, pintails, bar headed geese, demoiselle cranes, pochards, mallards, widgeons, gadwal, shoveller are the regular visitors. Sarus cranes are resident of Junona tank near Chandrapur. Besides these winter visitors there are variety of resident birds

in wide range. Prominent among them are Peafowls partridges, jungli murgi or grey jungle fowl , spur fowl quails, green pigeon, tits, babblers, bulbuls, robins, flycatchers, shrikes, drongos, warblers, mynas, weaver birds, munias, buntings, wagtails, woodpecker, cuckoos, parakeets, bee-eaters, kingfishers, owls, vultures, egrets etc.

TABLE-18
STATEMENT SHOWING NUMBER OF TIGERS AND PANTHERS
(CENSUS APRIL 2001)

Sr. No.	Tiger / Leopard	Male / Female	Location (Comptt. No.)	Date
1	Tiger	Female	348,349	23.4.2001
2	Tiger	Female	367,368,519	20.4.2001
3	Tiger	Female	357,358	22.4.2001
4	Tiger	Female	436	22.4.2001
5	Tiger	U. N.	Madnapur P. F.	22.4.2001
6	Tiger	U. N.	Gondmohadi P.F.	17.4.2001
7	Tiger	Female	220,221	20.4.2001
8	Tiger	Male	238,240,241,242	22.4.2001
9	Tiger	Female	234,235,228,229	21.4.2001
10	Tiger	Female	205,202,201,197,195,196,	22.4.2001
11	Tiger	Male	167,169	19.4.2001
12	Tiger	Male	378,379,380,Khandala,Chorgaon P.F.	18.4.2001
13	Tiger	Male	Junona P.F.502,501	23.4.2001
14	Leopard	Male	Chichpalli P.F.	23.4.2001
15	Leopard	Female	Mashbodan P.F.,354,522	23.4.2001
16	Leopard	Male	469,470	23.4.2001

Table-18 continued.....

17	Leopard	U. N.	357,358	23.4.2001
18	Leopard	U. N.	273	17.4.2001
19	Leopard	U. N.	321,273,272	21.4.2001
20	Leopard	U. N.	261	20.4.2001
21	Leopard	Male	219	22.4.2001
22	Leopard	Female	Minwat P.F.	23.4.2001
23	Leopard	Male	376,379,375	17.4.2001
24	Leopard	Male	167,169	
25	Leopard	Male	Khandala,Chorgaon P.F.,378,379,380	
26	Leopard	Male	Junona P.F.502,501	

TABLE-19
STATEMENT SHOWING MAJOR WILD ANIMALS
(CENSUS APRIL 2001)

Sr.No.	Species local name	Total No.
1	Gaur	137
2	Sambhar	159
3	Chital	429
4	Barking deer	173
5	Chowsingha	10
6	Rangaur	1171
7	Wild boar	659
8	Hyena	4

Table-19 continued.....

9	Wild dog	51
10	Sloth bear	45
11	Jungle cat	13
12	Procupine	5
13	Hare	74
14	Jackal	79
15	Small Indian Civet	5
16	Moongus	26
17	Bat	15
18	Peacock	186
19	Jungle wolf	103
20	Owl	17
21	Flying squirrel	2
22	Creasted Hawk Eagle	10
23	Nilgai	159
24	Pangolin	3
25	Creasted Serpant Eagle	10
26	Python	1

SECTION – 2: PAST MANAGEMENT OF WILDLIFE AND ITS RESULTS :

6.2.1. 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 promulgated with a view to conserve game, 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.

6.2.2 The shooting block had been divided into three categories i.e. those which are permanently closed, provisionally closed and open to hunting. However, now it is totally closed.

6.2.3 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.

6.2.4 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.

6.2.5 In October 1961, the Government of Maharashtra clarified that the Rules framed under Bombay Wild Animals and Wild Birds Protection Act of 1951 supercedes the provision of C.P. Game Act 1935.

That Act was superceded by the Wildlife (Protection) Act, 1972 which came into force from June 1, 1973 and Rules, 1975. Hunting of animals has been completely banned except for the shooting permission given to the cultivators during the harvesting season to shy away wild boars.

SECTION-3: LEGAL POSITION:

6.3.1 The provisions in Berar Forest Law, 1886 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 up to 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.”

6.3.2 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 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.

6.3.3 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

6.3.4 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.

6.3.5 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 any 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:

The Wildlife (Stock Declaration) Rules, 1973 (became effective in Maharashtra with effect from June 1, 1973).

The Wildlife (Transactions and Taxidermy) Rules, 1973 (became effective in Maharashtra w.e.f. June 1, 1973).

Wildlife (Protection) Rules, 1975 (became effective from March 6, 1975).

The Wildlife (Protection) Licensing (Additional matters for consideration) Rules, 1983 (became effective w.e.f. April 14, 1983)

6.3.6 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.

6.3.7 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.

6.3.8 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.

6.3.9 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.

6.3.10 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.

6.3.11 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.

6.3.12 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.

6.3.13 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.

6.3.14 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.

Section 9 of Wildlife (Protection) Act. 1972 has been amended and there is a total prohibition of hunting of animals specified in schedule I, II, III & IV except as provided under section 11 and 12.

6.3.15 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.

6.3.16 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 licenses 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 vehicle, vessel, weapon, trap, or tool which 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- 4: RIGHTS AND CONCESSIONS:

6.4.1 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- 5: OTHER MEASURES ADOPTED FOR PROTECTING WILDLIFE:

6.5.1 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.

6.5.2 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.

6.5.3 Provision has been made for compensation in case of death or injury to human life by wild animals vide Govt. Resolution No. WLP/1679/105651/CR-6/F-5 dated November 27, 1986. The maximum amount of compensation in case of death is Rs. 5000/- and in case injury Rs. 2000/- As per Govt. Resolution WLP/1090/CN-285/F-5, dated June 17, 1992, the compensation in case of death or permanently handicapped person supporting the family, Rs, 20000/- and to infants to Rs.10,000/-.

6.5.4 In case of serious injury the compensation is Rs. 6650/- and in case of minor injury it is Rs. 1000/- per injured person. As per Government of Maharashtra, Revenue and Forest Department Resolution No. WLP/1096/CR-1/F-1 dated March 19,1997 the Government has decided that in the event of attack by Tiger, Panther, Bear, Bison, Wildboar, Wolf, Jackal, Hyaena, Wilddogs and on the death or permanently handicapped adult person supporting family shall be paid a compensation of Rs. 40,000/- and to the person below eighteen years of age, shall be paid Rs. 20,000/- In case of serious injury Rs. 13,500/- and Rs. 2000/- in case of minor injury.

6.5.5 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.

6.5.6 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. Under the purview of the aforesaid Act, Rules, and Government Resolutions the efforts made for registering offences shall be given in draft plan.

6.5.7 The details of cattle lifting, injuring or killing of human beings within this tract has been furnished in the following table-20

TABLE-20
STATEMENT OF DEATH/INJURY TO HUMAN BEING AND DEATH OF
LIVE STOCK AND COMPENSATION PAID

Year	No.of cattle killed	No.of cases paid	Compensati on paid	No.of persons			Compensati on paid
				Deat h	Injury	Total	
1	2	3	4	5	6	7	8
1992-93	129	113	107471	1	1	2	5125
1993-94	155	203	203289	2	3	5	78468
1994-95	220	159	233234	2	2	4	66650
1995-96	235	173	270371	3	5	8	47718
1996-97	285	295	221661	6	7	13	166550
1997-98	241	294	536126	2	8	10	167450
1998-99	246	157	325570	1	5	6	44200
1999-00	186	296	552950	1	3	4	77000
2000-01	149	124	283493	2	7	9	163000
2001-02	212	188	446527	1	16	17	256000

SECTION 6 : INJURIES TO WILDLIFE:

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

6.6.2 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 area. 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

6.6.3 FIRE : The forest fire is very frequent.. 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.

6.6.4 WATER : Most of the streams, except a few big rivers, become dry during summer. Therefore, animals had to visit only a few waterholes. This fact makes the villagers and poachers easy to kill the wild animals

.SECTION- 7 : GENERAL MEASURES SUGGESTED FOR THE PROTECTION CONSERVATION AND DEVELOPMENT OF WILDLIFE.

6.7.1 The general measures suggested are as follows.

- i) The area should be strictly and effectively protected from fire.
- ii) To keep vigilant watch on poachers/villagers.

- iii) Water pools, which provide water to wild animals during summer, should be kept under constant watch.
- iv) Informers should be promptly rewarded
- v) Salt licks should be developed.
- vi) Shelter and hiding places should be developed at the required places.
- vii) Construction of bunds, anicuts, forest tanks etc. on nalas at suitable places should be carried out for providing permanent water holes to the wild animals.

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CHAPTER - 7

STATISTICS OF GROWTH AND YIELD

SECTION- 1: STATISTICS OF RATE OF GROWTH OF TEAK AND MISCELLANEOUS SPECIES:

GROWTH OF TEAK:

7.1.1 The stem analysis of teak trees in Chandrapur Forest Division was conducted by the Deputy Conservator of Forests, Working Plan Division-2, Chandrapur in order to assess the statistics of growth and yield. The following tables-21-22-23 gives the statistics of growth for site quality II, III and IV.

TABLE-21
GROWTH DATA FOR TEAK (SITE QUALITY-II)

Sr.No.	Age in years	Height in mt	DBH (ob) in cm	GBH (ob) in cm	MAI M ³	CAI M ³	Stem Timber Volume M ³
1	2	3	4	5	6	7	8
1	10	7.24	7.00	22.15	0.00104	--	0.010366
2	20	13.65	13.00	41.20	0.00328	0.00552	0.065555
3	30	16.30	20.32	64.30	0.00673	0.01365	0.20203
4	40	11.10	25.96	82.15	0.00957	0.01808	0.382844
5	50	19.60	34.42	108.92	0.01202	0.02179	0.60077
6	60	20.80	39.14	123.86	0.01483	0.02890	0.879721
7	70	21.60	44.40	140.50	0.01614	0.02399	1.129665

Table-21 continued

8	80	22.40	48.27	152.75	0.1731	0.02547	1.3845
9	90	23.24*	--	--	--	--	--
10	100	23.60*	--	--	--	--	--
11	110	24.00*	--	--	--	--	--

TABLE-22
GROWTH DATA FOR TEAK (SITE QUALITY-III)

Sr. No.	Age in years	Height in mt	DBH(ob) in cm	GBH(ob) in cm	MAI M ³	CAI M ³	Stem Timber Volume M ³
1	2	3	4	5	6	7	8
1	10	5.5	6.30	19.94	0.000718		0.007183
2	20	8.30	12.04	38.10	0.002075	0.03433	0.041511
3	30	9.60	15.23	48.19	0.002765	0.04026	0.081777
4	40	10.90	18.82	59.55	0.003424	0.00552	0.136972
5	50	11.90	21.87	69.20	0.004103	0.00682	0.205137
6	60	13.10	25.52	80.75	0.00481	0.00832	0.288338
7	70	14.20	27.13	85.85	0.005033	0.00640	0.352307
8	80	15.55	29.70	93.98	0.00553	0.007013	0.44283
9	90	17.0	32.40	102.53	0.006015	0.009869	0.541423
10	100	18.20	35.90	113.60	0.006614	0.01199	0.661423
11	110	19.20	36.50	115.50	0.006584	0.006281	0.724239
12	120	20.10*	--	--	0.006740	0.008461	0.808857
13	130	20.80*	--	--	--	--	--
14	140	21.30*	--	--	--	--	--
15	150	21.80*	--	--	--	--	--

TABLE-23
GROWTH DATA FOR TEAK (SITE QUALITY-IV)

Sr.No.	Age in years	Height in mt	DBH(ob) in cm	GBH(ob) in cm	MAI M ³	CAI M ³	Stem Timber Volume M ³
1	2	3	4	5	6	7	8
1	10	6.50	5.85	18.51	0.001862		0.01865
2	20	8.00	11.14	35.25	0.002262	0.00266	0.04524
3	30	9.00	15.12	47.84	0.002984	0.00443	0.08951
4	40	9.99	11.31	57.94	0.003385	0.00459	0.13542
5	50	10.90	21.03	66.55	0.003659	0.02618	0.18293
6	60	11.80	21.65	68.51	0.003236	0.00113	0.19418
7	70	12.60	25.00	79.11	0.003814	0.00728	0.26695
8	80	13.40	28.38	89.81	0.004577	0.00992	0.36618
9	90	14.10*	29.88	94.55	0.004865	0.00717	0.43783
10	100	14.60*	31.73	100.41	0.005079	0.00384	0.50793
11	110	15.10*	32.52	102.91	0.004967	0.00384	0.54637
12	120	15.40*	34.40	108.86	0.005218	0.07977	0.62614
13	130	15.50*	---	--	--	--	--
14	140	15.50*	---	--	--	--	--
15	150	--	---	--	--	--	--

* Figures with (*) mark shows that the same have been obtained after extrapolation.

7.1.2 The analysis of the data given in the above tables shows that teak tree attains a girth (o.b.) of 140.50 cm in site quality II, of 150.50 in site quality III and of 108.86 in site quality IV over the years 70, 110 and 120 years respectively. Since the teak trees in Chandrapur Forest Division

are mostly in Site Quality II/III and CAI/MAI curves intersect at the age of 100 years, therefore it has been found that on an average the teak trees attain a girth of 135 cm in 100 years. However the site has potential to grow beyond 135 cm g.b.h. (o.b.) and therefore the harvestable girth for teak and other important timber trees species has been fixed as 135 cm. The CAI/MAI-Age curve, Age-Height Curves and Age-Volume Curves for site quality II, III and IV respectively are given in **Appendix No. XXII** of Volume II of the plan.

GROWTH OF AIN :

7.1.3 Growth data of ain given in the Working Plans of East Chanda, Bhandara divisions and of Jimalgatta range of Sironcha Division are reproduced in table-24

TABLE-24

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

7.1.4 The results of stem analysis of bhirra, dhaora and tendu carried out by Shri Kartar Singh during the preparation of working plan of East Chanda Division are reproduced in table-25.

TABLE-25

Species	Girth b.h. in cm.	Diameter b.h. in cm.	Age in years
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

Table-25 continued

	060	191	052
	075	23.9	066
	090	28.6	081
	150	33.4	098
	120	38.2	120
	135	43.0	154
	150	74.7	--

GROWTH OF SEMAL :

7.1.5 Stem analysis of 29 trees of Semal was carried out by Shri Kartar Singh while preparing working plan for East Chanda division. Trees were selected of girth at b.h. between 105 to 150. It was found that the curves of C.A.I. and M.A.I. tend to intersect beyond 150 cm. g.b.h. The following table-26 indicates the results of stem analysis of semal:

TABLE-26

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

GROWTH OF BIJA :-

7.1.6 Growth data obtained from stem analysis of bija trees in Bhandara Division carried out by Shri Sardar during the preparation of working plan of Bhandara Forest Division are reproduced in table-27.

TABLE-27

Age in year	Height in mt.	Dia ubbh. Cm.	Dia ob.bh. Cm.	Std. stem timber volume	C.A.I. cu.m.	M.A.I. cu.m.
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

GROWTH OF SHISHAM :

7.1.7 The results of growth studies of Shisham in Sironcha Forest Division conducted in 1990 are given in the table-28.

TABLE-28

Age in Years	10	20	30	40	50	60	70	80	90	100	110	120
(o.b.)	04.15	07.23	11.21	14.56	17.37	19.27	22.53	25.55	29.15	33.23	38.14	42.60

SECTION – 2 ESTIMATION OF GROWING STOCK

(I) GENERAL VOLUME TABLE :

7.2.1 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.

7.2.2. 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-29

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)	$V/D^2H = 0.33352 + 0.00042/D^2H$

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

7.2.4. On the basis of the above equations the general volume tables prepared for all above mentioned species are given in **Appendix-XXIII**.

7.2.5 (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:

$$V = a + bD^2$$

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

$$V = a + b D + c D^2 + d D^3$$

$$V = a + b D$$

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

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

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

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

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

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

7.2.6 The following local volume equations shown in table-30 were selected for different species taking into consideration the same criteria as for general volume equations :

TABLE-30

S.N.	Species	Local Volume Equations
1	Tectona grandis(30)	$\sqrt{V} = - 0.106720 + 2.562418 D$
2	Terminalia alata(266)	$V/D = - 0.397340 + 0.011283/D$ $+ 4.704700D + 2.369640 D^2$

Table-30 continued

3	<i>Pterocarpus marsupium</i> (59)	$V = 0.107059 - 1.010240D + 7.685670 D^2$
4	<i>Diospyros melanoxylon</i> (140)	$V/D = - 0.975148 + 0.033867/D + 8.255412D$
5	<i>Anogiessus latifolia</i> (112)	$V/D = - 0.36762 - 0.006854/D + 4.5577D + 5.25567D^2$
6	<i>Phyllanthus emblica</i> (49)	$V/D^2 = 5.000428 - 0.013485/D^2$
7	<i>Lagerstroemia parviflora</i> (39)	$\sqrt{V} = - 0.130340 + 2.824203 D$
8	<i>Boswellia serrata</i> (38)	$V/D = - 2.641645 + 0.153684/D + 15.056400D - 6.2061 D^2$
9	<i>Lannea Coromandelica</i> (44)	$\sqrt{V} = - 0.138286 + 2.729368D$
10	<i>Madhuca latifolia</i> (78)	$V = 0.074069 - 1.23002D + 7.726902D^2$
11	<i>Buchanania lanzan</i> (67)	$V = - 0.00767 + 0.2654D + 1.0385 D^2 + 7.527 D^3$
12	<i>Cleistanthus collinus</i> (320)	$V = - 0.019404 + 3.80207 D^2$
13	Rest of species (402)	$V/D = - 0.610255 + 0.020853/D + 6.10823D + 0.637781 D^2$

Where V = volume in cum.

D = DBH in meter.

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

7.2.8 The conversion factors for drawing volume content in Chandrapur Forest Division Chandrapur for Teak, Teak-Miscellaneous and Miscellaneous Forest are given in **Appendix No XXIV, Appendix No XXV, and Appendix No XXVI .respectively in Volume II of the plan..**

(III) TREE ENUMERATION :

7.2.9 The tree enumeration was carried out by the unit of Forest Resource Survey, working under the control of the Dy. C.F.,W.P. Amaravati during 1996 -97. The object of the survey was to assess the local growing stock of all species. All the species were enumerated separately in 15 cm. girth classes down to 15 cm gbh. The data analysis was done with the help of computer at Chandrapur also. The results are given in **Appendix No. XXVII.**

SAMPLING METHOD :-

7.2.10 The felling series was taken as unit and the strip sampling method was followed for enumeration. The intensity of sampling the Reserve Forest as well as Protected Forests was 1 % of the growing stock in the area.

(IV) EXISTING GROWING STOCK (CUBICAL CONTENTS) :

7.2.11 Working circle wise growing stock per ha. has been calculated which is given in **Appendix No. XXVII.**

SECTION- 3: YIELD

7.3.1 The annual outturn of felling series in each working circle is given in **Appendix No XXVIII.**

SECTION-4: PRESERVATION PLOT AND SAMPLE PLOT:

7.4.1 The Maharashtra Van Sanshodhan Sanstha, Chandrapur has laid out some sample plots and preservation plot in the forest areas of Chandrapur Forest Division for various research trials. The list of sample plots and preservation plots is given in **Appendix No XXIX.**

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CHAPTER - 8

BASIS OF PROPOSAL

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

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 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.

8.1.5 The basic emphasis of the policy is on the management of the existing forests and forest land 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.

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.

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 regularised.

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

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 object of management are listed below:-

- (i) Large tracts of forest that 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 fail to regenerate. These forests may respond if they are restocked under afforestation scheme coupled with soil and moisture conservation works.
- ii) 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.
- iii) 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.
- iv) 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.

- v) 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.
- vi) There is increasing demand for the timber of teak and other important species in the market.
- vii) Owing to excessive cattle population the demand for fodder and grazing has increased.
- viii) Restoration of degraded environment as a national object.

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 soil and moisture conservation measures.
- ii) 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.
 - iii) To combat ill effects of soil erosion wherever it has already started and to prescribe preventive measures.
 - iv) To increase the production of non-timber forest produce 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.
 - vii) To maintain and conserve the medicinal plants in the conservation area, to preserve and multiply the endangered species, to ensure sustainable and non-destructive harvest of

medicinal plants, to cultivate and harvest medicinal plants in degraded forest treated in the JFM and to motivate the cultivation of medicinal plants.

SECTION – 4 : ANALYSIS AND VALUATION OF THE CROP:

8.4.1 The tree enumeration has been conducted by the SOFR Unit at Amravati by using 1% strip sampling method by laying out plots at a distance of 600 m x 600 m of the size 60 m x 60 m and all the tree species were enumerated down to 15 cm girth class. The results of enumerations have been given in the **Appendix No. XXVII.**

SECTION – 5 : CLASSIFICATION OF FORESTS :

8.5.1 The broad and general principles for classification of forests are embodied in the Resolution No. NNEP-1365/132211/Y, dated December 6, 1968 issued by the Govt. of Maharashtra in Revenue and Forest Department. Taking the above principles into consideration the forest of state are to be managed as follows.

(a) **Protection Forest:** This includes forest which occur on very steep slope (45° and over) or along river banks and forest that have become depleted through maltreatment and further harvesting of which will accentuate soil erosion and adversely affect the productivity of agricultural lands in the lower regions. The management should aim at rapidly conserving these forests so that they may once again exert their beneficial influence on the soil, the water regime and the climatic factors of the locality.

(b) **Tree Forests:** This includes forests that are prominently suited for growing large size timber and other products of commercial value.

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

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

(e) **Miscellaneous forests:** Grass reserves: Which are small blocks of forests situated amidst intensively cultivated tracts carrying scrub growth and capable of producing good fodder grasses which are in short supply. Remaining areas which are needed for other purposes. The functional classification of forest given in Appendix No. XXXI.

TABLE-31

Sr. No	Class of forest	Forest area in Hectare				Percentage
		R.F.	P.F.	UN.	Total	
1	Protection Forest	1886.850	1185.890	--	3072.740	3.47
2	Tree Forest	43285.572	1376.360	--	44661.932	50.38
3	Minor Forest	20512.302	20228.650	173.11	40914.062	46.15
Total		65684.724	22790.900	173.11	88648.734	100.00

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. 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. 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-32

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

SECTION-7: METHOD OF TREATMENT TO BE ADOPTED:

8.7.1 The new forest policy has laid emphasis on conservation of bio diversity and meeting the demands of the local people. Accordingly the objects of management of the forest have been fixed. To achieve these objectives new approach will be adopted. For the conservation of bio diversity and site, extensive soil and moisture conservation works will be taken up. The working of coupes will be rearranged on the watershed basis. Local species will be preferred for planting natural regeneration, wherever present will be properly tended. Local people will be involved in the plantation works through grampanchayat, forests protection committee or voluntary agencies. The forest produce obtained from the forest will be made available to the local people on priority. Special emphasis will be laid on rigid fire protection and protection from grazing and illicit cutting. Special mobile squad units will be proposed for effective protection. Special camps will be arranged to make the people aware about the protection of the forest.. The functional classification of the forest has been made by taking into consideration the above aspects, besides the growing stock and condition of site. The functional classification of forests by comptt & Ranges is given in **Appendix XXX**. The various types of forests will be treated as follows.

(a) Tree Forest:

8.7.2 These areas have been conveniently classified into categories: (1) The under stocked areas upto the density of 0.4 and of site quality IVb (ii) well stocked areas of the density from above 0.4 to 0.5 and of site quality in general IVa/ IVb and at times of III; (iii) very dense areas of density above 0.5 to 0.7 with site quality III (iv) Middle aged or young pole crops bearing areas. The Area (I) is to be dealt with in Improvement Working Circle and also under various working circles due to inability to separate the areas, with the input of soil and moisture conservation work. The Area(ii) will be covered, mostly under Improvement working circle, so as to get high forest in years to come. The Area (iii) will be covered mostly under selection-cum-Improvement working circle and the area (iv) being covered under tending silvicultural operations under various working circles.

(b) Bamboo Forest:

8.7.3. As an offshoot of gregarious flowering, the existing regeneration and congestion is to be tended for better productivity and covered under Bamboo overlapping working circle

(c) Scrub Forests:

8.7.4 The areas which are degraded or blanks and of the density below 0.4. These areas need to be rehabilitated and improved hence to be managed under Improvement Working Circle with adequate soil & moisture conservation works.

SECTION- 8 : WORKING CIRCLES AND THEIR DISTRIBUTION :

8.8.1 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 Chandrapur Forest Division shall be managed under the following working circles:

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

8.8.2 The distribution of forest area in various working circles is given in the following table-33

TABLE-33

Working Circle	Reserved Forest in ha.	Protected Forest in ha.	Unclass-ed Forest in ha.	Total Forest in ha.	Percent of Forest	Compar-tments
S.C.I.W.C.	20371.542	1376.360	--	21747.902	24.53	67
I.W.C.	40512.302	20228.650	173.110	60914.062	68.71	629
Teak Plantation W.C.	4800.880	1185.890	--	5986.770	6.75	10
Bamboo (Overlapp ing) W.C.	49024.600	2521.780	--	51546.380	58.15	162
N.W.F.P.W.C.	65684.724	22790.900	173.110	88648.734	Entire Forest	706
Wild life W.C.	65684.724	22790.900	173.110	88648.734	Entire Forest	706

SECTION-9: BLOCKS AND COMPARTMENTS :

8.9.1 The total number of compartments in Chandrapur Division are 923 and out of this, 87 compartments have been allotted to FDCM Ltd. and 130 comartments have been transferred to Tadoba Andhaari Tiger Reserve and remaining 706 compartments have been included in this working plan under revision. Out of this 706 compartments, 221 compartments are in the reserved forest areas, 475 compartments in the protected forest areas and remaining 10 compartments are in the unclassified forest areas. The following table-34 shows the allotment of compartments in the forests.

TABLE-34

Distribution of Forest compartments in Working Circle

Area – Specific Working Circle	Reserved Forest in ha.	Protected Forest in ha.	Unclass Forest in ha.	Total Forest in ha.
S.C.I.W.C.	57	10	--	67
I.W.C.	154	465	10	629
Teak Plantation W.C..	10	--	--	10
Total	221	475	10	706

SECTION-10: PERIOD OF THE PLAN :

8.10.1 The present working plan shall remain inforce for the period 2002-03 to 2011-12.

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CHAPTER : 9

WORKING PLAN FOR SELECTION CUM IMPROVEMENT WORKING CIRCLE

SECTION-1 : GENERAL CONSTITUTION OF THE WORKING CIRCLE

9.1.1 This working circle consists of areas which were earlier assigned to Improvement Working Circle in the previous plans. The forest are now fit to be managed under Selection-Cum-Improvement Circle because of the silvicultural rest given to them in the previous working plans. The areas included in this working circle comprise of mainly Reserved Forest however some areas of the protected forest having better site quality and crop density have also been included. The total area allotted to this working circle is 21747.902 ha. spread over mainly in Mul, Moharli and Shioni Ranges. The distribution of area included in this working circle in various ranges of Chandrapur Forest Division is shown in the following table-35.

Table-35

Range	Reserved Forest in ha.	Protected Forest in ha.	Unclassed Forest in ha.	Total Forest in ha.
Chandrapur	1940.050	1189.620	--	3129.670
Mul	5977.160	--	--	5977.160
Warora	1149.652	--	--	1149.652
Moharli	5630.610	186.740	--	5817.350
Shioni	5674.070	--	--	5674.070
Total	20371.542	1376.360	--	21747.902

SECTION-2 : GENERAL CHARACTER OF THE VEGETATION

9.2.1 The forests included in this working circle are mostly of miscellaneous species. The crop consists of mainly ain, dhaora, bija, aonla, tendu, mahua, lendia, garari etc. The teak occurs in patches. Bamboo occurs in the lower canopy and is thick over most of the area. It is a corollary to the gregarious bamboo flowering in the recent past i.e. 1982. Reproduction of teak occurs in patches and that of other miscellaneous species is fairly good. Age classes mostly vary from young to middle ages with a few mature patches. The mature trees are also widely scattered. The valuable trees form a very low percentage. The ground is fully covered with humus and grasses and at times with natural regeneration. The soil is deep, loamy and capable of producing high quality timber.

9.2.2 The erstwhile protected forests excluded from previous working plan have mixed crop in general with young to middle aged and mature trees throughout the area. The crop density is 0.5 to 0.7. The bamboo crop is very dense due to profuse regeneration after the gregarious flowering in 1983-84. It seems that only these densely stocked areas have been accorded the status of Reserved Forest. On the whole site quality is III. The Kukranji is widely spread throughout. The description of the forest is given in Chapter 2 of this working plan along with the species composition.

SECTION-3 : SPECIAL OBJECTS OF MANAGEMENT

9.3.1 The special objects of Management in constituting this Working Circle Area :-

- (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.

SECTION: 4 BLOCKS AND COMPARTMENTS:

9.4.1 The total number of compartments allotted to this working circle is 67 which comprises of 57 compartments of Reserved Forest and 10 compartments of Protected Forests. The list of the compartments allotted to this working circle is given in the **Appendix No. XXXI.**

SECTION-5 : ANALYSIS & VALUATION OF CROP:

9.5.1 It is as given below:

(a) **Stock Map :** These forests have been stock mapped (by GIS) on the map of 4"=1 mile and the result of the stock mapping for each compartment has been given in **Appendix No. XXXII.** The standard symbols have been used in the preparation of stock maps, site quality, density and occurrence of important species are shown on the stock maps, the various signs and symbols used in stock maps have been given in **Appendix No.XXXIII..**

(b) **Quality :-** The majority of the area of the working circle belongs to site quality II/III followed by IVa.

(c) **Enumeration Data :-** The tree enumeration of the growing stock has been done by SOFR Unit at Amravati using line strip sampling

method of 1% intensity by laying out plots of 60 m x 60 m at a spacing of 600 m x 600 m and the results of enumeration are reproduced in the following table-36

TABLE-36

Tree species and girth distribution in the Selection-cum-Improvement Working Circle

Species	Stems per hectare in girth-classes in cm.									
	15-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136 up	Total
Teak	6.13	4.28	2.66	1.69	1.06	0.86	0.56	0.42	0.25	17.91
Ain	2.09	2.23	1.77	1.44	1.21	0.87	0.47	0.30	0.28	10.66
Bija	0.34	0.58	0.57	0.91	0.99	0.98	0.77	0.59	0.34	6.07
Haldu	--	0.01	--	--	--	0.01	0.01	--	--	0.03
Shisham	0.15	0.66	0.93	0.75	0.47	0.18	0.04	0.01	0.03	3.22
Shiwan	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.02	--	0.13
Tiwas	--	--	--	0.01	0.01	--	--	--	--	0.02
Shehana	3.87	3.04	1.83	1.56	0.96	0.81	0.42	0.18	0.12	12.79
Garari	11.7	7.70	3.80	2.07	1.27	0.61	0.14	0.10	0.17	27.56
Dhaoda	2.30	1.92	2.20	1.22	1.44	0.98	0.38	0.21	0.13	10.78
Moha	1.30	1.53	1.37	1.51	1.55	1.45	0.85	0.75	0.65	10.96
Tendu	7.07	2.41	2.07	1.54	1.63	1.32	0.88	0.26	0.24	17.42
Khair	2.09	2.79	1.67	0.58	0.97	0.10	--	0.01	0.01	8.22
Aonla	1.38	1.20	1.06	1.03	0.53	0.30	0.18	0.07	0.07	5.82
Hirda	0.02	0.01	0.04	0.02	--	--	--	--	--	0.09
Beheda	0.20	0.63	0.27	0.37	0.26	0.28	0.20	0.15	0.08	2.44
Dikamali	--	--	--	--	--	--	--	--	--	--
Char	1.21	1.43	0.99	0.97	0.33	0.24	0.13	0.04	0.04	5.38
Ghoti	3.58	2.65	1.27	0.69	0.18	0.10	0.01	0.01	0.01	8.15

Table-36 continued.....

Others	12.15	16.05	16.54	9.21	6.87	5.06	2.84	1.47	0.70	7.89
TOTAL	55.60	49.13	39.06	25.59	19.75	14.16	7.89	4.59	3.12	218.89

(d) Analysis :- Teak occupies about 8.18%, Non-teak timber species (Ain,Bija,Haldu,Shisham,) occupy about 9.13 % and other non timber species occupy about 82.69 % of the crop, taking all girth classes together. On the basis of tree enumeration results 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. The results of tree enumeration are given in **Appendix No.XXVII**

SECTION – 6 : SILVICULTURAL SYSTEM:

9.6.1 Based on the objects of management, the silvicultural system to be followed shall be Selection-cum-Improvement . The potential of the site is a corollary to the silvicultural imperatives ..The site has the potential to grow big sized timber. The S.C.I. being the most conservative system ,it has been applied to preserve and improve the ecological status of the forest in general. Natural regeneration will be encouraged by way of subsidiary silvicultural operations and rigid fire protection and grazing control measures. In suitable areas, gap plantation of teak and superior species will be taken up to improve the quality of the crop. Bamboo plantation shall be taken up in suitable sites in the 4th year after teak plantation.

SECTION-7: CHOICE OF THE SPECIES :

9.7.1 Teak is the most valuable species from the commercial point of view therefore it will be given top priority while taking up of plantations depending on the suitability of the site and soil type. The miscellaneous species to be favoured along with teak, are bija, haldu, ain, shisham, kalam,

tiwas dhawada, 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 site has potential for growth and the results of stem analysis conducted for Chandrapur Forest Division show that in case of teak CAI & MAI curves intersect at the age of 100 years. The harvestable girth fixed for different tree species is given in table-37.

Table-37

Sr.No.	Species	Harvestable girth (cm)
1	Teak, bija, ain, shisham, Haldu	135
2	Any other timber species	120
3	Garari and lendia	45

SECTION-9: FELLING CYCLE :

9.9.1 The felling cycle shall be of 10 years.

SECTION – 10 : FORMATION OF THE FELLING SERIES

9.10.1 This working circle has been divided into 18 felling series and each felling series is divided into 10 annual coupes as shown in table-38 The compartments allotted to this working circle is given in **Appendix No.XXXIV**. The details of felling series and sequence of felling is given in **Appendix No.XXXV**.

TABLE-38

Sr. No.	Name of Felling Series	Compartment Nos.	Total Area in ha.
1	Nimbala S.C.I.F.S.	375, 376, 377	1152.14
2	Chorgaon S.C.I.F.S.	374, 380, 597	970.27
3	Khandala S.C.I.F.S.	592,593,594,595,596,	1007.26
4	Maroda S.C.I.F.S.	328,350	1225.81
5	Doni S.C.I.F.S.	329pt, 348, 349	1095.49
6	Mahadwadi S.C.I.F.S.	351,356pt,357	1299.32
7	Andhari S.C.I.F.S.	519pt	1361.44
8	Chichpalli S.C.I.F.S.	370,457,528	995.10
9	Mangali S.C.I.F.S.	201,202,219,215	1149.652
10	Moharli S.C.I.F.S.	154,165,166,167,169	1514.35
11	Agarzari S.C.I.F.S.	171,172,179,185,189	1188.16
12	Padmapur S.C.I.F.S.	102,103,104,105,862, 863,865,866	1291.13
13	Adegaon S.C.I.F.S.	170,190,197,272	1250.62
14	Pardi S.C.I.F.S.	175,191,192,193	1034.04
15	Vihirgaon S.C.I.F.S.	220,221,227,244,	1213.25
16	Pandharwani S.C.I.F.S.	237,261,262,	1261.00
17	Karwa S.C.I.F.S.	238,239,241,246	1127.42
18	Khatera S.C.I.F.S.	274,322,326,	1611.46
Total			21747.902

SECTION -11: AGENCY OF HARVESTING :

9.11.1 The coupes will be worked as per the directives issued by the Government.

SECTION- 12 : METHOD OF TREATMENT:

9.12.1. The compartments allotted to this working circle are having crop density of 0.5 to 0.7. The site quality is generally III and due to occurrence of mature and over-matured trees, the conservative harvesting has to be resorted to. Tree growth is very good with adequate natural regeneration. Trees in matured girth classes i.e. above 120 cms. are more than 7.0 per ha. and fairly distributed. The middle age crop (pre harvestable girth class) is also fairly good, more than 106 trees per ha. (girth 45cms.-120cms.). All areas having crop composition as described above are included in S.C.I. Only some isolated patches are excluded for management reasons and few adjoining compartments are included even though the numbers of trees is less than prescribed. Therefore, Selection-cum Improvement silvicultural system has been prescribed.

9.12.2. The harvestable girth has been determined after taking the inventory of the stocking. It envisages to selectively and silviculturally remove the trees of harvestable girth so that it is conducive for enriching the ecological status and at the same time it shall bring normalcy to the forests. Any species which is less than 1%, will not be removed or felled. The Natural regeneration shall be accorded top most priority supplemented with artificial regeneration, rigid fire protection measure, soil and moisture conservation works.

SECTION – 13 : REGULATION OF YIELD

9.13.1 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 will be laid down. The details of annual coupes and their sequence of working and planting is given in the **Appendix No XXXVI**.

9.13.2. K.P.Sagreiya's modification of Brandis method has been applied for yield calculation. The method of yield calculation is prescribed as below:

9.13.3. NUMBER OF STEMS PER HECTERE. :- From the enumeration data obtained after calculations for S.C.I. working circle of all five ranges, the average number of trees per ha has been calculated which is given in table-39.

TABLE-39

Girth classes	Ain,Bija,Shisham,Teak, Haldu	Garari, Lendia	Others	Total
15/30	8.72	17.66	25.95	52.33
30/45	8.17	13.53	25.02	46.72
45/60	5.92	7.30	21.18	34.40
60/75	4.79	4.22	15.09	25.10
75/90	3.73	2.39	12.83	18.95
90/105	2.89	1.52	9.75	14.16
105/120	1.89	0.57	5.46	7.92
120/135	1.33	0.30	2.86	4.49
135&above	0.90	0.31	1.93	3.14

9.13.4 SURVIVAL PERCENTAGE :- The percentage of trees that will be reaching to the harvestable girth has been calculated on the basis of number of trees that should have been in each girth class if the present stock was evenly balanced. The expected number of trees in different girth classes in an evenly balanced growing stock is what is obtained from the law of F.De. Liocourt.

FRANCOIS DE LALLEMENT DE LIOCOURT'S LAW :-

9.13.5 . The theory states that in a fully stocked Selection Forest i.e. the normal growing stock of the uneven aged forest the no. of stems falls 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. Besides, although the numerical value of the ratio varies from one forest to another, the general form of the distribution follows an exponential curve of the inverse -J shaped. The forest in tropics follow the DE LIOCOURT'S distribution.

$$Y = k e^{-x}$$

9.13.6 . The constant ratio of decrease in numbers of trees as diameter increases is a fundamental characteristic of the uneven aged condition which provides the basis for the concept of uneven aged normalcy. The felling rules do not envisage for removal of trees from various girth classes according to excess over normal crop but the crop has been reduced to normalcy while calculating the yield. This is an unusual departure from the original K.P.Sagreiya's modification

9.13.7 . Thus according to De Liocourt, the number of trees in successive diameter/girth classes represent a geometrical series of the form,

$$a, \quad ar^{-1}, \quad ar^{-2}, \quad ar^{-3}, \quad \dots$$

9.13.8. Where a represents the number of trees in the lowest diameter/girth class, ar , the number in the next higher diameter/girth class, and so on and ' r ' represents the common ratio of the geometrical progression. If the value of ' r ' and the number of stems in any class are known, the whole series can be worked out and this would give the

proportionate distribution of stems or an evenly balanced composition in an Ideal Selection Forest.

9.13.9 . The numerical value of r , which is the ratio of the geometric series, can easily be calculated if the stand table of such an ideal forest is available. By dividing the number of trees in a given diameter class by the number of trees in the next higher diameter class will give the value of r , which will be constant throughout all diameter/girth classes if the distribution is balanced. But in actual, such balanced distribution does not exist due to a no. of reasons. In order to visualize an ideal distribution for a given actual distribution, the above law is applied. For a given stand table the values of ' r ' and ' a ' are obtained as follows:

CALCULATION OF ' r ' :

9.13.10. There are three methods to calculate ' r '. These are as follows ;

(a) The average (arithmetic mean) of the successive ratios.

If $a_1, a_2, \dots, a_9$, are no. of stems in 9 girth/diameter classes, then

$$r = \frac{1}{8} (a_1/a_2 + a_2/a_3 + \dots + a_8/a_9)$$

(b) Since, $a_1/a_2 = a_2/a_3 = \dots = a_8/a_9 = r$

$$\text{and so } a_1 + a_2 + \dots + a_8 \div a_2 + a_3 + \dots + a_9 = r$$

and (c) Since $a_1/a_2 = a_2/a_3 = \dots = a_8/a_9 = r$

$$\text{and therefore, } (a_1/a_2) \cdot (a_2/a_3) \cdot \dots \cdot (a_8/a_9) = r^8$$

$$\text{or, } r = \sqrt[1/8]{a_1/a_9}$$

The value of 'r' can be calculated from any of the three methods, mentioned above. But (a) and (b) involves all terms of the series to find out the average value whereas the last only two and so these two are more appropriate.

9.13.11 Between (a) and (b), (a) includes ratios of higher girth classes, which contains fewer trees and so the chance of error is more and the estimate of 'r' may have more standard error. And, therefore, method (b) appears to be the most appropriate one and the same is being applied in the subsequent calculations.

9.13.12. B. CALCULATION OF FIRST TERM OF G.P.

The sum of n terms of a G.P. is given as

$$S = a + ar^{-1} + ar^{-2} + ar^{-3} + \dots + ar^{-(n-1)}$$

Where a is the no. of stems in the lowest girth class.

Multiplying both sides by 'r' and subtracting it from the former, we get as follows :

$$a = S \times [(r^{n-1}) \times (1-r)] / (r^n - 1)$$

Here, S is the sum of stems of all girth/diameter classes which is known and 'r' has been calculated as above. Therefore, the value of 'a' can be found out.

From these 'a' and 'r', the whole series of an ideal distribution for a given stem distribution can be found out. The same principle is applied hereafter to construct the table for different exploitable girths.

From these 'a' and 'r', the whole series of an ideal distribution for a given stem distribution can be found out. The same principle is applied hereafter to construct the table for different exploitable girths.

9.13.13. HARVESTABLE GIRTH 135 cms :- Yield regulation for Teak, Ain, Bija, Shisham and Haldu group shown in table-40.

TABLE- 40

Girth class in Cms		Stems per ha	Stems/ha as per Lioc-court	% of survival	Stems/ha reaching harvestable size (2 x 4)	Years required to pass over next girth class	Average annual recruitment
1		2	3	4	5	6	7
I	15-30	8.72	9.04	15.71	1.37	9	0.1522 R1
II	30-45	8.17	7.17	21.02	1.72	10	0.1720 R2
III	45-60	5.92	5.69	25.00	1.48	11	0.1345 R3
IV	60-75	4.79	4.52	31.53	1.51	12	0.1258 R4
V	75-90	3.73	3.59	39.71	1.48	13	0.1138 R5
VI	90-105	2.89	2.85	50.00	1.46	15	0.0973 R6
VII	105-120	1.89	2.26	62.94	1.19	17	0.0700 R7
VIII	120-135	1.33	1.79	79.31	1.05	17	0.0618 R8
IX	135 & above	0.90	1.42	100.00	0.90	16	0.0563 R9
TOTAL		38.32					

$$\text{Here } r = \frac{(8.72 + \dots + 1.33)}{(8.17 + \dots + 0.90)} = \frac{37.42}{29.60} = 1.27$$

$$a = S \times \left[\frac{(r^n - 1) \times (1-r)}{(r^n - 1)} \right]$$

$$= 32.32 \times \left[\frac{(1.27^n - 1) \times (1 - 1.27)}{(1.27^n - 1)} \right]$$

$$= 9.04$$

RECRUITMENT IN SUCCESSIVE FELLING CYCLES :-

9.13.14 The number of trees which will be recruited during felling cycle of 10 years is given below:-

fR1	=	10R9	=	0.563
fR2	=	6R9+4R8	=	0.585
fR3	=	10R8	=	0.618
fR4	=	3R8+7R7	=	0.6754
fR5	=	10R7	=	0.700
fR6	=	10R6	=	0.973
fR7	=	5R6+5R5	=	1.0545
fR8	=	8R5+2R4	=	1.16
fR9	=	10R4	=	1.258

Realizable and Accumulating yields for each cycle are obtained as below:-

1st Felling cycle.

Realisable recruitment : $R_r = \frac{1}{2} \{ (F_{rn} - p(R_n - R_x)) \}$

$$\begin{aligned}
 R_r &= \frac{1}{2} \{ 0.563 - 10(0.0563 - 0.0563) \} \\
 &= \frac{1}{2} \times 0.563 \\
 &= 0.2815
 \end{aligned}$$

$$\begin{aligned}
 \text{Accumulating recruitment : } R_a &= f_{rn} - R_r \\
 &= 0.563 - 0.2815 \\
 &= 0.2815
 \end{aligned}$$

2nd felling cycle.

Realizable recruitment.

$$\begin{aligned}
 \text{a) } & \frac{(R_x \cdot a^2)}{f \cdot 2} \\
 \text{b) } & \frac{b(R_x \cdot a)}{f} + \frac{(R_{x-1} \cdot B^2)}{f \cdot 2}
 \end{aligned}$$

$$\begin{aligned}
 \text{c) } & \frac{C(Rx \cdot a)}{f} + \frac{c(Rx-1 \cdot b)}{f} + \frac{(Rx \cdot C^2)}{f \cdot 2} \\
 & \frac{(R9 \cdot 36)}{10 \cdot 2} \\
 & \frac{4(R9 \cdot 6)}{10} + \frac{(R8 \cdot 16)}{10 \cdot 2} \\
 & = \frac{0.0563 \times 36}{20} = 0.101 \\
 & \text{Total} = 0.28551
 \end{aligned}$$

Accumulating recruitment.

$$\begin{aligned}
 Ra &= frn - Rr \\
 0.583 - 0.28551 &= 2975
 \end{aligned}$$

3rd Felling cycle.

Realisable recruitment : $Rr = \frac{1}{2} \{ (Frn - p(Rn - Rx)) \}$

$$\begin{aligned}
 Rr &= \frac{1}{2} \{ 0.618 - 10(0) \} \\
 &= 0.309
 \end{aligned}$$

$$\begin{aligned}
 \text{Accumulating recruitment : } Ra &= frn - Rr \\
 &= 0.618 - 0.309 \\
 &= 0.309
 \end{aligned}$$

4th felling cycle.

Realizable recruitment.

$$\begin{aligned}
 \text{a) } & \frac{(Rx \cdot a^2)}{f \cdot 2} \\
 \text{b) } & \frac{b(Rx \cdot a)}{f} + \frac{(Rx-1 \cdot B^2)}{f \cdot 2} \\
 \text{c) } & \frac{C(Rx \cdot a)}{f} + \frac{c(Rx-1 \cdot b)}{f} + \frac{(Rx \cdot C^2)}{f \cdot 2} \\
 & 3R8 + 7R7 \\
 & \frac{(R8 \times 9)}{10 \cdot 2}
 \end{aligned}$$

$$= \left(\frac{0.0618 \times 9}{10 \quad 2} \right) = 0.02781$$

$$0.12978 + 0.1715 = 0.30128$$

$$\frac{7(R8 \times 4)}{10} + \frac{(07 \times 49)}{10 \quad 2}$$

$$10 \quad 10 \quad 2$$

Accumulating recruitment. $Ra = frn - Rr$

$$= 0.6754 - 0.32909 = 0.34631$$

5th felling cycle.

$$\text{Realisable recruitment : } Rr = \frac{1}{2} \{ (Frn - p(Rn - Rx)) \}$$

$$FR5 = \frac{1}{2} \{ fr6 - 10(0) \}$$

$$= (\frac{1}{2} \quad 0.7)$$

$$= 0.35$$

$$\text{Accumulating recruitment : } Ra = frn - Rr$$

$$= 0.7 - 0.35 = 0.35$$

6th felling cycle.

$$a) \quad \frac{(Rx \cdot a^2)}{f \quad 2}$$

$$b) \quad \frac{b(Rx \cdot a)}{f} + \frac{(Rx-1 \cdot B^2)}{f \quad 2}$$

$$c) \quad \frac{C(Rx \cdot a)}{f} + \frac{c(Rx-1 \cdot b)}{f} + \frac{(Rx \cdot C^2)}{f \quad 2}$$

$$\frac{(R6 \cdot 25)}{20} = 0.1216$$

$$20$$

$$= 5 \left(\frac{R6 \cdot 5}{10} \right) + \frac{(R5 \cdot 25)}{20} = 0.3855$$

$$10$$

$$20$$

$$\text{Total} = 0.5071$$

Accumulating recruitment. $Ra = frn - Rr$

$$= 1.0514 - 0.5071 = 0.5441$$

7th felling cycle.

$$\text{Realisable recruitment : } R_r = \frac{1}{2} \{ (F_{rn} - p)(R_n - R_x) \}$$

$$\begin{aligned} Fr_7 &= \frac{1}{2} \{ fr_7 - 10(0) \} \\ &= (\frac{1}{2} \times 0.973) \\ &= 0.4863 \end{aligned}$$

$$\begin{aligned} \text{Accumulating recruitment : } R_a &= fr_n - R_r \\ &= 0.9726 - 0.4863 = 0.4863 \end{aligned}$$

TABLE-41

Felling cycle	Accruing	Realizable	Accumulating	Hence available in cycle.	Annual average recruitment	Annual average Volume in M ³
1	0.563	0.2815	0.2815	0.2815	0.02851	0.0229
2	0.583	0.28556	0.2977	0.56706	0.05671	0.0462
3	0.618	0.309	0.309	0.6067	0.06067	0.494
4	0.6754	0.32909	0.34631	0.63809	0.06381	0.0520
5	0.70	0.35	0.35	0.653	0.6530	0.0532
6	0.973	0.4863	0.4863	0.8363	0.08363	0.0681
7	1.0545	0.5071	0.5444	0.9934	0.9934	0.0809

YIELD IN FIRST SEVEN FELLING CYCLES:-

9.13.15 The existing number of stem/ha above 135 cm girth is 0.90 which will be liquidated in the first seven cycles. The annual liquidation will be 0.0129 stem/ha or 0.0105 M³ /ha. Thus the annual average yield per hectare in first seven felling cycles will be 0.0334 M³ 0.0567 M³ , 0.0599 M³, 0.0625 M³ , 0.0637 M³, 0.0786 M³, 0.0914 M³ respectively. Reserving

50% as future safeguard the utilizable, in the seven felling cycle will be 0.0167 M^3 , 0.0284 M^3 , 0.0300 M^3 , 0.0313 M^3 , 0.0319 M^3 , 0.0393 M^3 , 0.0457 M^3 respectively and the estimated annual yield for the whole working circle, in seven felling cycle will be 363.190 M^3 , 617.640 M^3 , 652.437 M^3 , 680.709 M^3 , 693.758 M^3 , 854.692 M^3 , 993.879 M^3 respectively. The number of percent of trees to be removed can be calculated as:

- Total realisable trees = $0.90 + 0.2815 = 1.1815$
- Total prescribed yield = $0.0457 \times 10 = 0.457$
- Percentage removal = $0.457 \div 1.1815 \times 100 = 39\%$

Hence only two trees out of five marked in the girth class shall be removed.

9.13.16 HARVESTABLE GIRTH 120 CMS :- Yield regulation for other timber species.

9.13.17

TABLE-42

Girth class in cms		Stems per ha	Stems/ha as per Lioc-court	% of survival	Stems/ha reaching harvestable size(2 x 4)	Years required to pass over next girth class	Average annual recruitment.
1		2	3	4	5	6	7
I	15-30	25.95	28.325	15.740	4.08	14	0.291 R1
II	30-45	25.02	22.480	19.830	4.96	13	0.382 R2
III	45-60	21.18	17.840	24.988	5.29	14	0.378 R3
IV	60-75	15.09	14.159	31.488	4.75	13	0.365 R4
V	75-90	12.83	11.238	39.675	5.09	13	0.392 R5
VI	90-105	9.75	8.919	49.981	4.87	12	0.406 R6

VII	105-120	5.46	7.078	62.987	3.44	13	0.265 R7

Table-42 continued...

VIII	120-135	2.86	5.617	79.365	2.27	16	0.142 R8
IX	135 & above	1.93	4.459	100.00			
	TOTAL	120.07					

$$\text{Here } r = \frac{(25.95 + \dots + 2.86)}{(25.02 + \dots + 1.93)} = \frac{118.14}{94.12} = 1.600$$

$$a = S \times \left[\frac{(r^n - 1) \times (1-r)}{(r^n - 1)} \right]$$

$$= 120.07 \times \left[\frac{(1.600^n - 1) \times (1 - 1.600)}{(1.600^n - 1)} \right]$$

$$= 28.325$$

RECRUITMENT IN SUCCESSIVE FELLING CYCLES :-

9.13.17 The number of trees which will be recruited during felling cycle of 10 years is given below:-

$$\begin{aligned} fR1 &= 10R7 &= 2.65 \\ fR2 &= 3R7+7R6 &= 3 \times 0.265 + 7 \times 0.406 = 3.637 \\ fR3 &= 6R6+4R5 &= 6 \times 0.404 + 4 \times 0.392 = 4.004 \\ fR4 &= 7R5+3R4 &= 7 \times 0.392 + 3 \times 0.365 = 3.839 \\ fR5 &= 10R4 &= 3.65 \\ fR6 &= 10R3 &= 3.78 \end{aligned}$$

$$fR_7 = 4R_3 + 6R_2 = 4 \times 0.378 + 6 \times 0.382 = 3.804$$

$$fR_8 = 7R_2 + 3R_1 = 7 \times 0.382 + 3 \times 0.291 = 3.547$$

Realizable and Accumulating yields for each cycle are obtained as below:-

1st Felling cycle..

$$\text{Realisable recruitment : } R_r = \frac{1}{2} \{ (F_{rn} - p(R_n - R_x)) \}$$

$$R_r = \frac{1}{2} \{ 2.65 - 10(0.) \} = 1.325$$

$$\text{Accumulating recruitment : } R_a = f_{rn} - R_r$$

$$= 2.65 - 1.325$$

$$= 1.325$$

2nd felling cycle.

Realizable recruitment.

$$a) \quad \frac{(R_7 \cdot 3^2)}{f \cdot 2} = \frac{0.265 \times 9}{10 \cdot 2} = 0.1192$$

$$c) \quad \frac{b(R_x \cdot a)}{f} + \frac{(R_{x-1} \cdot b^2)}{f} = \frac{7(R_7 \cdot 3)}{10} + \frac{(R_6 \cdot 49)}{10 \cdot 2}$$

$$\frac{7(0.265 \cdot 3)}{10} + \frac{(0.406 \cdot 49)}{10 \cdot 2} = 1.5512$$

$$(R_9 \cdot 36)$$

$$= (a) + (b) = 1.6704$$

3rd Felling cycle..

Realizable recruitment.

$$6R_6 + 4R_5$$

$$a) \quad \frac{(R_x \cdot a^2)}{f \cdot 2}$$

$$b) \quad \frac{b(R_x \cdot a)}{f} + \frac{(R_{x-1} \cdot b^2)}{f \cdot 2}$$

$$= \frac{(R_6 \cdot 24)}{10 \cdot 2} = \frac{0.406}{10} \times \frac{24}{2} = 0.4872$$

$$4 \frac{(R_6 \cdot 6)}{10} + \frac{(R_5 \times 24)}{10 \cdot 2}$$

$$= 4 \left(\frac{0.406 \cdot 6}{10 \cdot 2} \right) + \left(\frac{0.392}{10} \times \frac{24}{2} \right) = 1.4448$$

Total accruing amount = 1.448+0.4872=1.932

Accumulating recruitment. $R_a = fr_n - R_r$
 $= 4.004 - 1.932 = 2.072$

4th Felling cycle.

Realizable recruitment.

$$a) \quad \frac{(R_x \cdot a^2)}{f \cdot 2}$$

$$b) \quad \frac{b(R_x \cdot a)}{f} + \frac{(R_{x-1} \cdot B^2)}{f \cdot 2}$$

$$7R_5 + 3R_4$$

$$a) \quad \frac{(R_5 \cdot 49)}{10 \cdot 2} = \frac{0.392}{10} \times \frac{49}{2} = 0.9604$$

$$b) \quad \frac{3(R_5 \cdot 7)}{10} + \frac{(R_4 \times 9)}{10 \cdot 2}$$

$$= 3 \left(\frac{0.392 \cdot 7}{10} \right) + \left(\frac{0.365}{10} \times \frac{9}{2} \right) = 0.9874$$

$$RR = 0.9874$$

Accumulating recruitment. $R_a = fr_n - R_r$

$$= 3.839 - 0.9874 = 2.8516$$

5th felling cycle.

$$\text{Realisable recruitment : } R_r = \frac{1}{2} \{ (F_{rn} - p(R_n - R_x)) \}$$

$$FR5 = \frac{1}{2} \{ 3.65 \}$$

$$= 1.83$$

$$\text{Accumulating recruitment : } R_a = f_{rn} - R_r$$

$$= 3.65 - 1.83 = 1.83$$

6th felling cycle.

$$\text{Realisable recruitment : } R_r = \frac{1}{2} \{ (F_{rn} - p(R_n - R_x)) \}$$

$$10R3$$

$$= \frac{1}{2} \{ (F_{rn} - 10(0)) \}$$

$$= \frac{1}{2} \{ 3.78 \}$$

$$= 1.89$$

$$\text{Accumulating recruitment : } R_a = f_{rn} - R_r$$

$$= 3.78 - 1.89 = 1.89$$

7th Felling cycle.

$$4R3 + 6R2$$

Realizable recruitment.

$$\text{a) } \frac{(R3 \cdot 16)}{2} = \frac{378}{10} \times \frac{16}{2} = 0.3024$$

$$\text{b) } \frac{(R3 \cdot 4)}{10} + \frac{(R2 \cdot 1.036)}{10} = 6 \frac{(378 \cdot 4)}{10} + \frac{(382 \cdot 0.36)}{2} = 1.5948$$

$$\text{Total R.R.} = 1.5948 + 0.3024 = 1.8972$$

Accumulating recruitment : $R_a = f_{rn} - R_r$

$$3.804 - 1.8972 = 1.9068$$

$$a) \quad \frac{(R_2 \cdot 49)}{10 \cdot 2} = \frac{0.382}{10} \times 49 = 0.9359$$

$$b) \quad \frac{3(R_2 \cdot 7)}{10} + \frac{(R_1 \cdot 9)}{10 \cdot 2} = \frac{3(0.382 \cdot 7)}{10} + \frac{(0.291 \cdot 9)}{10 \cdot 2} = 9.3315$$

$$\text{Total R.R.} = 0.93315 + 9359 = 1.86905$$

Accumulating recruitment : $R_a = fr_n - R_r$

$$3.547 - 1.86905 = 1.67795$$

Accumulating recruitment. $R_a = fr_n - R_r$
 $= 3.839 - 0.9874 = 2.8516$

TABLE-43

Felling cycle	Accruing	Realizable	Accumulating	Hence available in cycle.	Annual average recruitment	Annual average volume in M ³
1	2.65	1.325	1.325	1.325	0.1325	0.108
2	3.637	1.6704	1.9666	2.9954	0.2995	0.244
3	4.004	1.932	2.072	3.8986	0.3898	0.318
4	3.839	0.9874	2.8516	2.8774	0.2877	0.235
5	3.65	1.83	1.83	4.6816	0.4682	0.382
6	3.78	1.89	1.89	3.72	0.3720	0.303
7	3.804	1.8972	1.9068	3.782	0.3782	0.308
8	3.547	1.86905	1.67795	3.77585	0.3776	0.308

YIELD IN FIRST 8 FELLING CYCLE: The existing number per hectare above 120 cm girth is 1.93 which will be liquidated in the first 8 felling cycles. The annual liquidation will be 0.0241 stem/ha or 0.0197

M³/ha. Thus the annual average yield per hectare in the first eight felling cycle will be 0.1321M³, 0.2681 M³, 0.3421 M³, 0.2591 M³, 0.4061 M³, 0.3271 M³, 0.3321, M³ 0.3321 M³ respectively. Reserving 50% as the future safeguard, the utilizable yield in 8 felling cycles will be 0.06605 M³, 0.13405 M³, 0.18105 M³, 0.12955 M³, 0.20305 M³, 0.16355 M³ 0.16605 M³ 0.16605 M³ per hectare respectively and estimated annual yield for the whole working circle in 8 felling cycle will be 1436.449 M³, 2915.306 M³, 3719.979 M³, 2817.441 M³, 4415.911M³, 3556.869 M³ , 3611.239 M³, 3611.239 M³ respectively. The number of percent of trees to be removed can be calculated as:

d) Total realisable trees = $0.265 + 0.1325 = 0.3975$

e) Total prescribed yield = $0.3321 \times 10 = 3.321$

f) Percentage removal = $0.3975 \div 3.321 \times 100 = 12\%$

Hence only one tree out of seven marked in the girth class shall be removed.

9.13.18 HARVESTABLE GIRTH 45 CM :- Yield regulation for Garari and Lendia group as shown in table-44.

TABLE-44

Girth class in cm.		Stems per ha	Stems/ha as per Lioc-court	% of survival	Stems/ha reaching harvestable size e(2 x 4)	Years required to pass over next girth class	Average annual recruitment.-
1		2	3	4	5	6	7
I	15-30	17.66	18.98	15.13	2.67	16	0.1668 R1
II	30-45	13.53	11.53	16.91	2.29	20	0.1145 R2
III	45-60	7.30	7.39	26.36	1.92		
IV	60-75	4.22	4.74	41.10	1.73		
V	75-90	2.39	3.04	64.13	1.53		
VI	90 & up	1.52	2.72				
VII	Total	46.62					

$$\text{Here } r = \frac{(17.66 + \dots + 2.39)}{(13.53 + \dots + 1.52)} = \frac{45.10}{28.97} = 1.56$$

$$\begin{aligned} a &= S \times \left[\frac{(r^n - 1) \times (1 - r)}{(r^n - 1)} \right] \\ &= 46.62 \times \left[\frac{(1.56^n - 1) \times (1 - 1.56)}{(1.56^n - 1)} \right] \\ &= 17.986 \end{aligned}$$

9.13.19 RECRUITMENT IN SUCCESSIVE FELLING CYCLES :-

$$\begin{aligned} fR1 &= 10R2 = 1.145 \\ fR2 &= 10R2 = 1.145 \\ fR3 &= 10R1 = 1.668 \\ fR4 &= 6R1 + 4R2 = 1.4588 \end{aligned}$$

Realizable and Accumulating yields for each cycle are obtained as below:-

1st Felling cycle..

$$\begin{aligned} \text{Realisable recruitment : } R_r &= \frac{1}{2} \{ (F_{rn} - p(R_n - R_x)) \} \\ R_r &= \frac{1}{2} \{ 1.145 - 10(0.) \} = 0.5725 \\ \text{Accumulating recruitment : } R_a &= f_{rn} - R_r \\ &= 1.145 - 0.5725 \\ &= 0.5725 \end{aligned}$$

2nd felling cycle.

$$\begin{aligned} \text{Realisable recruitment : } R_r &= \frac{1}{2} \{ (F_{rn} - p(R_n - R_x)) \} \\ R_r &= \frac{1}{2} \{ 1.145 - 10(0.) \} = 0.5725 \\ \text{Accumulating recruitment : } R_a &= f_{rn} - R_r \\ &= 1.145 - 0.5725 \\ &= 0.5725 \end{aligned}$$

3rd felling cycle.

Realisable recruitment : $R_r = \frac{1}{2} \{ (F_{rn} - p(R_n - R_x)) \}$

$$R_r = \frac{1}{2} \{ 1.668 - 10(0.) \} = 0.834$$

Accumulating recruitment : $R_a = f_{rn} - R_r$

$$= 1.668 - 0.834$$

$$= 0.834$$

4th Felling Cycle.

Realizable recruitment.

$$a) \quad \frac{(R_x \cdot a^2)}{f} =$$

$$b) \quad \frac{b(R_x \cdot a)}{f} + \frac{(R_x - 1) \cdot b^2}{f} =$$

$$a) \quad \frac{(R_1 \cdot 36)}{10} = 0.30024$$

$$b) \quad \frac{4(R_1 \cdot 6)}{10} + \frac{(R_2 \cdot 16)}{10} = 0.49192$$

$$\text{Total RR} = 0.79216$$

Accumulating recruitment : $R_a = f_{rn} - R_r$

$$= 1.4588 - 0.79216 = 0.66664$$

TABLE-45

Felling cycle	Accruring	Realizable	Accumulating	Hence available in cycle.	Annual average recruitment	Annual average volume in M ³
1	1.145	0.5725	0.5725	0.5725	0.05725	0.0466
2	1.145	0.5725	0.5725	1.145	0.1145	0.0933
3	1.668.	0.834	0.834	1.4065	0.1106	0.1146

4	1.4588	0.79216	0.66664	1.626	0.1626	0.1325

YIELD IN FIRST FOUR FELLING CYCLE:

The existing number of stems/ha above 45 cm girth is 7.30 which will be liquidated in the first four felling cycles. The annual liquidation will be 0.182 stem/ha or 0.149 M³/ha. Thus the annual average yield/ha in the first four felling cycle will be 0.2286 M³, 0.2753 M³, 0.2966 M³, 0.3145 M³ respectively. There should not be any reservation for this class. The yield in 4 felling cycles for this working circles will be 4971.570 M³, 5987.197 M³, 6450.428 M³ and 6839.715 M³ respectively.

The total yield for all three harvestable girth class will be as shown in table-46

TABLE-46

Felling Cycle	Per hectare annual average yield in M3				Annual average estimated yield for S.C.I.W.C
	Harvestable girths				
	135 cm	120 cm	45 cm	Total	
1	0.0167	0.661	0.229	0.907	19725.35
2	0.0284	0.134	0.275	0.437	9503.83
3	0.300	0.171	0.297	0.768	16702.29
4	0.313	0.130	0.315	0.758	16484.91

From above table, the yield is increasing progressively in successive felling cycles.

SECTION 14 : DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP 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 A broad treatment map will be generated through geo-media cell in the office of the Conservator of Forests, Working Plan, Nagpur showing different types of areas which will require more fine details. These details will be shown by the Range Forest Officer concerned and checked by the Asstt. Conservator of Forest. The maps will be basically of two types viz. management maps showing management details and stock maps.

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. The patch will not be less than half hectare. These patches will be spaced out for healthy growth. The old plantations will be dealt according to the thinning schedule given in **Appendix No XLII**

TYPE – D- WELL STOCKED AREAS :

9.14.6 Areas with crop density above 0.4 included in this category.

(C) 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

- (i) Protection Area which includes the steep slopes above 25 degrees, areas likely to erode and a strip of 30 mt around nala banks.
- (ii) Understock area less than 0.4 density.
- (iii) Well stocked areas more than 0.4 density.
- (iv) 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. The old plantations will be shown on the maps generated through geo-media cell.

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 – Understocked Area :**

Teak and suitable miscellaneous species shall be planted. Malformed trees will be cut back. The area of the plantation will not exceed 50 ha. at one place in each coupe.

(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. No felling is envisaged for the species with stocking of less than 1%.

SECTION- 15: MARKING TECHNIQUE AND MARKING RULES :

(a) Marking technique :

9.15.1 Marking technique for the trees to be marked for felling is discussed in the chapter on miscellaneous regulations..

9.15.2 The marking rules for each type of area is prescribed as follows-

TYPE – A- PROTECTION AREAS :

9.15.3 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:

9.15.4 Marking will not be carried out except-

- (i) 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 of valuable species which include teak, ain, bija, dhawda, mowai etc.
- (v) Malformed seedlings to be cut back, flush to the ground.

TYPE –C – POLE CROP :

9.15.5 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. The existing old teak plantations will be managed according to the thinning schedule given in **Appendix No XLII**. The thinning procedure has been laid down in Chapter on Teak Plantation Working Circle of this plan.

TYPE – D- WELL STOCKED AREA:-

- 9.15.6**
- 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 above the gbh one class below the harvestable girth class will be enumerated girth class wise.
 - 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. The silvicultural availability means another tree of the same dimension of the tree which has been proposed for felling is available within a distance of 10 m.
 - 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.

- vii) 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.

SECTION-16: SOIL AND MOISTURE CONSERVATION

WORKS :

9.16.1 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 : 17 REGENERATION :

(a) NATURAL REGENERATION:

9.17.1 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:

9.17.2 Regeneration will be treated as adequate if the area contains more than 625 seedling per ha. 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 :

9.17.3 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 :

9.17.4 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, Ain, Arjun, Tiwas, Sivan, Chinch, Jamun, Ber, Kulu, Biba, Anjan, Apta, Amba etc. The ratio of the species 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 :

9.17.5 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:

9.17.6 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-47.

TABLE-47

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 50 hectares will be planted in each coupe every year.

SECTION-18: SUBSIDIARY SILVICULTURAL OPERATIONS:

9.18.1 These works shall be carried out in the subsequent years of the main felling. These works will be carried out departmentally.

(i) CUTTING BACK OPERATION (C.B.O.):

9.18.2 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.

(ii) CLEANING:

9.18.3 These operations shall be carried out in the sixth year of main felling. The following operations are carried out, confining to D type areas only.

- (i) Climber cutting.
- (ii) All dead, badly damaged and uprooted trees should be cut.
- (iii) Cutting coppice shoots except one vigorously growing per stump where there is absence of advance growth of seedling origin (natural or planted).

SECTION -19: OTHER REGULATIONS:

(i) PROTECTION FROM FIRE :

9.19.1 Protection is paramount important for obtaining natural regeneration. These areas will be rigidly protected from fire, grazing and illicit felling.

(ii) GRAZING CONTROL:

9.19.2 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.

(iii) PARTICIPATION:

9.19.3 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.

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CHAPTER –10

WORKING PLAN FOR IMPROVEMENT WORKING CIRCLE

SECTION –1 : GENERAL CONSTITUTION OF THE WORKING CIRCLE:

10.1.1 This working circle includes the areas which were earlier allotted to Coppice With Reserve Working Circle, Kuran Working Circle and Improvement Working Circle of the previous plan. The areas are mostly open and understocked due to heavy biotic pressure. Mostly soil is lateritic which supports lesser vegetation. It consists of the areas of reserved forests, protected forests and all the areas of unclassified forest. The total area of this working circle is 60914.062 hectares and its distribution in various ranges is shown in the following table-48.

TABLE-48
Improvement Working Circle

Range	Reserved Forest in ha.	Protected Forest in ha.	Unclassified Forest in ha.	Total Forest in ha.
Chandrapur	3832.157	2091.480	--	5923.637
Mul	8963.398	1951.390	73.690	18188.478
Warora	11423.750	4548.960	99.420	16072.130
Moharli	3789.570	2856.750	--	6646.320
Shioni	12503.427	1580.070	--	14083.497
Total	40512.302	20228.650	173.110	60914.062

SECTION –2: GENERAL CHARACTER OF THE VEGETATION:

10.2.1 The forests are in general of site quality IVa/IVb, though there might appear patches of site quality III but such patches are rare.. The crop consists mainly of ain, dhaora, bija, aola, tendu, mahua, lendia and garari. Teak occurs in patches Bamboo occurs in the lower canopy and is thick over most of the area . Density varies from 0.4 to 0.6 but mostly it is 0.5. Regeneration of teak occur in patches and that of misc. species is scanty. There are areas which are very much degraded . The soil is generally well drained, sandy loam with patches of laterites. The growing stock is badly hacked at places. There are multiple coppice shoots.

SECTION- 3: SPECIAL OBJECTS OF MANAGEMENT:

10.3.1 The forests allotted to this working circle are degraded in quality. Due to various adverse factors which resulted in maltreatment of the forest in the past, they are not in a normal state. At present, the crop is generally young to middle aged. Therefore the prime object of management will be to give silvicultural rest and to prepare the crop for management under SCI W.C in future . Thus the special objects of management of these forest are.

- I) To improve the crop and bring normalcy as soon as possible.
- II) To check the soil erosion and to increase the productive capacity of the soil by taking soil and moisture conservation works..
- iii) To restore the quality and density of the forests.
- iv) To get maximum sustained outturn of small size timber and firewood to meet the local demand through nistars.

- v) To help natural regeneration of various species to establish and supplement the same by taking up afforestation works in understocked areas.

SECTION - 4: ANALYSIS AND VALUATION OF THE CROP.

10.4.1 Stock mapping:- It was done with the help of satellite imageries. The abstract is given in **Appendix No XXXII-**

10.4.2 Age :- The crop is generally young to middle aged.

10.4.3 Density :- It varies from 0.4 to 0.6 along with scattered natural blanks, barren patches and understocked areas.

10.4.4 Enumerations:- One percent enumerations have been carried out by SOFR Unit at Amaravati. The details of analysis of enumeration data are given in the **Appendix No.XXVII**. The following table shows the distribution of the species girth class wise in this working circle.

TABLE-49

Species and girth distribution in the Improvement Working Circle areas

[illegible]

Table-49 continued

1	2	3	4	5	6	7	8	9	10	11
Shehana	4.05	2.06	0.91	0.58	0.39	0.31	0.12	0.11	0.04	8.57
Garari	7.19	4.31	1.65	1.04	0.42	0.19	0.06	0.04	0.04	14.94
Dhaoda	2.98	1.26	1.07	1.06	0.73	0.54	0.33	0.03	0.19	8.19
Moha	1.48	1.04	0.87	0.92	0.94	1.05	0.80	0.65	1.00	8.75
Tendu	9.32	3.02	1.48	1.21	0.89	0.77	0.48	0.35	0.37	17.89
Khair	2.97	2.33	1.04	0.42	0.14	0.06	0.02	--	--	6.98
Aonla	0.97	0.57	0.28	0.18	0.11	0.04	0.03	0.01	--	2.19
Hirda	0.11	0.06	0.02	0.01	--	--	--	--	--	0.20
Beheda	0.37	0.25	0.24	0.21	0.18	0.15	0.10	0.08	0.08	1.66
Dikamali	0.02	0.01	--	--	--	--	--	--	--	0.03
Char	1.87	0.94	0.47	0.22	0.09	0.07	0.02	0.01	0.01	3.70
Ghoti	2.50	0.97	0.39	0.18	0.04	0.01	--	--	--	4.09
Other	16.82	11.92	7.46	5.33	3.45	2.59	1.61	0.98	1.06	51.22
TOTAL	65.42	36.53	19.98	14.23	9.33	7.36	4.51	2.85	3.47	163.68

ANALYSIS:

10.4.5 The analysis of the tree enumeration data shows that there are only six trees above 135 cm. girth class, 55 trees between girth class 45 to 120 cm and 102 trees below 45 cm. girth class per hectare which shows that most of the trees are in the younger age 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 10.5 whereas the non teak(Ain, Bija, Haldu and Shisham) is 11.0 and the remainig 78.5 are miscellaneous species and therefore efforts are needed to increase the per centage of valuable timber species to atleast 50 % of the crop by adopting higenic silvicultural and tending operations.

SECTION-5: SILVICULTURAL 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 10 years. since in this working circle, only improvement fellings are prescribed there is no need for fixing the harvestable girth . 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.XXXVII**. The total no.of compartments allotted to this working circle is 629 compartments which comprises of 154 compartments in Reserved Forest , 465 compartments in Protected Forests and 10 compartments are from Unclassed Forest areas.

SECTION-8: FELLING SERIES AND COMPARTMENTS :

10.8.1 The areas have been divided into 56 Working Series having 10 coupes in each Series. Average area of the coupe is 100 ha. to 150 ha. The details of the felling series are given in **Appendix No.XXXVIII**- The following table shows the description of the felling series and compartments allotted to them.

TABLE-50

Sr.No.	Name of Felling Series	Compartment No.	Total area in ha.
1	2	3	4
1	Chorgaon I.F.S.	587588,589,590,591,	1022.65
2	Warwat I.F.S.	388,381,578,579,580,581,582,583,584,585, 586A, 586B	1020.75
3	Sinala I.F.S.	400,401,402	1001.43
4	Nimbala, I.F.S.	398,399,403,409,	968.98
5	Chanda I.F.,.S.	485,485,572,573,571,574A, 574B,575,576 577,598,599,600,601,602,603,604,605A605B 606,607,608,609,610,611,612,613,618,619 541,542	1000.30
6	Ghanta Chouki I.F.S.	518,520,507,508,	909.527
7	Padzari I.F.S.	323,324	1102.36
8	Doni I.F.S.	325.327.329Pt	1064.73
9	Zari I.F.S.	347,361,531,532,368,620,621,622,	1210.63
10	Maroda I.F.S.	768,769A, 769B, 770 ,771, 772,773,774,775, 776,777,778,779,780,781,782,783,784,785,786,	999.52

Table-50 continued.....

1	2	3	4
11	Katwan I.F.S.	787,788,789,790,791,792,763,764,765,766,	1147.72
12	Mul I.F.S.	756,757,758,759,760,761,762,767	1043.12
13	Fulzari I.F.S	352,359	929.288
14	Janala I.F.S	353,533,534,536,716,748,749,751,750,535,747	1080.02
15	Wedi I.F.S	517,746A7,46B	744.99
16	Chiroli I.F.S	539,714,715,717,718,719,720,721,722,723,724,725,726,727,732	1082.36
17	Chichpalli. I.F.S	1005.529,537,538,708,709,710,711,530,614,615,616,617,628,629,630,639,632,631	1382.99
18	Kelzar I.F.S.	426,430,431,432,433	942.89
19	Gilbili I.F.S.	469,463,464,527,640,641,642,643,644,645	1120.68
20	Dabgaon I.F.S.	646,647,674,675,676,677A,677B,678A,678B,,679,680,681,540	596.74
21	Kanhargaon I.F.S.	436,437,438,456	1016.16
22	Shiwapur I.F.S.	793,794,796A,796B,796C,796D,795,799,800,801,802,803,797,798,753,754,755,752,650,651,736,737,733,734,735, 735B,735C,735D,735E,735F743,744,745,1008,1010,1011,1012,1013	1068.72

Table-50 continued....

1	2	3	4
23	Kelzar I.F.S.	668,698,699,700, 701,702,703,704,705,706,707,712,713,6 89,690,691,692,693,694,695,696,697,63 3,634,635,636 ,637,638,728,729, 730,731,623,624,625,626,627,682,683,6 84,685,686,687,688,667,664,665,666, 738,739,740,741,742	850.79
24	Dewada I.F.S.	652,653,654A,654B,655,656,657,658, 659,660, 661,662,663,669,670,671,672,673,965, 966,672 ,973,974,975,976,977,978,979,980,981 ,982,983,984,985,1014,1016,1017	816.61
25	Sitarampet h I.F.S.	554,555,864,956A,956B,957,553,958,9 59A,959B,960,988,989,990,991,992A,9 92B,993,994,995,996,997,998,999,961 A,961B,552,944,945,946,947,948,960, 988,989,990,991,992A,992B949,950A, 950B,951,952,953,954A,954B 942,943	1461.83
26	Ambezari, I.F.S.	551,874A,874B,875,876,986A,986B,98 7,173, 176 177,178,186,	1467.55
27	Agarzari I.F.S.	164,174,187,188,196,	1227.86
28	Masara I.F.S.	180,181,182,183,184	1144.46

Table-50 continued.....

1	2	3	4
29	Pailibhatali I.F.S.	877A,877B,877,879,880,881,882,883,884,885A 885B,886,887,1007,1009	1344.68
30	Karwa I.F.S.	240,242,247	1042.08
31	Vihirgaon I.F.S.	222,223,224,243	1216.49
32	Piparda I.F.S.	225,226,228,229	1211.61
33	Parna, I.F.S.	230,231,232,235	1188.50
34	Sirkada I.F.S.	233,234,236	1086.19
35	Shivni I.F.S.	263,264,265	974.89
36	Jamshala I.F.S.	268,269	999.17
37	Kukudheti I.F.S.	273,275	1248.45
38	Bamni I.F.S.	270,271,1004A,1004B	1156.09
39	Pangadi I.F.S.	319,320,808,809,810,811,812,813,814, 815 ,816,817,818,819,820,821,822,	1117.20
40	Naleshwar I.F.S.	1015,266B,804,805,806,807,962,967, 968,969,970,971,834,835,836,570,830, 831,832,833,828,829,842,843,844,845, 846,847,566,567,568,569,837,838,839, 840,841,848,849,850,851,852,853,560, 561,562,563,	1290.037

Table-50 continued.....

1	2	3	4
41	Gonmohadi I.F.S.	1000,1001,1002,1003,564,856,857,558 ,559, 854,855,858,859,860,861,963,964,556, 557, 565,823,824,825,826,827,	1552.79
42	Borgaon I.F.S.	7,867,868,869,870,1006	1089.18
43	Kem I.F.S.	1,6,8,	1122.35
44	Alfer I.F.S.	2,3,932,	1014.97
45	Sakhara I.F.S.	4,5	1031.95
46	Morwa I.F.S.	9,	1011.70
47	Wagholi I.F.S.	10,11	1029.12
48	Salori I.F.S.	12,13,14	1338.72
49	Awanda, I.F.S.	,202,203	1002.60
50	Defence I.F.S.	204,207,208,210,888	1150.38
51	Chora, I.F.S.	548,902,903,904,871,872A,872B,873A, 873B	1119.25
52	Chicholi I.F.S.	905A,905B,906,546,547,936A,936B,93 7A,937B,938A,938B,939A,939B,940A, 940B,941A,941B,933A,933B,934,935A ,935B	1049.68
53	Baranj I.F.S.	211,213,214,889A,889B,890A,890B,89 0C,895,891,892,893,894,	850.19

Table-50 continued.....

1	2	3	4
54	Morwa I.F.S.	549,907,908,909,910,911,915,916 917,918,919,920,921,922	975.28
55	Pandharkaw ada I.F.S.	900,901,925,896,897,898,899	1013.52
56	Ghotminwat I.F.S.	543A,543B,544,545A,545B,550,912, 913,914,923,924,925,928,929,930, 931,	1273.24
	TOTAL		60914.062

SECTION-9: CHOICE OF SPECIES.

10.9.1 The species to be favoured in order of preference are Teak, Bamboo, Ain, Bija, Tiwas, Dhawada, Lendia, Rohan, Bhirra & Kalam.

SECTION :10: FORMATION OF FELLING SERIES AND COUPES:

10.10.1 The compartment allotted to this working circle given in **Appendix No.XXXVII**. The formation of felling series and sequence of working of coupes are given in **Appendix No. XXXIX**.

SECTION :11: REGULATION OF YIELD:

10.11.1 The crop is generally young to middle aged. The fellings are limited to improvement of the crop only. Therefore the yield will vary and consist of small wood, poles and firewood only. Hence no yield regulation is prescribed.

SECTION :12: AGENCY FOR HARVESTING:

10.12.1 The demarcation and marking of the coupes will be done departmentally. Felling and disposal of the forest produce shall be done departmentally. 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 :13: DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP AND MARKING RULES:

DEMARCATION :-

10.13.1 It will be done one year in advance.

PREPARATION OF TREATMENT MAP :

10.13.2 A broad treatment map will be generated through geomedia cell in the office of the Conservator of Forests, Working Plan, Nagpur showing different types of areas which will require more fine details. These details will be shown by the Range Forest Officer concerned and checked by the Asstt. Conservator of Forest. The maps will be basically of two types viz. management maps showing management details and stock maps.

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) Riperian Zones
- (v) Sacred groves
- (vi) In these areas no trees will be marked for felling.

TYPE – B : UNDERSTOCKED AREAS :- The forests having less than 0.4 density are included in this category. In these areas the marking shall be done in the following manner:

- (i) All dead trees will be marked leaving two per hectares.
- (ii) All live high stumps will be reduced to the ground.;

TYPE – C : GROUPS OF YOUNG POLES:- 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 The existing old teak plantations will be managed according to the thinning schedule given in **Appendix No.XLII.** The thinning procedure has been laid down in Chapter on Teak Plantation Working Circle of this plan. Such areas have been excluded from this Working Circle.

TYPE – D : WELL STOCKED AREAS:- The areas having forests more than 0.4 density are included in these category. The following operations will be carried out.

- (i) All dead trees except two per ha. will be marked.

- (ii) All high live stumps shall be cut.
- (iii) Coppice shoots shall be reduced to one per stool.
- (iv) The mature trees of gbh more than 120 cm shall be removed provided it does not create a permanent gap in the canopy.
- (v) Trees not likely to survive next felling cycle will be removed.
- (vi) The badly damaged trees will be removed.
- (vii) The overmatured trees of g.b.h. of more than 240 cm shall be reserved against felling.

SECTION 14 : MARKING RULES:-

10.14.1 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.

10.14.2 The marking rules for each type of area, besides, climber cutting will be as follows:

TYPE A : PROTECTION AREA :

No marking will be done.

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.

TYPE C: GROUPS OF YOUNG POLES:

10.14.3 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 gbh 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 :

10.14.4 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 following trees will be marked for felling.

- (i) All dead and malformed trees after retaining two dead trees/ha. A tree will be treated as malformed if it does not have a clean bole up to at least 2 m above the breast height.
- (ii) All live and dead high stumps.
- (iii) All but one vigorously growing coppice shoot per stool
- (iv) The matured trees of gbh more than 120 cm shall be removed provided it does not create a permanent gap in the canopy.

SECTION 15 : REGENERATION.

Natural Regeneration.

10.15.1 Area containing good natural regeneration will be identified in the coupe.

Artificial Regeneration and choice of species.

10.15.2 Areas which are deficient in natural Regeneration shall be supplemented with artificial regeneration. The choice of species will mainly depend upon local demand and suitability of the species. The species indigenous to the area like Teak, Shisham, Bamboo, Ain, Arjun, Shiwan, Chinch, Jamun, Ber, Biba, Anjan, Amba, Apta etc. will be preferred. Normally a mixture of Teak and Miscellaneous species with ratio of 50:50 shall be adopted for artificial regeneration.

SECTION-16: SOIL AND MOISTURE CONSERVATION WORKS.

10.16.1 Soil and moisture conservation works will be carried out after the preparation of treatment 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 chapter on "Miscellaneous Regulations."

SECTION –17 : SUBSIDIARY SILVICULTURAL OPERATIONS :

(A) CUTTING BACK OPERATIONS :

10.17.1 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 :

10.17.2 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:

10.17.3 Weeding will be carried out in the plantation in order to boost up the growth of natural and planted seedlings.

SECTION-18: OTHER REGULATIONS.

(i) Grazing :

10.17.1 Coupes will remain closed to grazing for a period of five years from the year of main planting. While taking up plantations in the understocked areas palatable fodder grasses like sheda and paonea will be seed sown so that at the end of five 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

WORKING PLAN FOR THE TEAK PLANTATION

WORKING CIRCLE

SECTION-1: GENERAL CONSTITUTION OF THE WORKING CIRCLE.

11.1.1 This working circle comprises of better quality teak and teak-miscellaneous forest of Chandrapur, Shivani, Moharli and Warora Range of Chandrapur Forest Division. The areas are gently undulating and the soil is well drained, flat alluvial and free from water logging. This working circles includes the PBI areas of Teak conversion working circle, uncovered PBI areas and Improvement working circles of Shri Kartarsingh's working plan. This working circle also includes all the teak plantations which have been taken in the previous working plans beginning from 1975 to 2000. The total area allotted to this working circle is 5986.770 ha. The rangewise distribution of the area allotted to this working circle is given in following table:

TABLE-51

Range	Reserved Forest in ha.	Protected Forest in ha.	Unclassd Forest in ha.	Total Forest in ha.
Chandrapur	555.810	--	--	555.810
Mul	392.000	414.390	--	806.390
Warora	1759.830	85.000	--	1844.830
Moharli	1271.260	176.500	--	1447.760
Shioni	821.980	510.000	--	1331.980
Total	4800.880	1185.890	--	5986.770

SECTION-2: GENERAL CHARACTER OF THE VEGETATION:

11.2.1 The forest included in this working circle are mostly of teak and its associated miscellaneous species such as ain, dhawda, bija, aonla, tiwas moha, lendia, garari etc. Bamboo may or may not be present and mostly occurs on lower canopy. The site quality is II to IVa. and the crop density is 0.5 to 0.7. The natural regeneration of teak and other miscellaneous species is scanty and the crop is young to middle aged .

11.2.2 The plantations are mostly successful. The site quality varies from IV to II. 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 increase the percentage of teak in the forest.
- (ii) To convert the existing uneven aged crop containing large percentage of inferior species into an even aged teak forest.
- (iii) To obtain maximum sustained yield of teak timber of commercial value.
- (iv) Consistent with the above to utilize the maximum production capacity of forest.
- (v) To carry out thinning as per the yield table on the basis of age and site quality.
- (vi) To improve the crop by carrying out required silvicultural operations so as to achieve growth parameters comparable to those in the yield table.

- (a) **Stock map** : These forest have been stock mapped by Geographical Information System (GIS) on the map of 4" = 1 mile and the result of the stock mapping has been given in **Appendix No XXXII and Appendix No XXXIII**. The standard symbols have been used in the preparation of stock maps, site quality, density and important species. The standard symbols used have been given in **Appendix No.XXXIII**. All plantation will be shown on stock map 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 IVa.
- (d) **Tree enumeration** : 1% tree enumeration has been done by the Survey of Forest Resources Unit Amravati. The results of tree enumeration has been given in **Appendix No XXVII**. The distribution of stems/ha girthclass wise is given in the table-52

Species and girth distribution in the Teak Plantation Working Circle

[illegible]

Shisham	0.21	0.21	0.21	0.10	--	0.21	--	--	--	0.94
Shiwan	--	--	--	--	--	--	--	--	--	--
Tiwas	--	--	--	--	--	--	--	--	--	--
Shehana	2.92	1.25	0.52	0.10	0.21	0.21	0.10	--	0.10	5.42
Garari	5.21	3.85	2.92	1.56	1.04	0.52	--	--	0.10	15.21
Dhaoda	0.31	0.31	1.77	0.83	0.73	0.73	0.94	0.52	0.62	6.77
Moha	0.10	0.83	0.73	0.42	1.14	0.52	0.73	0.83	0.10	5.42
Tendu	6.56	3.85	2.29	2.92	1.87	1.46	0.31	0.62	0.31	2.21
Khair	0.31	0.10	0.10	--	--	--	--	--	--	0.52
Aonla	1.56	0.52	0.31	0.31	0.31	0.52	0.42	--	--	3.96
Hirda	0.21	--	--	--	--	--	--	--	--	0.21
Beheda	0.21	--	--	0.10	--	--	--	--	--	0.31
Dikamali	--	--	--	--	--	--	--	--	--	--
Char	1.04	0.94	0.42	0.21	--	--	--	--	--	2.60
Ghoti	1.77	0.83	1.67	1.35	0.31	0.10	--	--	--	6.04
Other	1.73	6.35	6.46	5.31	3.33	3.44	0.73	0.62	1.46	38.43
TOTAL	33.54	21.25	18.02	14.79	9.58	8.85	4.27	3.12	3.02	116.44

- a) **Analysis :** The analysis of data shown in the table above shows that Teak occupies 4.82%, non-teak timber species 4.92% and miscellaneous species occupy 90.25 %. Therefore it is found that the percentage of teak and non-teak timber species has gone down drastically although the soil has a potential to grow large large size valuable timber species including teak and therefore the percentage of teak in these areas need to be encouraged by raising up teak plantations and following necessary silvicultural operations in the teak plantation areas.

SECTION-5: SILVICULTURAL SYSTEM.

11.5.1 Consistent with the objects of the management of this working circle the silvicultural system shall be clear felling system followed by artificial regeneration of genetically superior stock of teak. However the advantage of advance growth of teak below 60 cm. in girth at breast height occurring in patches of not less than ½ hectares in extent and such patches would be kept as part of future crop after appropriate cleanings and thinnings.

SECTION- 6: FELLING CYCLE.

11.6.1 The felling cycle shall be of ten years and the entire forest area in this working circle shall be divided into ten annual coupes.

SECTION – 7: AGENCY OF EXPLOITATION.

11.7.1 The coupes shall be worked departmentally.

SECTION – 8: FELLING SERIES.

11.8.1 This working circle has been divided into four felling series for raising up teak plantations. The compartments allotted to each of the felling series and their sequence of working is given in the **Appendix No. XL**. The following table-53 shows the name of the felling series and the compartments allotted to each felling series.

TABLE-53

Sr.No.	Name of felling series	Comptt. included	Area of felling series.
1	Lohara	397,206	634.500
2	Pardi	205,168	626.850

Table continued.....

3	Mohorli	199,194,195,198	860.700
4	Pangadi	321	791.980
	Total		2914.030

In the teak plantation areas the silvicultural operations shall be done and the sequence of thinning is given in **Appendix No.XLII**.

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 alongwith 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 an 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 rich 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 radical 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 depend 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 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 shall be done as per standard methods prescribed for raising teak plantations either by direct seed sowing or preferably by root-shoot/ stump planting followed by weeding and casualty replacement.

(C) NURSERY TECHNIQUES:

11.9.18 The artificial regeneration of teak is mostly done by raising teak plantations through root shoot cuttings raised in nurseries. The nursery techniques are already standardized however there are lot of scope for improvement in the prevailing nursery techniques. **Shri M.G.Sardar, IFS and Shri K.Subramanian, IFS** have tried to explore and improve the nursery techniques for raising teak plantations in order to have genetically superior stands and uniform crops of teak. Shri .Sardar and Shri Subramanian have studied the various problems and based on their study and experience in Forest Development Corporation of Maharashtra Ltd., have suggested few improvements viz. collection of seeds only from the established seed plots and seed orchards; establishment of more clonal seed orchard of teak; establishment of seed certification unit; using seeds only above 0.75 cm. diameter and rejecting the rest below it; development of an appropriate mechanized tool to uproot the stumps to reduce labour, time and physical damage and to organize genetic and embryological studies in order to study the development of ovules. The studies carried out by Shri Sardar and Shri Subramanian are being followed in F.D.C.M.Ltd. and the same techniques may be adopted while raising teak plantations in forest areas under the control of the department.

SECTION –10: CHOICE OF THE SPECIES.

11.10.1 The teak will be the principal species to be planted at a spacing of 2 m X 2 m. The standard nursery and planting techniques for raising teak shall be adopted. Every year about 200 hectares of area shall be clear felled and planted. Each patch shall not exceed 20 hectares and in between two patches a natural strip of 5 meters will be retained on each side of the planted area 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 REGULATION OF YIELD.

11.13.1 Yield shall be regulated on 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 –14: METHOD OF EXECUTING THE FELLINGS :

Marking rules:-

11.14.1 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, and other superior miscellaneous species.like bija, shisham ain, haldu, kalam shivan, dhaoda etc. upto 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) 5 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- 15: BAMBOO PLANTATION :

11.15.1 Bamboo (*Dendrocalamus strictus*) is the natural associates of teak and therefore it has been observed that presence of bamboo in the teak areas promotes good teak growth. The teak plantations where thinning will be carried out , bamboo plantations shall be taken up at the spacement 6 m x 6 m in the gaps and where bamboo already exist no bamboo plantation shall be taken

SECTION- 16: SOIL AND MOISTURE CONSERVATION WORKS.

11.16.1 The effective soil and moisture conservation works shall be taken up as prescribed under the chapter on selection cum improvement working circle.

SECTION –17: SUBSIDIARY CULTURAL OPERATIONS.

11.17.1 These operations shall be carried out departmentally and shall include:

Thinning:

11.17.2 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. XLI** and the sequence of thinnings in existing plantations is given in **Appendix No XLII**.

Thinning in teak plantation:

11.17.3 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 fairs 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:

11.17.4 Teak is traditionally planted at a spacing of 2m x 2m i.e. 2500 seedlings 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:

Year	No./ha. (for site quality –III)	Spacement
1 st Year	2500	2m x 2m
5 th year	1767 (after 1 st Mechanical thinning of removing alternate digonal)	2 x 2 $\sqrt{2}$ m
10 th year	1250 (after 2 nd Mechanical thinning of removing alternate digonal)	2 $\sqrt{2}$ x 2 $\sqrt{2}$ m

11.17.5 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

- 11.17.6**
- (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, lendaria 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.

(2) Procedure for Mechanical thinning :

11.17.7 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 shall 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 poor quality, it should be done at the age of 10 years.

(B) Silvicultural thinning :

11.17.8 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 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 :

11.17.9 The thinning area should be properly demarcated.

(b) Treatment Map :

11.17.10 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 :**

11.17.11 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 –

- v) Bushy weeds.
- vi) Garadi, lendaria 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
- vii) Damaged or badly shaped poles/trees will be flushed to the ground.
- viii) 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.

(2) **Procedure of carrying out silvicultural thinning.**

11.17.12 The following shall be the procedure of carrying out silvicultural thinning.

a) **Assessment of Area :-**

The area shall be thoroughly traversed and areas which need thinning shall be drawn on the map. The under stocked areas, needing no treatment will be deleted.

b) **Stump analysis :-**

A sample tree shall be taken, and will be felled to determine its actual age.

c) **Enumeration :-**

A small area of 5 chain x 2 chain shall be selected inside the workable plot and total trees will be counted in girth class of 10 cm. The enumeration will not be located on the fringe of the plot. Subsequently the full enumeration in the total plantation area should be carried out.

(d) **Height measurement :-**

The height of at least 10 trees in each girth class present should be measured very accurately, if possible even by climbing the labour on the top of the tree with 30 meter tape. A curve is then drawn between diameter and height which is parabolic in nature, if the altimeter (haga) has been used for height measurement by using proportional scale, then height may be calculated by the following formula :

$$H \text{ (Height)} = (\text{Reading} \times \text{distance from Tree in meters}) \div 100$$

and then the self height should be added to get the full height of the tree. The height should be taken of the highest point of the crown or of the tip of the leader as provided in silvicultural research code volume III.

(e) **Calculation of basal area:**

-The basal area of the crop in the given plot is calculated. This gives the basal area per acre. It is also to be verified by using a wedge prism of BAF either 0.5 or 1.0, preferable of 0.25 as it will give the basal area to an

accuracy to a second place of the decimal. The point sampling is carried out at many places and then averaged. If the basal area, is less than what is stipulated at that specified age for that site quality, given in the Indian Forest Record, no thinning may be required, except at few congested places but if it exceeds the number given in Indian Forest Record, it may be proceeded. It may be noted that the figures in Indian Forest Record is after thinning.

(f) **Calculation of average top height:**

-100 trees per acre, which are highest in the plot are taken and then by using Lorey's formula, the average top height is calculated.

$$\text{Lorey's formula} = \frac{h_1 S_1 + h_2 S_2}{S_1 + S_2}$$

“h” is the height, and “S” is the basal area.

(g) **Measurement of top diameter:-**

The 100 such top diameter trees are taken, their basal area is calculated and from average basal area, the top diameter is calculated. With the help of height/diameter curve, corresponding to this top diameter, the top height is calculated.

(h) **Determination of site quality:-**

Now knowing the age of the crop and its top height refer to table 1 page 166 of Indian Forest Record Yield and stand tables for teak plantation Vol.9 No.4 F.R.I., which shows the relationship between top height by site quality and age. By using this chart, the site quality can be read directly.

(i) **Determination of spacing :-**

Now refer to Page 182, table 9 of the same book as referred to as above for the calculation of spacing knowing the age of the crop and site quality, the spacement between the two trees can be read directly from it. It will be a triangular spacing.

(j) **Comparison of stocking :-**

After ascertaining the site quality, again refer to Indian Forest Record, FRI, Dehra-Dun, yield and stand table and read the corresponding number of trees, its basal areas, average height and average diameter from the relevant table (table 2 to table 8) Page 168 to 180, for its site quality. A comparative statement be drawn between the present crop and the permissible number of trees, basal area, average height and average diameter taken from yield table Vol. 9.

(k) **Removal :**

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.

(l) **Inspection:**

After the marking for thinning is over, the thinning site should be inspected by an officer not below the rank of ACF. He should check the marking, and assess it by using a wedge prism to know whether marking has protected the basal area. A marginal difference of 0.5 Sq. meter/ha may be ignored, but if excess over it, is noticed, he should proceed either

to cancel the marking or increase it, depending on the difference so observed. The inspecting officer should also assess the number of retention in the crop, by using point sampling (Wedge prism) and formula.

$$\text{No. of stems retained} = \text{BAF} \sum_{i=1}^M 1/B_i$$

Where B_i is the basal area of the stem tallied.

(m) **Subsequent thinnings - Third Thinning :**

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 10 years 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 stabilises to some extent.

(n) **Thinning in very old plantation :**

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 consist 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.

(o) **Maintenance of Record:**

A perfect record of trees/poles removed from the crop shall be maintained. Besides the actual removal of trees, the estimate of standing volume shall also be maintained by using wedge prism, and formula.

$$V = (\text{B.A.F.}) \sum_{i=1}^L \frac{V_i}{L}$$

$$L=1 B_i$$

Where V_i is the volume of 2nd Tree tallied and B_i is the basal area of 2nd Tree tallied.

(p) **Period of thinning:-**

The first mechanical thinning can be done at any time during the year. The silvicultural thinning should be carried out in the first month of fair season preferably from November to February.

(q) **Thinning Cycle:-**

1 st thinning	10 th year
2 nd thinning	15 th year
Between 20-40 years	at the interval of 10 years
40-60 years	at the interval of 15 years

Last thinning should be at the 60 years, after that the crop should be left to nature to grow.

(ii) **Cutting back operations:**

11.17.13 These operations will be carried out departmentally in the year following the year of main felling. the operations consists of the following:-

- (i) Climber cutting over whole are of the coupe.
- (ii) Felling all badly damaged or broken trees.
- (iii) Cutting back of malformed advance growth of teak.
- (iv) Cutting back of valuable growth damaged during the felling.
- (v) Freeing young growth of teak and other valuable species from interference of bamboos and other inferior species.
- (vi) All stools will be cleared of felling debris.
- (vii) In eroded areas and areas liable to erosion, gullies and small nallas will be plugged with nearby debris or stones to check washing away of the soil and deepening and widening of the gullies and nallas.

(iii) Cleaning:

11.17.14 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 area 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.
- (vi) In plantations of teak, weed growth may be cleared within a radius of 1 meter from each surviving plant and intensive soil mulching carried out immediately after the rainy season is over.

Cleaning in plantation areas should be carried out as and when required up to 1st thinning. It consists of cutting multiple leaders and weeding.

SECTION -18: OTHER REGULATIONS:

(i) FIRE PROTECTION :

11.18.1 Plantation will be rigidly protected from fire. All measures will be taken. Local villagers will have to be taken into confidence to ensure success through the implementation of Joint Forest Management Scheme.

(ii) GRAZING:

11.18.2 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. However, the old teak plantations areas need not be closed for grazing unless the bamboo plantations have been taken up in the area or the area has been reboised as per prevailing rules or the area falls under the regular closed coupe.

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CHAPTER -12

WORKING PLAN FOR BAMBOO (OVERLAPPING) WORKING CIRCLE

SECTION – 1: GENERAL CONSTITUTION OF WORKING CIRCLE

12.1.1 This working circle extend over the entire Chandrapur forest Division, overlapping all the working circle. The total area of the Bamboo overlapping working circle is 51546.380 ha.

The distribution of Bamboo overlapping working circle is show in table-54.

TABLE-54

Range	Reserved Forest in ha.	Protected Forest in ha.	Unclass Forest in ha.	Total Forest in ha.
Chandrapur	4502.400	2212.270	--	6714.670
Mul	12500.798	--	--	12500.798
Warora	4278.042	--	--	4278.042
Moharli	10543.430	309.510	--	10852.940
Shioni	17199.930	--	--	17199.930
Total	49024.600	2521.780	--	51546.380

SECTION-2:GENERAL CHARACTER OF THE VEGETATION:

12.2.1. The common variety of bamboo occurring in this division is *Dendrocalamus strictus*. It generally forms an under storey all over the Division . The bamboo has gregariously flowered in 1982.Strict protection

measures led to profuse regeneration which has resulted in congestion. The clump formation has now been affected.

12.2.2. It is however observed that clump formation was better in following area:

- i) Areas where plantations were done during 1980 and in early 1990. In these areas every year clear felling of bamboo was carried out at the time of weeding.
- (ii) Areas where illicit cutting of bamboo was regularly taking place.

12.2.3. Hence it is concluded that regular thinning as well as repeated cleaning operation to limit the no. of bamboo clumps / ha. was necessary. Hence to gather systematic data, experimental plots were laid out and observation taken at regular interval. The observation clearly indicate that in gregariously flowered bamboo areas regular thinning and cleaning operation leads to early clump formation.

12.2.4. As the matured clumps formation is lesser in extent, only thinning and cleaning program are recommended for the areas under immature clumps. The extent of bamboo bearing area given in **Appendix No. XLIII.**

12.2.5. In Nistar Bamboo felling series areas, thinning is carried out by the forest Department.

SECTION-3 : COMPARTMENTS AND CUTTING SERIES

12.3.1 The details of the compartments and cutting series of commercial and nistar bamboo felling series are given in **Appendix No. XLIV and Appendix No. XLV.**

SECTION - 4 : SPECIAL OBJECTS OF MANAGEMENT

12.4.1. The special objects of management are .

- (i) To attain optimum increment in the growth of bamboo.
- (ii) To meet nistar & commercial demand on sustained basis.
- (iii) To meet the growing demand of bamboo based industries.

SECTION -5 : ANALYSIS AND VALUATION OF THE CROP

12.5.1 The bamboo crop was not undertaken during the tree enumeration exercise.

SECTION- 6 : SILVICULTURAL SYSTEM

12.6.1 The silvicultural system to be followed here will be selection system.

SECTION- 7 : CUTTING CYCLE

12.7.1 A cutting cycle of 3 years shall be followed.

SECTION - 8 : METHOD OF TREATMENT

12.8.1 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 - 9 : FORMATION OF CUTTING SERIES

12.9.1 Statement showing the constitution of commercial bamboo cutting series is given in **Appendix No.XLIV.**

12.9.2 Statement showing the constitution of nistar bamboo overlapping working circle is given in **Appendix No. XLV.**

SECTION-10: REGULATION OF YIELD

12.10.1. It is regulated by area.

SECTION -11 : IDENTIFICATION OF AGE OF BAMBOO

12.11.1 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

12.12.1 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 departmentally.

SECTION-13: METHODS OF EXECUTING THE TREATMENT

12.13.1 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 erecting poles at suitable intervals. On the 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 compartmentwise 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.

SECTION- 14 : METHODS OF WORKING :

12.14.1 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.
- 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.
 - 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.
- (b) The remaining culms will be considered available for harvesting.**
- vii) 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.

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

12.14.2 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: BAMBOO FLOWERING :

12.15.1 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 synchronises 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.

12.15.2 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.

12.15.3 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 be 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 :

12.15.4 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

12.15.5 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

12.15.6 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 :

12.15.7 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. :

12.15.8 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 :-

12.15.9 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 :-

12.15.10 This will be carried out in the 4th year as under planting in planted patches of main coupe.

Pre-monsoon Works :-

12.15.11 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. Preplanting 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 underplanting the bamboo, it will be done in the 4th year of main planting.

12.15.12 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 :

12.15.13 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 :

12.15.14 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.

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) Premonsoon works :

12.15.15 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, ain, 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 :

12.15.16 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 :

12.15.17 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 plant 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. Saucer helps 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.

12.15.18 In the second year two weedings should be carried out. The first weedings should be carried 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-16: GROWTH OF SEEDLINGS AND DEVELOPMENT OF CULMS AND CLUMPS.

12.16.1 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 produce. The transition is gradual.

12.16.2 The time taken to form normal culms depends on conditions of growth. Under artificially raised conditions and with regular weeding the stages are -

Third season	:	Whippy culms
Fourth Season	:	Fair sized culms
8th season	:	Large enough bamboos to permit cutting of 1 or 2 culms per clump.

The normal season at which new culm are produced appears to be July to September.

12.16.3 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 – 17 : OTHER REGULATIONS :

12.17.1 FIRE PROTECTION :- Fires cause extensive damage to the new shoots of bamboos and, therefore, these areas will be completely protected from fire.

12.17.2 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 takes place.

CHAPTER-13

WORKING PLAN FOR NON WOOD FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

SECTION-1: GENERAL CONSTITUTION OF THE WORKING CIRCLE :

13.1.1 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 88648.734 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:

13.2.1 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.

13.2.2 The important minor forest produce, found in this tract are Moha flower and fruits, Bamboo, Tendu, Myrabolons, Gum, Broom grass etc. The rangewise distribution of a few important species in different girth-classes as per analysis of tree enumeration data shall be given in final draft plan.

(B) MEDICINAL PLANTS :

13.2.3 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.

13.2.4 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.

13.2.5 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.

13.2.6 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 alleviate poverty of local people/tribals.

13.2.7 The important medicinal plants which have been identified in this tract have been given in **Appendix No XLVI**.

SECTION- 3 : SPECIAL OBJECTS OF MANAGEMENT :

13.3.1 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 :

13.4.1 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 :

13.4.2 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.

13.4.3 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 increase 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.

13.4.4 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 flavour.

13.4.5 Besides, moha trees have 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 Bastar 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 :

13.4.6 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.

13.4.7 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.

13.4.8 Crude oil has a deep colour, high acidity, unpleasant odour and bitter taste. 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.

13.4.9 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.

13.4.10 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-55

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 1/4 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 :

13.4.11 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 –56

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

13.4.12 As the year 1992 was not a good seed year, the average obtained above is on lower side.

(iv) FORMATION OF UNITS AND COUPES:

13.4.13 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 :

13.4.14 The collection of moha flowers and seeds is presently being done by 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 :

13.4.15 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.

13.4.16 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 essentials 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 one of the duties 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 :

- 13.4.17** (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 choudkars. 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 :

13.4.18 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 :

13.4.19 The range wise distribution of such trees in different girth classes is given in **the Appendix No. XXVII**. 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 :

13.4.20 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 fibre. 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 metre above the ground level. The next row of blazes will be made at the height of 60 cm from the lower i.e. at a total height of 1.6 metre from the ground level. the vertical portion of the blaze of upper row will alternate with similar portion of the row and no two blazes of the two rows will be directly one above the other.
- 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-57

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 :

13.4.21 Range is the unit. Each unit will be divided into three annual coupes. The working cycle will be of three years.

(v) AGENCY :

13.4.22 All operations will be carried out either through FLCS or the agency decided by the Government.

(vi) MARKET :

13.4.23 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 :

- 13.4.24**
- (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 form 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 :**

13.4.25 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 :

13.4.26 The production of tendu leaves and royalty obtained in the last ten years are furnished in the following table :

TABLE-58

Sr.No.	Year	Yield in std bag	Royalty in Rs.
1	1991-92	71385.703	21900996
2	1992-93	93959.475	35291928
3	1993-94	39564.805	28807512
4	1994-95	43907.170	32103207
5	1995-96	46280.701	36045655
6	1996-97	44528.786	35596348
7	1997-98	43707.720	31671143
8	1998-99	35950.519	23543065
9	1999-2000	44589.480	33396298
10	2000-01	41951.435	34535547

13.4.27 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. 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 continued, the seed bearers will go on diminishing season after season. The scientific impact of pruning of Tendu stands needs to be studied.

(iii) FORMATION OF UNITS :

13.4.28 The tract is already divided into tendu units which need not be changed.

(iv) AGENCY :

13.4.29 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 lumpsum 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, this system is detrimental to the forests. Govt. has reviewed the policy and tendu trade and resorted to pre 1991 method of tendu trade. Now Government has appointed State Level Ministers Committee under the Chairmanship of Hon'ble Forest Minister to review the policy on tendu trade in Maharashtra after studying the different systems of tendu trade followed in adjoining tendu growing states.

(v) MARKET :

13.4.30 Under the present system, the units are sold by tender. The proposed revision of policy on tendu trade will enable the sustainable development of tendu resources and will contribute to income generation to the local people.

(vi) OTHER REGULATIONS :

13.4.31 (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 :

13.4.32 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.

(ii) FORMATION OF COUPES :

13.4.33 The details of felling series and coupes are given in **Appendix No. XLIV and Appendix No. XLV.**

(iii) AGENCY :

13.4.34 This has been discussed in detail in the chapter on Bamboo (overlapping) Working Circle.

(iv) VILLAGE INDUSTRIES :

13.4.35 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 :

13.4.36 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 :

13.4.37 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 :

13.4.38 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 :

13.4.39 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. XXVII.**

(iii) FORMATION OF UNITS AND COUPES :

13.4.40 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 :

13.4.41 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 :

13.4.42 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 :

13.4.43 (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) BROOM GRASS :

(i) USE :

13.4.44 This grass is used in preparation of broom which is usually used in houses. It is a seasonal crop and localised one.

(ii) YIELD :

13.4.45 So far no study has been conducted to assess the yield of this grass.

(iii) FORMATION OF UNIT :

13.4.46 The Range will be the unit.

(iv) AGENCY :

13.4.47 The unit will be sold by calling tender.

(v) OTHER REGULATIONS :

13.4.48 (a) The areas suitable for this grass should be sown.

(b) The compartment wise details should be prepared and maintained at beat, round, range and division levels.

(c) The area should be fire protected.

(6) KHAIR :

13.4.49 The khair tree is distributed more or less in all ranges of the division and the details are given In **Appendix No. XXVII.**

(i) PROPERTIES :

13.4.50 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.

13.4.51 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 :

13.4.52 The khair heartwood is chiefly used for the production of katha and catch 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.

13.4.53 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.

13.4.54 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.

13.4.55 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).

13.4.56 The khair is the species mainly of degraded miscellaneous forests. The no. of stems/ha (khair) and its distribution among different girth classes is given in **Appendix No.XXVII**. The yield of khair has not been estimated separately. This can be done from the tables for different sites.

(7) KATHA AND CUTCH :

13.4.57 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,.

13.4.58 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.	Catechu tannic acid (cutch)	8.10 %
2.	Catechin (katha)	2.6%
3.	Mucilage	6.8%
4.	Residual matters.	5.7%

(iii) **USE OF KATHA :**

13.4.59 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 :**

13.4.60 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 :**

13.4.61 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 encouraged 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. The number of surviving katha trees is given in Appendix No.XXVII. There has been a spate in illicit cutting of katha trees in the state but, not so prolific in this region.

(vi) DESCRIPTION OF INDIGENOUS METHOD OF KATHA MANUFACTURING :

13.4.62 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 :

13.4.63 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 :

13.4.64 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 :

13.4.65 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 :

13.4.66 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 :

13.4.67 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 :

13.4.68 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 :

13.4.69 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 catch naturally takes longer time to dry. It should also be dried under shade.

(8) FORMATION OF UNITS :

13.4.72 The range will be the unit.

(9) AGENCY :

13.4.73 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 or sold by open auction based on the situation.

13.4.74 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 :

13.4.75 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 :

13.4.76 (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.

13.4.77 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.

13.4.78 Gum tapping should be started in the coupe which will be due for felling after 5 years. For gum tapping only mature trees should be used.

13.4.79 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 MFP'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 :

13.4.80 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.

13.4.81 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 girth 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:

13.4.82 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.

13.4.83 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 :

13.4.84 The territorial division shall endeavour 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 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 MPC 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 :

- (i) Selection of suitable degraded forest areas for MPDA programme.
- (ii) Involve a competent local NGO for organising the community.
- (iii) 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.
- (iv) Establishing a system of sustainable harvest based on collection guidelines for specific species that are informed by “conservation science”.
- (v) 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.
- (vi) Creation of market links & by back guarantees for sale of produce at the outset of the programme.
- (vii) Building and strengthening community institutions for sustainable management.

(b) Treatment for NTFP 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 total 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 silt gets deposited in them.
- (xvii) At convenient contour intervals, say 30 m. shrubs like Kumari (*Azadirachta indica*), Adhatoda (*Justicia adhatoda*), Nochi (*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 :

13.4.85 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 :

13.5.1 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 in the field is 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.

13.5.2 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 minor 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.

13.5.3 The forest silviculturist / geneticist shall be made the nodal officer for collection, processing and certification of seeds. The forest silviculturist shall develop in consultation with territorial Deputy. 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.

CHAPTER – 14

WILDLIFE (OVERLAPPING) WORKING CIRCLE.

SECTION-1:- GENERAL CONSTITUTION OF THE WORKING CIRCLE :

14.1.1 This is an overlapping working circle and covers the entire area of the division. Thus the total area included in this working circle is **88648.734 ha**. The range wise distribution of the area is given in the following table-59

TABLE--59

Range	Old R.F.		New R.F.	
	Comptts	Area	Comptts	Area
1	2	3	4	5
Chandrapur	21	6292.987	2	35.03
Mul	35	14121.968	14	1210.59
Warora	30	12835.882	10	1497.35
Moharli	40	10401.580	5	289.86
Shioni	48	17513.867	16	1485.61
Total	174	61166.284	47	4518.44

Table-59 continued...

P.F.		Un. Forest		Total	
1	2	3	4	5	6
Comptts	Area	Comptts	Area	Comptts	Area
48	3281.10	--	--	71	9609.117
221	9565.78	5	73.69	275	24972.028
71	4633.96	5	99.42	116	19066.612
65	3219.99	--	--	110	13911.430
70	2090.07	--	--	134	21089.574
475	22790.90	10	173.11	706	88648.734

SECTION-2 :- GENERAL CONDITION OF FLORA AND FAUNA :

14.2.1 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 5A/C3 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, Maropha, Chirchira, Aroni, Chilati .

14.2.2 The general conditions of the wildlife in Chandrapur 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, irrigation and power projects moreover a large tract of forest areas have been diverted in this division for extraction of coal in the coalmines and because of all these developmental and industrial activities the wildlife population in this division has been forced to restrict its advancements beyond a very small area which is ecologically not viable for the sustenance of wildlife. 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.

14.2.3 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:

14.3.1 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.

14.4.1 The wildlife evaluation shall be conducted for herbivores and carnivores by the territorial division every year. The figures for different wildlife species commonly found in the Chandrapur Forest Division is 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 and expanding coal mines. These illegal activities promoting encroachments should immediately be banned and no further permission under Forest Conservation Act 1980 be given for further expansion of coal mines.

SECTION - 5 : METHOD OF TREATMENT.

14.5.1 (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 will first be taught and convinced through dialogue, movie etc in the second phase teacher will teach the people the lesson of self realisation 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 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 remain 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 Chandrapur 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 the area around Tadoba and Andhari Tiger Reserve which forms the part of non protected area may be declared buffer zone so that the wildlife will find the safe corridors for their movements . These buffer zone area shall be around 10 km. in length and approximately 40, 000 hectares in extent.
- (C)** 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 alongwith wireless sets, tranquillisers etc.
- (D)** The territorial division should also be provided with trapping cages in order to catch the stray wild animals which some times enter into the neighbouring villages and towns and may cause damage and injury to the human beings.
- (E)** The stray animals if any 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.

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 PROTECTION OF WILDLIFE.

14.6.1 The legal provisions for the protection of wildlife are given in Chapter VI of this plan.

SECTION -7: GENERAL MEASURES FOR PROTECTION :

- 14.7.1**
- 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 ECO-TOURISM

14.8.1 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.

14.8.2 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.

14.8.3 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.XLVII.**

14.8.4 The Principal Chief Conservator of Forests, Maharashtra State, Nagpur vide his standing order No.CCF/PT&SP/416, dated the 7th Feb.2002 ON ECO-TOURISM has issued guidelines for the initiation of eco-tourism in the State which is reproduced in **Appendix No. XLVIII.**

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CHAPTER -15

MISCELLANEOUS REGULATIONS

SECTION - 1 : DEMARCATION OF COUPE AND

PREPARATION OF TREATMENT MAP:

15.1.1 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
 A.C.F.

Signature of the RFO with date

(A) DEMARCATION OF COUPE :

15.1.2 (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 :

15.1.3 (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 :

15.1.4 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-60

Sr.No.	Species	Girth at b.h.	Remarks
1	2	3	4

**(D) DEMARCATION OF OTHER AREAS GIVEN IN THE
TREATMENT MAP :**

15.1.5 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 :

15.2.1 (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).

(ii) The following trees in addition will bear digit serial numbers both at b.h. and at the base .

(a) All trees of teak, bija, shisham, ain,tiwas, haldu, karam, dhaora and shiwan of 45 cm and over in girth at b.h.o.b.

(b) Trees of all other species of and above 60 cm girth at b.h.

(iii) All remaining trees marked will bear serial number, 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.

(iv) All trees bearing serial number will be individually recorded in marking (recording) book giving following details :

TABLE -61

Sr.No.		Species	Girth at b.h.o.b.in cm.	Remarks
Digit	Coaltar			
1	2	3	4	5

(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

SECTION-3: MAINTENANCE OF BOUNDARIES.

15.3.1 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.ol@Hkq-v-@68@2000&2001 ukxiqj fnukad 29&5&2001] 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. XLIX** . According to Bombay Forest Manual, the Conservator of Forests, Territorial Circles are competent to take necessary action regarding boundary pillars.

15.3.2 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.

15.3.3 Boundary survey and demarcation should be done very meticulously. As 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 Jamabandi Maps and Consolidation Maps.

15.3.4 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.

15.3.5 The external and internal boundaries of the forest will be maintained according to 1/5 boundary demarcation and verification scheme given in **Appendix No. L**.

15.3.6 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. And all such cases of illegal shifting of boundary pillars should be dealt severely as provided under the Indian Forest Act, 1927.

15.3.7 The specification about shape, descriptions, foundation, dimension, colour wash etc. of boundary marks are given in the Principal Chief Conservator of Forests's letter dated 29/5/2001 as given in **Appendix No. XLIX**. The boundary marks (cairns) will be placed at visible distance one from the other, so that from any mark its 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.

(A) BOUNDARY MARKS SPECIFICATION :

15.3.8 The specifications of boundary marks is given in **Appendix No.L.**

15.3.9 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.

15.3.10 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 :-

15.3.11 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 **Appendix.No L** of the working plan for the forests of Chandrapur 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 :

15.3.12 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.

**(D) LEGAL PROVISIONS AVAILABLE FOR PROTECTION OF
THE BOUNDARY MARKS :**

15.3.13 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.

15.3.14 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.

15.3.15 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 :

15.4.1 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 :

15.4.2 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 provided into units which will be disposed off by calling tenders. Modified lumpsum system has been in operation since 1993.

(iii) BAMBOOS :

15.4.3 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 :

15.4.4 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 :

15.4.5 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 :

15.4.6 Mohua seeds are used for extraction of oil which forms an important edible oil for the tribals.

(vii) GUM : USE AND VALUE :

15.4.7 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 :

15.4.8 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 :

15.4.9 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 :

15.4.10 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 :

15.5.1 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 or balance 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 realised 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/afforestation 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

SECTION – 6 : FIRE PROTECTION :

15.6.1 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-

15.6.2 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, Old 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.

15.6.3 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.

15.6.4 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.

15.6.5 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.

15.6.6 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 15th 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 15th 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;

15.6.7 .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) f – burning of any tree.
- (iv) Section 26 (l) g – Burning of lime or charcoal.
- (v) 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 :

- (vi) Section 28(3) – All the above provisions apply in case of a village forest also.

(c) Protected forests :

(vii) Any persons who commits any of the following offences under section 33(I) (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:-

15.6.8 The Government of Maharashtra vide Notification No.1074/252 359/F6, dated February 14,1982 under sections 32 (6) and 76(I) (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 metre 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.**

15.6.9. 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-

15.6.10 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.

15.6.11 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.

15.6.12 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 exception cases.

15.6.13 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 of 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.

15.6.14 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. 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—

15.6.15 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.

15.6.17 (D) Provisions for fire protection contained in the Wildlife (Protection) Act, 1972.

- (i)** Section 17 (l) (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:-

15.6.18 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 be 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 2000-2001, 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:-

15.6.19 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 of the Forest Department under section 3, is punishable under section 4 of the above Act. The punishment to be done by the competent Forest Officer, may extend upto 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:-

15.6.20 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 :

15.6.21 (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 15th 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 15th 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.

15.6.22 (B) Fire Watchers.

- (i) The fire watchers will constantly patrol the fire lines in the areas assigned to them. 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. For this, the area will be divided into 5 to 10 ha. patches. For each patch one labourer will be kept, whose main job will be to protect the patch from fire and grazing. In addition, he will do the work of cleaning, weeding and singling of seedlings.

(C) Forest Fires.

15.6.23 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.

15.6.24 The utmost care should be taken to extinguish the fires and to quench the smouldering 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 smouldering 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 :

15.6.25 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:

15.6.26 The Range Forest Officer will be held personally responsible for the efficient fire protection in his range.

15.6.27 Where the forests of two ranges which are to be fire protected, 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.

15.6.28 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

15.6.29 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 15th 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.

15.6.30 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:

15.6.31 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.

15.6.32 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.

15.6.33 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.

15.6.34 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.

15.6.35 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:

15.7.1. 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 Development, 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. 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.

15.7.2 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.

15.7.3 The details of Government of Maharashtra Resolution dated March 16, 1992 has been produced in **Appendix No LI**. 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.

15.7.4 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.

15.7.5 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 Kms. 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 is annexed as an **Appendix No. LI.**

15.7.6 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 fuelwood, 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.

15.7.7 In areas where the villagers are willing to participate in Joint Forest management plan, the concerned territorial Deputy Conservator of Forests shall prepare a microplan 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.

15.7.8 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.

15.7.9 The microplan 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 :

15.8.1 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 :-

15.8.2 (i) **PREMONSOON WORKS** : They will be carried out in the year of main felling alongwith the felling. They will include following works :

15.8.3 (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, babul etc and planting of cutting of shrubs like vitex, dodonea etc will be done after the monsoon.

15.8.4 (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.

(2) NURSERY :

15.8.5 (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.

15.8.6 (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 polybag plants, the nursery work will be started latest by October in the previous year of planting. Shifting of 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 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.

15.8.7 (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 agave 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 polybag 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.

15.8.8 (b) SUBSEQUENT OPERATIONS : Immediately after the completion of planting, first weeding will be started. Casualty replacement will be done alongwith 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.

15.8.9 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 :

15.8.10 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:

15.8.11 (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.

15.8.12 (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.

15.8.13 (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 week of August, Three weeding and soil working will be done.

15.8.14 (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: :

15.9.1 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 :

15.9.2 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 agave will be done on the heaps of the soil for its stabilisation. 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:

15.9.3 However, the actual spacing is to be determined after getting treatment map and doing the following calculations.

If a = Average annual rainfall in mm in a year.

 b = Rainy days in a year.

a

 c = $\frac{a}{b}$, the average rainfall per rainy day in mm.

b

then d = 10 c, is the rain fall in cubic meter/rainy day/hectare.

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 m 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 – 62

Slope in degree	Distance between consecutive trenches.
Upto 15	8 m
15 to 25	5 m
Above 25	3 m

15.9.4 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. LII**.

(B) NALA BUNDING/CHECK DAMS :

15.9.5 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. Nala 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. LIII**.

- 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.

SECTION – 10: GRAZING CONTROL :

15.10.1 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.

15.10.2 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.

(1) SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

15.10.3 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 15 years, $5/15^{\text{th}}$ or $1/3^{\text{rd}}$ area will remain closed to grazing at any time after 5 years from the commencement of this plan. The average carrying capacity for this working circle will be 116405 cattle units.

(2) IMPROVEMENT WORKING CIRCLE :

15.10.4 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 10 years, $5/10^{\text{th}}$ or $1/2^{\text{nd}}$ area will remain closed to grazing at any time after 5 years from the commencement of this plan. The average carrying capacity will be 33943 units.

15.10.5 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 silege preparation should be conducted and through this, staff feeding should be advocated. The preparation of silege 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.

15.10.6 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.LIV**.

SECTION – 11: ILLICIT CUTTING :

15.11.1 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 unit units, consisting of the R.F.O., 4 foresters and 8 forest guards each with vehicle are proposed. These units will continuously patrol the forest areas vulnerable to illicit cutting.

15.11.2 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.

15.11.3 The following time schedule has been prescribed for inspection of illicit cutting area by the respective officers :

TABLE - 63

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.

15.11.4 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.

SECTION 12 : BEAT CHECKING :

15.12.1 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 :

15.12.2 The primary responsibility of forest protection devolves on the protective 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 :

15.12.3 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.

15.12.4 ROUND OFFICER : Each Round Officer will inspect each beat once in three months. He should verify enumerate the damage not

reported by the beat guard. He will submit punctually the report of each area inspected to the Dy. C.F. through the Range Forest Officer.

15.12.5 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 month 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.

15.12.6 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 :

15.13.1 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

15.13.2 The Government of Maharashtra vide Notification No. TRS/1083/91822 (ii) CR-87/F-6, dated May 13, 1985 has emended 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.

15.13.3 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:

15.14.1 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 licence 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 licence 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 licence in the form in Schedule-E subject to the conditions set out therein, or refuse to grant the sanction licence.

(4) Every licence 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.

15.14.2 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 and also made it mandatory that the licensee had to satisfy three conditions viz. (i) the applicant has purchase machinery or incurred financial or other liabilities of substantial nature, prior to the date of issue of these directions (ii) the applicant has fulfilled other formalities relating to industrial license, municipal license and (iii) the saw mill is to be located at least 10 km. outside the boundary of any reserved or protected forest. The Govt. of Maharashtra vide Revenue and Forest Department, Mantralaya Mumbai, Notification dated 6th November 2001 has issued directions for the relocation of licensed sawmills and transfer of ownership of such sawmills on account of owner's death or sale of the sawmill or both. However, if the applicant has already spent the money and completed the formalities, the license 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-12, the Asstt. Conservator of Forests-6, the Divisional Forest Officer-3 and the Conservator of Forests-1 saw mills in a month.

15.14.3 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 :

15.15.1 No permission to manufacture charcoal to the private person will be given in the Reserved or Protected Forests or in private areas up to 1 km from the boundaries of the forests.

SECTION -16 : ENCROACHMENTS :

15.16.1 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 alongwith the instructions in vernacular language. Records of encroachments will be made compartmentwise in the compartment history forms and will be shown on the map also.

15.16.2 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 regularised and taken place after March 31, 1978, should summarily be removed. As per Govt. circular dated 15th September 2001, all the illegal construction, encroachment / hutment on forest lands are to be removed immediately. There is a need for a stringent measures against the encroachers. The Govt. of India has now issued the instructions on 3rd May 2002 that all encroachments after 1980 shall be removed summarily by 30th September, 2002.

15.16.3 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 (ACFs, DCFs, DFOs) for the purpose of removal of encroachments. According to section-242 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. Encroachment on forest land for cultivation or any other purpose is a punishable offence under the provision of IFA 1927 Section 26 (h) & 33 (L).

SECTION -17 : FOREST PROTECTION

15.17.1 The Conservator of Forests (Territorial) shall ensure that a detailed forest protection plan for the territorial division is prepared under his chairmanship comprising a committee of Dy. Conservator of Forests (Territorial) of the division concerned and the Divisional Forest Officer (Vigilance) of the territorial circle concerned and the forest protection plan so finalised by the territorial Conservator of Forests shall be implemented by the concerned staff of the division and the circle.

SECTION 18 : USE OF HAMMERS.

15.18.1 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- 19 : SCHEDULE OF RATES FOR OFFENCE

CASES MATERIAL.

15.19.1 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 20 : .WORKING PLAN NOTE.

15.20.1 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- 21 : MARATHI TRANSLATION OF THE WORKING PLAN.

15.21.1 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 -22 : DEVIATIONS :

15.22.1 (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, fungi, 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 alongwith the control forms.

(C) PROCEDURE FOR OBTAINING SANCTION FOR DEVIATION

15.22.2 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.

15.22.3 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.

15.22.4 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. LV**.

SECTION -23 : IMPLEMENTATION OF WORKING PLAN.

15.23.1 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 & Forest Guards.	100%

15.23.2 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 -24 : TRIBAL WELFARE :

15.24.1 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 25 : PRIVILEGES AND CONCESSIONS FOR FOREST PRODUCE :

15.25.1 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 - 26 : BAMBOO HARVESTING OUTSIDE

BAMBOO WORKING CIRCLE.

15.26.1 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 - 27 : BAMBOO PLANTATION.

15.27.1 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

15.27.2 In Chandrapur District lot of Burads are there who 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 but on the supply of bamoos by the agency, who will work. Nistar has now been extended to Reserved Forest also.

SECTION -28 : SMALL TIMBER, POLES AND FIREWOOD :

15.28.1 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- 29 : REMOVAL OF EDIBLE FLOWERS, FRUITS, SEEDS AND OTHER MINOR FOREST PRODUCE.

15.29.1 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-30 : FORESTRY EXTENSION.

15.30.1 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, grampanchayats and voluntary agencies and the benefits of forestry and forest conservation should be explained to the local people through radio programmes, poster presentation, nature walk and nature studies, forestry lectures, T.V., programme etc.

SECTION - 31 : WATER SUPPLY :

15.31.1 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- 32 : CAMPING SITES :

15.32.1 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-33: RAIN-GAUGE AND TEMPERATURE

RECORDING STATIONS :

15.33.1 Mul, Warora and Chandrapur tahsils 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 – 34 : BUILDINGS :

15.34.1 The details of buildings is given in **Appendix No LVI.**

SECTION – 35 : ROADS ,CART TRACKS AND CULVERTS :

15.35.1 The details of roads, cart tracks and culverts shall be given in final draft plan. 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 – 36 : ESTABLISHMENT AND LABOUR :

15.36.1 The total area of the divisions 88648.734 ha. The forests of the Division is 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.

15.36.2 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- 37: MAINTENANCE OF LAND RECORDS :

15.37.1 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 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-38: MUTATION OF LAND RECORDS :

15.38.1 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 (egkjk"V^a 'kklu)

Forest Department (oufoHkkx)

Reserved/Protected Forest (jk[kho @ lajf{kr ou)

The above entries shall be in a manuscript and no stamps should be used to show these descriptions.

SECTION-39: TRANSFER OF FOREST LAND TO FOREST DEPARTMENT FROM REVENUE DEPARTMENT:

15.39.1 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-40 : ABOUT PROTECTED FORESTS , LAND ACQUIRED AND UNCLASS FORESTS:

15.40.1 There is about 22790.900 ha. of protected forest and 173.110 ha. Unclass 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.LVII.** The Unclass 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-41: MAINTENANCE OF MAP:

15.41.1 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-

15.41.2 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.

15.41.3 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.

15.41.4 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-

15.41.5 Management maps-

- 1) Conservator of Forests, working plans circle Nagpur-1 copy.
- 2) Conservator of Forests, North Chandrapur Circle Chandrapur-1 copy.

15.41.6 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.

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CHAPTER –16

CONTROL AND RECORDS

SECTION 1 :CONTROL FORMS:

16.1.1 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.

16.1.2 These control forms are given in **Appendix No.LVIII.** 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 No.LV.**

SECTION-2: Compartment histories:

16.2.1 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.

16.2.2 The sample compartment history forms are given in **Appendix No LIX**. 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 scrutinise 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:

16.3.1 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.

16.3.2 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.

16.3.4 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. LX**. Nursery registers should be maintained in Form No.1 to 10 samples of which are given in **Appendix No.LXI**.

CHAPTER – 17

NURSERY TECHNIQUES

SECTION-1 : INTRODUCTION

17.1.1 The nursery operations are precursor to the production of good quality planting 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

17.2.1 The objectives of the nursery technique are:

- i) To obtain the quality 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

17.3.1 As the seeds are the source of seedlings and the growth of plant is mostly dependent on the origin of seeds, 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.

17.3.2. PROCUREMENT

- i) Seeds should be collected from matured middle aged seed stands or seed production areas. 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.

17.3.3 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.

17.3.4 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, number, 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:

1. Mechanical Scarification (or)
2. Acid Scarification (or)
3. Stratification(or)
4. 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:

17.3.5 A sheltered sunny situation away from big trees but near the water source is an ideal place for preparing the seed beds.

17.3.6 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:-

17.3.7 It may be sown by broadcasting or in rows. Sowing in rows is advantageous.

Depth of sowing :

17.3.8 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.

17.3.9 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 plants 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 like VAM 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.

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CHAPTER-18

FINANCIAL FORECAST

SECTION-1: FINANCIAL FORECAST :

(A) FUTURE REVENUE :

18.1.1 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 some silviculturally available trees from both Selection-Cum-Improvement and Improvement Working Circles. The major yield will be obtained from 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 –64 gives a rough estimate of the future annual yield.

TABLE –64
ESTIMATED YIELD

Sr.NO.	Kind of Produce	Quantity	Remarks
1.	Timber a. Teak b. Miscellaneous	3191.96 M ³ 35817.83 M ³	8.18 % of Timber yield 91.82 % of Timber yield
2	Firewood a. Teak b. Miscellaneous	479 Beats 5373 Beats	30 % of Timber 30 % of Timber
3	Bamboo a. Long b. Bundle	100000 Nos. 110000 Bundles	For Nistar For Commercial
4	Tendu	45000 Std. bags	For commercial purpose
5	Miscellaneous Hirda,Gum,Moha flower, Moha fruits and etc.	-- -- --	

18.1.2 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 Chandrapur Forest Division, calculated at the current rates.

TABLE-65
ESTIMATED REVENUE

Sr.No.	Kind of Produce	Revenue in lakh	Remarks
1	Timber' a. Teak b. Miscellaneous	606.29 3223.60	Rs. 19000/ M ³ Rs. 9000 /M ³
2	Firewood a.Teak b.Miscellaneous	7.66 24.18	Rs.1600 /Beats Rs. 4500/Beats
3	Bamboo Long Bundles	8.00 22.00	Rs.8.00/ Per Rs.401.00/ N.T.
4	Tendu	405	Rs.900/Std.bags

18.1.3 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:

18.1.4 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 :

18.1.5 An approximate estimate of the total annual expenditure from 2002-03 to 2011-2012 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 North Chandrapur Circle, wage board rates, sanctioned rates for planting and rates for miscellaneous items sanctioned by the C.F. North 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 :

18.1.6 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 –66
EXPENDITURE IN THOUSAND

Sr.No.	Item of work	2002-03	2003-04	2004-05	2005-06	2006-07
1	2	3	4	5	6	7
1	Demarcation & Marking 4.5 MD/ha Rs. 144/ha	2154	2369	2606		3153
2	Coupe Working					
	a. Timber (7.7 MD/M ³) Rs. 246/M ³	3877	4265	4692	5161	5677
	b. Firewood (4.26/MD/Beat) Rs. 136/-beat	857	943	1037	1141	1255
	c. Bamboo (Departmental)					
	i) Long Bamboo (Rs. 2.5/Bamboo)	3818	4200	4620	5082	5590
	ii) Bamboo bundle (Rs. 4.5/bundle)	6750	7425	8167	8984	9884
3	Removal of windfallen					
	a. Timber (Rs.246/M ³) 1000 M ³ out-turn	416	457	502	552	607
	b. Firewood (Rs. 136/Beat)	52	57	63	69	76
4	Tendu leaves Collection Rs. 900/-std. Bag	32302	35532	39086	42994	47294
5	C.B.O. (Rs.192/-ha)					
6	Cleaning (Rs. 256/ha)	3200	3520	3872	4259	4685

Table-66 continued

1	2	3	4	5	6	7
7	Afforestation (Rate/ha) Activities Rs.					
	a. P.M.W. 8077	103701	114071	125478	138025	151827
	b. F.Y.O. 7381	-	93417	102758	113033	124336
	c. S.Y.O. 3273	-	-	35262	38788	42666
	d. T.Y.O. 2072	-	-	-	12813	14094
	e. 4 th Y.O. 563	-	-	-	-	6653
	f. 5 th Y.O. 563					
8	Maintenance (Build,Road, Bridges)	923	1015	1116	1228	1350
9	Wages	2012	2213	2434	2677	2944
10	Office Expenses	699	768	845	930	1023
11	Petrol/Diesel	310	341	375	412	453
12	Material supply	149	163	180	198	218
13	Salary	32564	35820	39402	43342	47676
14	T.A.	468	514	566	622	685
15	Miscellaneous	928	1020	1122	1235	1358
	Total					

TABLE-67

Sr.No.	Item of work	2007- 08	2008- 09	2009- 10	2010- 11	2011- 12
1	2	3	4	5	6	7
1	Demarcation & Marking 4.5 MD/ha Rs. 144/ha	3468	3815	4196	4616	5078
2	Coupe Working					
	a. Timber (7.7 MD/M3) Rs. 246/M ³	6245	6869	7556	8312	9143

Table-67 continued.....

1	2	3	4	5	6	7
	b. Firewood (4.26/MD/Beat) Rs. 136/-beat	1381	1519	1671	1838	2022
	c. Bamboo (Departmental)					
	i) Long Bamboo Rs. 2.5/Bamboo)	6149	6764	7440	8184	9002
	ii) Bamboo bundle (Rs. 4.5/bundle)	10872	11960	13156	14471	15918
3	Removal of windfallen					
	a. Timber (Rs.246/M3) 1000 M3 out-turn	667	733	806	886	974
	b. Firewood (Rs. 136/Beat)	84	92	101	111	122
4	Tendu leaves Collection Rs.900/-std. Bag	52023	57226	62948	69243	76167
5	C.B.O. (Rs.192/- ha)					
6	Cleaning (Rs. 256/ha)	5153	5668	6235	6858	7544
7	Afforestation (Rate/ha) Activities Rs.					
	a. P.M.W. 8077	167009	183709	202079	222286	244516
	b. F.Y.O. 7381	136769	150445	165489	182037	200240
	c. S.Y.O. 3273	46932	51625	56787	62465	68711
	d. T.Y.O. 2072	15503	17053	18758	20633	22696
	e. 4 th Y.O. 563	7318	8049	8853	9738	10711
	f. 5 th Y.O. 563	6653	7318	8049	8853	9738
8	Maintenance (Build,Road, Bridges)	1485	1633	1796	1975	2173
9	Wages	3238	3561	3917	4308	4738
10	Office Expenses	1125	1238	1362	1498	1648
11	Petrol/Diesel	499	549	604	664	730
12	Material supply	239	263	290	319	351
13	Salary	52444	57689	63458	69803	76784

Table-67 continued...

1	2	3	4	5	6	7
14	T.A.	753	829	911	1003	1103
15	Miscellaneous	1494	1644	1808	1989	2188
	Total					

SECTION-2: COST OF THE PLAN:

The total expenditure incurred on the preparation of this plan is difficult to account for because the tree enumeration and writing of P.W.P.R.. for Chandrapur forest division was done by Deputy Conservator of Forests, Working Plan Division, Amravati and the preparation of the final draft plan has been completed by Deputy Conservator of Forests, Working Plan Division No.2, Chandrapur who is also preparing Working Plans for Allapalli Forest Division and Sironcha Forest Division and therefore expenditure incurred can not be worked out separately for this plan.

ANNEXURE-I

In pursuance of clause (3) of article 348 of the Constitution of India, the following translation in English of the Maharashtra Transfer of Ownership of Minor Forest Produce in the Schedule Areas, and the Maharashtra Minor Forest Produce (Regulation of Trade) (Amendment) Ordinance, 1997 (Maha.Ord. XIX of 1997), is hereby published under the authority of the Governor.

By order and in the name of the Governor of Maharashtra,

PRATIMA UMAPJI,
Secretary to Government.

(Translation in English of the Maharashtra Transfer of Ownership of Minor Forest Produce in the Schedule Areas and the Maharashtra Minor Forest (Regulation of Trade) (Amendment) Ordinance, 1997 (Mah. Ord. XIX of 1997, published under the authority of the Governor).

REVENUE AND FORESTS DEPARTMENT

Mantralaya, Mumbai 400 032, dated the 10th December 1997.

MAHARASHTRA ORDINANCE NO.XIX OF 1997.

AN ORDINANCE

To make provisions for transfer of ownership of Minor Forest Produce in the Scheduled Areas and to amend the Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969.

WHEREAS both Houses of the State Legislature are not in session

AND WHEREAS the Governor Of Maharashtra is satisfied that circumstances exist which render it necessary for him to take immediate action to make provisions for transfer of ownership of Minor Forest

Produce in the Scheduled Areas and to Mah. LVII amend the Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969, of for the purposes hereinafter appearing;

Part Eight -184 (973)

NOW, THEREFORE, in exercise of the powers conferred by clause (i) of article 213 of the Constitution of India, the Governor of Maharashtra is hereby pleased to promulgate the following Ordinance, namely :-

CHAPTER I

PRELIMINARY

1. *Short title and commencement—*

(1) This Ordinance may be called the Maharashtra Transfer of Minor Forest Produce (Regulation of Trade) (Amendment) Ordinance, 1997. (2) It shall come into force at once.

CHAPTER II

TRANSFER OF OWNERSHIP OF MINOR FOREST PRODUCE TO PANCHAYATS IN SCHEDULE AREAS

2. ***Application*** - The Chapter shall apply to the Panchayats in the Scheduled Areas in the State of Maharashtra, referred to in clause 9(i) of article 244 of the Constitution of India.

3. ***Definitions*** – In this chapter, unless the context otherwise required-

(a) “Minor forest produce” means forest produce specified in the Schedule appended to this Chapter ;

(b) “Public servant” means a person as defined in section 21 of the Indian Penal Code :

© “Schedule” means the Schedule to this Chapter, and the State Government may, by notification in the official Gazette, and to modify the same after considering the necessity for such addition or modification in the public interest. Every such notification shall be laid before each House of the State Legislature, as soon as may be, after it is issued and shall be subject to such modification as the State Legislature, as soon as may be, after it is issued and shall be subject to such modification as the State Legislature may make, during the session in

which it is so laid, and published in the official Gazette, as modified by the State Legislature :

(d) “Working Plan” or “ Management Plan” or “Working Scheme” means a document of technical nature approved by a competent authority appointed by the State Government or the Central Government, as the case may be, laying the prescriptions for scientific management of specified forest area :

(e) all words and expressions used in this Chapter but not defined herein shall have the same meanings, respectively. Assigned to them in the Bombay Village Panchayats Act, 1958.

4. *Ownership of Minor Forest Produce to vest in Panchayat-* (1)

The ownership of Minor Forest Produce found in the Government lands in the Scheduled Areas, excluding the National Parks and Sanctuaries, shall vest in the Panchayat within whose jurisdiction such area falls.

Explanation- The exxpression “National parks” “Sanctuarnes” used inthis section shall have the same meaning, respectively, assigned to them under the Wild Life Protection Act, 1972.

(1) For removal of doubts, it is declared that the ownership of minor forest prduce shall be governed by the provisions of the Indian Forests Act, 1927.

(2) If any dispute arises regarding the ownership of minor forest produce among the Panchayats, the decision of the State Government shall be final.

5. *Panchayats to adhere strictly to the Silvlcultural presecrptions of Working Plan Management Plan or Working Scheme-* (1)

The Panchayats shall strictly adhere to the prescriptions contained in the Working Plan, Management Plan or Working Scheme, Management Plan or Working Schemes with regards to the harvest of minor forest produce. However, in the areas not covered under the Working Plan, Management Plan or Working Scheme, the Panchayats shall adhere to the rules made,

with regard to the harvesting of minor forest produce, under this Chapter by the Conservator of Forest of the concerned circle.

Whoever contravenes or violates the prescriptions contained in the Working plan or the Management plan or the working scheme or the rules made by the Conservator of Forest of the concerned circle shall, on conviction, be punished with fine which may extend to rupees five thousand or with imprisonment which may extend to one year or with both.

6. *saving in respect of acts done in good faith.*- No suit, prosecution or other legal proceedings shall lie against any public servant for anything which is in good faith done or intended to be so done in pursuance of this chapter.

7. *Offences by Panchayats and Provisions of Indian Forest Act, 1927 and wild Life protection Act, 1972, to apply.*- (1) The provisions of this Chapter shall be in addition to and shall not be in derogation of the provisions of the Indian forest Act, 1927: and all the penal provisions obtaining in the said Act shall also apply to all the *panchayats* to which this chapter applies.

(2) If the person committing an offence under this Chapter is a *Panchayat*, every person, who, at the time the offence was committed, was in charge of, and was responsible to the *Panchayat* for the exercise of the powers and conduct of the function and duties of the *panchayat* shall also be liable to be proceeded against and punished accordingly.

SCHEDULE

[See section 3 (a)]

1. Mahuwa flower.
2. Mahuwa fruits.
3. Gum.
4. *Terminilia chebula* (Hirda).
5. *Buchanania Lanzon* (Charoli).
6. *Emblica officinalis* (Awala.)
7. *Terminalia belerica* (Baheda).
8. Seeds of *Azadirachica indica* (Neem).
9. Seeds of *Pongamia pinnata* (Karanj).
10. Seeds of *Cassia fistula* (Amaltas).
11. *Tamarindus indica* (Linn).
12. Tamarind seeds.
13. Lac of *Butea monosperma*
14. Lack of *Schleichera oleosa* (Kusum).
15. Seeds of *Jatropha carcus* (Vanerand)
16. Takada/Pauda *Clerodendron phburldis*.
17. Nirmali/Kapi.
18. Guggul.
- 19' Bapchi bee (Seed).
20. Kunchla kari.
21. Shikakai.
22. Reetha.
23. *Semicarpus anacardium* (Biba).
24. Gunj seed.
25. Broom grass.
26. Mango seed.
27. Wawding.
28. Baphali.
29. Cut Grass and fodder.

- 30 Honey.
- 31 Palas leaves.
- 32 Sitaphal.
- 33 Cashew nuts-except those grown by Forest Development Corporations of Maharashtra, Limited.

CHAPTER III

AMENDMENTS TO THE MAHARASHTRA MINOR FOREST PRODUCE (REGULATION OF TRADE) ACT, 1969.

- 8 *Amendment of long title of Mah. LVII of 1969*—In the long title Maharashtra Minor Forest produce (Regulation of Trade) Act. 1969 (herein after in this chapter, referred to as “the principal Act”), the word “minor shall be deleted.
- 9 *Amendment of preamble of Mah LVII 1969.*- In preamble of the principal Act, in subsection (I) the word “minor” shall be deleted.
- 10 *Amendment of section 1 of Mah. LVII of 1969.* – In section 1 of the principal Act., in sub-section (I), the word “minor” shall be deleted.
- 11 *Amendment of Mah. LVII of 1969*-Throughout the principal Act, the word “minor”, wherever it occurs, shall be deleted.
- 12 *Amendment of section 2 of Mah. LVII of 1969*-In section 2 of the principal Act, for clause (e) the following shall be substituted, namely :-

“(c)” Forest Produce” means such forest produce as defined under the Indian Forest Act, 1927 as are specified in the Schedule appended to this Act. And the State Government may, from time to time, by notification in the *Official Gazette*, add to or modify , the Schedule in the public interest, and the provisions of sub-section(3) of section 19 in so far as they relate to laying before, and modification as they apply in relation to any rule made under that section shall apply in relation to such notification as they apply in relation to any rule made under that section.”

CHAPTER IV

MISCELLANEOUS.

13. *Power to remove doubts and difficulties.*-If any doubt or difficulty arises in giving effect to the provisions of the Ordinance, the State Government may, by order, give such direction, not inconsistent with the provisions of this Ordinance, as may appear to it to be necessary or enactment for the removal of the doubt or difficulty make consequential changes in the Maharashtra

STATEMENT

1) Parliament has enacted a law "The provisions of the *Panchyats* (Extension to the Scheduled Areas). Act, 1996 (Act No. 40 of 1996)./ The said Act, provides for endowing, by the State, the *Panchayats* in the Scheduled Areas, with such powers and authority as may be necessary to enable them to function as institutions of self-Government. It further provides that a State Legislature shall ensure *inter-alia*, that the *Panchayats* at the appropriate level and the *Gram Sabha* are endowed specifically with the ownership of minor forest produce. For timely compliance with the provisions of the said Government of India Act it is necessary for the State Government to undertake a suitable legislation providing for conferring of ownership of minor forest produce on the village *Panchayats* in the Scheduled Areas, and other matters incidental thereto. There is, however, no clear concept as to scope of the term "minor forest produce" It is, therefore, also necessary for the State Government to leave no room for doubt or ambiguity, to clearly lay down the scope of the term "minor forest produce" the ownership of which is to be transferred to the *panchayats* in the Scheduled Areas, by this Act.

2. Accordingly, the proposed law while providing for conferring of the ownership of the "minor forest produce" in the Schedule Areas within the

jurisdiction of the Village *Panchayats* in the Scheduled Areas to such *Panchayats*, also specifies in the Schedule appended to the Act, the minor forest produce the ownership of which shall stand transferred to the said *panchayats*.

3. Since, in the greater public interest the preservation of forest with all its biodiversity will still be the responsibility of the State Government, the exploitation of minor forest produce by the *panchayat* bodies, will be made subject to the restrictions as are already laid down in the Indian Forest Act, 1927, and also in the working plans, working schemes or regulations prescribed, from time to time, by the Forest Authorities. It is also being clarified as a matter of abundant caution that the penal provisions and the penalties which have been prescribed in the Indian Forest act, 1927 and the Wild Life Protection Act, 1972 the breach of the said penal provisions of the said Act would be applicable and enforceable against the said *panchayats* also.

4. By an independent Ordinance referred to above, the scope of minor forest produce is being specifically spelt out to cover 33 categories of forest produce listed in its Schedule. *Tendu*, *apta* and *bamboo* can no longer be considered 'minor forest produce' as conventionally understood in terms of revenue. Their exploitation requires skill, expertise and financial resources which the local bodies do not possess. Bamboo, in any case, is exclusively covered in the definition of the term 'tree' in the Indian Forest Act. Thus, the ownership of *tendu*, *apta* and *bamboo* is not intended to be transferred to the local bodies.

Since there is a need to continue the regulation of trade in *apta* and *tendu* though they are not covered by this Ordinance as "minor forest produce", it is necessary to make consequential changes in the Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 (Mah.LVII of 1969) So as to maintain its applicability to *apta* and *tendu*.

5. As both Houses of the State Legislature are not in session and the Governor of Maharashtra is satisfied that circumstances exist which

render it necessary for him to take immediate action to make such a law and also to amend the Maharashtra Minor Forest produce (Regulation of Trade) Act, 1969, for the purposes aforesaid. This Ordinance is promulgated.

P.C. ALEXANDER,
Governor of Maharashtra

By order and in the name of the Governor of Maharashtra
Mumbai,
Dated the 10th December 1997

VINAY BANSAL
Secretary to Government.