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GOVERNMENT OF MAHARASHTRA

WORKING PLAN

FOR

ALLAPALLI FOREST DIVISION

GADCHIROLI FOREST CIRCLE

PERIOD

(2017-18 TO 2026-27)

VOLUME – I

DIETY OF MADIYA TRIBE



BY

A. D. BHOSALE IFS

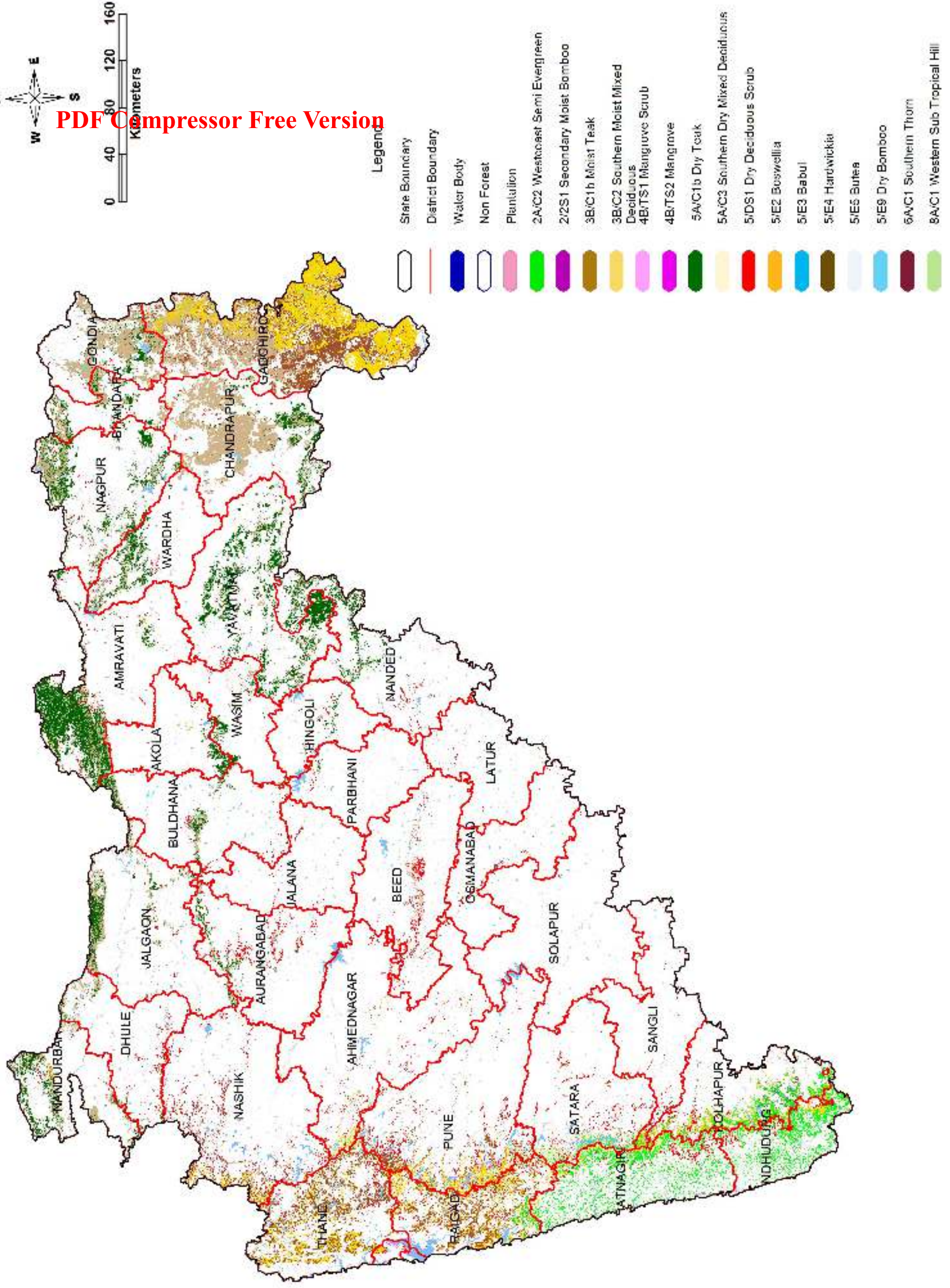
CONSERVATOR OF FORESTS

WORKING PLAN DIVISION, GADCHIROLI (M.S.)

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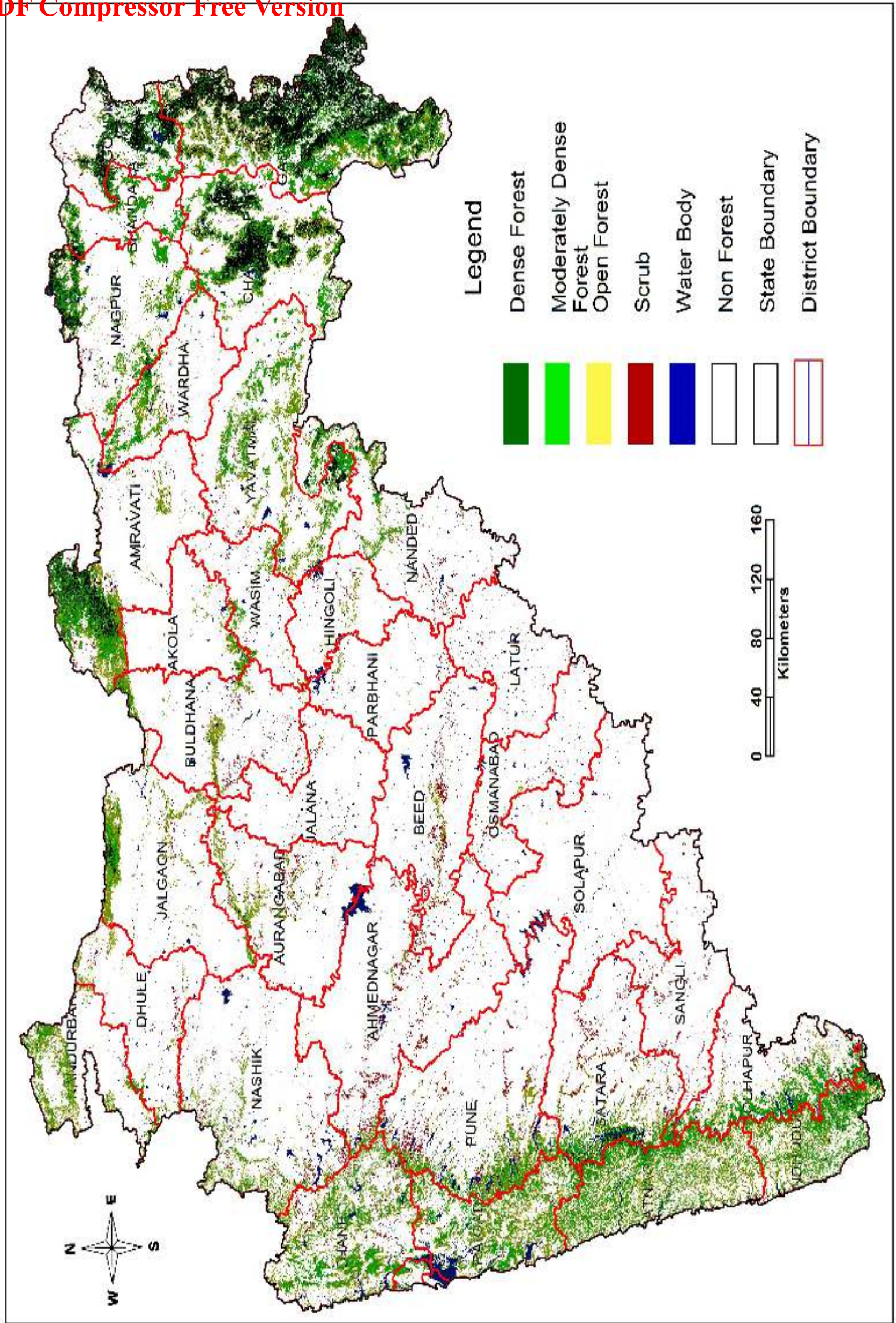
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MAHARASHTRA FOREST TYPE MAP



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MAHARASHTRA DENSITY TYPE MAP



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MAP OF ALLAPALLI FOREST DIVISION



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This Working Plan for Allapalli Forest Division replaces the earlier Working Plan for Allapalli Division by Shri Dr.S.S.Srivastava (2004-05 to 2013-14),

The present working plan for Allapalli Forest Division, Allapalli is the first consolidated plan for the entire division comprising of seven territorial ranges viz Allapalli, Pirmili, Ghot,Chamorshi, Markhanda, Aheri and Pedigudam. The total forest area of the division is 273296.863 ha and the present working plan covers 198709.905 ha of forest area and the remaining area 35601.598 ha. and 13478.000 ha. has been handed over to Forest Development Corporation of Maharashtra, Ltd. and Chaprala Wildlife Sanctuary respectively for specific management purposes and 25507.360 ha as a disforest area. The present working plans covers 164607.548 ha of Reserved Forest, 23389.004 ha of Protected Forest and 10713.353 ha of Unclassed Forest.

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

The preparation and revision of Working Plan for Allapalli Forest Division, Allapalli was started in 1998 and the tree enumeration works of Allapalli Forest Division were completed in 2012 and thereafter the analysis of the tree enumeration data was done and on the basis of data collected, the Preliminary Working Plan Report was prepared and discussed in the First State Level Committee meeting held on 13th September 2013 at Nagpur under the Chairmanship of Shri A.K.Joshi the then Principal Chief Conservator of Forests(HoFF),M.S. Nagpur and the P.W.P.R. for Allapalli Forest Division was approved by the Committee vide Additional P.C.C.F.Working Plan Circle, .Nagpur's office letter No. Desk-14/WP/SLC

Meeting (13.9.2013)/668/2013-14 dated 15th October 2013 and after approval of the aforesaid P.W.P.R. the Final Draft Working Plan for Allapalli Forest Division has been completed.

The present Draft Working Plan has proposed for some organizational changes in order to supervise the various forestry activities effectively. It is therefore proposed that the Allapalli Forest Division be bifurcated into one Territorial divisions with their headquarters at Allapalli and Ghot range be divided into two Territorial ranges namely Chamorshi and Ghot. Allapalli Forest Division will form part of the new Allapalli Forest Division with its headquarter at Allapalli. With comprising seven Territorial ranges namely Allapalli, Ghot, Chamorshi, Markhanda, Pirimili, Aheri and Pedigudam.

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

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

This working plan has also suggested for establishment of Eco-tourism, Biodiversity in the forest areas on the lines of National Policy on Eco-tourism

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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 Additional P.C.C.F. Working Plan Circle, Nagpur and the same will be supplied with this working plan by the office of the Conservator of Forests, Working Plan Circle, Gadchiroli

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

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

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

I am highly grateful to Shri Karunakaran, IFS, Addl. Principal Chief Conservator of Forests (Working Plan-East), Nagpur for extending his kind cooperation and valuable guidance in the preparation and revision of this working plan.

I am also thankful to Shri T.S.K. Reddy, IFS, Chief Conservator of Forests, (Territorial) Gadchiroli, Shri U.G. Awasak, IFS, Shri O.S. Chandramore IFS, Conservator of Forests, Working Plan, Gadchiroli.

Shri Rameshkumar, IFS, Shri Meena, IFS Deputy Conservator of Forests, Allapalli Forest Division, for extending their full support and cooperation in the preparation of this working plan.

I am personally thankful to the staff of this working plan division who have made it possible to complete this working plan and have put in their best endeavour in the preparation and revision of this working plan and therefore S/Shri M. S. Mahadik, RFO, K. Jidgilwar, Ranger Surveyor, Surveyors S/Shri

P. H. Dangore, N. T. Satai, C. J. Dule & Shri Kancharlawar for their kind co-operation and valuable support.

I am extremely thankful to the administrative staff of this division and Shri S. J. Madavi, 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.

Gadchiroli.

Sd/-
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Conservator of Forests
Working Plan Division, Gadchiroli.

ABBREVIATIONS USED IN THE PLAN

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A.C.F.	Assistant Conservator of Forests
Addl.PCCF	Additional Principle Chief Conservator of Forest
A.D.	Anno Domino
Apex	Appendix
A.W.C.	Afforestation Working Circle
AR	Artificial Regeneration
BFM	Bombay Forest Manual
BFR	Bombay Forest Rule
BILT	Ballarpur Industries Limited
b.h.	Breast height
B.O.W.C.	Bamboo Overlapping Working Circle
B.M.C.	Bio-diversity Management Committee.
C.A.I.	Current Annual Increment
CAMPA	Compensatory Afforestation Fund Management & Planning Authority
CBFS	Commercial Bamboo Felling Series
CCT	Continuous Contour Trench
Cft.	Cubic feet
Cum	Centimeter
Cm ³	Cubic meter
Comptt.	Compartment
Contd.	Continued
CP	Central Province
CRPF	Central Reserved Police Force
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
DFO	Divisional Forest Officer
Dn.	Division
DPDC	District Planning Development Council
F	Female
Etc.	Etcetera
FDA	Forest Development Agency
F.D.C.M.Ltd.	Forest Development Corporation of Maharashtra Limited
FDT.	Forest Development Tax
F.L.C.S.	Forest Laborers Co-Operative Society
F.R.H.	Forest Rest House

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FRI	Forest Research Institute
F.S.	Felling Series
FSI	Forest survey of India
F.S.O.	Forest Settlement Officer
F.V.	Forest Village
F.Y.M.	Farm Yard Manure
F.Y.O.	First Year Operations
GOM	Government of Maharashtra
GR	Government Resolution
GOVT	Government
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
GIS	Geographical Information System
ha/Ha	hectare
Hrs.	Hours
HoFF	Head of Forest Forces
i.e.	That is to say
IGF	Inspector General of Forests
IFA	Indian Forest Act.
I.P.R.	Intellectual Property Right.
IWC	Improvement Working Circle
J.F.M.C.	Joint Forest Management Committee
Kg	Kilogram
Km	Kilometer
KRA	Key Area Result
LAT	Latitude
LON	Longitude
M	Male
MISC.	Miscellaneous
Mtr.	Meter
M.T.	Million Tones
Mm	Millimeter
M3/m3	Cubic-meter
M.A.I.	Mean Annual Increment
M.F.P.	Minor Forest Produce
MP	Madhya Pradesh
MPCA	Medical Plant Conservation Areas
MPDA	Medical Plant Development Areas

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MREGS	Maharashtra Rural Employment Guarantee Scheme
M.S.	Maharashtra State
MSBB	Maharashtra State Bio-Diversity Board
M.S.L.	Mean sea level
MSP	Minimum Support Price
M.V.S.S.	Maharashtra Van Sanshodhan Sanstha
MOU	Memorandum of Understanding
MoEF	Ministry of Environment and Forests
N.B.A.	National Bio-diversity Authority.
NE	North East
NGO	Non Government Organization
NR	Natural Regeneration
NBFS	Nistar Bamboo Felling Series
NOVOD	National Oil Seeds and Vegetable Development Board
NNW-SSE	North, North West- South, South West
NW-SSE	North, West- South, South West
NTFP	Non Timber Forest Produce
NWFP	Non wood Forest Produce
NW-SE	North, West – South, East
OBC	Other Backward Class
ONGC	Oil and Natural Gas Commission
PA/PAs	Protected Areas.
P.B.	Periodic Block
PESA	Extension of Panchayat Act to Schedule Areas
P.F.	Protected Forests
Ph.	An index showing acidity/ alkalinity of soil, water.
P.P.O.	Pre Planting Operations
P.Y.O.	Preliminary Year Operations
P.W.D.	Public Works Department
P.W.C.	Protection Working Circle
Qtl.	Quintal
Qty.	Quantity
R.F.	Reserved Forests
R.F.O.	Range Forest Officer
Rs	Rupees
S.B.A.	State Bio-diversity Authority
S.C.I.	Selection-Cum-Improvement
SOFR	Survey of Forest Resources
Std.	Standard

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Sq.	Square
Sq.km.	Square Kilometer
Sp.	Species
S.R.P.F.	State Reserved Police Force
S.Y.O.	Second Year Operations
Sr.No.	Serial Number
SW	South West
TS.NO.	Topo Sheets Number
T.Y.O.	Third Year Operations
T.C.M.	Trench cum Mound
T.P.W.C.	Teak Plantation Working Circle
UNWTO	United Nations World Tourism Organization
W.C.	Working Circle
WCL	Western Coalfield Limited
WHO	World Health Organization
VAT	Value Added Tax
VIZ.	That is to say
IVth Y.O.	Forth Year Operations
Vth Y.O.	Fifth Year Operations
Vam	Vesicular Arbiscular Mycorrhiza

PDF Compressor Free Version **GLOSSARY OF LOCAL TERMS**

LOCAL TERM	MEANING
Adjat species	Miscellaneous species
Bhatti	Local stillery for liquor production
Bidi	Hand made cigarette wrapped in tendu leaf
Bir	An area reserved to grow grass
Burad	A caste whose main occupation is to make articles from bamboo
Doh	A deep pond in a river or stream
Geru	Red ochre or red earth
Ghani	Local crusher for oil extraction
Ghat	A road with a steep gradient
Gully	Water channel
Jagir	An estate conferred by the State in return for service
Jagirdar	The holder of jagir
Jamindari	An estate belonging to a zamindar
Jhiras	Temporary small wells dug in nalas during summer
Juar	A cultivated millet (<i>Sorghum vulgares</i>)
Kacha (roads)	Temporary (roads)
Kankar	Lime nodules
Karka	Whippy bamboo
Katha	Catechu
Kharif	South West 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.

LOCAL TERM **MEANING**

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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 Nistar rights on Government Land.
Occupational-Nistar	The nistar granted to village craftsmen i.e. Nistar mahars, blacksmiths, chamars, burads, cultivators etc. at concessional rate for their craft purposes.
Paidawar	Wild edible flowers, fruits or roots
Patwari	Village Officer (Sub-ordinate of Revenue Department)
P.C.No.	Patwari Circle Number
Pre harvestable girth	One girth class below exploitable girth class
Pucca	Permanent Construction
Pulla	Bundles of cut grass
Rabi	Winter Crop
Rahadari	Transit
Raiyatwari	A form of land tenure, applied to land in raiyatwari tenure and to villagers.
Regur	Black cotton soil.
Rith	A deserted village site
Satkatha	Miscellaneous tree species
Seri-culture	Rearing silk/tussar worms.

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

A. TREES

LOCAL NAME	BOTANICAL NAME	FAMILY
Achar	<i>Buchanania lanzan</i>	Anacardiaceae
Amaltas/Bahava	<i>Cassia fistula</i> , Linn	Caesalpiniaceae
Amta	<i>Bauhinia malabarica</i> , Roxb	Caesalpiniaceae
Anjan	<i>Hardwickia binata</i> , Roxb	Caesalpiniaceae
Apta	<i>Bauhinia racemosa</i> , Lamk	Caesalpiniaceae
Aonla	<i>Phyllanthus emblica</i>	Euphorbiaceae
Arjun	<i>Terminalia arjuna</i>	Combretaceae
Babul	<i>Acacia nilotica</i> Linn	Mimosaceae
Bud/Wad	<i>Ficus bengalensis</i> , Linn	Moraceae
Beheda	<i>Terminalia bellirica</i> ,	Combretaceae
Bel	<i>Aegle marmelos</i> (L)	Rutaceae
Bhirra	<i>Chloroxylon swietenia</i>	Rutaceae
Biba/Bhilwa	<i>Semecarpus anacardium</i> , Linn	Anacardiaceae
Bija	<i>Pterocarpus marsupium</i> , Roxb	Fabaceae
Bistendu	<i>Diospyros montana</i> , Roxb	Ebenaceae
Bor/Ber	<i>Zizyphus mauritiana</i> , Lamk	Rhamnaceae
Chichwa	<i>Albizia odoratissima</i> , Roxb	Fabaceae
Dhaman	<i>Grewia tilifolia</i> (vahl)	Tiliaceae
Dhaora	<i>Anogeissus latifolia</i> (R.Br.exDC)	Combretaceae
Dhoban/Satpuda	<i>Dalbergia paniculata</i> , Roxb	Fabaceae
Dikamali	<i>Gardenia resinifera</i> , Roth	Rubiaceae
Garari	<i>Cleistanthus collinus</i> , Roxb	Euphorbiaceae
Ghogar/papda	<i>Gardenia latifolia</i> Ait	Rubiaceae
Ghoti/Ghot	<i>Zizyphus glaberrima</i> (Sedgw)	Rhamnaceae
Gongal	<i>Cochlospermum religiosum</i> Line	Cachlospermaceae
Haldu	<i>Adina cordifolia</i> Roxb	Rubiaceae
Hingan	<i>Balanites aegyptica</i> (L)Del	Balanitaceae
Hiwar	<i>Acacia leucophloea</i> Roxb Willd	Mimosaceae

LOCAL NAME	BOTANICAL NAME	FAMILY
Hirda/Harra	<i>Terminalia chebula</i> Getz	Combretaceae
Imli/Chinch	<i>Tamarindus indica</i> Linn	Caesalpiniaceae
Jambhul/Jamaun	<i>Syzygium cumini</i> Linn	Myrtaceae
Kakad	<i>Garuga pinnata</i> Roxb	Burseraceae
Kala-umber	<i>Ficus hispida</i>	Moraceae
Kakai	<i>Flacourtia indica</i> (Burm.f)Mer	Flacourtiaceae
Kamala	<i>Mallotus philippensis</i>	Euphorbiaceae
Karai	<i>Miliusa velutina</i> H.F. & Thoms	Anonaceae
Kalam	<i>Mitragyna parviflora</i> Roxb	Rubiaceae
Karanj	<i>Pongamia pinnata</i> (L) Pierre	Fabaceae
Kateyen/Kasai	<i>Bridelia retusa</i> spreng	Euphorbiaceae
Kawith	<i>Limonia acidissima</i> Lorr	Rutaceae
Khair	<i>Acacia catechu</i> willd	Mimosaceae
Khirni	<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> Hoult	Anacardiaceae Merr
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	Fabaceae
Papra	<i>Holoptelea integrifolia</i>	Urticaceae
Rankela	<i>Dillenia pentagyna</i>	Magnoliaceae

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LOCAL NAME	BOTANICAL NAME	FAMILY
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	Mimosaceae
Sitaphal	<i>Annona squamosa</i> L.	Annonaceae
Suriya	<i>Xylia xylocarpa</i> Roxb.	Mimosaceae
Tendu	<i>Diospyros melanoxylon</i> Roxb	Ebenaceae
Tiwas/Tinsa	<i>Ougeinia oojeinensis</i> Roxb.	Fabaceae
Umbar/Gular	<i>Ficus recemosa</i> Linn	Moreaceae
Warang/Baranga	<i>Kydia calycina</i> Roxb	Malvaceae

B. SHRUBS AND HERBS

LOCAL NAME	BOTANICAL NAME	FAMILY
Aal	<i>Morinda citrifolia</i> (Lin)	Celastraceae
Aghada	<i>Achyranthes 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 lamps</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/ Gaturli	<i>Grewia hirsuta</i>	Tiliaceae Gursukri/
Gokhru	<i>Tribulus terrestris</i> ,Linn	Zygophyllaceae

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

C. GRASSES AND BAMBOOS

LOCAL NAME	BOTANICAL NAME	FAMILY
Ghonad	<i>Themeda triandra</i>	Gramineae
Bamboo-karka	<i>Dendrocalamus strictus(Roxb) Nee</i>	Gramineae
Bamboo-katang	<i>Bambusa arundinacea(willd)</i>	Gramineae
Bhurbhusi	<i>Eragrostis tenella (Roem & Schulf)</i>	Gramineae
Godhel	<i>Eragrostis interrupta</i>	Gramineae
Katanbahari	<i>Aristida funiculata(Trin.et.Rupa)</i>	Gramineae
Kunda/sum	<i>Eulaliopsis binata(Retz.)(Mark)</i>	Gramineae
Kusal/ Speargrass/Diwartan	<i>Heteropogon contortus(Linn)Beau</i>	Gramineae

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LOCAL NAME	BOTANICAL NAME	FAMILY
Marvel-small	<i>Dicanthium annulatum</i> (Forsek) Staff	Gramineae
Marvel-big	<i>Dicanthium aristatum</i> (Poir)	Gramineae
Mushan	<i>Iseilema laxum</i> (Hack)	Gramineae
Paonya	<i>Sehima sulcatum</i> (Hack) Acamus	Gramineae
Sheda	<i>Sehima nervosum</i> (Staff)	Gramineae
Tikhadi	<i>Cymbopogon martinii</i> (Roxb) Watson	Gramineae
Ukari	<i>Iseilema prostratum</i> Anderss	Gramineae
Chir	<i>Imperata Officinalis</i>	Gramineae

D. CLIMBERS

LOCAL NAME	BOTANICAL NAME	FAMILY
Bandke	<i>Dendrophoe falcata</i> (Linn) t	Loranthaceae
Chilar	<i>Caesalpinia ecapetala</i> (Roxb)	Caesalpinaceae
Chilati	<i>Mimosa hamata</i> (Willd)	Mimosaceae
Chilati badi	<i>Acacia torta</i> (W & A)	Mimosaceae
Dhimarval	<i>Celastrus paniculata</i> (Willd)	Celastraceae
Dudhi/Nagvel	<i>Cryptolepis buchananii</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>Milletia 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)	Caesalpinaceae
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
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LOCAL NAME	BOTANICAL NAME	FAMILY
<i>Amaraval</i>	<i>Cuscuta refferxa</i> (Roxb)	<i>Cuscutaceae</i>

F. EPIPHYTES

LOCAL NAME	BOTANICAL NAME	FAMILY
<i>Vanda</i>	<i>Vanda tesellata</i> (Roxb)	<i>Orchidaceae</i>

G. ENDEMIC/THREATENED PLANT SPECIES

LOCAL NAME	BOTANICAL NAME	FAMILY
<i>Alichettu</i>	<i>Eonymus godaverensis</i>	<i>Celastraceae</i>

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

COMMON NAME	SCIENTIFIC NAME

A : ANIMALS

<i>Tiger</i>	<i>Panthera tigris</i>
<i>Panther</i>	<i>Panthera pardus</i>
<i>Hyaena</i>	<i>Hyaena hyaena</i>
<i>Wild dog</i>	<i>Cuon alpinus</i>
<i>Wolf</i>	<i>Canis lupus</i>
<i>Jackal</i>	<i>Canis aureus</i>
<i>Fox</i>	<i>Vulpes bengalensis</i>
<i>Jungle cat</i>	<i>Felis chaus</i>
<i>Bison</i>	<i>Bos gaurus</i>
<i>Sambhar</i>	<i>Cervus unicolor</i>
<i>Cheetal</i>	<i>Axis axis</i>
<i>Nilgai</i>	<i>Boselaphus rago camelus</i>
<i>Wild boar</i>	<i>Sus cristatus</i>
<i>Sloth bear</i>	<i>Melursus ursinus</i>
<i>Barking deer</i>	<i>Muntiacus muntjak</i>
<i>Common langur</i>	<i>Presbytis entellus</i>
<i>Flying squirrel</i>	<i>Petaurista petaurista</i>
<i>Porcupine</i>	<i>Hystrix indica</i>
<i>Hare</i>	<i>Lepus ruficaudatus</i>
<i>Otter</i>	<i>Lutra perspicillata</i>

B : BIRDS

COMMON NAME	SCIENTIFIC NAME
<i>Painted sandgrouse</i>	<i>Pterocles indicus</i>
<i>Common sandgrouse</i>	<i>Pterocles exustus</i>
<i>Pea fowl</i>	<i>Pavo cristatus</i>
<i>Grey jungle fowl</i>	<i>Gallus sonneratii</i>
<i>Painted Partridge</i>	<i>Francolinus pictus</i>
<i>Grey partridge</i>	<i>Francolinus pondicerianus</i>
<i>Blackbreasted quail</i>	<i>Coturnix coromandelicus</i>
<i>Red spur fowl</i>	<i>Galloperdix spadicea</i>
<i>Crane</i>	<i>Grus Antigone</i>
<i>Spotted bill duck</i>	<i>Anas poecillorhyncha</i>
<i>Pigeon</i>	<i>Treron phoenicoptera</i>
<i>Dove</i>	<i>Streptopelia spp.</i>
<i>Cotton teal</i>	<i>Nettapus coromandelienus</i>
<i>Whistling teal</i>	<i>Dendrocygna javanica</i>

C : ENDANGERED WILDLIFE ANIMALS

Bison
Wolf
Panther
Sloth bear
Tiger

BIRDS

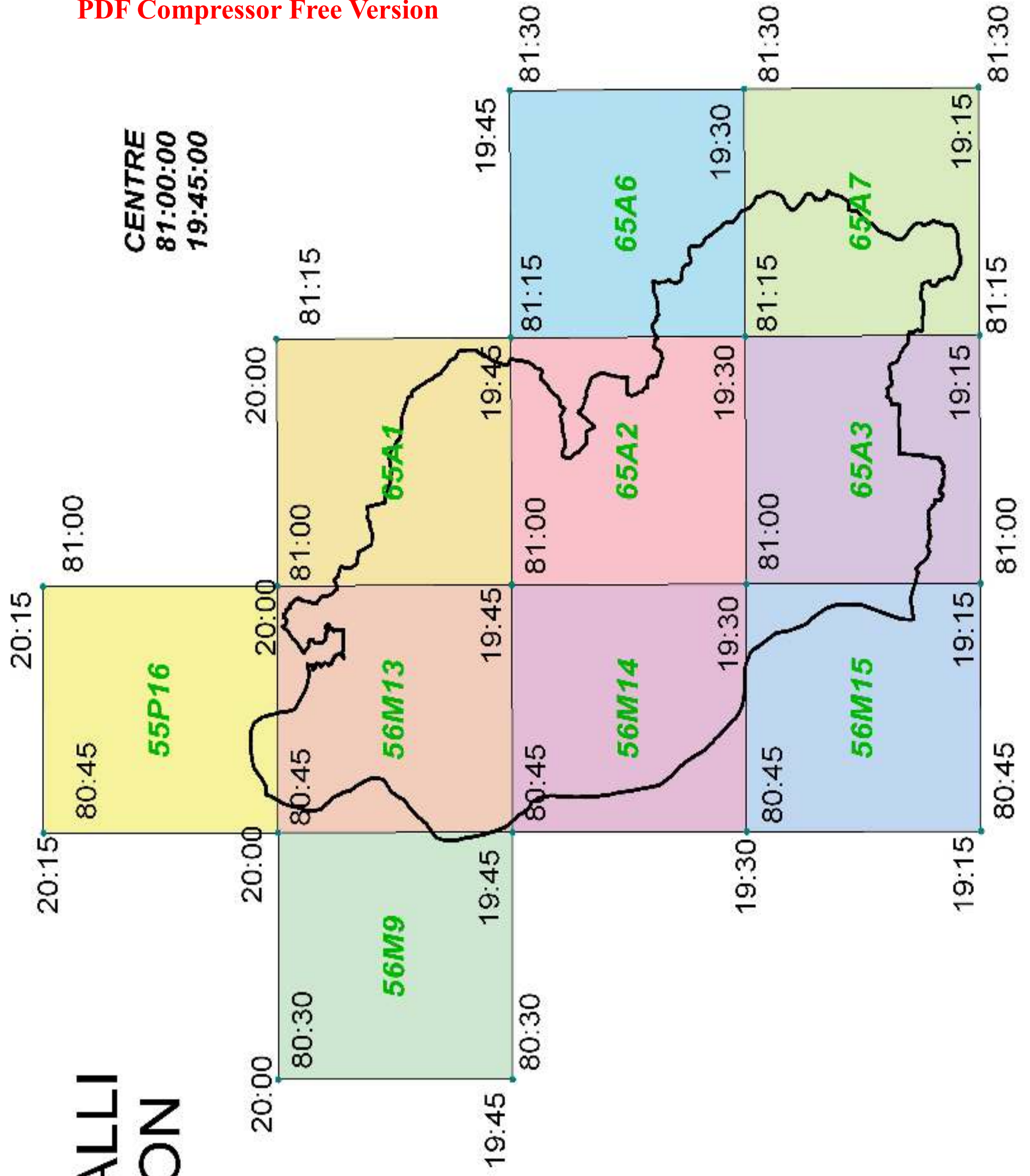
Pea fowl

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ALLAPALLI DIVISION

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Working Plan
For
Allapalli Forest Division
Gadchiroli Forest Circle

PART - I

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CHAPTER - 1

TRACT DEALT WITH

SUMMARY OF FACTS ON WHICH THE PROPOSALS ARE BASED

SECTION 1 : NAME AND SITUATION

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

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

1.1.3 The gross notified forest area of Allapalli Forest Division is 270957.474 ha. For management of Chaparala wild life sanctuary 13364.639 ha. forest land is handed over to Wildlife Division Allapalli. Forest land measuring 44474.753 ha. is handed over to F.D.C.M. Ltd. Hence the net notified forest area under management of Allapalli Forest Division proper is 213118.081 ha. which comprise 186976.173 ha. reserved forest, 25773.248 ha. protected forests and 368.66 ha. zudpi jungle.

The forest area, under management of Allapalli Forest Division proper, after digitization, comes out to be 190303.186 Ha. Thus the difference between notified area and digitized area is 22814.895 ha. The difference is due to un-surveyed 41011.550 ha. reserved forest and 1956.676 ha protected forest that is total 42968.224 ha. forest area in forest block of Permili range. The difference is also due to un-surveyed zudpi jungle 368.66 ha.

To ascertain the difference in notified area and digitized area i.e. 22814.895 ha., it is necessary to conduct detail survey of the un surveyed forest blocks in Permili range. The Deputy Conservator of Forest, Allapalli Division and Chief Conservator of Forest,(T) Gadchiroli Circle should initiate the detail survey in this regard which will reveal the difference in area and the reasons behind the difference in area,

The details of forest area un-surveyed in Permili range is given below table no. 1(A).

Table No. 1 (A)
Details Of Un surveyed Forest Block in Permili Range

Sr. No.	Village	Area in Ha		Notification No. of forest declaration	Date of Notification	Notified Forest Area (Ha.)	Digitised Area (Ha.)	Area Difference (Ha.) (7-8)
		RF.	PF.					
1	2	3	4	5	6	7	8	9
1	Makepalli block No.11	1525.400	00	FLD 3685/9316/CR/42/F5	5.5.1992	1525.400	1441.120	84.280
2	Makepalli M	00	28.739	NO.3056-1216-xi	13.8.1955	28.739	00	28.739

3	Udera block No 12	0.000	00	00	0	0.000	00	0.000
4	Tumargunda M	4790.290	00	FLD 3685/9316/CR/42/F5	5.5.1992	4790.290	3337.260	1453.030
5	Pandewahi M	00	180.491	FLD 4659 ii-8316-E	15.6.1959	180.491	00	180.491
6	Aladandi M	0.000	00	0.000	0	0.000	00	0.000
7	Udera M	0.000	00	0.000	0	0.000	00	0.000
8	Tatigudam M	0.000	00	0.000	0	0.000	00	0.000
9	Fundi block No 13	0.000	00	0.000	0	0.000	00	0.000
10	Fundi M	1501.500	00	FLD 3685/9316/CR/42/F5	5.5.1992	1501.500	1055.990	445.510
11	0	00	128.692	FLD 4659 ii-8316-E	15.6.1959	128.692	00	128.692
12	Kandoli M	0.000	00	0.000	0	0.000	00	0.000
13	0	0.000	00	0.000	0	0.000	00	0.000
14	0	0.000	00	0.000	0	0.000	00	0.000
15	Chandara block No 14	0.000	00	0.000	0	0.000	00	0.000
16	Gattepalli M	14936.830	00	FLD3685/9316/CR-42/F-5	5.5.1992	14936.830	4577.630	10359.200
17	Chandra M	00	411.971	FLD4659 ii-8316-E	15.6.1959	411.971	00	411.971
18	Aladandi M	0.000	00	0.000	0	0.000	00	0.000
19	Rapalle M	0.000	00	0.000	0	0.000	00	0.000
20	Tatigudam M	0.000	00	0.000	0	0.000	00	0.000
21	Abanpalli M	0.000	00	0.000	0	0.000	00	0.000
22	Jaweli M	0.000	00	0.000	0	0.000	00	0.000
23	Pirmilli block No 15	0.000	00	0.000	0	0.000	00	0.000
24	Gurupalli M	10872.800	00	FLD 3685/9316/CR/42/F5	5.5.1992	10872.800	5068.720	5804.080
25	Karem M	00	569.401	FLD 4659 ii-8316-E	15.6.1959	569.401	00	569.401
26	Kodawahi M	0.000	00	0.000	0	0.000	00	0.000
27	Pindigudam M	0.000	00	0.000	0	0.000	00	0.000
28	Mirkal block No 16	0.000	00	0.000	0	0.000	00	0.000
29	Kachaler M	7384.730	00	FLD3685/9316/CR-42/F-5	5.5.1992	7384.730	6826.950	557.780
30	Wedmpalli M	00	637.380	FLD 4659 ii-8316-E	15.6.1959	637.380	00	637.380
31	Gurja M	0.000	00	0.000	0	0.000	00	0.000
32	Total	41011.550	1956.674	00	0.000	42968.224	00	20660.554

The area of both protected and reserved forest is notified survey number wise and block wise approximately hence there exists a difference in notified forest

area and digitized forest area. In this plan the difference in notified and digitized forest area is mentioned as “miscellaneous area” to confirm to notified area as per Form No.1 of Allapalli Forest Division.

The forest area shown in above table as “00” for villages like Udera M, Aladandi M, Tatigudam M, Kandoli M, Rapalle M, Abanpalli M, Jaweli M, Kodawahi M, Pindigudam M, Gurja M. These villages were included in the block notification declared in 1955 & 1959, however these villages later on became Revenue villages having no forest area in the newly constituted village boundary.

This Working Plan proposes to include 213118.081 ha. of forest area of Allapalli Forest Division proper. The distribution of forest areas in Allapalli Forest Division is shown in the following table:

TABLE-1-B
GROSS NOTIFIED FOREST AREA OF ALLAPALLI FOREST DIVISION (Ha.)

Sr. No.	Range	Reserved Forest	Protected Forest	Zudpi Jungle.	Total Forest area
1	2	3	4	5	6
1	Chamorshi	16006.692	2962.403	197.310	19166.405
2	Ghot	40720.887	1517.551	164.740	42403.178
3	Pediguddam	33602.858	0.0000	0.000	33602.858
4	Permili	63418.384	10910.408	0.000	74328.792
5	Allapalli	18748.284	0.000	0.000	18748.284
6	Aheri	35351.059	8710.567	0.000	44061.627
7	Markhanda	29420.222	1895.338	6.610	31322.170
8	Erstwhile Choudampalli Range(now in wildlife sanctuary Chaprala)	6105.185	1218.975	0.000	7324.160
9	Total	243373.571	27215.242	368.66	270957.474

TABLE -1-C
FOREST AREA, FROM TABLE NO.1 –B, TRANSFERRED FOR SPECIFIC MANAGEMENT PURPOSE (Ha.)

Range	Wildlife management			F.D.C.M. Ltd.			Total Transfer		
	R.F.	P.F.	Total	R.F.	P.F.	TOTAL	R.F.	P.F.	TOTAL
2	3	4	5	6	7	8	9	10	11
Chamorshi	0.0	0.0	0.0	8901.714	0	890.714	890.714	0.0	890.714

Ghot	0.0	0.0	0.0	5680.498	0	5680.498	5680.498	0.0	5680.498
Pediguddam	0.0	0.0	0.0	13364.154	0	13364.154	13364.154	0.0	13364.154
Permili	0.0	0.0	0.0	0.00	0	0.000	0.00	0.0	0.00
Allapalli	0.0	0.0	0.0	1032.758	0	1032.758	1032.758	0.0	1032.758
Aheri	979.695	0.0	979.695	9549.828	0	9549.828	10529.523	0.0	10529.523
Markhanda	4837.765	223.019	5060.784	13956.801	0	13956.801	18794.566	223.019	19017.585
Erstwhile Choudampalli Range (now in wildlife sanctuary Chaprala)	6105.185	1218.975	7324.160	0.0	0	0.0	6105.185	1218.975	7324.160
Total	11922.645	1441.994	13364.639	44474.753	0	44474.753	63397.398	1441.994	57839.392

TABLE -1-D
RANGE WISE AREA STATEMENT OF RF AS PER OLD & NEW PLAN

Sr. No	Name of Range	Legal Status	Area as per old Plan	Area as per New plan	Difference	Reason
1	2	3	4	5	6	7
1	Allapalli	RF	18920.28	18748.28	172.00	Disforested area not include in W.P.
2	Chamorshi		0.00	16006.69	-16006.69	15322.19 from old ghot Range & 684.57 Unclass forest area.
3	Ghot		54430.34	40720.89	13709.45	39108.22 ha. From old ghot range &1612.67 ha. Unclass forest area.
4	Aheri		18709.50	35351.06	-16641.56	18704.503 old W. P. area.
						10076.76 F.D.C. M. area.
						979.70 Wild life Area.
						5585.096 Block area was not include in Old W. P.
5	Peddigudam		17367.44	33602.86	-16235.42	3541.33 Unclass forest 12694.09ha. Area of F.D.C. M.
6	Pirmalli	63634.72	63418.38	216.34	Disforested area not include in W.P.	
7	Markhanda	7937.82	29420.22	-21482.40	Old W. P. area as per Block 7997.82ha.F.D.C.M. area 13309.36ha. Wildlife area 4837.77ha.Unclass area 3275.27ha.	
Total			181000.11	237268.38		
Erstwhile Choudampalli Range (Now in wildlife sanctuary Chaprala.				6105.19		
243373.57						

TABLE -1-E**PDF Compressor Free Version****RANGE WISE AREA STATEMENT OF PF AS PER OLD & NEW PLAN**

Sr.No	Name of Range	Legal Status	Area as per old Plan	Area as per New plan	Difference	Reason
1	2	3	4	5	6	7
1	Chamorshi	PF	0.00	2962.40	-2962.40	Area taken from old Ghot Range
3	Ghot		4444.08	1517.51	2926.57	2926.57 ha. in old ghot range &35.87 ha. Unclass forest area.
4	Aheri		7985.22	8710.57	-725.35	725.35ha.block area not include in old W.P.
6	Pirmalli		9517.76	10910.41	-1392.65	Unclass Forest area 1392.65ha. Not include in old W.P.
7	Markhanda		1586.22	1895.34	-309.12	309.12ha. Area not include in old W.P
Total			23533.28	25996.23		
Erstwhile Choudampalli Range (Now in wildlife sanctuary Chaprala.				1218.975		
				27215.21		

TABLE – 1F**FOREST AREA, UNDER MANAGEMENT OF, ALLAPALLI FOREST DIVISION PROPER**

Sr. No.	Range	R.F.	P.F.	Zudpi jungle.	Total
1	2	3	4	5	6
1	Chamorshi	15115.978	2962.403	197.310	18275.691
2	Ghot	35040.389	1517.551	164.740	36722.680
3	Pediguddam	20238.704	0.0	0.0	20238.704
4	Permili	63418.384	10910.408	0.0	74328.792
5	Allapalli	17715.526	0.0	0.0	17715.526
6	Aheri	24821.536	8710.567	0.0	33532.103
7	Markhanda	10625.656	1672.319	6.610	12304.585
9	Total	186976.173	25773.248	368.660	213118.081

1.1.4 Disforestation:- The forest area disforested prior to 1980 is 28584.458 ha. which includes 10315.841 ha. reserved forest and 18268.617 ha. protected forest

The list of notifications of disforestation is attached vide **Appendix No. VIII**. The gross notified forest area of Allapalli Division and forest area under management of Allapalli Division proper is stated in Table No.1B and 1D respectively and excludes the disforested area.

The abstract of disforested area range wise is given below.

TABLE No.2

Sr. No.	Range	Disforested area (ha.)		Total (ha.)
		R.F.	P.F.	
1	2	3	4	5
1	Chamorshi	7626.010	0.0	7626.010
2	Ghot	1942.699	3792.751	5735.450
3	Pediguddam	85.380	8023.252	8108.632
4	Permili	121.012	410.092	531.104
5	Allapalli	172.00	0.0	172.00
6	Aheri	311.770	1271.280	1583.050
7	Markhanda	56.970	4771.242	4828.212
8	Total	10315.841	18268.617	28584.458

1.1.5 The boundaries of the tract dealt with are as below:-

North: - Gadchiroli Forest Division and Wainganga River

East: - Bhamragarh Division and Bandia river.

West: - Pranhita and Wainganga Rivers.

South: - Sironcha Forest Division and Jhamela nala.

1.1.6 The forest areas of Allapalli Forest Division occur within the territories of present Gadchiroli District and spread over Aheri, Mulchera, Chamorshi and Etapalli talukas. The total geographical area of the district is 14412 sq. km. and the forest area under the management of Allapalli Forest Division proper is 213118.081 ha. which is 14.79 % of the total area of district.

SECTION 2: CONFIGURATION OF THE GROUND:

1.2.1 The areas covered under this Working Plan are mostly plain with gently undulating slopes. The hilly tract occurs in the South-West named as Bhimaram hills and in North-Central named as Madkaki gatta (426 mtr. above MSL), Kalidurg gatta (311mtrs. above MSL) in Pedigundam and Ghot Range respectively. The Bhimaram hills

rise to its highest point at 488 mtr. above mean sea level. The slopes on eastern side are steeper than on the western side, especially the upper one third portions which is more or less precipitous. The numerous nalas arising out of the Burkulgatta hills run down in every possible direction furrowing the area deeply due to its above action, thereby transforming the area east of the Golamargu nala into multi ridged, mildly rugged, uneven country.

SECTION 3: GEOLOGY, ROCK AND SOIL

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

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

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

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

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

Recent		Alluvium and soil.
Pleistocene-Recent	..	Laterite
Cretaceous-Eocene	..	Deccan Trap with inter trappeans.
Cretaceous		Lameta beds.
Upper-Carboniferous		

To Upper Triassic
Late-Pre-Cambrian
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Archaean

Gondwana System.
Vindhyan System.
Cuddapah System.
Intrusives (granites & basic dykes).
Granite Gneisses and
Amphibolites, phyllites, quartzites,
Brecciated quartzites and banded
Quartz, magnetite rocks.

1.3.6 The rocks of Archaean age include granites, gneisses, quartzite, brecciated quartzite and banded magnetic rocks with intrusive. Granites are coarse-grained and light pinkish in colour, primarily composed of biotite, flesh coloured feldspar and quartz. Most of the outcrops appear to be highly decomposed, which are intruded by numerous quartz veins and quartz - feldspar 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, feldspar, muscovite and biotite are easily recognizable. Some gneisses are intersected with thin veins of pink feldspar. Amphibolites occur as conformable bands and layers in the gneisses. They are, however, intensely weathered and exposures of fresh rock are rare. Megascopically, the amphibolites are light to dark green in colour but generally altered and soft. Hornblende and feldspars are the only recognizable minerals in hand 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 micaceous is comparatively hard and compact. The quartzite's and banded quartz-magnetite which appear to belong to one cycle of sedimentation are remnants of the older met sediments (Dharwar) occurring as isolated hills and knolls within the gneisses. The banded quartz-magnetite rocks are composed of alternating layers of ore minerals (both crystalline magnetite and hematite) and quartz. Brecciated quartzites stand out prominent at many points as isolated small hills and are intensely fractured, later filled up by the secondary silica. Granites, granite-pegmatites and basic rocks are intrusive in gneisses and amphibolites and generally occur as thin discordant and concordant bodies. The granites and granite-pegmatites are medium to coarse grained sometimes with large phenocrysts of feldspars. The other recognizable minerals are quartz and little amount of ferromagnesian minerals. The basic intrusive are melanocratic, medium grained, hard and compact, essentially composed of augites and plagioclase laths with minor amounts of secondary hornblende.

1.3.7 Cuddapah System: - The rock of this system consists of shales limestone and quartzite. The quartzite is medium to coarse grained and show wide ripple marks at several places. The quartzite is overlaid by grey, siliceous, massive, impure lime stone. These lime stones 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 grey to purple in colour.

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

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

Chikhiala beds,
Kota Maleri
Kamthi,
Barakars,
Talchirs.

1.3.10 The Talchir series consist of a boulder bed at the bottom, followed by shales and sandstones successively. They occupy only a small area in the division and bear a poor miserable crop. In Barkers, the predominant rocks are the white felsparic sandstone, shales and clays along with coal seams. It has great economic value. The

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rocks in the Kamthi group are sandstones, shales, clays and conglomerates of which the sandstones and shales form the bulk of the series. The rocks of kotamaleri group comprise sandstone, clays, lime stones in the order of abundance. The Chikiala beds represent the youngest member of the Gondwanas of the Pranhita-Godavari basin and comprise conglomerates, sandstones, shales and clays.

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

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

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

1.3.14 LIMESTONE AND DOLOMITE :- Dewalmari - Katepalli limestone deposit is located at about 13 km. S-SW of Aheri (T.S. No. 56 M/15, 65 A/3). The limestone deposit has a strike length of about 1 km. and average width of about 100 mtr. General strike is NW-SE with northerly dips of 40-70. The limestone is grey, pinkish grey and brownish in colour. Another limestone deposit with a strike length of about 2.4 km. and the maximum width of about 0.7 km. is located near village Katepalli. This band has a strike of NW-SSE with westerly dips of 15 to 50. At places vertical dips are also noticed. The drilling data reveal the presence of limestone beyond 80 mtr depth. The lime stones from both the above said areas are estimated to contain reserves to the tune of 172 million tones with an average CaO content of 45 %. The MgO content of the Magnesium limestone bands ranges from 5 to 15 % and Silica percentage is low.

1.3.15 ASBESTOS / TALC :- In Gadchiroli district amphibolites type of asbestos is reported on the eastern slope of a hill range east schist, talc-tremolite schist, amphibolites and banded hematite quartzite of Precambrian age. The mineral bearing

formation is observed below the scarp of boulders over a length of 25 mtr. and 5 mtr. in width. The mineral is brownish to white in colour, soft flexible but of non-spinning type. The occurrence is insignificant and is not exploitable.

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

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

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

1.3.19 SILIMANITE:- Insignificant occurrences of Sillimanite corundum rock is located 3 km. SW of Elchil, which is 16 km. NE of Allapalli (T.S. No. 65 A/3). The Sillimanite-corundum rock is found in association with Pyroxene-garnet granulites, in the country rock comprising garnetiferous amphibolites and hornblende garnet gneiss. The NNW-SSE trending zone measures about 350 mtr. in length and 25 mtr. in width. Sillimanite occurs in the form of nodules scattered in this zone. The size of nodules varies from 10 mtr across. The Sillimanite-corundum nodules are mainly composed of radiating needles of Sillimanite, corundum and mica with accessories of quartz, magnetite, rutile, muscovite and biotite. The area does not appear to be promising.

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

1.3.21 Alluvium and Soil:- The bedrocks at several places, specially, the river valley areas of the region are covered by recent alluvium deposited by the streams and different types of soils derived from breaking up of the underlying rocks. At the time of

settlement, nine types of soil has been recorded in the district viz. kali, bersi, kanhar, morand, khardi, wardi, retari, bardj, pandhari and kachhar. These are local names of soil types present.

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

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

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

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

1.3.26 The forest cover where the underlying rock is metamorphic sandstone, while laterite also occurs frequently; the resulting soil is a sandy loam, changing to brown clay, with alluvium deposits of considerable depth in ravines. Wherever sufficient moisture exists, these soils are capable of supporting fairly dense mixed

forests but the excessive of it and dryness of the climate control the height growth and the vegetation is confined to monsoon months.

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1.3.27 Copper : 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.

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

1.3.29 Building and Construction materials: 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 sand stones are suitable for all sorts of building purposes and are extensively used locally. Brecciate quartzites are good sources for road construction. Massive lateritic is also used in the area as building stone.

1.3.30 Limestone: 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.

1.3.31 Clay: 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 1300⁰ c. Shrinkage varies from nil to 5 percent. The reserves are estimated at 921,000 tones. Parts of the area having this clay have been leased out.

SECTION 4 : CLIMATE

1.4.1 Climate of Allapalli area is hot and dry i.e. tropical type. Broadly speaking there are four seasons, namely, the winter season, the hot season(summer), monsoon season(rainy) and post monsoon season (October/November). The winter season

starts from November and continues up to mid February. The winter is mild and the weather is extremely pleasant. It is followed by hot summer from the middle of February till onset of monsoon in the middle of June.

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

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

TABLE – 3 (TEMPERATURE IN CENTIGRADE)

Month	Maximum	Minimum	Diurnal Ranges
January	31.80	10.20	22.10
February	33.10	12.10	21.55
March	39.30	15.00	23.25
April	45.37	21.00	23.76
May	48.00	23.76	24.40
June	47.32	21.62	22.66
July	39.40	22.08	19.11
August	33.96	23.34	11.16
September	32.40	19.45	14.02
October	37.75	17.20	19.25
November	33.10	12.22	20.32
December	28.95	9.30	21.17

1.4.4 Rainfall: - Some rainfall in the form of pre-monsoon showers occurs in May but the main rainy season is from June to October. An average for this tract indicates that the rainfall during the month of June to October is about 96.72 % of the average annual rainfall. July and August are the months when maximum down pour is experienced. Average annual rainfall of the tract during 2005 to 2015 is 1335.19 mm. with average rainy days per year is 56 as per rain fall data for Aheri and Sironcha rain gauge stations. Rain gauge stations are maintained at Aheri and Sironcha. The monthly rain fall and rainy days for Aheri and Sironcha rain gauge stations for the period 2005 to 2015 is given in **Appendix no. IV.**

1.4.5 Humidity: - The average monthly relative humidity for the period from 2004-05 to 2013-14 at Rajaram is given in Table V as below:-

TABLE – 4

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Sr. No	Month	8.30 Hrs.	17.30 Hrs.	Average
1	January	75.20	40.14	57.67
2	February	63.15	52.35	57.75
3	March	42.80	22.60	32.70
4	April	33.10	18.19	25.65
5	May	41.50	20.47	30.99
6	June	64.10	44.25	54.18
7	July	85.10	71.00	78.05
8	August	87.25	80.20	83.73
9	September	92.27	83.10	87.69
10	October	73.65	63.20	68.43
11	November	69.20	52.45	60.83
12	December	74.32	49.10	61.71

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

1.4.6 Frost: - Frost does not occur here.

1.4.7 Storms and winds:-

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

1.4.8 Health condition:-

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

SECTION 5 : DRAINAGE AND WATER SUPPLY

1.5.1 (A) DRAINAGE:

The rivers Wainganga and Pranhita form the Western boundary of this division. Zamela nala lies on Southern boundary of this division. River Dina, Gomni nala,

Chechi nala, Binnar nala and River Pathra finally merge into the river Pranhita and flow towards South.

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1.5.2 (B) WATER SUPPLY:

There is acute scarcity of water throughout the tract during the summer. Perennial rivers flow along the boundary of the tract dealt with. Rain water drains off quickly. Most of the inland nallas go dry from December onwards and water is confined to pools only. There are small to medium dams or inland water courses. A few anicuts and tanks have been constructed in past with very small capacity to retain water. The ground water is mostly tapped by dug wells and bore-wells. The dug wells ranges in depth from 30 mtr. to 35 mtr. and their yield varies from 45000-50000 litres a day. Most of the wells go dry after March. Bore-wells range in depth from 50 mtr. to 60 mtr. And their yield varies from 20000 to 27000 liters per day only. Some water also accumulates in riparian zones which is used by wild animals. In big villages, water supply schemes have been started by Zilla Parishad.

SECTION 6 : DISTRIBUTION OF AREA

1.6.1 The total forest area under management of the division including reserved, protected and zudpi forest is 213118.081ha. which has been covered under this working plan. The distribution of forest area range-wise is illustrated in the following table.

TABLE – 5

Sr.No	Range	Reserved Forest (ha)	Protected Forest (ha)	Zudpi jungle (ha)	Total Forest Area (ha)
1	2	3	4	5	6
1	Chamorshi	15945.212●	3497.63●	284.93●	19727.772●
2	Ghot	38478.52●	2568.14●	188.016●	41234.676●
3	Pediguddam	21537.834●	0.0	0.0	21537.834●
4	Permili	46115.232●	9570.881●	0.0	55686.113●
5	Allapalli	17799.587●	0.0	0.0	17799.587●
6	Aheri	11623.754●	9375.713●	0.0	20999.467●
7	Markhanda	11397.55●	1920.187●	0.0	13317.737●
8	Total	162897.689●	26932.551●	472.946●	190303.186●
9	Miscellaneous area	-----	-----	-----	22814.895■
10	Grand Total (8+9)	-----	-----	-----	213118.081

(● this area computed after digitization.)

(■ this is difference between notified forest area and digitized forest area of Allapalli Division proper)

1.6.2 The forest area of Allapalli Forest Division is divided in to 1616 compartments for management purpose. Allapalli, Aheri and Pedigudam ranges, together formed a compact block of best quality forest and were under scientific

management for last 100 years however due to establishment of Forest Development Corporation of Maharashtra Ltd. the areas of Pedigundam range is leased out to FDCM for management and therefore such areas is excluded from this working plan during the course of its revision.

1.6.3 Maps for Allapalli Forest Division are available on 4" = 1 mile and 1:50000 scale topo sheets. The protected forest area is shown on Karwai maps (corrected on Bandobast maps between 1935 to 1952 and on the basis of which the notification of protected forest was effected in the year 1955 and 1959.), Punarmojani (resurvey) maps and then Ekatrikaran (consolidation) maps. There has been some variation in the forest areas during each surveys and this anomaly requires investigation.

SECTION 7: STATE OF BOUNDARIES

1.7.1 The total length of the external boundaries of the forest areas of the division comes to 559.696 km. out of which 148.12 km. is covered by the natural feature i.e. rivers, streams etc. whereas 411.576 km. boundary is artificial. The boundary at places is well demarcated by erecting numbered pillars and the boundary is cleared to 12 mtr. width. Each pillar is surrounded by cairn of stones or earth. Each pillar is placed in the middle of the 12mtr. wide boundary line. All pillars are serially numbered in anti-clock wise direction. Separate series of numbers are adopted for boundary lines passing through different villages. The position and number of each pillar is shown on the 4" : 1 mile maps. The state of external boundary is extremely poor. The boundary between revenue villages and forest is either absent or in an extremely poor state. Encroachment in the vicinity of villages is not uncommon. Due to absence of proper demarcation on the ground, the forest officers find it difficult to identify the illegal encroachments without the help of the maps and surveyors.

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

SECTION 8: LEGAL POSITION:

1.8.1 The present Allapalli range and the Elchil block of Pedigundam range formed in the past a part of the Aheri Jamindari areas and were actually purchased by the Government between 1873 and 1883 for a total sum of Rs. 1,60,000 and were

included in the old Ghot and Chamorshi range. After 1883 an area of 766 acres around the Allapalli depot was acquired by way of exchange from the Jamindars.

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

1.8.3 The forest of the old Ghot range were declared as reserved forest in 1879 vide Notification No. 917 (g) and (i) dated 24th February 1879 under the provisions of Indian Forest Act (vii) of 1878. The original reserves constituted the initial Ghot range which was divided into Ghot and Markhanda ranges vide letter No. 1812 / XXV – 1 / 108 dated 4th December 1908 from the Under Secretary to Chief Commissioner C.P.& Berar. The Notification No. and date of Notification is given in **Appendix No. V** as per Desk-7/Est-1/C.R.No./03 (03-04)/part-2/Reha./152/09-10 Nagpur dated 12/05/2009, Ghot range is divided in to Chamorshi and Ghot respectively.

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

1.8.5 Under provisions of Section 30 and 32 of IFA 1927 certain tree species were declared reserved vide Notification No. FLD-4657/193064-F, dated 19/12/1959. The details of tree species notified as reserved are given in **Appendix No. VI**

SECTION 9: RIGHTS AND CONCESSIONS

(A) PROTECTED FORESTS:

1.9.1 Before the abolition of the Proprietary Rights, all lands belonged to the proprietors. A village administration paper called Wazib-ul-arz was prepared at every

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

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

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

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

1.9.4 However, the parts of the Protected Forests, included in the proposal for reservation, have now been notified as Reserved Forests vide Notification No. FLD/3685/9316/CR-42/F-3, dated May 5, 1992 under Section 20 of IFA, 1927. The rights and concessions over these areas were not recognized by the Forest Settlement Officer. The various notifications issued by the State Government are listed in **Appendix No. V** The Govt. of Maharashtra has extended the provisions of Maharashtra Forest Manual to whole of Maharashtra State. Nistar rates are fixed by the territorial DCF in consultation with the District Collector. There are 24 erstwhile forest villages in Allapalli

Forest Division and these forest villages were permitted to have free grants subject to certain regulations. These forest villages were declared as Revenue Villages vide Govt. of Maharashtra Resolution No FLD-4267-I-Y- dated 2/5/1967 and the Govt. of Maharashtra extended their erstwhile facilities to these newly constituted revenue villages. The free grants are specified in Section 147 of Bombay Forest Manual Volume-III.

(B) GRAZING:

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

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

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

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

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

1.9.7 As per directives of the Government contained in Land Reforms Department, Ex-Madhya Pradesh Memorandum No. 1290-1277-XXVIII, dated 4th September, 1953 sheep and goats are not allowed to graze in forests meant for production of big timber or in the forest area where villagers generally exercise their nistar rights. However it has been modified by the subsequent notification that sheep are also allowed to graze in the forest on conditional basis free of cost on the land specified by the DCF Territorial as provided in para 115 of BFM Volume III.

OCCUPATIONAL NISTARS :

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

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

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

1.9.10 The then Government of Madhya Pradesh, under whose control these forests vested, issued detailed instructions regarding administration of nistar supply of timber etc. to villages (new system) vide Government letter No. 2396/2389-XXVII, dated October 16, 1956. These instructions which listed details about areas from where nistar

was to be made available, extent of nistar to different categories, management of nistar and other forests; extraction and distribution of nistar material by the Gram Panchayats, Gram Sabhas or Nistar Panchayats, envisaged that forests would be managed on scientific basis by the Forest Department and communicated to the Village bodies which would then regulate the supply of nistar as per rules. The quantum of nistar was to be regulated as per the Government order No.336/1606-XXVIII, dated June 19, 1953, which listed the following categories of forest produce and the nistar over the same.

A. GRAZING:

- (a) **CULTIVATORS** : Two Plough cattle per plough plus four other including one she buffalo.
- (b) **AGRICULTURALISTS** : Four cattle and four sheep or goats/ house hold, artisans, laborers etc.

B. TIMBER :

- AGRICULTURAL IMPLEMENTS** : Eight poles up to 18" girth and timber actually needed for implements.
- MACHAN** : Four poles up to 45 cm girth at every third year.

- REPAIRS TO HOUSES** : Up to ten poles of khair (Misc. tree species) up to 60 cm. girth, if needed.

- FOR NEW CONSTRUCTION** : As required but on payment and also subject to availability.

C. BAMBOO :

- a) **AGRICULTURALIST** : 50 bamboos. (for repairs)
- b) **NON- AGRICULTURALIST** : 25 bamboos (subject to availability)

D GRASS FOR THATCHING:

- (a) **AGRICULTURALIST** : Four cartloads.
- (b) **NON-AGRICULTURALIST** : Four cartloads

E. MISCELLANEOUS :

- i) **FUEL** : One hundred head loads or five cartloads.
- ii) **THORNS AND BRUSH WOOD :**
- a) **AGRICULTURALIST** : Five cartloads.
- b) **NON-AGRICULTURALIST** : Two cartloads.

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iii)	LEAVES (excluding tendu)	:	No limit
	BAKKAL		
	ROOTS		
	EDIBLE	:	No limit
	PALAS	:	One head load.
(vi)	FRUITS & FLOWERS	:	No limit
(vii)	KARAI AND KARKA BAMBOOS		
a)	AGRICULTURALIST	:	Two cartload.
b)	NON AGRICULTURALIST:		One cartload.

1.9.11 The Govt. of Maharashtra vide their Resolution No. आबापू-1095 / प्र.क. 128 / एफ-9 दिनांक 30 / 5 / 03 has provided for supply of 1500 bamboo pieces to each burad family. The rates of each piece of bamboo under nistar shall be fixed by Addl.PCCF (Production & Management) M.S. Nagpur.

1.9.12 In nistar patrak of each village khasara numbers set aside for nistar are recorded. However, the details regarding quantum of nistar during which it is to be allowed, payment if any, to be made etc. are not given in the nistar patraks in general. Govt. of Maharashtra vide Revenue and Forest Department Resolution No. FCT-1564/2230-Y, Sachivalaya, Bomby-32 dated January 5, 1968, issued a detailed guideline for Nistar facilities. The details of the Govt. of Maharashtra Resolution dated January 15, 1968, is reproduced in **Appendix No. X.**

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

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CHAPTER – 2

IIA FOREST FLORA

SECTION 1: COMPOSITION AND CONDITION OF THE CROP.

2A.1.1. The forest of Allapalli Division dealt under this plan comes under two subgroups 3B-South Indian Moist Deciduous Forest and sub group 5A- Southern Tropical Dry deciduous Forests as per the revised classification of Forest types of India by H.G. Champion and S.K. Seth. Within these main sub types, considerable local variations occur depending mainly upon edaphic and topographic factors. The altitude does not vary considerably and so, it does not influence the distribution of various species. On the basis of variations in type and depth of the soil, the composition and quality of the crop vary and therefore the forests of Allapalli Forest Division can be classified as follows.

Forest types:-

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

Climax Types

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

2A.1.2 In Allapalli Range, forests in general are composed of Teak forests in high proportion. Understorey is well defined and shrubby undergrowth, especially in plain areas is quite dense. Bamboos occur in very few areas and are absent where drainage is bad. The grasses form a thick ground cover wherever the canopy was opened in the past and especially in areas where there are no bamboos. The growth and vigour of grass is phenomenal. In drier locality Teak is replaced by Surya while in moist area, it is associated with Kalamb.

2A.1.3 In general, the quality of the forest is II to III which improves on loamy well drained soil but degenerates into quality IVa in clayey and ill drained localities. Along the lower slopes and in the plains, the density is good but the forests are rather open on the upper steep hill slopes and plateaus. The natural regeneration of the tree species is mostly deficient especially in case of teak. Crop in general is healthy and vigorous with very small defective stock.

2A.1.4 For the purpose of description, Allapalli Range forests are distinguished into the following local sub-types as per Champion and Seth's revised classification of forest types.

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

A) TEAK BEARING FORESTS of Allapalli Range.

GENERAL DESCRIPTION:

2A.1.5 The flat or very gently undulating areas of the Allapalli range to the north, west and south of Bhimaram hills and also in the narrow strip to the east of these hills, appears this local sub-type. It is characterized by clayey nature of the soil, abundance of grass and weeds and high percentage of teak which forms a pure crop in small pockets. The percentage attained by teak, varies between 50 and 70 %. *Ain (Terminalia tomentosa)* and *Kalamb (Mitragyna parviflora)* are the characteristic associates of teak.

2A.1.6 The high quality of teak is attained in this sub-type in Allapalli range where-in site quality is as high as All India II / III. Density of the growing stock is usually 0.8 to 1.00, especially in the areas free from fires. Bamboos are abundant and grow tall. The rock here is metamorphic, mainly granite and gneiss with a trace of intrusion of igneous rock.

2A.1.7 The deep alluvial soil and comparatively higher water table in these areas afford optimum conditions for the luxuriant growth of teak and other species in natural conditions. These soils are, however, prone to water logging on clear felling and thus afford difficulty in artificial regeneration. Repeated burnings of the soil cause elimination of silicate gel, leading to rapid laterification. Repeated burning of grass, makes soil rich in Potassium and Phosphorus but poor in Nitrogen. These soils are basaltic in origin in the upper layers and sandy loam is present below clay loam and therefore the growth of the trees is less prominent and picks up after few years when the roots reach strata of sandy loam. The average pH of soil is near neutral.

2A.1.8 Teak is the predominant timber species found in this area and is associated with many species of varied importance and is usually associated with metamorphic

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

REPRODUCTION :

2A.1.9 Reproduction of teak and other species is very sparse over most of the hills especially in the western side as a result of the thick carpet of *Petalidium sp.* and dense bamboo. Conditions are rather better in the north and east owing possibly to the fact that *Petalidium sp.* has yet to spread in this area sufficiently deep, and some regeneration has come up as a result of past openings.

2A.1.10 The eastern slopes are generally very steep and dense bamboos extend almost to the foot of the hill. Here in some places the crop may be said to be of scattered teak and a few miscellaneous species with no reproduction. This is due to steep terrain and shallow soil. The growth of bamboos is remarkable in the valleys where the soil is rich. There is an addition of nearly 10 to 15 new culms to each clump annually. The bamboos on the slope with shallow soil are thin and of inferior quality, and are marked by twiny growth. There is congestion in clump due to bad soil as rhizome is unable to expand exterior and culms grow in upward direction. The recruitments in such areas are very poor.

B. MIXED FOREST:

GENERAL DESCRIPTION:

2A.1.11 The mixed forest, a local type, is mostly confined to the periphery of the Allapalli range and is limited to the flattened areas. Teak appearing in this type is unhealthy in appearance and slow growing. The soil is clayey with an admixture of sand and forms a hard crust. It is badly drained and is unsuitable to good forest growth. Density and quality is below All India Quality IV. The density is less and soil quality is IVa (Maharashtra) This type of forest is present in areas unsuitable for growth of Teak due to absence of loam or due to defective drainage. The species usually associated here are *Gardenia lucida*, *Gardenia turgida*. Bija is also found associated, but less in number in patches with loam and with defective drainage.

FLORISTICS :

2A.1.12 PDF Compressor Free Version

Ain (*Terminalia tomentosa*), Tendu (*Diospyros melanoxylon*), Rohan (*Soyimida febrifuga*), Aowla (*Embllica officinalis*), Bhirra (*Chloroxylon swietenia*), Lendia (*Lagerstroemia parviflora*), Dhawada (*Anogeissus latifolia*), Mowai (*Lannea coromandelica*), Moha (*Madhuca longifolia*), Salai (*Boswellia serrata*), Kusum (*Schleichera trijuga*), Mokha (*Schrebera swietenoides*), Palang (*Heterophragma roxburghii*), Anjan (*Hardwickia binata*).

2A.1.13 II – SECOND STOREY :

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

2A.1.14 IIa – BAMBOO

Bans (*Dendrocalamus strictus*)

2A.1.15 III – SHRUBS

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

2A.1.16 IVa – HERBS

Chirchira (*Achyranthes aspera*).

2A.1.17 IVb – GRASSES

Grasses are very abundant in open areas. Jalaram (*Sorghum halepense*) and *Imperata sp.* are found only in the south and west of Allapalli range in appreciable quantities. Elephanta grass (*Pennisetum purpureum*) is also present in moist areas. Kusal (*Heteropogon contortus*). Roshia or Tikhadi (*Cymbopogon martini*), Bhurbhushi (*Eragrostis tenella*). Marvel (*Dicanthium annulatum*), Sheda (*Schima nervosum*).

2A.1.18 V – CLIMBERS

Ramdatun (*Smilax zeylanica*), Malkanguni (*Celastrus paniculata*), Palasbel (*Butea superba*), Eroni (*Zizyphus oenoplia*),

NATURAL REPRODUCTION OF TEAK :

2A.1.19 No sure method has, however, been devised by which natural reproduction of teak could be induced in the area where it is desired. The following factors are usually considered to be adverse for the establishment of teak reproduction.

- Too dense an under wood and undergrowth usually of bamboo or garari (*Cleistanthus collinus*) and Petalidium,
- Insufficient high shade which does not keep down the amount of undergrowth.

- Clayey soils and poor drainage which encourage jalaram (*Sorghum halapense*) and Imperata grass.
- Repeated burning of the area.

2A.1.20 Petalidium is tolerant of high shade and forms a dense mass of undergrowth particularly where drainage is good near nalla. Efforts to eradicate Petalidium have proved to be unsuccessful in the past.

2A.1.21 Teak regeneration is usually noticed in the areas not covered by either bamboos or Petalidium. Thinnings in some parts of Plains Felling Series have been heavy in the past and have consequently induced dense growth of grass. This has inhibited teak reproduction. The die-back phenomenon has also been noticed at places. After initial years of less growth, the teak suddenly picks up the growth after three to four years. There is no problem with the quality of the seeds and each fruit has enough seeds to germinate.

2A.1.22 Recruitment has been generally poor and production remains seriously lacking in the Bhimaram hills. In the Petalidium and bamboo infested areas no regeneration has come up. On the eastern slopes, however, the regeneration has appeared in patches as a result of past heavy openings in the non-bamboo and Petalidium areas.

NATURAL REPRODUCTION OF OTHER SPECIES :

2A.1.23 Over the greater part of the tract, reproduction of the more valuable species is sparse but the reproduction of Surya (*Xylia xylocarpa*) is abundant on drier soil. Other species having abundant reproduction are, Garari (*Cleistanthus collinus*), Tendu (*Diospyros melanoxylon*), Lendia (*Lagerstroemia parviflora*), Bharanga (*Kydia calycina*). Haldu and Semal reproduction is observed in the plantations to some extent.

2A.1.24 In Markhanda Range occurrence of dry teak forest is confined to the banks and basin of the river Wainganga. In Ghot Range this type occurs along the hill slopes from the north-east of Ghot. Isolated patches of this type are seen along the hill slopes and plains to the south and south-west of Ghot. Depending upon the stability of soil and biotic influence, teak is seen gradually extending further into the mixed forests all over the tract.

2A.1.25 The tract over which this type occurs has a topography varying from plain to undulating ground and hills of low medium height. Altitude ranges from 200 mtr. to 580 mtr. above M.S.L. Altitude ranges from place to place.

2A.1.26 The site supports mostly quality III teak with 0.7 to 0.8 density. Main associates of teak in the top canopy are-

Ain (*Terminalia tomentosa*), Dhawada (*Anogeissus latifolia*), Mowai (*Lannea coromandelica*), Tendu (*Diospyros melanoxylon*), Lendia (*Lagerstroemia parviflora*), Bija (*Pterocarpus marsupium*), Haldu (*Adina cordifolia*), Semal (*Salmalia malabarica*), Shisham (*Dalbergia latifolia*), Kalamb (*Mitragyna parviflora*), Khair (*Acacia catechu*), Bhirra (*Chloroxylon swietenia*), Hiwar (*Acacia leucophloea*) and Mahuwa

(*Madhuca indica*). Though the middle storey is not usually distinguishable, the following are occasionally seen as codominated species, Garari (*Cleistanthus collinus*), Aonla (*Emblia officinalis*), palas (*Butea monosperma*), Dhaman (*Grewia tiliaefolia*), Apta (*Bauhinia racemosa*), Ghoti (*Zizyphus xylopyra*), Medsing (*Dolichandrone falcata*), and Bel (*Aegle marmelos*).

2A.1.27 Regeneration of teak and other important species is scanty. However in patches advance growth of teak is noticed.

2A.1.28 Undergrowth is practically wanting or sparse. Wherever present, the following shrubs constitute the Dikamali (*Gardenia lucida*), Ber (*Zizyphus jujuba*), Kuda (*Holarrhena antidysenterica*), Neel (*Indigofera pulchella*). Weeds are few. Bulk of the ground floor wherever weeds exist is covered by Tarota (*Cassia tora*) and Kutra (*Achyranthes aspera*). Grasses met with are Bhurbhushi (*Eragrostis tenella*), Kusal (*Heteropogon contortus*) and Mushan (*Iseilema laxum*). Common woody climbers are Palasbel (*Butea superba*), Waghaati (*Capparis sp.*), Eroni (*Zizyphus oenoplea*), Kukudranji (*Calycopteris floribunda*) and Lalvel/Papri (*Ventilago denticulata*).

2A.1.29 **Bamboo :** Few clumps of katang bamboos (*Bambusa arundinacea*) are seen on the fringes of nallas to the south-east of Markhanda. These bamboos are having flowering cycle of forty years and are yet to flower.

HILL TEAK FORESTS OF GHOT RANGE :

2A.1.30 Low hill forests of Ghot viz. the Jamgiri block and the hill forests extending from Jambia hill to the South-West of Ghot to the hill ranges to the north-west in anti clockwise direction have teak in patches. The soil in plains in Jamgiri block is black clay and supports poor quality (IVa) stands. Teak forms about 40 to 60 per cent of the growing stock with 0.6 to 0.7 density. Teak is mostly branchy, suppressed and unsound. Regeneration is scanty. Teak along the hill slopes attains quality III with fairly well grown teak though large number of teak trees is unsound. Teak forms about 10 to 20 percent of the growing stock and is usually classified as teak bearing forests. Density of the stands varies between 0.5 and 0.7. Floristic composition of these forests is as under.

2A.1.31 The top canopy consists of teak (*Tectona grandis*), shisham, bija, semal, karanj, dhoban, mowai, khair and mokha.

2A.1.32 Second storey is usually distinguishable and consists of Tendu, Kudursi, Hiwar, Bel, Koshimb, Medshing, Palas, Ghoti and Apta. Babmoos are confined to hill slopes and nalla banks. Under storey consists of Gilbilli, Dikemali, Bharati and occasional bushes of Lokhandi.

2A.1.33 Weeds of common occurrence are Tarota and Menduli. Grasses, common in the tract are Bhurbhusi and Chir grass. Climbers met with are Eroni, Ramdaton and Kukadranj. Regeneration of teak is scanty.

2A.1.34 According to the classification of the Forest Types of India by Champion and Seth, the forest of Permilli and Aheri tract fall under the sub group "5-A-Southern Tropical Dry Deciduous Forests"

It is further classified in to:-

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

2A.1.35 The variation in the composition, distribution and stocking of the Perimili and Aheri forests is not very significant, as practically identical climatic and topographical condition prevail in the tract dealt with. The edaphic and biotic factors are seen to exert considerable influence on these forests. The forest in the near vicinity of densely populated villages viz. Gurupalli, Udera, Bidri, Kondoli, Perimili etc. have been virtually reduced to scrub type and even grassy blanks. The types as distinguished above and their occurrence in relation to geological formation are described below.

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

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

2A.1.36 In Aheri Range, it occurs near villages Mosam and Chandra, underlying geological formation is of Archaean type gneiss and granites. The soil is coarse, stony, infertile, sandy and moderately deep, with less water holding capacity.

2A.1.37 Site Quality of the crop varies from IVa to III and at places it is II depending upon the depth and fertility of the soil. Natural regeneration of teak is poor and scanty.

2A.1.38 Regeneration of other species is generally satisfactory. Density of the crop varies from 0.4 to 0.6 (and at places upto 0.8). Crop is mainly middle aged with scattered, mature, suppressed or over mature trees.

2A.1.39 FLORISTIC COMPOSITION:-

- i) Teak (*Tectona grandis*), Dhawada (*Anogeissus latifolia*), Ain (*Terminalia tomentosa*), Bija (*Pterocarpus marsupium*),
- ii) Tendu (*Diospyros melanoxylon*), Salai (*Boswellia serrata*), Khair (*Acacia catechu*).
- iii) Bamboo (*Dendrocalamus strictus*),
- iii) Jilbil (*Woodfordia fruticosa*), Dikemali (*Gardenia resinifera*), Bharati (*Gymnosporia montana*).
- iva) Tarota (*Cassia tora*), Morrphalli/Murad sheng (*Helicteres isora*).
- ivb) Mushan (*Iseilma laxum*), Kusal (*Heteropogon contortus*).
- v) Palasbel (*Butea superba*), Eroni (*Zizyphus oenoplia*). Chilati (*Mimosa hamata*).

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

2A.1.40 This type occurs as under:

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

(a) Ain-Dhawada type: - This sub-type is chiefly noticed in the bulk of the area of Perimili Range and in Aheri range. This sub-type occurs over both the geological formations noticed in the area. General quality of the crop varies from IV a to III but in fertile locality like that of Karram, Pedigundam, Mirkal, Tadguda, Gattepalli etc. quality II crop is noticed at place. In places where the patches of shallow murumy soil occur, the crop deteriorates to IVb quality. Density varies from 0.4 to 0.6 in inferior quality areas while that in quality III areas it is 0.5 to 0.8. The crop is generally young to middle aged with scattered mature trees. These forests have dense bamboo under growth.

FLORISTIC COMPOSITION:-

- 2A.1.41**
- I) Ain (*Terminalia alata*), Dhawada (*Anogeissus latifolia*), Lendia (*Lagerstroemia parviflora*), Bija (*Pterocarpus marsupium*), Semal (*Bombax ceiba*), Mahua (*Madhuca longifolia*), Tendu (*Dispyros melanoxylon*), Moyen (*Lannea coromandelica*), Karram (*Mitragyna parviflora*) etc.
 - II) Achar (*Buchanania lanzan*), Palas (*Butea monosperma*), Aonla (*Phyllanthus emblica*), Salai (*Boswellia serrata*), Bhirra (*Chloroxylon swietenia*).
 - III) Jilbil (*Woodfordia fruticosa*), Dikamali (*Gardenia resinifera*). Bharati (*Gymnosporia montana*).
 - IV)
 - a) Tarota (*Cassia tora*), Marorphalli (*Helicteres isora*).
 - b) Mushan (*Iseilma laxum*), Kusal (*Heteropogon contortus*), Bhurbhusi (*Eragrostis tenella*).
 - c) Palasbel (*Butea superba*), Eroni (*Zizyphus oenoplia*), Chilati (*Mimosa hamata*).

a) Ain-Garari type :-

2A.1.42 This sub-type is generally seen over more clayey soils and with poor drainage and occurs in part of Tatigundam, Pandewahi, Burgi, Abanpalli, Udera, Gurupalli, Yermimar, Kusumaplli etc. Quality ranges from IVa to III. At places it is IVb also. Density varies from 0.4 to 0.6 in IVb areas and improves to 0.6 to 0.8 in quality IVa and III forests. The crop is young to middle aged with scattered mature trees. Garadi tends to become hollow with age.

2A.1.43 Main difference in Ain - Dhawada sub-type and Ain - Garari sub-type is that the later occurs on heavier soils with poor surface and sub-soil drainage and

occasionally in water logged areas. Dense under storey of Garari gives it a characteristically different appearance.

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FLORISTIC COMPOSITION:-

- 2A.1.44**
- I) Ain (*Terminalia tomentosa*), Tendu (*Diospyros melanoxylon*), Dhawada (*Anogeissus latifolia*), Mowai (*Lannea coromandelica*), Moha (*Madhuca longifolia*), Kalamb (*Mitragyna parviflora*) etc.
 - II) Garari (*Cleistanthus collinus*), Achar (*Buchanania lanzan*), Aonla (*Phyllanthus emblica*), Safed Phetra (*Gardenia turgida*), Lokhandi (*Ixora arborea*) etc.
 - III) Kuda (*Holarrhena pubescens*), Jilbil (*Woodfordia fruticosa*),
 - IV) a) Tarota (*Cassia tora*), Marorphalli (*Helicteres isora*).
b) Mushan (*Iseilma laxum*), Kusal (*Heteropogon contortus*), Bhurbhusi (*Eragrostis tenella*).
 - V) Palasbel (*Butea superba*), Eroni (*Zizyphus oenoplia*), Kukudranji (*Calycopteris floribunda*).

2A.1.45 Rohan-Bhirra-Khair type.

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

FLORISTIC COMPOSITION :-

- 2A.1.46**
- I) Rohan (*Symida febrifuga*), Bhirra (*Chloroxylon swietenia*), Khair (*Acacia catechu*).
 - II) Generally absent.
 - III) Bharati (*Gymnosporia montana*).
 - IVa) Tarota (*Cassia tora*)
 - IVb) Kusal (*Heteropogon contortus*), Bhurbhusi (*Eragrostis tenella*)
 - V) Palasbel (*Butea superba*)- sparse.

SECTION 2: INJURIES TO WHICH THE CROP IS LIABLE.

2A.2.1. ILLICIT FELLING :

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

2A.2.2 FIRE :

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

2A.2.3 ENCROACHMENTS :

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

TABLE - 6
RANGEWISE FOREST AREAS UNDER ENCROACHMENT
IN ALLAPALLI FOREST DIVISION

Sr.No.	Name of the range	No. of Cases	Area under encroachment in ha.			Total (Ha.)
			R.F.	P.F.	Unclassed	
1	2	3	4	5	6	7
1	Ghot	534	215.830	277.682	0	493.512
2	Markhanda	54	0	5.200	34.370	39.570
3	Chamorshi	278	149.041	0	136.670	285.711
4	Pedigundam	197	76.210	0	0	76.210
5	Allapalli	410	0	1217.810	0	1217.810
6	Perimili	455	75.520	615.687	0	691.207
7	Aheri	416	315.830	310.052	0	625.882
Total		2344	832.431	2426.431	171.040	3429.902

2A.2.4 The large scale encroachment is seen in Ghot, Perimili and Aheri ranges. The extent of land under encroachment is 3429.902 ha. in Allapalli Forest Division as confirmed by Dy.Conservator of Forests, Allapalli Forest Division, Allapalli vide letter No. कक्ष-4/सर्वे/2870 दिनांक 29-1-2003. 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 Assistant Conservator of Forest to summarily evict the

encroachments on the forest land. The proposal to regularize the encroachments on forest lands for the period 1972 to 1978 is pending with the Government of India. As per State Governments own policy and also as per Government of India's directives all encroachment after 1st April 1978 respectively to be removed. The Hon'ble Supreme Court in year 1995 further directed the State Government to reinvestigate the cases of encroachment by Adivasis, subject to prevailing Govt. order (Prabhu Judgment).

2A.2.5 Grazing by cattle:

This is another damaging element destroying young regeneration, plantations and soil texture by trampling. It is common near the villages. Unauthorized grazing is common. Number of cattle grazing on this forest are exceeding 1.30 lakhs. The over and illicit grazing has 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 large herds of cattle and these cattle are taken regularly to the forests for grazing. Traditionally tribal do not milk the cows, they can hardly afford to stall feed them. Grasses soon dry out by December and are lost in fire. This reduces the carrying capacity of the forests considerably. After the depletion of the grasses, grazing starts along with lopping for green foliage, especially of Ain (*Terminalia tomentosa*), Sissoo (*Dalbergia sissoo*), Apta (*Bauhinia recemosa*), Arjun (*Terminalia arjuna*) in the month of February when new foliage arrives. There is no practice of stall feeding. The lopping of trees like Ain, 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 loosens 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.

2A.2.6 Wild animals:

Chital damages the bark of young growth by rubbing their antlers. Chital, Sambhar and Nilgai browse seedling and coppice shoots. Bison is more destructive, as it 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. Porcupine usually feeds on outer bark of Haldu, Moha, Bhilawa and Amaltas, Aonla etc. near the base of the seedling/sapling/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 of the tree. 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. It also kill many Amaltas trees by digging of their roots for food in the hot season.

2A.2.7 Insects and fungi:

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

2A.2.8 Climbers and weeds:

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

2A.2.9 Parasites and epiphytes:

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

2A.2.10 Frost:

Frost does not occur here.

2A.2.11 Wind:

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The damage is significant. On an average 1/10th of the yield of timber and firewood is contributed annually from wind fallen trees. Isolated trees get uprooted while large scale uprooting occurs in some pockets. Teak is a shallow, rooted species and is unable to sustain wind pressure. The extent of damage to the forest due to wind is given in the **Appendix No.XII**.

2A.2.12 Drought:

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

SECTION 3 : SOIL EROSION.

2A.3.1 Due to indiscriminate felling of trees in the past and periodic fires, the soil slowly and continuously gets deprived of its protective influence over the vegetation. In rains, the rain water washes away the top soil which is rich in humus and other plant nutrients. Due to percolation of muddy water containing silt and soil, porosity of the soil is reduced resulting into rills and gullies. Gully erosion is noticed in several areas near villages at Mirkal, Sakingatta, Arenda, Perimili, Chaudampalli, Gattepalli, Kachler, Wedampalli, Kondoli, Udera, Karram etc. Gully erosion is common in hills. Erosion on banks of water courses is commonly seen. Sedimentary rocks get eroded easily. To tide over the soil erosion, planting of grass tussocks is essential in areas prone for soil erosion. The list of species of grass suitable for planting in soil erosion prone areas is given in **Appendix No.XIII**.

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CHAPTER II B FOREST FAUNA

A: MAMMALS

Sr.No	COMMON NAME	SCIENTIFIC NAME
1	Aswal/Bhalu/Riksha/ Bear	<u>Melursus ursinus</u>
2	Bandar/Monkey/Rhesus macaque	<u>Macaca mulatta</u>
3	Bagh/Sher/Tiger	<u>Panthera tigris</u>
4	Bhekar/Barking Deer	<u>Muntiacus muntjak</u>
5	Bibta/Panthe/Tendua	<u>Panthera pardus</u>
6	Bison/ Gaur	<u>Bos gaurus</u>
7	Chausingha	<u>Tetraceros quadricornis</u>
8	Cheetal/Deer/Hiran	<u>Axis axis</u>
9	Common Langur/ Hanuman Bandar	<u>Presbytis entellus</u>
10	Flying Squirrel	<u>Petaurista petaurista</u>
11	Fox/Lomadi/Lomas	<u>Vulpes bengalensis</u>
12	Hare/Shasha/Khargosh	<u>Lepus ruficaudatus</u>
13	Hyaena/Tadas/Lakadbaggha	<u>Hyaena hyaena</u>
14	Jackal/Kolha/Siyar	<u>Canis aureus</u>
15	Jungle Cat/Ran Majar	<u>Felis chaus</u>
16	Mongoose/Nevala	<u>Herpestes spp</u>
17	Nilgai/Blue Bull	<u>Boselaphus tragocamelus</u>
18	Otter	<u>Lutra perspicillata</u>
19	Pangolin/ Ant Eater/ Khawlya Manjar	<u>Manis crassicaudata</u>
20	Porcupine/Shahi	<u>Hystrix indica</u>
21	Sambhar	<u>Cervus unicolor</u>
22	Wild boar/Ran Dukar/Jungali Suar	<u>Sus scrofa</u>
23	Wild dog/Ran Kutra/Jungli Kutta	<u>Cuon alpinus</u>
24	Wolf/Landaga/Bhendia	<u>Canis lupus pallipes</u>

B : BIRDS

Sr.No.	COMMON NAME	SCIENTIFIC NAME
1	Painted Sandgrouse	<u>Pterocles indicus</u>
2	Common Sandgrouse	<u>Pterocles exustus</u>
3	Pea Fowl/Mayur/Mor	<u>Pavo cristatus</u>
4	Grey Jungle Fowl/Jungli Murga	<u>Gallus sonneratii</u>
5	Painted Partridge	<u>Francolinus pondicerianus</u>
6	Blackbreasted Quail	<u>Coturnix coromandelicus</u>
7	Red Spour Fowl	<u>Galloperdix spadicea</u>
8	Crane	<u>Grus antigone</u>
9	Spotted Bill Duck	<u>Anas poecillorhyncha</u>
10	Pigeon	<u>Treron phoenicoptera</u>

11	Dove	<u>Streptopelia spp</u>
12	Cotton Teal	<u>Nettapus coromandelienus</u>
13	Whistling Teal	<u>Dendrocygna javanica</u>
14	Woodpeckers	<u>Picidae spp</u>

C: REPTILES

Sr.No.	COMMON NAME	SCIENTIFIC NAME
1	Cobra	<u>Naza naza</u>
2	Typhleops Sp., Eryx Conicus	<u>Dutondyaon or Malvan</u>
3	Viper	<u>Vipera ruselli</u>
4	Dhaman/ Rat Snake	<u>Pityas mucosus</u>
5	Ghorpad	<u>Varanus griseus</u>
6	Common Lizards	<u>Varanus spp</u>
7	Typhleops sp., Eryx conicus	<u>(Dutondyaon or Malvan)</u>
8	(Sandboa),	<u>Eryx johny</u>
9	(Ajgar),	<u>Oligodon, Python</u>
10	Harantal	<u>Dryophis nasutus</u>
11	Dandekar or Manyar	<u>Bungarus caeruleus</u>
12	Dhul nagin	<u>Echis carinatus</u>
13	Leaf green snake	<u>Trimeresurus graminous</u>

D: ENDANGERE SPECIES

Sr.No.	COMMON NAME	SCIENTIFIC NAME
1	Bagh/Sher/Tiger	<u>Panthera tigris</u>
2	Panther	<u>Panthera pardus</u>
3	Hyena	<u>Hyaena hyaena</u>
4	wolf	<u>Canis lupus</u>
5	Bison/ Gaur	<u>Bos gaurus</u>
6	Chausingha	<u>Tetracerus quadricornis</u>
7	Dhanesh (Great Indian ornbill)	<u>Buceros bicornis</u>
8	Otter	<u>Lutra perspicillata</u>
9	Sloth Bear	<u>Melursus ursinus</u>
10	Mongoose	
11	Jackal	<u>Canis aureus</u>
12	Jungle Cat	<u>Feils chaus</u>
13	Porcupine	<u>Hystrix indica</u>
14	Hare	<u>^{1/4}Lepus reficaudatus^{1/2}</u>
15	Mongoose	<u>(Herpestes edwardsi)</u>
16	Shekaru	<u>(Ratufa indica) Indian Giant Squirrel</u>

SECTION 1: DESCRIPTION OF FAUNA:

2B.1.1 The tract with

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

(I) DISTRIBUTION OF WILDLIFE:

2B.1.2 The fauna was widely distributed in areas adjoining rivers. The wild animals commonly found in the past and rarely at present in this tract are as follows:

A – CARNIVORA:

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

B – HERBIVORA:

Bison (*Bos gaurus*), Sambhar (*Cervus unicolor*), Cheetal (*Axis axis*), Chausingha (*Tetracerus quadricornis*), Nilgai (*Boselaphus tragocamelus*), Wild Boar (*Sus cristatus*), Sloth Bear (*Melursus ursinus*), Barking Deer (*Muntiacus muntjak*), Langur (*Presbytis entellus*), Hares (*Lepus nigricollis*), Hare, *Lepus reficaudatus*½

C – RODENTS:

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

D- WILD BIRDS:

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

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

(II) CONCENTRATION OF WILD ANIMAL:

2B.1.3 Are known for the concentration of the wild animal in the past are as follows:

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

(III) SHOOTING AND GAMES:

2B.1.4 The wild animals were classified for the purpose of shooting in to three categories viz. i) Very big game, ii) Big game and iii) Small game. The details of which are as follows:

(A) VERY BIG GAME

Bison (*Bos gaurus*):

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

(B) BIG GAME

(i) Tiger (*Panthera tigris*):

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

(ii) Panthers (*Panthera pardus*):

Panther is less common in this tract. It is seen frequently only around the villages. Sometimes it used to enter into villages and do considerable damage to the live stock.

(iii) Sambhar (*Cervus unicolor*):

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

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

They were found all over the tract.

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

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

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

It is very common all over the area.

(vii) Wild Dog (*Cuon alpinus*):

It moves over in pack and does considerable damage to the wild animal. These packs are seen moving in the forests. However, the exact location cannot be given

(C) SMALL GAME:

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

(IV) BIRDS:

2B.1.5 Pea fowl (*Pavo cristatus*), Grey jungle fowl (*Gallus sonneratii*) are common. Ducks are commonly found in the rivers. Titar (*Francolinus pondicerianus*), Bater (*Coturnix coromandelicus*) are common in the tract. Saras crane (*Antigone antigen*) is also sighted around Regdi irrigation project.

(V) SNAKES:

2B.1.6 The ancient rulers were Gond Kings 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 : Typhleops sp., Eryx conicus (Dutondyaon or Malvan), Eryx johny (Sandboa), Lycodon, Oligodon, Python (Ajar), Ptyas mucosus (Dhaman), Natrix piscator, Natrix stoleta, Dryophis nasutus (Harantal or Yelhi or sarpatol)

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

2B.1.7 The tribal people (Madia) eat, lizards, red ants and many other animals which are non poisonous. In earlier days village patel used to do shikar and distribute the meat to the villagers. The results of animal census carried out in the year 2014 in Allapalli Forests Division, is given in the following table:

TABLE-7

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POPULATION ESTIMATION OF MAJOR WILD ANIMAL

Sr. No.	Species Local Name/ Scientific Name	Total Number	Sex Ratio				Remarks (Estimation method-Water hole/Block Count/ any other)
			Male	Female	Younger	Sex not Identified	
1	Tiger(<i>Panthera tigris</i>)	0	0	0	0	0	-----
2	PANTHER (<i>Panther pardus</i>)	0	0	0	0	0	-----
3	HYAENA (<i>Hyaena hyaena</i>)	0	0	0	0	0	-----
4	WOLF (<i>Canis lupus</i>)	0	0	0	0	0	-----
5	WILD BOAR (<i>Sus cristatus</i>)	347	56	98	48	145	WATER HOLE
6	SLOTH BEAR (<i>Melursus ursinus</i>)	1	0	1	0	0	WATER HOLE
7	CHITAL(<i>Axis axis</i>)	542	267	175	35	65	WATER HOLE
8	BARKING DEER(<i>Muntiacus muntjak</i>) Bhedki	26	12	8	2	4	WATER HOLE
9	NILGALI (<i>Boselaphus tragocamelus</i>)	246	78	68	45	55	WATER HOLE
10	CHOWSINGHA (<i>Tetracorus quadricornis</i>)	202	55	64	52	31	WATER HOLE
11	MONGOOSE(<i>Herpestes edwardsi</i>)	1	0	0	0	1	WATER HOLE
12	PEACOCK(<i>Pavo cristatus</i>)	3	2	1	0	0	WATER HOLE
13	SAMBER(<i>Cervus unicolor</i>)	31	10	15	5	1	WATER HOLE
14	GAUR(<i>Bos gaurus</i>)	0	0	0	0	0	WATER HOLE
15	WILD DOG (<i>Cuon alpinus</i>)	5	3	2	0	0	WATER HOLE
16	JACKAL(<i>Canis aureus</i>)	1	0	0	0	1	WATER HOLE
17	JUNGLE CAT(<i>Felis chaus</i>)	1	0	0	0	1	WATER HOLE
18	PORCUPINE(<i>Hystrix indica</i>)	2	0	0	0	2	WATER HOLE
19	HARE(<i>Lepus nigricollis</i>)	0	0	0	0	0	-----
20	MACAQUE(<i>Presbytis entellus</i>)	0	0	0	0	0	-----
21	FOX (<i>Vulpes bengalensis</i>)	14	6	8	0	0	WATER HOLE
22	KOBRA SNAKE(<i>Naja naja</i>)	2	0	0	0	2	WATER HOLE
23	SHEKARU(<i>Ratufa indica</i>) Indian Giant Squirrel	6	0	0	0	6	WATER HOLE
TOTAL		1430	489	440	187	314	

2B.1.8 The population estimate of major wild animals for which estimate can not be adequately represented in number is given in the following table:
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TABLE-8
POPULATION ESTIMATION OF MAJOR WILD ANIMALS
(Census figures April 8, 2011 & May 7, 2011)

Sr. No.	Species Local Name/ Scientific Name	Abundance (Abundant/Commonly/ Seen/Rate)	Distribution (Uniform / Localized)	Remarks
1	2	3	4	5
1	TIGER(<i>Panthera tigris</i>)	RARE	LOCALIZED	
2	PANTHER (Panther pardus)	RARE	LOCALIZED	
3	HYAENA (Hyaena hyaena)	RARE	LOCALIZED	
4	WOLF(<i>Canis lupus</i>)	ABUNDANT	LOCALIZED	
5	WILD BOAR(<i>Sus cristatus</i>)	SEEN	LOCALIZED	
6	SLOTH BEAR (<i>Melursus ursinus</i>)	ABUNDANCE	LOCALIZED	
7	CHITTAL(<i>Axis axis</i>)	COMMONLY SEEN	LOCALIZED	
8	BARKING DEER (<i>Muntiacus muntjak</i>)	COMMONLY SEEN	LOCALIZED	
9	NILGAI (<i>Boselaphus tragocamelus</i>)	COMMONLY SEEN	LOCALIZED	
10	CHOWSINGHA (<i>Tetracorus quadricornis</i>)	COMMONLY SEEN	LOCALIZED	
11	MONGOOSE(<i>Herpestes edwardsi</i>)	COMMONLY SEEN	LOCALIZED	
12	PEACOCK(<i>Pavo cristatus</i>)	COMMONLY SEEN	LOCALIZED	
13	SAMBER(<i>Cervus unicolour</i>)	COMMONLY SEEN	LOCALIZED	
14	GAUR(<i>Bos gaurus</i>)	RARE	LOCALIZED	
15	WILD DOG(<i>Cuon alpinus</i>)	SEEN	LOCALIZED	
16	JACKAL(<i>Canis aureus</i>)	SEEN	LOCALIZED	
17	JUNGLE CAT(<i>Felis chaus</i>)	SEEN	LOCALIZED	
18	PORCUPINE(<i>Hystrix indica</i>)	SEEN	LOCALIZED	
19	INDIAN GAIAT SQUIRREL (<i>Ratufa indica</i>) Shekaru	RARE	LOCALIZED	
20	HARE(<i>Lepus nigricollis</i>)	RARE	LOCALIZED	
21	MACAQUE(<i>Presbytis entellus</i>)	RARE	LOCALIZED	
22	FOX(<i>Vulpes bengalensis</i>)	COMMONLY SEEN	LOCALIZED	
23	BHEDAKI(<i>Muntiacus muntjak</i>) Barking deer	COMMONLY SEEN	LOCALIZED	
24	KOBRA SNAKE (<i>Naja naja</i>)	COMMONLY SEEN	LOCALIZED	

2B.1.9 The wildlife count shows the following number of wild animals present in the areas of Allapalli Forest Division. The perusal of the following table shows that there is a sharp decreases in the no. of the important wild animals during the period 2005 to 2014 and therefore the wildlife preservation, conservation and protection has to be dealt very seriously and the projects should be taken up to increase their number by providing them complete protection and a suitable habitat.

TABLE-9

WILD ANIMAL AND IT'S POPULATION.

Sr. No.	NAME OF WILD ANIMAL	NO OF ANIMAL			
		2005	2010	2011	2014
1	2	3	4	5	6
1	TIGER	0	0	0	0
2	PANTHER	0	3	0	0
3	HYAENA	0	0	0	0
4	WOLF	0	25	0	0
5	WILD BOAR	366	389	840	347
6	SLOTH BEAR	12	5	12	1
7	CHITTAL	345	315	468	542
8	BARKING DEER	103	13	51	26
9	NILGAI	54	74	97	250
10	CHOWSINGHA	3	0	9	202
11	MONGOOSE	18	0	1	1
12	PEACOCK	0	9	19	3
13	SAMBHAR	45	21	145	31
14	GAUR	9	0	0	0
15	WILD DOG	22	2	0	5
16	JACKAL	140	63	93	1
17	JUNGLE CAT	23	1	1	1
18	PORCUPINE	2	0	1	2
19	HARE	47	0	0	0
20	MACAQUE	24	0	0	0
21	FOX	8	0	240	14
22	BHEDAKI	0	61	71	41
23	KOBRA SNAKE	0	0	18	18
24	SHEKARU, Indian Giant Squirrel	0	0	6	6
TOTAL		1221	981	2072	1475

SHOOTING BLOCKS:

2B.1.10 Following shooting blocks were identified in which shooting was permitted on license:

TABLE – 10

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

SECTION 2: PAST MANAGEMENT OF WILDLIFE AND ITS RESULTS:

2B.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, indiscriminate killing of wild animal was controlled. The C.P Game Act, 1935 was promulgated with a view to conserve game and gave adequate power to Forest, Police and Revenue Officials to deal with offences. Licenses for 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. 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.

2B.2.2 Prior to the abolition of proprietary rights in 1951, there existed no rules for the regulation of hunting in these forests and the killing of animals for pleasure as well as for the sport was common. Subsequent to the abolition of proprietary rights in 1951, the then Madhya Pradesh Government framed rules for regulating shooting in the village forests in the year 1953.

2B.2.3 Subsequently when these forests were notified as Protected Forests under Section 29 of the Indian Forest Act, 1927, the management of wildlife came to be

regulated as per the rules framed under Section 32 (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.

2B.2.4 In October 1961, the Government of Maharashtra clarified that the Rules were framed under Bombay Wild Animals and Wild Birds Protection Act of 1951. That Act was superseded by the Wildlife (Protection) Act, 1972 which came into force from June 1, 1973 and Rules, 1975. Hunting of animals had been completely banned except for the shooting permission given to the cultivators during the harvesting season to shy away wild boars.

SECTION 3: LEGAL POSITION:

2B.3.1 The provisions in Berar Forest Law, 1886 was passed on October 22, 1886. No separate Act about the wildlife was in vogue at that time. However, under section 3, sub rule (7), the definition of the forest produce ,included “skins, tusks, bones and horns”. Under Section (8) of the said Act, “ any person who acts in contravention of the said Act in the State Forests was punishable with the fine which may go upto fifty rupees or when the damage resulting from his offence amounts to more than twenty five rupees, to double the amount of such damage “Under section 10, sub section (4) of the said Act,” the residency by orders may regulate any part of the State Forests for the hunting, shooting, fishing, poisoning water and setting trap or snares.”

2B.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 offences were punishable with the fine which may extend upto fifty rupees or when the damage resulting from the offence amounts to more than twenty five rupees, to double the amount of such damage. The section 10(4)(iii) empowered the resident to frame the rules regarding regulation of hunting, shooting, fishing, poisoning water and setting traps and snares.

2B.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(I) 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

2B.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.

2B.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 an Advisory Committee to advise in constitution and declaration of National Parks and Sanctuaries and formulation of administrative policy. The parliament then enacted the Wildlife (Protection) Act, 1971, which came into force in the State of Maharashtra with effect from June 1, 1973. From the commencement of this Act, every other Act relating to any matter, contained in this Act and in force in the State stood repealed. The subsequent rules made under the Act are as follows:

- i. The Wildlife (Stock Declaration) Rules, 1973 (became effective in Maharashtra with effect from June 1, 1973).
- ii. The Wildlife (Transactions and Taxidermy) Rules, 1973 (became effective in Maharashtra w.e.f. June 1, 1973).
- iii. Wildlife (Protection) Rules, 1975 (became effective from March 6, 1975).
- iv. The Wildlife (Protection) Licencing (Additional matters for consideration) Rules, 1983 (became effective w.e.f. April 14, 1983)
- v. The wildlife (Protection) Act, 1972 is a piece of comprehensive legislation which provides for effective protection and preservation of wildlife restriction on hunting and regulation of trade in wild animals articles made out of wild animals.

2B.3.6 Hunting of wild animals is strictly prohibited under this Act unless it is specially permitted. Wild animals have been categorised in five schedules and animals included in schedule-I and part II of schedule-II received the privilege of strict protection. Animals specified in these schedules are permitted to be hunted if they are

threat to or cause damage to life or property, and animals in schedule-II has become so disabled or diseased as beyond recovery.

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2B.3.7 Animals specified in schedule-II (Part-I), III & IV were prohibited from hunting, except under and in accordance with specific license issued under that Act or it had become dangerous to human life or property or had become diseased or disabled beyond recovery. Only vermin included in schedule-V, had been excluded from strict protection.

2B.3.8 Hunting of young and female of any wild animals other than vermin, or any deer with antlers in velvet is strictly prohibited unless specially permitted (Section-15). The Act specifically requires declaration to be furnished by the individuals as well as trophies etc in their control, custody or possession.

2B.3.9 The Government of India, vide letter dated September 18, 1975 stated that the control over tanks and rivers in National Parks and Sanctuaries should be vested with management authorities and not with the fisheries or irrigation department.

2B.3.10 Government of India, vide letter No. 1 E-11011/3/75/FRY-9-(WLF), has clarified that the certificate of legal procurement to be issued by the Chief Wildlife Warden is not necessary where an animal is not included in any schedule of the Wildlife (Protection) Act, 1972. The export will be regulated by the Ministry of Commerce.

2B.3.11 Subsequently, the delegation of power and duties of the Chief Wildlife Warden to the Police Sub-Inspector for the Purpose of section 41(1) and section 55 of the Wildlife (Protection) Act, 1972 was granted by Government Resolution No. WLP-1973/197578-FI dated April 5, 1976.

2B.3.12 The schedules are revised by the Government on and often 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.

2B.3.13 The wildlife Protection Act was again amended to be called as Wildlife (Protection) Amendment Act, 1986 and it came into force from November 25, 1986. Under Section-44 of the Wildlife Protection) Act, 1972, the Government vide letter No.WLP/1682/100208/CR-43 (1)/F-5 permitted the trapping of cobra and Russell vipers by a licensed dealer for the purpose of extracting venom. Under the power conferred under sub section (1) and sub section (2) of the section 64, the Government of India vide letter no. WLP/1682/10020(iii)/F-5 framed the new rules called Wildlife (Frog Leg Industry) Rules, 1987 and it came into force from November 25, 1987. The

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

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

2B.3.14 The following are the restrictions on hunting as per section 17 of Wildlife (P) Act, 1972. The following acts are prohibited, i.e.

- 1) Hunting any wild animal, from or by means of a wheeled or mechanically propelled vehicle on water or land or by aircraft.
- 2) Use of mechanically propelled vehicle for the purpose of driving or stampeding any wild animals.
- 3) Use of chemical, explosive, pitfalls, poisons, poisoned weapons, snares or traps, except in as far as these relate to the capture of wild animals under a Wild Animals Trapping License.
- 4) Hunting of special game or big game other than with a rifle, unless specially authorised by the license.
- 5) Setting fire to vegetation for the purpose of hunting.
- 6) Using artificial light for the purpose, of hunting except when specially authorized to do so under a license in the case of carnivore over a kill.
- 7) Hunting during night, except when specially authorized.
- 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 occupant 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.

2B.3.15 In 1991, the Government of India has passed the Wildlife (Protection) Amendment Act, 1991, which came into force with effect from October 2, 1991, except the Sections 35, 44, 55(c), Chapter III A and Chapter IVA. The salient features of this amended Act in brief are as follows.

- i The words “game reserves, big game and small game” have been omitted from the Act.
- ii Hunting the wild animals specified in Schedule I, II, III and IV of the Act has been banned, except as per the provisions of section 11.
- iii A new chapter III-A has been introduced for the protection of specified plants. The specified plants have been included in a new schedule.
- iv Section 29 of the Act has been amended and like National Parks no trees 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 there from.
- vii A new chapter, IVA has been introduced to provide for Central Zoo Authority and recognition of zoos.
- viii. Commercial felling and exploitation of wildlife (Flora and Fauna) has been banned in Wildlife Sanctuaries just as it is in National Parks.
- ix The penalties for wildlife offences have been enhanced substantially. Section 39 of the Act has been amended to the effect that have been used for committing an offence and have been seized shall become the property of the Government.
- x. Section 48 A has been introduced which provides for restriction on transportation of wildlife i.e. no person shall accept any wild animals (other than vermin) or any animal article, or any specified plant or part or derivative thereof, for transportation except after exercising due care to ascertain that permission from the Chief Wildlife Warden or any other officer authorized by the State Government in this behalf has been obtained for such transportation.
- xi. Trade in imported ivory and product carved from it has been banned with effect from 2nd April 1992. This 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 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: INJURIES TO WILDLIFE (FAUNA) LIBALE:

2B.4.1 The following agents are mainly responsible for the destruction of wildlife in Allapalli Forest Division.:

i. **POACHING/SHIKAR:** Poaching and shikar by tribals though not recorded but this is the most important reasons for destruction and depletion of the wild animal in this tract. 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 animal is only from local Madia and other tribals

ii. **DISEASES TO WHICH WILDLIFE (FAUNA) IS LIBALE :** Wildlife flora and fauna are susceptible to various diseases caused due to bacteria, viruses, micro organisms, fungi, protozoans and various other invertebrate and vertebrate parasites. The occurrence of diseases in wildlife has been an important factor in the disappearance of wildlife population of many important animal species from their natural habitat. Some of the important diseases commonly found in the wild animal are described below:

- a) **Tuberculosis:** It is a bacterial disease which is chronic, contagious and is not diagnosed at early stage but causes damage in its late stage in the animal when it is almost incurable.
- b) **Pasteurellosis:** It is another acute septicemic bacterial disease and usually affects cervids and bovids. The elephants and rhinos are also susceptible to this disease. The infection takes place through the respiratory tract.
- c) **Anthrax:** It is also an acute septicemic and contagious bacterial disease which causes death of the wild animals within few hours. The carcasses of animals should not be opened as the disease is equally harmful to the human beings. The most effective drug

used for the treatment of this disease is penicillin and vaccines are also recommended for treating this disease.

- d) **Foot and mouth disease:** It is one of the most important and rampant viral disease among the bovids and cervids including the domestic cattle. The disease involves the foot and mouth. Vesicles appear in the mouth and on the coronary band of the foot sores resulting in lameness of the animal, coupled with froth from the mouth. This disease may prolong up to two weeks and may cause death of the young animals due to cardiac failure.
- e) **Rinder pest:** It is another important viral disease which is spread in the wild animals from the domestic animals which graze in the forest. The preventive cure is the vaccination of the domestic animals living in or near the fringes of the forest. This disease is very harmful and may cause large scale mortality of the young and the adults.
- f) **Rabies:** It is viral disease causing loss to the animals as well as human beings. The infection takes place through the animals bite in the human beings or the animals. The animals which are rabies positive or small rodents, bats and mongoose. It is dangerous to live stock and human beings. Hydrophobia is the common symptoms of this disease. Prophylactic vaccination is recommended for the felids. The disease is mostly transmitted by the domestic dogs, wild dogs, jackal, hyaena, fox, panther, bear etc. The animal shows profound biting tendency and fails to recognize familiar objects.
- g) **Feline enteritis:** This occurs in the felids and characterized by loose motion with blood stain and mucous followed by high temperature. Vitamins and minerals should be supplied with the food for the captive animals and regular de-worming of the animals be done before the onset of monsoons.
- h) **Trypanosomiasis:** This is a protozoan disease commonly found in tigers, elephants and rhinos.
- i) **Coccidiosis:** This is a protozoan disease causing diarrhoea in the animals.

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

eggs only in the burnt logs and this is an important biological control for many important pests.

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

SECTION 5: MEASURES ADOPTED FOR PROTECTING WILDLIFE:

2B.5.1 Besides the legal provisions under the Wildlife (Protection) Act, 1972, amended from time to time and the various rules made there under, following measures have been taken to protect the wildlife.

- i. Compensation is paid to the owner whose cattle are killed by a tiger in the forest areas as per the provisions contained in Govt. Resolution No. WLP/1570/224482-X-II, dated September 30, 1971, No. MSC-1075/113554/F-1, dated March 25, 1977 and No. WLP/1579/6200/4/F-1, dated May 29, 1979. This provision was extended to the cattle killed by panther also and the killing by tiger or panther outside the forest areas also was included vide Govt. Resolution No. WLP/1581/116974/F-5, dated August 22, 1984. The Government in Revenue and Forest Department, Maharashtra vide Resolution No. WLP/1002/CR-258/F-1 dated January 17, 2003 have modified the amount of compensation to be paid to the cattle owners in the event of injury or death of the live stock subject to certain conditions laid down in the aforesaid G.R. dated January 17, 2003 and shall be applicable to all such cases which occur on or after 17 January, 2003.
- ii. Government of Maharashtra, Revenue and Forest Department Resolution No. WLP/1002/CR-258/F-1 dated January 17, 2003, the Government has decided that in the event of attack by Tiger, Panther, Bear, Bison, Wildboar, Wolf, Jackal, Hyaena, Wild dogs and on the death or permanently handicapped adult person supporting family shall be paid a compensation of Rs. 2,00,000/- and to the person below eighteen years of age, shall be paid Rs. 1,00,000/- In case of serious injury Rs. 50000/- and in case of minor injury the victim should be paid the expenses of his medical treatment if the victim gets treatments in private hospital, the limit of the expenses to be paid shall be limited to Rs 7500/- subject to the conditions laid down in detail in the above Government Resolution. This Govt., Resolution has come

into effect from 17/1/2003 and shall be applicable to all such cases which occur on or after January 17, 2003.

- iii. The Govt. of Maharashtra vide its Resolution No. WLP1002/CR-258/F-1 dated 20/5/2003, in supersession of its even no. Resolution dated 17/1/2003, has further directed that legal heir of the deceased irrespective of his/her age, shall be paid an amount of Rs. 2 lacs. as compensation in the event of death caused due to attack by the wild animal such as tiger, panther, bear, bison, wild dog, wolf, jackal and hyaena.
- iv. The Govt. of Maharashtra, in Revenue and Forest Department vide resolution no. WLP-2012/CR326 F-1/Mantralay Mumbai. Dated 09/07/2015 has revised the rate of compensation for crop damage by wild animal ranging from Rs.1000 to maximum Rs.25000. In addition to this, damage of horticulture crops the compensation is approved for coconuts @ Rs.4800/ tree, @ Rs 2800/betel nut tree, @3600/ mango tree, @ Rs.120/banana and @Rs500/ other fruit trees.

Govt. has approved compensation for damage of orange and mosambi fruit trees at the rate Rs. 2400/- per tree vide Govt. resolution no. WLP-2012/CR-326/F-1, Mumbai, dated 23/12/2015.

- v. Government of Maharashtra in Revenue and Forest Department vide resolution no. WLP/2012/CR 337/F-1, Mumbai dated 16/1/2015 has substantially increased the compensation due to attack by wild animal as follows.

- Death Rs.8.00 lakhs.
- Permanent disability Rs. 4.00 lakhs.
- Major injury Rs. 1.00 lakhs.
- Minor injury upto Rs. 0.15 lakhs.

Death, injury, disability caused by tiger, panther, sloth bear, bison, wild bear, wolf, hyena, jackal and wild dog will be compensated as above. However the compensation claim is decided on following conditions.

- If the claimant indulges in violation of Wild Life (Protection) Act, 1972.
- The report of attack should be within thirty six hours from the incidence of attack.
- Certificate by Government Medical officer regarding attack by wild animal.

- vi. 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.
- vii. The Chief Wild Life Warden, Maharashtra State, with the approval of the State Govt. accorded vide Govt. letter no. WLP.0613/CR-199/ F-1, dated 22.07.2013, has delegated his powers and duties under sub-section (2) of section 5 of the Wild Life (Protection) 1972, to Wild Life Wardens and honorary Wild Life Wardens.

2B.5.2 Besides, the above mentioned legal provisions for protection of wildlife, public awareness for protection and preservation of wildlife is created through the celebration of wildlife week from October 2, every year since 1951.

2B.5.3 The details of compensation given to the victim family for cattle lifting, injury or killing caused to human being is given in the **Appendix No.XXV**.

SECTION 6: RIGHTS AND CONCESSIONS:

2B.6.1 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 bona fide 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.

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UTILIZATION OF FOREST PRODUCE**SECTION 1 : AGRICULTURAL CUSTOMS AND WANTS OF THE POPULATION**

3.1.1 The forest of Allapalli Division is situated in Aheri tahsil, Etapalli tahsil, Chamorshi and, Mulchera tahsil of Gadchiroli District. The tract is sparsely populated. It is inhabited by Gond, Madia, Pardhan, Harijan, Navbuddhas, (New Budhists), Kunbi, Komti, Dhiwar, Madgi, Muslim, Chamar, Bengali etc. people who are settled in some of the villages.

3.1.2 Adiwasis like Madias and Gonds practice cultivation of primitive type. They still stick to their ancestral methods of cultivation. During non-agricultural season, they depend mainly on forestry operations. Their hardiness earns for them a considerable remuneration through forestry works. Their living condition in recent years is 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, canal irrigation. Regadi medium irrigation project irrigates the agricultural crops by canal irrigation. Paddy is the main crop and once it is harvested, the fields are left fallow for the remaining period of the year. Department of Agriculture has introduced some improved methods of cultivation, use of better quality seeds, manure etc. in this area. In some village like Yerminar, Chandra, Palley, use of solar cooker and Gobargas (Biogas) is in practice. Most of the people live in the thatched roof-huts built from stout posts of ain, garari or miscellaneous species and plastered with mud and cow dung. The taluka horticulture centres at Chamorshi for Chamorshi tahsil, at Kasansur for Etapalli tahsil produces grafted seedlings of improved and high yielding varieties of citrus, sapota, mango, mosambi and vegetables etc. for sale.

After formation of Gadchiroli District on 23/08/1982, all district offices of all the Government Departments and also some regional offices started at Gadchiroli. In addition to this Gondwana University, Agricultural College, other education institutes, SRPF and CRPF camp, all these institutes created job opportunities to local youths. Weekly and daily markets for vegetables, agricultural goods also flourished giving self employment opportunities to local farmers, unemployed youth, women and artisans. The infrastructure development in Gadchiroli district has transformed the rural and urban economy.

3.1.3 Population: The demographic status of the talukas covered under Allapalli Forest Division is presented in the following table-7 (2011 census). The total population of the Gadchiroli Districts is 10,72,942 spread over an area of 14,412 Sq. Km. and distributed in twelve talukas. The rural population is 9,54,909 spread over an area of 14336.76 Sq. Km. and the urban population is 1,18,033 spread over an area of 75.24 Sq. km. The scheduled caste population is 11.25 % and scheduled tribe population is 38.71 %. The no. of workers both main and marginal, are 5,84,237 which constitutes 54.45.% of the population, of which the cultivators (2,25,358) is 38.57% and agricultural labourers are 2,47,813 ,which is 42.42% ,and workers in the household industry are 11321 which is 1.94% and workers engaged in other works are 99745 (17.07%). The population of this district is benefited from infrastructure development in the district, i.e. formation of district level and regional level Government offices, education institutes, which provided self employment and job opportunities to local youth and small entrepreneurs.

TABLE - 11
POPULATION DETAILS OF GADCHIROLI DISTRICT.

Taluka	Area (Sq.km)	Population density (per sq km)	No .of villages		No. of Houses	Population		
			Inhabited	Deserted		M*	F**	Total
Etapalli	2267.30	36.04	45	0	15692	40959	40754	81713
Aheri	2282.70	51.25	78	1	26446	58916	58076	116992
Chamorshi	1314.18	136.30	161	0	43931	90759	88361	179120
Mulchera	735.81	62.23	67	0	10072	23438	22349	45787

M* - Male,

F** - Female

3.1.4 The Gadchiroli district is having an area of 14412 Sq.km and out of this 12057.679 Sq. km area covered under forest i.e. 83.66 % area of the district is covered under forest. The total number of villages is 1675 and out of this 166 are deserted villages. The land under cultivation is 2,03,000 ha. out of which 67,000 ha is irrigated land. The area under food grain cultivation is 1,67,000 ha. Major area of food grain cultivation is under rice cultivation.

3.1.5 The irrigation facilities in the district need to be improved by taking up wells, bore wells. According to 2002-2014 figures, irrigated land under cultivation was 67,000 ha i.e. 33.20 % of the land under cultivation is irrigated. The large irrigation tanks usually benefit distant areas. There are three major, 8 medium and 4 minor irrigation projects having command area 1,79,000 ha.

3.1.6 As per the 2011 live stock census, the live stock population of district is 1210000 out of this 54.50% are cows and bullocks, 9.9 % are buffaloes, sheep and goats 26.6 % and others 5.30 %. The population density of live stock is 66.20 per sq. km. Traditional cattle rearing, by setting cattle free in nearby forests, is still in practice.

However the demand of milk, fruits and vegetables, at urban areas like Gadchiroli, Wadsa, Aheri etc, is increasing with rise in urbanisation. The practice of stall feeding and rearing of high yielding milch cattle like Mura buffalo, Jersey cow etc, is on increase with increasing urbanisation of cities like Gadchiroli, Wadsa, Armori and Chamorshi. Sale of agricultural produce like vegetables, rice, arhar and milk has resulted in rise in agrarian economy.

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

3.1.8 Main requirements for which the people depend on the forests are as Under;

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

SECTION 2 : MARKET AND MARKETABLE PRODUCTS

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

3.2.2 In the Government Timber Depot at Ballarshah and Allapalli, the timber is graded into trade qualities on the basis of length, girth and quality. Timber of various trade of teak, ain, bija, haldu is also sold here in public auction. Auctions are held four times in a year. E-auction of timber at Ballarshah depot is just started. To meet out the requirement of small timber, poles auction is also held at Ghot depot for the local villagers.

SECTION 3: DEMAND AND SUPPLY OF FOREST PRODUCE

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

- i) **Teak** – Teak timber is in great demand in all sizes. It is basically required for making furniture and constructions of house.
- ii) **Semal** – Demand exists for timber over 121 cm. in girth.
- iii) **Ain, bija, haldu, shisham** – Demand exists for timber over 121 cm in girth and length above 2 mtr.
- iv) **Firewood** – There is considerable demand of firewood for charcoal manufacture. In earlier day's charcoal was manufactured in convenient localities near the coupe site but now a day's charcoal permission is not granted adjoining to coupes. Chalk timber is also in demand.
- v) **Tendu leaves** – There is a keen demand of Tendu leaves for bidi manufacture.
- vi) **Other Products** – Gum, honey, wax are collected for trade. Bark, roots from medicinal plants are extracted either for local consumption or for minor trade. Mahua flowers and fruits of tendu, khirni, and achar, eroni are collected for bonafide consumption or for sale.

3.3.2. The major forest produce for which the people adjoining the forests are dependent 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, Dhawada, Bhirra, Lendia, Haldu, Kalamb 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 Dhawada are used for making handle of the axe and Semal for dug out. The demand of Teak can

be assessed by the fact that even a piece of 15 cm. girth and of 0.3 metre length can be readily sold in the market. The same is true for other species as well. With the arrival of imported timber from the adjacent countries, the price of timber especially of non teak has stabilised.

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

TABLE-12

STATEMENT SHOWING DETAILS OF SALE OF TIMBER AND FUEL IN LAST 10 YEARS

Year	Forest Produce (Timber)	Quantity (In M ³) *	Amount Rs.	Forest Produce	Quantity In (Beats/ M ³)	Amount Rs.
2002-03	Teak/	3759.132	36867395	Fuel beat	1907.50	858375
	Non-teak	1535.781	7432330		2289.000	
2003-04	Teak/	1889.097	19920327	Fuel beat	1934.50	872525
	Non-teak	1173.480	5485830		2321.400	
2004-05	Teak/	2278.829	20328092	Fuel beat	3883.50	1941750
	Non-teak	1071.357	3106476		4660.200	
2005-06	Teak/	15994.156	141936575	Fuel beat	11227	729550
	Non-teak	3183.382	10945567		13472.400	
2006-07	Teak/	27906.195	560867600	Fuel beat	7572.50	6436625
	Non-teak	3639.730	20076075		9087.000	
2007-08	Teak/	20717.457	449185137	Fuel beat	14670.25	11736200
	Non-teak	4311.948	25997055		17604.300	
2008-09	Teak/	26573.150	502758741	Fuel beat	12713.75	11442375
	Nonteak	5578.799	35315821		15256.200	
2009-10	Teak/	22213.709	640059393	Fuel beat	8292.75	8292750
	Nonteak	6717.471	49886947		9951.300	
2010-11	Teak/	28079.426	771139370	Fuel beat	17535.00	19288500
	Non-teak	9375.585	93146765		21042.000	
2011-12	Teak/	23544.000	781071842	Fuel beat	13341.25	17917299
	Non-teak	7591.000	66795819		16009.500	
2012-13	Teak/	9048.034	234305178	Fuel beat	7943.30	19063920
	Non-teak	2239.844	22471447		9531.960	
2013-14	Teak/	20950.412	1198270447	Fuel beat	11774.400	167559744
	Non-teak	8076.599	95523300		22504.500	
2014-15	Teak/	10899.860	409433210	Fuel beat	3326.400	29769352
	Non-teak	5911.128	52180828		12681.600	

* includes teak poles in addition to timber.

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

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

TABLE-13
BAMBOO EXTRACTED & REVENUE REALISED.

Year	Forest Produce	Quantity in No.	Amount Rs.
2002-03	Bamboo	355874	4101045
	Bundles	27655	442480
2003-04	Bamboo	728391	8214189
	Bundles	75565	1209040
2004-05	Bamboo	655495	6360217
	Bundles	60055	7206660
2005-06	Bamboo	1049747	13143923
	Bundles	85456	1196384
2006-07	Bamboo	698639	10924334
	Bundles	64451	1353471
2007-08	Bamboo	819195	13934416
	Bundles	65453	1996316
2008-09	Bamboo	768253	11849292
	Bundles	54334	1738688
2009-10	Bamboo	912205	14149541
	Bundles	52113	1928181
2010-11	Bamboo	739409	13759863
	Bundles	58941	1296702
2011-12	Bamboo	788766	27606810
	Bundles	51032	2960000
2012-13	Bamboo	380500	10335508
	Bundles	15635	844290
2013-14	Bamboo	28451	492508
	Bundles	15300	918000
2014-15	Bamboo	29464	736600
	Bundles	15300	963900

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

(2) Tendu Leaves:- There is a large demand for tendu leaves from bidi manufacturers. The figure for sale of tendu units, revenue and expenditure during the last ten years is given in the following table. Most of the tendu units are purchased from bidders from adjoining states.

TABLE-14
TENDU LEAVES – PRODUCTION AND REVENUE REALISED.

Sr. No.	Year	Target (Std bags)	Production (Std.bags)	Revenue (Rs.)
1	2	3	4	5
1	2003-04	80600	46646.601	10837769
2	2004-05	78100	33936.751	5414117
3	2005-06	78200	24865.192	3789388
4	2006-07	79400	43779.909	7321908
5	2007-08	79400	82234.552	86226556
6	2008-09	79400	76418.388	29097502
7	2009-10	79400	78637.356	57210887
8	2010-11	80100	76477.984	89442067
9	2011-12	80750	80024.138	109870585
10	2012-13	81300	77247.472	149900208
11	2013-14	80250	66911.801	57145930
12	2014-15	80250	29115.701	31110090
13	2015-16 PESA	39560	39308.733	32171434
14	2015-16 NON PESA	12330	12310.215	7985372

3) Moha flower and seeds: There are plenty of Moha trees in the Allapalli Forest Division. The moha flowers are used for making wine and if dried flowers are 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-15

MOHA FLOWERS & FRUITS PRODUCTION & REVENUE REALISED.

Year	Forest produce	Quantity (in Qtl).	Amount (in Rs.)	Forest produce	Quantity (in Qtl)	Amount (In Rs.)
2002-03	Moha flowers	3	15	Moha Seed	0	0
2003-04	-do-	9.68	4840	-do-	0	0
2004-05	-do-	24.58	12290	-do-	0.46	220
2005-06	-do-	4.4167	2208.35	-do-	0	0
2006-07	-do-	4.106	2053	-do-	0.5489	274.45
2007-08	-do-	75.0855	37542.75	-do-	0.7575	378.75
2008-09	-do-	55.9384	27970	-do-	0.1065	53
2009-10	-do-	25.7802	12890	-do-	0	0
2010-11	-do-	29.3562	14678.1	-do-	0	0
2011-12	-do-	0	0	-do-	0	0
2012-13	-do-	1950.14	2933065	-do-	0	0
2013-14	-do-	899.77	777453	-do-	369.52	554284.5
2014-15	-do-	2103.55	3530245	-do-	376.71	602736

4) Gum: The division as a whole is a unit where it is sold by public auction. The gum of various species is now a days is used for various purposes- kulu (*Sterculia urens*) is of commercial importance while Dhawada (*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 –16.

TABLE-16

GUM - PRODUCTION & REVENUE REALISED

Year	Quantity (Qtl.)	Amount Rs.
2002-03	0.44	220
2003-04	0.2	100
2004-05	0.1	50
2005-06	0.133	66.5
2006-07	0.2203	110.15
2007-08	0.793	39.65
2008-09	0.099	5
2009-10	0.0051	3
2010-11	0.51	255
2011-12	----	-----
2012-13	1.34	----
2013-14	5.83	32065

(5) Other forest produce: Charoli, honey, wax, and edible fruits, roots, bark, leaves of mahua, fencing material, etc. are the other produces derived and obtained from forest. Some of the forest produce which are purchased by the Tribal Development Corporation and their production year wise is given in the following table.

TABLE-17
MINOR FOREST PRODUCE-PRODUCTION (IN QUINTALS) AND ROYALTY
OBTAINED (IN RS)

Sr. No.	M.F.P.	Year											
		2003-04		2004-05		2005-06		2006-07		2007-08		2008-09	
		Qty.	Royalty	Qty.	Royalty	Qty.	Royalty	Qty.	Royalty	Qty.	Royalty	Qty.	Royalty
1	Gum	0.2	100	1	50	0.133	66.5	0.2203	110.15	0.793	39.65	0.099	5
2	Moha flower	9.68	4840	24.58	12290	4.4167	2208.35	4.106	2053	75.0855	37542.75	55.9384	27970
3	Moha Seeds	0	0	0.46	220	0	0	0.5489	274.45	0.7575	378.75	0.1065	53
4	Hirda	0.0077	4	0.17	85	0.0035	3	0.8382	419.1	0	0	0	0
5	Aonla	0	0	0.5	250	0.0155	8	0	0	1.0505	525.25	0.0185	9
6	Behada	0	0	0.0018	1	0	0	0	0	0	0	0	0
7	Chinch	0	0	0	0	0	0	0	0	0	0	0	0
8	Chinch seeds	0	0	0	0	0	0	0	0	0	0	0	0

Table Continued.....

Sr. No.	M.F.P.	Year											
		2009-10		2010-11		2011-12		2012-13		2013-14		2014-15	
		Qty.	Royalty	Qty.	Royalty	Qty.	Royalty	Qty.	Royalty	Qty.	Royalty	Qty.	Royalty
1	Gum	0.0051	3	0.51	255	0	0	0	0	0	0	6.23	86923
2	Moha flower	25.7802	12890	29.3562	14678.1	0	0	1950.14	2933065	483.12	865023	2103.55	3530245
3	Moha Seeds	0	0	0	0	0	0	0	0	352.69	444284.5	376.71	602736
4	Hirda	0	0	0	0	0	0	2.73	5460	0	0	0.20	400
5	Aonla	0	0	0	0	0	0	0.25	625	0	0	0	0
6	Behada	0	0	0	0	0	0	25.73	38595	8.81	134155	42.07	2694
7	Chinch	0	0	0	0	0	0	0	0	0	0	0	0
8	Chinch seeds	0	0	0	0	0	0	0	0	0	0	0	0

SECTION 4 : METHODS OF HARVESTING AND THEIR COSTS

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

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

Village Panchayat

Public bodies including dairy societies

Forest labourer's co-operative societies

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

3.4.3 METHODS OF FELLING AND EXTRACTION:

- (I) Usually marking is completed upto the end of previous year i.e. one year in advance and the felling starts after end of rainy season. Timber and poles are felled first. Cutting of trees and conversion into timber and poles is done by saw. Firewood is prepared with saw and axe. Dragging or carting of timber, poles and firewood upto jungle depot is done by bullock carts and tractors. Transport of the timber and pole from jungle depots to sale depots is done by Govt. haulage.
- (II) Firewood is cut into billets and stacked in the coupe itself in the form of beats of size 2.0 mtr. x 1.20mtr. x 1.0 mtr. It is stacked in the sale depot in appropriate lines of 1 mtr. height and is recorded in terms of number of beats. Thick and sound, straight billets over 60 cm. mid girth 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 receiving the approval for the Felling Proposal for the year by Govt. of India, in Ministry of Environment and Forests, estimates of exploitation and transport is approved by the Deputy Conservator of Forests and 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 impressed at the butt end of the logs. Poles are classified into girth classes and their average volume is taken. The measurements of logs taken in coupe e.g. serial no. of log, length of log, mid girth are recorded in a register known as jungle/coupe register.

- (V) After receipt of the logs in the sale depot, the logs are given serial number of the depot, mid girth & length of the log is measured again and recorded in depot register. The difference between the measurements at the jungle and the sale depot are reconciled.
- (VI) All the logging operations are done by engaging local labourers in the departmental working and by the member of the FLCS in case of coupes worked by FLCS. Most of the items of work are done by job rates.

3.4.4 MAINTENANCE OF REGISTERS IN DEPOTS:

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

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

- (a) **Daily receipt register:** - It contains details of daily receipt. It has the entries as stated in the carting challan.
- (b) **Depot measurement register:** - This contains the entry of the measurement of logs done in the depot.
- (c) **Lot register:** - The lot register contains details about the lots. The logs with same specification like grade, length class, girth class, species etc. are put in the same lot.
- (d) **Sale register:** - This register contains details about the sale at the depot. It will contain the details like the name of purchaser, price fetched in auction, earnest money deposited, and the balance to be paid.
- (e) **Dispatch register:** - It has the daily entry of the material being sold in auction and dispatched outside the depot with valid transit pass.

(f) **Daily balance register:** - This register records the daily balance of the material in the depot.

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(g) **The register for departmental supply:** - The register contains the following details.

- Supply to Government agency.
- Supply to co-operative society.
- Supply to Government saw mills.
- Supply to Forest based industries.

3.4.6 The unified sale condition: - The sales 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 deposited 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) $\frac{1}{4}^{\text{th}}$ 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 of the sale result. 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 $\frac{3}{4}^{\text{th}}$ of the sale price along with the proportionate amount of the Forest Development Tax plus the entire amount of VAT 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 $\frac{1}{4}^{\text{th}}$ within the stipulated period extended, the above differentiation goes away and he is required to pay all dues in one installment.

If the successful bidder fails to make the payment, as given in above schedule, Deputy Conservator of Forests may cancel such sale. The amount deposited by the successful bidder either as earnest money deposited or $\frac{1}{4}^{\text{th}}$ or F.D.T. shall be forfeited to the government. The material will then be put to resale at the risk and cost of the initial bidder.

3.4.7 Grading Rules: - The material brought to the depot is graded. There are three plywood qualities, P1, P2 and P3 and six trade quality grades viz. 1, 2,3,4,5 & 6.

They are distinguished from each other on basis of 12 criteria, namely length, girth, knots, bends, etc. These grading rules are different than the standard fixed by Indian Standard Institution.

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

3.4.9 UNIFIED DEPOT SALE CONDITIONS:

(a) The successful bidder who intends to manufacture charcoal from the fuel wood beats purchased will be allowed to make payment in the following way.

- (i) $\frac{1}{2}$ of the sale price along with the proportionate amount of Forest Development Tax within 7 days from the date of auction/date of communication of acceptance by the Competent Authority as the case may be provided, however that if the successful bidder makes payment of the said $\frac{1}{2}$ sale price along with the proportionate amount of Forest Development Tax at any time there after but before the expiry of further 23 days, then he shall have to pay interest thereon at the rate of 18% per annum. For the extended period after 7 days but before the expiry of further 23 days on the amount that is required to be paid.
- (ii) After payment of the above $\frac{1}{2}$ sale price along with the proportionate Forest Development Tax, the successful bidder will be allowed to manufacture charcoal from the fuel wood beats purchased by him but he will not be allowed to remove the charcoal from the prescribed depot until full payment along with the tax etc., is made by him.
- (iii) Out of the balance $\frac{1}{2}$ of the sale price he shall pay $\frac{1}{4}^{\text{th}}$ sale price along with the proportionate amount of Forest Development Tax within 60 days from the date of auction/date of communication of acceptance by the competent Authority as the case may be.
- (iv) Balance $\frac{1}{4}^{\text{th}}$ of the sale price along with the proportionate amount of the Forest Development Tax and all other taxes and duties is leviable thereon within 120 days from the date of auction /date of communication of acceptance by the Competent Authority as the case may be.
- (v) The successful bidder will not be allowed to burn charcoal kilns in the Forests and that the kiln sites should be away from forest land so as NOT to cause any damage to forests and forest land.

- (vi) The successful bidder will be required to obtain certificate from the local territorial Range Forest Officer in whose jurisdiction charcoal kiln/s is/are situated regarding the bona fides of the fuel wood intended to be converted into charcoal in a kiln before the kiln is made.

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

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

3.4.10 The original bidder shall be liable to pay Government in the event of resale of the amount of the loss, if any, sustained by the Government as a result of such resale but he shall not be entitled to any profit rising as a result thereof. The original bidder shall forthwith on demand by the Divisional Forest Officer/Sub-Divisional Forest officer of the Independent Sub-Division pay to the Government the amount of such loss. The amount of such loss shall be deemed to be the arrears of land revenue and

without prejudice to any other rights, remedies and powers of the Government, the Government shall be entitled to recover the same from the successful bidder as arrears.

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

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

- i. No objection certificate of the Forest Department be obtained for the manufacture of the charcoal.
- ii. Charcoal manufacture should be done at a distance of 10 km and more from the Protected and Reserved Forests.
- iii. Charcoal should not be transported during the rainy season.
- iv. Non-agriculture permission shall be given for a year only.
- v. License be obtained for manufacture of charcoal similar to the license necessary for Saw Mills from the forest department.
- vi. The owners will have to plant, double the no. of trees felled for manufacture of charcoal.
- vii. The charcoal manufacture shall be done at a distance of 25 km. from the sensitive and most sensitive areas with respect to environment.

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

3.4.14 DISPOSAL OF ADIWASI MALKI CASES

The disposal of adiwasi malki cases is done as per provisions contained in Maharashtra Act No. XXIII of 1969 as modified from time to time which provides for Maharashtra Sale of Trees by Occupants Belonging to Schedule Tribes (Regulation) Act, 1969. The following table illustrates the details of Adiwasi Malki Cases disposed off by the Allapalli Forest Division during the year 2002-03 to 2013-14

TABLE-18

सन 1998-99 ते 2002-03 या वर्षात निकाली काढलेल्या आदिवासी मालकी प्रकरणाची माहिती

अ.क्र.	वर्ष	निकाली काढलेल्या आदिवासी मालकी प्रकरणांची संख्या	प्रकरणात प्राप्त झालेले उत्पादन						माल विक्री झालेनंतर प्राप्त रक्कम (रुपये)	त्यावर झालेला खर्च (रुपये)	आदिवासी खसराधारकास दिलेली रक्कम (रुपये)
			साग इमारती		साग बिट (थप्पी)	इतर प्रजाती इमारती		जळावु बिट (थप्पी)			
			नग	घ.मी.		नग	घ.मी.				
1	2	3	4	5	6	7	8	9	10	11	12
1	2002-03	0	0	0	0	0	0	0	0	0	0
2	2003-04	0	0	0	0	0	0	0	0	0	0
3	2004-05	0	0	0	0	0	0	0	0	0	0
4	2005-06	0	0	0	0	0	0	0	0	0	0
5	2006-07	1	698	55.383	56.00	12	1.075	0.75	1360900	137425	1223475
6	2007-08	0	0	0	0	0	0	0	0	0	0
7	2008-09	0	0	0	0	0	0	0	0	0	0
8	2009-10	1	99	2.676	23.00	0	0	0	64000	26398	30797
9	2010-11	1	3716	240.306	221.00	0	0	0	7270453	632686	6454967
10	2011-12	0	0	0	0	0	0	0	0	0	0
11	2012-13	0	0	0	0	0	0	0	0	0	0
12	2013-14	0	0	0	0	0	0	0	0	0	0
13	2014-15	0	0	0	0	0	0	0	0	0	0

3.4.15 Tendu leaf trade has been nationalized since 1969. Now the leaves are generally collected departmentally and auctioned. 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 transport tendu leaves from the notified Tendu units.

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

3.4.17 COST OF HARVESTING:

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

TABLE-19

सन 2002-03 ते 2012-13 या वर्षात साग व सागेत्तर प्रजातीचे
झालेले प्रत्यक्ष उत्पादन झालेला खर्च व प्राप्त महसुलाची माहिती

अ. क.	वर्ष	विवरण	प्रजाती	प्रत्यक्ष उत्पादन (रुपये)	झालेला खर्च (रुपये)	प्राप्त महसुल (रुपये)
1	2	3	4	5	6	7
1	2002.03	विभागीय रित्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित	साग प्रजाती इमारती (घ.मी.)	2118.493	1796314	63266362
			इतर प्रजाती इमारती (घ.मी.)	1440.210		
			साग बिट (थप्पी)	1122		
		थिनिंग कुपातील उत्पादन	फाटे (नग)	27259	436729	774741
		विभागीयरित्या हवेने पडलेल्या व अवैद्य तोडीपासून उत्पादित	जळावु बिट (थप्पी)	1907.50		
		निस्तार बांबु पातन श्रेणी मधील उत्पादन.	लांब बांबु (नग)	355875	1539699	2203537
			बांबू बंडल्स(नग)	27665		
		एकुण :-	-		3772742	66244640
2	2003.04	विभागीय रित्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित	साग प्रजाती इमारती (घ.मी.)	1175.438	619985	35518053
			इतर प्रजाती इमारती (घ.मी.)	1052.387	555082	
			साग बिट (थप्पी)	546.50	159474	
		थिनिंग कुपातील उत्पादन	फाटे (नग)	9692		743172
		विभागीयरित्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादि	जळावु बिट (थप्पी)	1934.50	564506	
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	728391	3856866	3504283
			बांबू बंडल्स(नग)	75565	711728	
		एकुण :-	-		6467641	39765508

3	2004.05	हवेने पडलेला व अवैद्य तोडी पासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	1354.484	744459	25484199
			इतर प्रजाती इमारती (घ.मी.)	963.762	529709	
			साग बिट (थप्पी)	573.75	174465	
		थिनिंग कुपातील उत्पादन	फाटे (नग)	22896		827747
		विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	जळवु बिट (थप्पी)	3883.50	1180890	
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	655495	3616808	
			बांबू बंडल्स(नग)	60055	600141	6615014
		एकुण :-	—		6846472	32926960
4	2005.06	विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	8102.817	4561456	109641961
			इतर प्रजाती इमारती (घ.मी.)	2957.842	1665091	
			साग बिट (थप्पी)	5911.00	1840972	
		थिनिंग कुपातील उत्पादन	फाटे (नग)	59231		3493460
		विभागीयरीत्या हवेने पडलेला व अवैद्य	जळवु बिट (थप्पी)	11227.00	3496633	
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	1049747	5932543	
			बांबू बंडल्स(नग)	85456	659682	8264422
		एकुण :-	—		18156377	121399843
5	2006.07	विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	17995.020	10946370	366464960
			इतर प्रजाती इमारती (घ.मी.)	3585.341	2180962	
			साग बिट (थप्पी)	8220.50	2766527	
		थिनिंग कुपातील उत्पादन	फाटे (नग)	6672		6754260
		विभागीयरीत्या हवेने पडलेला व अवैद्य	जळवु बिट (थप्पी)	7572.50	2548449	
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	698639	4266379	
			बांबू बंडल्स(नग)	64451	712828	16704760
		एकुण :-	—		23421515	389923980
6	2007.08	विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	12936.075	8329202	531216567
			इतर प्रजाती इमारती (घ.मी.)	4112.405	2647870	
			साग बिट (थप्पी)	5980.50	2130380	
		थिनिंग कुपातील उत्पादन	फाटे (नग)	47819		4363958
		विभागीयरीत्या हवेने पडलेला व अवैद्य	जळवु बिट (थप्पी)	14670.25	5225854	
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	819195	5295134	
			बांबू बंडल्स(नग)	65453	766245	14247776
		एकुण :-	—		24394685	549828301
7	2008.09	विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	17886.511		640653854
				12389843		
			इतर प्रजाती इमारती (घ.मी.)	5353.034	3708004	
		साग बिट (थप्पी)		7062.50	2706559	8725503
		थिनिंग कुपातील उत्पादन	फाटे (नग)	18850		
		विभागीयरीत्या हवेने पडलेला व अवैद्य	जळवु बिट (थप्पी)	12713.75	4872285	
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	768253	5342361	9562834
			बांबू बंडल्स(नग)	54334	684304	
		एकुण :-	—		29703356	658942191

8	2009.10	विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	14853.841	12716000	762831251
			इतर प्रजाती इमारती (घ.मी.)	6222.968		
			साग बिट (थप्पी)	5355.75		
		थिनिंग कुपातील उत्पादन	फाटे (नग)	41417	2871000	
		विभागीयरीत्या हवेने पडलेला व अवैद्य	जळायु बिट (थप्पी)	8292.75		9522599
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	912205	7969000	10300354
			बांबू बंडल्स(नग)	52113		
		एकुण :-	-		23556000	782654204
9	2010.11	विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	17421.037	50972000	850278727
			इतर प्रजाती इमारती (घ.मी.)	9003.884		
			साग बिट (थप्पी)	8159.00		
		थिनिंग कुपातील उत्पादन	फाटे (नग)	47976		
		विभागीयरीत्या हवेने पडलेला व अवैद्य	जळायु बिट (थप्पी)	17535.00		7764174
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	739429	9626000	10940180
			बांबू बंडल्स(नग)	58941		
		एकुण :-	-		60598000	868983081
10	2011.12	विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	14333.000	57565000	868893495
			इतर प्रजाती इमारती (घ.मी.)	680.900		
			साग बिट (थप्पी)	6195.00		
		थिनिंग कुपातील उत्पादन	फाटे (नग)	2558		
		विभागीयरीत्या हवेने पडलेला व अवैद्य	जळायु बिट (थप्पी)	13341.25		11142581
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	788766	10227000	14017715
			बांबू बंडल्स(नग)	51032		
		एकुण :-	-		67792000	894053791
11	2012.13	विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	3486.113	14697000	735869804
			इतर प्रजाती इमारती (घ.मी.)	1646.789		
			साग बिट (थप्पी)	3746.15		
		थिनिंग कुपातील उत्पादन	फाटे (नग)	80153		
		विभागीयरीत्या हवेने पडलेला व अवैद्य	जळायु बिट (थप्पी)	7943.30		15171882
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	380500	6689000	18433522
			बांबू बंडल्स(नग)	15635		
		एकुण :-	-		21386000	769475208
12	2013.14	विभागीयरीत्या हवेने पडलेला व अवैद्य तोडीपासून उत्पादित.	साग प्रजाती इमारती (घ.मी.)	19118.094	36989000	620022074
			इतर प्रजाती इमारती (घ.मी.)	6745.022		
			साग बिट (थप्पी)	11774.50		
		थिनिंग कुपातील उत्पादन	फाटे (नग)	241454		
		विभागीयरीत्या हवेने पडलेला व अवैद्य	जळायु बिट (थप्पी)	22504.50		13339415
		निस्तार बांबु पातन श्रेणी मधील उत्पादन	लांब बांबु (नग)	28451	4051000	12151134
			बांबू बंडल्स(नग)	15300		
		एकुण :-	-		41040000	645512623

13	2014.15	विभागीयरीत्या हवेने पडलेला	साग प्रजाती इमारती (घ.मी.)	10899.860	56735000	943540367
		ब अवेद्य मधील उत्पादन	इतर प्रजाती इमारती (घ.मी.)	5911.128		
			साग बिट (थप्पी)	2772.000		
		थिनिंग कुपातील उत्पादन	फाटे (नग)	20764.228		
		विभागीयरीत्या हवेने पडलेला व अवेद्य	जळावु बिट (थप्पी)	10568.000	737000	16100689
		निस्तार बांबु पातन श्रेणी	लांब बांबु (नग)	29464		
		मधील उत्पादन	बांबू बंडल्स(नग)	15300		
		एकुण :-	—		57472000	959641056

3.4.18 Cost of exploitation varies according to season or time of working. During agricultural season the labour supply is poor. Rates of daily wages/works are sanctioned by Govt. of Maharashtra while items for which no rates have been sanctioned by Govt. of Maharashtra, the rates are decided by the committee on wage board presided over annually by the Chief Conservator of Forests, Gadchiroli Circle, Gadchiroli and the details of Wage Board Rates fixed by the Committee are furnished in **Appendix No. XIV**. There are separate estimates for different models of plantation, nursery models duly sanctioned by Govt. of Maharashtra under Mahatma Gandhi National Rural Employment Guarantee Scheme of Govt. of India. The rate structure for the plantation activity under CAMPA, 13th Finance Commission are sanctioned by office of Principal Chief Conservator of Forests (HoFF,), M.S.Nagpur. The model estimates for different plantation models and nursery are sanctioned by Govt. of Maharashtra in Revenue and Forest Department for the plantations and nursery works to be carried out under District Plan Scheme under DPDC including Tribal and Non-Tribal sector.

SECTION 5 : LINES OF EXPORT

3.5.1 Timber extracted, at present is dragged to jungle depot, conveniently located along road side and then directly transported to Allapalli or Ballarshah. At Allapalli, mill class timber is converted in a saw mill of the Forest Department while jungle class timber is sold in open auction. The Government saw mill at Allapalli was established to supply railway sleepers. In the present context the demand for railway sleepers is not up to the mark as cement concrete sleepers are preferred. Also the supply of large size timbers required for sleepers is not sustainable hence the utility and continuance of Government saw mill is to be analysed and assessed. Mode of transport is by truck. Transport of timber and other forest produce of the department is carried out by the Government trucks of Transport and Marketing Division at Ballarshah. Some of the important roads and cart tracks in these forests and outside forest for transport of forest produce are noted below:-

TABLE –20

Sr.No.	Name of the road or cart track	Length In km.	Remarks
1	Aheri- Allapalli PWD road	6.410	All Weather tar
2	Allapalli-Ghot PWD road	70.00	-do-
3	Allapalli- Bhamragarh road	27.470	-do-
4	Allapalli- Chandrapur road	115.00	-do-
5	Elchil-Etapalli road (from Guddinaka to Dumme nala)	9.600	-do-
6	Allapalli-Sironcha road	90.00	-do-
7	Etapalli-Burgi-Kandoli Bidri cart track	22.720	Fair Weather Murum
8	Udera-Yemali-Koreli Cart track	22.180	-do-
9	Kandoli-Chandraa-Yarminar Cart track	17.760	-do-

SECTION 6 : PAST AND CURRENT PRICES

3.6.1 Market conditions-

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

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

Table No.-21

TIMBER (TEAK AND NON-TEAK)- PRODUCTION & REVENUE OBTAINED

Sr.NO.	Year	Quantity (Cum.) Teak	Value (in Rs).	Quantity (Cum.) Non teak	Value (in Rs).
1	2	3	4	5	6
1	2002-03	3759.132	36867395	1535.781	7432330
2	2003-04	1889.097	19920327	1173.480	5485830
3	2004-05	2278.829	20328092	7071.357	3106476
4	2005-06	15994.156	141936575	3183.382	10945567
5	2006-07	27906.195	560867600	3639.730	20076075
6	2007-08	20717.457	449185137	4311.948	25997055
7	2008-09	26573.150	502758741	5578.799	35315821
8	2009-10	22213.709	640059393	6717.471	49886947
9	2010-11	28079.426	771139370	9375.585	93146765
10	2011-12	23544.00	781071842	7591.000	66795819
11	2012-13	9048.034	234305178	2239.844	22471447
12	2013-14	20950.412	1198270447	8076.599	95523300
13	2014-15	27984.597	409433210	9590.619	52180828

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CHAPTER – 4

FOREST DEVELOPMENT CORPORATION OF MAHARASHTRA: **PDF Compressor Free Version** And SOCIO-ECONOMIC SURVEY REPORT

ACTIVITIES BY FOREST DEVELOPMENT CORPORATION OF MAHARASHTRA LIMITED (FDCM), IN THE TRACT

SECTION:1: FOREST DEVELOPMENT CORPORATION OF MAHARASHTRA LIMITED

4.1.1 Forest Development Corporation of Maharashtra Limited (An Undertaking of Maharashtra State) at Nagpur was constituted in 1974. Its aim was to convert and develop the under stocked and poor quality forest areas into productive forests by introducing valuable and production enhancing species. Presently, 44,474.753 ha of forest area in the tract is with Pranhita Project Division of FDCM at Allapalli. The range wise distribution of forest area in the tract under FDCM Limited Project Division Pranhita is given in Table No-1C in Chapter-I of this plan. 16.41 % of total forest area is under the management of FDCM Limited in this tract. The areas allotted to FDCM are in the form of. A, B class RF and C class RF forest area.

4.1.2 ACTIVITIES OF FDCM - Earlier FDCM used to work in Conversion Working Circle areas of Forest Department as an agency in clear felling, logging, transporting and marketing the forest produces and sharing the benefit on percentage fixed by the Government from time to time. But presently it is working totally independent of forest department on the areas given to it on lease basis. Separate Management Plan for the areas under it is prepared and duly sanctioned by competent authority through Central GOI MINISTRY OF ENVIRONMENT, FORESTS at Nagpur. Over wood removal of the forest areas and replanting with improved seedling.

4.1.3 IMPACT OF FDCM - The areas under taken by FDCM had been successfully converted into very good teak stock. Not only that the teak population in the plant community has increased but also the productivity has increased many folds. The vegetal cover has increased. The studies conducted have revealed that in teak plantation diversity of species is maintained by the nature. Even wildlife dispersal in FDCM areas is equally heartening. No wildlife depletion is normally experienced. The impact on employment side is also appreciable as it is providing employment to local people on regular basis.

Allapalli Range Teak plantation information

Sr. No.	Teak plantation n year	Round	Beat	Compart. no	Part no.	Total area	Teak Plantation area
1	2005	Tanbudi	Tanbudi	6	1	20.00	20.00
					2	10.00	10.00
			Total			30.00	30.00
2	2006	Tanbudi	Allapalli	2	1	24.00	16.00
3	2010	Tanbudi	Tanbudi	7	1	22.00	20.00
4	2014	Tanbudi	Tanbudi	7	1	18.00	14.640
					2	17.00	14.360
			Total			35.00	29.00
5	2015	Tanbudi	Tanbudi	7	1	17.00	12.920
					2	18.00	15.080
			Total			35.00	28.00
6	2016	Tanbudi	Allapalli	1	1	22.080	17.930
					2	14.200	9.347
					3	24.800	18.723
			Total			61.080	46.000

SECTION:2. THE SOCIO-ECONOMIC SURVEY REPORT:

4.2.1 The forest of Allapalli Division is situated in Aheri tahsil, Etapalli tahsil, Chamorshi and, Mulchera tahsil of Gadchiroli District. The local population mostly consists of Madiyas and Gonds. Madiyas use dialect which is influenced by Telugu language. Their diet consists of rice gruel and kodo and kutki. They are used to consume moha and toddy liquor. They also eat fish and meat of wild animals. The state government has taken up special measures to improve the conditions and life style of local population by providing them better health and education facilities.

LOCAL POPULATION:

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

THE SOCIO ECONOMIC STATUS OF ALLAPALLI DIVISION AS PER AS GIVEN BELOW

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TABLE No.22

Sr.No.	Particulars	Taluka			
		Chamorshi	Etapalli	Aheri	Mulchera
		Details	Details	Details	Details
1	Geographical Area	78789	18570.4	94592	22541
2	Number of Talukas	1	1	1	1
3	No of Citys	--	--	--	--
4	No of Villages	203	197	183	68
5	No of Blocks	---	---	---	---
6	No of Gram Panchayties	76	32	40	17
7	Rural Population	179120	81713	116992	45787
8	Civilian Population	---	---	---	---
	Total	179120	81713	116992	45787
9	Male Population	90759	40959	58916	23438
10	No of Woman Population	88361	40754	58076	22349
11	Schedul Cast Population	8.1%	3.5%	14.30%	5.10%
12	Schedul Tribe Population	18.2%	81.5%	49.80%	32.40%
13	Population per Sq.km.	36.30%	36.04%	51.25%	62.23%
14	literacy	75.76%	62.15%	70.05%	77.98%
	Rural	75.37%	62.15%	67.70%	77.98%
	Civil	87.79%	---	86.16%	---
	Total %	75.76%	62.15%	86.16%	77.98%
15	Families below poverty line (Rural)	37424	13543	70.05%	8684
16	Cattle Population	Other 3075	Other 45468	Other 12975	Other 1994
	Total Cattle population	156586	226074	226074	48783
17	Cow	22000	38364	38364	9452
18	Buffalo	6357	6308	6308	732
19	Sheep's /Goats	44520	77306	77306	8699
20	Land under agriculture	38856	15441	15441	6475
21	Area under irrigation	18552	1650	1650	1088
22	Waste land	2393	3327	3327	1426

SECTION-3 LAND UTILIZATION OF ALLAPALLI DIVISION:

4.3.1 Forests have continued to be as important source of livelihoods for pre adjacent to it. The major constituent of population of the Allapalli division is frame tribal area. They generally required small timber for agriculture implements. Firewood etc. they are dependent on the forests for MFP and industries based on forest produce and gent rating jobs for few people only

Table No.23

Sr.No.	Land Utilization	Taluka				
		Chamorshi	Etapalli	Aheri	Mulchera	Total
		In ha.	In ha.	In ha.	In ha.	In ha.
A	Geographical Area	78789	185704	94592	22541	381626
B	Net Sown area	41689	6475	15442	6475	70081
C	Forest	24837	161813	67623	11493	265766
D	Fallow land	---	---	---	---	---
E	Land not available for cultivation	314	604	657	92	1667
F	Cropping intensity	99%	99%	99%	99%	99%
G	Area brought under high yielding seeds	49137	17296	11145	6942	84520

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CHAPTER - 5

FIVE YEAR PLAN

SECTION: 1 FOREST RESOURCES :

5.1.1 India is one of the 12 mega Diversity countries, commanding 7% of the world's biodiversity and supporting 16 % of the major forest types, varying from tropical Semi Evergreen Forest on Western coast, to Desert and thorn forest in Gujarat, Rajasthan, and Mangrove forest in West Bengal. Orissa, Maharashtra and other coastal areas and Dry Alpine forest in Western Himalaya. The most common forest types are Tropical Moist Deciduous Forest, Tropical Dry Deciduous Forest, West Tropical Evergreen Forest and Tropical Semi Evergreen Forest. India has 45,000 identified plant species, including 15,000 flowering plants that include 5,154 endemic plants and 81,000 species of fauna. Through India has only 2.5% of the land mass and less than 2 % of the world's forest area, but it supports more than 7 % of the varieties of flora and fauna. India is a biocenogenesis of three flora, Indo Malayan, Siberian and Madagascar.

5.1.2 But nearly half of the country's area is degraded, affected by the problems of soil erosion and degradation according to the government statistics, nearly 22%, or 65 million ha, of the country's land have been recorded as forest, but only 19.5% have forest or tree cover, which is much less than a goal of 33% set forth by National Forest Policy 1988. The rising population has forced the rural poor to deplete the natural resources. It has been stipulated that the population of India will reach, one hundred and twenty crores, by 2050 and that will comprise above more than 16 % of the world's population. The problem is further complicated by enormous cattle population estimated to be 45 crores, about 18 % of the cattle population in world. Much of these animals have very low productivity, but due to socio-economic condition, these are retained by dwellers and these graze freely in forest area, causing a systematic degradation of forest and that has led to severe erosion leading to floods in the lower plains. A further degradation has been caused by the practice of the shifting cultivation. As a result, the demographic and economic landscape of the country is plagued with poverty and under employment. Agricultural productivity is only 1 ton per ha. against the actual stipulated capability of 4 ton per ha. The achievement of this stipulated target is the main challenge before the planners and decision makers of this country.

Mobilization of fund in the past:

5.1.3 Since the commencement of the first Five year plan (FYP) in 1951, a total Rs. 8500 crores have been spent, by the end of the Eighth FYP in 1996-97, on forestry development activities. During this period, afforestation of about 2.69 crores ha. was carried out. Financial allocation to forestry sector has increased phenomenally that is from Rs.7.6 crores in the first F.Y.P. To Rs. 4082 crores in Eighth F.Y.P. but this was still

less than 1% the total plan outlay of the country and that was one of the main reasons for the continuous deterioration of the forest resources. A provision of Rs. 68700 crores has been made in Ninth Five year plan. During 1997-98 afforestation of 0.148 crores ha. the average annual plan outlay for the forestry sector during eighth F.Y.P. was about Rs. 816 crores, whereas the estimated annual value of harvests (recorded and unrecorded) from the forests, was worth Rs.30000 crores, during the same period, which is about Five year plans is given in the following Table.

Table no.25

Budget Allocation for forestry under the five year plans, (Million Rs) (GOI)

Plan/Year	Thrust Areas	Total Plan		Forest and Wildlife Plan		Forest Outlay
		Outlay	Actual	Outlay	Actual	%
First plan 1951-56	S& D Rehabilitation of degraded forest	23780	19600	76	85	0.32
Second plan (1956-1961)	As above	45000	46720	212	212	0.47
Third plan 1961-66	Increasing Productivity, Fast growing spp.pl. Modern logging	75000	8577	458	459	0.61
Annual Plan(1966- 1969)	As above	66250	666225	419	421	0.63
Fourth Plan (1969-1974)	As above	159020	157790	894	938	0.56
Fifth Plan (1974-1979)	Social Forestry	393220	394260	2088	2088	0.53
Annual Plan (1979-1980)	Social Forestry	126010	121760	683	683	0.54
Sixth Plan (1980-1985)	Social Forestry Forest Cons.	975000	1092920	6924	NA	0.71
Seventh Plan (1985- 1990)	Forest Cons. Massive Aff.Wasteland	1800000	2187300	18519	19759	1.09
Annual Plan (1990-1991)	As above	647170	583690	6299	5764	0.97
Annual Plan (1991-1992)	As above	723170	647500	7831	7153	1.08
Eighth Plan (1992-1997)	JFM Ecotourism Biodiversity Conservation Wasteland utilization	4341000	--	40820	39930	0.94
Ninth Plan (1997-2002)	As above	8592000	7058180	68228	--	0.79
Tenth Plan (2002-2007)	Bio diversity	15923000	--	--	--	--

SECTION: 2 FOREST POLICY AND PLANNING:

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5.2.1 India has a long tradition of professional forestry has nationwide concern for the preservation of forest resources. Contemporary forestry legislation and policy even goes back to at least 1864 when forests almost became exclusively the state property under the prevailing British rule. The first Forest policy of 1894 was revised in year 1952. The present guiding legislation is dated back to Indian forest act of 1927. The National Commission of agriculture (NCA) studied the forestry planning in the country in 1976 and had made recommendations for future action and that led to the emergence of social forestry Wing and the establishment of State Forest Development Corporations (FDCs). The new forest policy accords highest priority to the governmental role of forests and strong derivation that the direct economic benefit must be subordinated to environmental priority.

5.2.2 The main establishing Forest Development Corporation was to enable the Forest Department, to retain its earnings from the sale of products for investment in plantations. However, this policy had two undesirable effects, mainly:

5.2.3 The main of establishing its earnings from the sale of products for investment in plantations. However, policy had two undesirable effects, mainly:

5.2.4 The management of natural forests received a little attention and it tends to deteriorate.

5.2.5 The establishment of high value plantations at the expense of natural forests resulted in the loss of biodiversity and Non-Wood Forest Products, As a result, there was opposition to the practice from the people and the government had to revise the plantation programme strategy.

5.2.6 The forest policy has been updated, most recently, through National Forest Policy of 1988. Other supplementary legislation has been enacted to explicitly provide for control and regulations covering non-forestry resources, wildlife protection and environmental protection, together with other broad directives in substantive areas of National Policy, the mechanism of Joint Forest Management (JFM) was legalized in 1990.

5.2.7 Its principal aim was to ensure environmental security and maintenance of ecological balance, through the preservation and rehabilitation of forests, while providing for fuel wood, fodder, Non-timber Forest products (NTFPs) and small timber needs to the local people. The JFM has since been institutionalized by most of the States. The emphasis has been on the formation of village forest Committees and by empowering them for participatory management, of degraded forest on a benefit – sharing basis.

5.2.8 It has been observed that the country's achievement in raising forestry plantations, in terms of area has been impressive. Up to 1998, the total area under tree

plantations was 2.838 crores ha, of which about 0.12 crores ha were planted before 1990 decade. The current annual rate of plantation is about 0.12 crores ha. the quality of these plantations varies considerably. It must be noted that forest plantations is meant to meet the increasing demand of industrial raw material, for direct individual consumption, i.e. fuel wood.

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

5.2.10 According to the report of F.S.I., 2011, the total tree cover of the country is about 6.9207 crores ha or 21.05% of the total geographical area of India with very dense forest consisting only 2.54% moderately dense forest accounting for 9.76% and open forest consisting 8.75% the report further states that the forest cover has increased by 728 sq.km. Since the last survey in 2009 funding to the tune of Rs. 6695 crores per year will be required per year is available from both the central and state budget, together to be allocated for afforestation.

5.2.11 Despite the enactment of all above legislations , clear symptoms of degradation in forest and ever declining capacity in meeting the various needs of the local population particularly of the rural poor and tribal is evident. Efforts to enlarge the forest estate as set forth in National Forest policy 1988 (from the present 19 percent to 33 percent of the total geographical area), would require a substantial increase in fund allocation to the forestry sector.

5.2.12 To reverse the process of degradation and for the sustainable development of forest, Government of India has prepared National Forestry Action Programme (NFAP).

SECTION: 3 NATIONAL FORESTRY ACTION PROGRAMME (NFAP) :

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

5.3.2 The objective of NFAP programme is to enhance the condition of forestry and tree resources to the ecological stability and people-centered development scheme

through qualitative and quantitative improvement in investment on sustainable conservation and development of forest resources.

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5.3.3 The basic purpose of NFAP is to establish a direct linkage between National Forest Policy 1988 and five year plan. In the past, there has not been any comprehensive and constant programme structure with a result, it was difficult to get linkages and established trends.

5.3.4 In the context of sectorial policies, the NFAP exercise proposed the imperative needs should be identified, which represent the absolute requirement to which all supporting objectives should contribute as envisaged in Forest Policy of India. Two imperatives were suggested: sustainability efficiency and people's participation sustainability should be the guiding factor for forestry management neither conservation nor development can be achieved in isolation. Efficiency in production implies improving productivity, reducing wastes and indirect costs and thus registering a higher economic rate of return, compared to other alternatives. The philosophy of people –based development assumes that participation is not only a fundamental precondition for a successful development but also is an end in itself.

SECTION: 4 FIVE YEAR PLANS:

5.4.1 The basic purpose of NFAP programme is to establish direct linkages between National Forest Policy 1988 and National Five Year Plans (FYPs). In past there was no comprehensive and constant programme structure for forestry. Every FYP has had its own programme structure, so it was difficult to get linkages and established trends. Although plans had specific objectives and programme the main activity under most of them tree planting the emphasis of different FYPs regarding forestry is as follow.

5.4.2 First and second plan FYPs aimed at rehabilitation of degraded forest, introduction of economic species survey, and forest demarcation; third and fourth FYPs envisaged increase productivity of forest, through fast growing species plantations, scientific assessment, and modern logging. Fifth FYPs stressed for the formulation of social forestry and fuel wood reserves with view to save natural forest, Sixth FYP stressed on social forestry and forest conservation. Seventh FYPs envisaged forest conservations and massive afforestation and wasteland development and. Eighth and Ninth FYP stressed on. Preservations of biological genetic diversity (both Flora and Fauna), protection of forest against biotic interference, utilization of wastelands, and promotion of people's participation through Joint Forest Management.

5.4.3 The percentage share of forestry sector outlay changed from 0.32 percent of the total on First FYP to 0.94 percent in Eighth FYP. The highest allocation was in Seventh FYP (1.09%) it is opined by many economist and conservation that for

the sustainable development of this sector, allocation for the forestry sector should be raised to about 4 & 5 percent of the total outlay of the country

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DEVELOPMENT UNDER THE FIVE YEAR PLAN

5.4.4 The year 2015-16 was the fourth year of the XII the Five-Year Plan. An investment of RS. 619.49 lakhs made on various developmental programmes implement under forestry and related sectors. The targets and achievement under the various developmental works according to various activities given below.

5.4.5 The progress made under various scheme implement by the Forest Department under the 12th plan is given below.

TABLE No.26

Financial targets and Achievements break up according to activity group for the year.

Sr. No.	Name of Scheme	Financial (Rs.in lakh)									
		2011-12		2012-13		2013-14		2014-15		2015-16	
		Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement
	(A)TOTAL(2406 FORESTRY AND WILDLIFE) (NON TRIBALE SUB PLAN)(STATE)										
1	Strengthening of check Nakas	0.00	0.00	2.26	2.26	4.79	4.79	0.00	0.00	2.89	2.89
2	Strengthening of existing wireless network	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Strengthening of Mobile Squad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Supply of cooking gas	0.00	0.00	50.21	50.21	16.03	16.03	22.23	22.23	57.43	57.43
5	Joint Forest Management	1.42	1.42	14.42	14.42	17.86	17.86	39.63	39.63	39.50	39.50
Total(A)		1.42	1.42	66.89	66.89	38.68	38.68	61.86	61.86	99.82	99.82

Sr. No.	Name of Scheme	Financial (Rs.in lakh)									
		2011-12		2012-13		2013-14		2014-15		2015-16	
		Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement
1	Modern forest fire control and management (IFPC)	26.54	26.54	9.94	9.94	3.23	3.23	7.83	7.83	10.80	10.80
2	National Afforestation Programme	20.18	20.18	24.11	24.11	49.62	49.62	37.33	37.33	25.61	25.61
Total(B)		46.72	46.72	34.05	34.05	52.85	52.85	45.16	45.16	36.41	36.41

Sr. No.	Name of Scheme	Financial (Rs.in lakh)									
		2011-12		2012-13		2013-14		2014-15		2015-16	
		Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement
1	Supply of cooking gas	0.00	0.00	56.85	56.85	16.03	16.03	74.09	74.09	36.27	36.27
2	Vidarbha Vikas	0.00	0.00	16.63	16.63	8.18	8.18	33.02	33.02	0.00	0.00
Total(C)		0.00	0.00	73.48	73.48	24.21	24.21	107.11	107.11	36.27	36.27

Sr. No.	Name of Scheme	Financial (Rs.in lakh)									
		2011-12		2012-13		2013-14		2014-15		2015-16	
		Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement
1	Soil and Moisture Conservation on forests areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Estt. Of central nursery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	2.50
3	Forest protection from fire	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Reforestation of degraded forest (RDF)	0.00	0.00	28.08	28.08	26.81	26.81	29.73	29.73	22.72	22.72
5	Development in forest Tourism	0.00	0.00	14.00	14.00	20.44	20.44	28.30	28.30	24.75	24.75
6	Compensation to the farmers for losses caused by the wildlife	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total(D)		0.00	0.00	42.08	42.08	47.25	47.25	58.03	58.03	49.97	49.97

Sr. No.	Name of Scheme	Financial (Rs.in lakh)									
		2011-12		2012-13		2013-14		2014-15		2015-16	
		Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement
1	Joint Forest Management (OTSP)	1.54	1.54	64.50	64.50	48.94	48.94	45.50	45.50	41.92	41.92
2	Plantation of General use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total(E)		1.54	1.54	64.5	64.5	48.94	48.94	45.5	45.5	41.92	41.92

Sr. No.	Name of Scheme	Financial (Rs.in lakh)									
		2011-12	2012-13				2013-14		2014-15		2015-16
	(F)4406 FORESTRY AND WILDLIFE (NON TRIBAL) (STATE)	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement
1	Construction of Van Talao	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.33	16.33
2	Massive Afforestation Programme	72.88	72.88	43.46	43.46	41.28	41.28	70.15	70.15	145.15	145.15
3	Afforestation for Soil Conservation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.43	33.43
Total(F)		72.88	72.88	43.46	43.46	41.28	41.28	70.15	70.15	194.91	194.91

Sr. No.	Name of Scheme	Financial (Rs.in lakh)									
		2011-12		2012-13		2013-14		2014-15		2015-16	
		Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement	Target	Achievement
1	Forest Building (Repairs)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Soil and Water Conservation on Forests areas	0.00	0.00	29.49	29.49	31.94	31.94	32.00	32.00	160.19	160.19
3	Forest Roads & Bridges (4406-4415)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	Forest Protection from fire	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Wild life and Nature Conservation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	Development of Forest Tourism	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	Compensation to the Farmers for Dosses Caused by the Wildlife	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total(G)		0.00	0.00	29.49	29.49	31.94	31.94	32.00	32.00	160.19	160.19
GRAND TOTAL OF PLAN SCHEMES (A TO G)		122.56	122.56	353.95	353.95	285.15	285.15	419.81	419.81	619.49	619.49

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

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CHAPTER – 6

STAFF AND LABOUR SUPPLY

SECTION 1: STAFF

6.1.1 In 1966, reorganization of erstwhile Chanda circle took place and Allapalli Division was created with its head quarter at Allapalli. The Allapalli Forest Division comprises of 7 territorial Ranges, 31 Forest Rounds and 166 Beats. The details of range, round and beat and forest area at present under management of Allapalli Division proper is given in the following table.

TABLE –27

Sr.No.	Name of Range	Ranges Headquarter	No.of Round	No. of Beat	Area in ha.
1	Chamorshi	Chamorshi	3	20	18275.691
2	Ghot	Ghot	6	38	36722.680
3	Pediguddam	Pediguddam	4	15	20238.704
4	Permili	Permili	6	39	74328.792
5	Allapalli	Allapalli	4	17	17715.526
6	Aheri	Aheri	5	24	33532.103
7	Markanda	Markanda	3	13	12304.585
Total	7	7	31	166	213118.081

6.1.2 The following is the detailed statement of permanent and temporary staff in Allapalli Division as on 01.04.2015

TABLE – 28

Sr. No.	Category	No.of posts			Pay scale
		Permtt	Temp.	Total	
1	2	3	4	5	6
I	<u>GAZETTED</u>				
1.	Dy. Conservator of Forests	1	-	1	15600-39100
2	Asstt. Conservator of Forests	5	1	6	9300-34800
3	Logging Officer	1	-	1	9300-34800
4	Workshop Superintendent	1	-	1	9300-34800
5	Medical Officer	1	-	1	9300-34800
6	Range Forest Officer	11	1	12	9300-34800
7	Office Superintendent	--	1	1	9300-34800
					9300-34800

Contd....

Sr. No.	Category	No. of posts			Pay scale Rs.
		Permtt	Temp.	Total	
1	2	3	4	5	6
II	<u>NON-GAZETTED:</u>				
1.	Chief Accountant	1	-	1	9300-34800
2.	Accountant	4	9	13	9300-34800
3.	Clerk	31	7	38	5200-20200
4.	Forester	40	19	59	5200-20200
5.	Forest Guard	158	60	218	5200-20200
6.	Driver	22	5	27	5200-20200
7.	Mahawat	8	-	8	5200-20200
8.	Chara Cutter	8	-	8	4440-7440
9.	Surveyor	2	-	2	5200-20200
10.	Police Constable	1	-	1	5200-20200
11.	Machinist	3	1	4	5200-20200
12.	Store keeper	1	-	1	5200-20200
13.	Compounder	2	1	3	5200-20200
14.	Nurse	2	-	2	5200-20200
15.	Electrician	1	-	1	5200-20200
16.	Auto Electrician	1	-	1	5200-20200
17.	Sharperner	3	-	3	5200-20200
18.	Latheman	1	-	1	5200-20200
19.	Welder	1	-	1	5200-20200
20.	Fitter	2	-	2	5200-20200
21.	Sawyer	5	-	5	5200-20200
22.	Mali	2	-	2	4440-7440
23.	Log lifter	2	-	2	4440-7440
24.	Black smith	1	-	1	5200-20200
25.	Khalashi	1	-	1	4440-7440
26.	Sweeper	6	-	6	4440-7440
27.	Wardboy	1	-	1	4440-7440
28.	Cleaner	13	6	19	4440-7440
29.	Daftari	1	-	1	4440-7440
30.	Peon/Naik	7	1	8	4440-7440
31.	Choukidar	11	1	12	4440-7440
32.	Dak-runner	1	-	1	4440-7440
33.	Arekas	-	1	1	4440-7440

6.1.3 The Govt. of Maharashtra in General Administration Department vide its Resolution No. 2000/ प्र.क-3 / बारा दिनांक 6 अगस्त 2002 has provided for certain incentives to the Govt. employees working in the Naxalite affected areas and has also issued guidelines for their appointment in these areas and as such the Govt. employees are being paid additional allowances and higher pay scales along with other facilities.

TABLE-29
STATEMENT SHOWING THE LIST OF OFFICERS , WHO HELD THE CHARGE OF ALLAPALLI
FOREST DIVISION.

Sr. No.	Name of the officers	Rank	Period	
			From	To
1	Shri. V.K. Sarwate	I.F.S.	01.04.1965	17.07.1968
2	Shri. R.L. Choudhari	I.F.S.	18.07.1968	04.10.1969
3	Shri. S.K. Mitra	I.F.S.	05.10.1969	31.12.1969
4	Shri. S.K. Kale	I.F.S.	01.07.1970	13.06.1971
5	Shri. M.H. Khedkar	I.F.S.	08.07.1971	19.07.1973
6	Shri. P. Keswani	I.F.S.	21.07.1973	25.06.1975
7	Shri. S.K. Bhargarva	I.F.S.	26.06.1975	04.08.1976
8	Shri. K.K. Chauhan	I.F.S.	05.08.1976	03.07.1978
9	Shri. B. Mazumdar	I.F.S.	04.07.1978	19.03.1979
10	Shri. A.B. Bhangare	I.F.S.	19.03.1979	16.07.1979
11	Shri. Jwala Prasad	I.F.S.	17.07.1979	21.08.1981
12	Shri. D.C. Pant	I.F.S.	22.08.1981	16.06.1982
13	Shri. A.K. Joshi	I.F.S.	21.06.1982	08.11.1984
14	Shri. P.C.S. Singh	I.F.S.	09.11.1984	02.07.1988
15	Shri. J.S. Grewal	I.F.S.	26.07.1988	05.11.1989
16	Shri. G. Ramakrishana Rao	I.F.S.	06.11.1989	18.01.1993
17	Shri. N. Vasudewan	I.F.S.	19.01.1993	26.11.1996
18	Shri. B.S. Huda	I.F.S.	27.11.1996	26.06.2000
19	Shri. B.R. Pachpor	I.F.S.	26.06.2000	31.01.2003
20	Shri A. V. Mardikar	I.F.S.	01.02.2003	26.06.2003
21	Shri A . R. Mande	I.F.S.	27.06.2003	08.09.2004
22	Shri S.L.Thaware	I.F.S.	09.09.2004	30.06.2008
23	Shri Rushikesh Ranjan	I.F.S.	02.07.2008	31.03.2010
24	Shri P.Kalyan Kumar	I.F.S.	01.04.2010	25.06.2010
25	Shri B.A.Pandilwar	M.F.S.	26.06.2010	27.07.2010
26	Shri P.Kalyan Kumar	I.F.S.	28.07.2010	30.07.2010
27	Shri R.M.Ramanujam	I.F.S.	31.07.2010	11.08.2010
28	Shri B.A.Pandilwar	M.F.S.	12.08.2010	18.08.2010
29	Shri P.N.Patil	I.F.S.	18.08.2010	31.05.2011
30	Shri B.A.Pandilwar	M.F.S.	01.06.2011	15.06.2011
31	Shri P.N.Patil	I.F.S.	16.06.2011	08.11.2011
32	Shri D.N.Meshram	M.F.S.	09.11.2011	15.11.2011
33	Shri S.Rameshkumar	I.F.S.	16.11.2011	24.02.2014
34	Smt. Shriakshmi Annabattula	I.F.S.	25.02.2014	18.04.2014
35	Shri H.K.Meena	I.F.S.	19.04.2014	Till now

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

COMMUNICATION LINES:

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

Under ICT project, for continuous monitoring of different forestry operations android mobile applications are developed for front line field staff users to report field data & photograph directly from field to their supervisory officers. In this respect, the NIC has developed necessary software for POR application, wildlife management, nursery and plantation etc. PDA/mobiles, equipped with such software applications for different forestry operations, have been distributed under schemes like CAMPA, 13th Finance Commission and such PDA/ mobiles are allotted to front line staff. During 2013-14 to 2015-16, 166 PDA/mobiles are distributed to front line staff of Allapalli Division and necessary training is also imparted by NIC for handling the PDA. Use of PDA/mobile by field staff will facilitate the quality of supervision and improve the monitoring of forestry operations.

SECTION 2 : LABOUR

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

INTERNAL LABOUR

6.2.2 Taking into consideration the difficulties faced in respect of man power in remote areas in executing the works in these important and valuable forests, in earlier period settlements in form of Forest Villages were purposely established in the ranges. In the earlier days, around 1895 onwards, forestry operations were few and

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simple and were restricted over a small part of the year and were unable to support the labour all around the year. Therefore, the laborers' were supplied with land for cultivation as an incentive for them to stay at site (villages) and as a measure of additional economic support. The inadequacy in availability of laborer was felt as early as at the time of drafting of 1930 plan and necessity for increasing the number of forest villages was stressed accordingly. However, attempts to that affect yielded little success except during the early and middle thirties, when economic conditions were bad. On the other hand, the forestry works increased manifold and that naturally increased the pressure on the limited source of forest village labour. With the introduction of artificial regeneration operations, the forestry works largely interfered with the agricultural operations. Carting season came in conflict with the rich harvesting season of the forest villagers. This resulted in desertion of the villages by many inhabitants.

6.2.3 The general census was carried out in the year 1981, population figures of which were collected and produced above. During the period from 2000 to 2011, there is a rise of 40.89 % in the population of the forested villages in the Allapalli range. Thus, there has been a definite increase in the labour availability and the activities of the department have also increased simultaneously.

EXTERNAL LABOUR

6.2.4 During non-agricultural season, labour for forestry works are available in adequate quantity. Acute shortage is however, felt for planting and weeding when the labour from villages gets locally employed for attractive wages for paddy transplanting, weeding and other agricultural operations. The tract is sparsely populated. Gonds and Madias form bulk of the unskilled labour in this tract.

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CHAPTER – 7

PAST SYSTEMS OF MANAGEMENT

SECTION 1: GENERAL HISTORY OF FORESTS:

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

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 Jagpatirao. In the year 1703 it was bestowed to Koksha. During his period the Zamindari was extended to Bhimrao or Venkatrao, who succeeded Koksha and held Zamindari from the year 1772 to 1818. Mussamatbai succeeded Bhimrao and Bhujangrao succeeded Mussamatibai. The tenure of Bhujangrao commenced with crisis and there was a general revolt. The Bhujangrao succeeded by his son Venkateshwarrao who died in 1851. The next successor was Laxmibai, widow of Bhimrao, who ruled firmly until her death in 1861. The successors of Laxmibai were Mangarao (1861 to 1866), Savitribai (1866 to 1871), and Dharmarao (1873 to 1893). After the death of Dharmarao the estate descended to Bhujangrao in 1893. Bhujangrao proved to be incapable of managing the affairs of the estate and so in 1902, the estate was taken over by the Court of Wards for management and it was subsequently handed over to Zamindars. The last Zamindar was Dharmarao Bhujangrao. In the year 1951, on passing the M.P. Abolition of Proprietary Rights Act of 1950 (Act-1 of 1951), the ownership of these forests was vested in the State Government.

7.1.2 After passing of M.P. Abolition of Proprietary Rights Act, the forest was vested in the Government and were taken over by the Revenue Department. On September 6, 1952 the same were transferred to the Forest Department for management. In the year 1955, a portion of the forests in surveyed villages were declared as Protected Forests under section 29 of the Indian Forest Act, 1927, vide Notification No. 3056-1216-XI, dated June 4, 1955. Remaining portion of the forests in surveyed and unsurveyed villages were declared as Protected Forests in the year 1959, vide Notification No. FLD/4659-3313-E, dated April 23, 1959. Further under section 4 of

IFA 1927 the Government decided to constitute these forests as Reserved Forests and accordingly, proposals were formulated vide Gazette Notification No. FLD/1258-II, 3314-E, dated May 30, 1959. The proposed area was declared as Reserved Forests vide Gazette Notification No. FLD/3685/9316/CR-42/F-3, dated May 5, 1992 under section 20 of IFA, 1927.

SECTION 2: PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS:

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

1) CLUTTARBUCK' PLAN (PRIOR TO 1903):

This was the first plan prepared for the Allapalli Range and was implemented in the year 1895. In this plan mainly selection felling was carried out. The plan divided the forest of Allapalli Range into two Working Circles viz. No. I and No. II. In Working Circle No. I Selection system was prescribed under which all teak trees of 24" and above in diameter were to be removed along with all unsound teak trees between 18" and 24" diameter at breast height. All trees of other species of diameter 24" and above were also to be exploited if marketable. Girdling or cutting of other trees interfering with young teak regeneration was prescribed. The Working Circle No. 2 comprised of all the poorer and degraded forests in which cultural operations were prescribed. Felling cycle was fixed at 40 years.

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

however the results were better due to less intensity of bamboo. Though increase in undergrowth was a hindrance to the establishment of regeneration, the removal of unsound and suppressed trees and the opening of canopy by removal of inferior species greatly benefited the young and middle aged teak crop. In 1930, the forests consisted mostly of pole and middle aged teak with some scattered old trees. The teak percentage was deficient.

2) GENTLE'S PLAN (1930 TO 1946):

This was perhaps the first scientific management plan for the tract and this was prepared after recording observations of growth parameters and enumeration and also the factors which included in the composition and growth of natural forests.

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

The main Working Circles constituted were

- I. Bhimram Hills Working Circle.
- II. Plains-Elchil Working Circle.
- III. Mixed Forests Working Circle.
- IV. Miscellaneous Working Circle.

i) BHIMARAM HILL WORKING CIRCLE :

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

SILVICULTURAL SYSTEM :

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

The felling rules provided for a felling cycle of 30 years and a selection diameter limit of 20" was fixed as it was considered that the site quality was not good enough to maintain a satisfactory annual increment after that size had been reached. However the unsound teak below 20" diameter diameter limit could be removed. The annual coupe was defined as an area over which a prescribed number of teak trees of 20 inches and over in diameter was found. The area and total outturn from all sizes and species therefore varied considerably from year to year. Immediately after the selection felling, subsidiary cultural operations were to be done. These included improvement felling, cutting back operations, thinning, cleanings, climber cutting and clear felling of bamboos.

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

ii) THE PLAIN – ELCHIL WORKING CIRCLE :

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

SILVICULTURAL SYSTEM:

The silviculture system applied was clear felling for Conversion to Uniform.

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The working rules prescribed for formation of six periodic blocks of twenty years each. The exploitable diameter was fixed at 24" at breast height over bark which was attained in 120 years. Annual coupe for exploitation and regeneration was the area in which a given number of teak trees of 24" and above in diameter at breast height was available. A heavy crown thinning on a ten year cycle was prescribed in periodic block II to favour the dominant trees. All unsound trees unlikely to survive the regeneration period were removed. All other trees except Ain, Shisham, Haldu, Bija, Shivan over 8" diameter were to be removed, which caused heavy openings.

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

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

i) PLAINS FELLING SERIES :

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

ii) BHIMARAM WORKING CIRCLE:

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

iii) BAMBOO WORKING CIRCLE;

Bamboo working circle was formed in 1959 in order to meet the demand of Ballarpur Paper Mill. Two felling series in Allapalli range viz. Patanil and Talawada

and three in Pedigundam range were formed. Four annual coupes were formed in each felling series. Bamboo working rules were prescribed. Bamboo on upper hills of Bhimaram was left out from working by the Paper Mill on economic ground.

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

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

- a) To satisfy all the local demand for forest produce and conserve as far as possible those tree species which produce edible fruits and flowers for the benefit of the aboriginal population in times of scarcity.
- b) To manage the forest on commercial lines to get optimum profit.
- c) To manage the forest as high forest under intensive working with the object of producing teak trees up to 2.13 mtr. (7') in girth at b.h.
- d) To maintain a judicious mixture of superior miscellaneous species with teak in the growing stock and a suitable under storey to protect and improve the soil.
- e) To increase the rate of conversion so as to complete the conversion program in the remaining period of conversion
- f) To manage the working of bamboo on a sustained basis so as not to interfere with growth of tree species.
- g) To maintain adequate cover on the steeper slopes by judicious and conservative felling in order to prevent soil wash.
- h) To aim at the creation of a normal forest and all that it implies.
- i) To maintain a continued production of large sized timber of teak and other superior species on the basis of sustained yield.
- j) To rigidly fire protect the forests in order to conserve valuable timber.
- k) In order to meet the above objects of management, the following working circles were formed.
 - i) Teak Conversion Working Circle.
 - ii) Plantation Working Circle.
 - iii) Hill Working Circle.
 - iv) Khorgaon Working Circle.
 - v) Mixed Forest Working Circle.
 - vi) Miscellaneous Working Circle.
 - vii) Bamboo (overlapping) Working Circle.
 - viii)

i) TEAK CONVERSION WORKING CIRCLE.:

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

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

SPECIAL OBJECTS OF MANAGEMENT :

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

i) SILVICULTURAL SYSTEM:

The silviculture system applied was conversion to uniform. The clear felling was to be supplemented by artificial regeneration of teak. The entire forest area was divided into six period blocks of 20 years each corresponding to the rotation of 120 years in the plains felling series, and five period blocks of 20 years each in the Elchil and the Bhimaram felling series corresponding to the rotation of 100 years.

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

ii) PLANTATION WORKING CIRCLE:

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

OBJECTS OF MANAGEMENT :

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

SILVICULTURAL SYSTEM :

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

The working rules prescribed that the coppice and the natural seedlings of the superior miscellaneous species were to be favoured to form mixture with teak in the under storey. Weeding was to be carried out to eliminate unwanted growth. In the areas infested with bamboo, frequent cutting of bamboos was necessary so as to gain

ascendency for teak over bamboo. Climber cutting was to be done at frequent intervals. Teak was favoured.

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

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

iii) HILL WORKING CIRCLE :

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

OBJECTS OF MANAGEMENT :

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

SILVICULTURAL SYSTEM :

The silviculture system applied was clear felling system.

The forest of the hill felling series comprised of the poor to good quality mixed forest containing no teak. The quality varies according to the plains and hills. Extensive grassy blanks on flat areas revealing water logging and scattered tree growth. In some patches good quality mixed forest containing scattered teak and superior

miscellaneous species were found. In some areas good quality even aged pole crop of teak with scattered matured teak trees along the foot hills were also found.

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

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

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

iv) KHORGAON WORKING CIRCLE :

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

OBJECTS OF MANAGEMENT :

The following objects of management were enunciated:-

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

SILVICULTURAL SYSTEM:

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

The working rules provided for formation of only one Felling series i.e. Khorgaon Felling Series. The forests are predominantly mixed type. The site quality varies from IVa to III. The important associates of teak were ain, haldu, dhaoda, kalam,

tendu, semal, shisham and salai. The exploitable girth for teak and other superior miscellaneous species was fixed at 120 cm. The subsidiary cultural operations included cutting back of any reserved trees or poles damaged badly during the course of felling, cutting back of coppice shoots damaged due to extraction. The coupes were to be closed to grazing for five years after working. The whole felling series was kept under special forest protection class.

v) MIXED FOREST WORKING CIRCLE.

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

OBJECTS OF MANAGEMENT:

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

vi) BAMBOO (OVERLAPPING) WORKING CIRCLE :

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

OBJECTS OF THE MANAGEMENT:

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

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

All climbers infesting the bamboo clumps were to be removed. The tending operations were to be taken care of.

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

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

OBJECTS OF MANAGEMENT:

The following objects of management were considered:-

- i) To satisfy all the local demand for forest produce and conserve as far as possible those tree species, which produce edible fruits and flowers for the benefit of the aboriginal population in times of scarcity.
- ii) To manage the forest on commercial lines to get optimum profit.
- iii) To manage the forests as high forests under intensive working with the object of producing teak trees up to 2.13 meters (7') in girth at breast height.
- iv) To maintain a judicious mixture of superior miscellaneous species with teak in the growing stock and suitable under storey to protect and improve the soil.
- v) To maintain and improve the forests on steep and precipitous hill slopes by judicious and conservative felling in order to prevent soil wash off..
- vi) To maintain the enhanced rate of conversion so as to complete the conversion program in the remaining period of conversion.
- vii) To progressively convert the areas containing mixed forest to more valuable forests, so as to utilize the optimum capacity of land.
- viii) To manage the working of bamboo on a sustained basis so as not to interfere with the growth of tree species.
- ix) To maintain a continued production of large size timber of teak and other superior species on the basis of sustained yield.
- x) To rigidly fire-protect the forests in order to conserve valuable timber and to check deterioration of site.
- xi) To protect and maintain the wildlife and thereby the whole ecosystem.
- xii) To preserve a part of original crop to avoid destruction of species, the use of which is not known at present and thus to safeguard the gene-pool.
- xiii) To aim at the creation of normal forest and all that it implies.

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

TABLE-30

Sr.No.	Working Circle	Area (ha)
1	Protection Working Circle.	1127.460
2	Teak Conversion Working Circle.	16383.713
3	Miscellaneous Working Circle.	770.117
4	Biosphere Reserve Maintenance Working Circle	639.000
5	Bamboo (overlapping) Working Circle.	4598.851
6	Wildlife (overlapping) Working Circle.	18920.284

i) PROTECTION WORKING CIRCLE:

The working circle comprised of all the compartments of Bhimaram felling series containing some areas of steep to very precipitous slopes of 25° and above. The main objects of management were to maintain and improve the adequate soil cover on the steep and precipitous hill slopes as a safe guard against soil erosion and rapid run off of water to give rest to these forests from exploitation activities and to promote and maintain a permanent soil cover. The forests allotted to this working circle are well stocked and mostly of site quality III though few patches of site quality II were also present. Teak was predominant and formed 93.76% of the growing stock by area and appeared best on gently sloping and well drained soil.

SILVICULTURAL SYSTEM :

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

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

grazing in order to avoid loss of top soil erosion and the entire area was to be strictly fire protected.

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ii) TEAK CONVERSION WORKING CIRCLE

Better quality exploitable teak forest areas were included in this working circle in order to manage the forest as high forest under intensive working with the object of producing large sized timber and plywood quality timber, to maintain the increased rate of conversion to increase the stocking of teak and to obtain maximum supply of teak timber.

SILVICULTURAL SYSTEM:

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

The working rules aimed at converting the existing irregular forest into a normal forest in one rotation. Reliance was placed on artificial regeneration of teak however advantage was taken of natural regeneration wherever it existed in the forest. Regeneration blocks were selected in the plain and Bhimaram felling series taking into consideration the maturity and incidence of teak in the stand. Teak was the principal species and other superior species were retained in the under storey to form a mixture.

iii) MISCELLANEOUS WORKING CIRCLE :

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

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

in comptt. No. 81, Talwada (36.80 ha.) in comptt. no. 65 and Zamela (15.73 ha) in comptt. 50

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The main object of this working circle was to provide Nistar to forest villages. The working rules prescribed, aimed at allowing free Grazing Policy laid down by the Government, supply of forest produce viz. thorns, wood and grasses for bona fide agricultural use and timber for house building repairs, wood for fuel, bamboos and leaves for thatching etc.

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

iv) BIOSPHERE RESERVE MAINTENANCE WORKING CIRCLE :

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

v) BAMBOO (OVERLAPPING) WORKING CIRCLE :

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

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

The working rules prescribed formation of Nistar and commercial felling series. The felling cycle of 3 years was prescribed and each felling series was divided in to 3 annual coupes one of which remained open for extraction in cycle. The commercial felling series was leased to Ballarpur Paper Mills for exploitation on long term lease. The remaining areas were to be exploited departmentally. Culms, 2 years of age or below, culms from under developed clumps (clumps having less than ten culms) were prescribed not to be felled. All the dead, crooked and suppressed bamboos were prescribed to be removed. No bamboo was to be felled below 15 cm. height and above

30 cm. from the ground level. At least eight major well grown culms per clump were required to be retained. Digging of rhizome was prohibited.

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The areas included in this working circle comprised of important wild animals which were fairly distributed over the entire range of Allapalli forests. The past history of management of these forests revealed that no scientific management throughout was attributed to the wild life management and therefore indiscriminate poaching of wild animals by local people continued for a long time. The area allotted to this working circle overlaps the areas of other working circles in the Allapalli range.

OBJECTS OF MANAGEMENT:

The special objects of management were:-

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

In order to achieve the aforesaid objectives the plan prescribed for preparations of Range inventory by identifying and listing all fodder and forage species which are grazed and browsed by wildlife herbivores and this needed to be quantified by laying down sample plots and the data so collected was to be computed statistically. The animal census was to be carried out every year and the animal behavior studies were to be done including the wildlife habitats and their habit of food, shelter and reproduction. The other important activities were the improvement of wildlife's habitats.

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

6) A.P.DESHMUKH AND S.P. JOSHI'S WORKING PLAN FOR PERMILI AND AHERI RANGES (1990-91 To 1999-2000) :

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

OBJECTS OF MANAGEMENT :

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

The tract dealt with in this plan was stock mapped on 4" to 1 mile scale and the total area was divided into two blocks viz. Permili block having 138 compartments and Aheri block having 4 compartments. The total forest area was divided into following three working circles namely:

TABLE-31

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

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

Teak is generally absent and other important species are Ain, Haldu, Tendu, Shisham, Semal, Mahua and Garari. Crop density varies from 0.5 to 0.7 and site quality is III and IVa and IVb. The whole working circle was divided into seven felling series with felling cycle of 30 years.

SILVICULTURAL SYSTEM.

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

TABLE- 32
Table Showing Exploitable Girth For Group Of Species

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

The working rules prescribed, aimed at production of large sized timber. The rotation was fixed at the average age at which individual tree reaches the diameter of girth required by the objects of management. The rotation for teak and other species of under storey was fixed at 120 years where as for the middle storey species like khair and garari, the rotation was fixed at 45 years. The felling rules provided for preparation of treatment map showing details of areas in each coupe. The areas along slope of 25° and above and areas having 20 mtrs. wide strip along river and nalla banks and 100 meter wide belt around banks of perennial tanks was to be protected and no felling prescribed. Natural blank areas and area having density less than 0.4 with minimum 0.4ha. area and under stocked areas with density less than 0.4, such areas, were required to be artificially regenerated. The remaining areas were to be worked which were fit for harvesting.

The subsidiary cultural operations included following:

- a. **Cut back operation:** In the following year of main felling, operations were carried out departmentally as mentioned bellow.
 - i. All the standing trees marked for felling, but not felled were to be felled.
 - ii. All badly damaged trees with broken tops were to be felled.
 - iii. All suppressed advance growth of trees shall be cut back and the inferior growth likely to interfere with the established natural regeneration will be cut to free the same for future crop and congestion removed with care.
 - iv. Active gullies will be plugged.
 - v. All woody climbers will be cut.
- b. **Cleaning:** Cleaning operations shall be carried out in the 6th year of main felling. The operations shall be carried out as under:
 - i) All climbers shall be cut.

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- ii) Damaged and suppressed saplings and coppice shoots shall be cut back and natural regeneration freed from competition.
 - iii) Multiple coppice shoots shall be reduced to two, retaining the most vigorously growing ones.

ii) IMPROVEMENT WORKING CIRCLE :

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

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

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

SILVICULTURAL SYSTEM :

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

The working rules prescribed formation of 55 felling series distributed in 55 compartments over the area 7011.162 ha. The working rules prescribed no fixed rotation. All areas were kept under strict fire protection vigil. All current coupes were to be closed for grazing for seven years. The villages were not allowed to harvest their nistar requirements themselves.

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

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

SPECIAL OBJECTS OF MANAGEMENT.

Special objects of management are

- i) To raise bamboo plantation to meet local demand,
- ii) To attain maximum utilisation of the area under plantation (maximum utility of the land)
- iii) To provide employment to local population.

The working rules prescribed selection of site, raising of planting stock two years in advance in the nurseries. The bamboo under planting was to be done in a spacing of 6 mtr. x 6 mtr. which required about 200 polypots per hectare. Bamboo

plantations were expected to reach harvesting stage after 6 years and a cutting cycle of 4 years was prescribed.

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7) K.N.KHISTI'S WORKING PLAN (1977-78 to 1991-92) :

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

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

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

TABLE-33

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

i) SELECTION-CUM-IMPROVEMENT WORKING CIRCLE:

The forest of this working circle is found on hilly to undulating terrain. The working circle comprises of teak forest, miscellaneous forest with low proportion of teak and miscellaneous forest devoid of teak. Teak forms about 40 to 60% of the growing stock. Density of the crop ranges between 0.5 and 0.7. The site quality varies from IVa to III. The teak trees of site quality III is fairly straight. Natural regeneration of teak was scanty to poor.

OBJECTS OF MANAGEMENT:

The objects of management were:-

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

SILVICULTURAL SYSTEM.

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

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

The subsidiary cultural operations included cutting back operation, cleaning and thinning in plantation areas. After main felling the coupes were closed for grazing for a period of five years.

ii) COPPICE WITH RESERVES WORKING CIRCLE :

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

tendu, moha, rohan and teak in the over wood and khair, bhirra, garari in the under wood. The undergrowth is sparse.

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OBJECTS OF MANAGEMENT

The objects of management are as follows:-

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

SILVICULTURAL SYSTEM .

The silviculture system was coppice with reserves.

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

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

iii) PLANTATION WORKING CIRCLE :

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

OBJECTS OF MANAGEMENT:

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The objects of management are as follows:-

- a) To counter balance paucity of natural regeneration by raising plantations of economically valuable species particularly the teak.
- b) To augment resources in softwood species.
- c) To increase the value of the growing stock.

SILVICULTURAL SYSTEM

The silvicultural system prescribed was clear felling followed by artificial regeneration.

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

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

iv) MISCELLANEOUS WORKING CIRCLE :

This working circle comprised of very much under stocked, extensively eroded areas near forest villages. The crop was very poor in density and site quality being generally IVb.

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

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

v) BAMBOO (OVERLAPPING) WORKING CIRCLE :

This working circle comprised of areas bearing bamboos in selection-cum-improvement working circle, coppice with reserve working circle and miscellaneous working circle.

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

OBJECTS OF MANAGEMENT :

The objects of management were as follows:-

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

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

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

c) Use of tender bamboo for bundling.

10) Use of sharp instruments should be insisted upon during extraction.

11) All climbers infesting the bamboo clumps should be removed.

8) WORKING PLAN BY SHRI DR.S.S.SRIVASTAVA FOR THE PERIOD (2004-05 TO 2013-14) :

After the end of working plan, by Cluttbuck (prior to 1903), Gentle plan (1930 to 1946), T. Mc. Donald and Mujumdar's plan (1947 to 1961), Chandras and Gurjar's plan (1965 to 1984) , S.A.H . Qureshi's plan (1985-86 to 2000-2001) , A.P. Deshmukh and S.P. Joshi's plan (1990-91 to 1999-2000) , K.N. Khistis's plan(1977-78 to 1991-92) ,all these plan dealt with part of forest tract of Allapalli division and the plan by DR.S.S. Shrivastava, covered first time the entire forest area under management of Allapalli forest division for the period from 2004-05 to 2013-14 and extension for the year 2014-15 & 2015-16 is accorded by Govt. Of India in MoEF. **(Appendix No.LXXIII)**

The aims and objectives of the plan were also based on the National Forest Policy 1988 and following general objects of management were proposed.

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

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

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

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

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

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

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

viii) To achieve compatible wildlife management.

ANALYSIS AND VALUATION OF THE CROP :

The enumeration of the growing stock was done by Survey of Forest Resources Unit at Chandrapur. 1% point sampling has been done by taking up plots of 60 mtr. x 60 mtr. at a distance of 600 mtr.

FORMATION OF WORKING CIRCLES :

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Keeping in view the objects of the management and the methods of treatment, the following working circles were prescribed in Shrivastava's working plan.

TABLE-34

LIST OF WORKING CIRCLES IN DR. SHRIWASTVA'S PLAN

Sr.no	Working circle	Area
1	Selection-cum-Improvement Working circle.	100283.382
2	Improvement Working Circle.	60640.152
3	Teak Plantation Working Circle.	20978.095
4	Afforestation Working Circle	29627.414
5	Protection Working Circle	6413.632
6	Bamboo (Overlapping) Working Circle.	12200.473
7	Wildlife (Overlapping) Working circle.	217942.685
8	Non-wood Forest Produce (Overlapping) Working Circle.	217942.685

1) SELECTION-CUM –IMPROVEMENT WORKING CIRCLE

1. GENERAL CONSTITUTION OF THE WORKING CIRCLE:

This working circle includes better forest areas i.e. all felling series worked under SCI in the previous working schemes. This working circle includes the areas which have I) Teak in very good proportion but which can not be worked under concentrated regeneration operations due to hilly terrain. ii) area with low proportion of teak and iii) areas with mainly miscellaneous species. The second and third type of areas are on sandy soils and if worked under concentrated regeneration i.e. teak conversion working circle may lead to soil erosion. The forests are of III to IV quality which reaches to quality II on good soil. The quality IV patches lie scattered all over the area.

2. SPECIAL OBJECTS OF MANAGEMENT

- i. The special objects of management are:-
- ii. To improve the quality and increase the proportion of valuable species by giving preferential treatment to naturally regenerated seedlings and by planting timber species mainly teak and its associates.
- iii. To produce large size timber by utilizing the full potential of the site.
- iv. To increase stocking of teak, bamboo and other valuable species.
- v. To promote and tend available regeneration of all valuable species.

- vi. 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.
- vii. To attain normalcy in the forest.

3.HARVESTABLE GIRTH :

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

1. Teak	135 cms.
2. Ain, bija, shisham and haldu	120 cms
3. Other timber species(other than in 1 & 2 above).	120 cms
4. Garari, lendia, khair.	45 cms.

4. REGULATION OF YIELD:

The annual yield will be regulated by area by making coupes as far as possible equi-productive in each felling series. The coupes of 100 to 125 ha has been laid down.

5. DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAPS AND MARKING TECHNIQUES:

(A) DEMARCATION:

Coupes will be demarcated one year in advance of the main felling.

(B) PREPARATION OF TREATMENT MAP:

The demarcation of the area shall be shown on the management maps generated through geographical information system (GIS) in the office of the Conservator of Forests, Working Plan Division, Gadchiroli and the treatment map shall be prepared by an officer not below the rank of R.F.O. after thorough inspection of the area as per working plan maps. It will be verified on the ground and approved by the A.C.F. in charge. The treatment map will show the following details.

TYPE A - PROTECTION AREA :-

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

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(iv) Riparian Zones

(v) Sacred Groves.

TYPE-B: UNDER STOCKED AREAS:

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 :-

It includes patches of well grown pole crop of teak and other miscellaneous species suitable for retention as a future crop in addition to old plantations. The patch will not be less than half hectare. These patches will be spaced out for healthy growth.

TYPE – D- WELL STOCKED AREAS:

Area with crop density above 0.4 included in this category.

TREATMENT:

Treatment map shall be generated in the office of the Conservator of Forests, Working Plan Division, Gadchiroli through Geographical Information System (GIS) showing the following features

Protection area which includes the steep slope above 25 degrees, areas likely to erode and a strip of 30mt along nala banks.

Under-stock area, less than 0.4 density.

Well stocked areas more than 0.4 density .

The C type area which can not be identified by the satellite through N.D.V.I will be assessed by visiting sites. The treatment map will be checked by the ACF before proceeding with the final felling.

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 :**

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Felling is not prescribed.

(ii) **Type B – Under-stocked Area :**

Teak and suitable miscellaneous species shall be planted.
Suppressed trees will be cut back.

(iii) **Type C – Pole Crop :**

No planting will be done. Thinning will be done in the young pole crop to 1/3 of the height. Teak plantation areas shall be treated as per prescriptions provided for old teak plantations working circle of this plan and such type of areas have been excluded from this working circle.

(iv) **Type D - Well Stocked Areas :**

No planting will be done. Felling will be carried out as provided under Marking Rules.

MARKING RULES AND MARKING TECHNIQUES:

Marking Rules:

Marking will be done in the same year in which demarcation will be done. Before actual marking, sample plots of size 60mtr. X60 mtr. with intensity 5 to 10 % in each section of coupe will be taken. Sample plots should not be at the edge of the coupe. The distance between the centers of two sample plots should not be less than 200 m. In sample plots complete enumeration will be done and the data will be compiled in the same format as is given in enumeration data analysis results. From this, the distribution of stems among different species and girth-classes can be known. In case if it is not practical to do the enumeration, the existing enumeration data shall be used for deciding the deficit or excess.

Then the site quality will be determined. In the same coupe when a patch of more than 5 ha. is having different quality, the enumeration data should be collected separately. The abstract of enumeration data will be prepared site quality wise. Thereafter, the normal stands table for uneven-aged normal forest for the above site qualities will be taken and comparison will be done. The surplus number of stems/ha will be marked for felling against concerned girth classes as is done in the case of thinning in even-aged forests with the help of yield table. The surplus number of stems/ha is to be removed from respective girth classes. Then the no. of stems to be removed from harvestable girth class is determined on the basis of groups of different species. In marking of the above surplus and mature trees, silvicultural, social and financial aspects of the species should be taken into account. In deciding the preference

of removal, if the crop composition has teak more than 20% then only the teak trees will be removed and miscellaneous non teak trees will be retained. In case, the crop has less than 20% teak then teak shall be retained. In main felling coupes, thinning felling will be done after execution of felling of mature trees, because in felling, some of small trees are damaged and they are to be removed. In order to compensate this unforeseen loss, the same number of trees, in respective girth classes is retained from the list of thinning marking. If there is no surplus stems in the girth class in which damage has been caused, the retention, from the nearer lower girth class in which surplus is there, will be done. For such type of retention basal area or volume should be the basis. Loss in higher girth class will be compensated with larger number from lower girth class and vice versa.

Besides, in each sample plot at any corner 20 mtr. x 20 mtr. plot is taken & regeneration survey is carried out. For this survey, data for different species are to be collected in the prescribed proforma.

TABLE No.35
Abstract of Regeneration Survey

Sr. No.	Species	No of Seedlings of height >30 cm & < 1.37mtr.	No of seedlings in Girth Class 0 U 15

The required number of seedlings of height more than 30 cm and up to 1.37 meter for a given site quality and with reference to the existing crop composition can be had from the normal stand table. If the number observed is less than the table value, the regeneration status is not up to the mark and accordingly decision for planting is to be taken and nursery activity should be started to have seedlings for planting in gap where oldest trees will be felled. Planting of natural and endemic species whose nursery technique is established will be preferred. Efforts to change the composition of the crop can be started with one or two favoured species in appropriate proportion by taking plantation in gaps created by felling. Species and its proportion will be decided as per site quality.

Marking techniques has been described in detail in chapter on Miscellaneous Regulations.

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

TYPE – A- PROTECTION AREAS:

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:

Marking will not be carried out except-

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All the dead trees after retaining two dead trees per ha.

- (ii) All live high stumps to be cut as close to the ground as possible and dressed.
- (iii) All coppice shoots of valuable species except one or two vigorously growing shoots per stool. Valuable species includes teak, ain, bija, dhawda, mowai etc.

Suppressed seedlings to be cut back , flush to the ground.

TYPE –C – POLE CROP:

The pole crop of not less than 0.5 hectares shall be spaced out in such a way that an average spacing of 1/3 of height of poles shall be maintained between two rows. The healthy poles will be preferred while retaining

TYPE – D- WELL STOCKED AREA:-

- i) All edible fruit yielding trees will be reserved from felling. All the trees of selection girth and approach class will be enumerated before marking in 15 cm. girth classes.
- ii) Climbers will be cut.
- iii) All trees in the pre harvestable girth class will be enumerated.
- iv) The entire multiple coppice tree or pole crops will be marked to reduce the number of stems or poles to one per stool retaining the most promising one.
- v) No tree will be marked for felling unless it is silviculturally available.
- vi) Only that number of teak trees preferably of coppice origin and that of harvestable girth and above will be marked for felling as prescribed under yield regulation. Those harvestable teak trees which are preventing the development of the seedling regeneration of the desired species will be removed in preference to others. Otherwise felling of trees from these girth classes will be first from the highest girth class and then next below and so on. Due care should be taken to remove teak trees of coppice origin while retaining the teak trees of seedling origin as far as possible. The trees which are not likely to survive till the next felling cycle will be preferred for removal. In addition to that the excess trees/poles

from each girth class as determined in earlier sections will be removed so as to achieve a normal forest in terms of its distribution. Based on the yield calculation for different group of species, the percentage of trees to be removed / harvested after marking is determined.

All suppressed and dead trees will be marked for felling, retaining two dead trees per hectare. To avoid the reckless felling, it is prescribed that suppressed trees having straight clear bole exceeding 2.5 meter in height from the ground level will not be felled. In addition to trees above exploitable girth as enunciated in table No. 73, the excess no. of poles/trees (or basal areas) from each girth class as explained in sub-chapter of normal forest shall also be removed to achieve normalcy. In the deficit class nothing will be done. There is no need to reserve the corresponding trees/poles from the lower girth class, for that basal area as it is not required for achieving normalcy. It has been found that the normalcy by the above method will be achieved after one or two rotations.

SOIL AND MOISTURE CONSERVATION WORKS :

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.

REGENERATION :

(a) NATURAL REGENERATION:

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:

Regeneration will be treated as adequate if the area contains more than 625 seedling per ha. in natural regeneration areas, the next year of main felling, systematic weeding should be carried out and continued thereafter until the plants are

free from the risk of competition. These areas will be rigidly protected from fire, 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 :

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 :

The areas which are deficient in natural regeneration shall be supplemented by planting suitable species of teak and other important misc. species such as Dhawada, charoli, Moha, Hirda, Behada, Ain, Arjun, Tiwas, Sivan, Chinch, Jamun, Ber, Kulu, Biba, Anjan, Apta, Amba etc. The ratio of the speices shall be teak: miscellaneous each fifty percent. Teak plantations shall be raised by stumps and miscellaneous plantations shall be raised by using seedlings raised in polypots / root trainers.

(c) METHOD OF PLANTING:

In the type B area of this working circle 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 this category should be marked with lime at 2 mtr. x 2 mtr. 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:

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.

All the marks where pits are not to be dug should be crossed on the treatment map. Pit of the size 45 cm. x 45 cm. x 45 cm. should be dug at other points. Not more than 10 percent of the coupe area will be planted every year.

SUBSIDIARY SILVICULTURAL OPERATIONS:

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

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

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 is likely to interfere with growth of teak and valuable miscellaneous species shall be cut.
- v) All suppressed and damaged advanced growth shall be cut back.

CLEANING:

These operations shall be carried out in the sixth year of main felling. The following operations are carried out.

- (i) Climber cutting.
- (ii) All dead, badly damaged and uprooted trees should be cut.

Cutting coppice shoots except one vigorously growing per stump where there is absence of advance growth of seedling origin (natural or planted).

RESULTS OF IMPLEMENTATION OF CURRENT WORKING PLAN

Selection cum Improvement Working Circle:

The forests in this working circle comprises of good quality of teak and teak-miscellaneous forests, with dense bamboo and forests that are situated mostly on hills and in interior areas. These forests exhibit a great genetic diversity, crop density varies from 0.6 to 0.8 and the site quality is between II and IVa and rarely IVb. However the site quality in some compartments in Allapalli Range reaches to I. Bamboo forms under storey and considerable degree of congestion in the clumps is noticed particularly in the areas of Nistar Bamboo F.S. The quality, density and composition of the crop change from place to place and within short distance. The status of natural regeneration of some of the miscellaneous species is satisfactory. Therefore, the advantage of this situation will be taken to regenerate the area. Although the growing stock mainly

consists of miscellaneous species, patches of well drained soils and undulated area support the growth of the teak. The details of coupes worked under this working circle are as under

TABLE-36

THE DETAILS OF COUPES WORKED UNDER S.C.I. WORKING CIRCLE

Coupe No.	Year of felling	Total Coupes No.	Total area ha.	Felled coupes No.	Area of felled coupe ha.	No. of Trees marked No.	No. of Trees felled No.	Production		Production / Ha.	
								Timber (cu. m)	Fuel Beat (Nos.)	Timber (cu. m)	Fuel Beat (Nos)
I	2005-06	45	4786.647	11	873.312	9193	3728	1983.591	5078.00	2.271	5.81
II	2006-07	45	5071.373	10	951.249	16237	16135	1266.840	6645.50	1.332	6.99
III	2007-08	45	4957.833	23	1582.443	33249	26795	4296.083	11059.50	2.715	6.99
IV	2008-09	45	4850.658	15	1160.432	28772	26610	5783.356	10668.50	4.984	9.19
V	2009-10	45	4832.298	16	1096.815	25576	23249	5737.093	8214.50	5.231	7.49
VI	2010-11	45	5002.309	16	1240.512	32873	31242	6398.592	10148.00	5.158	8.18
VII	2011-12	45	5064.014	16	1389.827	35199	29757	8678.495	12972.00	6.244	9.33
VIII	2012-13	45	4959.781	16	1375.991	27856	26277	5919.625	11263.00	4.302	8.19
IX	2013-14	45	5024.166	19	1605.635	34591	30415	4502.320	9309.00	2.804	5.80
X	2014-15	45	5059.817	15	1485.966	34775	8916	6786.321	3749.00	4.567	2.52
Total		450	49608.896	157	12762.182	269128	219396	51352.316	89107.00	4.024	6.98

- Percentage of area felled against the target 25.73 %
- Percentage of coupes felled against the target 34.89 %

The status of regeneration as per sample plot (100 mtr. x 100 mtr.) in the felling series viz., Ghot, Gundapalli, Chapalwada, Kotari, Vikaspalli, Regdi, Hetalasa, Gatta, is tabled below.

TABLE-37

STATUS OF REGENERATION - SCI WORKING CIRCLE

S. NO	COUPE NO	YEAR OF WORKING	NO OF SEEDLINGS/HA			TOTAL
			<10 cm girth	11-20 cm girth	21-30 cm girth	
1	I	2005-06	160	113	62	335
2	II	2006-07	163	128	121	412
3	III	2007-08	190	155	163	508
4	IV	2008-09	183	155	141	479
5	V	2009-10	162	140	123	425
6	VI	2010-11	253	251	316	820
7	VII	2011-12	182	152	175	509

From the above it is indicative that worked area also supports better regeneration.

Criteria for allotment of areas in SCI working circle:

1. Areas having more silviculturally mature trees are proposed to be included in SCI. Areas with all aged class trees with good regeneration are preferably included in this.
2. Areas having density of more than 0.5 are proposed to be included in SCI.
3. Areas capable of producing big and small sized timber, poles and firewood on sustained basis by way of improvement operation to meet the local requirement to the possible extent and ensure the sustained yield of aforesaid produce together with large sized timber in future.

Assessment of S.C.I. Working Circle:

The observations on working of this working circle are as under

- The status of natural regeneration has improved as can be seen from the data of sample plots.
- The hygienic condition of forest area has improved to some extent because of operations like climber cutting, removal of dead, dying and diseased trees.
- The congestion due to growth of inferior species like garadi, lendia etc has been eased out which has resulted in improvement of general condition of forests.
- CBO works and adequate regeneration works were carried out has also helped in improving the coupe area.
- Out of 360 coupes harvesting works could not be carried out in 39 coupes as they fall within 10 km of protected area and 198 coupes due to naxal activities.

5.9.5

ii) IMPROVEMENT WORKING CIRCLE

1. GENERAL CONSTITUTION OF THE WORKING CIRCLE:

The following areas are proposed to include in the working circle:-

- (i) The areas which were managed under improvement working circle of working plan by Shri. A.P. Deshmukh
- (ii) Miscellaneous working circle areas of Ghot Range of Shri. K.N. Khisti's plan.
- (iii) Miscellaneous Working Circle Areas of Allapalli Range in Shri. S.A.H. Qureshi's plan.

(iv) The remaining areas of C.W.R. system of Shri. K.N. Khisti's plan which have not been included in afforestation working circle in this plan.

(v) Protected Forests and Un-classed Forest areas which are fit to be retained under this Working Circle.

2. SPECIAL OBJECTS OF MANAGMENT:

- i. To maintain and improve the vegetation cover.
- ii. To improve stocking, composition and condition of the growing stock
- iii. To help natural regeneration of various species to establish and supplement the same by taking up afforestation works in under stocked areas.
- iv. To check soil erosion for increasing the productive capacity of the soil and maintaining the same.
- v. To meet the local demand for firewood, building material and agricultural equipments through nistar.

SILVICULTURAL SYSTEM :

To achieve the special objects of management, "Improvement felling supplemented by planting and tending of crop" shall be adopted.

FELLING CYCLE & HARVESTABLE GIRTH:

Felling cycle has been fixed at 20 years. In this working circle, only improvement felling is prescribed which will include removal of all such trees which are not likely to survive full felling cycle. There is no need for fixing the separate harvestable girth for this working circle and therefore the same harvestable girth as those prescribed for Selection-cum-Improvement Working Circle will be adhered to. Marking will be thinning marking and therefore from all girth classes surplus trees will be removed.

REGULATION OF YIELD:

The crop is generally young to middle aged. The felling is limited to improvement of the crop and the removal of trees above exploitable girth classes in the dense patches provided these trees are available silviculturally. The thinning will be done in the dense pole crop. Therefore the yield will vary and consist of small wood, poles and firewood only. Hence no yield regulation is prescribed.

**DEMARCATON OF COUPES, PREPARATION OF TREATMENT MAP
AND MARKING RULES:**

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DEMARCATON

It will be done one year in advance.

PREPARATION OF TREATMENT MAP:

A broad treatment map will be generated in the office of the Conservator of Forests, Working Plan Division, Gadchiroli using G.I.S. Software showing the following details.

- i. The protection area i.e. areas having slopes greater than 25° and width of 30 mtr. along the nala banks.
- ii. Area having crown density less than 0.4 .
- iii. Teak plantation, sample plots and preservation plots.
- iv. Area with the density more than 0.4.

Besides the aforesaid area on the treatment map, the following shall be included.

TYPE – A: PROTECTION AREAS :- This will include the following areas:

- (i) The area having steep slopes i.e. more than 25°
- (ii) Eroded or liable for erosion.
- (iii) A strip of 30 meter wide on either side of water course.
- (iv) Riparian zone.
- (v) Sacred grooves.

TYPE – B: UNDERSTOCKED AREAS :- The forests having density less than 0.4 are included in this category. It will include,

- (i) Areas with adequate root stock i.e. 625 seedlings per hectare.
- (ii) Area with inadequate root stock.

TYPE – C: GROUPS OF YOUNG POLES:- The group of young poles in patches of 0.5 hectare will be identified.

TYPE – D: WELL STOCKED AREAS:- The areas having forests more than 0.4 density are included in these areas. In such areas felling is envisaged.

MARKING RULES:-

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Marking will be done in the same year in which demarcation will be done. Soon after the receipt of approved treatment map, marking will be done. The marking technique is described in detail in the miscellaneous regulations. The common prescriptions for all types of area is given below:

- i. The common climber cutting operations will be taken up in the entire area. Soil and moisture conservation works such as continuous contour trenches, check dams, gully plugging etc. will be taken up.
- ii. Dressing of high stumps: The high stumps of the coppice species will be enumerated and measured and separate record will be prepared. The high stumps will be felled after approval from the Dy. Conservator of Forests. The felling should be 30 cm above ground level in order to promote lateral shoots instead of callous shoots.
- iii. The multiple shoots will be singled out into one and the promising lateral shoots shall be preferably retained. The suppressed poles shall be flushed to the ground.
- iv. The dens and snags will be retained preferably two dead non-teak trees will be retained as snag trees along with two fallen logs per hectare of non-teak species.
- v. Thinning will be done in the bamboo clumps falling in these coupes outside the regular bamboo coupes according to silvicultural prescriptions.
- vi. The congestion in the crop will be removed in order to promote healthy growth of the preferred species. The best poles will be retained as a future crop. The multiple poles from a single tree will be reduced to one.
- vii. The removal of non-wood forest produce in a non-destructible manner will continue.

The marking rules for each type of area, will be as follows:

TYPE A: PROTECTION AREA :

No marking will be done. The dead trees will be removed and the blank patches will be planted with species like neem, sisoo, shivan, siras etc.

TYPE B: UNDERSTOCKED AREA:

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All edible fruit and flower yielding trees will be reserved from felling. The following trees will be marked for felling:

- i) All dead and suppressed trees after retaining two dead trees/ha.
- ii) All but one vigorously growing coppice shoot per stool.
- iii) All live high stumps.
- iv) All edible fruits and flowers yielding trees will be reserved from felling.

TYPE C: GROUPS OF YOUNG POLES:

Silvicultural thinning shall be done as per yield table. The patches of not less than 1 hectare shall be identified having advance growth of any species and it shall be spaced out to one third of the top height, while retaining the vigorous and straight poles. The thinning shall be done in such a manner that epicormic branches do not come up. In the natural young crop thinning, marking will be done on the basis of weighted average g.b.h and site quality with the help of yield table or normal stand table as described in Teak Plantation Working Circle of this plan. In the plantation, thinning will be done as per the procedure prescribed in Teak Plantation Working Circle.

TYPE D: WELL STOCKED AREA :

All edible fruit and flower yielding trees such as moha, char, tendu, aonla, chinch, bel, sitafal, and trees of kulu will be reserved from felling. The species having their population less than 1 tree per hectare on the basis of tree enumeration data, will not be felled. The important tree species which should be reserved are haldu, shisam, shivan, tiwas, alonla, hirda, behada, dhaoda etc.

REGENERATION.

(A) Natural Regeneration.

Area containing good natural regeneration will be identified in the coupe and will be protected from fire and grazing.

(B) Artificial Regeneration:

Areas which are deficient in natural regeneration shall be supplemented with artificial regeneration. Suitable well drained areas preferably of site quality III & IVa having deficient natural regeneration will be selected for improving the stocking with artificial regeneration. This artificial regeneration will be restricted to 10 % of the

coupe area. The plantation will be done in a single phase as the soil is good and does not require restoration.

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SOIL AND MOISTURE CONSERVATION WORKS.

Soil and moisture conservation works will be carried out after the preparation of treatment map and is approved by the Deputy Conservator of Forests. Works shall be completed before the onset of monsoon. Gully plugging and nala bunding, WATs shall be done as per hectare or as per the treatment prescribed after actual inspection. The nala bund will be designed taking into consideration the catchment area, intensity of the rainfall and run off using Dunken's formula.

SUBSIDIARY SILVICULTURAL OPERATIONS:

(A) CUTTING BACK OPERATIONS:

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:

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 suppressed poles will be cut back.

(C) WEEDING:

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

RESULTS OF IMPLEMENTATION OF CURRENT WORKING PLAN

Improvement Working Circle:

The areas included in this working circle consist of teak and teak inferior miscellaneous species of stunted growth which require silvicultural operation and a good growing space. The forest is open, soil is shallow liable to erosion. The status of regeneration is poor. The density varies from 04. to 0.6. Site quality varies from III to

Iva. The crop consists of mainly of garadi, ain, mahua, salai, khair, bel, tendu, lendia, achar with patches of bija, rohan, dhawda hingan, bharati, lokhandi, dikemali, kharata appear as shrubs.

Felling cycle has been fixed at twenty years. In this working circle, only improvement felling has been prescribed which include removal of all such trees which are not likely to survive full felling cycle. The harvestable girth prescribed for SCI working circle has been adhered to. The area is divided into 29 felling series.

TABLE-38
The details of coupes worked under Improvement Working Circle

Coupe No.	Year of felling	Total Coupes No.	Total area ha.	Felled coupes No.	Area of felled coupe ha.	No. of Trees marked No.	No. of Trees felled No.	Production		Production / Ha.	
								Timber (cu. m)	Fuel Beat (Nos.)	Timber (cu m)	Fuel Beat (Nos)
I	2005-06	14	1614.692	3	406.009	2677	2677	137.449	1306.00	0.339	3.22
II	2006-07	14	1715.969	5	584.566	7173	7148	460.185	2448.50	0.787	4.19
III	2007-08	14	1542.285	9	832.833	9347	9336	526.071	3488.50	0.632	4.19
IV	2008-09	14	1542.600	7	824.62	8298	7915	623.579	800.00	0.756	0.97
V	2009-10	14	1660.703	4	301.35	4188	4188	661.1	1833.00	2.194	6.08
VI	2010-11	14	1476.282	5	438.98	5575	5575	1120.629	1914.00	2.553	4.36
VII	2011-12	14	1611.902	4	307.536	4929	4141	578.829	2215.00	1.882	7.20
VIII	2012-13	14	1396.567	3	234.013	2994	1974	461.683	1107.00	1.973	4.73
IX	2013-14	14	1498.323	3	194.570	2704	1850	336.965	864.00	1.732	4.44
X	2014-15	14	1673.889	4	400.826	6503	2052	678.49	846.00	1.693	2.11
Total		140	15733.212	47	4525.303	51711	44179	5584.980	16822.00	1.234	3.72

- Percentage of area felled against the target 28.76 %
- Percentage of coupes felled against the target 33.57 %

The status of regeneration as per sample plot (100 mtr. x 100 mtr.) in the felling series viz., Ghot, Gundapalli, Chapalwada, Kotari, Regdi, Wakdi is tabled below.

TABLE-39
STATUS OF REGENERATION - IMPROVEMENT WORKING CIRCLE

S. NO	COUPE NO	YEAR OF ORKING	NO OF SEEDLINGS/HA			TOTAL
			<10 cm girth	11-20 cm girth	21-30 cm girth	
1	III	2007-08	157	148	144	449
2	IV	2008-09	82	118	158	358
3	V	2009-10	157	281	262	700
4	VI	2010-11	206	240	194	640
5	VII	2011-12	78	128	164	370

From the above it is indicative that worked area supports better regeneration.

Criteria for allotment of areas in IWC Working Circle:

The general condition of the crop is good and can be used as a future crop to be tackled under Selection cum Improvement Working Circle, if adequate scientific management methods such as climber cutting, tending and cleaning operations are timely carried out and general and specific protection measures are taken.

Assessment:

The observations on working of areas under this working circle are as under.

- The natural regeneration got fillip because of removal of over mature trees and thinning out of congested areas.
- The hygienic condition of forest area has improved to some extent because of operations like climber cutting, removal of dead, dying and diseased trees.
- Works such as cutting back operations and cleaning were carried out as per the prescription during the past 8 years. This has helped in improvement of the site condition.
- Out of 112 coupes, harvesting works could not be carried out in 9 coupes as they fall within 10 km of protected area and 63 coupes due to naxal activities.

iii) TEAK PLANTATION WORKING CIRCLE

1. GENERAL CONSTITUTION OF THE WORKING CIRCLE

The working circle includes 11476.816 ha area. The teak plantations taken up in the current coupes of previous working plan as per the prescription contained in them have been included in this working circle. Shri S.A.H.Qureshi prescribed teak planting in PBI areas of teak conversion working circle. Shri K.N.Khisti proposed a teak plantation working circle in Ghot Range and PBI areas of conversion working circle and plantation working circle and all the areas planted with teak as per prescription given by Chandras and Gurjar in Pedigudam Range.

2. GENERAL CHARACTER OF THE VEGETATION:

The forest included in this working circle are mostly of over matured and matured teak and its associated miscellaneous species such as ain, dhawda, bija, aonla, tiwas moha, charoli, lendia, garari, etc. which has come up naturally or as an under storey. The site quality is II to III with few patches of site quality I and the crop density is 0.5 to 0.8. The natural regeneration of teak is scanty and the crop is young to middle aged in the old teak plantation and it is mature to over mature in the Teak Conversion

Working Circle areas of earlier working plans which could not be worked due to ban on clear felling. Such areas are more susceptible to fire and damages caused due to strong winds in the pre-monsoon season which uproot such trees and lead to loss of best quality timber every year therefore if in such areas over wood is not removed and replanted with teak, there is every possibility of the degradation of site quality and losing most valuable forests of India.

3. SPECIAL OBJECTS OF MANAGEMENT.

The objects of management in this working circle are listed as under.

- (i) To utilize the maximum production capacity of forest.
- (ii) To obtain maximum sustained yield.
- (iii) To carry out thinning as per the yield table on the basis of age and site quality.
- (iv) To save the forest from degradation.
- (v) To improve the crop by carrying out required silvicultural operations so as to achieve growth parameters comparable to those in the yield table.
- (vi) To involve the local people through J.F.M. Committees in the management and protection of the forest.

4. SILVICULTURAL SYSTEM.

Consistent with the objects of the management of this working circle the silvicultural system will be Conversion to Uniform System with supplemental artificial regeneration of genetically superior stock of teak in the teak plantation working circle. The plantations will be subjected to thinning and the first two thinning will be done in the 10th year and in the 15th year and the subsequent thinning at every 10 years. It has been found that the difference between two thinning should be of 10 years as it takes 5 years to close the canopy opened due to thinning and another 5 years are required to kill the branches which have grown on the stem due to opening of the canopy.

5. REGENERATION OF TEAK

(A) NATURAL REGENERATION:

In the moist type of forest where the canopy is complete, teak forms a small proportion of crop along with tall, well formed scattered clumps of bamboo, the natural regeneration teak is poor or wanting in the dry type where teak is found with *Anogeissus latifolia*. The factors affecting natural regenerations are climate, altitude

and aspects, the capacity of the seed to germinate, the conditions favourable for establishment of seedlings and the method of management. The climate in India, is distinguished 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 pre monsoon 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.

The physical structure of the soil especially its porosity, is responsible for success of natural regeneration. Granite, gneiss and trap formations produce favourable soils, basalt and sandstone develop adequately porous soils but the humus disintegrates very rapidly on such soils. Teak regeneration does not thrive on laterite because humus is rapidly leached out and also due to highly acidic nature of the soil. In endoyenamorphic soils, which are mostly present in this area, the characteristic of the rock beneath plays an important and decisive role in determining the nature of surviving forest and the future crop. Trap is a natural home of teak and this soil is present at many places. Teak grows well when the soil conforms to certain physical and chemical properties and therefore the soil should be tested before taking up teak plantations. Teak prefers slightly basic to neutral soils with high exchangeable Calcium and Magnesium. Teak grows well in humus rich sandy loam soils due to plasticity index. Teak grows well on northern and eastern aspects.

In moist deciduous forests, the forest floor is covered with dense undergrowth and therefore prevents the radicle to reach the ground and thus the seedlings fail to establish. The opening of the forest canopy may lead to increase in the growth of grasses and other weeds, which will again prevent establishment of natural regeneration.

In natural forest, the annual ground fire scorches the seeds and helps in natural regeneration. The establishment of teak seedlings depends especially on light however the sudden influx of light may cause death of young seedlings. The drip from the trees also adversely affects the young plants. The early development of strong tap-root requires a soft friable soil or the seedlings will remain weak and small and incapable of surviving the ensuing dry season.

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.

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:

The artificial regeneration of teak will be done by planting root shoot stumps prepared from the seedlings raised from quality teak seeds collected and marketed by FDCM Ltd.

CHOICE OF SPECIES.

The teak will be the principal species to be planted at a spacement of 2 mtr. X 2 mtr. The standard nursery and planting techniques for raising teak shall be adopted. Every year about 250 hectares of area shall be selected for canopy removal and after removal of canopy it will be planted with 'A' grade stumps raised from seeds obtained from F.D.C.M. Ltd. Each patch shall not exceed 20 hectares and in between two patches a natural strip of 20 meters will be retained on each side of the planted area. In this strip of 20 mtr. width, the forest will be managed as per prescriptions given for Selection-Cum-Improvement W.C. The site selected for teak plantation shall be rich in sandy loam soil or a well drained clayey loam soil with high degree of exchangeable calcium. The clay or red soil, lateritic soil and water logged areas should be avoided for raising teak. Debudding should be carried out in the plantations in the following 2 to 3 years after plantation.

REGULATION OF YIELD.

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.

DEMARCATON OF COUPES, PREPARATION

OF TREATMENT MAP AND MARKING TECHNIQUES:

i) Demarcation:

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:

The treatment maps shall be prepared by RFO and approved by ACF. A copy of the coupe map can be drawn through GIS system available in the office of the

Conservator of Forests, Working Plan Division and these maps will be used for treatment.

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iii) Marking techniques :

The standard marking techniques which have been prescribed in the Chapter on Miscellaneous regulations shall be followed and adopted.

Thinning in teak plantation:

(A) Mechanical thinning:

Teak is traditionally planted at a spacing of 2mtr. x 2mtr. i.e. 2500 seedlings per hectare and in ideal condition, would require a thinning at a age of 5 years of its formation 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 thinning at plantation age of 5 and 10 years. It prescribed following standard:

<u>Year</u>	<u>No./ha. (for site quality –III)</u>	<u>Spacement</u>
1 st Year	2500	2 mtr. x 2 mtr
5 th	1767 (after 1 st Mechanical thinning of removing alternate diagonal lines)	2 mtr. x 4 mtr.
10 th year	1250 (after 2 nd Mechanical Thinning by removing alternate vertical lines)	4 mtr. x 4 mtr

(1) Demarcation, preparation of treatment map and cleaning :

(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 under stocked 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 Chief Conservator of Forests (Territorial). The cleaning of plantation should include the removal of –

- i) Bushy weeds.

- ii) Garadi, lendia or any other pioneering species. Trees/poles of spp. Amaltas will not be removed as this is the natural biological parasites of teak-defoliators and teak-skeletonisers
- iii) Damaged or badly shaped poles/trees will be flushed to the ground.
- iv) Climber cutting :- The climber will be cut at two places,. The cleaning will be done only in the areas of the plantation, under thinning, as these are usually devoid of under growth, mainly due to closed canopy and often due to un-established allopathic effect where it is required. The cleaning may not be required in older plantations.

(B) Silvicultural Thinning :

The low grade thinning shall be done after 2nd 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 moribund trees, suppressed trees, dominated trees, whips, trees with defective stems and crowns. Only trees with normal crown development and good stem forms should be retained. All coppice crop should be removed, if silviculturally available and if all coppice crop is required to be retained, it should be of side origin and not of callous origin. The C-grade thinning include removal of dominated suppressed, diseased, dead and moribund, and also the removal of dominated trees with defective stem and crown. This is needed to promote 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 to a required basal area at that age with the yield table.

(1) Demarcation, preparation of treatment map and cleaning

(a) Demarcation :

The thinning area should be properly demarcated.

(b) Treatment Map:

Treatment map will be prepared, showing the extent of area, for thinning , and the under stocked area, which is not to be thinned.

(c) Cleaning :

The cleaning of plantation should include the removal of –

- i) Bushy weeds.

- ii) Garadi, lendia or any other pioneering species. Trees/poles of spp. Amaltas will not be removed as this is the natural biological parasites of teak-defoliators and teak- skeletonisers
- iii) Damaged or badly shaped poles/trees will be flushed to the ground.
- iv) Climber cutting :- The climber will be cut at two places. The cleaning will be done only in the areas of the plantation, under thinning, as these are usually devoid of under growth, mainly due to closed canopy and often due to un-established allelopathic effect where it is required. The cleaning may not be required in older plantations.

RESULTS OF IMPLEMENTATION OF CURRENT WORKING PLAN

Teak Plantation Working Circle

The forest included in this working circle are mostly of over matured and matured teak and its associated miscellaneous species such as ain, dhawda, bija, aonla, tiwas moha, charoli, lendia, garari, etc. which has come up naturally or as an under storey.

This working circle comprises of 16 plantation series for raising up teak plantations in 12448.192 ha spread over in 68 and 14 part compartments of Allapalli and Aheri and Pedigundam Range. The details of coupes worked in this working circle are as follows.

TABLE-40
THE DETAILS OF COUPES WORKED UNDER TEAK CONVERSION WORKING CIRCLE

Coupe No.	Year of felling	Total Coupes No.	Total area ha.	Felled coupes No.	Area of felled coupe ha.	No. of Trees marked No.	No. of Trees felled No.	Production		Production / Ha.	
								Timber (cu. m)	Fuel Beat (Nos.)	Timber C.mt.	Fuel Beat Nos.
I	2005-06	16	616.431	5	165.431	5260	5260	7571.658	8180.00	45.769	49.45
II	2006-07	16	637.797	4	122.258	19590	19590	5082.449	4405.00	41.572	36.03
III	2007-08	16	631.482	6	189.507	35373	34624	11511.361	12262.50	60.744	64.71
IV	2008-09	16	615.446	11	338.347	66231	62882	18983.518	16151.00	56.107	47.74
V	2009-10	16	614.890	8	208.63	46631	32488	13393.82	12420.00	64.199	59.53
VI	2010-11	16	630.136	9	268.286	62908	62015	14278.484	12072.50	53.221	45.00
VII	2011-12	16	631.510	8	255.08	47484	45348	11526.742	10730.00	45.189	42.07
VIII	2012-13	16	631.130	9	244.279	57469	49033	13700.078	11015.00	56.084	45.09
IX	2013-14	16	596.03	9	248.690	50649	46321	15483.253	11122	62.259	44.72
X	2014-15	16	622.220	7	228.262	48945	44368	13298.233	11071.00	58.259	48.50
Total		160	6227.072	76	2268.77	435280	396669	124829.59	109429.00	55.021	48.23

- Percentage of area felled against the target 36.43 %
- Percentage of coupes felled against the target 47.50 %

Under subsidiary silvicultural operations of this working circle, thinning operations were also carried out. The details of the thinning operations are as follows

TABLE-41
Thinning- details of coupe worked (Area in hectares)

Year of felling	Total Coupes No.	Total area ha.	Felled coupes No.	Area of felled coupe ha.	No. of Trees marked No.	No. of Trees felled	Production		Production / Ha.	
							Timber C.mt.	Fuel Beat Nos.	Timber C.mt.	Fuel Beat Nos.
2005-06	33	905.220	10	353.360			1076.863	2341.00	3.047	6.62
2006-07	46	1087.551	12	305.563	73224	67591	1259.671	3931.00	4.122	12.86
2007-08	37	953.021	15	394.485	64470	55235	1799.946	2607.00	4.563	6.61
2008-09	25	585.485	14	379.710	118146	106020	1963.857	3576.00	5.172	9.42
2009-10	27	719.277	12	321.305	101584	71167	3448.566	3704.50	10.733	11.53
2010-11	22	428.665	11	343.765	105123	71259	2318.816	2382.00	6.745	6.93
2011-12	30	920.024	19	602.700	170444	162808	5049.105	4393.00	8.377	7.29
2012-13	27	750.190	17	565.900	159509	141645	3521.123	4206.50	6.222	7.43
2013-14	36	1096.141	25	807.745	303663	229253	6146.884	3917.00	7.610	4.85
2014-15	34	935.162	20	652.209	136204	84045	3906.187	3064.00	5.989	4.70
TOTAL	317	7427.715	155	4726.742	1232367	989023	30491.018	34122.00	6.451	7.22

- Percentage of area felled against the target 63.64 %
- Percentage of coupes felled against the target 48.90 %

Assessment:

- Out of 128 coupes, harvesting works could not be carried out in 28 coupes as they fall within 10 km of protected area and 40 coupes due to naxal activities.
- On an average the area has yielded 52.86 cubic meter of timber per hectare and 48.7 fuel beats per hectare.
- Cut back operations have been carried in the areas where coupe working has been done along with artificial regeneration with teak stumps. These areas are converted into valuable teak producing forests.
- Out of 247 coupes for thinning 137 coupes could not be carried out due to naxal activities.
- On an average the thinning have yielded 6.256 cubic metre of timber and 8.31 fuel beats per hectare.
- The thinning operations are opening up the forests resulting in healthy growth in terms of girth and height of the remaining stand.

iv) AFFORESTATION WORKING CIRCLE

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1. GENERAL CONSTITUTION OF THE WORKING CIRCLE

The areas allotted to this working circle are mostly open, degraded having density below 0.4 and the site quality ranging from IVa to IVb and at some places site quality III is also present. The areas included in this working circle comprise of some of the compartments of coppice with reserve working circle of Shri. K.N. Khisti's plan which is not included in improvement working circle and the earlier B-Class reserved forest areas along with un-classed forest areas and all such areas of protected forest having density below 0.4.

2. GENERAL CHARACTER OF THE VEGETATION:

Most of the area allotted to this working circle is degraded and open with sparsely scattered, middle aged and matured trees. Due to intensive biotic pressure, the vegetation, in these areas, is reduced to shrubby growth. Some of these areas are subjected to heavy soil erosion. The state of natural regeneration is very poor. However, in some patches very good miscellaneous crop is noticed with a density of 0.5. The site quality varies from III to IVb. The soil is very rich and has the potential of supporting good vegetative growth.

3. SPECIAL OBJECTS OF MANAGEMENT:

- i) To reclaim the area by intensive soil and moisture conservation works.
- ii) To increase the percentage of vegetation growth.
- iii) To increase the productivity of the forest land.
- iv) To check soil erosion and
- v) To maintain and preserve the biodiversity of the area by encouraging the plantation of indigenous species.

4. REGULATION OF YIELD:

Most of the areas allotted to this working circle are degraded and no appreciable yield shall be available. However, the small timber, fire wood etc. removed during the working shall be made available to the members of Forest Protection Committee at concessional rates.

DEMARCATON OF COUPES, PREPARATION OF TREATMENT MAP AND MARKING TECHNIQUES :

(1) DEMARCATON OF COUPE:

Demarcation of coupes will be carried out one year in advance of main felling.

(2) PREPARATION OF TREATMENT MAP:

Treatment map shall be prepared by R.F.O. and verified by concerned A.C.F. after thorough inspection of that area. The treatment map will clearly indicate the following areas:-

TYPE-A: PROTECTION AREAS:- These will include:-

The treatment map will clearly indicate the following areas:

- (i) Steep slopes above 25°
- (ii) 30 meter width on the either side of water courses. In these areas no tree will be marked for felling.

TYPE-B: UNDERSTOCKED AREA :- It includes the forest below 0.4 density.

- (i) In these areas all dead trees will be marked for felling except two per hectare.
- (ii) All live stumps will be marked.

TYPE-C: GROUP OF YOUNG POLES.

It includes patches of well grown pole of Teak and other species suitable for retention as a future crop. The congested crop will be subjected to thinning to maintain a distance of 1/3 of its height.

TYPE – D: WELL STOCKED AREAS: These areas include the forests above 0.4 density. The exploitable girth as given in Selection-cum-Improvement Working Circle will be adhered to. Trees of species teak, ain, bija, shivan, garari and khair shall only be marked for felling whose population is more than 1 %. The species having population less than 1 % will not be marked for felling

(3) MARKING TECHNIQUE AND MARKING RULES.

- (a) **Marking technique** for the trees to be marked for felling is discussed in the Chapter on Miscellaneous Regulations.
- (b) **Marking Rules:** Marking will be done under the closed supervision of the RFO and constant guidance of the ACF concerned. The DCF will himself inspect most of the coupes to impart proper guidance and instructions to the staffs as well as to guard against excessive marking if any

TYPE-A: PROTECTION AREAS:- No tree will be marked for felling.

TYPE-B :- UNDERSTOCKED AREA:-

- (i) No tree will be marked for felling.
- (ii) The live high stumps will be cut back as well as the multiple coppice shoots and poles will be reduced to one per stool retaining the vigorous ones.

- (iii) The undesirable undergrowth which is preventing or likely to prevent the development of the regeneration of the desirable species, will be removed.

Thus all efforts shall be made to protect and develop the rooted stock.

TYPE-C :- GROUP OF YOUNG POLES.

- i) The congested young poles will be marked for thinning to a spacement of $\frac{1}{3}$ of the height of the tree. The dead, dying, diseased and suppressed poles will be marked first for thinning. The multiple poles will also be thinned to one pole per stool retaining the most promising one.
- ii) Care should be taken to remove the poles of coppice origin first while retaining the poles of seedling origin.
- iii) The undesirable undergrowth which is preventing or likely to prevent the development of regeneration of the desired species will be removed.
- iv) Rooted stock:- The following prescriptions will be followed:
 - a. Singling of coppice shoots. One healthy and promising coppice shoot will be retained and the rest will be removed. However coppice shoot interfering with promising sapling of seed origin should be removed.
 - b. All saplings and poles up to 45 cm girth at breast height having $\frac{1}{3}$ of the stem, damaged and suppressed shall be coppiced by cutting flush to the ground

TYPE-D:-WELL STOCKED AREAS:

- (i) In these areas edible fruits and flower yielding trees shall be reserved.
- (i) All dead, trees shall be marked for felling except two per hectare.
- (ii) If the trees are available for marking, the marking will be carried out as per the procedure laid down in S.C.I. working circle.

REGENERATION:

The under stocked areas will be regenerated artificially. Young recruits of Teak and other species, though noticed in patches at certain places, usually die before getting established mainly due to highly compact soil structure with bad drainage and bad aeration along with the high incidence of cattle grazing and recurrent fires.

METHOD OF TREATMENT FOR ARTIFICIAL REGENERATION:

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As these areas have been subjected to intensive biotic pressure, the primary object is to restore the fertility and productivity of the area. Therefore, intensive soil and moisture conservation works will be taken up along with afforestation of these areas with suitable species. Site specific treatment maps need to be prepared. The area under this working circle is treated in two phases viz., Restorative phase and Productive phase.

A) Restorative phase

Following operations will be taken up :-

The area of the coupe shall be completely protected from biotic interference by digging T.C.M. During this phase following works shall be taken up

- (i) Digging of TCM around the coupe.
- (ii) Nalla bunding and gully plugging will be done wherever necessary.
- (iii) Digging of LCTs (long continuous trenches) of size 0.60 m wide x 0.30 m deep. The total length of LCTs may vary from 800 running meters to 1000 r.m.t. depending upon slope and topography.
- (iv) Sowing of seeds of Gliricedia, Khair, Neem, Babul, Siras, Subabool and other local species on the mound of LCTs and TCM.
- (v) Singling and cutting back of the rooted stock.
- (vi) The villagers and local people shall be motivated to active participation in the regeneration and rehabilitation of degraded areas under the Joint Forest Management program and the micro plan for the concerned village will be prepared by the JFMC with technical guidance from RFO, ACF.
- (vii) The villagers shall be allowed to cut grass for stall feeding their cattle.

B) Productive phase: The treatment map shall be prepared after thorough inspection of the area in the fourth year of the restorative phase by the A.C.F. concerned in the forest division. The A.C.F. will consult the local villagers as regards selection of species for plantation. The productive phase shall be of seven years and will comprise of following works.

- (i) Preparation of treatment map in the 4th year.
- (ii) Repairs to TCM. as per treatment map in the 4th year.
- (iii) Repairs to nalla bunding and gully plugging in the 4th year.
- (iv) Singling and cutting back of the rooted stock.
- (v) Plantation will be taken up in the 5th year in that portion of the LCTs where seedlings of seed origin are not seen over length of 2 m.

(vi) Spacing out the seedlings of seed origin in the LCTs.

(vii) Maintenance and protection of the plantation from 5th to 10th year.

RESULTS OF IMPLEMENTATION OF CURRENT WORKING PLAN

Afforestation Working Circle

The areas allotted to this working circle are mostly open, degraded having density below 0.4 and the site quality ranging from IVa to IVb and at some places site quality III is also present. Due to intensive biotic pressure, the vegetation, in these areas is reduced to shrubby growth. Some of these areas are subjected to heavy soil erosion. The state of natural regeneration is very poor. The total area of this working circle has been divided into 5 plantation series having 50 annual coupes each.

Assessment:

Artificial regeneration was carried out in 4527.78 hectares from 2004-05 to 2012-13. Soil and moisture conservation works like nalla bunding, CCT works etc. were carried out. Under this circle 29627.414 ha. was proposed out of which 4527.78 ha. is treated. The gap of 4 years between restorative phase and productive phase of artificial regeneration does not conform to expected results and the gap of 4 year is quite long for continuous supervision and protection. The rate structure for artificial regeneration under different schemes like D.P.D.C., 13th finance commission and massive forestation programme does not include restorative phase and productive phase having gap of 4 years between these phases. Hence the results of restorative phase and productive phase are not encouraging.

V) PROTECTION WORKING CIRCLE

1. GENERAL CONSTITUTION OF THE WORKING CIRCLE

In the previous working plans the Bhimaram hills of Allapalli range and Madkaki gutta, Kalidurg gutta hill areas of Pedigundam range were considered fit for conservation activity and hence after prescribing certain relevant prescription, plantation activities were taken up. It was though conceded that these hills contain some very precipitous and hilly slopes where no clear felling was prescribed above 25° slope. However, in practice it was noted that generally this prescription was not followed and as a result, heavy soil erosion took place in this area. Practically every compartment contains some areas of slopes of 25° and above.

2. SPECIAL OBJECTS OF MANAGEMENT

The special objects of management in constituting this working circle are

- i) To maintain and improve the adequate vegetation cover on the steep and precipitous hill slopes as a safe-guard against soil erosion and rapid run off.

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- ii) To give rest to these forests from exploitation activities.
 - iii) To promote and maintain a permanent vegetation cover.
 - iv) To preserve the available rich genetic biodiversity in the natural forests in the form of nature reserves.

3. GENERAL CHARACTER OF THE VEGETATION.

The general description of the forest allotted to this working circle is given under Chapter II of this working plan. The forests are generally well stocked and mostly of III quality though few patches of II quality are met with on lower slopes. Teak is the principal species and appears at its best on gently sloping and well-drained soils. It is generally young to middle-aged with sprinkling of older trees. Regeneration is poor. Surya occurs in good quantity and generally replaces Ain. The density of the crop varies from 0.6 to 0.8. Under stocked patches are also common. The good crops are dominated in southern aspects where there are mesic sites. The areas near to habitation are severely affected. The growth of the crop is stunted and suppressed. The soil is shallow and bouldery. The top canopy includes Teak, Surya, Shisham, Achar, Lendia, Bija, Semal, Kakad, Moha, Rohan, Arjun, Chichwa, Gular and the second storey is comprised of Teak with associates like Garari, Ghoti, Aonla, Tendu, Hiwar, Lokhandi, Bamboos, the prominent shrubs are Dikemali, Karse, Anjan etc. The common herbs are Chirchira, Lotan and Jalaram. The climbers seen are Palasbel, Papri, Kukudranji, Khobrael, Gunj, Eroni, Chilalti, Dhimarwel, Nagvel, Gudvel, Ramdatun and Kawith.

4. SILVICULTURAL SYSTEM:

No specific silvicultural system has been prescribed.

5. ROTATION:

Consistent with the objects of management, no rotation is required to be fixed. Only dead trees and bamboos are required to be removed.

6. FORMATION OF FELLING SERIES AND FELLING CYCLE.

The area included in this working circle excluding the areas of the nature reserves has been divided into three felling series and each felling series is divided into 20 annual coupes and compartments covered under each felling series.

7. REGULATION OF YIELD.

Yield will be insignificant except bamboo which is prescribed to be removed. Yield from minor forest produce shall be monitored as prescribed under NWFP working circle of this working plan.

8. AGENCY FOR EXECUTING THE TREATMENT:

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No exploitation except of bamboos is prescribed. However the medicinal plants and its parts of medicinal value will be permitted to be removed by the local villagers in a manner which is not injurious to the growth and development of the particular medicinal plant or tree preferably under the guidance of local staff of the forest department. All the cultural operations will be carried out departmentally.

METHOD OF EXECUTING THE TREATMENT:

A) DEMARCATION:

All annual coupes will be demarcated one year in advance of main working as per the general guidelines. The treatment map showing steep slopes, erodable areas, roads and under stocked areas shall be made available in the maps which are being generated by the Geomedia Cell in the office of the Conservator of Forests, Working Plan Division, Gadchiroli.

The following areas will be demarcated:

- i) Eroderable areas
- ii) Under stocked areas

The erodable areas and under stocked areas will be demarcated by painting a geru ring on trees at breast height standing on the periphery at suitable intervals.

B) TREATMENT:

In areas (i): Nala bunding and gully plugging should be carried out with the help of local material in the area.

In areas (ii) seeds of neem, maharukh, salai, dhaora, sitaphal and other local species should be dibbled at a spacing of 2m x 2m just before the onset of monsoon, preferably from 15th march to April end. The results of the work should be evaluated in the following year. This work should be done by the Beat-guard/Vanmajoor himself and no extra expenditure should be incurred on it. In addition, bush sowing shall be carried out simultaneously and results evaluated in the following years. In the blank areas or in the under stocked area, the stump planting of one year old root-shoot of following species will be carried out. It will be done through the existing Vanmajoor/Beat-guard.

- i) Azadirachta indica. (Neem)
- ii) Dalbergia sisoo (Sisoo)
- iii) Albizzia lebek (Kala siras)
- iv) Gmelina arborea (Shivan)

The medicinal herbs and shrubs will be permitted to be removed, by the villagers for their bona fide needs or by the society or any other agency formed by the Govt. in this behalf in a non-destructive manner, with the prior sanction of the territorial Dy. Conservator of Forests

No further silvicultural treatment is required as it is likely to affect the soil equilibrium. The bush sowing of Neem has been found to give better results.

MARKING:

No marking rules have been prescribed.

SUBSIDIARY CULTURAL OPERATIONS.

No subsidiary cultural operations are prescribed nor it is necessary.

RESULTS OF IMPLEMENTATION OF CURRENT WORKING PLAN

Protection Working Circle

The forests are generally well stocked and mostly of III quality though few patches of II quality are met with on lower slopes. Teak is the principal species and appears at its best on gently sloping and well-drained soils. It is generally young to middle-aged with sprinkling of older trees. Regeneration is poor.

The area under nature reserves is high quality teak bearing forest famous for its quality and density in the whole of state and in order to preserve the rich genetic diversity and the gene pool it is necessary to reserve some of the promising areas of teak forest as a future stock without disturbing its natural growth and complexity. In such areas no exploitation or any other type of work shall be carried out so to preserve the ecosystem in its natural state.

In areas other than nature reserves the main objective is to maintain and improve the adequate vegetation cover and to give rest to these forests from exploitation activities. Therefore, no working in this forest is prescribed except essential cultural operations like climber cutting and removal of dead trees for fire protection. Bamboos form an under storey and its removal will generally not disturb the protective functions and hence bamboo exploitation as per the silvicultural prescriptions has been allowed. The area is divided into 3 felling series.

Assessment:

Seed sowing of neem, maharuk, salai has been dribbled with the help of local forest guard and van mazdoors. The area allotted to this working circle is more than 0.5 density and are found to have adequate regeneration and no soil erosion has been

noticed, hence no artificial regeneration or soil moisture conservation works were carried out.

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vi) BAMBOO (OVERLAPPING) WORKING CIRCLE

1. GENERAL CONSTITUTION OF THE WORKING CIRCLE

This working circle includes all the bamboo bearing forests both natural and planted of all other working circles.

2. GENERAL CHARACTER OF THE VEGETATION:

The common variety of bamboo occurring in this tract is *Dendrocalamus strictus*, forms an under storey in the better quality of forests. Quality of bamboo varies with the drainage, soil, density of the tree cover and past treatment. Bamboos occupy mostly hilly slopes and moist, sheltered areas and along nalah banks. Katang bamboo (*Bambusa arundinacea*), another species of bamboos occurs in few patches on the banks of nalahs and on the mesic sights. The regeneration is scanty in adjacent to these areas due to its gigantic size. There is formation of a mat of rootlets around its clumps which prevents any arboreal shrubby or herbaceous growth in the vicinity of one to two meters. The bamboo raised by way of plantations or congested due to non attendance. The clump on the poorer soil are congested or culms tend to grow inside the clump due to hard soil outside.

3. LOCAL AND COMMERCIAL DEMAND:

Bamboos are used for making baskets, tattas temporary walls and variety of other items by locals and burads and for making pulp and paper by paper mills. The tribal community i.e. burads need one year old bamboos called karka bamboo for making flexible mats, baskets etc. Their demand is met mostly from the first and second year bamboos which are soft and poorly lignified. The first and second year bamboos are highly brittle and vulnerable to fungus attack. Apart from local consumption and Ballarpur Paper Mill consumption, Chandrapur, Nagpur, Yeotmal and Nashik are the main consuming centers for bamboo of the tract.

Considering the local demand and extensive bamboo areas, the surplus of bamboo potential is available and hence with a view to utilize the maximum potential of the bamboo forests, the bamboo production areas are divided into Nistar bamboo felling series and commercial bamboo felling series in order to utilize the optimum potential of bamboo forests on silvicultural lines.

Bamboo felling Series. (B.F.S.):- The nistar felling series were intended to meet the requirement of nistar and commercial requirements either free, or at concessional and commercial rates. The tenders are invited by the State Govt. for the

commercial exploitation of commercial bamboo felling series. Considering the local demand for nistar, occupational and commercial requirements etc., every year few N.B.F.S. coupes are being worked departmentally and rest coupes under N.B.F.S. are allotted to the Paper Mill for working on payment of royalty.

Considering the nistar, occupational and local commercial requirements, N.B.F.S. and C.B.F.S., both types of felling series mentioned above would continue to exist and the old nomenclature would continue. Further, the local requirement for nistar, occupational and commercial purposes should be fully met with first by departmental working of N.B.F.S. coupes and only after satisfying fully these requirements, the surplus N.B.F.S. coupes will be disposed off as per Govt. instructions / procedure in vogue.

4. SPECIAL OBJECTS OF MANAGEMENT:

- I. Management of bamboo areas on scientific lines to obtain maximum sustained yield.
- II. To meet the nistar demands of local population and commercial demand of village industries.
- III. To fulfill the commercial requirement of paper and pulp industries and other bamboo based industries.
- IV. To regenerate the bamboo clump naturally.

5. METHODS OF WORKING:

Present practice of working bamboo forests areas on three years felling cycle shall continue.

- i. No harvesting works should be permitted between 15th June to 30th September i.e. no bamboo exploitation will be permitted during the monsoon season as this is a period of formation of new culms. As far as possible the cutting of bamboo should end by March when the culms are almost devoid of starch and therefore attract less insect, borer.
- ii. No culms below the age of two years will be felled.
- iii. In a mature clump the following types of culms (green and living) will be retained.
 - a) All current season's (i.e. less than one year old) culms.

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. The clear felling in the form of a wedge may be permitted so that the opening of the wedge shall not be more than 1mtr wide. The depth and width at the narrow end of the wedge should be less than 2mtr. wide all around.

iv. Following culms shall be removed from all clumps:-

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- a) All dead, decayed and dry bamboos.
- b) Culms whose half or more top part is broken or damaged.
- c) Twisted or suppressed culms.
- d) The remaining culms will be considered available for harvesting. The cutting height of culms will be between 15 cm to 45 cm. above the ground level i.e. above the first inter-node above the ground. The cut shall be slant with a sharp instrument. In case of any flowering, no culms from flowered clump shall be felled in the year of flowering.
- e) No clump should be considered fit for harvesting unless it contains more than 12 mature culms (one year as well as two years old included). The clumps having culms less than 12 will not be harvested only broken, dead, dry, badly damaged or over-matured bamboo will be felled. A failure to do that will cause congestion in the clump. Clear felling of the clump is never advisable. A minimum of 8 should be there wherever possible.
- f) Harvesting of bamboo shall be done in a manner so as to ensure that the retained culms are evenly spaced and that some mature culms i.e. more than two years old are retained on periphery for the purposes of support to the new culms. The culms on the periphery of the clump will not be removed except where absolutely necessary to facilitate working in the interior portion of the clump.
- g) The leading exterior culms may not be cut under any circumstances even if they are suppressed, as their retention is in the interest of outward growth of rhizome and clump and to support new culms.

v. 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
- d) No grazing will be permitted during the rains in the bamboo forest which have been worked in the previous open season.

A clump will be distinguished as an independent clump where its periphery is easily discernible from the adjacent clump irrespective of its distance from the other. Where such a distinction is not possible, two clumps within 1 meter distance will be considered as one.

The exposed bamboo rhizome on the periphery should be covered with the slash and earth to provide nourishment to the spreading rhizome and thus promoting peripheral growth of the culms.

RESULTS OF IMPLEMENTATION OF CURRENT WORKING PLAN

Bamboo (Overlapping) Working Circle

This working circle includes all the bamboo bearing forests both natural and planted of all other working circles. Total area under this working circle is 12200.473 ha. The common variety of bamboo occurring in this tract is *Dendrocalamus strictus*, forms an under storey in the better quality of forests. Quality of bamboo varies with the drainage, soil, density of the tree cover and past treatment. Bamboos occupy mostly hilly slopes and moist, sheltered areas and along nalah banks. The details of bamboo coupes worked are as under.

TABLE-42
DETAILS OF BAMBOO COUPES WORKED FROM 2004-05 TO 2012-13

coupe No.	Year of felling	No. of Coupes	Total Area ha.	Bamboo Area ha.	Agency	No. of Coupe	Area felled ha.	Bamboo Area felled ha.	Production	
									Long Bamboo No.	Bamboo bundles No.
1	2	3	4	5	6	7	8	9	10	11
B	2004-05	9	8090.354	4113.269	BILT	5	5010.461	2301.440	0	391464
B & A					Deptt.	4	3079.893	1811.829	669740	60255
					Total	9	8090.354	4113.269	669740	451719
C	2005-06	10	7933.508	3911.679	BILT	5	3234.247	2207.140	0	826869
C & B					Deptt.	4	4449.160	1577.059	1049747	85593
					Total	9	7683.407	3784.199	1049747	912462
A	2006-07	10	9952.503	4175.192	BILT	5	4030.307	2293.750	0	306202
A & C					Deptt.	4	5542.593	1650.772	733479	58614
					Total	9	9572.900	3944.522	733479	364816
B	2007-08	9	8090.354	4113.269	BILT	5	5010.461	2301.440	0	383218
B & A					Deptt.	4	3079.893	1811.829	735645	56640
					Total	9	8090.354	4113.269	735645	439858
C	2008-09	10	7933.508	3911.679	BILT	0	0	0	0	0
C & B					Deptt.	4	4449.160	1577.059	856566	62620
					Total	4	4449.160	1577.059	856566	62620
A	2009-10	10	9952.503	4175.192	BILT	5	4030.307	2293.750	0	167500
A & C					Deptt.	4	5542.593	1650.772	803935	58639
					Total	9	9572.900	3944.522	803935	226139
B	2010-11	9	8090.354	4113.269	BILT	5	5010.461	2301.44	0	228123
B & A					Deptt.	4	3079.893	1811.829	649009	45951
					Total	9	8090.354	4113.269	649009	274074
C	2011-12	10	7933.508	3911.679	BILT	5	3234.247	2207.140	0	747465
C & B					Deptt.	4	4449.160	1577.059	796231	53229
					Total	9	7683.407	3784.199	796231	800694
A	2012-13	10	9952.503	4175.186	BILT	5	4030.307	2293.744	0	301607
A & C					Deptt.	5	5922.196	1881.442	634617	31625
					Total	10	9952.503	4175.186	634617	333232
Grand Total		87	77929.095	36600.414		77	73185.339	33549.494	6928969	3865613

Assessment:

- **PDF Compressor Free Version** The harvesting operation has produced 69.28 lakh long bamboo and 38.65 lakh bamboo bundles which have catered to the demand of local population to a great extent.
- It has been observed that there was profuse regeneration of new bamboo shoots in the clumps due to proper silvicultural removal of bamboos from the forest.

Vii) NON WOOD FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

1. GENERAL CONSTITUTION OF THE WORKING CIRCLE

This is an overlapping working circle covering the entire forest area of the tract dealt with. The non-wood forest produce includes both minor forest produce (MFP) and also the medicinal plants found in this tract.

2. NON WOOD FOREST PRODUCE OF THE TRACT:

(A) MINOR FOREST PRODUCE:

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 employment to engage local tribals during which they remain virtually without work. This play an important role in rural economy.

The important minor forest produce, found in this tract are Moha flower and fruits, bamboo, tendu, myrabolons, gum, broom grass etc.

(B) MEDICINAL PLANTS:

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.

3. SPECIAL OBJECTS OF MANAGEMENT:

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 employment by providing work to the local people and thereby improving their socio-economic condition, by involving local villagers through active participant of JFMCs in collection, grading, processing and marketing of NWFP.
- 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.

4. OTHER REGULATIONS:

- I. Compartment wise list of moha trees should be prepared and maintained at beat, round, range and division levels.
- II. As it is a bare fact that one of the important reasons of forest fire is the burning of leaf litter on ground under moha trees by tribals to collect moha flowers and fruits. Therefore, before the start of flowers falling, the ground under the moha tree crown should be cleaned with the cooperation of villagers and choukidars. This may be treated as one of the most important duties of the Beat Guard, failure in it and occurrence of fire should be viewed very seriously.

The JFMC's should be promoted to clear the leaf letter on ground and to avoid burning of leaf litter. Such JFMC's should be given incentives through schemes like fire and forest protection, intensification of forest management.

- 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.

5. GUM:

(i) USE AND VALUE:

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 is also 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

6. TENDU:

(i) USE:

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 tribal's. Bidi making is such an activity which can be started without any costly infrastructure. Besides, bidi making can be done at any leisure time. The ownership of 33 MFPs is including tendu leaves vests with the Gram panchayats in the schedule areas. The benefit accrued from sale of tendu units is distributed to local villagers who have collected the tendu leaves. The amount of bonus is in proportion of tendu leaves collected by local villagers.

TABLE NO.43

Sr. No.	Year	Tendu leaves collection Std. Bags.	Royalty realised Rs.	Bonus Rs.
1	2006	43779.909	6887000	4190408
2	2007	82234.512	89561410	80996207
3	2008	76418.386	30846421	24857427
4	2009	78638.196	58879270	48873663
5	2010	74770.984	91819652	78019158
6	2011	79765.884	111635076	94652414
7	2012	77247.472	151306559	134314832
8	2013	66682.801	57401380	36295340
9	2014	39947.441	34820557	19639800
10	2015	51618.948	40156806	----(to be distributed)

7. BAMBOO:

(i) USE:

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 bamboo articles and by 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, agarbatti etc.

In Allapali division units, for making agarbatti round sticks from locally available bamboos from forest, is installed and run by local JFMC members with active guidelines and support by C.C.F.(T)Gadchiroli, D.C.F.(T) Allapali and field staff.

8. KHAIR:

(i) USE OF KHAIR:

The khair heartwood is chiefly used for the production of katha and cutch since very long time. It is a valuable structural timber due to its natural durability of heartwood. This species has been classified as “Super Group “ timber suitable for large spans more than 12 m and is placed as the first choice of selection for management structure (ISI : 1962). It is eminently suitable for tools and tool handles, specially for mallets and plane bodies. It is used for all kinds of agricultural implements and is excellent for making spokes and hubs of cart wheels. It is used for posts in house construction and for making rice pastels, oil expellers, gun butt etc. The spent heartwood is also used as fuel in the Katha-boiler and Katha bhatties. The charcoal of dead khair wood is much valued and used by goldsmiths. The calorie values of moisture free sapwood and heartwood are 5142 and 4946 calories respectively. The exhausted khair heartwood shavings can economically be utilized for making partition boards and decorative boards and also can be used as top of table for drawing room.

9. MEDICINAL PLANTS:

(I) ANALYSIS AND VALUATION OF THE MEDICINAL PLANTS:

Methodology for studying the medicinal 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 “Herbal garden” 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.

RESULTS OF IMPLEMENTATION OF CURRENT WORKING PLAN

Non- Wood Forest Produce (Overlapping) Working Circle

This is an overlapping working circle covering the entire forest area of the tract dealt with. The total forest area included in this working circle is 202851.437 ha.

TABLE-44
STATEMENT SHOWING THE DETAILS OF MFP COLLECTED (FIGURES IN QUINTAL)

Minor Forest Produce	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Mohaflower	9.68	24.58	4.4167	4.106	75.0855	55.9384	25.7802	29.3562	0	1950.14	483.12	2103.55
Gum	0.20	0.10	0.133	0.2203	0.793	0.099	0.0051	0.51	0	14.09	0	6.23
Hirda	0.0077	0.17	0.0032	0.8382	0	0	0	0	0	2.73	0	0.20
Mohafruits	0	0.46	0	0.5489	0.7575	0.1065	0	0	0	0	352.69	376.71
Charoli	0	0.17	0	0	0	0	0	0	0	1.45	0	...
Awala	0	0.50	0.0155	0	1.0505	0.0185	0	0	0	0.25	0	0.0
Behada	0.	0.018	0	0	0	0	0	0	0	25.73	8.81	42.07
Karnji	0	0	0.07	0	0	0	0	0	0	0	0	0.0

Assessment:

The forest area has huge potential of NTFP like gum, mahua flower, mahua seed, hirda, behada, lac, honey, charoli, medicinal herbs etc. The objective in this working circle is partly achieved as the department has to develop forward linkages for sale of minor forest produce in raw form (powder form) and finished products like gel, oil, tablets etc. In the year 2012-13, an effort has been made to collect NTFP systematically by declaring Minimum Support Price (MSP) for selected NTFP through Joint Forest Management Committees. For collection of tree borne oil seeds like moha, neem, karanj, charoli etc. funds can be available from National Oil Seeds and Vegetable Oil Development Board (NOVOD), Gurgaon, Haryana. The NOVOD Board finances projects involving collection, storage, oil extraction of oil seeds. Such projects by Govt. agencies is 100% financed by NOVOD Board. Such projects will assure handsome minimum support price for collection of oil seeds. The finished and raw products can be put for sale at different cities, tourist places for which a techno/economical survey will be quite useful. For sale of raw and finished products Jan Dhan Van Dhan yojana will also facilitate publicity and sale of MFPs. The full potential of NTFP of the division will be realized in future by systematic collection, storage and marketing of produce with well planned backward and forward linkages.

viii) WILDLIFE (OVERLAPPING) WORKING CIRCLE

1. GENERAL CONSTITUTION OF THE WORKING CIRCLE

This is an overlapping working circle and covers the entire area of the division.

2. SPECIAL OBJECTS OF MANAGEMENT:

The special objects of management are as follows:

- To sensitize the local people about the importance of conservation of wildlife and its habitat.

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- 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.

3. RESULTS OF IMPLEMENTATION OF CURRENT WORKING PLAN

Wildlife (Overlapping) Working Circle

This is an overlapping working circle and covers the entire area of the division. Thus the total area included in this working circle is 217942.685 ha.

Water holes have been created in the forest areas in the form of Van-talavs (forest tanks) and forest ponds for availability of water to wild animals. A total of 253 forest tanks and 9 forest ponds have been created mainly under the Employment Guarantee Scheme (E.G.S.) of the State Government. Various other habitat improvement measures have been initiated. The wildlife population figures as per 2005 & 2010 census are depicted below:-

TABLE-45

WILDLIFE POPULATION

Sr. No.	Name of Wild animal	No. of animal			
		2005	2010	2011	2014
1	Tiger	0	0	0	0
2	Panther	0	3	0	0
3	Hyena	0	0	0	0
4	Wolf	0	25	0	0
5	Wild boar	366	389	840	347
6	Sloth Bear	12	5	12	1
7	Chital	345	315	468	542
8	Barking deer	103	13	51	26
9	Nilgai	54	74	88	246
10	Chousingha	3	0	9	202
11	Common langur	216	70	19	22
12	Mongoose	18	0	1	1
13	Peacock	0	9	19	3
14	Sambhar	45	21	145	31
15	Gaur	9	0	0	0
16	Wild Dog	22	2	0	5
17	Jackal	140	63	93	1
18	Jungle Cat	23	1	1	1
19	Porcupine	2	0	1	2
20	Giant Squirrel/Shekaru	0	0	6	6
21	Hare	47	0	0	0
22	Macaque	24	0	0	0
23	Bhedki	0	61	71	41

Assessment

The incidences of cattle kill by carnivores and crop damage by herbivores were reported in the division. The following measures were undertaken for mitigation of man- animal conflict:-

- Sensitization of people through posters, hand bills, meetings, street plays etc.
- Sensitization of field level forest staff and regular monitoring of movement of wild animal and keeping constant touch with villagers.
- Increasing density of waterholes inside the forest.
- Timely payment of compensation.
- Timely and coordinated efforts by forest and police authorities in rescue operations.
- Warning Posters / Banners in sensitive areas.

Habitat development

Under habitat development numerous waterholes have been created in the division. Meadow development for herbivores has also been undertaken.

SECTION 2: PAST SYSTEMS OF MANAGEMENT AND THERE RESULTS:

7.2.1 The present working plan replaces the first consolidated and comprehensive working plan by Dr. S.S. Shrivastav for Allapalli Forest Division, which replaces Shri S.A.H. Qureshi's Working Plan for Allapalli Range, Shri A.P. Deshmukh and Shri S.P. Joshi's working plan for Perimili and Aheri range and Shri K.N. Knisti's Working Plan for Ghot Range.

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

7.2.2 i) TEAK CONVERSION WORKING CIRCLE:

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

The results of plantations are very good. The areas under this working circle have maintained their diversity with high percentage of teak. The natural regeneration of teak is very poor as also that of miscellaneous species. The forest is however well stocked. In some areas artificial regeneration of teak is a failure due to lack of proper identification of planting site for teak. However the anticipated growth is by and large absent. In remote areas and upper slopes in Bhimaram hills the congestion and unsound inferior species are common. The bamboo undergrowth is also very congested in few pockets. Though these areas have been worked under the conversion to uniform system since 1930 but due to silvicultural reasons and change in National Forest Policy, whole of these areas could not be clear felled after 1988. The PB I areas of Allapalli range as per working plan of Shri Qureshi could be worked up to coupe No. 5.

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

7.2.3 ii) SELECTION CUM IMPROVEMENT WORKING CIRCLE :

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

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

The operations to achieve the objectives set under this working circle required main felling, improvement felling, soil and moisture conservation works. By and large, the main felling of sound mature and marketable timber species was carried out as per prescriptions in the working plan but the improvement felling and soil and moisture conservation works were not given due care which resulted in poor improvement of growing stock and soil cover also did not improve as envisaged. Teak plantation in each annual coupe could not be taken as prescribed in the plan. Silvicultural operations could not be undertaken resulting in congestion and growth of unsound and unmarketable mature and over mature trees. Tending of natural regeneration could not be paid due attention and therefore the crop resulted in crooked and suppressed undergrowth. The harvesting of superior marketable species was preferred. The felling was quite conservative and the dense crop were not thinned in order to promote natural regeneration which was suppressed due to paucity of light

falling on the surface / ground. It has been observed that for such areas the best working circle is selection-cum-improvement if the prescriptions are followed meticulously. The productivity of the area can be increased by some manipulations at the time of marking and giving preferential treatment to the natural regeneration. The extent of felling is proposed to be decided on the basis of site quality and normal stand table. Coupe working should include year wise phased program of soil and moisture conservation works. All the plantations raised in S.C.I. areas in the past shall be put under a separate working circle i.e. Teak Plantation working circle.

7.2.4 iii) PROTECTION WORKING CIRCLE :

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

7.2.5 iv) PLANTATION WORKING CIRCLE :

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

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

The operations required to be followed to meet the above objectives were demarcation of areas and marking of trees. The felling rules provided for retention of trees except mature and over mature all along nala banks on 20 meters wide strip. The advance growth of teak and other valuable species of bija, shisham, ain, was to be retained, patches of pole crop of more than 0.5 hectare were to be retained

and due silviculture treatment was to be provided and the rest of the area was to be clear felled and planted.

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

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

7.2.6 v) COPPICE WITH RESERVE WORKING CIRCLE:

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

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

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

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

7.2.7 vi) MISCELLANEOUS WORKING CIRCLE:

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

7.2.8 vii) BAMBOO OVERLAPPING WORKING CIRCLE:

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

The Ballarpur Paper Mill in the beginning harvested only those commercial felling series which were easily accessible and the coupes in remote areas

due to extraction cost are not worked which resulted in congestion of crop in hilly tracts and interior areas.

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

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

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

7.2.9 Based on the results and analysis of past systems of management prescribed under various working schemes/plans, and also based on the enumeration data, crop density, basal area available from satellite imagery of the forest tract dealt with, this working plan proposes following working circles as given below.

TABLE-46
DISTRIBUTION OF FOREST AREA IN WORKING CIRCLES PROPOSED.

Sr. No.	Working Circle	Area (ha)	Percentage Area of the Division.
1	Selection-cum-Improvement W.C.	103098.125	54.18%
2	Improvement W.C.	31269.733	16.43%
3	Teak Conversion W. C.	12489.649	6.56%
4	Afforestation W.C.	7848.660	4.12%
5	Protection W.C.	35597.019	18.71%
6	Bamboo (Overlapping) W.C.	12200.473	6.41%
7	Wildlife (Overlapping) W.C.	190303.186	100.00%
8	Non-Timber Forest Produce (Overlapping) W.C.	190303.186	100.00%
9	Ecotourism Overlapping Working Circle	227.18	0.12 %
10	Miscellaneous Regulations	190303.186	100 %
11	Miscellaneous Area	22814.895 *	
12	Area Proposed Under This Plan	213118.081	

(*Difference between Notified forest area and digitize area)

SECTION:- 3 SPECIAL WORKS OF IMPROVEMENT TAKEN:

Fire protection

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7.3.1 The areas are covered under this working plan shall be rigidly protected from fire. All precautionary & preventive measures in respect of fire as provided under chapter on miscellaneous regulations shall be taken up in order to ensure that no fire breaks out in these areas. The Dy.c.f. (Territorial) will take necessary steps to from forest management programme in order to protect these areas from fire and illegal felling and the members of the committee or the villages/local people who are involved in the protection of these areas will be benefited in terms of collection of N.T.F.P. or medicinal plants/tree or its produce.

Rewards may be granted to villagers who assist the forest Department in protecting the forests from fire.

Soil And Moisture Conservation Works:

7.3.2 Soil & moisture conservation works will be carried out after the preparation of treatment map and is approved by the Deputy Conservator of Forests works shall be before the onset of monsoon. Gully plugging and nala bunding, wats, shall be done as per Ha. or as per the treatment prescribed after actual inspection. the nala bund will be designed taking into consideration the catchment area, intensity if the rainfall and run off using Dunken's formula.

7.3.3 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.

Climber cutting

All climbers interfacing the growth of teak & available miscellaneous species shall be removed completely.

Commutation & Amenities to staff:-

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

7.3.5 Monitoring of different forestry operations through android mobile applications are developed for front line field staff user. In this respect, the NIC has developed necessary software for POR application, wildlife management, nursery and plantation etc. PDA/mobiles, equipped with such software applications for different

forestry operation. PDA/ mobiles, motor cycle is allotted to front line staff. During 2013-14 to 2015-16, distributed to front line staff of Allapali Division and necessary training is also imparted by NIC for handling the PDA. Use of PDA/mobile by field staff will facilitate the quality of supervision and improve the monitoring of forestry operations.

SECTION:- 4 PAST YIELD REVENUE & EXPENDITURE

Revenue during the Plan Period Year wise Revenue in the following table.

TABLE No.47

REVENUE DURING THE YEAR 2004-05 TO 2015-16													
Sr. No	Year	Timber		Firewood		NTFP						Total Value (in Lakhs)	Remarks
		Quantity (Cu.Mtr.)	Value (in Lakhs)	Quantity (Beats)	Value (in Lakhs)	Bamboo		Bundles		Tendu			
						Quantity (Nos.)	Value (in Lakhs)	Quantity (Nos.)	Value (in Lakhs)	Quantity (Std.Bag)	Value (in Lakhs)		
1	2	3	4	5	6	7	8	9	10	11	12	13	1
1	2004-05	3350.186	234.35	3883.50	19.42	655495	63.60	60055	9.61	33936.751	54.14	381.12	
2	2005-06	19177.538	1528.82	11227.00	72.98	1049747	131.44	85456	11.96	24865.192	37.89	1783.09	
3	2006-07	31545.925	5809.44	7572.50	64.37	698639	109.24	64451	13.53	43779.909	73.22	6069.80	
4	2007-08	25029.405	4751.82	14670.25	117.36	819195	139.34	65453	19.96	82234.552	862.27	5890.76	
5	2008-09	32151.949	5380.75	12713.75	114.42	768253	118.49	54334	17.39	76418.386	290.98	5922.02	
6	2009-10	28931.180	6899.46	8292.75	82.93	912205	141.50	52113	19.28	78638.196	572.11	7715.28	
7	2010-11	37455.011	8642.86	17535.00	192.89	739409	137.60	58941	12.97	76477.984	895.12	9881.43	
8	2011-12	31135.000	8478.68	13341.25	179.17	788766	276.07	51032	29.60	79765.874	1062.18	10025.69	
9	2012-13	11287.878	2567.77	7943.30	190.64	380500	103.36	15635	8.44	76916.508	1513.07	4383.27	
10	2013-14	29027.011	12937.94	11774.40	1675.6	28451	4.93	15300	9.18	44247.220	516.51	15144.15	
11	2014-15	19767.079	7686.72	3326.40	297.69	29464	7.37	15300	9.64	29115.701	311.10	8312.52	
12	2015-16	21073.263	8561.53	17184.50	867.79	363098	140.89	343	0.29	51618.948	401.57	9972.06	

TABLE No.48

Revenue and Expenditure during the year 2004-05 to 2015-16

(Amt in Lakhs)

Year	Revenue	Expenditure			Total	Surplus/Deficit (2-6)
		Conservation	Establishment	Plan		
1	2	3	4	5	6	7
2004-05	381.12	137.53	589.99	27.73	755.25	-374.13
2005-06	1783.09	228.42	692.02	5.50	925.94	857.15
2006-07	6069.80	203.21	689.03	17.57	909.81	5159.99
2007-08	5890.76	407.59	750.70	30.13	1188.42	4702.34
2008-09	5922.02	469.00	847.86	105.42	1422.28	4499.74
2009-10	7715.28	500.97	982.95	68.92	1552.84	6162.44
2010-11	9881.43	810.07	1221.94	219.45	2251.46	7629.97
2011-12	10025.69	814.59	1372.34	151.21	2338.14	7687.55
2012-13	4383.27	827.26	1566.39	682.10	3075.75	1307.52
2013-14	15144.15	1257.45	1766.90	545.34	3569.69	11574.46
2014-15	8312.52	1659.64	1920.72	623.08	4203.44	4109.08
2015-16	9972.06	1277.91	2093.54	762.10	4133.55	5838.51
Total	85481.19	8593.64	14494.38	3238.55	26326.57	59154.62

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CHAPTER – 8

STATISTICS OF GROWTH AND YIELD

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

8.1.1 GROWTH OF TEAK: The study has been conducted by the office of the Dy C.F. Working Plan, Chandrapur II in respect of Allapalli Forest Division in all the seven ranges of Allapalli Division viz. Allapalli, Perimilli, Ghot, Chamorshi, Markhanda, Pedigundam and Aheri. Stem analysis comprised of 17 teak trees from site quality I, II, and III areas spread over the above seven ranges. The results are summarised in the following table.

TABLE – 49

GROWTH DATA FOR TEAK (Site quality I)

Age in years	Height in mt.	D.B.H. (o.b.) in cm.	D.B.H. (u.b.) in cm.	G.B.H. (o.b.) in cm.	MAI in M ³	CAI in M ³	Stem Timber volume (cu. m.)
10	5.80	6.10	5.50	19.30	0.00102	0.00265	0.0102
20	11.20	11.60	10.80	36.71	0.00266	0.00750	0.0532
30	15.90	19.10	18.00	60.44	0.00533	0.0717	0.1599
40	19.80	24.50	23.20	77.53	0.01019	0.0257	0.4074
50	23.00	30.10	28.60	98.42	0.0135	0.0273	0.6749
60	25.40	34.50	32.60	109.18	0.0159	0.0367	0.9542
70	27.20	37.90	35.80	119.94	0.02013	0.0279	1.4092
80	28.20	40.70	38.50	128.80	0.0184	0.0222	1.5118
90	30.11	43.00	40.60	136.07	0.0204	0.0214	1.8358
100	32.00	44.20	41.70	139.87	0.0170	0.0260	1.7043
110	33.68	47.20	44.60	144.37	0.0182	0.0257	2.0027
120	35.36	50.30	47.50	159.18	0.0202	0.0238	2.4246

TABLE – 50
GROWTH DATA FOR TEAK (Site Quality II)

Age in years	Height in mt.	D.B.H. (o.b.) in cm.	D.B.H. (u.b.) in cm.	G.B.H. (o.b.) in cm.	MAI in M ³	CAI in M ³	Stem Timber volume (cu.m.)
10	5.45	2.80	2.30	8.86	0.0004	0.0006	0.0040
20	9.80	6.60	5.70	20.89	0.0006	0.0027	0.0126
30	13.70	12.40	10.90	39.24	0.0019	0.0075	0.0574
40	17.20	19.20	17.30	60.56	0.0041	0.0031	0.1633
50	20.40	25.50	23.40	80.70	0.0064	0.0183	0.3192
60	23.10	28.60	26.50	90.51	0.0088	0.0217	0.5293
70	25.45	32.20	30.10	101.90	0.0108	0.0196	0.7534
80	27.69	37.10	35.10	117.40	0.0094	0.0280	0.7536
90	29.45	41.70	39.90	131.96	0.0096	0.0263	0.8651

TABLE – 51
GROWTH DATA FOR TEAK (Site Quality III)

Age in years	Height in mt.	D.B.H. (o.b.) in cm.	D.B.H. (u. b.) in cm.	G.B.H. (o.b.) in cm.	MAI in M ³	CAI in M ³	Stem Timber volume (cu.m.)
10	7.10	6.50	5.70	20.60	0.0002	0.0026	0.00102
20	12.00	13.30	12.00	42.09	0.0082	0.0081	0.05228
30	15.40	20.00	18.30	63.29	0.0055	0.0097	0.1647
40	17.30	24.00	22.10	57.95	0.0062	0.0125	0.2481
50	19.50	31.10	27.90	98.42	0.0083	0.0126	0.4148
60	21.80	31.80	29.50	100.63	0.0083	0.0072	0.5003
70	23.60	33.30	31.00	105.38	0.0080	0.0049	0.5984
80	25.30	34.90	32.50	110.44	0.0075	0.0044	0.6494
90	26.90	37.30	34.80	118.04	0.0072	0.0288	--

8.1.2 The growth rate indicates that teak plant takes 5 years to establish and attains diameter (o.b.) of 43.50 cm. in 100 years and 46.00 cm. in 120 years. The average CAI/MAI curves intersects at the age of 100 years (figure-10) and thereafter the teak trees show decline in growth. The age-height curve, age-volume curve and age-CAI/MAI curves for site quality I, II, and III are given in figure No.1 to 9. The details of figure 1 to 10 are given in **Appendix No.XV**. The criteria for deciding all India site quality is given as under:

Sr. No	Site Quality	Height at the age of 100 years (in mt)
1	I	30 - 39
2	II	24 - 30
3	III	18 - 24
4	IV	12 - 18

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

TABLE – 52

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

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

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

TABLE – 53

Species	Girth b.h. in cm.	Diameter b.h. in cm.	Age in year
1	2	3	4
Bhirra	015	04.8	012
	030	09.5	024
	045	14.3	033
	060	19.1	043
	070	23.9	055
	090	28.6	063
	105	33.4	079
	120	38.2	092
	135	43.0	108
	150	47.7	124
Dhaora	015	04.8	016
	030	09.5	028
	045	14.3	040
	060	19.1	052
	075	23.9	066
	090	28.6	080
	105	33.4	093
	120	38.2	107
	135	43.0	123
	150	47.7	142
Tendu	015	04.8	012
	030	09.5	026
	045	14.3	039
	060	19.1	052
	075	23.9	066
	090	28.6	081
	150	33.4	098
	120	38.2	120
	135	43.0	154
	150	74.7	--

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

TABLE – 54

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

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

TABLE – 55

Age in year	Height in mt.	Dia ub.bh. Cm.	Dia ob.bh. Cm.	Std. stem timber volume (M ³)	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

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

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TABLE –56

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

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

SECTION 2 ESTIMATION OF GROWING STOCK :

(I) GENERAL VOLUME TABLE :

8.2.1 Forest Survey of India has conducted the Forest Resources Survey of Ballarshah catchment areas during 1971-75. During this survey data for felled tree i.e. volume of teak and miscellaneous species was calculated and on the basis of which general volume equations were derived for the species for which data of felled tree at least for 30 trees was 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) $V/D^2 H = a + b/D^2 H$
- iii) $V = a + b D^2 H + c (D^2 H)^2$
- iv) $\text{Loge } V = a + b \text{ Loge } D + c \text{ Loge } H$
- v) $V/D^2 = a + b/D^2 + c H^2$

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.

8.2.2 Since the tract dealt with comes within the Ballarshah 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-44 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-57

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

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

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

8.2.5 (II) LOCAL VOLUME TABLE:- During the survey by Forest Survey of India, 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:

$$V = a + bD^2$$

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

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

$$V = a + bD$$

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

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

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

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

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

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

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

TABLE-58

Sr. No	Species	Local Volume Equations
1	Tectona grandis (30)	$\sqrt{V} = -0.106720 + 2.562418 D$
2	Terminalia alata (266)	$V/D = -0.397340 + 0.011283/D + 4.704700D + 2.369640 D^2$
3	Pterocarpus marsupium (59)	$V = 0.107059 - 1.010240D + 7.685670 D^2$
4	Diospyros melanoxylon (140)	$V/D = -0.975148 + 0.033867/D + 8.255412D$
5	Anogiessus latifolia (112)	$V/D = -0.36762 - 0.006854/D + 4.5577D + 5.25567D^2$
6	Phyllanthus emblica (49)	$V/D^2 = 5.000428 - 0.013485/D^2$
7	Lagerstroemia parviflora (39)	$\sqrt{V} = -0.130340 + 2.824203 D$
8	Boswellia serrata (38)	$V/D = -2.641645 + 0.153684/D + 15.056400D - 6.2061 D^2$
9	Lannea coromandelica (44)	$\sqrt{V} = -0.138286 + 2.729368D$
10	Madhuca latifolia (78)	$V = 0.074069 - 1.23002D + 7.726902D^2$
11	Buchanania lanzan (67)	$V = -0.00767 + 0.2654D + 1.0385 D^2 + 7.527 D^3$
12	Cleistanthus collinus (320)	$V = -0.019404 + 3.80207 D^2$
13	Rest of species (402)	$V/D = -0.610255 + 0.020853/D + 6.10823D + 0.637781 D^2$

Where **V** = volume in cum.

D= DBH in meter.

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

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

SECTION 3: ENUMERATION :

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

SECTION 4 : ESTIMATION OF YIELD :

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

SECTION 5 : PRESERVATION AND SAMPLE PLOT:

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

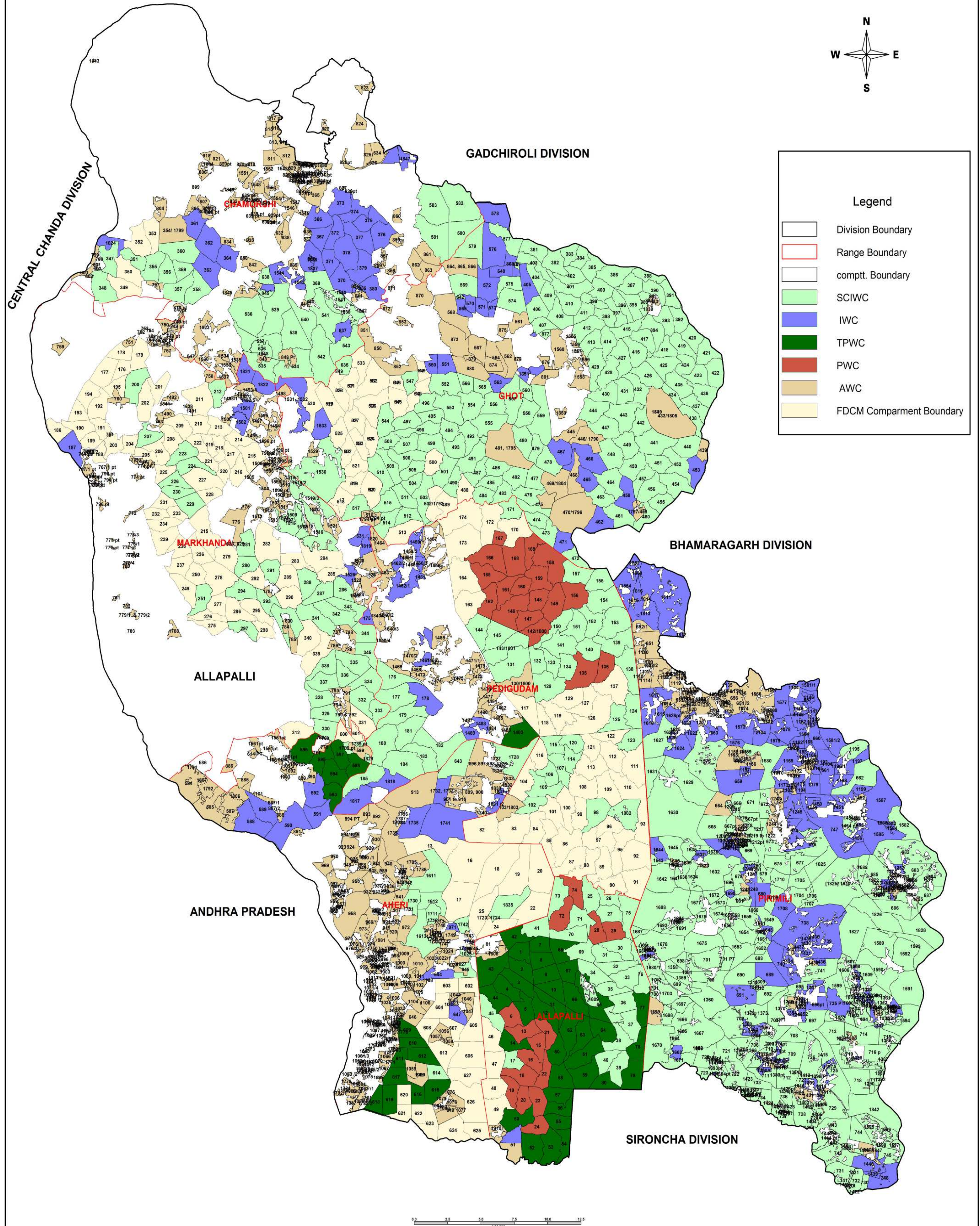
8.5.2 The preservation plots are maintained in compartment No. 39 and compartment No. 76 in Allapalli Range. The preservation plot in compartment No.39 was established in 1946 at Burkulgatta and covers an area of 4.00 ha. The three preservation plots in compartment No. 76A cover an area of 6.00 ha, 5.00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

8.5.3 The Glory of Allapalli is situated at an altitude of 228.60 mtr above meansea level. Aspect-level, Rock-Archaeon gneisses and granites with a few intrusions of pegmatite, soil-clayey loam, humus depth variable from 1" to 4".Drainage good. climate- extreme temperatures in summer and winter. Frost absent. Rainfall between 60"and 70" mainly during July-October. The plot was formed in the year 1953. The plot has been demarcated and important tree species 3' and above in girth at breast height

is recorded. The species in top canopy in order of abundance are *Tectona grandis*, *Terminalia tomentosa*, *Madhuca latifolia*, *Adina cordifolia*, *Stephegyne parviflora*, *Diospyros melanoxylon*, *Schleichera oleosa*, *Diospyros montana*, *Dalbergia latifolia*, *Careya arborea*, *Tamarindus indica*, *Lagerstroemia parviflora*, *Salmalia malabarica*, *Pterocarpus marsupium*, *Albizzia odoratissima* and *Stereospermum suavelons* etc. The detail of tree species and their girth at breast height (g.b.h. in cm) is furnished in **Appendix No.XXIV.**

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ALLAPALLI FOREST DIVISION
MAP SHOWING PROPOSED WORKING CIRCLES



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Working Plan
For
Allapalli Forest Division
Gadchiroli Forest Circle

PART - II

FUTURE MANAGEMENT
DISCUSSED AND PRESCRIBED

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SECTION 1: NATIONAL FOREST POLICY:

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

FOREST POLICY 1894 FOR INDIA:

1.1.2 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:

1.1.3 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:

1.1.4 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.

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- (v) Meeting the requirements of fuel wood, fodder, minor forest produce and small timber for 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.

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

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

SECTION 2: FACTORS INFLUENCING THE GENERAL OBJECTS OF MANAGEMENT:

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

- (i) Large tracts of forest which were managed under the coppice with reserve system of previous plans and scheme have suffered due to heavy grazing, illicit felling and lack of coppice regeneration, with the result that bulk of forest areas have become under stocked and open and failed to regenerate. These forests may respond if they are restocked under afforestation scheme coupled with soil and moisture conservation works.
- ii) The forest areas are capable of producing large size timber and therefore all the areas which were placed under teak conversion working circle in the previous plans, need to be put under Conversion working circle in order to take up artificial regeneration of pure teak by over wood removal of the areas having potential to support good quality teak forest.
- iii) The demand is increasing by local population for fire wood, small timber and fodder, grass in thickly populated areas. Adequate provisions have to be made in the plan for meeting the demands.
- iv) The state of natural regeneration of teak and miscellaneous species is satisfactory in interior areas of the tract, where as it is unsatisfactory in plains, and nearby human habitations. New recruits are not established due to frequent fires, soil compactness and excessive biotic pressure. Provisions will have to be made in the plan for soil working and tending and protection of young natural regeneration, which would help them to establish.
- v) The forest tract of thickly populated area are open, under stocked and degraded which need improvement in their stocking by tending natural regeneration supplemented by artificial regeneration.
- vi) The forest areas of steep slopes, undulating areas and along water courses are liable for soil erosion hence provisions to be made in the plan to check the same.
- vii) The forest areas are rich in non timber forest produce and various important medicinal plants which are either locally consumed or sold in the market at a very cheaper rates and therefore scientific management of these resources should be taken up on priority to provide the employment to the local people in order to alleviate their poverty.
- viii) The forest areas are capable of growing better quality bamboos which are needed by local people for their domestic and agricultural purposes.
- ix) Restoration of degraded environment as a national object.
- x) Conservation and protection of wild flora and fauna.

SECTION 3: GENERAL OBJECTS OF MANAGEMENT:

Important factor which influences the general object of management is the rapid depletion of growing stock in the plains due to over exploitation, heavy grazing and illicit cutting. The special objects of management will be as under.

- 1.3.1**
- i) To preserve and enrich the growing stock in natural forests and to restock all under-stocked and degraded areas of the forests with the help of artificial regeneration and soil and moisture conservation measures.
 - ii) To improve the quality and to increase the ratio of valuable tree species by encouraging natural regeneration and also by artificial regeneration by way of planting important timber and miscellaneous species.
 - iii) To improve the stocking of teak, bamboo and other valuable species in order to produce large size timber to meet the local and commercial demand.
 - iv) Preservation and improvement of minor forest to obtain progressively increasing yield of small timber, fire wood, and poles in order to meet the demands of local people and to provide grazing to local cattle.
 - v) To combat ill effects of soil erosion wherever it has already started and to prescribe preventive measures.
 - vi) To increase the production of non timber forest produce and medicinal plants, and to manage the same scientifically.
 - v) To increase the productivity and ensure progressively increasing yield of forest produce in demand.
 - vi) To achieve compatible wildlife management.

SECTION 4 : ANALYSIS AND VALUATION OF THE CROP :

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

FUNCTIONAL CLASSIFICATION OF FORESTS:

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

i) PROTECTION FORESTS:-

This category includes forests on very steep slopes, 25° and over, along river banks, forest that have depleted through mal-treatment and further harvesting will accelerate soil erosion and adversely affect the productivity of agricultural lands in the lower regions. The management shall aim at soil and moisture conservation.

ii) TREE FORESTS:-

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

iii) MINOR FORESTS:-

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

iv) PASTURE LANDS:-

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

(v) MISCELLANEOUS FORESTS:

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

SECTION 5: GRAZING POLICY:

1.5.1 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 a uniform grazing policy throughout the state (**Appendix No.XVI**). The policy aims at providing ideal pasturage within the available resources in the state forests without letting the resources impair or deteriorate. In view of the above, the Government of Maharashtra vide Revenue and Forest Department Resolution No.MFP-137/237035-z dated November,3,1973 promulgated the grazing rules to illustrate the regulatory character of the forests grazing (**Appendix No. XVII**). The important features of the grazing rules are as below.

- (i) All grazing in the forest (whether free or other wise) would be on permit only.

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- (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 by 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-52.

TABLE – 59

Sr. No.	Cattle	Equivalent cattle unit	Grazing fees Rs.
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	
44	Cow calf (less than 3 years, but more than 6 months old)	1/2	0.50

Table No.59A**PDF Compressor Free Version****Statement Showing Details Of Grazing Units in Allaplli Division**

Range	Name of Grazing Unit	Beat	Sr. No.	No of Village	Grazing Unit Incidence	Grazing Unit Area(Hecter)	Capacity of Grazing Unit (Cattle Unit)
1	2	3	4	5	6	7	8
Aheri	Indaram, Aheri, Khamancheru, Velgur, Lagam	24	-	36	-	138.780	8587.5
Allapalli	Allapalli, Zimela, Talwada	13	-	3	-	4317.089	2101.5
Pirmilli	Gurupalli, Bidri, Kandodi, Yermanar, Pirmili, Medpalli,	39	-	46	-	---	519.5
Pedigundam	Mulchera, Gomani, Mukadi, Elchil	15	-	21	-	3019.100	4029.5
Markhanda	Rengevahi, Gundepalli, Konsari	13	-	31	-	2768.200	3719
Ghot	Ghot, Devda, Bolepalli, Makkaepalli, Regadi, Vikaspalli	38	-	37	-	1656.400	5911
Charmorshi	Charmorshi, Bhadbhidi, Jamgiri	20	-	61	-	2751.014	6229.5
Total		162	-	235	-	14650.583	31097.5

- (vii) Essential cattle, subject to a maximum of two plough units per cultivator family, should be allowed free grazing in forests. 2 plough units 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.

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

- **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).
- **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.
- **Pasture Land:** The grazing incidence for these lands should be one cattle unit per 0.4 ha.
- **Grass Reserve:** The grazing is completely eliminated from these areas, but cutting of grasses on cut and carry basis should be permitted.

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

Table No.60
Distribution Of Forest Class Wise

Sr. No.	Class of Forests	Area (ha.)
1	Protection Forest	6007.926
2	Tree Forest	156500.320
3	Miner Forest	27794.940
4	Total	190303.186
5	Miscellaneous Area	22814.895
6	Grand Total(4+5)	213118.081

SECTION 6: METHOD OF TREATMENT

1.6.1 It is influenced by situation and condition of the forests, condition of regeneration of the crop, topography of the area, status of soil erosion, wild life population, bio-diversity plots, needs of local people and availability of labour, staff and resources.

The forests under this plan is allotted to various working circles based on the aspects like crop density, basal area, growing stock, elevation available from satellite images, enumeration data. In general the method of treatment prescribed is as below.

- i. The annual coupes will be surveyed, demarcated and treatment map will be prepared for entire coupe one year in advance of main felling. The treatment map will be prepared by RFO & will be verified by ACF. Based upon the treatments prescribed in the treatment map, Dy.C.F. will approve the treatment map.
- ii. The area of coupe will be divided into A, B, C, D Type areas.
- iii. **Type A Areas** : The type A areas will include areas with slope more than 25° and will be identified as A1 areas and no operations are prescribed except grazing and fire control. The 20 mtr. wide strip along water

courses will be identified as A2 area and only seed sowing along this strip is proposed. In addition to this the riparian zones, sacred grooves will be identified as type A area. Only gully plugging and nalla bunding is proposed to arrest the surface run-off. The protection forests included in Protection Working Circle comes under this type of areas i. e. A1 & A2.

iv. **Type B Areas** : The forest having density less than 0.4 is included in this category i. e. Type B areas (i. e. under stocked area) and will be further classified as:

- a. B1: Areas with adequate regeneration i. e. minimum 400 seedlings/ rooted stock per ha.

To promote the growth of existing regeneration, subsidiary silvicultural operations like cutting of common climbers, singling of coppice shoots, dressing of live high stumps, soil working and weeding around existing natural regeneration allowing its leading shoot free from congestion and competition is prescribed. Suitable patches for artificial regeneration will be selected and planted with teak and indigenous species like Behada, Moha etc. Such patches should be minimum 5 ha. at one place. Soil and moisture conservation work will be carried out as per availability of site.

- b. B2: Areas with inadequate regeneration i.e. less than 400 seedlings/ rooted stock per ha.

This area will be treated to improve the existing stock by taking up subsidiary silvicultural operations and the blanks will be artificially regenerated by species like teak, bamboo, moha, behada, aonla etc. SMC works will be taken up to improve the existing growth and site condition.

v. **Type C Areas** : Groups of young poles. This area includes patches of well grown pole crop of teak & other species which can be retained as future crop. Such patches should not be less than 2 ha. The patches of pole crop will be demarcated and thinning will be carried out depending upon no of poles per ha, type of thinning required i.e. mechanical/silvicultural. The congested pole crop will be thinned to 1/3 rd of the height of the dominant pole crop, the crop will be thinned and spaced out. No plantation will be done in this area except CBO in the year after main felling.

vi **Type D Areas** : This is well stocked forest hence, no planting is envisaged. The trees attaining exploitable girth will be harvested if silviculturally available. SMC works and CBO would be carried out. Dead trees will be removed retaining 2 trees per

ha. as den and snags. 2 logs of soft wood species per ha. will be retained as habitat for birds, rodents, reptiles etc. Cutting of common climbers will be done. All live high stumps will be cut and dressed as close to the ground as possible. The multiple coppice shoots will be thinned out by keeping 1 or 2 healthy and vigorous shoot.

vii The fruit trees will be excluded from harvesting

viii In the well stocked patches of selection cum improvement working circle, conversion working circle and in few well stocked patches of improvement working circle, trees attaining the exploitable girth class will be exploited if silviculturally available. In conversion working circle the old teak plantations will be subjected to thinning as per thinning schedule given in Volume II of this Plan.

ix Improvement felling is prescribed in improvement working circle. However the dense patches available will have some trees attaining exploitable girth class and above will be harvested if silviculturally available.

x The afforestation working circle is under stocked and adjacent to cultivation areas, habitation hence felling will be only restricted to cutting back and dressing of live high stumps, common climber cutting. Small timber, fire wood available from such felling will be made available to local JFMCs at concessional rates.

xi The annual bamboo coupes will be harvested as per prescriptions given in Chapter no. 14 assigned for bamboo overlapping working circle. The felling cycle for both commercial bamboo felling series and nistar bamboo felling series, in PESA & Non-PESA areas will be 3 years which must not be reduced due to silvicultural reasons which will assure sustained yield of bamboo.

xii The under stocked areas will be treated with SMC works, artificial regeneration with active participation of JFMCs. The JFMCs will be actively involved in protection of the coupe from grazing, fire and illicit cutting.

xiii For wild life habitat management, snag, den trees and logs of soft wood species will be left for habitat improvement for birds, rodents, and reptiles. The existing water holes will be monitored in the summer season and new water holes should be prepared in such a way that minimum one water hole for every five sq. km. habitat will be available for wild life. The present habitat of shekaru, vulture, and Indian otter will be protected, monitored and habitat will be improved by planting suitable species.

xiv The major NTFP like moha, gum, honey, will be priority MFPs for collection, processing, marketing through active participation of stake holders through JFMCs. Necessary skill up gradation of stake holders in MFP collection, processing will be achieved through field visits and training. Basic infrastructure for MFP and Agarbatti units will be taken up. The NTFP producing areas will be conserved and protected

through stake holders and JFMCs. Dependency of villagers on forests will be minimized by encouraging villagers in utilization of alternative energy sources like LPG, bio gas, and income generation activities like stall feeding and rearing of high yielding milch cattle.

xv Every year the 1/5 th boundary demarcation will be carried out as per the schedule.

xvi The potential eco-tourism sites will be identified and development plan will be prepared & should be submitted for approval from PCCF (HoFF), MS, Nagpur. The eco-tourism sites will be developed without disturbing the bio diversity, water courses, conservation sites, research plots; wild life habitat like nesting sites, meadows, core area and over all the activities should not attract nor violate provisions of Forest Conservation Act 1980. The eco-tourism sites should be managed through JFMCs and necessary training for skill up gradation of stake holders should be imparted with expert NGOs or individuals.

xvii The annual coupes will be closed for grazing for a period of five years from the year of main felling. The coupes will be rigidly protected from fire by tracing the fire lines for a period of five years from the year of main felling, to protect the existing natural regeneration. The JFMCs should be involved in protection of coupes from fire and grazing.

xviii Preference for local indigenous species like moha, behada, aonla, shivan, mango, bamboo, tamarind, arjun, bor, sitaphal, maharukh, anjan, biba, char, etc. will be given and the overall composition of species should have 15 % of teak.

SECTION-7: CONSTITUTION OF WORKING CIRCLES:

1.7.1 Keeping in view the objects of the management and the methods of treatment, the following working circles are prescribed in this working plan.

- I. Selection-cum-Improvement Working circle.(SCI)
- II. Improvement Working Circle. (IWC)
- III. Conversion Working Circle (CWC)
- IV. Afforestation Working Circle(AWC)
- V. Protection Working Circle (PWC)
- VI. Bamboo (Overlapping) Working Circle(BOWC)
- VII. Wildlife (Overlapping) Working Circle (WOWC)
- VIII. Eco-tourism(Overlapping) Working Circle.

IX. Non-Timber Forest Produce (Overlapping) Working Circle
(NTFPOWC)

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X. Miscellaneous Regulations

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

TABLE—61
DISTRIBUTION OF FOREST AREA AND COMPARTMENTS IN VARIOUS WORKING CIRCLES

Working Circle	Reserved Forest (ha)	Protected Forest (ha)	Zudapi Jugle (ha)	Total Forest area (ha)	Percent of Forest	No. of Compartments
Selection-cum-Improvement. Working Circle	98519.631	4566.227	12.267	103098.125	54.18%	494
Improvement Working Circle	25680.034	5230.755	358.944	31269.733	16.43%	231
Teak Plantation Working Circle	12489.649	0.00	0.00	12489.649	6.56%	54
Afforestation Working Circle	18359.715	17135.569	101.735	35597.019	18.71%	804
Protection Working Circle	7848.660	0.00	0.00	7848.660	4.12%	33
Bamboo (Overlapping) Working Circle	12200.473	0	0	12200.473	6.41%	118
Wildlife (Overlapping) W.C.	162897.689	26932.551	472.946	190303.186	100%	1616
Eco-tourism (overlapping) working circle	227.18	0	0	0	0.12 %	5
N.T.F.P. (Overlapping) W.C.	162897.689	26932.551	472.946	190303.186	100%	1616
Miscellaneous Area				*22814.895		
Grand Total	186976.173	25773.248	368.660	213118.081		

* Difference between notified area and digitised area.

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

TABLE – 62
DISTRIBUTION OF FOREST AREA IN VARIOUS RANGES AND WORKING CIRCLES.

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Sr. No.	Name of Range	S.C.I. W.C.	Improvement W.C.	Teak Plantation W.C.	Affores. W.C.	Prot. W.C.	Total Area Under W.Cs
1	2	3	4	6	5	7	8
1.	Chamorshi	9140.879	5236.849	0.00	5350.044	0.00	19727.772
2.	Ghot	28938.508	4581.184	0.00	7714.984	0.00	41234.676
3.	Pedigudam	11748.765	1911.539	350.816	2685.368	4841.346	21537.834
4.	Pirmilli	36528.579	14872.059	0.00	4285.475	0.00	55686.113
5.	Allpalli	5176.486	130.724	8983.488	501.575	3007.314	17799.587
6.	Aheri	3079.801	3361.996	3155.345	11402.325	0.00	20999.467
7.	Markhnda	8485.107	1175.382	0.00	3657.248	0.00	13317.737
8	TOTAL	103098.125	31269.733	12489.649	35597.019	7848.660	190303.186
9	Miscellaneous Area	-	-	-	-	-	22814.895
10	Grand Total(8+9)						213118.081

Table Continued

Sr. No.	Name of Range	Bamboo. (Overlapping) W.C.	NTPF Overlapping W.C.	Wild Life Overlapping W.C.	Eco-Tourism Overlapping W.C.
1	2	9	10	11	12
1.	Chamorshi	0.00	19727.772	19727.772	0
2.	Ghot	3968.743	41234.676	41234.676	174.18
3.	Pedigudam	3551.930	21537.834	21537.834	0
4.	Pirmilli	0.00	55686.113	55686.113	0
5.	Allpalli	4679.800	17799.587	17799.587	23.00
6.	Aheri	0.00	20999.467	20999.467	0
7.	Markhnda	0.000	13317.737	13317.737	30.00
8	TOTAL	12200.473	190303.186	190303.186	227.180
9	Miscellaneous Area		22814.895	22814.895	0
10	Grand Total(8+9)		213118.081	213118.081	227.18

SECTION 8: BLOCKS AND COMPARTMENTS:

1.8.1 The Plan is proposed for 213118.081 ha. spread over 1616 compartments. The area of the plan includes A) Reserved Forests of Allapalli Forest Division is 186976.173 ha. Including the additional area of Protected Forest which has been declared as Reserved vide Govt. of Maharashtra, R. & F.D. Notification No. FLD/3685/9316/CR-42/F-3 dated May 5, 1992. B) Protected Forests 25773.248 ha. and C) Zudpi forest 368.66 ha. This Plan excludes the area 44474.753 ha. Transferred to Forest Development Corporation of Maharashtra Ltd. and 13363.639 ha. area transferred to Chaprala Wildlife Sanctuary.

SECTION 9: PERIOD OF WORKING PLAN

1.9.1 Dr. S.S. Shrivastavas' Plan period is from 2003-04 to 2013-14 and Govt of India in MoEF has accorded extension to Dr. S.S. Shrivastavas' plan for 2014-15 and 2015-16. The present proposed plan is fixed for 10 years for the period from 2017-2018 to 2026-2027.

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CHAPTER-II SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

2.1.1 This working circle includes better forest areas i.e. all felling series worked under S.C.I. This working circle includes the areas which have i) Teak in very good proportion but which can not be worked under concentrated regeneration operations due to hilly terrain. ii) areas with low proportion of teak but availability of mature tree of other species iii) areas with mainly miscellaneous species. The second and third type of areas are on sandy soils and if worked under concentrated regeneration i.e. teak plantation may lead to soil erosion. The forests are of III to IV quality which reaches to quality II on good soil. The quality IV patches lie scattered all over the area. The forest areas suitable for timber harvesting if otherwise available are included in this working circle based on enumeration data and vegetation pattern.

2.1.2 The S.C.I. Working Circle is the biggest working circle in this plan having an area of 103098.124 ha. spread over 494 compartments which includes Reserved forest and Protected forest compartments. The distribution of the area in the seven ranges is given in the following table:

TABLE – 63
S.C.I. WORKING CIRCLE.

Sr.No.	Name of Range	Reserved Forest(ha.)*	Protected Forest(ha.)*	Zudpi Jungle(ha.)*	Total (ha.)*
1	2	3	4	5	6
1.	Chamorshi	9081.941	46.671	12.268	9140.879
2.	Ghot	28882.027	56.48	0.00	28938.507
3.	Pedigudam	11748.765	0.00	0.00	11748.765
4.	Permilli	33212.345	3316.234	0.00	36528.579
5.	Allapalli	1932.96	1146.841	0.00	3079.801
6.	Aheri	5176.486	0.00	0.00	5176.486
7.	Markhanda	8485.107	0.00	0.00	8485.107
Total		98519.631	4566.226	12.268	103098.124

* Area shown is digitized area.

SECTION 2: GENERAL CHARACTER OF THE VEGETATION:

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

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

SECTION 3: FORMATION OF FELLING SERIES AND COUPES :

2.3.1 This working circle is divided into 42 felling series and each felling series is divided into 20 annual coupes. The sequence of working is given in **Appendix No. XXX**. The details of the felling series and compartments allotted to each felling series is given in the **Appendix No. XXIX**.

SECTION 4: BLOCKS AND COMPARTMENTS:

2.4.1 This working circle includes reserved forest, protected forest, Zudpi jungle. The details of the compartments allotted to this working circle is given in **Appendix No. XXVIII**.

SECTION:5 SPECIAL OBJECTS OF MANAGEMENT.

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2.5.1 The special objects of management are:-

- To bring normality in the forest and 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.
- To produce large size timber by utilizing the full potential of the site.
- To increase the stocking of Teak, bamboo and other valuable species.
- To promote and tend the available regeneration of all the valuable species.
- To maintain and improve adequate soil cover in the forest areas as a safeguard against soil erosion and rapid runoff by soil and water conservation measures on the basis of watershed.
- To attain normality in the forest.

SECTION 6 : ANALYSIS AND VALUATION OF THE CROP.

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

2.6.2 ii. DENSITY AND AGE CLASSES: The crop is mostly young to mature trees with scattered over mature trees. Density generally varies from 0.6 to 0.8.

2.6.3 iii. REGENERATION: The regeneration status of ain, dhaoda, garari, lendia, tendu etc. is satisfactory. The regeneration status of other superior miscellaneous species like bija, shisham, haldu, etc. is not satisfactory. The regeneration of teak is very poor due to its silvicultural character.

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

TABLE-64

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

Group	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151up	Total	r1	r2	r3
Group1	5.82	4.90	4.39	3.69	3.13	2.22	1.65	1.08	0.69	0.57	28.14	108.48	58.94	32.39
Group2	10.54	6.48	5.41	5.29	5.84	4.92	3.69	2.70	1.55	1.21	47.63	183.59	99.75	54.82
Group3	32.51	21.89	16.36	12.57	11.62	8.35	6.18	4.09	2.48	1.69	117.74	453.84	246.59	135.51
Group4	28.23	16.79	11.23	7.46	5.11	1.69	0.54	0.14	0.04	0.02	71.25	274.64	149.22	82.00
Total	77.10	50.06	37.38	29.00	25.71	17.18	12.05	8.02	4.77	3.50	264.76	1020.55	554.50	304.72

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

TABLE-65

Percentage crop composition derived from enumeration data.

Species	Stems								
	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	135/ above
Group-I	7.55	9.79	11.76	12.19	12.94	13.65	13.53	14.48	15.20
Group-2	13.68	12.95	14.45	22.72	28.60	30.60	33.70	32.51	33.41
Group-3	42.17	43.73	43.76	45.20	48.64	51.26	50.98	52.13	50.58
Group-4	36.61	33.53	30.03	19.88	9.81	4.49	1.80	0.88	0.81
Total	100	100	100	100	100	100	100	100	100

2.6.5 v. Analysis :- On the basis of tree enumeration results, it is inferred that the area has the potential to grow better quality teak forest and therefore it is suggested that the percentage of teak and other timber species should be increased in order to meet the growing demand of timber for the local market and to earn the revenue by selling the important timber obtained from these forests.

SECTION 7: SILVICULTURAL SYSTEM :

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

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

2.7.3 The structure of all aged single species normal form yield table for site quality III is given in the following table.

TABLE-66
All aged single species normal form yield table for site quality III

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

TABLE-66-A

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

TABLE-67

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

Species	Stems								
	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	135/above
Group-I	10.306	9.734	8.505	6.695	4.673	3.610	2.771	1.998	1.634
Group-2	18.680	12.873	10.455	9.596	8.709	7.978	6.212	4.979	3.593
Group-3	57.597	43.470	31.659	22.822	17.323	13.566	10.405	7.532	5.439
Group-4	50.007	33.333	21.730	13.543	7.620	2.737	0.912	0.266	0.087
Total	136.589	99.410	72.350	52.656	38.325	27.891	20.299	14.775	10.753

NORMAL FOREST:

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

productivity of a given site is the element of objects of management which determines the species and their distribution in the crop. With the change in any of the above mentioned parameters, the structure of the normal forest or normal forest will change and therefore, the concept of normality is not an absolute. A normal forest is a forest where the mean annual increment is equal to current annual increment through out the period of rotation.

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

- A normal series of age-classes.
- A normal increment.
- A normal growing stock.

NORMAL SERIES OF AGE-CLASSES :

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

NORMAL INCREMENT:

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

NORMAL GROWING STOCK :

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

STRUCTURE OF NORMAL FOREST :

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

According to the theory of De Liocourt, in a fully stock selection forest i.e. the normal growing stock of the uneven-aged forest, number of stems fall off from

one diameter class to the next higher diameter class in a geometrical progression with a constant ratio, which means that the percentage reduction in the stem number from one diameter class to the next, is constant i.e.

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

Where N represents the Number of stems in lowest diameter class and K is the constant i.e. common ratio of the geometrical progression.

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

The basic information about the stand has been drawn from the volume table. By and large the site quality of the Allapalli Division is III and hence the yield table corresponding to site quality III has been chosen. A graph is drawn between the diameter and number of trees. Since this distribution is not normal, it is harmonized by a linear equation. In the yield table, there are 16 girth/diameter class shown and this has been reduced to nearly 8 diameter class as required for the yield calculation.

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

SECTION : 8 **ROTATION PERIOD:** Rotation Period has been fixed

SECTION : 9 **EXPLOITABLE DIAMETER:**

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

TABLE-68

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

2.9.2 However harvestable girth in traditional sense has not much relevance in the present silvicultural system. In this system, felling may take place in any girth classes in which number of stems per hectare exceeds to that of normal stand table, thus all girth classes in traditional sense may be harvestable or may not be, depending upon number of stems per hectare.

TABLE – 69

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

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

TABLE-70

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

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

SECTION : 10 **REDUCING FACTORS AND REDUCED AREAS:** Not applicable.

SECTION : 11 **FELLING CYCLE :** The treatment cycle is fixed at 20 years.

SECTION : 12 DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK
(PB) : Not applicable, as the shelter wood system is not adopt for this working circle
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SECTION 13 : REGULATION OF YIELD :

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

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

YIELD CALCULATION:

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

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

TABLE-71

Girth Class in cm.		Stem per ha.	Stem/ ha as per De Liocourt	% of survival	Stem/ha. reaching harvestable size (3x5/100)	Years required to pass over next girth class	Average annual recruitment(6/7)
1	2	3	4	5	6	7	8
I	15-30	5.82	5.88	22.63	1.32	9.00	0.1463R1
II	30-45	4.90	4.88	27.25	1.34	10.00	0.1336R2
III	45-60	4.39	4.05	32.82	1.44	11.00	0.1311R3
1V	60-75	3.69	3.36	39.52	1.46	12.00	0.1214R4
V	75-90	3.13	2.79	47.60	1.49	13.00	0.1148R5
VI	90-105	2.22	2.32	57.33	1.27	15.00	0.0850R6
VII	105-120	1.65	1.93	69.04	1.14	17.00	0.0668R7
VIII	120-135	1.08	1.60	83.15	0.90	17.00	0.0530R8
IX	135above	1.26	1.33	100.14	1.26	16.00	0.0788R9
X	Above						
		28.14					

$$r = \frac{(5.82 + \dots + 1.08)}{(4.90 + \dots + 1.26)}$$

$$= \frac{26.88}{22.32}$$

$$= 1.204$$

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

$$= \frac{28.14 [1.204^{(9-1)} (1.253 - 1)]}{1.204^9 - 1}$$

$$= \frac{28.14 [4.42 (0.205)]}{4.33}$$

$$= \frac{28.14 [0.906]}{4.33}$$

$$= 28.14 \times 0.20$$

$$\therefore a = 5.88$$

$\therefore$ Stem/ ha. for 15/30 girth class per DeLiocourt = 5.88

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

$$FR_1 = 16 R_9 + 4 R_8 = 1.260 + 0.212 = 1.472$$

$$FR_2 = 13 R_8 + 7 R_7 = 0.689 + 0.468 = 1.157$$

$$FR_3 = 10 R_7 + 10 R_6 = 0.668 + 0.850 = 1.518$$

$$FR_4 = 5 R_6 + 13 R_5 + 2 R_4 = 0.425 + 1.492 + 0.243 = 2.160$$

$$FR_5 = 10 R_4 + 10 R_3 = 1.215 + 1.311 = 2.526$$

$$FR_6 = 1 R_3 + 10 R_2 + 9 R_1 = 0.1311 + 1.336 + 1.316 = 2.783$$

Felling cycle

Realisable recruitment : R_r i.e. R_1

$$a = \frac{R_x}{f} \times \frac{a^2}{2}$$

$$= \frac{R_9}{20} \times \frac{16^2}{2}$$

$$= \frac{0.0788}{20} \times \frac{256}{2}$$

$$= 0.00394 \times 128$$

$$\therefore a = 0.504$$

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

$$= \frac{16 \times 4 \times R_9}{20} + \frac{4^2 \times R (9-1)}{2 \times 20}$$

$$= \frac{64 \times 0.0788}{20} + \frac{16 \times R_8}{40}$$

$$= \frac{5.0432}{20} + \frac{16 \times 0.0530}{40}$$

$$= 0.252 + \frac{0.848}{40}$$

$$= 0.252 + 0.0212$$

$$\therefore b = 0.273$$

$$\therefore R_r (\text{Realisable recruitment}) = (a) + (b)$$

$$\therefore R_1 (\text{Realisable recruitment}) = 0.504 + 0.273 = 0.777$$

Accumulating recruitment

$$\begin{aligned} R_a &= FR_n - R_r \\ &= FR_1 - R_1 \\ &= 1.472 - 0.777 \\ \therefore R_a &= 0.695 \end{aligned}$$

2nd felling cycle

Realizable recruitment

$$\begin{aligned} a &= \frac{R_x \times a^2}{f \times 2} \\ &= \frac{R_8 \times 13^2}{20 \times 2} \\ &= \frac{0.053 \times 169}{40} \\ &= \frac{8.957}{40} \\ \therefore a &= 0.224 \\ b. &= \frac{a \times b \times R_x}{f} + \frac{b^2 \times R_{x-1}}{f \times 2} \\ &= \frac{13 \times 7 \times R_8}{20} + \frac{7^2 \times R_{(8-1)}}{20 \times 2} \\ &= \frac{91 \times 0.053}{20} + \frac{49 \times R_7}{40} \\ &= \frac{4.823}{20} + \frac{49 \times 0.0668}{40} \\ &= 0.241 + \frac{3.273}{40} \\ &= 0.241 + 0.082 \\ \therefore b. &= 0.323 \end{aligned}$$

$$\therefore R_r (\text{Realisable recruitment}) = (a) + (b)$$

$$R_1 = 0.224 + 0.323$$

$$\therefore R_2 (\text{Realisable recruitment}) = 0.547$$

Accumulating recruitment

$$\begin{aligned} R_a &= FR_n - R_r \\ &= FR_2 - R_2 \\ &= 1.157 - 0.547 \\ \therefore R_2 &= 0.610 \end{aligned}$$

3rd Felling cycle

Realisable recruitment

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$$\begin{aligned}
 a &= \frac{R_x \times a^2}{F \times 2} \\
 &= \frac{R_7 \times 10^2}{20 \times 2} \\
 &= \frac{0.0668 \times 10^2}{40} \\
 &= \frac{0.0668 \times 100}{40} \\
 &= \frac{6.680}{40} \\
 \therefore a &= 0.167 \\
 b &= \frac{a \times b \times R_x}{f} + \frac{b^2 \times R_{(x-1)}}{2 \times f} \\
 &= \frac{10 \times 10 \times R_7}{20} + \frac{10^2 \times R_{(7-1)}}{2 \times 20} \\
 &= \frac{10 \times 10 \times 0.0668}{20} + \frac{100 \times R_6}{40} \\
 &= \frac{100 \times 0.0668}{20} + \frac{100 \times 0.0850}{40} \\
 &= \frac{6.68}{20} + \frac{8.50}{40} \\
 &= 0.334 + 0.212 \\
 \therefore b &= 0.546 \\
 \therefore (a) + (b) &= 0.167 + 0.546 \\
 &= 0.713
 \end{aligned}$$

I) Accumulated recruitment Ra i.e.R3

$$\begin{aligned}
 Ra &= FR_n - R_r \\
 &= FR_3 - R_3 \\
 &= 1.518 - 0.713
 \end{aligned}$$

$$R_3 = 0.805$$

4th Felling cycle

Realizable recruitment

$$\begin{aligned}
 a &= \frac{a^2 \times R_x}{F \times 2} \\
 &= \frac{5^2 \times R_6}{20 \times 2} \\
 &= \frac{25 \times 0.085}{40} \\
 &= \frac{1.7125}{40} \\
 &= 0.043 \\
 b &= \frac{a \times b \times R_x}{f} + \frac{b^2 \times R_{(x-1)}}{2 \times f}
 \end{aligned}$$

$$= \frac{5 \times 13 \times R_6}{20} + \frac{13^2 \times R(6-1)}{40}$$

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$$= \frac{65 \times 0.085}{20} + \frac{169 \times R_5}{40}$$

$$= \frac{5.525}{20} + \frac{169 \times 0.1148}{40}$$

$$= 0.276 + \frac{19.401}{40}$$

$$= 0.276 + 0.485$$

$$\therefore b = 0.761$$

$$c = \frac{a \times c \times R_x}{f} + \frac{b \times c \times R(x-1)}{f} + \frac{c^2 \times R(x-2)}{2f}$$

$$= \frac{5 \times 2 \times R_6}{20} + \frac{13 \times 2 \times R_5}{20} + \frac{2^2 \times R(6-2)}{40}$$

$$= \frac{10 \times 0.85}{20} + \frac{26 \times 0.115}{20} + \frac{4 \times R_4}{40}$$

$$= \frac{8.50}{20} + \frac{2.99}{20} + \frac{4 \times 0.1214}{40}$$

$$= 0.425 + 0.150 + \frac{0.4856}{40}$$

$$= 0.575 + 0.012$$

$$\therefore c = 0.587$$

Realizable recruitment R4 = (a) + (b) + (c)

$$\therefore R_4 = 0.053 + 0.761 + 0.203$$

$$= 1.017$$

Accumulating recruitment

$$R_a = FR_n - R_r$$

$$= FR_4 - R_4$$

$$= 2.160 - 1.017$$

$$R_a = 1.143$$

5th Felling Cycle

Realizable recruitment

$$a = \frac{a^2 \times R_x}{f \times 2}$$

$$= \frac{100 \times R_4}{20 \times 2}$$

$$= \frac{100 \times 0.121}{40}$$

$$= \frac{12.100}{40}$$

$$= 0.303$$

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$$\begin{aligned}
 b &= \frac{a \times b \times R_x}{f} + \frac{b^2 \times R (x-1)}{2f} \\
 &= \frac{10 \times 10 \times R}{20} + \frac{10^2 \times R(4-1)}{20 \times 2} \\
 &= \frac{100 \times 0.121}{20} + \frac{100 \times R}{40} \\
 &= \frac{12.10}{20} + \frac{100 \times 0.131}{40} \\
 &= 0.605 + \frac{13.10}{40} \\
 &= 0.605 + 0.328 \\
 \therefore b &= 0.933 \\
 (a) + (b) &= 0.303 + 0.933 \\
 &= 1.236
 \end{aligned}$$

Accumulating recruitment

$$\begin{aligned}
 Ra &= FR_n - R_r \\
 &= FR_5 - R_5 \\
 &= 2.526 - 1.236 \\
 \therefore Ra &= 1.290
 \end{aligned}$$

6th Felling Cycle

Realizable recruitment

$$\begin{aligned}
 a &= \frac{a^2 \times R_x}{f \times 2} \\
 &= \frac{1^2 \times R}{20 \times 2} \\
 &= \frac{1 \times 0.131}{40} \\
 &= 0.003 \\
 b. &= \frac{a \times b \times R_x}{f} + \frac{b^2 \times R (x-1)}{2f} \\
 &= \frac{1 \times 10 \times R}{20} + \frac{10^2 \times R (3-1)}{20 \times 2} \\
 &= \frac{10 \times 0.131}{20} + \frac{100 \times R}{40} \\
 &= \frac{1.310}{20} + \frac{100 \times 0.1336}{40} \\
 &= 0.0655 + \frac{13.36}{40} \\
 &= 0.066 + 0.334 \\
 &= 0.400
 \end{aligned}$$

$$c = \frac{a \times c \times R x}{f} + \frac{b \times c \times R (x-1)}{f} + \frac{c^2 \times R (x-2)}{2f}$$

$$= \frac{1 \times 9 \times R 3}{20} + \frac{10 \times 9 \times R (3-1)}{20} + \frac{9^2 \times R (3-2)}{20 \times 2}$$

$$= \frac{9 \times 0.131}{20} + \frac{90 \times R 2}{20} + \frac{81 \times R 1}{40}$$

$$= \frac{1.179}{20} + \frac{90 \times 0.1336}{20} + \frac{81 \times 0.1463}{40}$$

$$= 0.059 + \frac{12.024}{20} + \frac{11.850}{40}$$

$$= 0.059 + 0.601 + 0.296$$

$$= 0.956$$

$$(a) + (b) + (c) = 0.003 + 0.400 + 0.956$$

$$= 1.359$$

Accumulating recruitment

$$Ra = FR n - Rr$$

$$= 2.783 - 1.359$$

$$= 1.424$$

Hence available in cycle

	Realisable	0.7772	}	0.7772
1 st felling cycle	Accumulate	0.6948		1.242
2 nd felling cycle	Realisable	0.5471	}	
	Accumulate	0.6098		1.3233
3 rd felling cycle	Realisable	0.7135	}	
	Accumulate	0.8043		1.8223
4 th felling cycle	Realisable	1.018	}	
	Accumulate	1.1417		2.3804
5 th felling cycle	Realisable	1.2386	}	
	Accumulate	1.2870		2.6461
6 th felling cycle	Realisable	1.3591	}	
	Accumulate	1.4242		

Group –2

HARVESTABLE GIRTH 120 cm. FIELD CALCULATION FOR AIN, BIJA, HALDU, SHISHAM

TABLE-74

Girth Class in Cms.	Stem per ha.	Stem/ha as per De Liocourt	% of survival	Stem/ha reaching harvestable size (3x5)	years required to pass over next girth class	Average annual recruitment
1	2	3	4	5	6	7
I	15-30	10.54	10.07	26.41	2.78	9
II	30-45	6.48	8.33	31.95	2.07	10
III	45-60	5.41	6.88	38.65	2.09	11
IV	60-75	5.29	5.69	46.75	2.47	12
V	75-90	5.84	4.70	56.55	3.30	13
VI	90-105	4.92	3.89	68.41	3.37	15
VII	105-120	3.69	3.21	82.76	3.05	17
VIII	120-135	2.7	2.66	100.00	2.70	17
IX	135above	2.76	2.20	100.00	2.76	16
X	Above					
	Total	47.63				

$$r = \frac{(10.54 + \dots + 2.7)}{(6.48 + \dots + 2.76)}$$

$$= \frac{44.87}{37.09}$$

$$= 1.2097$$

$$a = \frac{s [r^{(n-1)} (r-1)]}{r^n - 1}$$

$$= \frac{47.63 [1.2097^8 (1.2097-1)]}{1.2097^9 - 1}$$

$$= \frac{47.63 [4.5859(0.2097)]}{5.5475 - 1}$$

$$= \frac{47.63 [4.5859 \times 0.2097]}{4.5475}$$

∴ Stem/ ha. for 15/30 girth class per DeLiocourt = 10.072

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

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$$\begin{aligned}
 FR_1 &= 17 R_8 + 3 R_7 = 2.700 + 0.539 = 3.239 \\
 FR_2 &= 14 R_7 + 6 R_6 = 2.514 + 1.346 = 3.861 \\
 FR_3 &= 9 R_6 + 11 R_5 = 2.020 + 2.795 = 4.814 \\
 FR_4 &= 2 R_5 + 12 R_4 + 6 R_3 = 0.508 + 2.473 + 1.140 = 4.122 \\
 FR_5 &= 5 R_3 + 10 R_2 + 5 R_1 = 0.950 + 2.07 + 1.546 = 4.567
 \end{aligned}$$

1st Felling cycle

Realisable Recruitment

$$\begin{aligned}
 a &= \frac{R_x}{f} - \frac{a^2}{2} \\
 &= \frac{17^2 R_8}{40} \\
 &= \frac{17 \times 0.1588}{40} = 1.1475 \\
 b &= \frac{a \cdot b \cdot R_x}{f} + \frac{b^2 \cdot R_{x-1}}{2f} \\
 &= \frac{17 \times 3 \cdot R_8}{20} + \frac{3^2 \cdot R_7}{40} \\
 &= \frac{17 \times 3 \times 0.1588}{20} + \frac{3^2 \times 0.1796}{40} \\
 &= 0.405 + 0.0404 \\
 &= 0.4454 \\
 (a) + (b) &= 1.1475 + 0.4454 \\
 &= 1.5929
 \end{aligned}$$

Accumulating Recruitment

$$\begin{aligned}
 Ra &= f r_n - R_r \\
 &= 3.239 - 1.593 \\
 &= 1.646
 \end{aligned}$$

2nd felling cycle

Realizable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{14^2 R_7}{40} \\
 &= \frac{14^2 \times 0.1796}{40} = 0.880 \\
 b &= \frac{a \cdot b \cdot R_x}{f} + \frac{b^2 \cdot R_{x-1}}{2f} \\
 &= \frac{14 \times 6 \cdot R_7}{20} + \frac{6^2 \cdot R_6}{40} \\
 &= \frac{14 \times 6 \times 0.1796}{20} + \frac{6^2 \times 0.2244}{40} \\
 &= 0.7543 + 0.2019 \\
 &= 0.9562 \\
 (a) + (b) &= 0.880 + 0.9562 = 1.8363
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 R_a &= f r_n - R_r \\
 &= 3.861 - 1.8363 \\
 &= 2.0245
 \end{aligned}$$

3 rd felling cycle

$$\begin{aligned}
 a &= \frac{a^2 R_6}{40} = \frac{9^2 R_6}{40} \\
 &= \frac{9^2 \times 0.2244}{40} \\
 &= 0.4544 \\
 b &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{9 \times 11 R_6}{20} + \frac{11^2 R_5}{40} \\
 &= \frac{9 \times 11 \times 0.2244}{20} + \frac{11^2 \times 0.2540}{40} \\
 &= 1.1107 + 0.7685 \\
 &= 1.8793 \\
 (a) + (b) &= 0.4544 + 1.8793 \\
 &= 2.3337
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 R_a &= f r_n - R_r \\
 &= 4.814 - 2.3337 \\
 &= 2.4805
 \end{aligned}$$

4 th felling cycle

Realisable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{40} \\
 &= \frac{2^2 R_5}{40} \\
 &= \frac{2^2 \times 0.2540}{40} \\
 &= 0.0254 \\
 B &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{2 \times 12 R_5}{20} + \frac{12^2 R_4}{40} \\
 &= \frac{2 \times 12 \times 0.2540}{20} + \frac{12^2 \times 0.2061}{40} \\
 &= 0.3048 + 0.7419 \\
 &= 1.0467 \\
 C &= \frac{a \cdot c R_x}{f} + \frac{b \cdot c R_{x-1}}{f} + \frac{c^2 R_{x-2}}{2f} \\
 &= \frac{2 \times 6 \times R_5}{20} + \frac{12 \times 6 \times R_4}{20} + \frac{6^2 \times R_3}{40}
 \end{aligned}$$

$$\begin{aligned}
&= \frac{2 \times 6 \times 0.2540}{20} + \frac{12 \times 6 \times 0.2061}{20} + \frac{6^2 \times 0.1900}{40} \\
&= 0.1524 + 0.7419 + 0.1710 \\
&= 1.0654 \\
(a) + (b) + (c) &= 0.0254 + 1.0467 + 1.0654 \\
&= 2.1376
\end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
Ra &= f r n - R_r \\
&= 4.122 - 2.1376 \\
&= 1.9839
\end{aligned}$$

5 th felling cycle

$$\begin{aligned}
A &= \frac{a^2 R_x}{40} \\
&= \frac{5^2 R_3}{40} \\
&= \frac{5^2 \times 0.1900}{40} \\
&= 0.1187 \\
B &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
&= \frac{5 \times 10 R_3}{20} + \frac{10^2 R_2}{40} \\
&= \frac{5 \times 10 \times 0.1900}{20} + \frac{10^2 \times 0.2070}{40} \\
&= 0.4751 + 0.5175 \\
&= 0.9926 \\
C &= \frac{a \cdot c R_x}{20} + \frac{b \cdot c R_{x-1}}{20} + \frac{c^2 R_{x-2}}{40} \\
&= \frac{5 \times 5 \times R_3}{20} + \frac{10 \times 5 \times R_2}{20} + \frac{5^2 \times R_1}{40} \\
&= \frac{5 \times 5 \times 0.1900}{20} + \frac{10 \times 5 \times 0.2070}{20} + \frac{5^2 \times 0.3093}{40} \\
&= 0.2376 + 0.5175 + 0.1933 \\
&= 0.9483 \\
(a) + (b) + (c) &= 0.1187 + 0.9926 + 0.9483 \\
&= 2.0598
\end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
Ra &= f r n - R_r \\
&= 4.567 - 2.0598 \\
&= 2.5068
\end{aligned}$$

Hence available in cycle

	Realisable	1.5929	1.5929
1 st felling cycle	Accumulate	1.6459	3.4822
2 nd felling cycle	Realisable	1.8363	
3 rd felling cycle	Accumulate	2.0245	4.3582
	Realisable	2.3337	
4 th felling cycle	Accumulate	2.4805	4.6182
	Realisable	2.1376	
5 th felling cycle	Accumulate	1.9840	4.0438
	Realisable	2.0599	
	Accumulate	2.5069	

THE AVERAGE ANNUAL YIELD IN M³ IS GIVEN IN THE FOLLOWING TABLE:

TABLE-75

Felling Cycle	Hence Available in cycle	Annual average recruitment	Annual average Vol (m ³)
1st	1.5929	0.0796	0.0482
2nd	3.4822	0.1741	0.1053
3rd	4.3582	0.2179	0.1318
4th	4.6182	0.2309	0.1397
5th	4.0438	0.2022	0.1223

ANNUAL REALISABLE YIELD IN CYCLE

TABLE-76

Stock in hand	I	II	III	IV	V
1 st cycle	0.3526	0.1741	0.2179	0.2309	0.2022
2nd cycle	0.2634	0.2634	0.2179	0.2309	0.2022
3rd cycle	0.2482	0.2482	0.2482	0.2309	0.2022
4th cycle	0.2439	0.2439	0.2439	0.2439	0.2022
5th cycle	0.2355	0.2355	0.2355	0.2355	0.2355

Yield in first 5 felling cycle

- a. Total Realisable trees = 5.46 + 1.5929
= 7.0529
- b. Total prescribed trees = 0.235 x 20
= 4.711
- Percentage Removal = $\frac{4.711 \times 100}{7.0529}$
= 67 %

Hence 5 trees out of 10 marked trees in the girth class shall be removed in group 2 species

Group –3

HARVESTABLE GIRTH 120 cm YIELD CALCULATION FOR OTHER MISCELLANEOUS SPECIES (OTHER THAN GROUP 1,2 AND 4)

TABLE-77

Girth Class in Cms.		Stem per ha.	Stem/ha as per De Liocourt	% of survival	Stem/ha reaching harvestable size (2x4)	year required to pass over next girth class	average annual recruitment
1	2	3	4	5	6	7	1
I	15-30	32.51	31.77	13.41	4.36	14	0.3113R1
II	30-45	21.89	23.85	17.86	3.91	13	0.3008R2
III	45-60	16.36	17.90	23.80	3.89	14	0.2781R3
IV	60-75	12.57	13.43	31.71	3.99	13	0.3066R4
V	75-90	11.62	10.08	42.25	4.91	13	0.3776R5
VI	90-105	8.35	7.57	56.29	4.70	12	0.3917R6
VII	105-120	6.18	5.68	75.00	4.63	13	0.3565R7
VIII	120-135	4.09	4.26	100.00	4.09	16	0.2556R8
IX	135above	4.18	3.20	100.00	4.18	16	0.2613R9
TOTAL		117.75					

$$\begin{aligned}
 r &= \frac{(32.51 + \dots + 4.09)}{(21.89 + \dots + 4.18)} \\
 &= \frac{10.70}{7.54} \\
 &= 1.3323 \\
 A &= \frac{S r^{(n-1)} (r-1)}{r^n - 1} \\
 &= 117.75 \frac{(1.3323)^8 \times (1.3323-1)}{(1.3323)^9 - 1} \\
 &= 117.75 \frac{9.9303 \times 0.3323}{13.2306 - 1} \\
 &= 117.75 \frac{9.9303 \times 0.3323}{12.2306}
 \end{aligned}$$

∴ Stem/ ha. for 15/30 girth class per DeLiocourt = 31.7743

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

$$FR_1 = 16 R_8 + 4 R_7 = 4.090 + 1.426 = 5.516$$

$$FR_2 = 9 R_7 + 11 R_6 = 3.209 + 4.309 = 7.517$$

$$FR_3 = 1 R_6 + 13 R_5 + 6 R_4 = 0.392 + 4.909 + 1.840 = 7.141$$

$$FR_4 = 7 R_4 + 13 R_3 = 2.146 + 3.616 = 5.762$$

$$FR_5 = 1 R_3 + 13 R_2 + 6 R_1 = 0.278 + 3.910 + 1.868 = 6.056$$

1st Felling cycle Realisable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{16^2 \times R_8}{40} \\
 &= \frac{16^2 \times 0.25561}{40} \\
 &= 1.636 \\
 b. &= \frac{a.b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{16 \times 4 \times R_8}{20} + \frac{4^2 R_7}{40} \\
 &= \frac{16 \times 4 \times 0.2556}{20} + \frac{4^2 \times 0.3565}{40} \\
 &= 0.818 + 0.1426 \\
 &= 0.9606 \\
 (a) + (b) &= 1.636 + 0.9606 \\
 &= 2.5966 \\
 \text{Accumulating recruitment} \\
 R_a &= f_{rn} - R_r \\
 &= 5.516 - 2.5966 \\
 &= 2.9195
 \end{aligned}$$

2nd felling cycle realizable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{9^2 R_7}{40} \\
 &= \frac{9^2 \times 0.3556}{40} = 0.7219 \\
 b. &= \frac{a.b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{9 \times 11 R_7}{20} + \frac{11^2 R_6}{40} \\
 &= \frac{9 \times 11 \times 0.3556}{20} + \frac{11^2 \times 0.3916}{40} \\
 &= 1.7648 + 1.1848 \\
 &= 2.9496 \\
 (a) + (b) &= 0.7219 + 2.9496 = 3.6716
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 R_a &= f_{rn} - R_r \\
 &= 7.517 - 3.6716 \\
 &= 3.8456
 \end{aligned}$$

3 rd felling cycle

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$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{1^2 \times R_6}{40} = \frac{1^2 \times 0.3916}{40} \\
 &= 0.00979 \\
 b &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{1 \times 3 \times R_6}{20} + \frac{13^2 R_5}{40} \\
 &= \frac{1 \times 3 \times 0.3916}{20} + \frac{13^2 \times 0.3776}{40} \\
 &= 0.2546 + 1.5955 \\
 &= 1.8501 \\
 c &= \frac{a \cdot c R_x}{f} + \frac{b \cdot c R_{x-1}}{f} + \frac{c^2 R_{x-2}}{2f} \\
 &= \frac{1 \times 6 \times R_6}{20} + \frac{13 \times 6 \times R_5}{20} + \frac{6^2 \times R_4}{40} \\
 &= \frac{1 \times 13 \times 0.3916}{20} + \frac{13 \times 6 \times 0.3776}{20} + \frac{6^2 \times 0.3066}{40} \\
 &= 0.1175 + 1.4727 + 0.2759 \\
 &= 1.8662 \\
 (a) + (b) + (c) &= 0.0097 + 1.8501 + 1.8662 \\
 &= 3.7261
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 R_a &= f r_n - R_r \\
 &= 7.141 - 3.7261 \\
 &= 3.4144
 \end{aligned}$$

4 th felling cycle Realisable recruitment

$$\begin{aligned}
 A &= \frac{a^2 R_x}{40} \\
 &= \frac{7^2 R_4}{40} \\
 &= \frac{7^2 \times 0.3066}{40} \\
 &= 0.3756 \\
 b &= \frac{a \cdot b R_x}{f} + \frac{b^2 R_{x-1}}{2f} \\
 &= \frac{7 \times 13 \times R_4}{20} + \frac{13^2 \times R_3}{40} \\
 &= 225
 \end{aligned}$$

$$= \frac{7 \times 13 \times 0.3066}{20} + \frac{13^2 \times 0.2781}{40}$$

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$$= 1.3950 + 1.1750$$

$$= 2.5701$$

$$(a) + (b) = 0.3756 + 2.5701$$

$$= 2.9457$$

Accumulated Recruitment

$$R_a = f r_n - R_r$$

$$= 5.762 - 2.9457$$

$$= 2.8160$$

5 th felling cycle Realisable recruitment

$$a = \frac{a^2 R_x}{40}$$

$$= \frac{1^2 R_3}{40}$$

$$= \frac{1^2 \times 0.2781}{40}$$

$$= 0.0069$$

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

$$= \frac{1 \times 13 R_3}{20} + \frac{13^2 R_2}{40}$$

$$= \frac{1 \times 13 \times 0.2781}{20} + \frac{13^2 \times 0.3007}{40}$$

$$= 0.1807 + 1.2708$$

$$= 1.4515$$

$$c = \frac{a \cdot c R_x}{f} + \frac{b \cdot c R_{x-1}}{f} + \frac{c^2 R_{x-2}}{2f}$$

$$= \frac{1 \times 6 \times R_3}{20} + \frac{13 \times 6 \times R_2}{20} + \frac{6^2 \times R_1}{40}$$

$$= \frac{1 \times 6 \times 0.3916}{20} + \frac{13 \times 6 \times 0.3776}{20} + \frac{6^2 \times 0.3066}{40}$$

$$= 0.0834 + 1.1730 + 0.2801$$

$$= 1.5366$$

$$(a) + (b) + (c) = 0.0069 + 1.4515 + 1.5366$$

$$= 2.995$$

Accumulated Recruitment

$$R_a = f r_n - R_r$$

$$= 6.056 - 2.995$$

$$= 3.061$$

		Hence available in cycle	
	Realisable	2.5966	2.5966
1 st felling cycle	Accumulate	2.9195	6.5912
2 nd felling cycle	Realisable	3.6716	
3 rd felling cycle	Accumulate	3.8456	7.5719
	Realisable	3.7261	
4 th felling cycle	Accumulate	3.4144	6.3602
	Realisable	2.9457	
5 th felling cycle	Accumulate	2.8160	5.8113
	Realisable	2.9952	
	Accumulate	3.0610	

TABLE- 78

felling Cycle	Hence Available in cycle	Annual average requirement	Annual average Vol (m ³)
1st	2.5966	0.1298	0.0785
2nd	6.5912	0.3296	0.1994
3rd	7.5719	0.3786	0.2290
4th	6.3602	0.3180	0.1924
5th	5.8113	0.2906	0.1758

Annual Realisable Yield in cycle

TABLE-79

if Stock in hand	I	II	III	IV	V
1 st cycle	0.5433	0.3296	0.3786	0.3180	0.2906
2nd cycle	0.4364	0.4364	0.3786	0.3180	0.2906
3rd cycle	0.4172	0.4172	0.4172	0.3180	0.2906
4th cycle	0.3924	0.3924	0.3924	0.3924	0.2906
4 th cycle	0.3720	0.3720	0.3720	0.3720	0.3720

Yield in first 5 felling cycle

- a. Total Realisable trees = 8.29 + 2.5966
= 10.8666
- b. Total prescribed trees = 0.3720 x 20 = 7.440
Percentage Removal = $\frac{7.44 \times 100}{10.866}$
= 68 %

Hence 5 trees out of 10 marked trees in the girth class shall be removed in group 3 species.

Group -4

HARVESTABLE GIRTH 45 CMS : YIELD CALCULATION FOR GROUP 4 (GARADI, LENDIA)

Table No. 80

Girth Class in Cms.		Stem per ha.	Stem/ha as per De Lio court	% of survival	Stem/ha reaching harvestable size (2x4)	year required to pass over next girth class	Average annual requirement
1	2	3	4	5	6	7	8
I	15-30	28.23	28.49	36.53	10.31	16	0.6445R1
II	30-45	16.79	17.22	60.45	10.15	20	0.5074R2
III	45-60	11.23	10.41	100.00	11.23		
IV	60-75	7.46	6.29	100.00	7.46		
V	75-90	5.11	3.80	100.00	5.11		
VI	90-105	1.69	2.30	100.00	1.69		
VII	105-120	0.54	1.39	100.00	0.54		
VIII	120-135	0.14	0.84	100.00	0.14		
IX	135above	0.07	0.51	100.00	0.07		
TOTAL		71.25					

$$\begin{aligned}
 r &= \frac{(28.23 + \dots + 0.14)}{(16.79 + \dots + 0.07)} \\
 &= \frac{71.183}{43.02} \\
 &= 1.6545 \\
 a &= \frac{S r^{(n-1)} (r-1)}{r^n - 1} \\
 &= 71.25 \frac{(1.645)^8 \times (1.645-1)}{(1.56)^9 - 1} \\
 &= 71.25 \frac{56.164 \times 0.645}{92.9266 - 1}
 \end{aligned}$$

∴ Stem/ ha. for 15/30 girth class per DeLiocourt = 28.494

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

$$\begin{aligned}
 FR_1 &= 20R_2 = 10.147 \\
 FR_2 &= 16 R_1 + 4 R_2 = 10.313 + 2.029 = 12.342 \\
 FR_3 &= 16 R_2 + 4 R_1 = 8.118 + 2.578 = 10.696
 \end{aligned}$$

Ist Felling cycle

Realisable recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{20^2 R_2}{40} = \frac{20^2 \times 0.5074}{40} \\
 &= 5.074
 \end{aligned}$$

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$$\begin{aligned}
 b &= \frac{a \cdot b}{f} R_x + \frac{b^2}{2f} R_{x-1} \\
 &= \frac{20 \times 0}{20} R_2 + \frac{0^2}{40} R_1 \\
 &= \frac{20 \times 0 \times 0.5074}{20} + \frac{0^2 \times 0.6445}{40} \\
 &= 0 + 0 \\
 &= 0 \\
 (a) + (b) &= 5.074 + 0 \\
 &= 5.074
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 R_a &= f r_n - R_r \\
 &= 10.147 - 5.074 \\
 &= 5.073
 \end{aligned}$$

2nd Felling cycle

Realizable Recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{16^2 R_1}{40} = \frac{16^2 \times 0.6445}{40} \\
 &= 4.125 \\
 b &= \frac{a \cdot b}{f} R_x + \frac{b^2}{2f} R_{x-1} \\
 &= \frac{16 \times 4}{20} R_1 + \frac{4^2}{40} R_2 \\
 &= \frac{16 \times 4 \times 0.6445}{20} + \frac{4^2 \times 0.5074}{40} \\
 &= 2.0625 + 0.2029 \\
 &= 2.2655 \\
 (a) + (b) &= 4.125 + 2.2655 \\
 &= 6.3905
 \end{aligned}$$

Accumulated Recruitment

$$\begin{aligned}
 R_a &= f r_n - R_r \\
 &= 12.342 - 6.391 \\
 &= 5.951
 \end{aligned}$$

3rd Felling cycle

Realizable Recruitment

$$\begin{aligned}
 a &= \frac{a^2 R_x}{2f} \\
 &= \frac{16^2 R_2}{40} + \frac{16^2 \times 0.5074}{40} \\
 &= 3.2472 \\
 b &= \frac{a \cdot b}{f} R_x + \frac{b^2}{2f} R_{x-1} \\
 &= \frac{16 \times 4}{20} R_2 + \frac{4^2}{40} R_1
 \end{aligned}$$

$$\begin{aligned}
 & \frac{16 \times 4 \times 0.5074}{20} + \frac{4^2 \times 0.6445}{40} \\
 & = 1.6235 + 0.2578 \\
 & = 1.8813 \\
 (a) + (b) & = 3.2472 + 1.8813
 \end{aligned}$$

$$\begin{aligned}
 & = 5.1285 \\
 \text{Accumulated Recruitment} \\
 R_a & = f r_n - R_r \\
 & = 10.696 - 5.1285 \\
 & = 5.5675
 \end{aligned}$$

Hence available in cycle

1 st felling cycle	Realizable	5.0736	5.0736
2 nd felling cycle	Accumulate	5.0736	11.4643
	Realisable	6.3905	
3 rd felling cycle	Accumulate	5.9516	11.0802
	Realisable	5.1285	
	Accumulate	5.5675	

TABLE-81

Felling Cycle	Hence available in cycle	Annual average recruitment	Annual average Vol (m ³)
1st	5.0737	0.2537	0.0123
2nd	11.4643	0.5732	0.0278
3rd	11.0802	0.5540	0.0269

Annual Realizable Yield in cycle

TABLE-82

Stock in hand	I	II	III
1 st cycle	1.5657	0.5732	0.5540
2nd cycle	1.0695	1.0695	0.5540
3rd cycle	0.8976	0.8976	0.8976

Yield in first 3 felling cycle

$$\begin{aligned}
 a) \quad \text{Total realizable trees} & = 26.24 + 5.0737 = 31.3137 \\
 b) \quad \text{Total prescribed trees} & = 0.8976 \times 20 = 17.953 \\
 \text{Percentage of removal} & = \frac{17.953 \times 100}{31.314} \\
 & = 57 \%
 \end{aligned}$$

Hence 5 trees out of 10 marked in the girth class shall be removed in group 4 species.

2.12.4 VOLUME DETERMINATION (ESTIMATION) IN RESPECTIVE GROUPS OF SPECIES
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Total forest area covered under selection cum improvement working circle is 1,03,098.124 ha. Annual area for regeneration felling will be on an average 5155 ha. The no of stems available for felling in and above harvestable girth class for respective groups of species is arrived after above calculations, by applying K.P. Sagreiy's modification of Smithies safeguarding formula and volume or yield is determined for the respective groups of species as below.

TABLE-82A

Sr. No.	Groups	No. of Stems in harvestable girth class/ha.	No. of Stems to be removed	Annual area	Total No. of Stems to be removed	Volume m ³	Timber m ³	Fuel beat Nos.
1	2	3	4	5	6	7	8	9
1	I	2.0372	1	5155	5155	2835	2835	850
2	II	7.053	3	5155	15465	9356	9356	2807
3	III	10.866	5	5155	27775	15594	15594	4678
4	IV	31.277	16	5155	82480	---	---	1670
Total		51.234	26	5155	130875	27785	27785	10005

Above statement clearly shows that 50% of stems from exploitable /harvestable girth class will be felled as per Government of India's guidelines.

2.13.4 The yield calculated is the average yield for the whole felling cycle based on the average site quality II/III of the working circle. However, the actual annual yield will be the function of the site quality and the crop composition. Therefore, the annual yield during the felling cycle will be distributed around average value in such a way that the sum of difference is zero. The actual calculation of yield at any point of the time can be have from the structure of uneven-aged normal forests (normal stand table) for different types of site qualities.

2.13.5 The year of passing from one girth class to another girth class is also approximate. It is not possible to have the same period of time for all species to pass from one girth class to another as the rate of growth of different species is different even at a given girth. There is very little statistics with respect to the study of growth of miscellaneous species in natural condition of the forest. But the accurate prediction of future growth is based on the growth study only. Therefore, so long as the growth study is not conducted perfectly, the correct prediction of future yield is not possible. But the application of the structure of uneven-aged normal forest of miscellaneous species will make the existing forest normal and then the yield will be sustained. This will become a true base for future predication of yield even in absence of growth study (from the

observation of past yield). The improvement in yield calculation method itself has much scope, because for such type of system there is no reference for yield calculation.

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SECTION : 14

TABLE OF FELLING: The abstract of table of felling is given below

Table No. 83

YEAR WISE WORKING OF COUPES

Selection Cum Improvement Working Circle.						
Year	Range	Nos. Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2016-2017	GHOT	13	I	13	14	1510.12
	CHAMORSHI	4	I	4	5	485.866
	MARKHANDA	4	I	4	4	372.758
	PEDIGUDAM	5	I	5	5	603.105
	ALLAPALLI	2	I	2	2	242.249
	AHERI	1	I	1	1	211.04
	PIRMILI	13	I	13	13	1962.513
		42		42	44	5387.653

Year	Range	Nos. Total F.S.	Coupe No.	Total Nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2017-2018	GHOT	13	II	13	17	1735.653
	CHAMORSHI	4	II	4	4	508.123
	MARKHANDA	4	II	4	5	513.567
	PEDIGUDAM	5	II	5	5	640.493
	ALLAPALLI	2	II	2	2	339.61
	AHERI	1	II	1	1	191.34
	PIRMILI	13	II	13	14	2041.443
		42		42	48	5970.232

Year	Range	Nos. Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2018-2019	GHOT	12	III	12	12	1459.357
	CHAMORSHI	4	III	4	4	424.167
	MARKHANDA	4	III	4	4	378.04
	PEDIGUDAM	5	III	5	5	556.684
	ALLAPALLI	2	III	2	2	343.464
	AHERI	2	III	2	2	204.007
	PIRMILI	13	III	13	19	1814.923
		42		42	48	5180.642

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2019-2020	GHOT	13	IV	13	13	1345.991
	CHAMORSHI	4	IV	4	5	582.049
	MARKHANDA	4	IV	4	3	326.713
	PEDIGUDAM	5	IV	5	5	625.961
	ALLAPALLI	2	IV	2	2	239.618
	AHERI	1	IV	1	1	230.3
	PIRMILI	13	IV	13	17	2090.768
		42		42	46	5441.4

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2020-2021	GHOT	13	V	13	13	1414.408
	CHAMORSHI	4	V	4	4	461.253
	MARKHANDA	4	V	4	4	412.445
	PEDIGUDAM	5	V	5	5	607.322
	ALLAPALLI	2	V	2	2	362.618
	AHERI	1	V	1	1	242.759
	PIRMILI	13	V	13	22	2278.848
		42		42	51	5779.653

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2021-2022	GHOT	12	VI	12	14	1497.618
	CHAMORSHI	4	VI	4	4	456.725
	MARKHANDA	5	VI	5	7	654.572
	PEDIGUDAM	5	VI	5	5	634.987
	ALLAPALLI	2	VI	2	2	326.825
	AHERI	1	VI	1	1	177.92
	PIRMILI	13	VI	13	15	2010.292
		42		42	48	5758.939

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2022-2023	GHOT	12	VII	12	14	1381.655
	CHAMORSHI	4	VII	4	4	499.439
	MARKHANDA	5	VII	5	5	564.687
	PEDIGUDAM	5	VII	5	5	711.909
	ALLAPALLI	2	VII	2	2	331.552
	AHERI	1	VII	1	1	165.866
	PIRMILI	13	VII	13	23	1839.598
		42		42	54	5494.706

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2023-2024	GHOT	13	VIII	13	14	1489.653
	CHAMORSHI	4	VIII	4	4	436.141
	MARKHANDA	5	VIII	5	5	572.868
	PEDIGUDAM	5	VIII	5	5	754.448
	ALLAPALLI	2	VIII	2	2	333.172
	AHERI	1	VIII	1	1	104.502
	PIRMILI	12	VIII	12	21	1876.05
		42		42	52	5566.834

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2024-2025	GHOT	13	IX	13	15	1485.381
	CHAMORSHI	4	IX	4	4	452.299
	MARKHANDA	4	IX	4	4	435.171
	PEDIGUDAM	5	IX	5	5	756.099
	ALLAPALLI	2	IX	2	2	234.102
	AHERI	1	IX	1	1	108.944
	PIRMILI	13	IX	13	26	1811.771
		42		42	57	5283.767

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2025-2026	GHOT	12	X	12	15	1460.133
	CHAMORSHI	4	X	4	4	455.631
	MARKHANDA	4	X	4	4	476.344
	PEDIGUDAM	5	X	5	5	678.417
	ALLAPALLI	3	X	3	3	249.233
	AHERI	1	X	1	1	167.143
	PIRMILI	13	X	13	15	1519.282
		42		42	47	5006.183

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2026-2027	GHOT	13	XI	13	14	1396.626
	CHAMORSHI	4	XI	4	4	462.905
	MARKHANDA	3	XI	3	3	299.979
	PEDIGUDAM	4	XI	4	6	509.807
	ALLAPALLI	3	XI	3	3	404.858
	AHERI	1	XI	1	1	104.864
	PIRMILI	12	XI	12	16	1521.341
		40		40	47	4700.38

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2027-2028	GHOT	13	XII	13	15	1394.208
	CHAMORSHI	4	XII	4	4	454.914
	MARKHANDA	3	XII	3	3	331.69
	PEDIGUDAM	4	XII	4	5	634.644
	ALLAPALLI	3	XII	3	3	341.628
	AHERI	1	XII	1	1	96.748
	PIRMILI	12	XII	12	20	1501.63
		40		40	51	4755.462

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2028-2029	GHOT	12	XIII	12	12	1264.825
	CHAMORSHI	4	XIII	4	4	471.856
	MARKHANDA	4	XIII	4	6	486.49
	PEDIGUDAM	4	XIII	4	5	528.828
	ALLAPALLI	3	XIII	3	3	391.973
	AHERI	2	XIII	2	2	127.156
	PIRMILI	11	XIII	11	14	1406.439
		40		40	46	4677.567

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2029-2030	GHOT	12	XIV	12	13	1456.532
	CHAMORSHI	4	XIV	4	4	534.905
	MARKHANDA	3	XIV	3	5	328.498
	PEDIGUDAM	4	XIV	4	4	521.783
	ALLAPALLI	4	XIV	4	4	306.354
	AHERI	1	XIV	1	1	91.166
	PIRMILI	12	XIV	12	14	1506.991
		40		40	45	4746.229

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2030-2031	GHOT	12	XV	12	14	1657.195
	CHAMORSHI	4	XV	4	5	509.566
	MARKHANDA	3	XV	3	3	330.319
	PEDIGUDAM	4	XV	4	4	537.039
	ALLAPALLI	3	XV	3	3	345.582
	AHERI	3	XV	3	3	156.622
	PIRMILI	11	XV	11	19	1474.334
		40		40	51	5010.657

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2031-2032	GHOT	13	XVI	13	13	1377.864
	CHAMORSHI	4	XVI	4	4	439.824
	MARKHANDA	3	XVI	3	3	279.962
	PEDIGUDAM	4	XVI	4	5	524.243
	ALLAPALLI	3	XVI	3	3	434.442
	AHERI	1	XVI	1	1	82.853
	PIRMILI	12	XVI	12	15	1461.307
		40		40	44	4600.495

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2032-2023	GHOT	12	XVII	12	13	1209.87
	CHAMORSHI	4	XVII	4	5	502.811
	MARKHANDA	4	XVII	4	6	496.811
	PEDIGUDAM	4	XVII	4	5	481.385
	ALLAPALLI	3	XVII	3	3	388.487
	AHERI	1	XVII	1	1	116.246
	PIRMILI	12	XVII	12	15	1586.067
		40		40	48	4781.677

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2033-2034	GHOT	13	XVIII	13	14	1384.484
	CHAMORSHI	4	XVIII	4	4	459.821
	MARKHANDA	3	XVIII	3	4	282.235
	PEDIGUDAM	4	XVIII	4	4	493.83
	ALLAPALLI	3	XVIII	3	5	421.953
	AHERI	1	XVIII	1	1	137.318
	PIRMILI	12	XVIII	12	26	1663.997
		40		40	58	4843.638

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2034-2035	GHOT	13	XIX	13	14	1372.585
	CHAMORSHI	4	XIX	4	4	503.587
	MARKHANDA	3	XIX	3	3	341.331
	PEDIGUDAM	4	XIX	4	4	461.853
	ALLAPALLI	3	XIX	3	6	528.039
	AHERI	1	XIX	1	1	187.395
	PIRMILI	12	XIX	12	14	1856.72
		40		40	46	5251.51

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Year	Range	Nos. Total	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2035-2036	GHOT	13	XX	13	15	1457.139
	CHAMORSHI	4	XX	4	4	511.367
	MARKHANDA	3	XX	3	3	308.734
	PEDIGUDAM	4	XX	4	5	485.924
	ALLAPALLI	3	XX	3	5	433.251
	AHERI	1	XX	1	1	175.607
	PIRMILI	12	XX	12	13	1684.139
		40		40	46	5056.161

SECTION : 15

METHOD OF EXECUTING OF FELLING:

2.15.1

AGENCY FOR HARVESTING: Demarcation of coupes and marking of trees for felling will be carried out departmentally to meet the silviculture and technical requirements. Feeling of trees, logging and haulage of the felled material will be carried out entire by department or by FLCS as per existing Government directives. Silvicultural operation like cut back operation, cleaning, thinning etc. and other regeneration activities after main feeling of the coupes will be carried out under strict supervision of the Forest Department.

2.15.2

The areas allotted to this working circle will be worked departmentally are through J.F.M. program by involving local people or through F.L.C.S.

2.15.3

DEMARCATON OF COUPES, PREPARATION OF TREATMENT MAPS AND MARKING TECHNIQUES:

(A) DEMARCATION:

Coupes will be demarcated one year in advance of the main felling.

(B) PREPARATION OF TREATMENT MAP:

The demarcation of the area shall be shown on the management maps provided by Conservator of Forests, Working Plan Division, Gadchiroli and the treatment map shall be prepared by an officer not below the rank of R.F.O. after thorough inspection of the area as per working plan maps. It will be verified on the ground by A.C.F. and approved by the Dy.C.F. The treatment map will show the following details.

TYPE A: - PROTECTION AREA:-

It includes the following area

- A1 : Areas with steep slopes more than 25°
- Areas eroded or liable for erosion.
- A 2: 20 meter wide strip on either side of banks of the water course
- Riparian Zones
- Sacred Grooves.

TYPE B:- UNDER STOCKED AREAS:

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It includes the areas with crop density less than 0.4 but exceeding 5 ha. in extent at one place.

- B1 : Areas with adequate regeneration having > 400 seedlings or root stock per ha.
- B2: Areas with inadequate regeneration having < 400 seedlings or root stock per ha.

TYPE C:- GROUP OF YOUNG POLES:-

It includes patches of well grown pole crop of teak and other miscellaneous species suitable for retention as a future crop in addition to old plantations. The patch will not be less than half hectare. These patches will be spaced out for healthy growth.

TYPE D:- WELL STOCKED AREAS:

Areas with crop density above 0.4 included in this category.

TREATMENT:

Treatment map shall be provided by Conservator of Forests, Working Plan Division, Gadchiroli. The treatment map will show,

Protection Area which includes the steep slopes above 25 degrees, areas likely to erode and a strip of 20 mtr. around nala banks.

- Under-stock area less than 0.4 density.
- Well stocked areas more than 0.4 density.
- The C type area which can not be identified by the satellite through N.D.V.I will be assessed by visiting sites. The treatment map will be checked by the ACF before proceeding with the final felling.

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 :

Seed sowing along banks of nalas and gully plugging and nala bunding to check the surface run-off is prescribed. Felling is not prescribed,

(ii) **Type B:– Under-stocked Area :**
Teak and suitable miscellaneous species shall be planted. Suppressed and badly shaped trees will be cut back.

(iii) **Type C:– Pole Crop :**
No planting will be done. Thinning will be done in the young pole crop to 1/3 rd of the height. Teak plantation areas shall be treated as per prescriptions provided for old teak plantation 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.

2.15.4

MARKING RULES AND MARKING TECHNIQUES:

Marking Rules:

Marking will be done in the same year in which demarcation will be done. Before actual marking, sample plots of size 60mX60 m with intensity 5 to 10 % in each section of coupe will be taken. Sample plots should not be at the edge of the coupe. The distance between the centers of two sample plots should not be less than 200 m. In sample plots enumeration will be done completely and the data will be compiled in the same format as is given in enumeration data analysis results.

Then the site quality will be determined. In the same coupe, if a patch of more than 5 ha. is having different quality, the enumeration data should be collected separately. The abstract of enumeration data will be prepared site qualitywise. Thereafter, the normal stands table for uneven-aged normal forest for the above site qualities will be taken and comparison will be done. The surplus number of stems/ha will be marked for felling against concerned girth classes as is done in the case of thinning in even-aged forests with the help of yield table. The surplus number of stems/ha is to be removed from respective girth classes. Then the no. of stems to be removed from harvestable girth class is determined on the basis of groups of different species. In marking of the above surplus and mature trees, silvicultural, social and financial aspects of the species should be taken into account. In deciding the preference of removal, if the crop composition has teak more than 20% then only the teak trees will be removed and miscellaneous non teak trees will be retained. In case, the crop has less than 20% teak then teak shall be retained. In main felling coupes, thinning felling will be done after execution of felling of mature trees, because in felling, some of small trees are damaged and they are to be removed. In order to compensate this unforeseen loss, the same number of trees , in respective girth classes are retained from the list of thinning marking.

Besides, in each sample plot at any corner 20 mtr. x 20 mtr. plot is taken and the regeneration survey is carried out. For this survey, data for different species are to be collected in the following proforma.

TABLE-84

Species	No. of seedlings Of height >30 cm and < 1.37 m	No. of seedlings in Girth class 0 U 15

The required number of seedlings of height more than 30 cm and up to 1.37 meter for a given site quality and with reference to the existing crop composition can be had from the normal stand table. If the number observed is less than the table value, the regeneration status is not up to the mark and accordingly decision for planting is to be taken and nursery activity should be started to have seedlings for planting in gap where oldest trees will be felled. Planting of natural and endemic species whose nursery technique is established will be preferred. Efforts to change the composition of the crop can be started with one or two favoured species in appropriate proportion by taking plantation in gaps created by felling. Proportions and species will be decided as per site quality.

Marking techniques has been described in detail in chapter on Miscellaneous Working Circle.

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

TYPE A :- PROTECTION AREAS:

No marking shall be done as felling is not prescribed. As the area is having slope more than 25° , hence the dead trees lying on ground will act as barrier to the surface run off hence dead trees will not be removed except leaving two dead trees per hectare to act as snags and dens and log the of soft wood species which is habitat for birds, insects and rodents. The root suckers will be encouraged. Bush sowing of neem and maharukh will be carried out by the beat guards/van majors. Gully plugging and nala bunding works will be taken up across nalas to reduce the speed of surface run off.

TYPE B:- UNDERSTOCKED AREAS:

Marking will not be carried out except-

All the dead trees after retaining two dead trees per ha. and two logs of soft wood species.

(ii) All live high stumps to be cut as close to the ground as possible and dressed.

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(iii) All coppice shoots of valuable species will be removed except one or two vigorously growing shoots per stool. Valuable species includes teak, ain, bija, dhawda, mowai etc.

Suppressed seedlings to be cut back and flush to the ground.

TYPE C :— POLE CROP :

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 rd. of height of poles shall be maintained between two rows. The healthy poles will be preferred while retaining

TYPE D:- WELL STOCKED AREA:-

- 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 class.
- ii) Common climbers will be cut.
- iii) All trees in the pre harvestable girth class will be enumerated.
- iv) The entire multiple coppice tree or pole crops will be marked to reduce the number of stems or poles to one per stool retaining the most promising one.
- v) No tree will be marked for felling unless it is silviculturally available.
- vi) Only that number of teak trees preferably of coppice origin and that of harvestable girth and above will be marked for felling as prescribed under yield regulation. Those harvestable teak trees which are preventing the development of the seedling regeneration of the desired species, will be removed in preference to others. Otherwise felling of trees from these girth classes will be first from the highest girth class and then next below and so on. Due care should be taken to remove teak trees of coppice origin while retaining the teak trees of seedling origin as far as possible. The trees which are not likely to survive till the next felling cycle will be preferred for removal. In addition to that the excess trees/poles from

each girth class as determined in earlier sections will be removed so as to achieve a normal forest in terms of its distribution. Based on the yield calculation for different group of species, the percentage of trees to be removed / harvested after marking is given in the following table.

TABLE-85
PERCENTAGE OF TREES TO BE REMOVED

Sr.No.	Group	% of trees to be removed
1	I (Teak)	50 % above the harvestable girth class
2	II (Ain,bija,haldus,shisham)	50 % of the marked trees
3	III (Other miscellaneous species not included in group II and IV)	50 % of the marked trees
4	IV (Garari and lendia)	50 % of the marked trees

All suppressed and dead trees will be marked for felling, retaining two dead trees per hectare. To avoid the reckless felling, it is prescribed that suppressed trees having straight clear bole exceeding 2.5 meter in height from the ground level will not be felled. In addition to trees above exploitable girth as enunciated in table 77, the excess no. of poles/trees (or basal areas) from each girth class as explained in sub-chapter of normal forest shall also be removed to achieve normalcy. In the deficit class nothing will be done. There is no need to reserve the corresponding trees/poles from the lower girth class, for that basal area as it is not required for achieving normalcy. It has been found that the normalcy by the above method will be achieved after one or two rotations.

SECTION 16: SUBSIDIARY SILVICULTURAL OPERATIONS:

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

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

2.16.2 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:-

- All standing trees marked for felling but not felled shall be felled.
- All damaged trees which are not likely to recover shall be cut back.
- All common climbers interfering the growth shall be removed.
- All growth of inferior species which is likely to interfere with the growth of teak and valuable miscellaneous shall be cut.
- The suppressed and damaged advanced growth shall be cut back.

CLEANING:

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2.16.3 These operations shall be carried out in the sixth year of main felling. The following operations are carried out.

- Common climber cutting.
- All dead, badly damaged and uprooted trees should be cut.

Cutting coppice shoots except one vigorously growing per stump where there is absence of advance growth of seedling origin (natural or planted).

SECTION 17: REGENERATION:

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

2.17.2 METHODH OF REGENERATION

(a) NATURAL REGENERATION:

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 species competition which will result in improper growth of desirable species. These areas can be categorized into two groups.

i) AREAS WITH ADEQUATE REGENERATION:

Regeneration will be treated as adequate if the area contains more than 400 seedling/root stock per ha. In natural regeneration areas, in the next year of main felling, systematic weeding should be carried out and continued thereafter until the plants are free from the risk of competition. These areas will be rigidly protected from fire, 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 :

The area having seedlings or root stock less than 400 per ha. will be treated as areas with inadequate regeneration. 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.

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(b) ARTIFICIAL REGENERATION:

The areas which are deficient in natural regeneration shall be supplemented by planting suitable species of teak and other important misc. species such as Dhaoda, charoli, Moha, Hirda, Behada, Ain, Arjun, Tiwas, Sivan, Chinch, Jamun, Ber, Kulu, Biba, Anjan, Apta, Amba etc. The ratio of the speices shall be teak: miscellaneous each fifty percent. Teak plantations shall be raised by stumps and miscellaneous plantations shall be raised by using seedlings raised in polypots / root trainers.

(c) METHOD OF PLANTING:

In the type B area of this working circle, 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 this category should be marked with lime at 2 mtr. x 2 mtr. 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:

Pit not to be dug – (a) If within a radius of one meter a seedling of natural origin exists. OR (b) If the mark comes within the influence zone of a standing tree. Influence zone for various size trees may be taken as given in table below:-

TABLE-86

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 size 45 cm x 45 cm x 45 cm should be dug at other points. Not more than 10 percent of the coupe area will be planted every year.

SECTION-18: OTHER REGULATIONS:

PROTECTION FROM FIRE :

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

GRAZING CONTROL:

2.18.2 The areas after main felling shall remain closed to grazing for a period of five years. The closed areas shall clearly be mentioned in grazing licenses and people shall be made aware about closure of the coupes. In order to increase the carrying capacity of the area, seeds of palatable grasses shall be broadcasted and villagers will be motivated to harvest the fodder for stall feeding. Rotational grazing will be followed based on the carrying capacity of the area.

PARTICIPATION:

2.18.3 The local people shall be made aware of the importance of protection to the forests from fire, illicit grazing, illicit cutting and encroachment. Participation of local people shall be encouraged in protection and afforestation of forests. For this purpose, regular camps shall be arranged to explain the people about the importance and benefit of regeneration and protection of forests. Village forest protection committees will be formed under Joint Forest Management Program wherever possible and a comprehensive forest protection scheme will be undertaken.

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CHAPTER – III

IMPROVEMENT WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

3.1.1 The following areas are proposed to include in the working circle:-

- The areas which were managed under improvement working circle of Shri. A.P. Deshmukh plan.
- Miscellaneous working circle areas, of Ghot Range, of Shri. K. N. Khistis' plan.
- Miscellaneous Working Circle Areas of Allapalli Range in Shri. S.A.H.Qureshi's plan.
- The remaining areas of C.W.R. system of Shri. K. N. Khistis' plan which have not been included in afforestation working circle in this plan.
- Protected Forests and Zudpi jungle which are fit to be retained under this Working Circle.

3.1.2 This working circle includes the forest areas which are capable of producing large size timber but major area of this working circle is unfit for harvesting in this plan period except few trees, in the scattered dense patches, attaining harvestable girth class. Improvement Working Circle includes forests which need rest for some time including, the pole crop and the old teak plantations which have not been covered in the Teak Plantation Working Circle. The improvement working circle covers 16.43 % or 31269.733 ha area of the division. This area is distributed in 231 compartments which include 25680.034 ha of Reserved Forest, 5230.755 ha of Protected Forest and 358.944 of zudpi jungle. This working circle is constituted in order to serve as transition for the future S.C.I. Working Circle.

Range-wise distribution of area under this working circle is given in the following Table

TABLE-87
RANGE WISE AREA UNDER IMPROVEMENT WORKING CIRCLE

Range	Reserved Forest in ha.	Protected Forest in ha.	Zudpi jungle in ha.	Total Forest in ha.
Chamorshi	4811.327	197.459	228.063	5236.849
Ghot	4261.626	188.677	130.881	4581.184
Pediguddam	1911.539	0.0	0.0	1911.539
Permili	10328.422	4543.637	0.0	14872.059
Allapalli	130.724	0.0	0.0	130.724
Aheri	3077.519	284.477	0.0	3361.996
Markanda	1158.877	16.505	0.0	1175.382
Total	25680.034	5230.755	358.944	31269.733

SECTION 2 : GENERAL CHARACTER OF THE VEGETATION :

3.2.1 **PDF Compressor Free Version** The status of regeneration is poor, in some area, however at many places it is very good. The density varies from 0.4 to 0.6. Site quality varies from III to Iva. Most of these areas are with teak and teak - inferior miscellaneous species of stunted growth which require silvicultural operation and a good growing space. The forest is open, soil is shallow liable to erosion. The crop consisting of mainly garadi, ain, moha, aonla, salai, khair, bel, tendu, lendia, achar with patches of bija, rohan, dhawada and teak appears in some patches over better soil.

SECTION 3 : FELLING SERIES AND COMPARTMENTS :

3.3.1 The areas under this working circle is divided into 14 felling series having 20 annual coupes in each Series. Average area of the coupe is 100 ha. to 150 ha. The details of the felling series and sequence of working is given in **Appendix No. XXXIII.**

SECTION 4 : BLOCKS AND COMPARTMENTS

3.4.1. The details of compartments allotted to this working circle are given in **Appendix No. XXXII.**

SECTION 5 : SPECIAL OBJECTS OF MANAGEMENT :

- 3.5.1**
- i. To maintain and improve the vegetation cover.
 - ii. To improve growing stock in favour of timber species.
 - iii. To help natural regeneration of various species to establish and supplement the same by taking up afforestation works in under stocked areas.
 - iv. To check soil erosion for increasing the productive capacity of the soil and maintaining the same.
 - v. To meet the local demand for firewood, building material and agricultural equipments through nistar.

SECTION 6 : ANALYSIS AND VALUATION OF THE CROP :

- 3.6.1**
- i **Stock mapping:** It has been done with the help of satellite imageries in the office of the Conservator of Forests, Working Plan Division Gadchiroli.
 - ii. **Age:** The crop is generally young to middle aged.

ii. **Density:** It varies from 0.4 to 0.6 along with scattered natural blanks, barren patches and under stocked areas.

iv. **Enumerations:** One percent enumerations is carried out by SOFR Unit at Gadchiroli. The details of analysis of enumeration data are given in the **Appendix No.XXI**. The following table shows the girth class wise distribution of the species and the regeneration status in this working circle. The group 1 includes teak, group 2 includes ain, haldu, bija, shisham, group 3 includes other miscellaneous species not included in group 1, 2 and 4 and group 4 includes garadi and lendia.

TABLE-88

TREES PER HECTARE IN IMPROVEMENT WORKING CIRCLE

Group	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151up	Total	r1	r2	r3
Group1	4.27	3.35	2.57	2.27	2.12	1.42	0.87	0.49	0.25	0.19	17.79	73.15	37.42	34.21
Group2	14.54	7.50	5.87	5.27	6.06	4.64	3.67	2.21	1.17	0.82	51.76	212.83	108.88	99.54
Group3	38.31	22.84	17.13	13.34	12.28	8.98	6.24	3.66	1.97	1.54	126.28	519.22	265.62	242.83
Group4	23.26	15.89	11.40	8.05	4.94	1.80	0.57	0.10	0.03	0.00	66.04	271.53	138.91	126.99
Grand Total	80.38	49.58	36.97	28.93	25.39	16.84	11.35	6.45	3.42	2.56	261.87	1076.72	550.83	503.57

ANALYSIS:

3.6.2 The analysis of the tree enumeration data shows that there are 6.79 % teak, 19.77 % group 2 major timber species, 48.22 % other miscellaneous species and 25.22 % group 4 species i.e. garadi and lendia. The analysis shows that there are 3.16 trees per hectare above 120 cm girth class where as the majority of the trees are falling under the girth class 16 to 60 cm which shows that most of the trees are in the younger to middle-aged group and fairly distributed over the whole working circle and therefore these compartments have been included in the improvement working circle in order to prepare this young crop to reach harvestable size and to improve the edaphic and ecological conditions of the forest. The percentage of teak in the forest is 18.86 % which shows that the composition of the forest is mainly teak forest whereas the non teak (Ain, Bija, Haldu and Shisham) is 24.28 % and the remaining 56.86 % are inferior miscellaneous species and therefore efforts are needed to take up the hygienic Silvicultural and tending operations and also taking up artificial regeneration of various species which will improve the quality and composition of the forest as a future crop to be worked under Selection-cum-Improvement Working Circle.

SECTION 7 : SYLVICULTURAL SYSTEM:

3.7.1 ~~PDF Compressor Free Version~~ To achieve the special objects of management, "Improvement fellings supplemented by planting and tending of the crop" shall be adopted.

SECTION 8 : ROTATION PERIOD: Rotation Period has not been fixed

SECTION 9 : EXPLOITABLE DIMETER & HARVESTABLE GIRTH:

3.9.1 In this working circle, only improvement felling is prescribed which will include removal of all such trees which are not likely to survive full felling cycle. Marking will be thinning marking and therefore from all girth classes surplus trees will be removed.

SECTION 10 : REDUCING FACTORS AND REDUCED AREAS: Not applicable.

SECTION 11 : FELLING CYCLE : The treatment cycle is fixed at 20 years.

SECTION 12 : DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB) : Not applicable, as the silvicultural system applied is for improvement, there is no division in to period are any Periodic Block.

SECTION 13: REGULATION OF YIELD:

3.13.1 The crop is generally young to middle aged. The felling is limited to improvement of the crop and the removal of trees above exploitable girth classes in the dense patches provided these trees are available silviculturally. Thinning will be done in the dense pole crop. Therefore the yield will vary and consist of small wood, poles and firewood only. Hence no yield regulation is prescribed.

SECTION 14 : TABLE OF FELLING: The abstract of table of felling is given below

Table No. 89
Year wise working of coupes

Improvement Working Circle.						
Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2016-2017	GHOT	2	I	2	2	261.112
	CHAMORSH	2	I	2	2	231.19
	MARKHAND	1	I	1	3	120.064
	PEDIGUDA	1	I	1	1	120.273
	ALLAPALLI		I			
	AHERI	1	I	1	1	160.646
	PIRMILI	7	I	7	19	905.383
		14		14	28	1798.668

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2017-2018	GHOT	2	II	2	3	327.437
	CHAMORSH	2	II	2	2	250.433
	MARKHAND	1	II	1	1	137.35
	PEDIGUDA	1	II	1	1	79.812
	ALLAPALLI		II			
	AHERI	1	II	1	1	170.798
	PIRMILI	7	II	7	9	
		14		14	17	965.83

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2018-2019	GHOT	2	III	2	3	228.735
	CHAMORSH	2	III	2	2	260.831
	MARKHAND	1	III	1	1	131.956
	PEDIGUDA	1	III	1	1	78.308
	ALLAPALLI		III			
	AHERI	1	III	1	1	180.341
	PIRMILI	7	III	7	9	750.42
		14		14	17	1630.591

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2019-2020	GHOT	2	IV	2	2	331.088
	CHAMORSH	2	IV	2	2	217.68
	MARKHAND	1	IV	1	1	44.604
	PEDIGUDA	1	IV	1	1	95.009
	ALLAPALLI		IV			
	AHERI	1	IV	1	1	183.185
	PIRMILI	7	IV	7	10	738.331
		14		14	17	1609.897

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2020-2021	GHOT	2	V	2	2	228.977
	CHAMORSH	2	V	2	2	253.152
	MARKHAND	1	V	1	1	112.28
	PEDIGUDA	1	V	1	1	97.309
	ALLAPALLI		V			
	AHERI	1	V	1	1	193.03
	PIRMILI	7	V	7	8	783.519
		14		14	15	1668.267

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2021-2022	GHOT	2	VI	2	3	229.059
	CHAMORSH	2	VI	2	2	274.489
	MARKHAND	1	VI	1	2	189.575
	PEDIGUDA	1	VI	1	1	80.751
	ALLAPALLI		VI			
	AHERI	1	VI	1	1	186.193
	PIRMILI	7	VI	7	8	778.01
		14		14	17	1738.077

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2022-2023	GHOT	2	VII	2	2	224.419
	CHAMORSH	2	VII	2	3	237.567
	MARKHAND	1	VII	1	1	120.61
	PEDIGUDA	1	VII	1	1	78.714
	ALLAPALLI		VII			
	AHERI	1	VII	1	1	174.54
	PIRMILI	7	VII	7	13	830.989
		14		14	21	1666.839

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2023-2024	GHOT	2	VIII	2	2	203.89
	CHAMORSH	2	VIII	2	3	317.166
	MARKHAND	1	VIII	1	2	124.537
	PEDIGUDA	1	VIII	1	1	77.126
	ALLAPALLI		VIII			
	AHERI	1	VIII	1	4	157.941
	PIRMILI	7	VIII	7	10	817.862
		14		14	22	1698.522

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2024-2025	GHOT	2	IX	2	2	182.642
	CHAMORSH	2	IX	2	5	301.496
	MARKHAND	1	IX	1	1	99.578
	PEDIGUDA	1	IX	1	1	99.008
	ALLAPALLI		IX			
	AHERI	1	IX	1	2	213.23
	PIRMILI	7	IX	7	29	709.051
		14		14	40	1605.005

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2025-2026	GHOT	2	X	2	2	206.843
	CHAMORSH	2	X	2	2	226.206
	MARKHAND	1	X	1	1	94.828
	PEDIGUDA	1	X	1	1	87.292
	ALLAPALLI		X			
	AHERI	1	X	1	1	190.919
	PIRMILI	7	X	7	12	906.608
		14		14	19	1712.696

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2026-2027	GHOT	2	XI	2	2	184.781
	CHAMORSH	2	XI	2	2	208.045
	MARKHAND		XI			
	PEDIGUDA	1	XI	1	1	101.973
	ALLAPALLI		XI			
	AHERI	1	XI	1	1	105.307
	PIRMILI	6	XI	6	9	765.895
		12		12	15	1366.001

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2027-2028	GHOT	2	XII	2	2	185.701
	CHAMORSH	2	XII	2	3	244.579
	MARKHAND		XII			
	PEDIGUDA	1	XII	1	1	90.317
	ALLAPALLI		XII			
	AHERI	1	XII	1	1	134.171
	PIRMILI	6	XII	6	11	797.003
		12		12	18	1451.771

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2028-2029	GHOT	2	XIII	2	2	174.915
	CHAMORSH	2	XIII	2	2	277.795
	MARKHAND		XIII			
	PEDIGUDA	1	XIII	1	1	89.907
	ALLAPALLI		XIII			
	AHERI	1	XIII	1	1	123.089
	PIRMILI	6	XIII	6	6	740.979
		12		12	12	1406.685

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Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2029-2030	GHOT	2	XIV	2	2	187.252
	CHAMORSH	2	XIV	2	2	221.679
	MARKHAND		XIV			
	PEDIGUDA	1	XIV	1	1	91.241
	ALLAPALLI		XIV			
	AHERI	1	XIV	1	1	146.101
	PIRMILI	6	XIV	6	7	558.23
		12		12	13	1204.503

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2030-2031	GHOT	2	XV	2	2	236.655
	CHAMORSH	2	XV	2	2	194.828
	MARKHAND		XV			
	PEDIGUDA	1	XV	1		118.531
	ALLAPALLI		XV			
	AHERI	1	XV	1	1	183.264
	PIRMILI	6	XV	6	7	578.082
		12		12	12	1311.36

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2031-2032	GHOT	2	XVI	2	2	210.416
	CHAMORSH	2	XVI	2	2	245.459
	MARKHAND		XVI			
	PEDIGUDA	1	XVI	1	1	105.06
	ALLAPALLI		XVI			
	AHERI	1	XVI	1	1	218.001
	PIRMILI	6	XVI	6	6	620.028
		12		12	12	1398.964

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2032-2023	GHOT	2	XVII	2	2	254.872
	CHAMORSH	2	XVII	2	2	261.124
	MARKHAND		XVII			
	PEDIGUDA	1	XVII	1	1	117.694
	ALLAPALLI		XVII			
	AHERI	1	XVII	1	1	260.494
	PIRMILI	6	XVII	6	7	665.119
		12		12	13	1559.303

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Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2033-2034	GHOT	2	XVIII	2	2	231.591
	CHAMORSH	2	XVIII	2	2	366.562
	MARKHAND		XVIII			
	PEDIGUDA	1	XVIII	1	2	78.371
	ALLAPALLI		XVIII			
	AHERI	1	XVIII	1	1	233.38
	PIRMILI	6	XVIII	6	9	645.566
		12		12	16	1555.47

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2034-2035	GHOT	2	XIX	2	2	251.591
	CHAMORSH	2	XIX	2	2	360.734
	MARKHAND		XIX			
	PEDIGUDA	1	XIX	1	1	79.737
	ALLAPALLI		XIX			
	AHERI	1	XIX	1	1	144.492
	PIRMILI	6	XIX	6	10	711.936
		12		12	16	1548.49

Year	Range	Nos.Total F.S.	Coupe No	Total nos of Coupes	Total Nos of Comptt. Involved	Total Area in Ha.
2035-2036	GHOT	2	XX	2	2	239.208
	CHAMORSH	2	XX	2	2	285.828
	MARKHAND		XX			
	PEDIGUDA	1	XX	1	1	78.772
	ALLAPALLI		XX			
	AHERI	1	XX	1	1	133.595
	PIRMILI	6	XX	6	15	103.998
		12		12	21	841.401

SECTION 15: METHOD OF EXECUTING THE FELLING:

3.15.1 Agency For Harvesting: The demarcation and marking of the coupes will be done departmentally. Felling and disposal of the forest produce shall be done departmentally or through F.L.C.S. under the prevailing system. The small timber, poles and firewood will be made available to the local people on priority and the balance shall be sold in open auction departmentally. The areas allotted to this working circle can also be undertaken under Joint Forest Management as per guidelines issued by the State Government from time to time. But the overall supervision of the works shall be of the Forest Department.

3.15.2 DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP :

DEMARCATION.

It will be done one year in advance.

PREPARATION OF TREATMENT MAP:

A digitized copy of map of the coupe will be provided by Conservator of Forests, Working Plan Division, Gadchiroli. using G.I.S. Software. The treatment map will be prepared by RFO and verified by ACF and approved by Dy.C.F. showing the following details.

- The protection area i.e. areas having slopes greater than 25° and width of 20 m along the nala banks.
- Area with crown density less than 0.4.
- Teak plantation, sample plots and preservation plots.
- Areas with the density more than 0.4.

Besides the aforesaid areas on the treatment map, the following shall be included.

TYPE – A: PROTECTION AREAS :-This will include the following areas:

- (i) A1: The area having steep slopes i.e. more than 25° .
- (ii) Eroded or liable for erosion.
- (iii) A2: 20 meter wide strip on either side of water courses.
- (iv) Riparian Zones
- (v) Sacred groves

TYPE – B: UNDERSTOCKED AREAS:- The forests having density less than 0.4 are included in this category. It will include:-

- (i) B1: Areas having adequate rooted stock i.e. > 400 seedling per hectare.
- (ii) B2: Areas with inadequate rooted stock i.e. <400 seedlings per ha.

TYPE – C: GROUPS OF YOUNG POLES:- The group of young poles in patch of minimum 0.5 hectare will be identified.

TYPE – D: WELL STOCKED AREAS:- The areas having forests more than 0.4 density are included in these areas. In such areas felling is envisaged.

3.15.3: MARKING RULES:-

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Marking will be done in the same year in which demarcation will be done. The important marking rules are as follows.

- Soil and moisture conservation works such as continuous contour trenches, check dams, gully plugging etc. will be taken up.
- Dressing of high stumps: The high stumps of the coppice species will be enumerated and measured and separate record will be prepared. The high stumps will be felled after approval from the Dy. Conservator of Forests. The felling should be 30 cm above ground level in order to promote lateral shoots instead of callous shoots.
- The multiple shoots will be singled out into one and the lateral shoots shall be preferably retained. The suppressed poles shall be flushed to the ground.
- The dens and snags will be retained preferably two dead non-teak trees will be retained as snag trees along with two fallen logs per hectare of non-teak species preferably soft wood species.
- Thinning will be done in the bamboo clumps falling in these coupes outside the regular bamboo coupes according to silvicultural prescriptions.
- The congestion in the crop will be removed in order to promote healthy growth of the preferred species. The best poles will be retained as a future crop. The multiple poles from a single tree will be reduced to one.
- The removal of non timber forest produce in a non destructible manner will continue.

The marking rules for each type of area, will be as follows:

TYPE A: PROTECTION AREA:

No marking will be done. The dead trees will be removed and the blank patches will be planted with species like neem, sissoo, shivan , siras etc.

TYPE B : UNDERSTOCKED AREA:

All edible fruit and flower yielding trees will be reserved from felling. The following trees will be marked for felling:

- All dead and suppressed trees after retaining two dead trees/ha.
- All but one vigorously growing coppice shoot per stool.
- All live high stumps.
- All edible fruits and flowers yielding trees will be reserved from felling.

TYPE C: GROUPS OF YOUNG POLES:

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Silvicultural thinning shall be done as per yield table. The patches of not less than 1 hectare shall be identified having advance growth of any species and it shall be spaced out to one third of the top height, while retaining the vigorous and straight poles. The thinning shall be done in such a manner that epicormic branches do not come up. In the natural young crop thinning marking will be done on the basis of weighted average g.b.h and site quality with the help of yield table or normal stand table as described in Conversion Working Circle of this plan. In the plantation, thinning will be done as per the procedure prescribed in Conversion Working Circle.

TYPE D : WELL STOCKED AREA :

All edible fruit and flower yielding trees such as moha, char, tendu, aonla, chinch, bel, sitafal, and trees of kulu will be reserved from felling. The species having their population less than 1 tree per hectare on the basis of tree enumeration data, will not be felled. The important tree species which should be reserved are haldu, shisham, shivan, tiwas, alonla , hirda, behada, dhaoda etc.

SECTION 16 : SUBSIDIARY SYLVICULTURAL OPERATIONS :

(A) CUTTING BACK OPERATIONS:

3.16.1 The following operations will be carried out in the next year of the main felling in the D type area.

- all badly damaged trees not likely to recover will be cut.
- Common climbers will be cut.

(B) CLEANING:

3.16.2 Cleaning operations will be carried out in the Sixth year of the main felling in D type areas.

- Common climbers will be cut.
- Coppice shoots will be reduced to one or two per stool.
- Inferior growth which may interfere with the teak or miscellaneous species will be removed.
- Damaged and suppressed poles will be cut back.

(C) WEEDING:

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

SECTION 17: REGENERATION.

3.17.1 Choice Of Species:

The species to be favoured in order of preference are Teak, Bamboo, Ain, Bija, Tiwas, Dhawada, Charoli, Moha, Aonla, Hirda, Behada, Lendia, Rohan, Bhirra & Kalam.

3.17.2 METHODS OF REGENERATION.

(A) Natural Regeneration.

Area containing good natural regeneration will be identified in the coupe and will be protected from fire and grazing.

(B) Artificial Regeneration:

Areas which are deficient in natural Regeneration shall be supplemented with artificial regeneration. Suitable well drained areas preferably of site quality III & Iva having deficient natural regeneration will be selected for improving the stocking with artificial regeneration. This artificial regeneration will be restricted to 10 % of the coupe area. The plantation will be done in a single phase as the soil is good and does not require restoration. A minimum of 625 seedlings are required per ha. to treat the area to be adequate in regeneration a patch of minimum 5 ha. will be treated as adequate plantation.

SECTION 18 : OTHER REGULATIONS.

3.18.1 (i) Grazing :

Coupes will remain closed to grazing for a period of 10 years from the year of main planting. While raising plantations in the under stocked areas, palatable fodder grasses like sheda and paonea will be seed sown so that at the end of 10 years when the coupe will be opened for grazing the villagers will have enough fodder for the their cattle on rotational harvest basis from such coupes.

3.18.2 (ii) Fire Control :

The areas shall be protected from fire. Annual fire prevention schemes shall be implemented in order to protect the areas from annual fires.

3.18.3 (iii) Participation :

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. The protection of plantation from fire and grazing should be entrusted to landless and **sc/st** families through JFMCs by paying remuneration based on survival percentage of seedlings after every year. R.F.O, Forester and forest guard should motivate local people through JFMCs for participation in protection of forest from fire and grazing.

SECTION 19: SOIL AND MOISTURE CONSERVATION WORKS.

3.19.1 Soil and moisture conservation works will be carried out after the preparation of treatment map and is approved by the Deputy Conservator of Forests. Works shall be completed before the onset of Monsoon. Gully plugging and nala bunding, WATs shall be done as per the treatment prescribed after actual coupe inspection. The sites for loose boulder, gabian structure, earthen nala bund and forest tank should be technically selected by R.F.O. after site inspection and approved by A.C.F. The SMC works in the coupe should be proposed on watershed basis.

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CHAPTER – IV

CONVERSION WORKING CIRCLE.

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE:

4.1.1 This working circle includes 12586.990 ha area. The teak plantation taken up in the annual coupe of previous working plan as per the prescription is included in this working circle. Therefore area of this working circle is not in consolidated patch, rather in scattered patches spread over few ranges. This Working Circle includes the Reserved forest areas of Pedigundam Range and better quality Teak forests of Allapalli and Aheri Ranges which were included in Teak Conversion Working Circle in the earlier working plans. But due to ban on clear felling of forest, the areas of PB-I, which could not be tackled, have now been included under this Working Circle and over wood will be removed in all such areas and replanted with pure teak of genetically superior quality raised from seeds of selected seeds stands, clones. All successful old teak plantations have also been included in this working circle.

4.1.2 The range-wise distribution of the area allotted to this working circle is furnished in the following table:

TABLE-90

Sr. No.	Name of the range	Area of the range(ha)*
1	Pedigundam	350.816
2	Allapalli	8983.488
3	Aheri	3155.345
Total		12489.649

* Digitized area

SECTION 2 : GENERAL CHARACTER OF THE VEGETATION:

4.2.1 Teak is most widely planted species. The site quality is II to III with few patches of site quality I and the crop density is 0.5 to 0.8. The natural regeneration of teak is scanty and the crop is young to middle aged in the old teak plantations and it is mature to over mature in the Teak Conversion Working Circle areas of earlier working plans which could not be worked due to ban on clear felling. Such areas are more susceptible to fire and damages caused due to strong winds in the pre-monsoon season which uproot such trees and lead to loss of best quality timber every year therefore if in such areas over wood is not removed and replanted with teak, there is every possibility of the degradation of site quality and losing most valuable forests of India.

4.2.2 The plantations are mostly successful. The site quality varies from II to III. The area is fully stocked. Due to non observance of the subsequent silvicultural operations after planting, the proportion of misc. species in the plantation is high.

SECTION 3: FELLING SERIES.

4.3.1 This working circle comprises of 13 plantation series for raising up teak plantations in 12489.649 ha spread over in 54 compartments of Allapalli and Aheri and Pedigundam Range. The balance area of this working circle comprises of old teak plantations in all the ranges which require silvicultural operations such as cleaning, thinning and tending. The thinning operations are prescribed for old teak plantations as well as newly raised plantations as per thinning schedule given in **Appendix No. XXXVI.**

SECTION 4 : BLOCKS AND COMPARTMENTS

4.4.1. The compartments allotted to the conversion working circle and their sequence of working is given in the **Appendix No. XXXVII and XXXVIII.**

SECTION 5: SPECIAL OBJECTS OF MANAGEMENT.

4.5.1 The objects of management in this working circle are listed as under;

- (i) To utilize the maximum production capacity of forest.
- (ii) To obtain maximum sustained yield.
- (iii) To carry out thinning as per the yield table on the basis of age and site quality.
- (iv) To save the forest from degradation.
- (v) To improve the crop by carrying out required silvicultural operations so as to achieve growth parameters comparable to those in the yield table.
- (vi) To involve the local people through J.F.M. Committees in the management and protection of the forest.

SECTION 6 : ANALYSIS AND VALUATION OF CROP.

4.6.1 The analysis and valuation of the crop has been assessed as under.

(a) Stock map: The forests have been stock mapped by Geographical Information System (GIS) on the map of 4" = 1 mile. The standard symbols have been used in the preparation of stock maps, site quality, density and important species have been given in **Appendix No. LIV.** All plantations have been shown on stock maps in a 1: 50000 and 1: 20000 scale.

(b) Density: Generally the crop is fully stocked.

(c) **Site Quality:** The site quality of the working circle is II to III.

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(d) **Tree enumeration:** 1% tree enumeration has been done by the Survey of Forest Resources Unit Gadchiroli. The results of tree enumeration is given in **Appendix No.XXI**. The distribution of stems/ha girth class wise is given in the following table:

TABLE-91
SPECIES AND GIRTH DISTRIBUTION IN THE TEAK CONVERSION WORKING CIRCLE

Group	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151up	Total	r1	r2	r3
Group1	11.48	14.47	16.48	16.01	11.68	7.61	5.16	3.36	2.00	1.52	89.78	384.56	215.31	112.66
Group2	2.80	2.05	2.10	2.71	3.11	2.93	1.97	1.06	0.78	0.59	20.10	86.10	48.21	25.23
Group3	19.23	11.59	9.52	8.32	7.74	6.26	4.53	3.06	1.72	1.71	73.67	315.53	176.66	92.44
Group4	14.54	9.05	6.53	4.79	2.63	1.04	0.38	0.11	0.03	0.02	39.11	167.53	93.80	49.08
Grand Total	48.05	37.16	34.63	31.82	25.17	17.84	12.04	7.58	4.53	3.84	222.66	953.72	533.97	279.41

(e) **Analysis :** The analysis of data shown in the table above shows that Teak occupies 40%, non-teak timber species (ain, bija, haldu and sisham) 9 % and other miscellaneous species occupy 33% and 18% group 4 species. Therefore it is found that the percentage of teak in the area is very good for regenerating the area under the over wood removal system by raising pure teak plantations of genetically superior variety in order to convert the area into pure teak forest.

SECTION 7: SILVICULTURAL SYSTEM.

4.7.1 Consistent with the objects of the management of this working circle the silvicultural system will be conversion to uniform system with supplemental artificial regeneration of genetically superior stock of teak in the conversion working circle. The plantations will be subjected to thinning and the first two thinning will be done in the 10th year and in the 15th year and the subsequent thinning at every 10 years. It has been found that the difference between two thinning should be of 10 years as it takes 5 years to close the canopy opened due to thinning and another 5 years are required to kill the branches which have grown on the stem due to opening of the canopy.

SILVICULTURE OF TEAK:

4.7.2 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

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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.

4.7.3 The tree is capable of thriving on variety of soils and geological formations, but requires good sub-soil drainage. The teak produces deep root-system. 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.

4.7.4 Teak coppices and pollards vigorously, and sometimes retains the power of coppicing to a considerable size. All the coppice shoots originated in one or 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:

4.7.5 Flowering in teak

Flowering in teak is always terminal and limited only to sunlit branches. The species is naturally adapted with very low flower to fruit ratio and fruit to seed 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.

4.7.6 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.

4.7.7 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.

4.7.8 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.

4.7.9 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.

4.7.10 Synchrony in flowering between clones need to be worked on the basis of number of flowering days overlapping between clones.

4.7.11 A minimum spacement of 10M x 10M, application of nitrate fertiliser for at least 4-5 years (100-250 gms of urea/plant with 2 watering; application is recommended during pre-monsoon showers) In general, large inflorescence size lead to exponential increase in pollen production. In general, activities related to pollarding the main stem result in physiological shock.

SECTION 8: ROTATION PERIOD: Average site quality of the forest includes in this working circle is II to III. To avoid any possibility of degradation of site, rotation not shorter than that of age of maximum volume production is suggested. The area fit for working will be covered in the first felling cycle i.e. 20 years

SECTION 9: EXPLOITABLE DIAMETER: Harvestable girth for various important species, in Conversion working circle, has been determine at maximum volume

SECTION 10: REDUCING FACTORS AND REDUCED AREAS: Not applicable.

SECTION 11: FELLING CYCLE.

4.11.1 The planting period will be of 20 years and the forest area proposed for teak plantation in this working circle shall be divided into 20 annual coupes. The plantations will be subjected to thinning according to silvicultural thinning regime and will be strictly in accordance with F.R.I. Publications No.1957 Volume 9 No.4. The rotation of 100 years has been fixed and no plantations included in this working circle are old enough to complete rotation. The crop completing rotation will be clear felled and planted with teak.

SECTION 12: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB) :
Not applicable, as the shelter wood system is not adopt for this working circle

SECTION 13: CALCULATION OF YIELD.

4.13.1 Yield shall be regulated on the basis of area, though the annual coupes will be nearly equal in extent, the annual yield is bound to vary because of irregular nature of crop.

SECTION 14: TABLE OF FELLING: The abstract of table of felling is given below but the detail schedule is given in **Appendix No.XXXVIII.**

SECTION 15 : METHOD OF EXECUTING THE FELLINGS:

AGENCY FOR EXECUTION OF WORKS.

4.15.1 The coupes shall be worked through departmentally however thinning will be done exclusively by the department.

DEMARCATON OF COUPES, PREPARATION OF TREATMENT MAPS AND MARKING TECHNIQUES:

i) Demarcation:

4.15.2 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:

4.15.3 A digitized copy of the map of coupe will be provided by Conservator of Forests, Working Plan Division, Gadchiroli. Treatment map will be prepared by RFO and verified by ACF and Dy. C.F. will approve the treatment map.

iii) Marking techniques :

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4.15.4 The standard marking techniques which have been prescribed in the Chapter on Miscellaneous Regulations shall be followed and adopted.

Marking rules:-

4.15.5 The guidelines issued by Govt. of India in the Ministry of Environment and Forest, New Delhi vide their letter No. 6.5/2000 9ROHQ dated 2/8/2001 and G.O.I., MOEF, New Delhi letter dated 11/9/2003 addressed to the Managing Director, Forest Development Corporation of Maharashtra Ltd. has been incorporated here for the Conversion Working Circle. Marking will be done under the close supervision of the Range Forest Officer and will be verified by an Officer not below the rank of Asstt. Conservator of Forests. The marking rules are as follows:

- Growth to the extent of 20 m width along either banks of nalas, streams and rivers should be retained and therefore no felling shall be done in this area.
- Patches containing advance growth of teak will be retained after removal of over wood if any. Suppressed advance growth will be cutback.
- Patches 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.
- All young to middle aged fruit bearing trees up to 20 trees per hectare should be retained.
- Young to middle aged trees of semal, khair, rosewood and other superior miscellaneous species. like bija, shisham ain, haldu, kalam shivan, dhaoda etc. up to 20 trees per hectare uniformly spread over the area should be retained.
- The plantation area constituting a section shall not exceed 20 hectare at one place.
- 20 mtr. wide strip of natural forest should be retained on all sides of the section.
- Improved and genetically superior planting stock shall be used in order to increase the productivity.
- Trees of *Cassia fistula* will not be felled as they act as biological control against teak defoliators and teak skeletonizers

SECTION 16: SUBSIDIARY CULTURAL OPERATIONS.

4.16.1 These operations shall be carried out departmentally and will include:

Thinning:

4.16.2 Thinning in plantation areas will be carried out at 10th year, 15th year and thereafter on a 10 years cycle. The first two thinning will be mechanical. During first

mechanical thinning trees in alternate diagonal lines will be removed, the subsequent second mechanical thinning will remove alternate vertical lines and the subsequent thinning will be silvicultural thinning to be carried out on a ten years cycle 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. XL.** and the sequence of thinning in existing plantations is given in **Appendix No XXXVI**

Thinning In Teak Plantation:

Mechanical Thinning And Silvicultural Thinning:

4.16.3 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 :

4.16.4 Teak is traditionally planted at a spacing of 2mtr. x 2mtr. i.e. 2500 seedlings per hectare and in ideal conditions would have required a thinning at an age of 5 years of its formation as at that age, the canopy starts interfering and accordingly, two mechanical thinning of removing alternate diagonal and vertical 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 thinning at plantation age of 5 and 10 years. It prescribed following standard:

<u>Year</u>	<u>No./ha. (for site quality –III)</u>	<u>Spacement</u>
1 st Year	2500	2mtr x 2mtr.
5 th year	1767 (after 1 st Mechanical thinning of removing alternate diagonal line)	2 mtr. x 2 mtr.
10 th year	1250 (after 2 nd Mechanical thinning of removing alternate vertical line)	4 mtr. x 4 mtr.

4.16.5 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 competition really

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does not start at this stage. There are limiting factors due to moisture and root competition. 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.

Silvicultural Thinning:

(1) Demarcation, Preparation of Treatment Map and Cleaning :

- 4.16.6** (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 under stocked 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 Chief Conservator of Forests (Territorial). The cleaning of plantation should include the removal of :
- Bushy weeds.
 - Garadi, lendia or any other pioneering species. Trees/poles of spp. Amaltas will not be removed as this is the natural biological parasites of teak-defoliators and teak-skeletonisers
 - Damaged or badly shaped poles/trees will be flushed to the ground.
 - Climber cutting:- Only the common climbers 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.

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(1) Demarcation, Preparation of Treatment Map and Cleaning :

(a) Demarcation :

4.16.7 The thinning area should be properly demarcated.

(b) Treatment Map :

4.16.8 Treatment map will be prepared, showing the extent of area, to be thinned, and the under stocked area, which is not to be thinned.

(c) Cleaning :

4.16.9 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 Chief Conservator of Forests (Territorial). The cleaning of plantation should include the removal of :

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(3) Procedure of Carrying Out Silvicultural Thinning.

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

a. Removal :

4.16.11

The average diameter of the crop should be calculated, by taking all trees in plot (5 chain x 2 chain or 150 mtr.X 60 mtr.). At the time of removal, the maximum number of removal should be from the trees below this average girth. All suppressed, 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 to be retained. Trees/ poles of higher diameter should always be retained. This may cause a normal increase in the basal area. The number of trees should be then reduced, but the basal area should be protected. The end result of thinning would be that each tree should have a clear crown around it, but not enough to activate a dormant epicormic shoot.

b. Subsequent Thinning - Third Thinning :

4.16.12 Third thinning will be after 25th year of the formation of plantation, and fourth thinning will be carried out at the age of 35 years, i.e. at an interval of 10years till 60 years. This is done after analyzing sigmoid growth curve, which indicates that the growth is very steep during the period till 80 years and then stabilizes to some extent.

c. Thinning In Very Old Plantation :

4.16.13 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.

(4) Cleaning:

4.16.14 A cleaning operation will be carried out in the 5th year commencing from the year of main felling.

- All common climbers will be cut over the whole area of the coupe, if necessary.
- Damaged and suppressed sapling and coppice shoots will be cut back.

- Multiple coppice shoots will be reduced to two or three per stool. Shoots to be retained should be most vigorous, well grown and well spaced. Persistent side branches will be cut 15 cm away from the plant without damaging the stem.
- Fast growing inferior species and bamboo interfering or likely to interfere with the reproduction of teak and other valuable species will be cut.
- In thick patches of teak advance growth and established regeneration of other valuable species, a spacing between saplings to be retained, should vary from 2 mtr. to 2.59 mtr. depending on the height growth.

SECTION 17: REGENERATION

CHOICE OF THE SPECIES.

4.17.1 The teak will be the principal species to be planted at a spacement of 2 mtr. X 2mtr. The standard nursery and planting techniques for raising teak shall be adopted. Every year about 250 hectares of area shall be selected for over wood removal and after removal of over wood it will be planted with 'A' grade stumps raised from seeds obtained from F.D.C.M. Ltd. Each patch shall not exceed 20 hectares and in between two patches a natural strip of 20 meters will be retained on each side of the planted area. In this strip of 20m width, the forest will be managed as per prescriptions given for Selection-Cum-Improvement W.C. The site selected for teak plantation shall be rich in sandy loam soil or a well drained clayey loam soil with high degree of exchangeable calcium. The clay or red soil, lateritic soil and water logged areas should be avoided for raising teak. Debudding should be carried out in the plantations in the following 2 to 3 years after plantation under strict supervision of R.F.O. The debudding operation should be carried carefully so as not to hurt the living cambium

(A) NATURAL REGENERATION:

4.17.2 In the moist type of forest where the canopy is complete, teak forms a small proportion of crop along with tall well formed scattered clumps of bamboo, the natural regeneration of teak is poor or wanting in the dry type where teak is found with *Anogeissus latifolia*. The factors affecting natural regeneration 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 distinguished 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 pre monsoons 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.

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4.17.3 The physical structure of the soil especially its porosity, is responsible for success of natural regeneration. Granite, gneiss and trap formations produce favourable soils, basalt and sandstone develop adequately porous soils but the humus disintegrates very rapidly on such soils. Teak regeneration does not thrive on laterite because humus is rapidly leached out and also due to highly acidic nature of the soil. In endoyenamorphic soils, which are mostly present in this area, the characteristic of the rock beneath plays an important and decisive role in determining the nature of surviving forest and the future crop. Trap is a natural home of teak and this soil is present at many places. Teak grows well when the soil conforms to certain physical and chemical properties and therefore the soil should be tested before taking up teak plantations. Teak prefers slightly basic to neutral soils with high exchangeable Calcium and Magnesium. Teak grows well in humus rich sandy loam soils due to plasticity index. Teak grows well on northern and eastern aspects.

4.17.4 In moist deciduous forests, the forest floor is covered with dense undergrowth and therefore prevents the radicle to reach the ground and thus the seedlings fail to establish. The opening of the forest canopy may lead to increase in the growth of grasses and other weeds, which will again prevent establishment of natural regeneration.

4.17.5 In natural forest, the annual ground fire scorches the seeds and helps in natural regeneration. The establishment of teak seedlings depends especially on light however the sudden influx of light may cause death of young seedlings. The drip from the trees also adversely affects the young plants. The early development of strong tap-root requires a soft friable soil or the seedlings will remain weak and small and incapable of surviving the ensuing dry season.

4.17.6 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.

4.17.7 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:

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4.17.8 The artificial regeneration of teak will be done by planting root shoot stumps prepared from the seedlings raised from quality teak seeds collected and marketed by FDCM Ltd.

SECTION 18: OTHER REGULATIONS:

(i) FIRE PROTECTION :

4.18.1 Plantations will be rigidly protected from fire. Local people should be persuaded to ensure success of the plantations by rigid fire protection through Joint Forest Management Committees.

(ii) GRAZING:

4.18.2 The local people will be persuaded to graze their cattle in areas other than closed areas. For cooperation extended by villagers in protecting area from grazing, they should be allowed to cut grass from the closed coupes free of cost. Repeated dialogue with the local villagers should be continued to have better understanding with them.

(iii) PARTICIPATION:

4.18.3 The local people shall be made aware of the importance of protection of the forests from fire, illicit grazing, illicit cutting and encroachment. Participation of local people shall be encouraged in protection and afforestation. For this purpose, regular camps shall be arranged to explain the people about the importance and benefit of regeneration and protection of forests. Village forest protection committees shall be formed and a comprehensive forest protection scheme shall be undertaken under the Joint Forest Management Program. The families exerting in protection of the coupe, plantations from fire, grazing and illicit cutting should be remunerated through JFMCs.

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CHAPTER – V

AFFORESTATION WORKING CIRCLE.

SECTION 1 : GENERAL CONSTITUTION OF THE WORKING CIRCLE:

5.1.1 The areas included in this working circle comprise of some of the compartments of coppice with reserve working circle in Shri. K.N. Khisti's plan which are not included in improvement working circle and the earlier B-Class reserved forest areas along with zudpi jungle areas and all such areas of protected forest having density below 0.4. The areas allotted to this working circle are mostly open, degraded having density below 0.4 and the site quality ranging from IVa to IVb and at some places site quality III is also present. The basal area of the compartments is calculated from the enumeration data collected by the SOFR Unit, Gadchiroli. The total area included in this working circle is 35597.019 ha. spread over 804 compartments constituting 18.71% area of division. The range-wise distribution of area is given in the following table:

TABLE –92
DISTRIBUTION OF FOREST AREA IN HA.

Range	Reserved Forest (ha.)*	Protected Forest (ha.)*	Unclassed Forest(ha.)*	Total(ha.)*
Chamorshi	2051.944	3253.500	44.600	5350.044
Ghot	5334.867	2322.982	57.135	7714.984
Pediguddam	2685.368	0.0	0.0	2685.368
Permili	2574.465	1711.01	0.0	4285.475
Aalapalli	501.575	0.0	0.0	501.575
Aheri	3457.930	7944.395	0.0	11402.325
Markanda	1753.566	1903.682	0.0	3657.248
Total	18359.715	17135.569	101.735	35597.019

* Digitized area

SECTION 2 : GENERAL CHARACTER OF THE VEGETATION:

5.2.1 Most of the areas allotted to this working circle is degraded and open with sparsely scattered, middle aged and matured trees. Due to intensive biotic pressure, the vegetation, in these areas is reduced to shrubby growth. Some of these areas are subjected to heavy soil erosion. The state of natural regeneration is very poor. However, in some patches very good miscellaneous crop is noticed with a density of 0.5. The site quality varies from III to IVb. The soil is very rich and has the potential of supporting good vegetative growth.

In the earlier plan by S. S. Srivastava 5 felling series having 50 annual coupes each (i. e. 2004-05 to 2053-54 as felling cycle) was proposed under afforestation working circle, with an average annual area of the coupe 118.50 ha. Hence for the plan period from 2004-05 to 2015-16, the total area (target) to be treated comes out to be 7110.58 ha. out of which 4527.78 ha (63.68%) is treated. As per report by Dy. C.F. Allapalli the survival percentage of plantations taken up is 60-70%. Inspite of the biotic factors like fire, grazing the results of plantations are satisfactory. The balance area i.e. 29627.414 - 4527.78 ha. =25099.634 ha. is left untreated as major of the balance area is beyond the earlier plan period as the felling is fifty years. Hence in the proposed plan 15 felling series are proposed with 20 annual coupes for each felling series.

SECTION 3: FELLING SERIES AND COUPES:

5.3.1 The Total area of this Working Circle is divided in to 15 Felling series having 20 annual coupes each. The details of the Felling series and the compartment allotted to each Felling series is given in **Appendix No. XLIII and Appendix No. XLII.**

SECTION 4 : BLOCKS AND COMPARTMENTS:

5.4.1 Compartments allotted to this working circle are 784 spread over 7 ranges Allapalli, Pirmilli, Aheri, Markhanda,Chamorshi,Pediguddam and Ghot.

SECTION 5 : SPECIAL OBJECTS OF MANAGEMENT :

- 5.5.1**
- i) To reclaim the area by intensive soil and moisture conservation works.
 - ii) To increase the percentage of vegetation growth.
 - iii) To increase the productivity of the forest land.
 - iv) To check soil erosion and
 - v) To maintain and preserve the biodiversity of the area by encouraging the plantation of indigenous species.

SECTION 6 : ANALYSIS AND VALUATION OF THE CROP:

- 5.6.1**
- i. **Stock mapping:** It has been done with the help of satellite imageries in the office of the Conservator of Forests, Working Plan Circle, Gadchiroli.
 - ii. **Age:** The crop is generally reduced to shrubs with occasional tree growth. The crop is mostly young to middle aged.
 - iii. **Density:** It is below 0.4 along with scattered natural blanks, barren patches and under-stocked areas.
 - iv. **Enumerations:-** One percent enumeration is carried out by SOFR Unit at Gadchiroli. The details of analysis of enumeration data is given in the **Appendix No.XXI.** The following table shows the girth class wise distribution of the species in this working circle.

TABLE NO-93

PDF Compressor Free Version **NO. OF STEMS PER HECTARE GIRTH CLASS WISE**

Group	16/30	31/45	46/60	61/75	76/90	91/105	106/120	121/135	136/150	151up	Total	r1	r2	r3
Group1	0.59	0.30	0.17	0.04	0.07	0.05	0.00	0.02	0.00	0.00	1.57	17.38	8.25	3.79
Group2	7.17	3.19	2.37	1.40	1.79	1.15	0.95	0.63	0.49	0.45	19.60	216.90	103.00	47.25
Group3	21.70	9.20	5.84	4.09	3.25	2.08	1.62	1.30	0.65	0.71	50.45	558.15	265.05	121.59
Group4	11.34	5.78	3.92	1.78	1.18	0.46	0.17	0.01	0.00	0.00	24.64	272.57	129.44	59.38
Grand Total	41.11	18.47	12.31	7.32	6.29	3.75	2.75	1.97	1.14	1.15	96.26	1065.00	505.74	232.01

- v. **ANALYSIS:** Analysis of results of enumeration given in the above table shows that no. of stems per hectare are present in inadequate number in each group. The group 1 species i.e. teak is almost absent, the group 2 species i.e. ain, bija, haldu, shisham and group 3 species i.e. other miscellaneous species, are also present in very negligible number and therefore the area is highly degraded which implies that in order to regenerate and rehabilitate this area, the intensive artificial regeneration program by raising plantations of indigenous species should be encouraged and promoted on a large scale which will help in increasing the vegetation cover of the soil and will arrest the soil erosion also and in turn will improve the moisture regime of the area.

SECTION 7: SILVICULTURAL SYSTEM:

5.7.1. The area will be regenerated with suitable species. No harvesting is prescribed in this working circle. Tending of existing rootstock, saplings, coppice shoots and poles, supplemented by plantations, are prescribed as the main activities in this working circle.

5.7.2. The primary object of management in these areas is to restore the soil fertility and increase the productivity. Therefore, intensive soil and moisture conservation works will be taken up and the areas will be afforested with suitable species. No regular silvicultural system will be applied. The existing growth will be tended by suitable operations. The root-stocks present in the area which have been constantly hacked for firewood will be redressed properly to achieve the vigorous growth. The species to be planted in these areas will be decided in consultation with the Joint Forest Management Committee by taking into consideration the local requirement. The suitability to the soil shall be the most important factor.

SECTION 8: ROTATION PERIOD: Rotation Period has not been fixed

SECTION 9: EXELOITABLE DIAMETER: Not applicable

SECTION10: REDUCING FACTORS AND REDUCED AREAS: Not applicable.

SECTION 11: FELLING CYCLE : The treatment cycle is fixed as 10 years. The entire area of this working circle will be covered in a period of 10 years.

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SECTION 12: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB) :
Not applicable,

SECTION 13: CALCULATION OF YIELD :

5.13.1 Most of the areas allotted to this working circle are degraded and no appreciable yield shall be available. However, the small timber, fire wood etc. removed during the working shall be made available to the members of Forest Protection Committee at concessional rates.

SECTION 14: TABLE OF FELLING: Not applicable

SECTION 15: METHOD OF EXECUTING OF FELLING :

IMPLEMENTING AGENCIES :

5.15.1 Considering technical nature of the operations, the works shall be carried out departmentally by involving Joint Forest Management Committees in protection and plantation works.

DEMARCATON OF COUPES, PREPARATION OF TREATMENT MAP AND MARKING TECHNIQUES :

5.15.2 (1) DEMARCATON OF COUPE :

Demarcation of coupes will be carried out one year in advance of main felling.

5.15.3 (2) PREPARATION OF TREATMENT MAP :

Treatment map shall be prepared by R.F.O. and verified by concerned A.C.F. after thorough inspection of that area, and approved by Dy C.F. The treatment map will clearly indicate the following areas:-

TYPE-A : PROTECTION AREAS:- These will include:-

The treatment map will clearly indicate the following areas:

- (i) Steep slopes above 25°
- (ii) 20 meter width on the either side of water courses.

In these areas no tree will be marked for felling.

TYPE-B : UNDERSTOCKED AREA:- It includes the forest below 0.4 density.

- (i) In these areas all dead trees will be marked for felling except two per hectare.
- (ii) All live stumps will be marked, for felling.

(iii) All fruit bearing trees will be retained.

(iv) All vigorously growing coppice shoot per stool will be removed.

TYPE-C : GROUP OF YOUNG POLES.

It includes patches of well grown pole of Teak and other species suitable for retention as a future crop. The congested crop will be subjected to thinning to maintain a distance of 1/3 rd of its height.

TYPE-D: WELL STOCKED AREAS: These areas include the forest above 0.4 density. The exploitable girth as given in Selection-cum-Improvement Working Circle will be adhered to. Trees of species like teak, ain, bija, shivan, garari and khair shall only be marked for felling whose population is more than 1 % and the trees of exploitable silviculturally available. The species having population less than 1 % will not be marked for felling.

5.15.4 (3) MARKING TECHNIQUE AND MARKING RULES.

- (a) **Marking technique** for the trees to be marked for felling is discussed in the Chapter on Miscellaneous Regulations.
- (b) **Marking Rules:** Marking will be done under the close supervision of the RFO and constant guidance of the ACF concerned. The DCF will himself inspect most of the coupes to impart proper guidance and instructions to the staffs as well as to guard against excessive marking if any

TYPE-A : PROTECTION AREAS:- No tree will be marked for felling.

TYPE-B :- UNDERSTOCKED AREA:-

- (i) No tree will be marked for felling.
- (ii) The live high stumps will be cut back as well as the multiple coppice shoots and poles will be reduced to one per stool retaining the vigorous ones.
- (iii) The undesirable undergrowth which is preventing or likely to prevent the development of the regeneration of the desirable species, will be removed.

Thus all efforts shall be made to protect and develop the rooted stock.

TYPE-C:- GROUP OF YOUNG POLES.

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- i) The congested young poles will be marked for thinning to a spacing of 1/3 rd of the height of the tree. The dead, dying, diseased and suppressed poles will be marked first for thinning. The multiple poles will also be thinned to one pole per stool retaining the most promising one.
- ii) Care should be taken to remove the poles of coppice origin first while retaining the poles of seedling origin.
- iii) The undesirable undergrowth which is preventing or likely to prevent the development of regeneration of the desired species will be removed.
- iv) **Rooted stock:-** The following prescriptions will be followed:
- Singling of coppice shoots. One healthy and promising coppice shoot will be retained and the rest will be removed. However coppice shoot interfering with promising sapling of seed origin should be removed.
 - All saplings and poles upto 45 cm at breast height having 1/3rd of the stem damaged and suppressed shall be coppiced by cutting flush to the ground

TYPE-D:-WELL STOCKED AREAS:

- (i) In these areas edible fruits and flower yielding trees shall be reserved.
- (i) All dead, trees shall be marked for felling except two per hectare.
- (ii) If the trees are available for marking, the marking will be carried out as per the procedure laid down in S.C.I. working circle..

SECTION 16 : SUBSIDIARY SYLVICULTURAL OPERATIONS : Not applicable.

SECTION 17 : REGENERATION:

5.17.1 The under stocked areas will be regenerated artificially. Young recruits of Teak and other species, though noticed in patches at certain places, usually die before getting established mainly due to highly compact soil structure with bad drainage and bad aeration along with the high incidence of cattle grazing and recurrent fires.

METHOD OF TREATMENT FOR ARTIFICIAL REGENERATION:

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5.17.2 As these areas have been subjected to intensive biotic pressure, the primary object is to restore the fertility and productivity of the area. Therefore, intensive soil and moisture conservation works will be taken up along with afforestation of these areas with suitable species. Site specific treatment maps need to be prepared. In order to restore the under stocked, degraded forest following treatment is prescribed.

- The treatment map of the coupe prepared by RFO will be inspected by concerned ACF after field visit and approved by Dy.C.F.
- The area of the coupe shall be protected completed by digging TCM all around.
- Contour trenches of size 0.60 mtr X 0.30 mtr. will be dug having length 1100 rmt. to 1600 rmt. depending upon suitable area available for alignment of trenches.
- Sowing of seeds like khair, neem, babul, siwan, maharukh, on TCM and mound of counter trenches.
- The high stumps with the vigorous coppice shoots will be numbered grid wise and record should be prepared.
- Seedlings of species like khair, neem, karanj, maharukh, behada, chichawa Jamun, dhoban, moha, tamarind, aonla, bamboo, etc. should be prepared in nursery for planting. Teak stumps from FDCM nursery preferably be planted on suitable patches
- Singling of coppice shoots and cutting back of high live stumps should be attained with active participation of JFMCs
- For treatment of entire coupe on basis of watershed, soil and moisture conservation works ,like WATs, Gabian structure, earthen and cement nala bunds, gully plugging, check dams, and forest ponds etc. should be under taken with proper site selection. The RFO and ACF should prepare be treatment map of coupe for SMC works.
- The plantation so raised should be protected from grazing, fire by participation of JFMCs and giving incentive to JFMCs if the coupe area is totally protected from grazing and fire.

CHOICE OF SPECIES:

5.17.3 The choice of the species should be on the basis of the edaphic and other ecological factors. Some species show preference for a particular type of soil and therefore they grow very vigorously on particular type of soil of their preference. The following table shows the type of soil and suitable species which can be planted in such type of soils.

TABLE-94

Sr.No.	Soil type	Suitable species
1	2	3
1	Sandy loam soil	Grewia, Ber, Kala Siris, <i>Albizzia odoratisima</i> , <i>Tamarindus indica</i> , <i>Dalbergia sisoo</i> , <i>Pongamia pinnata</i> , Ain, Shiwan, Teak.
2	Clayey Loam soil	Kala Siris, <i>Dalbergia latifolia</i> , <i>Pterocarpus marsupium</i> , <i>Adina cordifolia</i> , <i>Mitragyna parviflora</i> .
3	Black Cotton soil	Neem, <i>Soymida febrifuga</i> (Rohan) <i>Buchanania lanzan</i> . Khair, Hiwar (<i>Acacia leucophloea</i>), <i>Acacia nilotica</i> , Kala Siris, <i>Albizzia procera</i> , <i>Qugenia oogenensis</i> , <i>Lagerstroemia parviflora</i> ,
4	Stiff Clay soils	<i>Aegle marmelos</i> , <i>Semecarpus anacardium</i> , <i>Cassia fistula</i> , <i>Adina cordifolia</i> , Mahua.
5	Riverain soil	<i>Xylia xylocarpa</i> , <i>Dalbergia sisoo</i> , <i>Bombax ceiba</i> .
6	Sandy soil	Khair, <i>Terminalia arjuna</i> ,
7	Hilly tract with good soil	<i>Ailanthus excelsa</i> , <i>Melia azadirach</i> , <i>Buchanania lanzan</i>
8	Water logged Area	<i>Terminalia arjuna</i> , Jamun
9	Hilly tract with poor soil	<i>Dolichondron falcata</i>
10	Gravelly soil	Rohan, Khair, Mahua, <i>Annona squamosa</i> , Dhawda, <i>Bauhinia variegata</i> , <i>Terminalia chebula</i>
11	Shallow soil	<i>Sterculia urens</i> , <i>Ailanthus excelsa</i> , <i>Melia azadirach</i> Khair, Hiwar, <i>Xylia xylocarpa</i> , <i>Bauhinia variegata</i> , <i>Cassia fistula</i> , <i>Hardwickia binnata</i> , Dhawda, <i>Terminalia chebula</i>
12	Lateritic soil	<i>Xylia xylocarpa</i> , <i>Terminalia belerica</i> , <i>Terminalia chebula</i> , Neem, Karanj, Mahua (oil bearing seeds).
13	Swampy soil	<i>Acacia nilotica</i> , <i>Albizzia procera</i> , <i>Pongamia pinnata</i> <i>Mitragyna parviflora</i> , <i>Terminalia arjuna</i> .
14	Grassy Blank soil	<i>Hardwickia binnata</i> , <i>Bombax ceiba</i> , <i>Dolichondron falcata</i>

5.17.4 Local edible fruit and flower yielding trees upto 15% like aonla, biba, bel, behada, jamun, moha, charoli, bor, sitaphal etc. in addition to neem, khair and other suitable miscellaneous species will be planted. The evaluation reports of the D.F.O. Evaluation, Chandrapur will be taken as guideline for deciding the choice of species. Pure bamboo plantations in patches on suitable sites should also be raised as the area has good potential for it. Katang bamboo plantations should be raised in moist areas.

SECTION 18: OTHER REGULATIONS:

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5.18.1 FIRE PROTECTION :- These areas will be rigidly protected from fire for a period of five years from the year of main felling. Forest protection committees may be made responsible for protection of these areas. Separate fire tracing will be done for plantation areas. Effective fire protection measures shall be taken during the period February 15 to June 15 each year in order to ensure survival and establishment of NR of all species for developing into the future growing stock. Joint Forest Management Committee will be formed and comprehensive fire scheme will be chalked out wherever it is possible.

5.18.2 GRAZING :- The areas will be closed for grazing for a period of ten years from the first year, The seeds of fodder grasses shall be broadcasted to increase the ground cover and to meet the local demand for fodder. Local people shall be made aware of forest protection from fire, grazing and illicit felling and they will be involved actively in the afforestation and protection works through Joint forest Management committee. Women shall be given due representation in these committees. The local staff shall be directed to pursue the local people and to explain them about the benefits of afforestation and importance of forest protection. Every year if the coupe along with plantation is protected from grazing and fire, totally by JFMCs members, then every year after assessing the results of participation by survival count of seedlings in plantation, JFMCs members, through JFMCs can be rewarded with incentive. The families involved in protection of forest from grazing and fire including illicit cutting should be selected for supply of L.P.G. units and milch cattle, and other livelihood opportunities for their livelihood.

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CHAPTER-VI

PROTECTION WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE :

6.1.1 This working circle includes the hilly and undulating areas having slope above 25°. These areas are situated in Bhimaram hills of Allapalli range and Madkaki gutta, Kalidurg gutta hill areas of Pedigundam range. However, in practice it was noted that generally prescriptions were not followed and as a result, heavy soil erosion took place in this area. Practically every compartment contains some areas of slopes of 25° and above. The total area of working circle is 7848.660 ha. constituting 4.12% of total forest area and covering 33 compartments

6.1.2 This working circle includes all the compartments of hilly areas containing some areas of very steep to precipitous slopes of 25° and above and the areas under preservation plots, sample plots and the whole area included under Biosphere Reserve Working Circle of Allapalli Range in Shri. S.A.H. Qureshi's plan. The extent of area covered by this working circle is 7848.660 hectares in Allapalli and Pedigundam range. The range wise distribution of area under this working circle is furnished in the following table:

TABLE-95

Sr. No.	Name of Range	Reserved Forest (ha) *	Protected forest (ha)*	Zudpi jungle (ha)*	Total (ha)*
1	2	3	4	5	6
1	Pedigundam	4841.346	0.0	0.0	4841.346
2	Allapalli	3007.314	0.0	0.0	3007.314
Total		7848.660	0.0	0.0	7848.660

* Digitized area.

SECTION 2 : GENERAL CHARACTER OF THE VEGETATION.

6.2.1 The general description of the forest allotted to this working circle is given under Chapter II of this working plan. The forests are generally well stocked and mostly of III quality though few patches of II quality are met with on lower slopes. Teak is the principal species and appears at its best on gently sloping and well-drained soils. It is generally young to middle-aged with sprinkling of older trees. Regeneration is poor. Surya occurs in good quantity and generally replaces Ain. The density of the crop varies from 0.6 to 0.8. Understocked patches are also common. The good crops are in depression and in southern aspects where there are mesic sites. The areas near to habitation are severely affected. The growth of the crop is stunted and suppressed. The

soil is shallow and bouldry. The top canopy includes Teak, Surya, Shisham, Achar, Lendia, Bija, Semal, Kakad, Moha, Rohan, Ariun, Chichwa, Gular and the second storey is comprised of Teak with associates like Garari, Ghoti, Aonla, Tendu, Hiwar, Lokhandi, Bamboos, the prominent shrubs are Dikamali, Karse, Anjan etc. The common herbs are Chirchira, Lotan and Jalaram. The climbers seen are Palasbel, Papri, Kukudranji, Khobrael, Gunjl, Eroni, Chilalti, Dhimarwel, Nagvel, Gulvel, Ramdatun and Kawith.

SECTION 3 : FELLING SERIES AND CUTTING SECTION:

6.3.1 The area included in this working circle excluding the areas of the nature reserves is divided into 4 felling series and each felling series is divided into 20 annual coupes and 33 compartments covered under each felling series have been given in the **Appendix No. XLV**. Felling cycle of 20 years is prescribed as the same is convenient. The sequence of working has been given in **Appendix No. XLVII**.

SECTION 4 : BLOCKS AND COMPARTMENTS:

6.4.1. The details of compartments allotted to this working circle are given in **Appendix No. XLV & XLVI**.

SECTION 5 : SPECIAL OBJECTS OF MANAGEMENT

6.5.1 The special objects of management in constituting this working circle are

- To maintain and improve the adequate vegetation cover on the steep and precipitous hill slopes as a safe-guard against soil erosion and rapid surface run off.
- To give rest to these forests from exploitation activities.
- To promote and maintain a permanent vegetation cover.
- To preserve the available rich genetic biodiversity in the natural forests in the form of nature reserves.

SECTION 6 : ANALYSIS AND VALUATION OF THE CROP.

6.6.1 i. STOCK MAPPING: The entire area of this working circle is stock mapped through satellite imageries in the office of the Conservator of Forests, Working Plan Division, Gadchiroli.

6.6.2 ii. ENUMERATION: Enumeration of the growing stock of the tract dealt with, is done by Survey of Forest Resources Unit Gadchiroli. 1% point sampling method has been used to record the tree enumeration data and the same has been analyzed manually and the results of the analysis of the data is given in the **Appendix No. XXI**.

6.6.3 iii. DENSITY AND AGE CLASSES: The crop is mostly young to mature trees with scattered over mature trees. Density generally varies from 0.6 to 0.8. Some under stocked and blank patches of more than one hectare are also included.

SECTION 7 : SILVICULTURAL SYSTEM:

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6.7.1 These forest having density 0.6 to 0.8 distributed along precipitous slopes, having 25 degree and more slopes, is catchment to adjoining streams and rivers hence any prescriptions with felling will invite serious erosion in future and loss of regeneration of valuable species. No specific silvicultural system is prescribed. However seed sowing along nala banks and blanks will be carried out along with SMC works like gully plugs, brush wood dam etc should be taken up to slow down the speed of surface run off. The dead trees and logs will be retained as dens and snags taking care that the dead trees and logs retained should not cause severe fire incidence. The coupes should be strictly protected from fire and participation of JFMC's should be taken up.

SECTION 8 : ROTATION PERIOD:

6.8.1 Consistent with the objects of management, no rotation is required to be fixed. Only bamboo will be harvested on silvicultural basis described in Chapter for Bamboo(overlapping) working circle.

SECTION 9 : HARVESTABLE DIAMETER: not applicable

SECTION 10 : REDUCING FACTORS AND REDUCED AREAS: Not applicable.

SECTION 11 : FELLING CYCLE : The treatment cycle is fixed as 20 years.

SECTION 12 : DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB) :
Not applicable,

SECTION 13: CALCULATION OF YIELD.

6.13.1 Yield will be insignificant except of bamboo which is prescribed to be removed. Yield from minor forest produce shall be monitored as prescribed under NTFP working circle of this working plan.

SECTION 14 : TABLE OF FELLING: Not applicable

SECTION 15 : METHOD OF EXECUTING:

A) AREAS UNDER NATURE RESERVES:

6.15.1 The forest in Allapalli range are the only high quality teak bearing forest famous for its quality and density in the whole of State and in order to preserve the rich genetic diversity and the gene pool. It is necessary to reserve some of the promising areas of teak forest as a future stock without disturbing its natural growth and complexity. In such areas no exploitation or any other type of work shall be carried out so as to preserve the ecosystem in its natural state. The biosphere reserve will include the following areas as given in the table:

TABLE-96

Sr. No.	PDF Compressor Free Version Type of Forests	Champion & Seth's Classification	Comptt. No. allotted	Area in Ha.
1	Teak Plains	3B/C1b – Moist Teak Forest	6	199.915
2	Teak Bhimaram Hills	3B/C1b – Moist Teak Forest	24	184.537
3	Mixed Forest	3B/C2 – Southern Mixed deciduous Forest	72	245.548
TOTAL			102	639.000

These areas will require following regulations:

- A sign board, showing the compartment No., original felling series and the area along with the year of formation/reservation as nature reserves shall be exhibited on the boundary of the compartment at prominent places.
- A separate journal will be maintained showing the list of the species, their botanical name and local name and the girth at breast height.
- The compartments included in the nature reserves shall remain closed to grazing and strict fire protection measures shall be taken to prevent any fire and therefore compartment boundary line shall be cleared of all bushy growth and grasses and all such inflammable material which may cause damage due to fire shall be removed from the compartment before fire season.
- A close monitoring of the growth and reproduction of all such species and the regeneration percentage shall be done in coordination with the Director, M.V.S.S., Chandrapur and all the necessary steps shall be taken to preserve the genetic biodiversity of these compartments.

B) AREAS OTHER THAN NATURE RESERVE

6.15.2 The main objects of the management is to maintain and improve the adequate vegetation cover and to give rest to these forests from exploitation activities. Therefore, no working in this forest is prescribed except essential cultural operations like common climber cutting and removal of dead trees for fire protection. Bamboos form an understorey and its removal will generally not disturb the protective functions and hence bamboo exploitation as per the silvicultural prescriptions is allowed. No specific system of management is prescribed. However collection of minor forest produce and medicinal plants is permitted in accordance with prescriptions given under Non Timber Forest Produce (Overlapping) working circle.

6.15.3 The forests under this working circle need special treatment in the form of soil and moisture conservation works on water shed basis and therefore special schemes should be prepared to treat this area in order to check soil erosion and loss of vegetation cover. Dibbling of seeds of suitable species in under stocked and blank areas should be done before monsoon every year through the concerned beat guards and their results should be evaluated periodically. Bush sowing should also be encouraged. Bush sowing of neem and maharukh is found to give better results.

6.15.4 The road repair works in the areas under this working circle should be taken up very carefully and before the onset of monsoon cross drains should be put up on the roads and for repair of the roads, murum should be brought from outside and no digging of borrow pits should be allowed in the area.

AGENCY FOR EXECUTING THE TREATMENT:

6.15.5 No exploitation except of bamboo is prescribed. However the medicinal plants and its parts of medicinal value will be permitted to be removed by the local villagers in a manner which is not injurious to the growth and development of the particular medicinal plant or tree preferably under the guidance of local staff of the forest department. All the cultural operations will be carried out departmentally. Bamboo will be exploited by lessees or departmentally as the case may be.

METHOD OF EXECUTING THE TREATMENT:

A) DEMARCATION:

6.15.6 All annual coupes will be demarcated one year in advance of main working as per the general guidelines. The treatment map showing steep slopes, erodable areas, roads and under stocked areas shall be made available in the maps which are being generated by the Geo-media Cell in the office of the Conservator of Forests, Working Plan Division, Gadchiroli.

The following areas will be demarcated:

- Eroderable areas
- Understocked areas

The erodable areas and understocked areas will be demarcated by painting a geru ring on trees at breast height standing on the periphery at suitable intervals.

B) TREATMENT:

6.15.7 **PDF Compressor Free Version** In hilly areas nala bunding and gully plugging should be carried out with the help of local material in the area. Construction of loose boulders along streams, nalas, will reduce the speed of surface run off and will protect the nala banks from scouring in the hilly areas.

Along banks of streams nala, and blanks areas seeds of neem, maharukh, salai, dhaora, sitaphal, jamun and other local species should be dibbled at a spacing of 2 mtr. x 2mtr. just before the onset of monsoon, preferably from 15th April to May end. The seeds should be collected. The results of the seed sowing should be evaluated in the following year. This work should be done by the Beat-guard/Vanmajoor(if available) himself and no expenditure should be incurred on it. In addition, bush sowing shall be carried out simultaneously and results evaluated in the following years. In the blank areas or in the understocked area, the stump planting of one year old root-shoot of following species will be carried out. It will be done through the existing Vanmajoor/Beat-guard.

- Azadirachta indica. (Neem)
- Dalbergia sissoo (Sissoo)
- Albizia lebek (Kala siras)
- Gmelina arborea (Shivan)

6.15.8 The medicinal herbs and shrubs will be permitted to be removed in a non-destructive manner with the prior sanction of the territorial Dy. Conservator of Forests by the villagers for their bona fide needs or by the society or any other agency formed by the Govt. in this behalf.

6.15.9 No further silvicultural treatment is required as it is likely to affect the soil equilibrium. The bush sowing of Neem has been found to give better results.

MARKING:

6.15.10 Marking rules is not prescribed.

SECTION 16: SUBSIDIARY CULTURAL OPERATIONS.

6.16.1 No subsidiary cultural operations are prescribed.

SECTION 17 : REGENERATIONS : Not applicable

SECTION 18 : OTHER REGULATIONS :

PDF Compressor Free Version FIRE PROTECTION :

6.18.1 The areas covered under this working circle shall be rigidly protected from fire. All precautionary and preventive measures in respect of fire as provided under Chapter on Miscellaneous Regulations shall be taken up in order to ensure that fire does not break out in these areas. The Dy. C.F. (Territorial) will take necessary steps to form Joint Forest Management Committees under the Joint Forest Management Programme in order to protect these areas from fire and illicit felling and the members of the committee or the villagers/local people who are involved in the protection of these areas will be benefited in terms of collection of N.T.F.P. or medicinal plant/tree or its produce and such families can be given incentives after assessment of 100 % protection of forest from fire, grazing and illicit cutting .

6.18.2 GRAZING : Areas of this working circle will be permanently closed for grazing.

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CHAPTER – VII

BAMBOO (OVERLAPPING) WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE

7.1.1 This working circle includes all the bamboo bearing forests both natural and planted of all other working circles. Total area under this working circle is 12200.473 ha. The range-wise distribution of area is given in the following table -

TABLE-97
DISTRIBUTION OF FOREST AREA UNDER BAMBOO (OVERLAPPING) W.C.

Sr.No.	Name of Range	Area of working circle (ha)				No. of Comptt	% of the area of the Range	% of the area of the Division
		R.F.(ha.)*	P.F (ha.)*	Zudpi .jungle. (ha.)*	Total (ha.)*			
1	2	3	4	5	6	7	8	9
1	Chamorshi	0.0	0	0	0.0	0.0	0.0	.0.0
2	Ghot	3968.743	0.0	0.0	3968.743	48	9.62	2.09
3	Pediguddam	3551.930	0.0	0.0	3551.930	40	16.49	1.87
4	Permili	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Allapalli	4679.800	0.0	0.0	4679.800	30	26.29	2.46
6	Aheri	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Markhanda	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL		12200.473	0	0	12200.473	118	26.18	6.48

* Digitized area.

Criteria for inclusion of area under this working circle is as follows:

- The compartment should have more than 10 clumps per hectare of area but the available bamboo culms are quite high in these compartments.
- The compartments should not be a part of the Protected area or buffer area.

SECTION 2 : GENERAL CHARACTER OF THE VEGETATION

7.2.1 The common variety of bamboo occurring in this tract is *Dendrocalamus strictus*, forms an under storey in the better quality forests. Quality of bamboo varies

with the drainage, soil, density of the tree cover and past treatment. Bamboo occupy mostly hilly slopes and moist, sheltered areas and along nala banks. Katang bamboo (*Bambusa arundinacea*), another species of bamboos occurs in few patches on the banks of nalas and on the mesic sites. The regeneration is scanty in adjacent to the these areas due to its gigantic size. There is formation of a mat of rootlets around its clumps which prevents any arboreal shrubby or herbaceous growth in the vicinity of one to two meters. The bamboo raised by way of plantation is congested due to non attendance. The clumps on the poorer soil are congested or culms tend to grow inside the clump due to hard soil outside.

LOCAL AND COMMERCIAL DEMAND

7.2.2 Bamboo is used for making baskets, furniture, articles, tattas temporary walls, in building constructions, as support for cultivation of vegetable & horticulture crops and variety of other items by locals and burads and for making pulp and paper by paper mills. The tribal community i.e. Burads need one year old bamboo called karka bamboo for making flexible mats, baskets etc. Their demand is met mostly from the first and second year bamboo which are soft and poorly lignified. The first and second year bamboo is highly brittle and vulnerable to fungus attack. Apart from local consumption and Ballarpur Paper Mill consumption, Chandrapur, Nagpur, Yeotmal and Nashik are the main consuming centers for bamboo in this tract.

7.2.3 Considering the local demand and extensive bamboo areas, the surplus of bamboo potential is available and hence with a view to utilize the maximum potential of the bamboo forests, the bamboo production areas are divided into Nistar bamboo felling series and commercial bamboo felling series in order to utilize the optimum potential of bamboo forests on silvicultural lines.

7.2.4 Bamboo felling Series. (B.F.S.): - The nistar felling series were intended to meet the requirement of nistar and commercial requirements either free, or at concessional and commercial rates. The tenders are invited by the State Govt. for the commercial exploitation of commercial bamboo felling series. Considering the local demand for nistar, occupational and commercial requirements etc., every year few N.B.F.S. coupes are being worked departmentally and rest coupes under N.B.F.S. are allotted to the Paper Mill for working on payment of royalty.

7.2.5 Considering the nistar, occupational and local commercial requirements, N.B.F.S. and C.B.F.S., both types of felling series mentioned above would continue to exist and the old nomenclature would continue. Further, the local requirement for nistar, occupational and commercial purpose should be fully met with first by departmental working of N.B.F.S. coupes and only after satisfying fully these requirements, the surplus N.B.F.S. coupes will be disposed off as per Govt. instructions / procedure in vogue.

SECTION 3 : FELLING SERIES

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7.3.1 Statement showing the constitution of commercial bamboo cutting series is given in **Appendix No XLIX and L.**

7.3.2 Statement showing the constitution of nistar bamboo overlapping working circle is given in **Appendix No. LI and LII.**

SECTION 4 : BLOCKS AND COMPARTMENTS

7.4.1. The compartments allotted to the bamboo overlapping working circle and their sequence of working is given in the **Appendix No. LII**

SECTION 5 : SPECIAL OBJECTS OF MANAGEMENT

- 7.5.1**
- (i) Management of bamboo areas on scientific lines to obtain maximum sustained yield.
 - (ii) To meet the nistar demands of local population and commercial demand of village industries.
 - (iii) To fulfill the commercial requirements of paper and pulp industries and other bamboo based industries.
 - (iv) To regenerate the bamboo clump naturally.

SECTION 6 : ANALYSIS AND VALUATION OF THE CROP

7.6.1 The enumeration of bamboo crop in the tract is carried out compartment wise by Allapalli forest division.

SECTION 7 : SILVICULTURAL SYSTEM

7.7.1 The silvicultural system to be followed for the management of bamboo working circle will be Clump Selection System. The culm here may be compared to the coppice shoots. The coppice power of the clump is not lost with the time but is lost one for at the time of gregarious flowering when the entire clump dies. The concept of harvesting bamboo clumps, is to remove as much culms as are being recruited annually in the subsequent year and if the recruitment falls below harvest in the subsequent year, it means that the clump has been over harvested and therefore removal of culms be checked.

SECTION 8 : ROTATION PERIOD:

7.8.1 Consistent with the objects of management, no rotation is required to be fixed. Only bamboo will be harvested on silvicultural basis described in Chapter for Bamboo(overlapping) working circle.

SECTION 9 : HARVESTABLE DIAMETER: not applicable

SECTION 10 : REDUCING FACTORS AND REDUCED AREAS: Not applicable.

SECTION 11 : FELLING CYCLE :

7.11.1 Cutting cycle will be three years. Each cutting series will be divided into three coupes approximately as equiv. productive as possible.

Bamboo, a minor forest produce, in PESA areas is maintained and exploited by Grampanchayats. By and large the cutting cycle in bamboo is either 3 or 4 years depending upon growth of bamboo. The bamboo felling is done in such a way that the production of new shoots takes place every year. The Grampanchyats are demanding cutting cycle to be reduced to one year from present three year cycle so as to gain more income. Cutting of bamboo every year will disturb and expose the peripheral surface of the clump which will eventually damage the new culms less than one year old and also the rhizome and the roots along the outer periphery of the clumps which will obstruct the supply of nutrient to one year and two year old culms. Also cutting of bamboo every year will expose one year old and less than three year old culms exposed to winds and this will increase deformity in standing bamboo clump. In such cases the lateral development of rhizomes will be hindered and hence the growth of clump will be hampered and will also severely affect formation of new shoots. For all these reasons the cutting cycle of bamboo for PESA and NON PESA areas should be strictly adhered to three year. With the development of rhizome, bamboo clump produces continuously new culms every year, hence to get maximum number of culms every year cleaning of bamboo clumps should be under taken with active participation of joint forest management committee.

SECTION 12 : DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB) :

Not applicable,

SECTION 13 : CALCULATION OF YIELD

7.13.1 It is regulated by area.

SECTION 14 : TABLE OF FELLING: Felling series is given in **Appendix No XLIX and L.** and **Appendix No. LI and LII.**

SECTION 15 : METHOD OF EXECUTING THE FELLING:

IDENTIFICATION OF AGE OF BAMBOO:

7.15.1 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, except one or two 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.

AGENCY FOR HARVESTING

7.15.2 The commercial felling series are being sold as per guidelines issued by Govt. of Maharashtra through open auction. The nistar felling series will be worked through J.F.M. Committees or departmentally.

METHOD OF TREATMENT

7.15.3 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. The culms of three year old are fit for harvesting.

METHODS OF EXECUTING THE TREATMENT

7.15.4 The coupe due for working will be demarcated in April/May (before onset of monsoon) in the year in which coupe become due for harvesting by giving three geru bands at 15 cm intervals on the trees selected at intervals or by erecting poles. On the trees selected / poles, compartment number, coupe no. and name of cutting series will be written. Soon after the demarcation, the entire coupe due for working will be thoroughly inspected by the R.F.O and minimum 50% checking will be done by A.C.F. The inspection will be carried out compartment wise and the area containing bamboo will be shown on the map. In this area sample enumeration will be done and on its basis, estimate of bamboo clump harvestation will be prepared. As per the enumeration the estimate of various works and yield of bamboos will be prepared. The enumeration will be done in one hectare plot for every 100 hectare of area under bamboo at random on map delineating the area and then demarcated on the ground. The clumps will be then enumerated in the following categories of culms:

- Current year culms (n)
- The previous year's culms (n_1)
- The rest year's culms (r)
- The dead culms (d)

The annual yield will be calculated by using formula:

$$\text{Annual yield} = (n + n_1 + r - 8) \times \text{cl} \times A + d \times \text{cl} \times A$$

Where- cl is the total clumps per hectare

A is the area under bamboo

METHODS OF WORKING :

7.15.5 ~~PDF Compressor Free Version~~ Present practice of working bamboo forest areas on three years felling cycle shall continue.

- i. No harvesting works should be permitted between 15th June to 30th September i.e. no bamboo exploitation will be permitted during the monsoon season as this is a period of formation of new culms. As far as possible the cutting of bamboo should be completed by March when the culms are almost devoid of starch and therefore attract less insect borer.
- ii. No culms below the age of three years will be felled.
- iii. 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.
- iv. Following culms shall be removed from all clumps:-
 - All dead, decayed and dry bamboos.
 - Culms whose half or more top part is broken or damaged.
 - Twisted or suppressed culms.
 - The remaining culms will be considered available for harvesting. The cutting height of culms will be between 15 cm to 45 cm. above the ground level i.e. above the first inter-node above the ground. The cut shall be slant with a sharp instrument. In case of any flowering, no culms from flowered clump shall be felled in the year of flowering.
 - No clump should be considered fit for harvesting unless it contains more than 12 mature culms (one year as well as two years old included). The clump having culm less than 12 will not be harvested, only broken, dead, dry, badly damaged or over-matured bamboo will be felled. A failure to do that will cause congestion in the clump. Clear felling of the clump is never advisable. A minimum of 8 should be there wherever possible.
 - 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 purpose of support to the new culms. The culms on the periphery of the clump will

not be removed except when it is absolutely necessary to facilitate working in the interior portion of the clump.

- The leading exterior culms may not be cut under any circumstances even if they are suppressed, as their retention is in the interest of outward growth of rhizome and clump and to support new 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) Culm.
- 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., the clear felling in the form of a wedge may be permitted so that the opening of the wedge shall not be more than one meter wide. The depth and width at the narrow end of the wedge should be less than 2 meter wide all around.

v. Following Acts will be strictly prohibited.

- Digging of rhizome.
- Lopping of bamboo culms for fodder.
- Use of tender bamboo culms for bundling
- No grazing will be permitted during the rains in the bamboo coupe which is worked in the previous season.

vi. A clump will be distinguished as an independent clump where its periphery is easily discernible from the adjacent clump irrespective of its distance from the other. Where such a distinction is not possible, two clumps within 1 meter distance will be considered as one.

vii. The exposed bamboo rhizome on the periphery should be covered with the slash and earth to provide nourishment to the spreading rhizome and thus promoting peripheral growth of the culms.

7.15.6 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 16: SUBSIDIARY SILVICULTURAL OPERATION

SILVICULTURE OPERATION OF BAMBOO

7.16.1 In India bamboo is distributed from the sea level in the South, to 3700 mtr. altitude in the Himalayas. More than 50% of bamboo species occur in Eastern India. *Dendrocalamus strictus* is the most commonly found bamboo in India upto 1000

mtr. elevation in the hills. In Maharashtra, the three main species of bamboos viz. *Dendrocalamus strictus*, *Bambusa bambos* and *Pseudo oxytenanthera ritcheyi* are found. Out of these, the first two species are found in Allapalli Forest Division. The total area under bamboo cultivation in Maharashtra is estimated about 0.85 Million ha. Bamboo occur as an under storey and the *Dendrocalamus strictus* is the only species which is harvested on commercial basis and is particularly used in Paper Mill and other small cottage industries for making bamboo articles, mats etc. Bamboo occupy a wide range of climate and edaphic formations with rainfall, one of the most important limiting factor. Champion (1936) referred to bamboo brakes found in Moist Tropical Forest, Dry Topical Forest and Montane Temperate Forest almost as a pure crop mixed with some other timber species.

7.16.2 Bamboo prefer regions of high rainfall ranging from about 1270 mm to 6350 mm though it also occur in dry deciduous forest with rainfall as low as 762 mm to 1016 mm. and therefore rainfall plays an important role in both the distribution and growth of different species of bamboo. In the high rainfall areas, the growth is rapid. Besides rainfall, temperature, humidity, soil structure, soil drainage, soil moisture, altitude and physiography play an important role in the distribution and growth of the species.

7.16.3 Bamboo grow luxuriously on deep loamy soils, sandy loams and fertile clay loams. Some species however also occur on depleted soil layers on hill tops and plateaus. Bamboo prefer well drained soils though it also occur along river banks, nalas, low-level depressions, beds of streams and other moist sites. The most common bamboo i.e. *Dendrocalamus strictus* prefer well drained hill-slopes, bouldary and stoney sites while *Bambusa bambos* prefer low level areas, river and nala banks and moist sites.

7.16.4 Bamboo belong to family *Poaceae* or *Gramineae* and are perennial grasses of extremely gregarious habit in which the woody stem arise from woody rhizome which is true underground stem. The stem is called culm and its joints as nodes. A scaly rhizome or underground stem is produced from the base of the seedling plant which after growing vertically downwards for a short distance, curves up again and appears as a small culm. Further rhizome sections develop in succession from first and follow the same course, penetrating deeper into the soil till the optimum depth of 30 cm is reached sending up successively larger culms. Full size culms are produced after 4 to 12 years depending on the species and soil conditions. The rhizome often is branchy, two or more club shaped lengths, each ending in a culm or culm bud, developing from bud on a single older length. Growth normally tends to be peripheral, but rhizome sometimes grow towards the centre, especially if conditions are unfavourable. In *Dendrocalamus strictus*, the culms are solid which is probably an inherited character. The new culms arise from the rhizome in rainy season, appearing

above the ground in the form of tender pointed cones covered with imbricate sheaths at the nodes. The culms elongate rapidly, reaching full height, as a rule in two to four months.

INJURIES CAUSED TO BAMBOO:

The main injuries which are caused to bamboo is either due to insect pests or the disease caused by fungus:

(a) Insect pests of bamboo: Bamboo suffer from insect damage in varying degree right from the seed to the finished product and have quite a rich spectrum of insect fauna including borers, defoliators, culm and shoot borer and sap sucker. Some of the important insect pests of bamboo are given below:-

- i. **Bamboo seed bug:-** (*Ochrophora montana*) :The bug occasionally feeds on the developing seeds and has been reported to attack the seeds of *Dendrocalamus strictus*. In order to control this bug fumigating the seeds with Carbon disulphide or Methyl bromide is under taken.
- ii. **Nursery pests:-** The main nursery pests are termites (*Odontotermes spp.*), Chafer-grubs (*Holotrichia consanguinea*), Grass hoppers (*Hieroglyphus banian*) etc. The termites have been observed causing direct injury to the roots of germinating seedlings and rhizomes of bamboos. The termites eat away the fibrous roots, leading to drying up of the young seedlings. The chaffer grubs eat away the developing rhizomes. The nymphs and adults of grass hoppers defoliate the leaves of *Dendrocalamus stricuts* in the initial stage. The termites and white grubs can be prevented by the application of Thimet 10 G @ 200 gm. The defoliating grass hoppers and their nymphs can be controlled by spraying 0.2 % water emulsion of Folithion 50 EC.
- iii. **Insect pest of plantations and natural stands of bamboos:-** The important insect pests of plantations and natural stands of bamboos are white grubs, termites, culm and shoot borers (*Cyrtotrachelus dux* and *Estigmena chinensis*). The culm shoot borers damage is characterised by a long larval tunnel starting beneath on near the culm sheath passing internally through several internodes by perforating each node and ending in a hollowed and dead terminal shoot. A single larva is capable of destroying a culm.
- iv. **Defoliators:-** About 48 species of defoliators are found to attack the bamboo and they cause large damage to bamboo leaves. The important defoliators are *Pyrausta bambucivora*, *Calamochrous pntasaris*, *Crocidophora ptyophora* etc.

v. **Sap suckers** :- These sap suckers feed on the sap under leaf, sheath of bamboo.

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vi. **Witches broom**:- it has been reported in *Dendrocalamus strictus* in various areas . The attack occurs on the branches which are coming out of a node and which become slightly swollen at the base and stunted.

vii. **Insects on felled and stored bamboos**:- The bamboos are liable to massive damage after their felling and during their storage period by a variety of insects and pests. The important among them are *Chlorophorus annularis*, Shot hole borers, *Lyctus africanus*, *Stromatium barbatum*, termites etc. Ghoon borers are the most serious pests of felled bamboo all over the country.

(b) Diseases: The common bamboo i.e. *Dendrocalamus strictus* has been found to attract about 28 fungi and about 2 bacteria which cause disease in them. The number of seed borne fungi are more in *Dendrocalamus strictus* than in *Bambusa tulda* and *Bambusa bambos*. The important fungal species attacking bamboo are *Aspergillus*, *Cephalosporium*, *Chaetomium*, *Fusarium*, *Penicillium* and *Trichoderma* species. The common diseases found in bamboo are damping off in the seedling stage, *Rhizoctonia* leaf blight resulting complete defoliation and death of young shoots, Rhizome bud rot caused by *Pythium* and *Fusarium* species in Katang bamboo, Rhizome rot caused by *Ganoderma lucidum* in *Dendrocalamus strictus*, Rhizome decay caused by *Pseudomonas* species, Culm rot caused by *Fusarium* species, *Colletotrichum* sp. in *Dendrocalamus strictus*, culm sheath rot caused by *Glomerella cingulata* in *Dendrocalamus strictus*, leaf rust caused by *Dasturella divina* and leaf spot caused by *Alternaria alternata* in *Dendrocalamus strictus* etc.

BAMBOO FLOWERING.

7.16.5 Flowering is either periodic or annual. It is either gregarious, sporadic or both. Gregarious flowering is usually followed by the death of clumps, but in some cases of sporadic flowering the clumps do not die after flowering. The gregarious flowering proceeds from one end of the forest to another in waves. In two to three years the entire forest flowers. Because of this phenomenon, bamboo flowering is an important event to reckon with in estimates of sustained supplies. The common bamboo (*Dendrocalamus strictus*) found in this area shows an irregular flowering in which one or few culms in one clump or a few clumps in one locality flower at any one time, while at other times all culms of one clump and all clumps in one district are simultaneously covered with flowers . The physiology of bamboo flowering is still not fully understood. Rhizome planted away from the parent rhizome also maintains the physiological cycle of the parent. There is also a belief that bamboo flowering synchronizes with famine year. This is accountable to the fact that drought period hastens up flowering it is also noticed

that in the year previous to flowering no new shoots are put up. In case of *Dendrocalamus strictus*, it has been observed that intensity of flowering varies from locality to locality and from year to year in the same locality. If the 50 % of the clumps in the compartment, have flowered the areas should be treated as gregariously flowered. The flowering cycle in *Dendrocalamus strictus* is 40 years whereas in case of kattang bamboo, it is 60 years.

7.16.6 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.

7.16.7 It is essential to keep a proper record of bamboo flowering. As soon as gregarious flowering occurs in any locality, its extent should be found out and recorded in the compartment histories and also in the Divisional Note Book. A report should also made to the Chief Conservator of Forests, Silviculturist, Conservator of Forest, Working Plans and Editor of Indian Forester, Dehradun. As soon as bamboo clump 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 seeding should be cut and disposed off.

TREATMENT OF BAMBOO FLOWERING AREA.

Collection Of Seeds And Their Disposal :

7.16.8 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 .

7.16.9 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 Chief Conservator of Forest (T), will take a decision in this regard.

Tending Operations .

7.16.10 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.

7.16.11 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. :

7.16.12 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 focii, will be removed.
- ii) All weeds, grasses and climbers, within and around the focii 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 :-

7.16.13 The operations, as prescribed under (A) and (B) above, will be carried out annually. Where it 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 Chief Conservator of Forests will decide 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 :-

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

Pre-monsoon Works :-

7.16.16 Demarcation of the patches suitable for bamboo plantations will be done in the year of demarcation of the bamboo coupe. Plantable patches not less than 5 ha. in extent will bear separate demarcation. Pits will be dug at 6mtr. x 6mtr. or 5mtr. x 5mtr. of size 60 cm x 60 cm x 60 cm negotiating the overwood and bamboo clumps etc. to bring up the bamboo population to sufficient extent. Pre-planting operations will be carried out in the year of harvesting bamboo in the coupe. Planting operations will be carried out in the rains subsequent to bamboo harvesting. In case of under-planting the bamboo, it will be done in the 4th year of main planting. Rhizome planting can also be done from the rhizomes grown in nurseries however this should not be a routine planting source.

7.16.17 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:

7.16.18 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. Normally 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 putting of cotyledons in solutions for 24 hours. The viable seeds become red coloured. .

(b) Nursery technique :

7.16.19 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 mtr x 1.20mtr. x 0.30mtr. 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 must be minimum 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 in May-June, it should be sown in lines in the bed, lines being 10 cm apart. About 1kg. 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 %. The bamboo beds should be watered regularly and fertiliser like in two dose of NPK should be given between two lines. This will facilitate the growth of bamboo seedlings and hence the bamboo rhizome. After six months the bamboo seedlings will have well developed rhizome which is fit for transplanting. At this stage the bamboo seedlings on the beds will attain height around 45 cm.

iv) Transplantation:- As soon as the seedlings are 45 cm tall, it 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 three to five seedlings should be transplanted together in a bag as it helps the early formation of rhizome. A minimum of 10,000 polythene bags can be prepared in this way from one bed. The mixture in the polypots should be invariably from soil adjacent to bamboo clumps which contains VAM i.e. Vesicular Arbuscular Mycorrhiza which helps in the healthy growth of rhizome.

V) Watering and shifting:- The seedlings so transplanted together in a bag as it helps in the early formation of clumps. A minimum of 10,000 polythene bags can be prepared in this way from one bed.

vi) Seedlings can be raised in poly bags of size 12.5 cm X 25 cm, 200 gauge however seedlings raised in such poly bags has not sufficient space and potting mixture in the poly bag for proper development of rhizome.

For well development of rhizome in poly bags, it is also prescribed to prepare bamboo seedlings in 25 cm X 40 cm and 600 gauge HDPE bags. The quantum of potting mixture in 25 cm X 40 cm size poly bags is much more as compared to that in 12.5 cm X 25 cm size poly bags, and hence rhizome in a 25 cm X 40 cm size poly bags will get enough nutrients and space for lateral development of rhizome which will allow bamboo seedlings to attain a height of 1.5 mtr in one year only. Tall bamboo seedlings are raised from rhizomes in 25 cm x 40 cm HDPE or poly bags in nursery by Social Forestry Division Sindhudurg under MREGS. A rate structure is approved, under MREGS

by Govt. of Maharashtra in Water Conservation and EGS, Department, for formation of tall seedlings in 25 cm X 40 cm, 600 gauge poly bags. The tall bamboo seedlings after planting will establish early and rhizome development will start immediately, which will facilitate early formation of clump. Hence it is prescribed to prepare tall seedlings of bamboo in 25 cm x 40 cm, 600 gauge poly bags.

(C) Pre-monsoon works:

7.16.20 Immediately after demarcation of the areas at the close of rains a treatment map will be prepared indicating the areas suitable for bamboo under planting. The pre-monsoon works will then be taken up in such areas which include the following works :-

1) Clearing of fire lines: One meter wide straight lines should be cleared by cutting all brush wood and under growth at intervals of 6/5 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 60cm x 60cm x 60cm should be dug on these cleared lines at a spacing of 6 mtr. x 6 mtr. or 5 mtr. x 5mtr.

3) Soil conservation works: All gullies should be plugged. Soil moisture conservation works like WATS, loose boulder structure, nala bunds will be taken up on watershed basis.

4) Refilling of pits: After the soil gets sufficient weathering, the pits should be refilled with the excavated soil in the month of May. To avoid possible attack on 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. In some location, the planted bamboo receives severe mortality due to wild boars. To tide over this situation, it is prescribed that instead of filling pits completely before monsoon, the pit should be filled partly. The pits can be filled with good soil up to 20cm and after receiving sufficient monsoon, bamboo seedlings should be planted along with filling of remaining 40cm depth of pit. This will keep the rhizome nearly 40cm deep inside the soil which will be difficult for wild boar to dig out the rhizome. This can be tried in a patch of 2 ha. and after assessing the result, decision can be taken to continue the part filling of pits. Observations in this regard should be recorded and reported to Chief Conservator of Forest by Deputy Conservator of Forest. The RFO and ACF should keep record like no. of bamboo seedlings attacked by wild boar in 2 ha. plot and no. of bamboo seedlings attacked in remaining planted area outside 2 ha plot.

D) Planting operations :

7.16.21 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 of the seedling should go completely below the ground level. The soil should be packed thoroughly round the plants and sloped so as to avoid water logging.

E) Weeding operations :

7.16.22 Weeding is necessary to save the plants from suppression for first 3 years. In the first year 3 weeding is 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 area around the bamboo seedling should be cleared to a distance of 45cm by uprooting the weeds, grasses. 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 shaped soil working 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. The development of bamboo clump depend upon the soil working. The forests of Allapalli division experiences hot summer every year. This may lead to compaction of soil around bamboo clumps which will hinder lateral growth of rootlets. To tide over this situation at least two soil workings in first, second and third year is prescribed in the month of December and January. The soil working around bamboo seedlings helps in loosening of soil around bamboo seedling which will break the capillaries in the soil and will retain maximum moisture. For better growth of rhizome it is necessary to apply a dose of 100 gm NPK at the time of planting for every seedling.

7.16.23 In the second year two weeding and two soil working should be carried out. The first weeding 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. The first and second soil working should be carried out in the month of December and January respectively.

In the third year only one weeding should be carried out in the month of August. The first and second soil working should be carried out in the month of December and January respectively.

(F) Tending Operations:

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All common climbers within or around the plants up to a distance of 1.5 meter will be completely removed in the sixth year.

GROWTH OF SEEDLINGS AND DEVELOPMENT OF CULMS AND CLUMPS.

7.16.24 In the first year the seedling develop in to 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 it (shoot) arise become larger and larger. The earlier shoots are thin, wiry and grass like but subsequently a stage is reached when woody culms are produced. The transition is gradual.

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

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

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

7.16.26 Maturity: A clump is said to have attained maturity when it commences formation of new branches to the rhizomes and more new culms are produced every year. This increase goes up to a point. Investigation by 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 : REGENERATION : Given in silviculture opration.

SECTION 18 : OTHER REGULATIONS :

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

7.18.2 GRAZING CONTROL:- These areas should be protected from grazing, especially after flowering and in the rainy seasons in which the recruitment of new culms will takes place.

PARTICIPATION : -

7.18.3 Well stocked bamboo areas yield every year mature bamboo which meets local house hold demand and surplus bamboo gives assured income to JFMCs.

Hence the local people should be made aware of the importance of protection of bamboo areas from fire, illicit grazing, illicit cutting and encroachment. Participation of local people shall be encouraged in protection and afforestation through JFMCs. The availability of bamboo from nistar felling series is assured raw material for round stick agarbatti making. The participation of villagers in agarbatti making units will create self employment opportunities. Hence the sustained supply of bamboo from the coupes will strengthen the agarbatti making units. The villagers should be educated about the protection of bamboo coupes from fire, grazing, encroachment and over exploitation. The villagers including women, youth should be trained in preparation of bamboo articles.

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**NON TIMBER FOREST PRODUCE
(OVERLAPPING) WORKING CIRCLE****SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE :**

8.1.1 This is an overlapping working circle covering the entire forest area of the tract dealt with. Thus total forest area in this working circle is 213118.081 ha. The non-timber forest produce includes both minor forest produce (MFP) and also the medicinal plants found in this tract.

SECTION 2: GENERAL CHARACTER OF THE VEGETATION:**NON TIMBER FOREST PRODUCE OF THE TRACT:****(A) MINOR FOREST PRODUCE:**

8.2.1 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.

8.2.2 The important minor forest produce, found in this tract are Moha flower and fruits, bamboo, endu, myrobolons, gum, broom grass etc.

(B) MEDICINAL PLANTS :

8.2.3 The tract is rich in variety of medicinal plant 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, and generate employment.

8.2.4 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 is 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 Organization (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 microbial 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.

8.2.5 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.

8.2.6 For sustainable and equitable development of medicinal plants it is realised that medicinal plants conservation area needs to be identified and field survey and study is 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.

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

8.2.8 The Gadchiroli forest division, with active participation of potential JFMCs members and traditional medicinal plant users (practitioners) i.e. vaidyas, has established a massive infrastructure for storage, grading, cleaning, drying, pulverizing, oil extraction units etc. with necessary equipments and infrastructure. Herbal product in form of churn (powder), oil, shampoo, honey, bija glasses, jam and health drinks of moha flowers etc. is kept for sale at Godwana Herbs outlet at Gadchiroli and also supplied outside. Herbal produce in powder form (Churn) for species like *Adathoda vesica*, *Terminalia bellerica*, *Terminalia arjuna* etc, is prepared, bottled and labelled for

sale. Such products being in pure form is in demand from outside also. The Gondawana Herbs centre has created employment in collection of medicinal MFPs, storage, grading, drying, processing, value addition, packing and sale of MFP products. This will help in poverty alleviation of local tribal, women and unemployed youth.

At Gondwana herbal centre a minimum support price is fixed for all the medicinal plant parts. This will ensure fair price guarantee to medicinal plant parts collected by tribal. Deputy conservator of forest of Allapalli can assess stock of the situation in his jurisdiction and can make a head way in this regard.

SECTION 3: FELLING SERISE AND CUTTING SECTION: Not applicable

SECTION 4: BLOCKS AND COMPARTMENTS : Species wise formation of units prescription given in section of NTFP Produce.

SECTION 5: SPECIAL OBJECTS OF MANAGEMENT:

8.5.1 As per the National Forest Policy, 1988 the development of minor forest produce (MFP) is one of the objectives in forest management. Therefore consistent with the above policy, the special objects of management decided are as follows:

- To manage MFP and medicinal plant scientifically and to utilise the existing potential optimally and thereby to enhance the productivity and production of the same.
- To take measures for conservation and sustainable use of N.T.F.P.
- To generate mandays for providing work to the local people and thereby improving their socio-economic condition.
- To provide better and improved quality of life and culture supporting items to the local tribals.
- To identify and conserve the forest areas rich in M.F.P. and medicinal plants.

SECTION 6: ANALYSIS AND VALUATION OF CROP: Species wise analysis prescription given in section of NTFP Produce.

SECTION 7: SILVICULTURAL SYSTEM: Not applicable

SECTION 8: ROTATION CONVERSION PERIOD: Not applicable

SECTION 9: EXPLOITABLE DIAMETER: Not applicable

SECTION 10: REDUCING FACTORS AND REDUCED AREAS: Not applicable.

SECTION 11: FELLING CYCLE : Not applicable.

SECTION 12: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB) : Not applicable,

SECTION 13: CALCULATION OF YEILD: species wise yield given in section of NTFP Produce.

SECTION 14: TABLE OF FELLING: Not applicable

SECTION 15: METHOD OF EXECUTING AND TREATMENT: species wise executing agencies and treatment given in section of NTFP Produce.

SECTION 16: SUBSIDIARY SILVICULTURAL OPERATIONS: Not applicable

SECTION 17:ARTIFICIAL REGENERATION: Not applicable

SECTION 18: OTHER REGULATIONS: species wise regulations given in section of NTFP Produce.

SECTION 19: NTFP PRODUCE:

(A) MINOR FOREST PRODUCE :

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:

8.19.1 MOHA:

Moha trees constitutes 4.315% of total crop composition of the tract dealt with.

8.19.2 MOHA FLOWER: USE AND NUTRITIVE VALUE :

Moha flower is a rich source of sugar, vitamins and calcium. The flower, in its ripen form, has almost 73% of all sugar and is, therefore, even a better medium for fermentation than grapes.

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, sal seeds, grains or other food or as sweet meat. Dried Moha flower is also boiled with rice and mixed with wheat flower and this provides a wholesome food. After drying it becomes valuable food additive to the tribal diet. Moha flower is largely used in the preparation of distilled liquor also. This liquor is actually the beer of India having strong smoky foetid odour which disappears on aging. It is reported to excite gastric irritation and produce other adverse effects. Redistilled and carefully prepared liquor is of good quality without having adverse effects and closely resembles to Irish Whisky. The corollas were, in the past, exported to France for distillation of cheap brandy. However, the French Government in order to protect their home industry prohibited the import of the same. Subsequently, it was imported by Europe for feeding pigs.

Moha spirit prepared by distillation of liquid containing fermented moha flowers is the most important alcoholic drink in many of the tribal areas. 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 delicate flavors.

Besides, moha tree has an important place in tribal folklore and religious beliefs. For example, moha flowers are used to forecast rain and moha tree is worshiped in the form of deity called "Mahugoria" in parts of Baster district of Madhya Pradesh. The Madias prefer to bury or cremate their dead bodies under a moha tree.

8.19.3 MOHA FRUIT: USE AND NUTRITIVE VALUE :

A ripen 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.

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.

Crude oil has a deep colour, high acidity, unpleasant odour and bitter test. Refining and hydrogenation yield product similar to mutton tallow 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.

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.

Moha oil should have a set of characteristics. For this purpose ISI standards have been prescribed which are given in the following table-89.

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TABLE-98

Sr.No.	Characteristics	Grade		
		I	II	III
1	Moisture and insoluble impurities % by mass maximum	0.10	0.25	0.50
2	Colour in a ¼ in cell on the Loviband scale expressed are Y + 5R not deeper than	20	30	50
3	Refractive index at 40 C	1.459	to	1.460
4	Specific gravity at 90/30 C	0.862	to	0.875
5	Saponification	187	to	196
6	Iodine value	58	to	70
7	Unsaponification matter % by mass	2.00	3	3.00
8	Acid value maximum	0.5	20.00	>20

8.19.4 (iii) YIELD :

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 class were selected for the purpose of this study. The results obtained are given in the following table:

TABLE –99

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

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

8.19.5 FORMATION OF UNITS AND COUPES:

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.

8.19.6 AGENCIES FOR COLLECTION :

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The collection of moha flower and seed is presently being done by individual. Normally villagers confine themselves around their villages only to collect moha flowers and seeds. Large scale operation of collection may be done by either the FLCS or other agency under terms and conditions as decided by the Government.

8.19.7 MARKET :

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.

Moha oil is the only source of edible oil and illuminance to the poor tribals. But the crude oil is bitter in taste, bad in odour and is having many hazardous ingredients. The comparison of the crude oil with that of ISI mark compels us to do something for the poor people of the forest. This is the first and foremost duty of the department to improve the quality of life supporting items of the local tribals and thereby ensuring to the maximum possible extent the energetic and healthy state of the tribals. Therefore, setting up efficient expeller or solvent plants attached with refining tools is required to be decided without missing an opportunity any further. The installation of the same should be at range level. The regulation of production and distribution etc. should be as per the guidelines decided by the Government. The financial bottleneck should be removed by using 5 % forest grant for the welfare of the tribals. Health drink from moha flowers is prepared, bottled and kept for sale at Gondwana Herbs centre Gadchiroli. Such products will create self employment to women, unemployed youth. For collection of moha seeds, storage and oil extraction of moha seeds the NOVOD Board, Gurgaon, Haryana finances 100% for Govt. agencies.

8.19.8 OTHER REGULATIONS :

- (i) Compartment wise list of moha trees should be prepared and maintained at beat, round, range and division levels.
- (ii) As it is a bare fact that one of the important reasons of forest fire is the burning of leaf litter on ground under moha trees by tribals to collect moha flowers and fruits. Therefore, before the start of flowers falling, the ground under the moha tree crown should be cleaned with the cooperation of villagers and choukidars. This may be treated as one of the most important duties of the Beat Guard, failure in it and occurrence of fire should be viewed very seriously.
- (iii) The measures for enhancing the production and productivity by

local means should be explored and taken. Local people may be of great help in this regard.

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8.19.9 (2) GUM :

The trees yielding gum are Kulu, dhaora, khair and salai which constitute 0.003% , 6.659%, 3.128% , 14.127% and 0.990 % population of the total growing stock.

8.19.10 USE AND VALUE :

Kulu (*Sterculia urens*), dhaora (*Anogeissus latifolia*), khair (*Acacia catechu*), Ain (*Terminalia tomentosa*) 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.

8.19.11 YIELD :

The composition of gum yielding species in the growing stock is given as above. The study of yield of gums is 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 on the collection is very important for protection of forest from fire.

8.19.12 TAPPING RULES :

The rules for tapping, derived by the FRI, Dehradun, are as follows:

- The tapping season will commence from November to end of May each year. No tree below 90 cm in girth will be tapped.
- Tapping will be confined to the main bole of tree between 15 cm from ground level to the point from which first branch is given off.
- Only trees above 90 cm in girth at breast height will be tapped.
- 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.
- 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 bark.

- Blaze may be made horizontally leaving approximately equal space between the two blazes. The blazes should not have any loose fiber. The lower surface of the blaze should be slightly slopping outwards to avoid lodging of guggul in the blazed pocket in case initial blazing is done by adze.
- The guggul starts oozing out soon after blaze is 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.
- 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.
- The lowest row of blazes will be at one meter above the ground level. The next row of blazes will be made at the height of 60 cm from the lower i.e. at a total height of 1.6 meter from the ground level. The vertical portion of the blaze of upper row will alternate with similar portion of the row and no two blazes of the two rows will be directly one above the other.
- 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-100

Sr. No.	Girth at breast height	Max. No. of blazes to be made on each trees.
1	0.9 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.

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

➤ In the second cycle i.e. in the 7th year (after three years rest) new blaze 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.

8.19.13 FORMATION OF UNITS AND COUPES :

Range is the unit.

8.19.14 AGENCY :

All operations will be carried out either through FLCS or the agency decided by the Government. In PESA areas Grampanchyat will take decision regarding collection of gum. However in non PESA areas the JFMC's if decides to undertake the collection of gum then the JFMCs should collect the gum in their jurisdiction under guidance and supervision of forest department.

8.19.15 MARKET :

The market is extended by the TDC under the provisions of Monopoly Act. Besides the sale of raw or finished goods across and outside the state should also be thought of.

8.19.16 OTHER REGULATIONS :

- (i) 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 followed judiciously. To increase the population of salai trees, soil should be dug up, around salai tree, in the form of a ring with a radius of 1.5 times that of crown. By doing so root surface is injured and from which profuse shoots come out. Singling and tending of the seedlings from roots will increase the population of this species. The same may be tried for Kulu as well.
- (iii) Gum producing trees should be reserved from felling.
- (iv) Strict watch is necessary to enforce tapping rules and check un authorised collection of gum and tapping during the period of rest.

8.19.17 (3) TENDU :

The growing stock of the tract dealt with constitute 7.626 % of tendu trees.

8.19.18 USE :

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.

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8.19.19

YIELD :

The production of tendu leaves and royalty obtained in the last ten years is furnished in the following table.

TABLE-101

Sr.No.	Year	Yield in std bag	Royalty in Rs.
1	2	3	4
1	2001-02	75190.371	22086218
2	2002-03	84475.616	21505674
3	2003-04	46646.601	10837769
4	2004-05	33936.751	5414117
5	2005-06	24865.192	3789388
6	2006-07	43779.909	7321908
7	2007-08	82234.552	86226556
8	2008-09	76418.388	29097502
9	2009-10	78637.356	57210887
10	2010-11	76477.984	89442067
11	2011-12	80024.138	109870585
12	2012-13	77247.472	149900208
13	2013-14	66911.801	57145930
14	2014-15	29115.701	31110090

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. Beside to this unofficially burning after pruning is done by the contractors to get good flush of leaves. Both these operations are detrimental to the future production of the leaves. During pruning all small size plants, whether seed origin seedlings or coppice origin seedlings, are cut every year resulting into threat to future seed bearers. If such type of operation continue, then the seed bearer will go on diminishing season after season. Besides, in the greed of flush of leaves, yearly entire forest is burnt which cause much more damage as compared to the benefits obtained out of. This is undisputed fact that this the most important reason of forest fire. The practice for so called augmentation of leaves production should be strictly prohibited and punitive measures should be taken in such events.

8.19.20 FORMATION OF UNITS :

The tract is already divided into forty tendu units which need not be changed. The details of the existing tendu units in Allapalli Division as notified by Govt. of Maharashtra, Revenue and Forest Department, P.C.C.F. Office tender notice dated 9/12/2002 are given in the following table:

TABLE-102

Sr. No.	Name of the Range	Name of the Unit	No. of Units	Notified yield (Approx) in std bags
1	Ghot	1 Venur	I	1150
		2 Garanji		
		3 Regadi		1400
		4 Bolepalli	II	1400
		5 Deoda		800
		6 Gatta		
		7 Ambela		1800
		8 Potepalli	III	3400
2	Chamorshi	9 Makepalli		
		10 Ghot		3400
		11 Matteguda		1800
		12 Jangam	IV	1500
		13 Amgaon		1400
		14 Karkapalli		1100
		15 Chamorshi	V	1300
		16 Jamgiri		1100
3	Markhanda	17 Bhendala		1200
		18 Haldi		
		19 Saganapur		2200
		20 Jairampur		1100
		21 Konsari	VI	4700
		22 Gundapalli		
		23 Chandankhedi		
		24 Adapalli		2000
		25 Rengewahi		Contd.
		26 Koparalli		2400
4	Aheri	27 Lagam	VII	3400
		28 Bori		
		29 Elgur		2200
		30 Yetlacheru	VIII	2100
		31 Rampur		1200
		32 Aheri		2150
		33 Indaram	IX	2300
		34 Mosam		
5	Pedigundam	35 Barsewada	X	1400
		36 Mukadi		
		37 Mulchera		3300
		38 Moharli		3100

6	Allapalli	39 Gomni		2600
		40 Eelchil		1700
		41 Allapalli	IX	1600
		42 Talwada		
		43 Zamela		
7	Pirmilli	44 Vedampalli		1400
		45 Medpalli		2000
		46 Pirmilli		2500
		47 Yermingar		1550
		48 Udera		2300
		49 Birdi		2800
		50 Kandoli		2100
		51 Marpalli	X	2800
		52 Dumme		
Total			-----	82150

8.19.21**AGENCY :**

With the enactment of "Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969" the trade in tendu is Nationalised. Under this Act, tendu units are sold by tender. Prior to 1991 the standard bag system was in practice. But after that the lumpsum system has been adopted. In the new system, the pronounced illicit cutting of tendu trees has been observed. This is because of the fact that the contractors want to have more and more leaves by hook or crook. Therefore, the present system appears to be detrimental to the forests. In order to get rid of it, instead of selling the units to contractors, the tender should be invited only for collection of leaves. The leaves collected should be brought to the departmental godowns or to the godowns under the control of the department. All the collected leaves should be sold/auctioned as is done in Orissa and M.P. By doing so, the contractor who will collect the leaves will not have extra interest for collecting more by damaging the forests, as it is not certain that the same leaves will be purchased by him. The probability of getting leaves of any unit by any purchaser will be equal. This will solve both major problems of illicit cutting and forest burning and thereby ensuring the better production of leaves in perpetuity.

8.19.22**MARKET :**

Under the present system, the units are sold by tender. As per present proposition under this plan, instead of selling units, units should be auctioned by tender for collection of leaves on commission basis. The final disposal should be done departmentally in open auction or by tender as has been discussed above.

8.19.23**OTHER REGULATIONS :**

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 (a) To increase 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 multiple 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.

8.19.24**(4) BAMBOO :****USE :**

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 food during the monsoon. Besides, it is used by burads to prepare bamboo 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, agarbatti making etc.

8.19.25**AGENCY :**

This has been discussed in detail in the chapter on Bamboo (overlapping) Working Circle.

8.19.26**VILLAGE INDUSTRIES :**

Making bamboo furniture, articles is one of the important and potential propositions. This should be encouraged, along with tother activities by the local people, particularly tribals. The villagers especially women, youth can be trained with the help of expert NGO's , individuals in the preparation of articles, furniture from bamboo. The trained women & youth should be given financial assistance for making articles and furniture. The sale of the bamboo articles and furniture should be encouraged by giving financial assistance required for transportation, display by installation of stall. This will increase sharply the economic status of the tribals. Bamboo available to villagers as nistar is a sustainable forest produce if protected from fire, illicit cutting , grazing and over exploitation. The bamboo is raw material for preparation of round stick making for agarbattis. This division has sufficient quantity of bamboo for round stick making. The round stick prepared can be purchased by agarbatti making industries. At present in Allapalli division Muttapur, Chamorshi, Ghot, Permili and Italcherur, these are 5 round stick making units in operation with active

participation of JFMC's. The round sticks can be supplied to agarbatti making industries by executing a MOU between industries, JFMC's and Forest Department. This will assure employment generation for the villagers, usufruct sharing between the stake holders, strengthening of JFMC's and utilization of MFP at village level and protection of forest by JFMC's. The raw material will be supplied by the department in the manner described in the Chapter on Bamboo (Overlapping) Working Circle.

8.19.27 MARKET :

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.

8.19.28 OTHER REGULATIONS :

A list of firms requiring bamboo tatta and its quantity should be prepared and maintained at range and division levels.

8.19.29 (5) MYRABOLONS, DIKAMALI AND NIRMALI FRUITS :

The growing stock of Allapalli division has aonala, (0.287%), behada (0.178%), hirda (0.040%), nirmali (kavi) 0.010% and dekemali (0.057%).

8.19.30 USE :

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, dikemali are given to child in villages invariably for cold, cough and stomach disorder, nirmali fruits are used in chemicals and in many other industries.

8.19.31 YIELD :

So far no study has been conducted to assess the yield of fruits from these tree species. The distribution of such species in different girth classes is given in **Appendix No.XXI.**

8.19.32 FORMATION OF UNITS AND COUPES :

The range will be the unit. Since working is annual and covers the entire area and so Range unit will also be the coupe.

8.19.33 AGENCY FOR HARVESTING :

The units should be given on lease. The lessee will collect the same as per the direction of the Dy. C.F. 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.

8.19.34 MARKET :

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. These MFP's can be sold at Gondwana herbal, center, Gadchiroli which assures minimum support price for MFP's.

8.19.35 OTHER REGULATIONS :

- (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.

8.19.36 (6) KHAIR :

Khair constitutes 3.128% of the growing stock.

The khair tree is distributed more or less in all ranges of the division and the details are given In **Appendix No.XXI**.

8.19.37 PROPERTIES :

Khair is known to occur and grow on granite, gneiss, schist, quartzite, basalt, trap, limestone, conglomerate and laterite soils. 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. The germination of khair is assured and seedlings for plantations can be raised in nursery by seed sowing in poly bags.

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".

8.19.38 USE OF KHAIR :

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, including

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.

The result of the experiment 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.

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.

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 Asa foetida in haemoptysis (spitting of blood).

The khair is the species mainly of degraded miscellaneous forests. Khair constitutes 3.128% of the stock. The yield of khair has not been estimated separately. This can be done from the tables for different sites.

8.19.39 (7) KATHA AND CUTCH :

Khair heart wood yields an 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.

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%

8.19.40 USE OF KATHA :

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Katha is used in many different 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 diarrhea. Externally, it is used as a stringent and as a cooling application to ulcer boils and eruption of the skins.

8.19.41 USE OF CUTCH :

It is extensively used as a tanning material, for dying purposes and as a preservative for fishing net to impart a 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 dying 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).

8.19.42 METHOD OF EXTRACTION OF KATHA :

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.

8.19.43 DESCRIPTION OF INDIGENOUS METHOD OF KATHA MANUFACTURING :

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.

8.19.44 PREPARATION OF CHIPS :

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.

8.19.45 EXTRACTION OF CHIPS :

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 litre 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.

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8.19.46 CONCENTRATION OF MOTHER LIQUOR :

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.)

8.19.47 CRYSTALLIZATION :

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.

8.19.48 FILTRATION :

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 hold 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.

8.19.49 TABLETING PROCESS :

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.

8.19.50 CUTCH :

The mother liquor (cutch solution) obtained after separation of katha is further concentrated to a suitable consistency (when it gives a thread, while hot, lifting by means of a stick) so as to give a solid product of cutch on being poured into wooden frames or cakes of suitable sizes. The cutch naturally takes longer time to dry. It should also be dried under shade.

8.19.51 FORMATION OF UNITS :

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8.19.52 AGENCY :

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.

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.

8.19.53 MARKET :

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.

8.19.54 OTHER REGULATIONS :

(i) To increase the population of trees in the suitable sites, circumference 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.

The record of production of khair wood 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 Chief Conservator of Forests will decide the form in which records are to be maintained.

In this working circle, subject has been written in short. The objective is to draw the attention towards this and to translate into reality. By doing this the importance of N.T.F.P's will increase and eventually it will be managed in better way and the economic status of the poor tribal will be elevated.

8.19.55 LAC CULTIVATION AND MANUFACTURE OF LAC

1. Lac:

Lac, one of the most important of minor forest produce, is a natural resin secreted by tiny insect namely *Kerria lacca* (Kerr) feeding on few host plant

species. India is a major producer of lac which accounts for nearly 70 % to 80 % of total world production. Lac is used in nearly about 150 various in industries. Lac production by artificial means has limitations. Hence lac cultivation and manufacture of shellac has sustainable potential in forestry sector

2. The lac insect:

The lac insect, *Kerria lacca* (Kerr) feeds on sap of tender shoots of several plants called hosts, and continuously secretes the resin around its body throughout its life. There are two strains (biotypes) of the lac insect namely Rangeeni and Kusumi. Each of these strains completes its life cycle twice in a year i.e. two harvestation every year.

3. Host Plants:

The suitability of lac for different crops is given in following table

Table – 102A
LAC-HOST PLANTS AND THEIR SUITABILITY.

Sr. No.	Host	Common name	Strain	Suitable crop
Major hosts				
1	Butea monosperma	Palas	Rangeeni	Summer and rainy
2	Schleichera oleosa	Kusum	Kusumi	Summer and winter
3	Zizyphus mauritiana	Bor	Rangeeni	Pre mature summer
4	Zizyphus mauritiana	Bor	Kusumi	winter
Other Hosts				
5	Acacia catechu	Khair	Kusumi	Winter
6	Albizzia lebbek	Shiras	Kusumi	Winter

The crop periods and duration of biotypes is given following table.

Table – 102B
DIFFERENT CROPS AND THEIR LIFE PERIOD.

Strain/ Biotype	Season	Period		Approx. Duration (months)
		Inoculated	Mature(Harvested)	
Rangeeni	Rainy	June/July	October/November	4
	Summer	October/November	June/July	8
Kusmi	Winter	June/July	January/February	6
	Summer	January/February	June/July	6

4 Growing Stock of Host Plant:

The enumeration data of growing stock in Allapalli Forest Division shows the percentage composition (Appendix no. XXI) of lac host plants as below.

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i.	Kusum	0.198 %
ii.	Palas	2.438 %
iii.	Bor	0.001 %
iv.	Khair	3.128 %
v.	Pipal	0.012 %
vi.	Umber	0.009 %
vii.	Ghat bor	0.731 %
viii.	Kala Shiras	0.005 %
ix.	Tiwas	0.004 %
	Total	6.52 %

8.19.56 Major Lac Operations:

- i. Pruning of host plants
- ii. Infestations of Lac hosts (inoculation).
- iii. Removal of used up broodlac sticks.
- iv. Pest Management.
- v. Harvesting.
- vi. Scraping of Lac from twigs.

i. Pruning of host plants:

Pruning of branches is essential to ensure good, healthy, succulent tender shoots for feeding by larvae of lac insect. Dead, diseased and broken branches are removed. Pruning also ensures rest to host trees for maintaining its potential. Sharp axe or pruner or secateurs is used for pruning. Branches more than 2.5 cm. diameter should not be cut. Branches are cut at the point of origin. Thick branches also should be cut for canopy management. Pruning should be done six month before inoculation in respect of Rangeeni crop and eighteen months before inoculation in respect of Kusumi Crop.

ii. Inoculation:

Broodlac bundles (lac stick with mature female insect) on host twigs are tied when new, succulent and tender shoots are emerging. In respect of kusumi lac, the broodlac bundles are tied in the month of January/ February and June/ July and in case of Rangeeni lac the broodlac bundles are tied in the month of October/November and June/July.

The leaves and unwanted portion of the shoots from broodlac is removed. The broodlac stick is cut in to equal parts, each part weighing about 100 gms. Each part of broodlac is put preferably in 60 mesh nylon netting bag (33x10 cm.) and then tie this on shoots of host plants on lower parts of pruning point so that tender shoots are easily accessible to larvae.

iii. Removal of used-up Broodlac Sticks:

The mature mother lays 400 eggs on an average within 7-10 days. The hatching of eggs in to larvae is completed with 3 weeks of inoculation. The

eggs hatch within few hours and large no. of larvae swarms out from the lac encrustations. The crimson red coloured tiny larvae crawl and reaches soft, succulent shoots, twigs and start feeding by thrusting their proboscis in to the bark of twigs/shoots. As the feeding goes on the larvae is incapable of any movement and secretes lac resin in semi solid state from the lac glands which are distributed all over larval body. The semi solid resin hardens with exposure to air. The females secrete major portion of the resin in a lac crop, while the contribution of males is almost insignificant. When the female adult is ready to lay eggs, a yellow spot appears on the posterior end of the lac cell, which is indicative of the fact that brood is mature and is ready to be cut for inoculation purpose. This is called broodlac and used for self inoculation or artificial inoculation. In case of artificial inoculation, empty broodlac sticks are removed from the tree after larval settlement and scrapped. Living lac sticks are used as broodlac again for the next crop and excess scrapped as stick lac. The removal of used-up broodlac prevents access of insect predator and parasitoids of lac insect.

iv. Pest Management:

The larvae, insects are attacked by pest. Hence care should be taken to spray insecticides and fungicide after inoculation.

Insecticides: Cartrap hydrochloride 50 sp (e.g.Caldan) for control of *Eublemma amabilis* and *Pseudohypatopa pulvrea* or Ethofenprox 10 E.C. (Nukil) for control of *Chrysopa* spp. (Neuroptera), *Eublemma amabilis* and *Pseudohypatopa pulvrea* (Lepidopteran)

Fungicides: Carbendazim 50 % WP(e.g. Derosal or Bengard or Bavistin etc.) for control of fungi. Fungicide is normally used during rainy season. Pesticides should be used only after incidence of insect predators.

One month after inoculation, 0.02 % Ethofenprox or 0.05 % Cartrap hydrochloride should be sprayed. Second spray if necessary should be done one month after first spray.

v. Harvesting:

The lac is haeversted from mature broodlac and immature lac crop. The scraped lac is dried in shade with sufficient aeration. The harvested broodlac is used for self inoculation purpose or sale of lac. First lac encrusted twigs, shoots are collected from places where there is no further space for the insect settlement. Leave lac encrusted twigs at places where space for lac insect settlement is available. Use of secateurs for harvesting broodlac is preferred.

8.19.57

Yield:

The anticipated yield of lac will be as below

Sr. No.	Species	Yield
1	Kusum (medium size tree)	25 kg/tree/year
2	Palas (medium size tree)	5kg/tree/year
3	Bor (medium size)	10 kg/tree/year

The Kusumi lac is sold on an average @ Rs. 300/kg. and Rangeeni lac is sold @ Rs. 200/kg.

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Above rates are for broodlac however if broodlac is processed and sold (as Chauri lac) it fetches more price.

8.19.58

Value Addition:

Since the Chauri lac fetches double the price of broodlac, hence production of Chauri lac is profitable and following processes should be adopted as value addition for production of Chauri lac.

i) Manual or Power Operated Broodlac Peeler:

The lac from lac encrusted twigs is manually scraped which contains dust, pieces of bark etc. The manual or power operated peeler peels of lac from twigs and pulverises the lac. This machine produces raw lac 20 kg/hour.

ii) Manual or Power Operated Filtering Machine:

The dust and bark mixed lac can be subject to manual or operated machine which separates dust, bark, pieces from raw lac . This machine separates dust, bark pieces from raw lac @ 40 kg. raw lac per hour.

iii) Lac Cleaning Machine :

The lac after removing dust and bark pieces is subjected to washing, cleaning in power operated or manually operated drum filled with water. 20 kg. lac can be cleaned at a time. This process gives lac called as “ Chauri Lac “

iv) Grading of Chauri Lac :

The chauri lac so prepared is subjected to manually or power operated grading machine which gives chauri lac in three quality grades .

v) Collection and Packing :

The chauri lac after grading is dried in shade and packed in bags of 25 kg.

8.19.59

Cropping :

In cropping attention to the following points should be given.

- i) Harvesting should be undertaken when the crop is mature.
- ii) Lac crops should be cut within a week of larval emergence.
- iii) The crop should be fully harvested .
- iv) Harvested lac sticks selected for use as broodlac should be used as early as possible, if brood has to be stored for a day or two this should be done in well ventilated rooms.

8.19.60

Grouping of Host Trees :

Every pruning of host tree, slows down the growth of trees after some year. Hence it is proposed to group host trees as Bor and Palas, Kusum and Bor, etc.

The host trees can be divided into two sets with equal no. of trees and carry out lac cultivation operations in these two sets in alternate years. This has following advantages.

- The host tree gets the opportunity to rest and rejuvenate itself.
- Ensures regular income.
- Provides sustained and higher yield.
- Minimises incidence of predators & parasite.

TABLE NO. 102 C
LAC CULTURE- TIME TABLE

MONTHS	KUSMI	RANGEENI
JANUARY	• Forecast of larval emergence from winter crop(winter) • Pruning of new Kusum trees.	• Cleaning of termite from Palas and Ber trees. • Spray of insecticide in last week (Before male emergence).
FEBRUARY	• Pruning of new Kusum trees. • Harvesting of winter crop and simultaneously pruning of trees. • Inoculation of summer crop (summer) using nylin net. • Phunki removal and scraping. • Pruning of Ber trees for inoculation in July or August.	• Partial harvesting of inoculated of Palas.
MARCH	• First spray of ethofenprox on lac culture.	• Estimation of yield of stick lac from summer ari.
APRIL	• Second spray of ethofenprox and carbedazim at 60 days of inoculation.	• Crop harvesting in summer ari stick lac coupe and simultaneously pruning of trees. • Pruning of trees in broodlac coupe and also collection of aril ac (left during October/November six months before).
MAY	• Spray of ethofenprox, if attack of Chrysopa is seen (but not between 65-90 days of inoculation).	• Scraping of aril ac from stick and its marketing.
JUNE	• Forecast of larval emergence and estimation of yield from summer crop. • Estimation of broodlac requirement for inoculation of winter crop.	• Forecast of larval emergence and estimation of broodlac yield from summer crop.

JULY	- Harvesting of summer crop partially or fully as per requirement after observing yellow spot. - Inoculation of Winter crop. - Phunki removal and scraping.	- Leave summer crop in broodlac coupe for self-colonisation. - Partial harvesting of excess broodlac in broodlac coupe.
AUGUST	First spray of insecticide ethofenprox, after 30 th days of inoculation.	First spray of insecticide emulsion(ethofenprox) and fungicide (bavistin) one month after inoculation.
SEPTEMBER	Second spray of insecticide and fungicide emulsion between 37-40 days of inoculation.	- Second spray of insecticideethfenprox(if necessary). - Forecast of larval emergence in broodlac coupe. - Estimation of broodlac requirement in ari and second second broodlac coupe.
OCTOBER	Third spray of insecticide and fungicide emulsion between 60-65 days of inoculation.	- Harvesting of broodlac when a few crawlers appear on encrustation. - Inoculation of broodlac in ari coupe and in a broodlac coupe.
NOVEMBER	Make arrangement to prevent theft of winter crop.	- Phunki removal, scraping and disposal of scraped lac. - Estimation of incidence of predators and parasitoids. - Spray of insecticide (ethofenprox) on lac culture.
DECEMBER	- Estimation of yield from winter crop. - Estimation of brood lac, requirement for summer crop.	Second spray of insecticide on lac culture (if needed).

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Operations	Schleichera oleosa (KUSUM)	Butea monosperma (PALAS)	Zizyphus mauritiana (BER)
Age of tree for lac inoculation	About 15 yrs depending upon growth of tree formation of crown.	About 8-10 years	About 5-6 years
Grouping of trees	In 5 groups	Only broodlac production-2 Groups Broodlac + Immature lac-3 groups	In combination with palas: for baisakhi ari crop (One group ber + 2 groups pals) In combination with kusum: for aghani broodlac crop
Time of pruning	January/February of June/July	For raising baisakhi-April For raising katki-February	For raising baisakhi-May Aghani-February
Inoculation time brood rate	Eighteen months after pruning 20 g per metre shoot or 4-8 kg/medium sized tree	Six months after pruning Broodlac production groups -@10 g per metre shoot or 2450-350 g per trees Baisakhi ari group-@20-25g per metre shoot or 1 kg per tree.	Six-months after pruning Oct Nov=immature baisakhi June-July=aghani 20-25 g per meter shoot or 2.0 kg/average sized tree.
Harvesting	Partial harvesting Six month after inoculation Complete harvesting One year after the inoculation. In January/February of June /July or at the time of crop maturity and simultaneously pruning.	Broodlac harvesting – One year after inoculation in October after allowing self inoculation in July; Baisakhi ari-April or May and simultaneously prune the trees.	Baisakhi ari : May Aghani – February and Simultaneously pruning.

TABLE NO. 102 D

PDF COMPRESSOR VERSION LAC CULTIVATION OPERATIONS AT A GLANCE

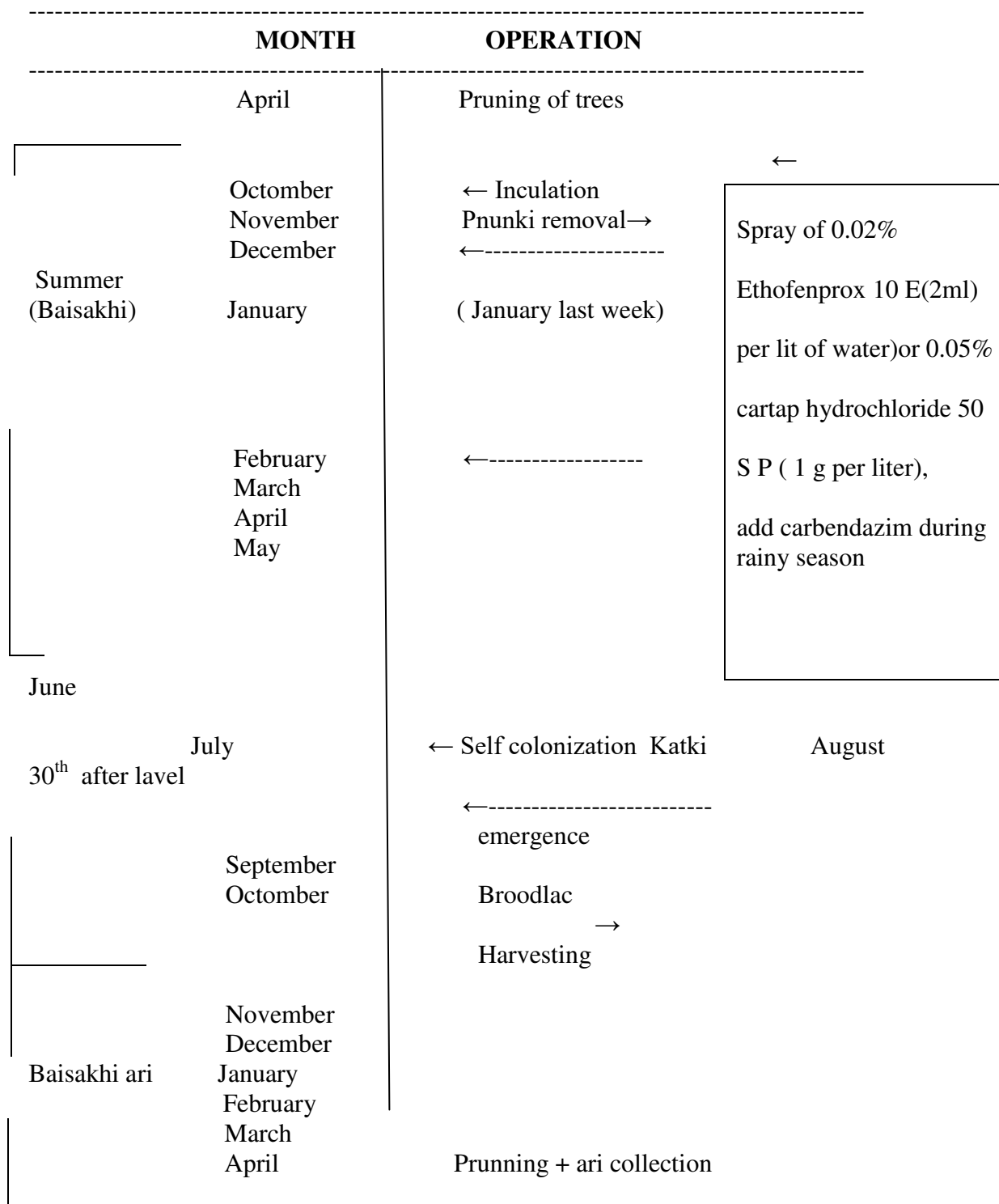
Diagram 1. Production of broodlac on *Butea monosperma* (Palas)

Diagram 2. Lac Cultivation operation and spray schedule for Kusmi crop
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	MONTH	OPERATION	
	June / July 18 months	- Pruning	
	January ← Inoculation		
	February	← Phunki removal	
	March	←----- (30 th day) –First spray	Spray Ethofenprox (10EC) 0.02% (2ml per lit of water + 0.01% carbendazim (3 g in 14 lit water)
Jethwi	April	←----- (60th day) – Second spray male emergence (65-70 days)	
	May		
	June		
	July	→ Partial harvesting	Ethofenprox (10EC) 0.02 % (2 ml per lit of water) + 0.01 % Carbendazim (3 g in 14 lit water)
	August	→ Punki removal	
		←----- (30 th day) First spray	
	September	← (37-40 th day) - Second spray Male emergence (42- 58days)	
	Octobers		
Aghani	November December January February	→ Complete harvesting	

- i) The total growing stock of Allapalli Forest Division has 6.52 % of host tree species for lac cultivation.
- ii) The lac cultivation process is employment generation activity as there is rising demand for lac and prices of lac are rising as lac is utilized in more than 150 industries. The cultivation and manufacture of shellac will create employment opportunity from lac cultivation process like pruning, inoculation, pest management, collection of broodlac twigs, processing chauri lac from broodlac twigs with the help of manually operated for power operated machines, grading, packing and marketing.
- iii) Potential areas of host plants should be identified, mapped and exact no. of growing stock of host tree species should be prepared.
- iv) The approximate yield per year from identified locations having host trees should be calculated to decide feasibility of lac cultivation process.
- v) The JFMCs should be made aware of benefit accruing from lac cultivation. For this field visits to successful lac cultivation areas, processing unit should be arranged by Dy. CF Allapalli. The training programme in lac cultivation should be arranged for JFMC members, stake holders and frontline staff. Pruning, inoculation, collection of broodlac twigs, processing of raw lac to pure Chauri Lac, disease and pest management etc. should be explained in field.
- vi) Potential areas for plantation of host tree species near JFMC villages should be identified and selected for plantation having minimum 25 % of lac host tree species composition should be taken up. The plantation in a year should not be more than 5 ha. at one place as protection of plantation from grazing ,fire, illicit cutting can be done effectively. For early establishment and growth of plants, protective watering, manuring, preparation of vigorous tall seedlings of host plant species for plantation should be undertaken.
- vii) A comprehensive project report should be prepared by Dy CF Allapalli including, identification of potential areas for lac cultivation near JFMCs villages, cultivation of lac, value addition, marketing, plantation of host plants species, marketing, capacity

building of stake holders and frontline staff, incentive to JFMCs and stake holders etc. Funds can be made available from state plan scheme, DPDC, Govt. of India funded schemes. The project should also include installation of processing plants for value addition of lac.

8.19.62

(B) MEDICINAL PLANTS:

(I) ANALYSIS AND VALUATION OF THE MEDICINAL PLANTS :

The growing stock of the tract dealt with constitutes important medicinal plant species as bija 2.903% , amaltaas 0.278%, aola 0.287%, behada 0.178%, bel 0.016%, biba 0.078%, char 2.108%, dhaman 0.218%, dhawda 6.659%, dikemali 0.057%, hirdha 0.040%,kulu 0.003%,kevi 0.010%, kuda 1.74% ,kusum 0.188%, muradsheng 0.001%,salai 0.99%, etc.

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.

The methodology adopted for conducting this type of study is known as tree quadrat method in which a sample plot of 50 m x 20 m is laid and the number of plots is decided on the basis of crop/species composition and the area of the study. In each quadrat data on stems measuring >30 cm gbh is enumerated and identified and recorded and this data is used for calculating species richness, size class distribution, height class distribution etc and is essential to understand the sustainability of natural resource extraction and the spatial and temporal changes due to the impact of extraction. The plot size for shrubs is 5 m x 5 m. and all stems measuring a girth of >3 cm but with girth > 30 cm or a height >140 cm are enumerated. To make qualitative and quantitative assessment of herbs plots are required to be randomly located inside the shrub quadrat and the plot size for herbs is normally 1m x 1m . The control plots are also required to be laid in order to study the comparison and the identical sampling methods need to be adopted. In each sample plot the medicinal plant species shall be identified with the help of taxonomist and desired data will be recorded.

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 The medicinal plants conservation areas (MPCA) and (MPDA) medicinal plants development areas shall be managed within the N.T.F.P. overlapping working circle and its boundaries shall be co-terminus with N.T.F.P. areas.

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.

The territorial division shall endeavor to establish MPCA, MPDA and NTFP 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 NTFP areas. Non JFM forest areas will be conveniently divided into appropriate lease units preferably in tune with NTFP units which cover some medicinal species also.

(a) Treatment for MPCA areas:-

- Selection of site, 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.
- Conducting ethno botanical study 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 plant collected, needs to be carried out.
- Records about the MPCA such as the year of formation, extent, forest type, works carried out etc. shall be maintained at the divisional level.
- 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.

- Efficient measures should be taken 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.
- Locating breeding populations of RL (Red listed) and economically valuable species and at a subsequent stage develop a suitable species recovery program for critically endangered species and enrichment planning programme for economically valuable species.
- (vii) Except for the collection of seeds/ propagules for multiplication either for research or development elsewhere, no other removal shall be permitted.
- The endangered and valuable vulnerable species spotted in the MPCA can be multiplied in the nursery and planted in the vicinity where such species are found
- 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.
- Establishing signage and demonstration plots in selected MPCAs for education of local people and visitors. Important species can be labeled around the demonstration plot.
- Building and strengthening community institutions for long term management of the sites.
- 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 up gradation of degraded forest is to be resorted using the JFM concept and the following prescriptions need to be followed :

- Selection of suitable degraded forest areas for MPDA programme.
- Involve a competent local NGO for organising the community.
- 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.

- Establishing a system of sustainable harvest based on collection guidelines for specific species that are informed by “conservation science”.
- Joint management of MPDA between local Forest Department and local community. Proceed of harvest of medicinal plant from MPDA (in the form of raw material) to be shared under JFM framework.
- Creation of market link & buy back guarantee for sale of produce at the outset of the programme.
- Building and strengthening community institution for sustainable development

(C) Treatment for NTFP areas:-

- Selection of suitable non-degraded areas where medicinal plant collections is already underway.
- Involvement of competent NGO for organising the community.
- Establishing a system of sustainable harvest based on collection guidelines for specific species that are informed by “conservation science”.
- Joint management of forest sites by the local Forest Department and organised local community. Assign specific forest areas to specific local village communities with clear delegation of responsibilities, privileges and full accountability. Proceed of the harvest of medicinal plants to be shared under the JFM framework.
- Creation of market links for sale of produce at the outset of the programme.
- Building and strengthening of community institution for sustainable management.
- Only such plants/parts of the plant specified for each species whose medicinal value is recognized should be collected e.g. fruits and seeds of neem tree.
- Removal of plants or plant parts of species other than the specified ones shall be totally prohibited.
- Lopping of branches to gather buds, fruits or leaves shall be totally prohibited.

- 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.
- 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.
- Species to be raised for use in Primary Health Care, trade in the RF/PF/buffer areas will be listed out category wise, well in advance to facilitate nursery operation. Information already generated on nursery and plantation techniques for the chosen species, will be used for artificial regeneration.
- 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 programme.
- Tending of coppice shoots/root stocks of existing tree shall be taken up and the natural regeneration shall be encouraged.
- 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
- 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.
- At convenient contour intervals, say 30 m. shrubs like Kumari (*Aloe barbadensis*), Adhatoda (*Justicia adhatoda*), Nirgudi (*Vitex negundo*) and Vettiver (*Vetiveria zizanioides*) can be raised as vegetative barriers along the contour. These species can also be planted along the RF boundary. This will incidentally facilitate demarcation of the RF from the buffer zone.

- In the swamps, along the stream banks and on the water spread areas and aprons of check dams and percolation ponds, hydrophytes like Neerbrahmi (*Bacopa monnieri*), Vallarari (*Centella asiatica*), Vasambu (*Acorus calamus*), Arathai (*Alphinia calcarata*) etc. can be planted.

8.19.65 IV) Sustainable harvest :

Information suggesting norms for sustainable levels of harvest shall be worked out by the territorial Deputy Conservator of Forests after taking into consideration the result of survey of vegetation 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 vettiver, the roots alone are used in medicine. Since it is raised as a soil binder and vegetative barrier, harvesting can be taken up only when the slips establish and the clumps form a thick barrier. At this stage, leaving a strip of grass barrier on the uphill side, tussocks 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 20: RESEARCH WORKS :

8.20.1 There are so many minor forest produce in the forest which are unidentified and untapped. The efforts of the department should be to explore them and manage them scientifically. The identification of medicinal plants is the field to be taken for study immediately. This has wide scope in future. Dr. M.N.Padhye of Nagpur and his team have been conducting a survey of medicinal plants in the forests of Gadchiroli and Chandrapur Districts. Over 150 such plants have been identified so far. This is not the exhaustive list of medicinal plants. It is open to add more names of such plants. Besides, identification and localization of the same are the field for future study. Innovation and research works should always be carried out and the same be recorded and reported properly so that those could be of use to those who come next.

SECTION 21: THE FOLLOWING ARE THE IMPORTANT RULES :

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- The annual estimates of collection of N.T.F.P. shall be based upon the experience.
- The annual estimates of collection of N.T.F.P. shall be approved by the Chief Conservator of Forests.
 - The Range Forest Officer of the respective range shall issue the passes for collection of N.T.F.P to the lessees and keep record of the collection etc.
 - The non timber forest produce lease units shall have distinct boundaries.
 - N.T.F.P. collection estimates shall be based upon the inventories of forests resources.
 - Scheme shall be formulated for improving yield of N.T.F.P. e.g. plantations, protection against disease etc.
 - Measures shall be taken to maintain and improve the present output of the N.T.F.P.
 - The MPCA areas shall be accorded the status of a “preservation plot” and documentation shall be done by opening plot files.
 - The Territorial DCF will maintain a record of NTFP harvested legally or illegally from the forest along with the quantities and the collection charges paid to the labourers.
 - The Territorial DCF will select the representative area in each beat comprising of around one hectare. RFO and ACF will visit these plot twice in a year and will identify and will record the occurrence of flora along with flowering and fruiting periods.
 - The Territorial DCF will select plus trees / stand / seed plots of trees, climbers, shrubs, herbs and rhizomes and tuber species of NTFP/Medicinal plant commonly used by the local people for their livelihood and food vegetable and commercially traded in Maharashtra.
 - The Territorial DCF will collect the information regarding all types of forest produce, their quantities and the sale price during the weekly bazar days throughout the year. Tours of local schools situated at bazar places may be taken to collect the said information at beat, round, range and division level.
 - The Territorial DCF will collect and document the traditional knowledge about the use of wild plants / animal products by the locals / tribals as traditional medicine / food / fruits / vegetable etc.
 - The Vanmajoor and forest guards should collect minimum 100 kgs. of seeds in a year of the most traded and economically important medicinal plants and will use these seeds for bush sowing/sowing in blank areas in the beat, without involving any extra cost and arranging SHRAMDAN at least once in

a year as prescribed vide Govt. of Maharashtra Resolution No.MSC/2000/C. No.143/F-1 dated 25/04/2003.

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- The Territorial DCF will take initiative and efforts to maintain a register at every beat, round, range and division level noting the present unscientific and destructive harvesting practices and to collect the information regarding correct scientific harvesting of NTFP for sustainable production from various journals and Institutions within and outside Maharashtra State like IIFM Bhopal; CIMAP, Lucknow; ICFRE, Deharadun etc.
- The Territorial DCF will maintain a register at every village level regarding the domestic consumption of NTFP family wise in order to accurately assess the production and requirement of NTFP at the State level through a computerised program to take corrective measures to streamline the production as a action point under Biodiversity Act 2003.
- The Territorial DCF will maintain a register of all the vendors, purchasers, manufacturers, stockiest of NTFP including medical plants by prescribing fees and format as being done in Thane Circle.
- The Territorial DCF will prescribe a register to be maintained by the purchaser at every collection center compiling information on full name of the collectors of the forest produce, approximate place of collection, village, name of forest produce, quantity, rate at which forest produce sold to vendor/purchaser, name of purchaser and all other forward linkages.

8.21.1 The forest geneticist/ silviculturist shall be made the nodal officer for collection, processing and certification of seeds. The forest geneticist/silviculturist shall develop in consultation with territorial Dy. Conservator of Forests cost effective propagation technique for the medicinal plants and minor forest produce and will also study the economics of medicinal plants and minor forest produce found in the division.

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CHAPTER – IX

WILDLIFE (OVERLAPPING) WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE :

9.1.1 This is an overlapping working circle and covers the entire area of the division. The total area included in this working circle is 213118.081 ha. The range wise distribution of the area is given in the following table-94

TABLE-103

Sr. No.	Name of the Range	Reserved Forest (ha.)*	Protected Forests (ha.)*	Zudpi jungle (ha.)*	Total Forests (ha.)*
1	2	3	4	5	6
1	Chamorshi	15945.212	3497063	284.93	19727.772
2	Ghot	38478.520	2568.140	188.016	41234.676
3	Pediguddam	21537.834	0.0	0.0	21537.834
4	Permili	46115.232	9570.881	0.0	55686.113
5	Allapalli	17799.587	0.0	0.0	17799.587
6	Aheri	11623.754	9375.613	0.0	20999.467
7	Markhanda	11397.550	1920.187	0.0	13317.737
8	TOTAL	162897.689	26932.551	472.946	190303.186
9	Miscellaneous area	---	---	---	22814.895°
10	Grand Total (8+9)	162897.689	26932.551	472.946	213118.081

* Digitized area. ° Difference between notified area and digitized area.

SECTION 2: GENERAL CHARACTER OF THE VEGETATION:

9.2.1 The description of the flora is given in Chapter II of Part IIA of this working plan. The forest type as described by the Champion and Seth is Southern dry mixed deciduous forest. The dominant species is teak which is associated with Bija, Dhaoda, Ain, Moha, Aonla, Semal, Tendu, Lendia, Kusum, Haldu, Siras, Salai , Arjun etc. The lower canopy is formed of young trees of above species along with Garari, Achar,

Moyen, Bhirra, Bel, Ghoti and bamboo. The undergrowth consists of Kukaranji, Kuda, Marophal, Ghirchira, Eroni, Chilati.

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The detail of forest type is described in Chapter 2 of this working plan.

9.2.2 The general conditions of the wildlife in Allapalli Forest Division is not very satisfactory because of various reasons such as loss of habitat due to encroachment on forest areas for agriculture and grazing which resulted in the shrinkage of wilderness. Considerable amount of wildlife habitat has been sacrificed in this area for agriculture. Whenever the wild animals move out of their restricted habitat because of in search of water, food, the wild animals are either killed or hunted by the locals and professional poachers to meet their greed. Another major factor 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.

9.2.3 The wildlife population in the division includes tiger, panther, Jungle cat, striped hyena, jackal, fox, spotted deer, sambhar, barking deer, blue bull, wild boar, mongoose, common langur, porcupine, hare, etc besides these, large variety of avian fauna is also present in the area. Recently a pair of Indian Otter is sighted near a water pound in forest of Aheri. This endangered species needs to be protected from hunting. The otter needs its natural habitat that is a perennial water body. Hence care should be taken to protect this water body near Aheri for conservation, breeding of otter. Also care should be taken for availability of water in the water body throughout the year by taking soil & water conservation works in the catchment area of the water body. Mostly the otter feeds on fish hence fishing should be prohibited in the water body.

SECTION 3: FELLING SERISE AND CUTTING SECTION: Not applicable

SECTION 4: BLOCKS AND COMPARTMENTS: Entire Forest area of the Division.

SECTION 5: SPECIAL OBJECTS OF MANAGEMENT:

9.5.1 The special objects of management are as follows:

- i) To ensure maximum protection and conservation of wild life including both fauna and flora.
- ii) To augment the conservation and protection of wild life habitat on scientific basis.
- iii) To protect and conserve habitat of endangered wild animals like Indian otter, shekaru, pangolin, vulture. To monitor the protection and conservation measures taken up for development of habitat of Indian otter, shekaru.

iv) To sensitize the local people about the importance of conservation of wildlife and its habitat.

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- v) To protect the wild animals from various contagious diseases spread from domestic cattle from adjoining villages by arranging health check up camp for cattle regularly.
- vi) To check wild life trade and smuggling by arranging regular, surprise patrolling in sensitive areas.
- vii) To establish a network of informers for gathering information regarding trade in wild life and trophy, hunting and rewarding the informers as per the incidence of offence.
- viii) To promote the eco tourism with active participation of JFMCs without disturbing wild life habitat.
- ix) To sensitise villagers regarding compensation from crop damage, attack on live stock and human live so as to lessen the man animal conflict.

SECTION 6: ANALYSIS OF THE WILDLIFE:

9.6.1 The wildlife evaluation will be conducted for herbivores and carnivores by the territorial division every year. The figures for different wildlife species commonly found in the Allapalli Forest Division are not very satisfactory due to illegal hunting and poaching of animals for their meat and other body parts such as horns, skins, bones etc and also due to shrinkage of wild life habitat on account of encroachment for agriculture purpose. These illegal activities promoting encroachments should immediately be banned. The existence of wild life can be accessed by actual sighting, by pugmarks, by excreta, by antlers markings, by a specific sound or call, by nail marks on trees like moha, arjuna, and by wallowing sights near muddy areas and meadows.

9.6.2 The general condition of vegetation has been prescribed in various working circle. The wildlife was widely distributed in areas adjoining rivers. The wild animals commonly found in the past and rarely at present in this tract are as follows:

A – CARNIVORA:

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

B – HERBIVORA:

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Bengal Tiger (*Panthera tigris*), Sambar (*Cervus unicolor*), Cheetal (*Axis axis*), Chausingha (*Tetraceros quadricornis*), Nilgai (*Boselaphus tragocamelus*), Wild Boar (*Sus cristatus*), Sloth Bear (*Melursus ursinus*), Barking Deer (*Muntiacus murtjak*), Langur (*Presbytis entellus*), Hares (*Lepus nigricollis*), Hare, *Lepus reficaudatus*½

C – RODENTS:

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

D- WILD BIRDS:

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

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

SECTION 7: SILVICULTURAL SYSTEM: Not applicable

SECTION 8: ROTATION CONVERSION PERIOD: Not applicable

SECTION 9: EXPLOITABLE DIAMETER: Not applicable

SECTION 10: REDUCING FACTORS AND REDUCED AREAS: Not applicable.

SECTION 11: FELLING CYCLE : Not applicable.

SECTION 12: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB) :
Not applicable,

SECTION 13: CALCULATION OF YEILD: Not applicable

SECTION 14: TABLE OF FELLING: Not applicable

SECTION 15: METHOD OF TREATMENT.

9.15.1 Survey of wild life habitat

With the help of front line staff location of natural and artificial water hole , open areas, natural salt licks, meadows, grass lands, nesting sites, rivarian areas,

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nesting sites of migratory birds, natural caves, hideouts, special habitat for endangered wild animal likes pangolin, shekaru, Indian otter, vulture will be surveyed and locations by GPS will be recorded on range and division maps. Also sites of machan, view points, weekly bazaar, check nakas will also be shown on map. Such map will be of help in preparing plan for protection and conservation of wild life habitat.

9.15.2 (A) Habitat development works

The wild life habitat is under stress due to biotic pressure like cultivation, encroachment, shrinking water body, less availability of prey population, hunting etc. The wild life habitat has reached a threshold and hence the habitat development works needs to be taken up on priority. Following activities are proposed

a) Water hole development

Non availability of water compels wild animal to migrate which further create man animal conflict. To check the man animal conflict due to migration of wild animal to human habitat, water holes needs to be created near the breeding sites, nesting sites, wallowing sites, natural salt licks. To augment the water availability following activities may be taken.

- The existing water sources like perennial streams, old ponds, old cement nala bunds and earthen nala bunds, will be identified and locations with help of GPS will be recorded on range and division maps.
- Additional locations for new water hole required for habitat development will be shown on range, division maps with LAT-LON.
- A list of existing water bodies which are silted will be prepared for rejuvenation by desilting.
- Every stream will be treated with soil and water conservation structures like brushwood dam, check dam, which will augment water for herbivores and carnivores.
- In remote areas small saucer shaped water hole supplemented by solar pump will be installed to tie over scarcity and hot summer.

b) Meadows development

This division experiences hot summer coupled with the incidence of fire. During summer herbivores migrate nearby cultivation areas in search fodder. Suitable areas for development of meadows will be indentified and shown on range and division map. Preference should be given to open area for meadows development.

c) Nesting sites

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For development of safe and secured nesting place, species like banyan, ficus, jamun, tamarind etc. should be planted and for this areas near water bodies should be identified. Tall seedlings of species suitable for nesting should be planted. The list of villages and no. of cattle grazing in and around forest will be prepared by R.F.O. Veterinary camps at least once in a year will be arranged with the active participation of Animal Husbandry department for health check up and treatment of domestic cattle for treatment of contiguous diseases like foot and mouth etc.

In the veterinary camps the villages can be sensitized with demonstration for rearing milch cattle of improved variety, practicing stall feeding, cultivation of nutrient rich fodder crops and making silage, vaccination of domestic cattle. D.C.F. Allapalli with close co-ordination of JFMCs will tie up with District Animal Husbandry Offices for arranging such camps in every range every year.

d) Skill up gradation of front line staff

The front line staff should be trained in use of tranquilizing gun, crowd management, rescuing wild animal either injured/ trapped, to handle man- animal conflict.

At every range level a proper network of informer must be meticulously formed to gather intelligence in event of wild life crimes.

Regular and surprise patrolling in sensitive area, like weekly market place, should be planned and monitored by ACF's with close co-ordination with wild life wing. Workshops should be arranged for newly recruited staff regarding handling of wild life offences, wild life habitat development works, tackling man animal conflict issues.

e) The treatment map of annual coupe of all working circle should show locations of water hole, nesting sites, habitat of endangered wild animal like pangolin, (Mauis crassicaudata), vulture (Neophron perenopterus), Otter (Lutra perspicillata), and shekaru (Ratufa indica) etc. The fruit bearing species, like aonla, mango, moha etc, dead trees or hollow logs will be retained as snags, dens. At sensitive places along road passing through forest, where casualty, of wild animal, passing across the road occur, at such places hoardings, illustrating the drivers to mind the speed of vehicle, should be installed with warnings and precautions neatly displayed.

g) No labor camp should be allowed near breeding sites, nesting sites, meadows and water holes.

(B) The territorial division should also be provided with trapping cages and vehicle equipped with kit having tranquilising gun, blow pipe, ropes, etc. in order to catch the stray and injured wild animals which

sometimes enter into the neighboring villages and towns and may cause damage and injury to the human beings or the wild animal may suffer due to injuries.

- (C) The wild animals which may enter into the human settlements such as villages and towns and are trapped in the cages for releasing them into jungles, should be tagged so that it may not be wrongly declared as man eater or threat to live stock and therefore may not be killed without any reasonable evidence and cause.
- (D) To ensure that the green foliage is available to the herbivorous species, one tree per hectare of pole size of apta, dhaman, ain, kasai, ghatbor or any other fodder species will be pollarded at breast height in the working coupe so that the green foliage in the month of March and April can sustain wildlife. Such pollarded tree / pole should be capable of yielding 30 kg of fodder. Three to four culms in a mature clump will be cut at a height between 3rd to 4th internodes from the ground so as to give green flush of leaves for wild animals to eat.

9.15.3 To improve the fodder resources and water availability following measures are proposed.

- i. **Fodder Development:-** The development of fodder resources will be carried out by raising plantations of fodder and fruit species. The fodder development will include introduction of better varieties of palatable grasses along with local grasses. The dietary requirement of wild animals is estimated as 70% cereal and 30% legumes and therefore cereal crops be planted with legumes as mixed crops. The cereal grasses such as *Schima nervosum*, *Schima sulcatum*, *Dicanthium annulatum* should be planted along with legume grasses like *Atylocia scorbooides* and *Alysicarpus rigosus*

Some improved variety of cereal grasses like *Pennisetum pedicellatum*, *Cenchrus ciliens* should be included in natural meadows alongwith legume grass *Stylo hemata*. *Deshmanthes virgatus*, *Schima nervosum*, *Schima sulcatum* are best suited as fodder grasses. It is rich in protein and easily digestible. *Stylo hamata* and *Pennisetum pedicellatum* remain palatable till December while *Dicanthium annulatum* remain green till early summer.

At places especially near river beds, the seeds of herbaceous plants should be sown. Some seeds of maize, jowar, grass etc will be mixed with the grass seeds and sown in meadows as a lure crop.

ii. **Development of Water Resources:-** The territorial division will take necessary steps to increase the availability of water to the wild animals and in order to achieve this, the following measures will be taken up:

- a. **Deepening of existing water holes:** The desilting of existing water holes will be done regularly in order to increase the water holding capacity.
- b. **Stream Opening:** Stream will be opened during the summer season in the important river beds, water courses at a distance of about 3 to 4 Km. in order to make water available to the wild animals which regularly visit the river beds for their water needs.
- c. **Improvised use of hume pipe:** When the water flow beneath the river is deep and much beyond the reach of the wild animals, in such circumstances improvised method of collecting water by using hume pipes will be undertaken. It should be done in the month of February. The hume pipes of 1 mtr. length be dug vertically inside the river bed and sand be removed from inside the pipe to allow the water to flow upwards
- d. **Anicuts:** Small anicuts on nala should be built.

SECTION 16: SUBSIDIARY SILVICULTURAL OPERATIONS: Not Applicable

SECTION 17: ARTIFICIAL REGENERATION: Not Applicable

SECTION 18: SHEKARU HABITAT IN KONSARI:

Shekaru (*Ratufa indica*) is classified as Least Concern (LC) by the IUCN and included in schedule II of Wildlife (Protection) Act, 1972, which indicates the conservation status of Shekaru. In comp. No. 207, Konsari, Markhanda range, Shekaru (*Ratufa indica*) is sighted during census conducted in 2011 and 2014 and the population is found to be 6. The recent census and sightings in May 2015 has revealed that the Shekaru population is 24 with nest count as 136. This may be due to protection measures and improved vegetations cover. The satellite imagery of forest in compartment no 207 reveals that the crop density is 0.4 and above with basal area 7 having site quality MIII (forest type : Southern dry mix deciduous forest). The area of compartment no 207 is 148.924 ha. A Chintakaruppa vagu (nalla) flows through comp. No. 207 (i.e. habitat of shekaru) and has a catchment of 1458 ha. including both non forest land and forest land in comp. No. 763,1490, 1492 and 1841. The population of Shekaru is sighted in a patch of 10 ha. in compartment no.207 which is inhabited by species suitable for Shekaru like Anjan, Ficus, Moha, Behada, Tendu, Mango, Tamarind, Bel, Mowai, Palas etc. The increase in population of Shekaru is an indication of favorable habitat with better protection measures. Presently 10 ha. habitat of Shekaru in compartment no.207 is fenced. This habitat needs further to be expanded by forming

present 10 ha. area as core area and surrounding 20 ha. forest as buffer area which if developed further, will accommodate the increasing population of Shekaru and a secured place for nesting will be available. The local JFMC should be actively involved in protection and development of habitat of Shekaru.

9.18.1 Following activities are proposed for development of habitat.

- i. The habitat of 10 ha. in compartment no 207 should be declared as Conservation Reserve showing core and buffer area.
- ii. A comprehensive management plan for habitat development for Shekaru should be prepared by DCF Allapalli.
- iii. An area measuring 20 ha. around present 10 ha. habitat should be selected and treated as buffer area.
- iv. The buffer area 20 ha. should be treated and developed in first 5 years of this plan period. Every year 4 ha. forest area in buffer zone should be taken for planting of tall seedlings (seedlings of 1.5 mtr height raised in 25 cm. x 40 cm. and 600 gauge poly bags) at 7mtr x 7mtr. spacing by digging 1mtr.x 1mtr. x 1mtr pits. Every tall seedling planted should have individual fencing of thorny branches. Each seedling should have protective manual irrigation @ 20 litres/ plant having six watering for first three years each. This will facilitate early establishment and better growth of seedlings planted. The planted area should be strictly protected from fire and grazing. Species which are essential for feeding and nesting of Shekaru like mango, ficus, tamarind, anjan, behada, bel etc should be given preference in raising of seedlings.

The planting of tall seedlings assisted with watering and strict protection from grazing and fire will facilitate better growth of seedlings and formation of closed canopy in next few years which is the requirement for nesting and breeding of Shekaru.

- v. The buffer area also should be closed by chain link in next five years. The lopping of branches for fodder, thatching or for any other purpose should be strictly banned as the branching below the canopy is suitable nesting site for Shekaru. The villagers, surrounding the habitat, should be taught about the importance of branches, forks in the canopy for nest formation by shekaru. Hence any attempt to lop these branches by villagers, farmers, cattle herders, shepherds will destroy the nesting habitat and will adversely affect the breeding and protection of shekaru.

- vi. Extensive soil and water conservation structures like inverted bandhara, WATS, loose boulder structure, forest ponds, earthen nala bunds, cement nala bunds on entire area of compartment no. 207, and catchment of Chintakaruppa vagu (nalla) including comp. No 763, 1490, 1492 and 1841 should be planned and implemented strictly on watershed basis. For this the catchment treatment plan of Chintakaruppa vagu (nalla) on watershed basis should be prepared by RFO and approved by ACF. This will help in maximum seepage of surface runoff and will increase the ground water table and hence moisture regime will increase over the year. The increased moisture regime will help in luxuriant growth of vegetation there by improvement in canopy closure.
- vii. Nature trail should be established in such a way that it will not obstruct movement of Shekaru.
- viii. Every year in the month of May count of nests and Shekaru should be conducted by taking LAT-LON by GPS.
- ix. The JFMC should be actively involved in protection of habitat from fire, grazing, illicit cutting, lopping of green branches and poaching. The families involved in protection of habitat can be given incentive in addition to supply of LPG, milch cattle on subsidy.
- x. Local youths can be trained as nature guide.
- xi. Entry fee should be levied on visitors by JFMC.
- xii. Colored brochures of Shekaru giving details of habitat, approach to site should be published for publicity.
- xiii. The count of nest, number of shekaru with off springs, any causality, any incidence on disturbance to canopy, should be closely observed by frontline staff and to be reported monthly to DCF Allapalli.

During 15, 16, and 17th May 2015 census was conducted by Allapalli Forest Division in Konsari compartment no. 207. During census the nest count was also carried out. The no. of nest in use, no. of nests under repair and no. of nests abandoned were counted. The tree species bearing the Shekaru nest were also identified. The list of tree species harboring nests, status of nests is listed in table given below.

TABLE - 103 A

STATEMENT SHOWING LIST OF TREES HARBORING NEST WITH ITS STATUS

Sr. no	Species	Scientific name	No. of Nests				Total
			In use	Under repair	Abandoned	Nursery	
1	2	3	4	5	6	7	8
1	Anjan	Hardwickia binata	4	21	3	2	30
2	Tamarind	Tamarindus indica	4	17	2	1	24
3	Mahua	Madhuca indica	2	13	3	0	18
4	Teak	Tectona grandis	2	11	4	0	17
5	Arjun	Terminalia arjuna	0	3	0	0	3
6	Vad	Ficus bengalensis	1	17	3	1	22
7	Pipil	Ficus religiosa	0	2	2	0	4
8	Tendu	Diospyros melanoxylon	1	0	0	0	1
9	Bel	Aegle marmelos	1	0	0	0	1
10	Dhawada	Anogeissus latifolia	0	1	0	0	1
11	Palas	Butea monosperma	1	2	0	0	3
12	Mango	Mangifera indica	3	4	1	0	8
13	Total		19	91	18	4	132

SECTION 19 : Otter (*Lutra perspicillata*) HABITAT DEVELOPMENT:

9.19.1. It is shy, smooth coated mammal belonging to family Mustellidae and belongs to schedule III of Wildlife (Protection) Act 1972.

Otter habitat is normally observed along river banks, perennial water lakes. The body is covered by smooth, velvety and shining under fur. The Otter has powerful long

tail, and can swim for long distances and stay underwater 6 to 8 minutes. It has prominent, strong claws. The front feet are shorter, as compared to hind feet. The paws are strongly webbed for easy swimming. Otter have five toes.

9.19.2. Habitat: Otter is generally social animal and live in pairs or family groups of parents and their young ones. Otter is active both during day and at night. It lives in dens and burrows along river beds, streams, lakes, wetlands.

9.19.3. Food: Otter mainly feeds on small fish, frogs, snails, crustaceans.

9.19.4 Breeding: Male is larger, female dominates the group. It breeds every year. Gestation period is 63-65 days. It breeds near a shallow burrows or shelter near water and usually 1-2 cubs are born in a litter. The young ones live with its mother up to one year and attain breeding age at 2-3 years.

9.19.5 Occurrence in Allapalli Division:

Otter with its young one is sighted in a perennial water lake at Aheri compartment no. 191, of Aheri range in early 2016.

9.19.6 Prescriptions:

i) The water bodies, streams, river banks, perennial stream banks should be visited, monitored to locate population of Otter.

ii) The water bodies having Otter population should be protected from encroachment, illegal fishing, illegal desilting and poisoning the fish in water bodies.

iii) Driftwood, rocks along banks of water bodies should be protected as it is resting spot for Otter. If the water body is devoid of wooden logs then to facilitate the protection by formation of burrows, some wooden logs should be introduced in the water body.

iv) The water bodies having population of Otter should be regularly monitored. The population of young ones should be closely monitored.

v) The villagers through JFMCs should be actively mobilized in protection of water bodies from encroachment, illegal fishing and desilting.

vi) The Otter feeds on small fish, frogs, snails and crustaceans. Sufficient prey population if not available then with the onset of sufficient monsoon, fingerlings (Botukali) should be made available from Fisheries Department and should be introduced every year in the water body. This will ensure sufficient prey population for Otter.

Vii) To ensure the storage capacity of water body soil moisture conservation works should be planned and implemented in the catchment of water body.

viii) Machans/observation tower should be erected near water bodies to observe the moment of Otter, and protection of Otter from hunting. Trap camera should be installed near burrows to monitor the young ones.

ix) Dy. CF Allapalli should prepare habitat development plan for Otter.

x) The census of Otter should be carried out every year on 2 nd February i.e. World Wetland Day.

SECTION 20 : WILDLIFE AND ECO-TOURISM

9.20.1 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 local host communities.

9.20.2 Eco-tourism can be defined as sustainable, nature tourism involving the local 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.

9.20.3 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.LXIV**. The Territorial DCF Allapalli will take necessary steps to identify the Eco-tourism areas, historical sites etc. in his division.

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SECTION 21: OTHER REGULATIONS:

Legal Provisions For The Protection Of Wildlife.

9.21.1 The legal provisions for the protection of wildlife are given in Chapter-II, IIB of this plan.

GENERAL MEASURES FOR PROTECTION :

- 9.21.2**
- 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 or injury to any person or his livestock and the Deputy Conservator of Forests 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 involved in 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. Publicity media should be explored to educate public for preserving the wildlife. These means should be imaginative, informative and inspiring.
 - viii) The PCCF (WL) MS, Nagpur has issued a standing order (Wildlife) No.001. This order prescribes duties and list of measures for the protection and conservation of the wildlife

outside PAs. Following are the general prescriptions, majority of which are based on the guidelines under this Standing Order, for the protection of wildlife in the areas outside the Protected Areas. The territorial staff of the Allapalli Division shall scrupulously implement these prescriptions.

1. Duties of Forest Guard, Forester, RFO and ACF include-

- Keeping information of waterholes, particularly in summer and watch on the same, that is, special vigilance at all the water holes in the Division is prescribed.
- Keeping a watch on the electric lines passing through forests.
- Ensuring registration of arms licenses as required under Wildlife (Protection) Act 1972.
- Cognizance of cases of injury due to wild animals as per Govt. Orders from time to time with speedy and transparent disposal of cases.
- Keeping a track of animals like Tiger, particularly Tigress with cubs and a watch on such vulnerable animals.
- Proper disposal of carcass of wild animals found dead or killed.
- Local staff shall maintain record of sensitive wildlife areas such as areas with heavy concentration of wild animal.
- Establishing a network of informers with the aid of Secret Service Fund.
- There shall be regular short-term training/ workshops in anti-poaching activities and legal requirements in dealing with wildlife offence cases.
- Cases of Man-animal conflict should be handled swiftly and efficiently. Keeping in view the vast area of the division, at least two Rapid Response teams shall be operationalized 24*7. Such team should be given need based training. Every Range HQ should contain equipments necessary to handle conflict situations. This team should have one vehicle with arrangements to include trapping cage/ treatment cage, tranquilising gun/ blow pipe, net, rope, ladder etc.

- Nature education programme in the villages adjoining forests and in schools and colleges shall be arranged.
- Ecologically sensitive habitats shall be identified and protected.
- Antler trade is now banned; hence, no collection of shed antlers is to be allowed.
- The involvement of Honorary Wildlife Warden and experienced NGO's be encouraged for nature education programme.
- It will be ensured that cattle grazing in forests near the important wildlife habitats are inoculated every year against contagious diseases.

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CHAPTER – X

Joint Forest Management (J.F.M.) Overlapping Working Circle

SECTION 1: GENERAL CONSTITUTION OF THE WORKING CIRCLE :

This is an overlapping working circle covering the entire forest area of the Allapalli Forests Division. which is the co-terminus with the area of Villages that are adjoining to the forest areas the focal areas for practicing Joint Forest Management.

SECTION 2: GENERAL CHARACTER OF THE VEGETATION:

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

SECTION 3: FELLING SERISE AND CUTTING SECTION: Not applicable.

SECTION 4: BLOCKS AND COMPARTMENTS:

Entire forest area of the Allapalli Forests Division.

SECTION 5: SPECIAL OBJECTS OF MANAGEMENT:

- To rehabilitate and regenerate the degraded forest areas through JFM.
- To check soil erosion and water conservation through JFM.
- To maintain an optimum level of carrying capacity in the forests
- To protect the forests with active participation of villagers.
- To utilize the degraded forest areas for productive purpose in order to meet the demand for fuel, fodder and small timber ultimately achieving the integrated development of the adjoining villages with the help of other development agencies.
- To generate livelihood opportunities for the JFM villages

SECTION 6: ANALYSIS AND VALUATION OF CROP (J.F.M.):

Joint Forest Management

10.6.1 This is a mandatory working circle as per the directions given in the National Working Plan Code 2004. Joint Forest Management (Overlapping) Working Circle covers the entire area of Allapalli Forest Division. The area is overburdened with

heavy cattle and human population and is subjected to biotic pressure to meet the requirement of fodder, fuel, small timber. Illicit felling, grazing and forest fires are common. Control of these illegal activities and protection of forest and wildlife is becoming a difficult task. The staff available for the purpose of protection of forest and wildlife is meager when compared to the extent of area allotted to them for protection. Encroachments in forest areas are also a common feature.

10.6.2 Under these circumstances, for the better protection and management of forest resources the Joint Forest Management is one of the best options for Forest Department. The National Forest Policy 1988 emphasizes the importance of traditional rights of forest dwellers and the importance of their role in protecting the forests.

10.6.3 In this working circle, the prescriptions for management of Forest areas within or adjoining to the village boundary by allocating forest areas to JFM Committees and implementation of the micro-plan for protection, regeneration of forest areas and holistic development of the village has to be included.

10.6.4 There are 307 villages in Allapalli Division out of which 234 forested villages. The joint forest management committees are formed in 152 villages. The details of Jfmcs' range wise is as below.

TABLE—104
RANGE WISE LIST OF JFM COMMITTEE ALLAPALLI FOREST DIVISION.

Sr.No.	Range	No. of JFMC's	Total forest area allotted to JFMC's
1	Chamorshi	23	33639 Ha.
2	Ghot	29	
3	Pediguddam	28	
4	Permili	24	
5	Aalapalli	2	
6	Aheri	29	
7	Markanda	17	
Total		152	

10.6.5 The 152 JFMC villages cover forest area 33639 ha. out of which development works as per micro-plan are taken up under Centrally Sponsored Scheme in 42 villages covering forest area 17893.237 ha.

SECTION 7: SILVICULTURAL SYSTEM: Not applicable

SECTION 8: ROTATION CONVERSION PERIOD: Not applicable

SECTION 9: EXPLOITABLE DIAMETER: Not applicable

SECTION 10: REDUCING FACTORS AND REDUCED AREAS: Not applicable.

SECTION 11: FELLING CYCLE : Not applicable.

SECTION 12: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB) :
Not applicable,

SECTION 13: CALCULATION OF YEILD: Not applicable
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SECTION 14: TABLE OF FELLING: Not applicable

SECTION 15: METHOD OF EXECUTING THE FELLING: Not applicable

SECTION 16: SUBSIDIARY SILVICULTURAL OPERATIONS: Not applicable

SECTION 17: ARTIFICIAL REGENERATION: Not applicable

SECTION 18: BASIS OF THE JFM & ROLE OF FOREST DEPARTMENT:

10.18.1 The Government of India through Ministry Of Environment and forest has issued detail guidelines for the implementation of JFM program in all the states vide its circulars No.22-8/98-FPD-88 dated 11.02.2000 & No.22-8/2000 (FPD) dated 21.02.2000. In continuation to these guidelines the Government of Maharashtra has also issued Resolutions through Revenue and Forest Department vide G.R.No.SLF-1091/C.N.143/F-1 dated 25.04.2003 for the effective implementation of JFM program. The Government of Maharashtra has realized that, it is not possible to protect the valuable forests from illicit felling and illegal trade without active participation of the local people living in and around the forest areas.

10.18.2 In areas where the villagers are willing to participate in JFM plan, the Dy.Conservator of Forests shall prepare a micro plan for all such areas to be tackled as per the government instructions issued vide G.R. dated 16.03.1992. The micro plan prepared for the particular village shall match with the prescriptions of the working plan so far as the village is concerned. In no case Forest (Conservation) Act.1980 shall be violated while working. The micro plan shall be sanctioned by a committee headed by the Conservator of Forests.

10.18.3 The execution of works and control shall be exercised strictly in accordance with the guidelines issued by Government of India through Ministry of Environment and Forests vide letter No.6-21/89-FP dated 01.06.1990 and the Government of Maharashtra G.R.No.SLF-1091/C.N.119/F-11 dated 16.03.1992 and also other guidelines, Circulars issued from time to time.

10.18.4 The guidelines issued by the Government of Maharashtra emphasizes on the following aspects,

- I. The degraded forests in and around the villages and hamlets shall be selected for the regeneration, protection and management purposes. All the families in these villages will be the members of the JFM committee.

- II. The JFM committee members shall be responsible for the plantation taken up by the department and their protection in and around the villages.
- III. The JFM committee shall appoint an executive committee who will prepare a plan of operations to be taken up and implementation of the same. However all the policy decisions will be vested with the JFM committee.
- IV. Distribution of benefits from the regenerated areas among all the member families as decided by the committee.

10.18.5 ROLE OF WOMEN IN JFM:

The Government of India in its G.R. dated 21.02.2000 has stated that at least 50% of the members of the JFM general body should be women, and the presence of 50% women member is a prerequisite for holding general body meeting. Besides this, 33% of executive committee members should be women. These instructions shall be strictly complied with while implementing the JFM.

10.18.6 In recent years, many activities are being undertaken by the JFM committees apart from protection of forests. Many plantation and SMC works, Eco-tourism works under CAMPA, FDA, Dist. level scheme, State plan scheme is implemented by the JFM committees. The JFMC's recently are involved in implementation of the natural regeneration works.

10.18.7 Nowadays, under KRA-2; the progress under JFM activities is being monitored very closely. The villagers are being encouraged to use of LPG for cooking, undertake castration of unproductive cattle and supply of milch cattle. The programmes of capacity building through exposure visits, and trainings are being undertaken so that the committee members are encouraged to under take income generation activities.

SECTION 19: PARTICIPATION OF JFMCS IN ALLAPALLI DIVISION.

The JFMC's in Allapalli has participated as follows.

Implantation of micro - plan

- a) Agarbatti making.
- b) Minimizing dependency on forests for fuel wood and fodder, by supplying LPG and milch cattle to JFM members on subsidy.
- c) Lac cultivation
- d) Maintenance and operationlising of Bio-diversity Garden.
- e) Coupe working (Talwada)
- f) SMC works.
- g) Plantation works.
- h) Protection of Forests.

Implementation of micro - plan.

The micro- plan is implemented in 42 JFMCS under Centrally Sponsored National Afforestation Programme.

10.19.1 The agarbatti stick making project is implemented since last three year at Allapalli, Muttapur, Chamorshi, Ghot, Permilli, Etalcheru, Gomani, Haladwahi, Gurupalli under IAP and HDM schemes. For making agarbattis round sticks are prepared from bamboo available from adjoining forests .The raw agarbatti is sold to Cycle Brand Agarbatti Company for final product as scented Agarbatti. This project has future for expansion as raw material i.e. bamboo is available in plenty on sustainable basis and the agarbatti making companies require assured and sustainable supply of round sticks raw agarbatti for production of scented Agarbatti of specific brand; hence the Agarbatti project in Allapalli division is certainly a livelihood program for JFMC members particularly women and unemployed youth.

TABLE--105

IN THE JURISDICTION OF ALLAPALLI FOREST DIVISION THE AGARBATTI'S PRODUCTION DETAILS IS AS UNDER.

Division	Sr.No.	Place	Head	No. of Machines	No. of Women
Allapalli	1	Muttapur	IAP	30	30
	2	Chamorshi	IAP	30	30
	3	Ghot	IAP	33	40
	4	Pirimilli	HDM	30	30
	5	Italcheru	JFM	30	30
Total	----	----	----	153	160

10.19.2 b) The forest is burdened continually for supply of fuel wood and fodder to local villagers. Felling trees for fuel wood, severely affects advance growth and degradation of forests goes on unabated. The grazing by large herds of cattle also severely damages natural regeneration due to over grazing and trampling . To tide over this Govt. vide Resolution dated 10.7.2012 launched schemes for SC, ST people for supply of LPG/Biogas units and milch cattle of improved variety at subsidized rates.

10.19.3 Allapalli division has distributed LPG units to 1809 beneficiary (923 units for ST, 842 units for SC and 44 units for open category beneficiary in 69 JFMCS, 9 milch cattle are distributed in four JFMCS. In four JFMCS 8 biogas units are supplied. 300 beneficiaries in 31 JFMCS are benefitted from MFP collection. In 39 JFMCS, 3300 beneficiaries are involved in lac cultivation on trees like Palas.

SECTION 20: OTHER REGULATIONS:

10.20.1 Legal provisions for JFMC'S

The joint forest management committees are now development committee of Grampanchyat vide Govt. Resolution No.FDM2011/CR100/F-2 Mumbai

dated 05.10.2011. To reduce stress on forests for fuel and fodder, supply of LPG/Bio gas units, milch cattle on subsidy to families of SC,ST,OPEN category, incentive to families involved in protection of plantation is envisaged under joint forest management programme. Vide Govt. Resolution no. FDM 2012/CR-4/F-2, MUMBAI Dated 10.07.2012. Under this scheme many families in Allapalli Division benefitted with supply of LPG, milch cattle at subsidized rate. The salient features of Govt. Resolution dated 5.10 2011 and 10.7.2012 are as follows

- i) JFMC will be formed by the Gramsabha under provisions of sections 1,2,3,4, of section 49 in Mumbai Grampanchyat Act 1958. Women will constitute not less than 50 % the total member's in the committee. The committee will also have members of SC, ST, NT, DT, VJNT, as per provision under that is Act.
- ii) The member secretary will be with forest guard or forester for villages having population less than 100 and more than 1000 receptively.
- iii) Forest area within 3 km from gaathan will be handed over to JFMC's for management.
- iv) MOU will be signed between JFMC's and Deputy conservator of forest in prescribed format
- v) Micro plan prepared by JFMC's will be approved by Dy. C.F. The period of micro plan will be 10 years which will be as per working plan prescriptions in operation.
- vi) JFMC's will be participated in maintaining forts, pathways, water source at eco-tourism center and to levy nuisance fees, vehicle fees, from tourist. Amount collected from such levies will be utilized by Grampanchyat with approval from Dy.CF (T). 50% of this amount will be utilized by JFMC's for maintenance of forest, water sources etc. and remaining 50% will vibe utilized for supplying energy saving devices, income generation activities for needy villagers.
- vii) JFMC's will have its tenure co-terminus with the existing Grampanchayat
- viii) If the JFMC's president resigns on if no confidence motion passed by Gramsabha, then Dy. C.F.(T) will accept the resignation / no-confidence motion and will instruct Grampanchyat for formation new JFMC.
- ix) JFMC's can levy grazing fee, also levy fines on persons involved in illegal grazing, illicit cutting etc.
- x) The JFMC's if found not discharging duties, then Dy. C.F.(T) after giving opportunity to JFMC's, Dy. C.F.(T) is empowered to dissolve JFMC's and instruct Grampanchayat to elect new JFMC.
- xi) Forest is burdened with felling of trees for fuel wood, illegal grazing affecting natural regeneration and standing growth. To tie over this Govt. of Maharashtra vide GR. No. FDM 2012/CR-4/F-2 MUMBAI Dated

10.07.2012. decided to supply LPG/ BIO GAS, Milch Cattle on subsidized rate, incentive in cash for protection of plantation to families involved in protection of forest from fire, illicit felling, grazing, protection of plantations.

10.20.2 Vide this Resolution LPG/ bio gas units are supplied to eligible families on 75% subsidy and milch cow/buffalo on 50% subsidy in lieu of disposal / culling of 4 scrub cattle. Also villagers will be involved in protection of plantation from grazing, fire and they will remunerated based on number of seedling survived. These provisions will reduce dependency of local people on forest for fuel wood, fodder and improve the migration status of villagers in search of employment

10.20.3 Recommendations.

Regular intervention with JFMCS, by front line staff, attending JFMCS meeting by RFO, ACFs, will help in understanding attitude, dependency on forests, protection issues and development issues.

10.20.4 The plan submitted by Gramsabha for utilization of amount deposited in Committee Account should be judiciously utilized, after receiving approval from Dy C.F. Allapalli. Proper utilization of funds both for maintenance of forests and improving livelihood of economically and socially backward families for their upliftment and reducing dependency upon forest for fuel wood and fodder is prime responsibility of Gramsabha vis-à-vis JFMC and the utilization must be monitored by Dy.C.F. through R.F.O. and A.C.F. and the expenditure incurred thus should be audited by approved auditors and the audit report along with account should be put before Gramsabha for approval. A copy of this audit report duly approved by Gramsabha along with account should be submitted by Gramsabha to Dy.C.F. through R.F.O. RFO and ACF should visit the forest area allotted to JFMC's and guide the technical aspects of works to JFMC's. RFO and ACF should attend the meeting of JFMC's and guide the JFMC's in account keeping , utilization of funds, benefit sharing, protection of forests and shramdan. RFO and ACF must inspect the field work, account of JFMC's and instruct the JFMC's to improve the works if any discrepancy notice.

10.20.5 The potential of MFPs should be assessed for collection of non edible oil seeds like moha, karanj, neem, kusum etc.

10.20.6 The JFMCS should be promoted and sensitized in collection, storage, grading, value addition and processing, packing, transport and sale of MFPs and its products.

10.20.7 Necessary training programs should be arranged for skill up gradation of youth, women in collection, grading, processing and marketing of MFPs, with field visits to successful MFPs, collection, processing and marketing centers. In this respect experienced NGOs, experts, and producers can be invited for skill up-gradation and experience sharing.

Areas of coupe working, regeneration can be allotted to JFMCS.

10.20.8 JFM micro plans for all villagers should be prepared which must be in consonance with prescriptions of approved working plan. Protection of forest from encroachment, fire, grazing, illicit cutting, implementation of natural regeneration and development and protection of wild life habitat are prime responsibilities of JFMC's . Proper and transparent account keeping and approval of expenditures, account by Gramsbha is mandatory.

10.20.9 The annual audit of expenditure i.e. accounts must be promptly done through approve auditors and copy of audit statement should be sent for approval to Dy. c.f. (T)

10.20.10 The JFMC's should be trained in maintaining documents like measurement books, completion report, preparation of accounts, JFMC's meetings register,etc.

10.20.11 The works implemented by JFMC's should be evaluated at the end of year and performance of JFMC's with gradation should be prepared.

10.20.12 The JFMC's should be adequately trained in technical matters like nursery works , plantation works, SMC works, natural regeneration works , tending operations.

10.20.13 The JFM programme should have convergence with other developmental scheme of line Departments like Agriculture, Irrigation, Animal husbandary etc. for ensuring over all development of village.

Village forests:

10.20.14 The section 28 (1) of I.F.A 1927 empowers State Govt. to assign to any village panchayat the rights of Govt. to or over a forest land constituted as Reserved or protected forest and may cancel such assignment also. All forest so assigned are called as "village forests" further subsections (2) of section 28 of I.F.A.1927 empowers State Govt. to formulate rules for regulating the management of village forest, for the protection and improvement of such forest.

- Govt. of Maharashtra in exercise of the power conferred by section 26, 28, 30, 32, 34, and 76 of Indian Forest Act 1927 (Act no. 1927), has notified the “Villages Forest Rules 2014 “on 13th may 2014.
- The village panchyat fulfilling at least three criteria for assignment of forests in the village boundary as village forest. The criteria are as below:
 - Zero encroachment.
 - Enhanced natural regeneration
 - More than 60% survival percentage in plantations.
 - Strict fire control measures (In last three year the area burnt should be less than 5 %)
 - Effective implementation of charai bandi, kurad bandi.
- The Village Forest Management Committee will manage the forest assigned as village forest.
- The Village Forest Management Committee will prepare a 10 year micro-plan for village forests duly approved by Gramsabha and further submit for approval by Dy. c.f.(T). The micro-plan should be in concurrence with existing prescriptions of working plan.

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CHAPTER – XI

ECO-TOURISM

(OVERLAPPING) WORKING CIRCLE

SECTION: 1 GENERAL CONSTITUTION OF THE WORKING CIRCLE :

This is an overlapping working circle covering the entire forest area of the tract dealt with. Thus total forest area in this working circle is 213118.081 ha.

SECTION 2: GENERAL CHARACTER OF THE VEGETATION:

11.2.1: Ecotourism In Forest Management.

Industries like automobile, pharmaceutical, garment etc. are actively promoted by Governments as these industries contribute for social, economic development of society. Tourism is also now a day, a recognized industry all over world.

Ecotourism is also recognized, as important industry, by UNWTO. (United Nations World Tourism Organization). The World Tourism Day celebration started by UNWTO since 1980 to aware the people about significant role of tourism in social, economic and cultural values.

The theme of International World Tourism Day was “Eco-tourism the key to sustainable Development”, and for 2010, it was “Tourism and Biodiversity”, for 2008, the theme was “Tourism Responding to the challenges of climate change and Global Warming”, for 2014 year, the theme was “Tourism and Community Development”, for the 2017 year, the theme would be “Sustainable Tourism- a tool for development”. It is evident that tourism vis-à-vis eco tourism is a major growth sector having potential for sustainable community development laying emphasis on conservation and development of national natural heritage i.e. flora, fauna, historical places through active participation of local forest dependent community.

Conservation of flora and fauna, which represents biological diversity and genetic resources of the country is also objective of National Forest Policy 1988.

SECTION 3: FELLING SERISE AND CUTTING SECTION: Not applicable.

SECTION 4: BLOCKS AND COMPARTMENTS

AREA:

The eco-tourism places in Allapalli Division, Allapalli, Regadi dam, Ghot bio-diversity garden in Ghot range and Shekaru habitat in Markhanda range are

proposed ecotourism places which covers forest area spread over 5 compartments in three ranges under this working circle and range wise given as bellow.

Sr. No.	Range	R.F. (ha.)	P.F.(ha.)	Zudpi	Total
1	Allapalli	2.00	0	0	2.00
2	Ghot	174.180	0	0	174.180
3	Markhanda	30.00	0	0	30.00
4	Total	206.18 ha.	0	0	206.18 ha.

SECTION 5: SPECIAL OBJECTS OF MANAGEMENT:

11.5.2. Ecotourism Policy:

i) Ministry of Tourism, in Government of India has declared “Eco-tourism in India Policy and guidelines, 1998”. This policy has underlined the activities of tourism ought to be environment-friendly having no adverse impact on ecosystem.

ii) The UNWTO came into force in 1970 on 27th September. To aware the people about the role and impact of tourism on society, the UNWTO started celebrating World Tourism Day on 27th September every year since 1980. Every year a theme is launched on the eve of World tourism Day by UNWTO. Ecotourism, Environment Protection, Climate change, Biodiversity, Community development became theme of World Tourism Day in the year 2002, 1997, 2008, 2010, and 2014 respectively.

iii) Government of Maharashtra, in Tourism and cultural affairs vide Resolution No. MTC-2005/2/CR-172/ Tourism, Mumbai dated -2006, declared Tourism Policy-2006 having tourism vision 2025. This policy has identified “Ecotourism” sector. Infrastructure development, public-private partnership, capacity building, creating awareness etc. are high lights of this policy.

iv) Govt. of Maharashtra in Revenue and forest Department vide Resolution No. WLP 1002/C.R.53/F-1, Mumbai dated 20.2.2008 has declared “Eco-tourism Policy 2008”. This policy illustrates the role of stake holders, capacity building of stake holders, Information, Education and communication, selection of eco-tourism centers and operationalisation of it, formation of “Maharashtra Eco Tourism Promotion Board” to promote ecotourism. This policy laid down principles of Eco tourism as below,

- The Ecotourism activity should be concise and small for proper utilisation.
- It should be proper in view of environmental, social and cultural aspects.
- It should be proven and worthy of adoption.
- Participation of local community.
- It should neither degradable nor destructive.
- As per tourist demand but definitely with some restrictions.

This policy entrusts Forest Department to prepare management plan of eco-tourism centres' in pursuance of Forest Conservation Act.1980, Wildlife Protection Act 1972, and guidelines by National Tiger Conservation Authority. The Maharashtra Eco-tourism Board has key role in co-ordination of line departments, granting of permission for infrastructure development, signing of MOU with Forest Department for development of infrastructure and revenue sharing.

v) The Govt. of Maharashtra, in Revenue and Forest Department vide Resolution No.-M-2011/ C.R. 174/F-5, Mumbai, dated 24.11.2011 has issued guidelines for implementing eco-tourism activities in forest areas. Identification of eco-tourism places, preparation of management plan, involvement of stake holders, stay and food facilities, home-stay facilities, capacity building of local people and staff, identification of various types of tourism etc. are important provisions in eco-tourism policy 2008.

11.5.3 Identification Of Eco-Tourism Centers In Allapalli Forest Division.

Back Ground

Allapalli forest division with its rich flora and fauna, has 1509 forested and 166 Non-forested villages. The forest is sparsely populated having 4,23,612 population.

Continuous forest tract with enchanting teak forest, hill forests with bamboo break and meandering rivers, streams, nallas, irrigation tanks inhabiting bird population, enormous growth of variety of tree species is prime location for nature lovers, students, tourists.

The historical background of forest villages, Govt. saw mill, Govt. oil depot, forest dispensary, forest depot are important locations to unearth the history of forestry operations and life style of aborigine like Gond, Madia, Pardhan etc.

11.5.4 The population of Shekaru (Giant squirrel: *Ratufa indica*), an endangered species, is found to be increased from 19 in the past to 23 in 2015 censuses, in Konsari forest. The present population is restricted in 10 ha. fragmented habitat which needs to be spread over in adjoining forests so as to achieve a continuous canopy for Shekaru to be developed with proper management plan.

11.5.5 In Ghot range a medium irrigation project on river Dina known as Regadi Project which has adjoining forest areas, is another spot which will be tourist attraction by installing boating facility, nature trails, observation tower etc.

11.5.6 The forest areas near Ghot, Allapalli villages are located along all weather roads and presently biodiversity garden at Ghot, Allapalli is formed which needs to be developed further by installing eco-friendly activities.

Prior to 2015, monthly on an average 50 to 60 tourists visited Glory of Allapalli but after release of Marathi film based on life and work of Prakash Baba Amte, tourist flow increased from 50-60 to 800-900 per month. The tourists are also from far off places like Mumbai, Pune, Nagpur including students also. The rise in tourist visiting Glory of Allapalli, Hemalkasa is an awakening call for Forest Department to develop tourist facilities like tents, adventure sports, ethnic food, tribal culture display, natural trail, at Allapalli, Ghot biodiversity garden, Regadi dam, Konsari forests. Emphasis also should be laid on involvement of JFMCs in maintaining and operating tourist facilities, keeping gardens, pathways, water sources clean and free from non-degradable wastes like a plastic etc. The JFMC member's especially unemployed youth, women must be given skill up gradation training in catering, nature guides, cleanliness, and hospitality management.

11.5.7 It is now evident that there exists potential for development of eco-tourism places in Allapalli Forest Division.

An attempt can be made to assess and tap the tourists from Gadchiroli and Chandrapur district. Chandrapur district has industrial growth centers like cement factories (Manikgad, ACC, etc.), thermal power station (Chandrapur, Bhadrawati.) Ballarshah paper mill, Coal mines, which has large number of staff as managerial levels and executive levels which is potential tourist source.

Gadchiroli district also has 1965 schools, 132 colleges, 34 professional institutions harboring 207145 students. These students can have opportunity to visit the eco-tourism places in Allapalli Forest Division.

11.5.8 The eco-tourism places, which has potential to attract tourists, needs development in basic tourists facilities, like stay, ethnic food. Adventure sports, bio-

diversity garden, are proposed for development and operationalising during first five years of this plan period.

1. Allapalli.
2. Ghot.
3. Markhanda.
4. Regadi dam.
5. Shekaru habitat in Konsari Forest.

The detail of Eco-tourism places is given below.

TABLE NO.106

Sr. Nos.	Eco-tourism place	JFMC villages	Locations	Range, Round, Beat	Activity	Area in ha.
1	2	3	4	5	6	7
1	Allapalli	Allapalli	Compt. No. 28	Allapalli Range, Aheri Round, Nagepalli Beat	• Biodiversity garden, • Adventure Sports, • Forest Museum, • Govt. Saw Mill. • Govt. Timber Depot, • Agarbatti Units, • Govt. Workshop, • Forest Dispensary, • Elephant camp, • Tent camping, • Biodiesel unit.	2.00
2	Ghot.	Ghot.	Compt. No.850 S.No. 31.	Ghot Range Ghot Round Ghot Beat	• Biodiversity Garden, • Adventure Sports, • Nature Trail. • Observation towers. • Camping.	159.18

3	Ragadi	Regadi	Compt. No. 445	Ghot Range, Ragdi Round, Regadi beat	• Boating • Observation tower. • Bird watching. • Protection hut. • Nature Trail. • Adventure Sports. • Camping • Planting of tall seedlings.	15.00
4	Konsari	Raipur	Compt. No. 207	Markhanda Range, Konsari Round, Konsari Beat.	• Conservation Reserve declaration. • Formation of Core and Buffer zone. • Development of Buffer zone • Observation tower. • Nature Trail. • SMC works. • Closer of area.	30.00

While developing above eco-tourism sites, it should be verified that the proposed activities must not attract nor violate provisions under Forest Conservation Act 1980.

SECTION 6: ANALYSIS AND VALUATION OF CROP: Not applicable

SECTION 7: SILVICULTURAL SYSTEM: Not applicable

SECTION 8: ROTATION CONVERSION PERIOD: Not applicable

SECTION 9: EXPLOITABLE DIAMETER: Not applicable

SECTION 10: REDUCING FACTORS AND REDUCED AREAS: Not applicable.

SECTION 11: FELLING CYCLE : Not applicable.

SECTION 12: DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCK (PB) :
Not applicable,

SECTION 13: CALCULATION OF YEILD: Not applicable

SECTION 14: TABLE OF FELLING: Not applicable

SECTION 15: METHOD OF EXECUTING THE FELLING: Not applicable

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SECTION 16: SUBSIDIARY SILVICULTURAL OPERATIONS: Not applicable

SECTION 17: ARTIFICIAL REGENERATION: Not applicable

SECTION 18: OTHER REGULATIONS:

11.18.1: Development Of Eco-Tourism Places:

Allapalli:

Allapalli is erstwhile forest village. To facilitate the variety of forestry operations in earlier days, milestones in forestry like Govt. Workshop, permanent and mobile dispensary, Govt. timber depot, elephant camp for timber haulage in interior areas, formation of forest villages were established and run successfully. In forest compartment no. 28, a biodiversity garden is established and operated at present.

DEVELOPMENT STRATEGY:

i) Bio-diversity Garden:

The Bio-diversity garden is spread over 2 ha. in compartment no. 28, s. no. 40. Plants of different species are planted in this garden. Toys are also installed for children. For maintenance of this garden entry fee was levied which at present is stopped. This garden needs additional infrastructure like amphitheatre, adventure sports facility like Burma bridge, crawling net, etc. This centre, after development, must be handed over to JFMC for operationalising and maintenance and entry fee should be levied for future maintenance. A small place should be reserved for displaying tree and animal fossils available from adjoining forests displaying signs depicting information of fossil.

The local youth can be trained in adventure sports, maintenance of adventure kit and equipments, safety measures by experienced NGO's or institutions working in adventure sports.

ii) Forest museum:

At present forest museum is formed for teak species. However herbarium of local species, wood samples of all timber species, pods of *Rademachera xylocarpa*, *Entada phaseoloides* etc. should be displayed. Pictorial information relating to silviculture of teak should be displayed. Information with coloured photographs of different forestry operations in forestry, bio-diversity, wildlife management, climate change also can be displayed.

iii) Govt. saw mill, Timber Depot, Dispensary and Workshop.

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All these Govt. establishments should be kept clean. The background and importance of these units in early forestry operations should be displayed by erecting signs. The role played by these units in employment generation, skill up gradation, best utilization of forest produce (Railway sleepers etc.), grading of timber in to plywood and other specification etc. can be displayed. In Govt. timber and fuel wood depot record keeping, grading of timber, auction procedure can be displayed. For easy understanding the background and utility of these units, a brochure in Marathi can be prepared giving details of operations.

iv) Elephant camp:

In the nineteenth century the forestry operations like felling of trees, loading unloading and transportation of timber logs started. It was difficult to load the big logs manually which was achieved with the help of trained elephants. Elephant camp along with trained mahout is established at Patanil camp. The elephant camp will be an added attraction for the tourist.

v) Agarbatti units:

Six agarbatti making units are established in Allapalli Division including sophisticated machinery for chipping, cutting, splitting machines. Permanent sheds are established with power supply. Bamboo is main raw material collected by local JFMC members mainly women and brought at agarbatti centre where Bamboo or Bamboo pieces are cut, split and chipped to form agarbatti sticks and these sticks are rounded in rounding machines. These sticks are bundled and dipped in pulverising unit. Such sticks are then supplied to scented agarbatti manufacturing units at Bangalore. The main labour force working in these units are women JFMC members from adjoining villages. The agarbatti units have created employment opportunities to local women in collection of MFP, value addition and processing. For the tourist it is equally amazing to visualise the agarbatti making process and role of MFP like bamboo in creating livelihood opportunity to women.

vi) Bio-diesel unit:

The automobile sector is rapidly increasing every year along with rise in consumption of petrol and diesel. More than 75 % oil demand is met through import. To reduce the import bill for crude oil, Govt. is promoting bio-diesel. Bio-diesel can be produced from non edible oil seeds of moha, neem, karanj, seeds by oil extraction process. The tree enumeration carried out in Allapalli forest division shows distribution of oil seed species by percentage wise as follows.

- Moha 4.315 %
- Chapals 2.108 %
- Karanj.....0.013 %
- Neem.....0.013 %.

It is evident from above data that Moha is a potential tree species for production of bio-diesel from Moha toli. A bio-diesel unit is established at Allapalli. It will be interesting for tourists specially students to know the trans-esterification process for bio-diesel production. The tourists visiting Hemalkasa can have at least half a day stay at Allapalli for visiting all above places. Local food, clean drinking water can be made available by JFMC members at reasonable rates. A single entry fee can be charged for all the places which will be suitable and time saving for the tourists.

Camping arrangements in tents can be thought over after assessing the required flow of tourists and development of tourist facilities and amenities. The local youth and women can be given skill up gradation training in hospitality management, nature guides, catering, adventure sports, and record keeping with the help of experienced NGOs/Institutions

. 11.18.2 Ghot:

At present bio-diversity garden along with herbal treatment centre by local vaidu is in operation in forest compartment no. 850 Ghot. This is well connected with all weather road Gadchiroli-Allapalli. The total forest area of compartment 850 is 159.18 ha. The bio-diversity garden, spread over an area of 12.50 ha, and operated by Ghot JFMC by levying entry fee for the tourists. The present bio-diversity garden can be strengthened by creating additional facilities like Cactus garden, fossil-park and adventure sports, nature trail, observation tower, camping facility by erecting tents etc. The adjoining forest area through active participation of JFMC Ghot should be protected from fire, illicit cutting and grazing. SMC works like gabian structure, loose boulder, forest pond, cement nala bund, earthen nala bund and inverted bandhara should be taken on water shed basis which will increase ground water table by arresting surface run off and thus the increased moisture regime. Burma bridge, crawling net, rappelling etc. adventure sports facility can be taken up. The local youth and women should be given skill up gradation training in hospitality management, catering, adventure sport etc.

11.18.3 REGADI:

In Ghot range a medium irrigation project is constructed on river Dina which comes under jurisdiction of Regadi JFMC. The adjoining forest is in compartment no. 445. This irrigation project and adjoining forests is habitat for many local and

migratory birds. The adjoining forests can be developed by following activities to attract tourists.

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- i. Boating facility through JFMC Regadi can be taken up. The JFMC members should be trained in operationalising and maintainance of boats, safety of tourists. Fees can be levied for boating and amount from fees collected will be deposited in Committee Account of JFMC.
- ii. 15 ha. of forest area in compartment no.445 adjoining to Raegadi dam can be identified and marked on ground for basic facilities like adventure sports, nature trail, observation tower etc.
- iii. Plan of nature trail should be prepared from an experienced agency.
- iv. The local youths/ women should be selected, and trained for providing local food, clean drinking water to tourists, hospitality management.
- v. Observation towers for bird watching should be erected.
- vi. The JFMC members should be selected for skill up gradation in adventure sports, security measures. Adventure sports like Burma Bridge, zip line, crawling net, rappelling, river crossing should be installed and operated through trained JFMC members. For skill up gradation, training can be arranged for local youths from experienced, professional agencies in adventure sports.
- vii. Local youths can be trained as nature guide.
- viii. Camping facility like tent should be installed after assessing tourist flow.
- ix. A development plan of Regadi eco-tourism place should be prepared and got approved and should be developed in first five years of this plan period.

11.18.4 SHEKARU HABITAT IN KONSARI:

In Markhanda range Shekaru (*Ratufa indica*) is sighted in 6 no. in census conducted for the year 2011 and 2014. The recent census and sightings in May 2015 has revealed that the Shekaru population is 24 with nest count as 136. This may be due to protection measures and improved vegetation cover and hence the increased continuous canopy cover.

The giant Indian squirrel is listed in Schedule II of wild life protection act 1972. The giant Indian squirrel called as shekaru, a state animal, is diurnal, frugivorous and arboreal. Shekaru requires a continuous canopy of mostly fruit bearing, branchy trees having underneath perennial water courses. Shekaru feeds on fruits, seeds, barks, ripe and unripe fruit pulp, tender leaves, leaf buds, leaf petioles, flowers, inner bark, barked twigs, tree sap. Thus it is evident that the landscape required for habitat of Shekaru needs to be protected from fire, illicit cutting, lopping of branches for fodder, fire etc. The Shekaru construct its nest just below the canopy in the branches preferably in the

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forks of branches. The Shekaru and its young one is threatened by predators like civet cat, snake, predator birds and most likely hunted by man also. The Shekaru constructs its nest in dome shape having lateral openings. The nest is constructed with the help of twigs and leaves. The Shekaru lives mostly alone and spends most of its time in feeding on fruits, seed, bark, etc. Normally a Shekaru constructs 6 to 7 nests in an area ranging from 7ha. -12 ha. so as to elude the predators. Shekaru also spends considerable time in nest preparation and travelling. The suitable species for Shekaru for its habitat are as follows.

- * *Mangifera indica*
- * *Artocarpus*
- * *Flacourtai* spp.
- * *Zizyphus mauritiana*.
- * *Syzygium cuminii*
- * *Tamarindus indica*
- * *Hardwickia binata*.
- * *Ficus religiosa*.
- * *Aegle marmelos*.
- * *Terminalia bellirica*
- * *Diospyros melanoxylon*
- * *Ficus bengalensis*

The population of Shekaru can be estimated from count of nests, actual sighting and loud vocalizations. Giant squirrel is an indicator of forests having continuous or fragmented canopy with composition of tall trees having perennial water courses beneath the canopy.

The satellite imagery of forest in compartment no 207 reveals that the crop density is 0.4 and above with basal area 7 having site quality MIII (forest type Southern dry mix deciduous forest). The area of compartment no 207 is 148.924 ha. A Chintakaruppa vagu(nala) flows in adjoining compartment no. 205 and further joins the Bamani nalla which further meets the river Vainganga. The Chintakaruppa vagu(nala) has 1458 ha. catchment area covering forest compartment no 763, 1490, 1492, 1841 and 207 along with non forest area between the villages Konsari, Raipur, Dharmapur and Somanpalli. The catchment is almost flat to undulating land which slows down the water flow in the chintakaruppa vagu (nalla). In compmtt. No. 207, two cement nalla bunds having length 16 mtr. and 10 mtr. are constructed in the year 2014-15. Four inverted bandharas are constructed in the year 2014-15. To dugout ponds are constructed 2015-16 and four gabian structures are also constructed in the year 2014-15. The formation of water harvesting structures and construction of inverted bandhara has definitely helped in rise in the ground water table. The gentle slope of the vast catchment and water storage structure resulted in improvement of moisture regime and making the Chintakaruppa vagu (nalla) as perennial nalla. The improvised moisture

regime due to rise in ground water table has helped in luxuriant growth of trees, and hence the rapid development in vertical development of branches and green biomass. This has helped in development of habitat for Shekaru in Konsari forest.

The population of Shekaru is sighted in a patch of 10 ha. in compartment no.207 which is inhabited by species suitable for Shekaru like Anjan, Ficus, Moha, Behada, Tendu, Mango, Tamarind, Bel etc. The increase in population of Shekaru is an indication of favorable habitat having close and continuous canopy with better protection measures. Presently the 10 ha.habitat of Shekaru in compartment no.207 is fenced. This habitat needs further to be expanded by forming present 10 ha. area as “ core area” and surrounding 20 ha. forest as buffer area which if developed further will accommodate the increasing population of Shekaru and a secured place for nesting will be available. The local JFMC should be actively involved on protection and development of habitat of Shekaru.

11.18.5: Following activities are proposed for development of habitat.

- i. The habitat of 10 ha. in compartment no 207 should be declared as Conservation Reserve.
- ii. A comprehensive management plan for habitat development for Shekaru should be prepared by DCF Allapalli.
- iii. An area measuring 20 ha. around present 10 ha. habitat should selected and treated it as buffer area.
- iv. The buffer area 20 ha. should be treated and developed in first 5 years of this plan period. Every year 4 ha. forest area in buffer zone should be taken for planting of tall seedlings (seedlings of 1.5 mtr height raised in 25 cm. x 40 cm. and 600 gauge ploy bags) at 7mtr x 7mtr. spacement by digging 1mtr.x 1mtr. x 1mtr pits. Every tall seedlings planted should have individual fencing of thorny branches. Each seedling should have protective manual irrigation @ 20 litres/ plant having six watering for first three years each. This will facilitate early establishment and better growth of seedlings planted. The planted area should be strictly protected from fire and grazing. Species which are essential for feeding and nesting of Shekaru like mango, ficus, tamarind, anjan, behada, bel etc should be given preference in raising of seedlings.
- v. The planting of tall seedlings assisted with watering and strict protection from grazing and fire will facilitate growth of seedlings and formation of closed canopy in next few years which is the requirement for nesting and breeding of Shekaru.
- vi. The lopping of green branches for fodder, pole purpose should be strictly prohibited as it threatens the nesting and food habitat of Shekaru. The removal of dead trees, mature/over mature trees, thinning should be strictly prohibited.
- vii. The buffer area also should be closed by chain link in next five years.

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- viii. Extensive soil and water conservation structures like inverted bandhara, WATS, check dams, forest ponds, earthen nala bunds, cement nala bunds on entire area of compartment no. 207, strictly on watershed basis should be taken and suitable site selection should be done by RFO and approved by ACF. This will help in maximum seepage of surface runoff and will increase the ground water table and hence moisture regime will increase over the year. The increased moisture regime will help in growth of vegetation there by improvement in canopy closure.
- ix. Nature trail should be established in such a way that it will not obstruct moment of Shekaru.
- x. Every year in the month of May count of nests and Shekaru should be conducted by taking LAT-LON by GPS.
- xi. The JFMC should be actively involved in protection of habitat from fire, grazing, illicit cutting and poaching, lopping of green branches by shepherds/farmers/cattle herders. The families involved in protection of habitat can be given incentive in addition to supply of LPG. milch cattle on subsidy.
- xii. Local youths can be trained as nature guide.
- xiii. Entry fee should be levied on visitors by JFMC.
- xiv. Colored brochures of Shekaru giving details of habitat, approach to site should be published for publicity.
- xv. The front line staff should report every month regarding the count of nest, formation of new nest, no. of shekaru counted, no. of offspring observed, causality etc to DCF Allapalli.

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CHAPTER – XII

BIODIVERSITY

CHAPTER – 16

WILDLIFE (OVERLAPPING) WORKING CIRCLE

SECTION 1: BIODIVERSITY CONSERVATION

12.1.1 Biodiversity encompasses variety of all life on earth. India is one of the 12 mega biodiversity countries of the world. With only 2.5 % of the land area, India already accounts for 7.8% of the recorded species of the world. India is equally rich in traditional and indigenous knowledge, both coded and informal. India is a Party to the Convention on Biological Diversity (1992). The main objectives of the Convention are:

- I. Conservation of biological diversity;
- II. Sustainable use of its components;
- III. Fair and equitable sharing of benefits arising out of utilisation of genetic resources.

Biodiversity is a multi-disciplinary subject involving diverse sectoral activities and actions. The stakeholders in biological diversity include the Central Government, State Governments, institutions of local self-government, scientific, and technical institutions, experts, non-governmental organizations, industry etc. One of the major challenges before India lies in adopting an instrument which helps in realising the objective of equitable sharing of benefit enshrined in the Convention on Biological Diversity.

The main objective of biodiversity conservation is as under:-

- (i) To regulate access to biological resources of the country with the purpose of securing equitable share in benefits arising out of the use of biological resources; and associated knowledge relating to biological resources ;
- (ii) To conserve and sustainable use biological diversity;
- (iii) To respect and protect knowledge of local communities related to biodiversity ;
- (iv) To secure sharing of benefits with local people as conservers of biological resources and holders of knowledge and information relating to the use of biological resources.

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- (v) Conservation and development of areas important from the standpoint of biological diversity by declaring them as biological diversity heritage sites;
 - (vi) protection and rehabilitation of threatened species;
 - (vii) Involvement of institutions of self- government in the broad scheme of the implementation of the Act through constitution of committees.

Proper documentation of biological diversity is essential for conservation planning and its sustainable use for using it sustainably for the benefit of human kind. The endangered and threatened plant species in the forests of this Division needs to be explored with the help of knowledgeable persons. In this regard, efforts are being made to seek the help of locally available resource persons and other learned persons in this field.

Raising awareness among people through activities like holding camps, trainings, dissemination of information through print media *etc.* are proposed to be undertaken during the Plan period.

Allapalli Forest Division, Allapalli



The "Glory of Allapalli", established in 1953 and spread over 6 ha. in compartment no 76 of Allapalli range, is a Permanent Preservation Plot is, maintained by Silviculturist, Chandrapur. Glory of Allapalli being maintained by Research wing hence it is merely mentioned in this Plan on account of its importance in view of its Bio-Diversity and unique Eco-logical importance. The Glory of Allapalli will be maintained and looked after by Silviculturist, Chandrapur.

WATER BODIES AT GLORY OF ALLAPALLI



12.1.2 Bio-diversity Act -2002

To enforce the objectives in Bio-diversity convention 1992, Bio-diversity Act- 2002 is enacted in 2002 by Govt. of India. This act empowers every citizen their access to biodiversity and biological resource including conservation of biodiversity, sustainable use of biological resource and equitable benefit

sharing mechanism from biological resource and use of traditional knowledge for utilization of biological resource on commercial basis.

For operationalising and monitoring provisions of Biodiversity Act 2002 ,a National Biodiversity Authority (N B A) is formed vide section 8 (1) of Biodiversity Act 2002. As per section 22 (1) of Biodiversity Act 2002, Govt. of Maharashtra has formed 'State Biodiversity Board at Nagpur for ensuring implementation of Biodiversity Act in the state.

The section 41(1) empowers every local body, at District level, Panchayat Samiti level, Grampanchayat level, and Municipal Corporation level, to establish Biodiversity Management Committees (BMC) for implementation of provisions under Biodiversity Act 2002.

The section 58, of the Biodiversity Act 2002 states that the offence under this act shall cognizable and non bail-able

The section 41(1) of Biodiversity Act 2002 empowers the Biodiversity Management Committees at local level to ensure and take measures in promotion of conservation, sustainable use and documentation of biological resources (I.e. Biodiversity Register). It is evident that the Biodiversity Management Committees are now legal body for ensuring implementation of Biodiversity Act 2002. Some of the salient features Biodiversity Act 2002 is as below,

- (a) Section 2(a) defines the term "Benefit Claimers" as; the conservers of biological resources, their byproducts, creators and holders of knowledge and information relating to the use of such biological resources, innovations and practices associated with such use and application.
- (b) Section 2(b) defines the term "Biological diversity" as; the variability among living organisms from all sources and the ecological complexes of which they are part, and includes diversity within species or between species and of eco-systems.
- (c) Section 2(c) defines the term "Biological resources" as; Plants, animals and micro-organisms or parts thereof, their genetic material and by-products (excluding value added products) with actual or potential use or value, but does not include human genetic material.
- (d) Section 2(o) defines the term "Sustainable use "as the use of components of biological diversity in such manner and at such rate that

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does not lead to the long-term decline of the biological diversity thereby maintaining its potential to meet the needs and aspirations of present and future generations.

- (e) Section 3(1) regulates the access to Biological diversity for persons mentioned in section 3(2) who shall, without previous approval of the National Biodiversity Authority(NBA), obtain any biological resource occurring in India or knowledge associated thereto for research or for commercial utilization or for bio-survey and bio-utilization.
- (f) Section **3(2)**: The persons who shall be required to take the approval of the NBA under section 3(1) are the following, namely: (a) a person who is not a citizen of India; (b) a citizen of India, who is a non-resident as defined in clause (30) of section 2 of the Income-tax Act, 1961; (c) a corporate body, association or organization not registered in India or registered in India under any law for the time being in force which has any non-Indian participation in its share capital or management.
- (g) **Section 4**: No person shall, without the previous approval of the NBA, transfer the results of any research relating to any biological resources occurring in, or obtained from, India for monetary consideration or otherwise to any person who is not a citizen of India or citizen of India who is non-resident as defined in clause (30) of section 2 of the Income-tax Act, 1961 or a body corporate or organization which is not registered or incorporated in India or which has any non-Indian participation in its share capital or management.
- (h) **Section 6(1)**: No person shall apply for any Intellectual Property Right (IPR), by whatever name called, in or outside India for any invention based on any research or information on a biological resource obtained from India without obtaining the previous approval of the NBA before making such application.
- (i) **Section 7**: No person, who is a citizen of India or a body corporate, association or organisation which is registered in India, shall obtain any biological resource for commercial utilization, or bio-survey and bio-utilization for commercial utilization except after giving prior intimation to the State Biodiversity concerned.
- (j) **Section 8(1)**: Central Government for the purposes of this Act, shall appoint a body called the National Biodiversity Authority (NBA).

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- (k) **Section 21(1):** The National Biodiversity Authority shall while granting approvals shall ensure that the terms and conditions subject to which approval is granted secures equitable sharing of benefits arising out of the use of accessed biological resources, their by-products, innovations and practices associated with their use and applications and knowledge relating thereto in accordance with mutually agreed terms and conditions between the person applying for such approval, local bodies concerned and the benefit claimers.
- (l) **Section 21(4):** NBA shall in consultation with the Central Government frame guidelines for operationalising section 21(1).
- (m) **Section 22(1):** For the purpose of this Act, State Government may, by notification in the Official Gazette, establish State Biodiversity Board.
- (n) **Section 37(1):** Without prejudice to any other law for the time being in force, the State Government may, from time to time in consultation with the local bodies, notify in the Official Gazette, areas of biodiversity importance as biodiversity heritage sites under the Act.
- (o) **Section 37(2):** The State Government, in consultation with the Central Government, may frame rules for the management and conservation of all the heritage sites.
- (p) **Section 38:** Without prejudice to the provisions of any other law for the time being in force, the Central Government, in consultation with the concerned State Government, may from time to time notify any species which is on the verge of extinction or likely to become extinct in the near future as a threatened species and prohibit or regulate collection thereof for any purpose and take appropriate steps to rehabilitate and preserve those species.
- (q) **Section 41(1):** Every local body shall constitute a Biodiversity Management Committee (BMC) within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.
- (r) **Section 41(2):** The NBA and SBA shall consult the Biodiversity Management Committees (BMCs) while taking any decision relating to

- (s) The BMCs may levy charges by way of collection fees from any person for accessing or collecting any biological resource for commercial purpose from areas falling within its territorial jurisdiction.
- (t) **Section 55(1):** Whoever contravenes or abets the contravention of the provisions of sections 3, 4 or 6 shall be punishable with imprisonment for a term which may extend to five years, or with fine which may extend to ten lakh rupees and where the damage caused exceeds ten lakh rupees such fine may commensurate with the damage caused, or with both.
- (u) **Section 58:** The offences under this Act shall be cognizable and non-bailable.
- (v) **Section 59:** The provisions of this Act shall be in addition to, and not in derogation of, the provisions in any other law, for the time being in force, relating to forests or wildlife.

12.1.3 Biodiversity of Gadchiroli District.

A) The section 41 (1) empowers the local body i.e. Biodiversity at districts, village level.

The Chief Conservator of Forest Gadchiroli in 2013, with the help of expert botanist Dr. Almeida and his team of 20 researchers has extensively visited the biological resource areas of Gadchiroli district. This ten covered almost 70% of the district and documented the list of plants especially vascular plants. The field visit and study was conducted for vascular plants however the survey of lower plant groups like Algae, fungi, Bryophytes was not taken of at that time for want of experts. Dr. Almeida and his team visited Allapalli, Bhamragad , Sironcha , Wadsa , Kamlapur , Markanda ,Elchil , Repanpali , Wapanpalli , Etapalli forest areas, collected herbarium of plants not known or exotic etc. Still nearly 30 % of the area left for study due to remoteness coupled with security concerns of the area.

The findings of the report by Dr Almeida and his team is in nut shell as below:

- a. Samples of 1909 Species, belonging to 892 Genera and 199 Family for vascular plants, are listed by the team during field visit in

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Gadchiroli District. The 1909 species listed belonged to 147 Dicot family, 35 Moncot family 35, Gymnosperms 3 and Pteridophytes 14 .

- b. Least concerned plant species is 360.
- c. Frequent palnts which are native indigenous or endemic species are 393 species.
- d. As per IUCN categorization rare and endangered plants species is 78 in number.
- e. The exotic, introduced plant species are 294.
- f. Gadchiroli forest area is now a known treasure of plant and animal fossils. The study revealed presence of Living Fossil plant like Cycus circinalis L, Gentum ula Borngn, and Equisetum ramosissimum Roxb, are plants species which are identified as Living Fossil, which suggests scope for study of Paleontology in the district.
- g. 650 species indentified are used for various medicinal purposes. The list may increase which requires subject expertise and space for study.
- h. Ornamental species -294 No.
- i. Fodder plants 117 species of grasses and plants.
- j. Timbers trees 30 species.
- k. Avenue tree 211 species.
- l. Essential Oil yielding plants 30 species and dye yielding plants 23 species.
- m. Poisonous plant 16 species,
- n. Wild edible plants 67 species,
- o. Of the 1909 species the Herbaceous species constitute 1233 which include 815 annual herbs, 125 perennial herbs, 266 ephemerals, 24 climbing herbs , 3 epiphytic herbs.
- p. Of the 1909 species, the tree species constitutes 289 out of which 286 species are erect trees and 3 species are of climbing lianas.
- q. The 1909 species found in Gadchiroli District. Shows the original habitats of species i.e. native country as below.

TABLE No.-107

DISTRIBUTION OF SPECIES SHOWING ENDEMISM TO ITS NATIVE COUNTRY

Sr. No.	Endemic to	Number of species	percentage
1	India	1250	65.47%
2	Asia	298	15.2%
3	America	206	11.0%
4	Europe	48	2.5%
5	Africa	51	2.7%
6	Australia	16	0.8%
7	Caledonia	4	0.2%
8	Mediterranean	2	0.2%
9	Solomon Island	1	0.05%
10	Galapagos	1	0.05%
11	Unknown	32	1.7%

TABLE No.-108

r) CATEGORISATION OF 1909 PLANT SPECIES AS PER IUCN NORMS.

Sr. No.	Abbreviate	Meaning	No of species
1	Ab	Abundant	64
2	LC	Least count	254
3	LR	Low Risk	101
4	C	Common	15
5	Cu	Cultivation	343
6	CC	Commonly cultivated	69
7	IP	Introduced plant	301
8	En	Endangered	83
9	F	Frequent	425
10	Th	Threatened	657
11	Co	Common in wild	612
12	R	Rare	720
13	DD	Data Deficient	1
14	V	Vulnerable	1

- q) **11 FAMILIES HAVE NO. OF SPECIES MENTIONED AGAINST THEN AND THEIR PERCENTAGE IN THE DESCENDING ORDER.**

TABLE No.-109

Sr no.	Families	No of species collected	% of species record
1	Fabaceae (S.S.) (include. Caesalpiniaceae & Mimosaceae)	162 (253)	8.47% (31.31%)
2	Asteraceae	88	4.63%
3	Acanthaceae	77	4.05%
4	Rubiaceae	49	2.57%
5	Malvaceae (S.S.) (include. Bombaceae)	49 (53)	2.57% (2.78%)
6	Convolvulaceae	44	2.31%
7	Lamiaceae	42	2.21%
8	Scrophulariaceae	37	1.94%
9	Mimosaceae	37	1.94%
10	Euphorbiaceae	35	1.84%
11	Poaceae	34	1.78%

In these 11 families showing more diversity only one monocot family lies at the bottom of the list and all 10 families above it, belong to Dicotyledons. The reasons perhaps is because, the maximum area of district is occupied by forests which have only few shrubs, climbers and trees. Only small areas being occupied by grasslands and only few shade- loving grasses, with exception of bamboos is found in forest vegetation.

10 FAMILIES SHOW GENERIC DIVERSITY SHOWN BELOW ALONG WITH THEIR PERCENTAGE IN DESCENDING ORDER.:

TABLE No.-110

Sr No.	Genera	No. of. Species	Diversity of Genera
1	Crotalaria	21	2.9 %
2	Indigofera	17	2.35%
3	Fimbristylis	16	2.2%
4	Ficus	16	2.2%
5	Fragrostis	16	2.2%
6	Ipomoea	15	2.0%
7	Blumea	14	1.9%
8	Cassia	13	1.8%
9	Cyperus	13	1.8%
10	Alysicarpus	10	1.3%

The above maximum generic diversity is found in top ranking two genera belong to Fabaceae, namely Crotalaria Linn. The tail end is represented by Alysicarpus Desv at the bottom. The other two genera falling in first 10 ranks belong to Monocot genera of family Cyperaceae L.; namely Fimbristylis Vahl and Cyperus L.

TABLE No.-111

GENERIC DIVERSITY WITH THE FAMILIES IN DESCENDING ORDER IS AS SHOWN UNDER

Sr. no.	Families	No of Genera	% Generic Diversity
1	Poaceae	75	10.4%
2	Asteraceae	58	8.0%
3	Fabaceae (S.S.)	45	6.2%
4	Acanthaceae	32	4.4%
5	Rubiaceae	26	3.6%
6	Cyperaceae	20	2.7%
7	Scrophulariaceae	19	2.3%
8	Lamiaceae	18	2.49%
9	Malvaceae	17	2.35%
10	Asclepiadaceae & Bignoniaceae	16 (each)	2.2%

**HABIT WISE ANALYSIS OF VASCULAR PLANTS IN GADCHIROLI GIVES
FOLLOWING FIGURES:**

Sr No.	Habit	Species	% of diversity
1	Trees	286	14.9 %
2	Climbing trees	3	0.15 %
3	Shrubs	269	14.09 %
4	Climbing	118	6.18 %
5	Herbs (annual)	815	42.69 %
6	Herbs (ephemerals)	266	13.61 %
7	Herbs (perennials)	125	6.4 %
8	Climbing Herbs	24	1.25 %
9	epiphytes	3	0.15 %
Total	=	1909	

12.1.4 Recommendations

i) The biodiversity management committee at village level, tahasil level , municipal level should be formed with active participation of NGO's, experts for sensitization of villagers and promotion of biodiversity conservation. The existing Joint Forest Management Committees / Eco-development committees with necessary Gramsabha resolution may be declared as 'Biodiversity Management Committees'.

ii) The "Gondwana herbs project " at Gadchiroli is a platform for local villagers which ensures profit sharing mechanism through minimum support price for minor forest produce collected traditionally. This project has products which have ensured economic returns to local villagers. Further development in new products, marketing, will give handsome returns to villagers. The Gondwana herbs projects should be further developed with proper infrastructure, forward linkage and consultants.

ii) The plants useful for medicinal propose needs to be conserved with active participation of JFMC/EDC or BMC. Potential forest areas including biological resources needs to the surveyed, mapped and ex-situ conservation needs to be taken.

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iv) The biodiversity register needs to be prepared village wise, taluka wise, district wise, municipal corporation wise.

v) The traditional healers i.e. vaidus have immense knowledge of use of certain plants parts for healing wounds, chronic diseases etc. A district level body called “Zila vanoushadli mandal, Gadchiroli” is a registered body (Regi. No. MAHA.56/2014 Gadchiroli) comprising known vaidus, ayurvedic doctors in the district. This body has helped in identifying and listing of species and its parts in traditional healing. Informative booklet is also published in Marathi by this body giving details of ailments and useful plants species. This body (mandal) should further actively participate in future expansion of Gondwana Herbs Projects.

vi) Forest areas having biodiversity of plants, wild life habitat should be indentified & protected with active participation of JFMCs’.

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CHAPTER - XIII

FINANCIAL FORECAST

SECTION 1 : IMPLEMENTATION OF THE PLAN AND NEED FOR FINANCIAL FORECAST

13.1.1 The prescriptions of this working plan conforms to emphasis laid in National forest policy 1988. The policy lays emphasis on protection and conservation of forest, catchment treatment of rivers and streams, preservation of natural forests, increase in productivity of forest, increase in forest cover, protection of rights and concessions on people, tribal, meeting requirement of people for small timber ,fuel wood etc. The implementation of prescriptions of this working plan will incur expenditure both on establishment , execution of works and also generate ecological services as indirect benefit and revenue from sale proceeds of different produce.

SECTION 2 : EXPENDITURE

13.2.1 Establishment

Expenditure will be incurred on salary and allowances of staff, maintenance of road, culvert, communication facilities, vehicles, machineries like saw mill units, building.

13.2.2. Expenditure on Coupe Working

As per prescriptions of this working plan expenditure will be incurred on exploitation of exploitable trees from mainly Selection Cum Improvement Working Circle, Teak Plantation Working Circle, Improvement Working Circle. The yield from thinning in improvement and teak plantation working circle is not taken in to account. Expenditure will also be incurred upon exploitation of bamboo, collection of MFPs like tendu etc.

13.2.3. Expenditure on Regeneration

The felling of annual coupes will precede regulation activity i.e. natural and artificial regeneration. The felling in Teak Plantations Working Circle will be followed by Teak Plantations and natural regenerations will be under taken in Selection Cum Improvement Working Circle, Teak Plantation Working Circle, Improvement Working Circle and a forestation working circle. Timely and sufficient growth is prime requirement of regeneration activity.

13.2.4. Expenditure on Soil and Moisture Conservation Works.

Every working circle has prescriptions of soil and moisture conservation works. Soil and moisture conservation works can be taken at potential sites under different schemes like DPDC, State Plan and Non Plan schemes etc. throughout the area.

It is estimated that soil and moisture conservation works worth Rs. 50 lakh per year will be taken up under different schemes during the plan period.

13.2.5. Expenditure on Protection Measures

The fire lines both external and internal will be maintained every as per fire plan. The boundaries will be demarcated and maintained every year including erection of pillars and repair of old pillars. Expenditure incurred on these measures will protect the forests from fire, encroachment and boundary pilferage.

13.2.6. Expenditure on Wild life Habitat, Eco tourism and Conservations works

Protection and development of wild life habitat including that of endangered wild animal like pangolin, vulture, otter, shekaru and infrastructure requirement for minimizing man animal conflict and development facilities at potential eco-tourism centers will incur expenditure. For all the activities it is assumed that Rs. 50 lakh per year expenditure will be incurred during the plan period.

13.2.7. EXPENDITURE DETAILS:

The expenditure to be incurred on establishment and for execution of works as per prescriptions of working plan will vary with the rise in daily wage rate due to rise in living allowance, hike in salary and allowances of staff, rise in cost of equipments and material required. It is expected that area under regeneration, exploitation will not vary substantially. The daily wage rates, salary and allowances are kept constant during the plan period and the annual hike in daily wage, salary allowances, price of equipments and materials will be taken in to account while budgeting the annual plan of operations. Hence expenditure to be incurred during plan period is based on assumption of static rates of daily wage, salary allowance and equipment, materials.

13.2.8 EXPENDITURE ON ESTABLISHMENT

During the plan period for implementation of the prescriptions of this plan will also incur expenditure on salary and allowance of staff, maintenance of infrastructure like buildings, depots, sawmill, roads, culverts, vehicles, elephants etc. expected expenditure on this will be Rs.246.90 lakhs per year.

A) EXPENDITURE ON EXPLOTATION :

FOR TEAK AND NON TEAK

Cost of Exploitation of Timber = Rs. 3800 /m³

Cost of Exploitation of fuel wood = Rs. 1000 /fuel wood beat

Table No. 113

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ESTIMATED ANNUAL EXPENDITURE TO BE INCURRED ON HARVESTING

Sr. No.	Working Circle	Area in ha.	Annual Area ha.	Total Yield		Expenditure Rs. in Lacs
				Timber M ³	Fuel wood No. of Beats	
1	2	3	4	5	6	7
1	SCI	103098.125	5155.00	27785	10005	1155.88
2	TPWC	12489.649	624.00	2163	891	91.104
3	IWC	31269.733	1563	3268	1474	138.92
4	AWC	35597.019	1780	1614	614	67.472
5	BOWC	12200.473	610	700000 long bamboo	40000 bundles	156
6	NWFP OWC	190303.186	9515		lump sum	20
Total			19247			1629.376

B) EXPENDITURE ON REGENERATION

- i) Natural regeneration will be carried out in SCI working circle, Teak Plantation working circle, Improvement working circle and Afforestation working circle. The works will be carried out as per the rate sanctioned by PCCF, M.S. Nagpur.

Table No.114

EXPENDITURE DETAILS ON NATURAL REGENERATION WORKING CIRCLE WISE

Sr. no.	Working circle	Area in ha.	Workable area annually ha	Expenditure Rs. 11600/ ha. (Rs. 340 / Man days) Rs in lakh	No of man days to be generated No.
1	SCI	103098.125	700	81.20	18900
2	TPWC	12489.649	300	34.80	8100
3	IWC	31269.733	200	23.20	5400
4	AWC	35597.019	100	11.60	2700
5	Total	190303.186	1300	150.80	35100

II) Artificial regeneration:

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The artificial regeneration works will be carried out as per availability of blank areas, clear felled areas, in SCI, TPWC, IWC, AWC. The rates for artificial regeneration works for teak, mixed and bamboo plantations will be considered as per approved rate structure by PCCF, M.S. Nagpur.

The details of artificial regenerations works for all working circle giving annual area of works year wise estimated expenditure and generations of man days in given as below.

i) PLANTATION UNDER A.R. IN SCI

Table No.115

PLANTATION UNDER A.R. IN SCI					
Plantation work	Total Area in ha. During this Plan period	Area available per year in ha.	Operation	Expenditure in Rs lakhs. (daily wage rate 340/MD)	No. of man-days to be generated
1	2	3	4	5	6
Mix species plantation and other	103098.1	250	PPO/PYO	231.865	59322.5
			FYO	115.7675	24467.5
			SYO	52.565	12242.5
			TYO	28.7775	7910
			4th YO	13.77	3785
			5th YO	13.77	3785
			Total	456.515	111512.5

Table No. 116

Year	Artificial Regeneration expenditure in SCI						Total Expdr.in (lakhs)	No. of man-days to be generated
	PPO	FYO	SYO	TYO	4 th YO	5 th YO		
1	2	3	4	5	6	7	8	9
2016 - 17	232						232	59322.5
2017 - 18	232	116					348	83790
2018 - 19	232	116	53				401	96032.5
2019 - 20	232	116	53	29			430	103942.5
2020 - 21	232	116	53	29	14		444	107727.5
2021 - 22	232	116	53	29	14	13	457	111512.5
2022 - 23	232	116	53	29	14	13	457	111512.5
2023 - 24	232	116	53	29	14	13	457	111512.5
2024 - 25	232	116	53	29	14	13	457	111512.5
2025 - 26	232	116	53	29	14	13	457	111512.5

Table No. 117

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ii) PLANTATION UNDER A.R. IN IWC					
Plantation work	Total Area in ha. During this Plan period	Area available per year in ha.	Operation	Expenditure in Rs lakhs. (daily wage rate 340/MD)	No. of man-days to be generated
1	2	3	4	5	6
Mix species plantation and other	31269.73	400	PPO/PYO	370.984	94916
			FYO	185.228	39148
			SYO	84.104	19588
			TYO	46.044	12656
			4th YO	22.032	6056
			5th YO	22.032	6056
			Total	730.424	178420

Table No.118

Year	Artificial Regeneration expenditure in IWC						Total Expdr.in (lakhs)	No. of man-days to be generated
	PPO	FYO	SYO	TYO	4 TH YO	5 th YO		
1	2	3	4	5	6	7	8	9
2016 - 17	371						371	94916
2017 - 18	371	185					556	134064
2018 - 19	371	185	84				640	153652
2019 - 20	371	185	84	46			686	166308
2020 - 21	371	185	84	46	22		708	172364
2021 - 22	371	185	84	46	22	22	730	178420
2022 - 23	371	185	84	46	22	22	730	178420
2023 - 24	371	185	84	46	22	22	730	178420
2024 - 25	371	185	84	46	22	22	730	178420
2025 - 26	371	185	84	46	22	22	730	178420

Table No.119

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iii) PLANTATION UNDER A.R. IN AWC

Plantation work	Total Area in ha. During this Plan period	Area available per year in ha.	Operation	Expenditure in Rs lakhs (daily wage rate 340/MD)	No. of man-days to be generated
1	2	3	4	5	6
Mix species plantation and other	35597.02	200	PPO/PYO	185.492	47458
			FYO	92.614	19574
			SYO	42.052	9794
			TYO	23.022	6328
			4th YO	11.016	3028
			5th YO	11.016	3028
			Total	365.212	89210

Table No.120

Year	Artificial Regeneration expenditure in AWC						Total Expdr.in (lakhs)	No. of man-days to be generated
	PPO	FYO	SYO	TYO	4 TH Year	5 th Year		
1	2	3	4	5	6	7	8	9
2016 - 17	185						185	47458
2017 - 18	185	93					278	67032
2018 - 19	185	93	42				320	76826
2019 - 20	185	93	42	23			343	83154
2020 - 21	185	93	42	23	11		354	86182
2021 - 22	185	93	42	23	11	11	365	89210
2022 - 23	185	93	42	23	11	11	365	89210
2023 - 24	185	93	42	23	11	11	365	89210
2024 - 25	185	93	42	23	11	11	365	89210
2025 - 26	185	93	42	23	11	11	365	89210

Table No.121

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IV) PLANTATION UNDER A.R. IN TPWC					
Plantation work	Total Area in ha. During this Plan period	Area available per year in ha.	Operation	Expenditure in Rs. lakhs (daily wage rate 340/MD)	No. of man-days to be generated
1	2	3	4	5	6
Teak	12489.65	250	PPO/PYO	11.5	19745
			FYO	117.8575	31590
			SYO	55.5975	15282.5
			TYO	25.14	6910
			4th YO	13.77	3785
			5th YO	27.4125	7535
			Total	251.2775	84847.5

Table No.122

Year	Artificial Regeneration expenditure in TPWC						Total Expdr.in (lakhs)	No. of man-days to be generated
	PPO	FYO	SYO	TYO	4 TH YO	5 th YO		
1	2	3	4	5	6	7	8	9
2017 - 18	12						12	19745
2018 - 19	12	118					130	51335
2019 - 20	12	118	56				186	66617.5
2020 - 21	12	118	56	25			211	73527.5
2021 - 22	12	118	56	25	14		225	77312.5
2022 - 23	12	118	56	25	14	27	252	84847.5
2023 - 24	12	118	56	25	14	27	252	89210
2024 - 25	12	118	56	25	14	27	252	84847.5
2025 - 26	12	118	56	25	14	27	252	84847.5
2026 - 27	12	118	56	25	14	27	252	84847.5

Table No.123

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v) PLANTATION UNDER A.R. IN BAMBOO OVERLAPPING WORKING CIRCLE					
Plantation work	Total Area in ha. During this Plan period	Area available per year in ha.	Operation	Expenditure in Rupees lakhs (daily wage rate 340/MD)	No. of man-days to be generated
1	2	3	4	5	6
Bamboo	12200.47	300	PPO/PYO	70.473	19338
			FYO	39.483	10389
			SYO	22.671	6231
			TYO	18.039	4959
			4th YO	16.524	4542
			5th YO	16.524	4542
			Total	183.714	50001

Table No.124

Year	Artificial Regeneration expenditure in B. O. W. C.						Total Expdr.in (lakhs)	No. of man-days to be generated
	PPO	FYO	SYO	TYO	4 TH YO	5 th YO		
1	2	3	4	5	6	7	8	9
2017 - 18	70						70	19338
2018 - 19	70	39					109	29727
2019 - 20	70	39	23				132	35958
2020 - 21	70	39	23	18			150	40917
2021 - 22	70	39	23	18	17		167	45459
2022 - 23	70	39	23	18	17	17	184	50001
2023 - 24	70	39	23	18	17	17	184	89210
2024 - 25	70	39	23	18	17	17	184	50001
2025 - 26	70	39	23	18	17	17	184	50001
2026 - 27	70	39	23	18	17	17	184	50001

III) EXPENDITURE ON MAINTENANCE OF FIRE LINE BOUNDARY DEMARCATION

Every year maintenance of fire line as per fire plan and 1/5th boundary demarcation will be taken up and Rs. 180.00 lakh per year expenditure will be incurred for the protection measures during the plan period.

SECTION 3. ANNUAL REVENUE EXPECTED

13.3.1 The timber, fuel wood, bamboo obtained from exploitation during plan period will generate revenue. Also minor forest produce like tendu, moha flowers and moha seeds etc will also contribute towards revenue.

Table No.125

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ESTIMATED REVENUE

Sr. No.	Particulars	Quantity	Rate Rs.	Revenue Rs. In lakh
1	Teak timber	4295 /M ³	60500 /M ³	2598.475
2	Teak beats	1288 beats	9000 per beat	115.92
3	Misc. timber	30535/M ³	9000/M ³	2748.15
4	Misc. fuel beats	11696 beats	2500 per beat	292.4
5	Tendu leaves.	52000 Std. bags.	772 per Std. bags	401.57
6	Bamboo	700000. Long bamboo	35 per bamboo	271
		40000 bundles	65 per bundles	
7	Moha flowers, seeds etc.	200 tons	Lump sum	50
8	Misc.	---	Lump sum	10
9	Total	---	-----	6487.52

Table No.126

SECTION 4: ANNUAL EXPENDITURE TO BE INCURRED

Rs. In lakh

Year	Estt .	Protection measures	Eco-tourism wild life	SMC	A.R.	N.R.	Timber fuel wood & bamboo	Total expdt.
1	2	3	4	5	6	7	8	9
2017-18	246.90	180.00	50.00	50.00	870	150.80	1629.376	3177.076
2018-19	246.90	180.00	50.00	50.00	1421	150.80	1629.376	3728.076
2019-20	246.90	180.00	50.00	50.00	1679	150.80	1629.376	3986.076
2020-21	246.90	180.00	50.00	50.00	1820	150.80	1629.376	4127.076
2021-22	246.90	180.00	50.00	50.00	1898	150.80	1629.376	4205.076
2022-23	246.90	180.00	50.00	50.00	1988	150.80	1629.376	4295.076
2023-24	246.90	180.00	50.00	50.00	1988	150.80	1629.376	4295.076
2024-25	246.90	180.00	50.00	50.00	1988	150.80	1629.376	4295.076
2025-26	246.90	180.00	50.00	50.00	1988	150.80	1629.376	4295.076
2026-27	246.90	180.00	50.00	50.00	1988	150.80	1629.376	4295.076
Total	2469.00	1800.00	500.00	500.00	17628	1508	16293.76	40698.76

Table No.127

Section 5 : ABSTRACT OF REVENUE AND EXPENDITURE FOR THE ENTIRE PLAN PERIOD
Rs. In lakh

Sr. No.	Year	Total Revenue	Total Expdt.
1	2	3	4
1	2017-18	6487.52	3177.076
2	2018-19	6487.52	3728.076
3	2019-20	6487.52	3986.076
4	2020-21	6487.52	4127.076
5	2021-22	6487.52	4205.076
6	2022-23	6487.52	4295.076
7	2023-24	6487.52	4295.076
8	2024-25	6487.52	4295.076
9	2025-26	6487.52	4295.076
10	2026-27	6487.52	4295.076
11	TOTAL	64875.2	40698.76

SECTION 6 : EXPENDITURE FOR PLAN PREPARATIONS

13.6.1 The enumeration of growing stock of Allapalli Forest Division is conducted by Survey of Forest Resources Unit, Gadchiroli during February 2011 to 2012. In addition to this, this unit has completed the enumeration of growing stock Sironcha division from May 2013 to June 2014 and from March 2012 to March 2013 for Bramahpuri Forest division. Presently enumeration of growing stock of Gadchiroli Forest division started from February, 2015 and likely to be completed by March 2016. Hence it is evident that the expenditure incurred upon preparation of working plan of a division is co-terminus with revision of working plan of other division also. In this situation exact expenditure incurred in respect of Allapalli Forest Division is difficult to estimate. However after considering the period taken for enumeration of growing stock and relative period taken for PWPR-I and II DWPR, for revision of working plan of Allapalli division is worked proportionately as follows

- Working Plan Area 213118.081ha
- Expenditure incurred Rs.304.42 lakhs
- Working plan revision cost.....Rs.142.84 / Ha.

The above cost for revision of working plan of Allapalli Forest Division, Allapalli for one ha. is due to rise in Pay and Allowances of staff and daily wages rates (enumeration wages).

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CHAPTER -XIV

MISCELLANEOUS REGULATIONS

SECTION 1 : DEMARCATION OF COUPE AND PREPARATION OF TREATMENT MAP:

14.1.1 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. and approved by DCF. A coupe demarcation certificate along with the treatment map will be furnished by the concerned R.F.O. in the following format :

CERTIFICATE FOR COUPE DEMARCATION AND TREATMENT MAP

I,-----, R.F.O.,-----certify that I have personally inspected the demarcation of coupe No.----- in compartment No.-----of-----Felling Series.-----Working Circle 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 RFO
A.C.F. -----Range

Allapalli Division, Allapalli.

(A) DEMARCATION OF COUPE:

- 14.1.2**
- (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 coal tar band serial number of the tree, in Arabic, on coupe boundary line 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:-

TABLE No.128**LIST OF TREES MARKED ON COUPE BOUNDARY AND SECTION LINE**

Sr. No.	Sr. No. of Tree Marked on Boundary Line of Coupe Area	Sr. No. of Tree marked on Boundary Line of Section. (I/1,I/2,....I/n)	Species	Girth at b.h.	Remarks
1	2	3	4	5	6

(iii) No trees bearing coupe demarcation bands will be marked for felling .

(B) DEMARCATION OF SECTION:

14.1.3 (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 of the tree on section line will be given on the side away from the area they would denote.

(C) DEMARCATION OF PROTECTION AREAS :

14.1.4 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,I/2,I/3.....,I/n and the similar trees on the periphery of protection area No. II will bear the No.II/1,II/2,II/3,.....II/n etc. The serially numbered trees will be recorded in the following form.

TABLE – 128 A

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LIST OF TREES MARKED ON BOUNDARY OF PROTECTION AREAS

Sr.No.	Sr.No. of Protection Area (I,II,III.....)	Sr.No. of trees marked on Boundary of Protection Area(I/1,I/2,...I/n,II/1,II/2..II/n)	Species	Girth at b.h.	Remarks
1	2	3	4	5	6

(D) DEMARCATION OF OTHER AREAS GIVEN IN THE TREATMENT MAP:

14.1.5 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 :

14.2.1 (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 breast height and at the base on a clear blaze of size - (10 cm x 10 cm). It will be given a digital number in a sequence.

(ii) The trees in the pre harvestable class in addition will bear digital serial numbers both at b.h. and at the base. The trees in the pre harvestable class in the coupe will be enumerated and given a serial number.

(iii) All remaining trees marked for felling will bear serial numbers, which will be given by coaltar. The digit and coaltar numbers will form separate series. Suppressed trees alone will be recorded as fuel trees except that of teak. A tree will be classified as fuel tree only when it is incapable of yielding any useful sawn timber or pole. Marking has to be done carefully as the labourers employed in logging go by the marking technique.

(iv) All trees bearing serial number will be individually recorded in marking (recording) book giving following details as shown in the table below :

TABLE -129

LIST OF TREES MARKED FOR FELLING

Sr.No.		Species	Girth at b.h.(o.b.) in cm.	Remarks
Digit	Coaltar			
1	2	3	4	5

In the remarks column the type of timber i.e. timber/pole/chalk timber/fuel/stump will be recorded.

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(v) Abstract of trees marked for felling will be made in 15 cm girth classes. Timber, poles and firewood trees will be shown separately.

(vi) The number on the trees will be put in the vertical direction as shown below:

3

Tree No. 317-----→ 1

7

(vii) RFO will inspect the 50% of coupe area and 10% of trees marked for harvesting. ACF will inspect the 25% of coupe area and 5% of trees marked for harvesting. DCF will inspect the 5% of coupe area and 1% of trees marked for harvesting.

(viii) The A.C.F. will explain the coupe demarcation, section line demarcation, marking technique, identification and marking on coupe map of areas with natural regeneration/pole crop/protection area/blank areas/water holes/grass areas/nesting sites along with the rules for different working circles to forest guard and forester, RFO. For this ACF should arrange every year work shop for front line staff before the coupe working starts.

SECTION 3: MAINTENANCE OF BOUNDARIES.

14.3.1 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 Conservator of Forests, Working Plan Division, Gadchiroli for his record and for showing the pillar nos. on the master set maintained in his office. This work should be taken up without loss of time as early as possible, latest in very first year of the implementation of this working plan. Besides, the compartment boundaries

of these newly created R.F. by 3 meters wide clear line should be made and maintained by cutting under growth regularly. The external boundary demarcation of the forests must be done by R.C.C. cairns of approved designs. The distinction between R.F. and P.F. should be clear. The Principal Chief Conservator of Forests M.S. Nagpur vide his office letter No. वस/भु.अ./68/2000-2001 नागपुर दिनांक 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. LVII**. According to Bombay Forest Manual, the Conservator of Forests, Territorial Circles are competent to take necessary action regarding boundary pillars.

The Chief Conservator of Forest is empowered to decide the type of forest boundary marks suitable in a particular locality as per provision Section 5.10(iv) Part V, Volume II, of Maharashtra Forest Manual 2013. As per this provision the shape, dimensions, position, foundation and details of the boundary mark to be erected can be decided by the Chief Conservator of Forest. In case of boundary pillars the shape, size, foundation, position of the boundary mark for Allapalli division can be decided by CCF(T) Gadchiroli.

There is difference of 22814.895 ha. between notified forest area and digitized area of Allapalli Division. The difference is due to un-surveyed reserved forest 41011.550 ha. ,1956.676 protected forest and 368.66 zudpi jungle . The total un surveyed forest area is 43336.886 ha. Out of 43336.886 ha. un surveyed forest ,41011.550 ha. un surveyed forest is from un surveyed forest block of Permilli range. Hence the detail survey of un surveyed forest block of Permilli range listed in Table No. 1 (A) , Chapter 1 of this Plan. CCF Gadchiroli (T) and Dy CF Allapalli should plan and execute survey of un surveyed forest block of Permilli range in first five year of this Plan period. Budgetary provision for this survey should be made by Dy CF Allapalli .To ascertain the difference in area it is necessary to know the entries of forest land on different revenue records like 7/12 extract, mutation entry register, 9(3) 9(4) form, bandobast maps, maps after Consolidation Scheme.

14.3.2 Similarly, remaining Protected Forests also needs to 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 sizable tract of Protected Forest areas is under encroachment due to lack of demarcation of the forest boundaries.

14.3.3 Boundary survey and demarcation should be done very meticulously. A special program will be launched by the Deputy Conservator of Forests, for survey, demarcation and procurement of maps from D.I.L.R. such as Bandobast Maps,

Punarmojani or Ekatrikaran maps and the corresponding survey numbers of Forest Department will be shown on the map.

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14.3.4 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.

14.3.5 The external and internal boundaries of the forest will be maintained according to 1/5 boundary demarcation and verification scheme given in **Appendix No.LVIII**.

14.3.6 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 obstruct the view of the boundary marks one from the other. Except where natural features, the boundary demarcation will be done by cairns. For erecting boundary pillars, the soil of the pits should be mixed with either charcoal or glass pieces so that the boundary pillars are not shifted illegally. All such cases of illegal shifting of boundary pillars should be dealt severally as provided under the Indian Forest Act, 1927 which provides for an imprisonment of two years for such offences. The inter division/range boundary width will be 12 meters, compartment boundary width 3 meters and the coupe and plantation boundary 6 meters.

14.3.7 The specification about shape, descriptions, foundation, dimension, colour wash etc. of boundary marks are given in the Principal Chief Conservator of Forest's letter dated 29/5/2001 as given in **Appendix No. LVII**. The boundary marks (cairns) will be placed at visible distance one from the other, so that from any mark it's neighboring one on both sides can be seen clearly. Where there is no change in direction over a large distance, the boundary marks will be erected at intervals not greater than 250 meters. Each cairn will bear a serial number, a fresh series being given for each adjoining village. The numbers inscribed on the boundary pillars of Reserved Forest should tally with the numbers provided in the Survey of India maps. The provisions contained in Maharashtra Forest Manual, Volume-II in this regard will be strictly maintained.

(A) BOUNDARY MARKS SPECIFICATION :

14.3.8 The specifications of boundary marks

14.3.9 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.

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14.3.10 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 post 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 1966.

(B) RULES FOR INSPECTION AND MAINTENANCE OF

FOREST BOUNDARY MARKS :-

14.3.11 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 it is 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 :-

CERTIFICATE

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I, _____, certify that the annual length of boundary lines in my jurisdiction as prescribed under the scheme given in _____ of the working plan for the forests of Allapalli Forest Division has been verified by me personally on _____ and that boundary lines and marks and pillars are found to be correct as per the demarcation registers and maps. I, further, certify that next cairn on either side of a cairn is visible and they are in proper condition and bear correct serial number. There are no encroachments or encroachments are as detailed below:-

The Range Forest Officer will check at least 25% of the annual boundary line as per the 5 year program and 5% verification will be carried out by the ACF.

(C) MAINTENANCE OF COMPARTMENT BOUNDARIES :

14.3.12 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 in white, the compartment numbers will be written on them with red paint. The compartment boundaries will also be maintained as fire lines.

(D) LEGAL PROVISIONS AVAILABLE FOR PROTECTION OF THE BOUNDARY MARKS :

14.3.13 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.

14.3.14 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.

14.3.15 The Deputy Conservator of Forests Territorial shall supply a copy of the corrected maps and area register to the Conservator of Forests, Working Plan every year in the month of June. The National Forest Policy, 1988 prohibits the regularization of any further encroachments on forest lands.

SECTION 4 : HARVESTING AND DISPOSAL OF FOREST PRODUCE :

PDF Compressor Free Version (i) TIMBER AND FIRE WOOD :

14.4.1 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 :

14.4.2 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 will generate lot of employment to the local tribals. For the purpose of collection, of tendu leaves the entire division is divided into units which will be disposed of by calling tenders. If the tenders are not received, then the units are sold by negotiations. Modified lumpsum system has been in operation since 1993. The collection of tendu leaves is regulated by Maharashtra Forest Produce (Regulation of Trade) Act-1969 and Maharashtra Forest Produce (Regulation of Trade in tendu leaves) Rules-1969.

(iii) BAMBOOS :

14.4.3 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 :

14.4.4 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) MOHA FLOWERS AND FRUITS :

14.4.5 Moha flowers is important source of food for tribals particularly in the off season. They also brew liquor from moha flowers. These flowers are collected by local people on behalf of Tribal Development Corporation or for their own consumption.

(vi) MOHA SEEDS :

14.4.6 Moha seeds are used for extraction of oil which forms an important edible oil for the tribals.

(vii) GUM : USE AND VALUE :

14.4.7 Kulu (*Sterculia urens*), dhawara (*Anogeissus latifolia*), are the main sources of gums of this area. The gum is basically used in medicines, chemicals cosmetics and food industries. No scientific method is used for tapping of gum in this area. Gum tapping is a potential field for employment generation and revenue earning.

(viii) MYRABOLONS, DIKAMALI :

14.4.8 These N.T.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 timber forest produce in this tract collected and marketed by Tribal Development Corporation.

(ix) HONEY, WAX, BROOM GRASS :

14.4.9 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 :

14.4.10 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 :

14.5.1 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 will report compartment wise 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 Chief Conservator of Forests. Further distribution will be done by the Gram Panchayat or Committees under the supervision of the concerned R.F.O. Where there is no demand for this material, it will be brought to the sale depot and sold in open auction. The details of material obtained from each compartment, number of beneficiaries and revenue realized from it will be entered in the respective compartment history form.

- (ii) Approval of felling of trees on the fire lines will be given by the Dy. Conservator of Forests, without reference to the Chief 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.
- (x)** The removal of trees for the construction of extraction path in area outside the current coupes will be permitted.
- (xi)** Bamboo outside the Bamboo overlapping working Circle: bamboos outside the Bamboo overlapping Working Circle will be removed or harvested on the basis of silvicultural lines in order to meet the local demand of Nistar at the time of main felling and cleaning, provided working scheme prepared by DyCF, for harvesting bamboo clumps outside the area of bamboo overlapping working circle, is approved by MoEF, GOI.

SECTION 6: FIRE PROTECTION :

14.6.1 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-

14.6.2 Class I- Forests completely protected:-

This class will include-

- i) All plantations
- ii) All forests of Protection W.C. and all main felling and thinning coupes of selection cum improvement working circle, teak plantation working circle and Improvement W.C.
- iii) All regenerated coupes of all working circles till, the young crop has attained an age of 10 years.
- iv) All areas of the proposed Sanctuary.
- v) All Government timber depots.
- vi) Any other areas of special importance ordered by the Chief Conservator of Forests.
- vii) Nesting sites, habitat of Shekaru.

14.6.3 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 Dy.C.F. immediately in writing giving the details of area burnt and the various types of losses occurred to the forest crop.

14.6.4 Class-II – Forest generally protected:-

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a) This class includes-

- i) The remaining areas of Improvement Working Circle and Selection-cum-Improvement working circle.
- ii) Such other areas as the Chief 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 Chief Conservator of Forests.

14.6.5 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.

14.6.6 To reduce the possibility of forest fires following measures should be observed:-

- (i) The cutting and cleaning of fires lines should be completed by the end of December and burning should be completed before the end of February.

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(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 Deputy Conservator of Forest, no fire lines shall be burnt after the end of February. If such a permission is granted, the burning should be done in the presence of the R.F.O. at his risk and cost.

Dy CF should prepare Fire Protection Plan every year and submit it to approval by Chief Conservator of Forest. The plan should include details of fire lines and cost of fire line tracing, deployment of fire watcher during fire season, deployment of crew at important locations during fire season to extinguish fire incidence, map of division showing fire prone areas, incentive to JFMCs for best fire protection measures, publicity and extension activities. After the fire season Dy CF should submit action taken report on Fire Protection Plan. The individuals, JFMCs and front line staff performing at its best in protection of fire should be rewarded by certificate/incentive during celebrations of World Forestry Day, Earth Day, Wild Life Week etc.

1. Legal Provisions available:-

(A) Provisions contained in the I.F.A. 1927-

(a) Reserved Forests;

14.6.7 .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(I) b – to set fire to a reserve forests.
- (ii) Section 26(I) c - Kindling, keeping and carrying any fire except at such seasons as the forest officer may notify in this behalf.
- (iii) Section 26 (I) g – Burning of lime or charcoal.
- (iv) Section 26 (3) – The State Government may suspend the exercise of all rights of pasture or to forest produce in the reserve forest/protected forest or a portion there of

whenever the fire is caused willfully or by gross negligence
for such period as it thinks fit.

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(b) Village forest :

- (v) Section 28(3) – All the above provisions apply in case of a village forest also.

(c) Protected forests :

- (iv) Any persons who commits any of the following offences under section 33(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:-

14.6.8 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 meter wide on the side of the area which he proposes to burn which is nearest to the boundary of the forest in such a manner that no fire can spread across such belt.
- (ii) He should keep a watcher to see that the fire does not spread in the forest area.

Rule 5:- Under this rule any person desirous of burning "Rab" or clearing land by burning the growth on it near the forest boundary, should inform the nearest forest officer at least one week in advance of his intention to so do. A clean belt of at least 10 mtr. 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 Deputy Conservator of Forest may by general or special orders prescribe, 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 Deputy Conservator of Forest for the use of visitors. A list of all such camping places will be published annually and except on such camping grounds no fire 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 fire.

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 Maharashtra Forest Manual – Vol.-II, Part-VI.

(i) AO:09:- Fire offences should not as a rule be compounded.

14.6.9. 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) AO:10:- Duties of Magistrates when trying offenders in forest fire case-

14.6.10 The following instructions are laid down for the guidance of all Magistrates in the Province:-
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- (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) AO:11:-Regarding findings of Magistrates in fire cases.

14.6.11 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) AO:14:- Continuous protection of valuable forest from fire.

14.6.12 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 started for each circle what area has been completely protected for seven years or more.

(v) AO:15:- Communal punishment for bad fires in exception cases.

14.6.13 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 and 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 Dy. C.F. 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 Dy. C.F. 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) AO:16:-Duties of village officers with regard to fire protection.

14.6.14 The principal hope of fire protection rests in the co-operation of the inhabitants of forest villages, and this co-operation can best be secured through the authority and influence of the village headmen. It is necessary therefore that the assistance of the village headmen should be gained whether through the fear of punishment or the hope of reward. Either punishment or reward should be meted out, and speedily, according to desert. If forest fire 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) AO:17:- Rewards for help in fire-protection and powers of officers to sanction them—

14.6.15 Rewards may be granted to villagers who assist the forest department in protecting the forests from fire. The Dy. C.F. 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.

14.6.16 (D) Provisions for fire protection contained in the Wildlife (Protection) Act, 1972.

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- (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 person 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:-

14.6.17 In the Agent’s Agreement Form made under the provisions of the above Act as per the terms and conditions Nos. 6(xix), (xx), (xxi), (xxii) and 8, the Agents appointed by the Government for collection of tendu leaves are responsible for any damage done to the forest by their negligence and they have to observe all rules, regulations and orders for the time being in force and made and issued under the Indian Forest Act, 1927. If any damage is done to the forest (which includes fire damage it shall be assessed by the Deputy Conservator of Forest and his decision shall subject to an appeal to the Chief Conservator of Forests, be final, conclusive and binding on the Agent. As per condition No XII of terms and conditions of the contract for tender for 1993, the licensee, his representatives and munshis and labourers employed by him for collecting tendu leaves shall be bound to assist in putting out any forest fire and to give information of any forest fire in their knowledge or vision to the nearest forest or police officer. The licensee will be held responsible for any fires deliberate or accidental occurring in his unit/Group of units or in its close proximity during the above period for which he will be liable for penal action.

(F) Provisions contained in “The Maharashtra Felling of Trees

(Regulation) Act, 1964:-

14.6.18 As per section 2 (e) of the above Act burning trees on private lands is included in the definition of "Felling of trees" and such act on the part of any person without obtaining felling permission from the competent authority i.e. Tree Officer under section 3, is punishable under section 4 of the above Act. The tree officer may award punishment, which may extend up to Rs.1000/- besides the tree so felled is also liable to be forfeited to the Government.

(G) Protection of bamboo areas from fire after flowering:-

14.6.19 The rules and regulations to be followed for protection of bamboo areas from fire by the contractors are given in the draft agreement vide Revenue and Forest Deptt. No. VM/D/1283/77 831/F1, dated 21-7-1983 and contained in the condition Nos. 41(1), 41(2) and 41(3).

2. STEPS TO BE TAKEN TO CONTROL FIRE :

14.6.20 (A) CUTTING AND BURNING OF FIRE LINES:

- (i) The cutting of the lines will be completed by the end of December and burning will be completed before the end of February.
- (ii) Dry leaves and other dry material on fire lines will be collected from time to time and deposited along the edge of fire lines and burnt before the fire season starts.
- (iii) Except with the express permission of the Dy. C.F., no fire lines will be burnt after the end of February. If such a permission is granted, the burning should be done in the presence of the R.F.O.
- (iv) Modern fire fighting tools will be used for extinguishing the fire.

14.6.21 (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 an 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, TPWC, Afforestation W.C. and Improvement Working Circles will require special efforts.

(C) Forest Fires.

14.6.22 As soon as the smoke is seen rising anywhere in or near the forest, by any Range Forest Officer or Forester or Forest Guard, he shall at once collect such aid as is immediately available and proceed in person along with villagers nearby 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.

14.6.23 The utmost care should be taken to extinguish the fires and to quench the smoldering material absolutely. Filling earth over such material will be found every effective. No official shall leave the burnt locality till the senior forest officer present on the spot has ascertained and satisfied himself that no smoldering material remains. All men assisting in extinguishing fires in Government forest shall be paid according to the amount of assistance rendered.

(D) Use of wireless:

14.6.24 A scheme should be prepared for establishing the wireless network in the whole division so that the communication becomes easier and faster. This will help not only in the fire protection works but will also be helpful in overall protection of the forest.

3. RESPONSIBILITY:

14.6.25 The Range Forest Officer will be held personally responsible for the efficient fire protection in his range, as per the prescriptions in the annual fire plan approved.

14.6.26 Where the forests of two ranges is adjoining then, 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 Deputy Conservator of Forest Allpalli, In cases of common boundary between two divisions of the same circle, the above responsibility will be fixed by the Chief Conservator of Forest Gadchiroli on one of the Range Forest Officer and in cases of the common boundary between two divisions of the two different circles, the concerned Chief Conservators after mutual consultation, will fix the responsibility on one of the Range Forest Officer.

14.6.27 The Dy. C.F. 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, wild life management. 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.

14.6.28 The Dy. C.F. must satisfy himself that the exterior fire lines and other fire lines have been properly cleared and burnt thoroughly before the end of February. He must carry out inspections to inquire about the implementation of 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.

14.6.29 The 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:

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14.6.30 The Range Forest Officer shall report the out break of a fire in his area to the Dy. C.F. at once without reasonable delay. 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 Dy. C.F. 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 Dy. C.F. within 15 days after thorough inspection of the burnt area by himself. The burn forest area should be demarcated by GPS and the Lat. ,Lon. of fire should be reported. This will help in preparation of digitised fire map showing locations of fire incidence and fire prone areas. Range forest officer should ensure that the frontline staff keeps and maintain the PDA Mobile with him round the clock during fire season for reporting and assessing help required to extinguish fire.

14.6.31 The Dy. C.F. will submit monthly return. (in prescribed proforma Form No. IX-74) to the Chief 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 Dy. C.F.

14.6.32 A fire record will be maintained in the Dy. C.F. 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.

14.6.33 Areas deliberately burnt for silvicultural reasons e.g. to destroy felling debris or to stimulate reproduction will be excluded from the schemes of fire protection. Such fire 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 Dy. C.F.

14.6.34 Financial loss due to fire will be communicated to the Accountant General as per Appendix-19 of Rule 148 of Bombay Financial Rules, 1959 and B.F.M. Vol. I, Rule 369.

SECTION 7: JOINT FOREST MANAGEMENT:

14.7.1 The National Forest Policy of 1988 stressed upon the need to provide fuel wood, 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-timber forest products and percentage share of final harvest to villagers that will help in protection and regeneration of the degraded forest lands. This approach has been defined as Joint Forest Management. But the Govt. of India vide its circular No. 22.8/2000-JFM(FPD) dated 21/2/2000 and letter no. DO/21.1.7/99/B2 dated 31/5/2002 has issued further instructions to include such other areas also which are not under the control of Forest Department as well as better forest areas also under this program. The Govt. of Maharashtra in persuasion to the Govt. of India's directives, vide its Revenue & Forest Department Resolution No.MSC/2000/CR143/F-2, dated 25/04/2003 has issued fresh guidelines for the benefit of the local people in order to encourage them to participate in joint forest management program.

14.7.2 The Government of India vide letter No. 621/89-PP dated 1st June, 1990 conveyed to all the State Governments, a framework for creating massive people's movement through involvement of village communities for the protection, regeneration and development of degraded forest lands. Govt. of India vide Ministry of Environment and Forests, Forest Protection Division Circulars No. 22-8/98-FPD dated February 11, 2000 and No.22-8/2000-JFM(FPD) dated February 21, 2000 has issued detail guidelines for the Joint Forest Management Programme to be taken up by the States. Government of Maharashtra vide Resolution No. SLF-1091/P.K.119/F-11 Mantralaya, Mumbai dated March 16, 1992 realising the fact that illegal felling of forests can not be controlled and checked without the active participation and cooperation of local people in the management, protection and regeneration of forests, issued guidelines and instructions for the preparation of plans for the management of forest areas with the active participation and cooperation of local population living in and around forest areas.

14.7.3 The details of Government of Maharashtra Resolution dated March 16, 1992 has been produced in **Appendix No XLVI**. 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.

14.7.4 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.

14.7.5 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 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 holding general body meeting. 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 area which was till, confined to poor areas only. According to the circular, the JFM activity in good areas is to confine to NTFP 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 forest, shall not exceed 100 Ha. and within 2 Km. It further says that JFM in good area shall be on a pilot basis and should be done, only after the degraded areas have exhausted. The copy of the main circular will be annexed as an **Appendix No. XLVI..**

14.7.6 The special objects of management have been defined keeping in view the National Forest Policy 1988 and the cost increasing population pressure on the Forest areas resulting in loss of tree over, depletion of soil and soil erosion due to demand for timber and fuel-wood, grazing pressure , fires and the forest land diverted 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 purpose 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.

14.7.7 In areas where the villagers are willing to participate in Joint Forest management plan, the concerned territorial Deputy Conservator of Forests shall prepare a micro-plan for the area to be tackled as provided in the Govt. of Maharashtra Resolution dated March 16,1992. The Micro Plan prepared for the particular village shall coincide with the prescriptions contained in Working Plan in so far as the village is concerned. The micro plan shall be sanctioned by a committee headed by Conservator of Forests.

14.7.8 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, Govt. of Maharashtra from time to time and as are applicable to the state of Maharashtra.

14.7.9 The micro plan and the Joint Forest Management Scheme shall be implemented through Forest Department or any other agency approved by the Government of Maharashtra. Government of Maharashtra has given status to JFMC as a development committee of Gram Panchayat by amending the Mumbai Gram Panchayat Act 1958 and issued Govt. Resolution Revenue and Forest Department No. FDM 2011/CR 100/F2, Mumbai 5-10-2011. The role and responsibility of JFMC, constitution of JFMC Usufruct sharing is well defined in this Resolution. Further to reduce stress on forest for fuel wood, fodder Govt. of Maharashtra vide Resolution No. FDM 2012/CR 4/F 2, Mumbai dated 10-7-2012 has decided to supply at subsidized rates LPG/Bio gas, milch cattle, to give incentive to families involved in protection of plantations. This Resolution has helped the families living in forested villages. In receiving LPG/Bio gas, milch cattle, incentive in cash for protection of plantation.

SECTION 8 : ARTIFICIAL REGENERATION :

(1) PLANTING OF TEAK AND MISCELLANEOUS SPECIES :

14.8.1 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 :-

14.8.2 (i) PREMONSOON WORKS : It will be carried out in the year of main felling along with the felling. It will include following works :

14.8.3 (ii) CLOSURE OF AREA: The whole coupe if 70% area is to the planted, otherwise compartment will be taken for T.C.M. of standard cross section of 1.90 mtr. x 0.60 mtr. x 1.0 mtr. will be dug where the boundary runs along the contour. No T.C.M. will be dug when the boundary of the coupe runs across the contour or inside the compartment. In that case, live-hedge fencing will be taken. Live hedge fencing will consist of two outer rows of agave 50 cm apart and 3 inner rows, 50 cm apart, on which

sowing of seeds of fast growing thorny trees like Acacia senegal, babool etc and planting of cutting of shrubs like Vitex, Dodonea etc will be done before the monsoon.

14.8.4 (iii) PIT DIGGING: For planting of miscellaneous species pits of size 30 cm x 30 cm x 30 cm will be dug. The dug up soil will be kept on the upper side of the slope. The pit digging will be completed upto March and the soil will be allowed to weather during summer. Pit filling will be done at the end of May. The number of plants of teak and miscellaneous species will be 2500/ha. In the high rainfall areas, pit planting has been prescribed.

(2) NURSERY :

14.8.5 (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.

14.8.6 (ii) MISCELLANEOUS PLANTS : The miscellaneous plants will be raised in the polythene bags. The standard size of the poly bag plants suitable for planting will be when the collar of the plant is approximately thumb thick and is woody in appearance. The height of the plants will vary from species to species. To achieve the optimum sized poly-bag plants, the nursery work will be started latest by October in the previous year of planting. The polythene bags will be shifted every 15 days, once the height of plants reaches ten cm. Care will be taken that each bag contains only one seedling. During the shifting the bags will be arranged in descending order of plant heights. Suitable fertilizer preferably urea and manure will be given to the plants at regular intervals. Before planting, the planting stock will be examined by an ACF and he will certify the suitability of the planting stock. The nursery technique has been described in detail in the chapter on Nursery Techniques in this Plan.

14.8.7 (a) FIRST YEAR OPERATIONS : As soon as the monsoon starts, seed sowing in 3 rows for live hedge fencing, described earlier, will be done by raking the soil along the line 10 cm deep. Planting of agaves on the outer two rows of live hedge fencing at a spacing of 50 cm and planting of shrub cutting on the inner 3 rows, will be done. Teak stump planting in crow bar holes and poly-bag planting in pits will also be done along with the planting on live hedge. The polythene bags will be planted in such a manner that their collars are at the ground level and it will be covered with soil upto a height of 5 cm above collar. All these operations will be completed in not more than 15 days after the break of monsoon.

14.8.8 (b) SUBSEQUENT OPERATIONS : Immediately after the completion of planting, first weeding will be started. Casualty replacement will be done along-with the first weeding. Second and third weeding will be done in the month of September and October respectively. The last weeding will include soil working and mulching to reduce the evaporation losses. One more soil working may be done in the month of January, if there are winter rains, subject to the availability of funds. Weeding and soil

working to the seedlings on live hedge will also be done in order to enhance their growth and survival.

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14.8.9 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 July 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 April/May.

(3) BAMBOO PLANTING:

14.8.10 Bamboo will be planted, at a spacing of 6m x 6m, or 5m x 5m in the fourth year from the year of main felling. The details of various works will be as follows:

14.8.11 (i) PREMONSOON WORKS: It 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.

14.8.12 (ii) NURSERY: Two years old bamboo seedlings raised in 25cm x 40cm and 600 gauge poly bags will be raised. The seedlings may be prepared of *Dendrocalamus strictus* and *Bambusa balcoa*. The *Bambusa balcoa* is fast growing, thorn less species, hence this species should be tried. 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 November/ December of the PPO, PYO, the seedlings from the beds will be transplanted into polythene bags after cutting their branches above 3 to 4 nodes. The rhizome 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.

14.8.13 (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. If there is occurrence of wild boar near by plantation site, then to minimize the wild boar attack, the pits should be filled partly in the month of April / May and after receipt of sufficient rains, the bamboo can be planted along with refilling of pits. This will help in dip planting of rhizome which will not be in reaches of wild boars' canine. At the time of planting, suitable fertilizers and insecticides will be given to each plant in the pits. Casualty replacement will be done at the end of July or in the first weed of August. Three weeding and soil working will be done. Protective irrigation and additional soil working will help in early establishment of rhizome and accelerated growth.

14.8.14 (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:

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14.9.1 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. It will include two main operations namely, contour trenching and nala bunding/check dams. It is proposed that the entire coupe can be treated as a micro watershed. The streams, nalas, contour line, elevation, these features are available on coupe map. Based on this features RFO and ACF should thoroughly inspect the entire coups area and ascertain the sites of various SMC works on technical basis. Various SMC works like wat, gullyplugs, brush wood dam, gabian bandhara, losse boulder, earthen nala bund, cement nala bund, inverted bandhara, dug out pond, forest pond, etc. should be proposed strictly on technical grounds. This coupe treatment plan for SMC works should give the estimated run off to be arrested for the entire works. This plan will help in improvement in seepage of surface runoff, reduction in soil erosion, rise in ground water table and hence over all the moisture regime of the coupe will be increased.

(A) CONTOUR TRENCHING :

14.9.2 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 i.e. in areas having slope less than 8 degree. The cross section of the trenches will be 45 cm x 30 cm. The soil from the trenches will be heaped on the lower side of the trenches. The boulders from the trenches will also be neatly stacked on the lower side. Grass tussocks planting, sowing of seeds of grasses and local tree and shrub species and planting of cuttings of Vitex, Dodonea, Ipomea and bulbils of agaves will be done on the heaps of the soil for its stabilization. The contour interval between the consecutive trenches will be 1.5 m. Depending upon the slope, the distance between the two consecutive trenches will vary. In order to bring the uniformity in working the distance between consecutive trenches is given in Table below:

14.9.3 However, the actual spacing is to be determined after getting treatment map and doing the following calculations.

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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 = 0.6x0.3 = 0.180 Sq.mt., the length of trench in meter per hectare required to absorb water pouring per rainy day per hectare completely can be calculated as follows :

$L = d/0.18$ in mt. And accordingly the distance between two consecutive lines can be determined. Taking an example of one hectare the distance between consecutive trenches come to 10,000/L in meter.

TABLE – 130

Slope in degree	Distance between consecutive trenches.
Upto 15	
15 to 25	
Above 25	

14.9.4 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. LXI.**

(B) NALA BUNDING/CHECK DAMS :

14.9.5 The basic aim of nala bunds or check dams will be to reduce the run off and to arrest the silt. Nala bunding will start from the top of nala downwards. The entire catchments will be treated in a sequence. The design of the nalla bunds will depend on the intensity of the rainfall and the total run off by using Dunken’s Formula. The nalla bund will be so constructed that the weight of the bund will be more than the force of the water. Nalla bunds/check dams will be prepared from the loose boulders found in or around the nala bed. No digging or blasting will be done. Where sufficient boulders are not available brushwood can also be used. Nala bunds will be prepared on nalas upto 8 m bed width. Beyond that these structures will not be useful and permanent engineering structures will be required. These structures are not being

prescribed here. For the design of nala bunds, the nalas have been divided into three categories, namely (i) upto 4 m bed width (ii) between 4 m to 6 m bed width and (iii) between 6 m to 8 m bed width. The details of structure of nala bunds is given in **Appendix No.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.

C) SEDIMENTARY SILTATION TANK (VAN TALAV) :

The sedimentary siltation tank of size not exceeding two hectares of submergence will be constructed at suitable places in accordance with the guidelines issued by the Govt. of Maharashtra in this behalf.

D) INVERTED BANDHARA :

A large amount of water flows below the surface and to check this flow of ground water it is essential that inverted bandharas are constructed at such intervals at suitable places that the flow of ground water is arrested. For the construction of inverted bandhara, the black cotton soil of one meter deep is put horizontally in the nalla, which swells considerably after absorbing the water and thus prevents the flow of ground water.

SECTION 10: GRAZING CONTROL:

14.10.1 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.

14.10.2 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. Coupes can be closed to grazing for a period upto 10 years or more where it is difficult to get successful regeneration in shorter period. The grazing settlement has been carried out only in Reserved Forest where the rights have been settled, but no settlement has been done in Protected Forest. To protect naturally regenerated areas and plantation areas of forest entry of cattle in forest areas is regulated vide Govt. of Maharashtra GR No. MFP-2011/PK -248/F-1, Mumbai, Dated 31.10.2011

(1) SELECTION-CUM-IMPROVEMENT WORKING CIRCLE

14.10.3 As per functional classification, this working circle comprises of tree forests and the maximum incidence of grazing prescribed for it is 1.2 ha per cattle unit. All main felling coupes will remain closed to grazing for a period of 5 years from the year of main felling. Thus with a felling cycle of 20 years, $5/20^{\text{th}}$ or $1/4^{\text{th}}$ area will remain closed to grazing at any time after 5 years from the commencement of this plan.

(2) IMPROVEMENT WORKING CIRCLE :

14.10.4 This working circle comprises of minor and degraded forest and the maximum incidence of grazing prescribed for it is 0.8 ha per cattle unit. All main felling coupes will remain closed to grazing for 5 years from the year of main felling. Thus with a felling cycle of 20 years, $5/20^{\text{th}}$ or $1/4^{\text{th}}$ area will remain closed to grazing at any time after 5 years from the commencement of this plan.

14.10.5 Thus as per the prescriptions of the working plan 125002 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.

14.10.6 Grazing rules made applicable vide Govt. of Maharashtra Revenue and Forest Department Resolution No. MFP-1371/237035-Z, dated 3rd November, 1973 is given in **Appendix No. XXVII**.

SECTION 11: ILLICIT CUTTING :

14.11.1 Though there is no problem of large scale organised illicit cutting, except in areas adjoining to village, but the large consumption of forest produce by the local people, as described above, has put tremendous pressure on these forests. This has

resulted in deterioration of forests adjoining to the villages. For effective control on illicit cutting two mobile units, consisting of 1 R.F.O., 4 foresters and 8 forest guards each with one vehicle are proposed. These units will continuously patrol the forest areas vulnerable to illicit cutting.

14.11.2 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.

14.11.3 The following time schedule has been prescribed for inspection of illicit cutting area by the respective officers vide the Govt. of Maharashtra vide its GR no. TRS-04/2014/CN/72/F-6 Mumbai 13.08.2014 (**Appendix No.LXIX.**)

TABLE - 131

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	Up to Rs.50000	R.F.O.	3 days from detection/receipt of intimation of detection.
2	Above Rs.50000 but not exceeding Rs.2,00,000	A.C.F.	3 days from the receipt of intimation.
3	Above Rs.200000 but not exceeding Rs.500000	Dy,C.F./DFO/Sub-Dfo (T)	3 days from the receipt of intimation.
4	Above Rs.500000	C.C.F.(T)	7 days from the receipt of intimation.

14.11.4 Vide above G.R. Dated 13.08.2014 the Government has stated that the offences involving value of forest produce above Rs. 10000/- should be necessarily brought to court for prosecution, unless the prosecution is difficult to succeed.

SECTION 12 : BEAT CHECKING :

14.12.1 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:

14.12.2 The primary responsibility of forest protection devolves on the protection staff, which generally detects and reports the offence. The duties and responsibilities in regard to each category of the staff are broadly specified as below

BEAT GUARD: Every guard must patrol his beat regularly. He will thoroughly inspect the entire forest within his charge every fortnight and issue P.O.R. for all the damage detected in each beat within the first instance.

ROUND OFFICER : Each Round Officer will inspect each beat once in three months. He should verify/enumerate the damage not reported by the beat guard. He will timely submit the report of each area inspected to the Dy. C.F. through the Range Forest Officer.

RANGE FOREST OFFICER: It is the prime responsibility of the R.F.O. to ensure that round officers and guards carry proper patrolling of the forests. RFO has to inspect all the beats in his jurisdiction in a year i.e. one beat per month, and report to Dy C F.

ACF will recheck the beats checked by forester and RFO and will inspect serious lapses and report it to Dy C F. Dy C F will also recheck the beats where illicit cutting severe. In addition to this RFO, DFO will also have inspection of beats as per beat inspection programme prepared by C.C.F. Dy C F. will prepare beat inspection programme for the year and will monitor the beat inspection and will act and take action against any negligence and lapses found.

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 :

14.13.1 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.

14.13.2 The Government of Maharashtra vide Notification No. TRS/1083/91822 (ii) CR-87/F-6, dated May 13, 1985 has amended Section 61 of Indian Forest Act, 1927 making the law more stringent. It has authorised certain officers to be called as Authorised Officer for the purpose of this Act, who will be competent to confiscate the vehicle involved in offence related to the illicit transport of timber and firewood, charcoal, and sandal wood.

14.13.3 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:

14.14.1 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 it is has been decided to constitute such lands as 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 10 Km of such limits, no person shall erect or operate any machinery or saw mill for cutting or converting of timber, without obtaining a license in that behalf.
- (2) Any person desiring to establish a saw-pit or manufacture charcoal under clause (i), of sub-rule (1) shall make an application in that behalf to the Range Forest Officer and the Divisional Forest Officer, respectively.

Provided that where within a period of one month from the date of the application, the applicant fails to receive the sanction under clause (i) of sub-rule (1), the applicant may proceed to establish the saw-pit or to manufacture charcoal, but not so as to contravene any of the provision of the Act or any Rules made thereunder.

- (3) On receipt of an application under sub-rule (2) the Range Forest Officer, or as the case may be, the Divisional Forest Officer shall make such enquiry as he deems fit and after satisfying himself on the question whether or not there would be any objection to granting the sanction or license applied for, having regard to safeguarding the timber in any Reserved or Protected Forests or in any land referred to in sub-rule (i), may grant the sanction or license in the form in Schedule-E subject to the conditions set out therein, or refuse to grant the sanction license.

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- (4) Every license granted or renewed under this rule shall, subject to the provision contained in this rule regarding cancellation, be effective for a period not beyond the day of December 31 from next following the date of its issue or renewal.
 - (5) The Divisional Forest Officer may, on application made to him, renew the license issued under sub-rule (3) with effect the date of its expiry.
 - (6) An application for renewal of a license shall be made before the expiry of the period of the license and failure to renew will render the licensee liable to punishment for operating the saw mill without a license.
 - (7) Notwithstanding anything contained in the foregoing sub-rules, the Divisional Forest Officer, may where he has reason to believe a licensee is operating the saw mill in contravention of the provisions of these rules and conditions of the license or the licensee is indulging in activities prejudicial to the interests of the forest conservancy, at any time, revoke the license granted under this rule.
 - (8) Where the Divisional Forest Officer refuses to issue, or renew, or revokes, a license granted under this rule, he shall do so by an order communicated to the application or holder, as the case may be, giving reason in writing for such refusal or revocation.
 - (9) Any person aggrieved by an order made under sub-rule (8), may, within thirty days of the service on him of the orders, appeal to the Chief Conservator of Forests who shall decide the appeal after giving such person and the Divisional Forest Officer making the orders, an opportunity of being heard, and the decision of the Chief Conservator of Forests shall be final.
 - (10) Nothing contained in this rule shall apply to the ordinary operations of domestic carpentry or to other similar works on a small scale.

14.14.2 Subsequently, the State Government has issued amendment vide notification No. SWM.1081/106836/F-6, dated 16th July, 1981, the state Government put a ban on issue of new license. However, if the applicant has already spent the money and completed the formalities, the licenses can be issued vide SWM 1081/106836 (AF-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 04/2014/CN 72/F 6, R. & F. D. Mumbai dated Aug. 13, 2014 has laid down the inspection norms of saw mills by the officers or various ranks. The Range Forest Officer is to inspect-8 saw mills per month minimum of if no. of saw mill is less than 12, all saw

mill will be inspected in each month, the Asstt. Conservator of Forests-4 saw mill per month, the Divisional Forest Officer-2 saw mill per month and the Chief Conservator of Forests- subject to condition when ever required.

14.14.3 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 :

14.15.1 No permission to manufacture charcoal to the private person will be given in the Reserved or Protected Forests or in private areas upto 1 km from the boundaries of the forests.

SECTION 16 : ENCROACHMENTS :

14.16.1 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 solutions in eviction of encroachments. A special scheme is required to be launched to demarcate Protected and Reserved Forests properly. The maintenance of the boundary will be emphasized. The beat guards will be provided beat maps along-with the instructions in vernacular language. Records of encroachments will be made compartment-wise in the compartment history forms and will be shown on the map also.

14.16.2 The encroachment on forest land between 1972 to 78 are to be regularised by the Government vide two resolution R & F.D. LEN/1078/3483-G-I, dated December 27, 1978 and R & F.D.-FLD-1079/1366-F-3 dated September 12, 1979. The present Government policy is very clear vide two resolutions R & F.D. No. FLD-1078/144074-F-3, dated March 5, 1980 by which any illegal construction of hut on the forest land should be removed immediately and FLD-1087/PK-397/F-3, dated July 14, 1987 stating that encroachment not likely to be regularized and taken place after March 31, 1978, should summarily be removed. There is a need for a stringent measure against the encroachers. The Govt. of India has now issued the instructions that all encroachments after 1980 shall be removed summarily by 30th September, 2002.

14.16.3 Eviction of encroachment - The Govt. of Maharashtra has conferred the power of section 53, 54, and 54-A of Land Revenue Code-1966 to Forest Officers for the purpose of removal of encroachments. According to section-262 of Cr. P.C. the offences having penalty upto one year can be tried summarily by the Court and encroachment cases should be dealt accordingly.

SECTION 17 : USE OF HAMMERS.

14.17.1 The territorial Chief 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 hammer for marking the trees to be harvested as per working plan prescription.
- vii) Marking of material from Jungle Depot to Coupe Depot.
- viii) Marking of material from coupe depot to sale depot
- ix) Marking of sold material.
- x) Marking of malki materials/ timbers by A.C.F.

SECTION- 18: SCHEDULE OF RATES FOR OFFENCE

OFFENCE CASE MATERIAL.

14.18.1 The Chief Conservator of Forest (Territorial) shall in the beginning of the financial year circulate the schedule of rates for offence case material to all the Dy. Conservator of Forests (Territorial) in his circle.

SECTION 19: WORKING PLAN NOTE.

14.19.1 At end of the working plan period working plan note shall be prepared by the Chief Conservator of Forests (Territorial) in consultation with Dy. Conservator of Forests (Territorial) of the concerned division and the note shall be forwarded to the Conservator of Forests, Working Plan Division for preparation and revision of the working plan of the forest division. Copy of Divisional Note Book is given in **Appendix No. LXIII.**

SECTION 20 : MARATHI TRANSLATION OF THE WORKING PLAN.

14.20.1 The territorial Chief Conservator of Forests, shall entrust the work 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.

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SECTION 21: DEVIATIONS:

14.21.1 (A) Following works will not constitute as deviation from plan.

- (i) Removal of dead, fallen firewood.
- (ii) Petty felling carried out as mentioned in Para under irregular harvesting.

(B) Following works will constitute a deviation from 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.
- (iii) Implementation of approved JFM micro plan which is dovetailed with approved working plan prescriptions.

(1) Deviation which would seek to alter the schedule of working given in 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 felling for planting because of shortage of labour, funds, material for plantation work, or unsuitability of terrain and soil for undertaking plantations to the extent prescribed by the working plan.
- (ii) Extensive felling of dry trees killed by fire, fungus, insect attack or other natural calamities.
- (iii) Felling of unusual size and extent for special departmental works.
- (iv) Special felling to meet a sudden new demand of a particular industry.
- (v) Felling involving modifications in the prescribed marking rules.

The sanction to all these deviations will be obtained. Application for sanction to such deviation will be submitted sufficiently in advance, so that such may be received as far as possible before the deviation occurs and without fail before the annual list of deviation is submitted along with the control forms. The format of Deviation Form is given in Chapter 22 "Control and Records".

(C) PROCEDURE FOR OBTAINING SANCTION FOR DEVIATION

14.21.2 All deviation proposals require the approval of the Director General of Forests as per instructions contained in Govt. of India, Ministry of Agriculture No. 6-14/84/FRY (W.P.) dated August 23, 1984.

14.21.3 The Dy. C.F. territorial will submit duly filled typed copies of deviation form in triplicate along with copy of control forms in 8 copies duly filled to Chief Conservator of Forest (T.) by October end. The Chief Conservator of Forest (T) should submit the Deviation proposal along with control forms to Conservator of Forest Working Plan by December end and Conservator of Forest Working Plan will further forward with his remarks to APCCF (Working Plan), East, Nagpur. The major Deviations will be approved by Regional APCCF, MoEF, Central Zone, Nagpur Region. The minor deviations are to be approved and sanctioned by the Head, Working Plan Organisation on behalf of the PCCF (HoFF) provided he agrees with the necessity of these deviations. One copy of the sanctioned deviation proposal will be returned to Dy. C.F. (T), CCF (T), APCCF (WP-E), Nagpur, C.F. Working Plan. The major deviations include like change in silviculture system prescribed in sanctioned working plan. The sanction of deviation proposal, finalization of control forms should be completed by the year end.

14.21.4 The Government of India has created a working plan cell in the Ministry of Environment & Forests under the Director General of Forests. This cell has to be associated while considering any deviation from the prescriptions of the approved working plans and this deviation will be allowed only after obtaining the approval of the Director General of Forests. All proposals for deviations must be entered in a Register of Deviation maintained by the Division office. The proforma for submission of deviation proposals is given in **Appendix No.LXVII**.

SECTION 22 : IMPLEMENTATION OF WORKING PLAN.

14.22.1 The territorial Conservator of Forests shall ensure that the prescriptions of the working plan are meticulously implemented by the territorial Dy. Conservator of Forests and the works shall be inspected as under.

Chief Conservator of Forests	2 %
Dy. Conservator of Forests	5 %
Asstt. Conservator of Forests	20 %
Range Forest officer, Forester & Forest Guards.	100%

14.22.2 The norms for inspection of works shall be in consonance with various standing orders and circulars issued by the Government of Maharashtra and the Department in this behalf. The responsibilities for any lapses shall be fixed by the disciplinary authority in accordance with Govt. Resolution, Standing Order, Circular. The Chief Conservator of Forest (Territorial) shall be the competent authority to decide any technical matter prescribed under the working plan and he will guide the subordinates in all such matters.

SECTION 23 : TRIBAL WELFARE :

14.23.1 To ensure a proper environmental and ecological balance, it is essential that the cultural survival and socio-economic well being of tribal is well taken care of. Unless it is done all attempts aiming at protection of forests shall be futile. Thus to ensure this, it is essential that the social and economic stability of tribal through forest based industries/programme, safeguarding their genuine domestic needs of forest produce like bamboo, firewood and constructional timber, is under taken by the forest department. All activities of minor forest produce enshrined in Non-Timber Forest Produce Working Circle will beset up for tribal through forest department. Besides, the tribal can also be encouraged for collection of other minor forest produce which have not been covered under NTFP Working Circle.

SECTION 24 : PRIVILEGES AND CONCESSIONS FOR FOREST PRODUCE :

14.24.1 As per the National Forest Policy of 1988, the first charge on the forest produce is that of tribal and other villagers living in and around the forests. Accordingly, the forest produce obtained from the forests will first be supplied to the local people at the rate fixed by the Conservator of Forests. The arrangement for supply of material will be made in such a way that the people should get the material within a radius of 2 km from their inhabitation. Only the surplus forest produce or the forest produce which is not required by the local people will be sold in open auction.

SECTION 25 : BAMBOO HARVESTING OUTSIDE BAMBOO WORKING CIRCLE.

14.25.1 For harvesting bamboo clumps outside bamboo overlapping working circle, working scheme for harvesting of bamboo clumps outside bamboo overlapping working circle should be prepared and submitted by Dy. C.F. (T) to CCF (T) which will be forwarded by C.F. Working Plan, Gadchiroli to PCCF (P&M), M.S., Nagpur through APCCF (WP-E) Nagpur. The working scheme for bamboo will be approved by Regional APCCF (Central Zone), MoEF Nagpur. After approval of this working scheme DY. C.F. (T) can issue the necessary working order for harvesting bamboo outside bamboo overlapping working circle. 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.

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SECTION 26 : BAMBOO PLANTATION.

14.26.1 Bamboo is a poor man's timber and therefore bamboo plantation must be encouraged all over the division wherever possible and the produce obtained from such areas should be made available to the local people and burads for construction and other cottage industries purposes

14.26.2 In Allapalli Forest Division, the tribal prepare bamboo mats and other articles to earn their livelihood. Bamboos are required by agriculturists also. Their requirements are fulfilled through departmental working of nistar coupes. However, in the present working plan the requirement is to be met for the supply of bamboos by the agency, who will work. Nistar has now been extended to Reserved Forest also.

SECTION 27: SMALL TIMBER, POLES AND FIREWOOD :

14.27.1 Small timber and poles for agricultural purposes and repairs to houses and firewood for domestic use will be supplied from the depots at concessional rates, depending upon the availability of these produce. Depots will be opened at suitable places, throughout the division, so that people have to go to minimum possible distance to procure these produce. Range, round or beat head quarters will be chosen for this purpose, so that supervision and maintenance of these depots becomes convenient.

SECTION- 28: REMOVAL OF EDIBLE FLOWERS, FRUITS, SEEDS AND OTHER MINOR FOREST PRODUCE.

14.28.1 Collection of moha flowers and seeds, charoli, tendu fruits, bor and other minor forest produce may be allowed free to tribal and local villagers for their consumption. However, no forest produce will be allowed to be removed free for commercial purpose. During collection of any produce, no felling or hacking of trees will be allowed.

SECTION 29 : FORESTRY EXTENSION.

14.29.1 In order to promote the forestry activity in the division, the forestry extension, programme should be taken up by concerned territorial Dy. Conservator of Forests and regular awareness camps at regular intervals all over the division should be taken up with the active participation of local people, gram panchayats and voluntary agencies and the benefits of forestry and forest conservation should be explained to

the local people through radio program, poster presentation, nature walk and nature studies, forestry lectures, T.V. program etc.

SECTION 30 : WATER SUPPLY :

14.30.1 Due to erratic rains, water scarcity is felt in the summer during the year in which rainfall is scanty. At some places shortage of drinking water occurs. Adequate arrangements are needed to supply drinking water to staff at such places. The nurseries will be located at such places, where the water availability is sufficient. The augmentation of water supply can be thought of by constructing anicuts at suitable places. Besides, deepening of the existing wells and creating tube wells by using modern machinery available can also be thought of.

SECTION 31 : CAMPING SITES :

14.31.1 No camping site for the harvesting purpose or for any other produce should be permitted within half a kilometer radius of the existing waterholes. The exhaustive list of such waterholes shall be prepared and maintained at divisional level and the copy of the same shall be provided to the Conservator of Forests, Working Plan, Gadchiroli for record.

SECTION 32 : RAIN-GAUGE AND TEMPERATURE RECORDING STATIONS:

14.32.1 Aheri tahsil has facilities for recording rains and temperature. There is no recording station in the interior places. It is, therefore, recommended that the rain and temperature recording instruments should be installed at least at Range Headquarters where the forest staff can be trusted with the working of recording the same.

SECTION 33 : BUILDINGS :

14.33.1 The details of buildings are given in **Appendix No .LIX.**

SECTION 34 : ROADS , CART TRACKS AND CULVERTS :

14.34.1 The details of roads, cart tracks and culverts are given in **Appendix No.LX.** The construction of new roads on the forest lands is not permitted under the Forest Conservation Act , 1980.

SECTION 35 : ESTABLISHMENT AND LABOUR :

14.35.1 The forests of the Division are more or less compact and there is no organized illicit felling in this area. However, for better control of all working plan operations, the R.F.Os. and subordinates shall be properly placed. The Dy.C.F. Territorial will fix the headquarters of sub-ordinates staff, according to work load.

(a) Beat Norms :-

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(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.

14.35.2 As per these norms the number of ranges round and beats will be increased and the existing staff is not sufficient for execution of works. The reorganization of ranges, round and beats is required because some of the areas have been transferred to FDCM and their beat guards are left with no work and therefore the services of these guards may be utilized elsewhere where the beats are vacant for want of postings or new appointments.

SECTION 36: MAINTENANCE OF LAND RECORDS :

14.36.1 The land records shall be maintained which will constitute the procurement of

1. 7/12 record of all survey numbers belonging to forests.
2. Village maps on 16"-1 Mile and 1:5000 scale of either Ekatrikaran or Punarmojani whichever is later and rectified later.
3. A comparative chart of three surveys i.e. Jamabandi (1911-1921), Punarmojani and Ekatrikaran and difference in area of forest survey numbers in each survey.
4. The mutation entry register.
5. Khasara patrak.

SECTION 37 : MUTATION OF LAND RECORDS :

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14.37.1 The 7/12 extract of record of right shall be mutated in favour of forest department. This will prevent any unlawful diversion or change in title of forest land. In each 7/12 , the following entries will be recorded.

Govt. of Maharashtra ;महाराष्ट्र शासन)

Forest Department (वनविभाग)

Reserved/Protected Forest (राखीव / संरक्षित वन)

The above entries shall be in a manuscript and no stamps should be used to show these descriptions. To ascertain the entries of above rights (legal status of land, ownership of the land), it is necessary to procure every year copies of 7/12 form, mutation entry form for the forest land and these copies should be neatly filed as permanent record by RFO.

SECTION-38 : TRANSFER OF FOREST LAND TO FOREST DEPARTMENT FROM REVENUE DEPARTMENT:

14.38.1 The transfer of forest land to Forest Department according to statistics, there is still 5443.23 ha. 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 and Dy. C.F. Allapalli keeping co-ordination with Collector Gadchiroli should prepare a programme for handing over of forest land with Revenue Department to Forest Department. For this joint inspection of 5443.23 ha. forest land by frontline staff of Forest and Revenue Department is essential.

SECTION 39 : ABOUT PROTECTED FORESTS , LAND ACQUIRED AND ZUDPI JUNGLE:

14.39.1 There is 27215.242 ha. protected forest and 368.66 ha. zudpi jungle land in this division. The compartment numbers have been given to these areas numeric Statement showing range, villages & Survey no. wise protected forest is given in **Appendix No.LIX.**

SECTION 40 : MAINTENANCE OF MAP:

14.40.1 The fresh 6 sets of maps (4"=1 mile scale) have been prepared. The distribution of these sets as per standing order No.55 issued by Conservator of Forests, working plan circle, M. S. Pune's No.RS/III/11/1089/75-76 dated 14th August-1975 is as follows-

14.40.2 Map Set for the Conservator of Forests working Plans Division.

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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.

14.40.3 Map sets for the Deputy Conservator of Forests (Territorial)-

Management Map

- i) One uncut and mounted set showing the compartments, coupes, felling series, working circles, Range boundaries and other management details.
- (ii) One cut and mounted set showing management details.
- (iii) One cut and mounted set showing management details for distribution amongst R. F. O's.

14.40.4 Any alteration in the map due to afforestation and disforestation will be shown on the uncut set. In addition following copies of management maps, reference maps and grazing maps on 1:50,000 scales are prepared.

The distribution of these maps is as follows-

14.40.5 **Management maps-**

- 1) APCCF, (Working Plan-E) Nagpur-1 copy.
- 2) Chief Conservator of Forests, Gadchiroli Circle. 1 copy.

14.40.6 **Reference map:** This working plan is accompanied by a reference map on 1: 250,000 scale showing working circle, felling series and Range boundaries, Roads; Railway lines, Rest House, Range Head quarters and division Head-quarters.

SECTION 41: PRESERVATION PLOTS AND SAMPLE PLOTS:

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14.41.1 The prescriptions of the working plan for different working circles will not apply to the areas selected for research purposes as preservation plots and sample plots. These areas will be treated as per choice of the research officer for specific research studies.

14.41.2 CARBON SEQUESTRATION.

ESTIMATION OF CARBON STOCK.

The forest of Allapalli Division is enumerated by Survey of Forest Resources unit, Gadchiroli by 1% point sampling method. Total 5606 plots are laid for enumeration. Each plot size is 60 mtr. x 60 mtr. Trees are enumerated with 15 cm girth class interval. The enumeration data is computed and basal area, site quality is determined. The satellite imagery of the tract dealt with showing distribution of vegetation types i.e. crown density is made available from regional office of F.S.I, Nagpur. The basal area and site quality from enumerations data and crown density from satellite images are compared and compartments are allotted to Working circles based on these parameters. Carbon sequestered in the tract dealt with is ascertained by extrapolating the basal area available from enumeration data, and is illustrated as below,

Table No.132

CARBON SEQUESTRATION WORKING CIRCLE WISE

Sr no.	Working circle	Total area in ha.	Average growing stock M³/ha.	Total growing stock	Total carbon Sequestered Metric Tones
1	S.C.I.	103098.125	44.83728745	4622640.266	1386792.08
2	I.W.C.	31269.733	24.30641991	760055.261	228016.5783
3	T.P.W.C.	12489.649	53.61559259	669639.932	200891.9797
4	A.W.C.	35597.019	3.933764925	140030.305	42009.09144
5	P.W.C.	7848.660	65.79521212	516404.250	154921.2749
6	Misc.Area	22814.895	35.253062	804294.907	241288.472
7	Total	213118.081	-----	7513064.92	2253919.48

SECTION 42: The Schedule Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, Rule 2008.

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14.42.1 1) The Schedule Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, is enacted by Union of India and notified on 2.1.2007 in the Gazette of India. The Central Government, for implementation of provisions laid in above Act, has formulated and notified Rules on 1st January 2008 which was further amended by notification dated 6th September 2012.

2) The individual and community rights which are Forest Rights under above Act, are processed, approved, / rejected/ reviewed by procedure laid down in above said Act and Rules there under. The status of rights claimed, recognized, rejected, approved, etc. in respect of individual and community forest Rights is as below for Allapalli Forest Division.

Table No.133

Status of Individual & Community Forest Rights Claims

Sr. No.	Type of claims	No of claims received	No of claims rejected	No of claims and area finally approved	No of claims pending at DLC for decision	Remarks
1	Community forest rights	193	0	185 No. 9745.95 ha.	8No. 25.12 ha.	Allapalli division has 254 villages out of which 234 villages are forested. Community forest rights are awarded for 185 villages.
2	Individual rights	8120	2288	5832 No. 6547.47 ha.	N.A.	
3	Infrastructure development	60No. 65.27 ha.	N..A.	26 No. 21.57 ha.	N.A.	

3) The rights holder are beneficiaries of forest land and the sensitization of right holders should be done to impart his duties in protection of forests & wild life.

4) The individual & community rights holder should be actively participated in collection, processing and marketing of NTFP's which will give employment opportunities to right holders. The overall development of cultivation area of rights holder should be done with close association & convergence of land and crop developments schemes of Line Departments like Agriculture, Sericulture etc.

5) The claims if finally rejected after following due process, then such areas should be set free from encroachment by following prevalent procedure.

14.42.2 General prescriptions

- 1) The Form no.1 of Allapalli Division is updated by recording entries of area finally approved for cultivations under FRA 2006, forest area, diverted for 13 infrastructure developments u/s 3 (2) of The Schedule Tribes and Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006, Rule 2008, forest area diverted for non forestry purpose under section 2, FCA 1980 and these entries should be attested by Dy. C.F. (T) Allapalli quoting order no. of sanction by Dy. C.F.
- 2) The forest area under individual claims will be demarcated by Revenue Department with the survey by Land Records. This survey will take some time, however field staff should ensure that the rights holder will not extend his claim area

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ESTABLISHMENT AND LABOUR**SECTION 1 : ESTABLISHMENT AND LABOUR :**

15.1.1 The forests of the Division are more or less compact and there is no organized illicit felling in this area. However, for better control of all working plan operations, the R.F.Os. and subordinates shall be properly placed. The Dy.C.F. Territorial will fix the headquarters of sub-ordinates 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.

15.1.2 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 2 : Labour availability:

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Most of the schemes have some amount on labour welfare amounts should be pooled and utilized for the community welfare program in concerned villages by involving local communities. Labourt skills shall be upgraded by organizing camps in NTFP collection and grading and bamboo harvesting etc.

Some scheduled adjustment should be sufficient for execution of the forestry operations. Temporary manpower shortage is experienced during the crop sowing period.

Care should be taken to ensure adequate employment availability to the local people. The forest Labour Co-operative Societies (FLCS) often engage large manpower of non-members in coupe working allotted to the societies, and the proportion of the work done by the non –members should be recorded.

CHAPTER – XVI CONTROL AND RECORDS

SECTION -1 : CONTROL FORMS:

16.1.1 This should be written /updated by the WPO/DFO territorial as his inspection of forests proceeds and should be a well documented description of the lowest management unit in the field i.e. compartment / Village. Normally they should be updated before the working plan is completed. The following forms(in two sets, one each for range and the division) are used for writing the compartment history for each management unit (compartment/village)

CH Form-1	Compartment description
CH Form-2	Compartment enumeration
CH Form-3	Bio-diversity assessment
CH Form-4	Management details
CH Form-5	Details of NTFP including MAPs
CH Form-6	Trees marked for felling since last plan
CH Form-7	Compartment out – turn
CH Form-8	Harvesting of NTFP
CH Form-9	Past events during the last plans in the compartment

16.1.2 COMPARTMENT DESCRIPTION :

The format (CH Form – 1) is as under :

Identification

Division	Range	Block	Compartment

Description

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Title of description	Explanatory notes to writes the description
Area (in Hectares)	Total area under each species type, blank, unworkable, etc
Situation	As accurate as possible with the help of GPS.
Boundaries	N,S,E,W (mention boundary pillars, ridges, spurs, streams, etc .
Legal states	Legal status of the forests may be as reserve forest, protected forest, un-classed forest, national park, private forest, private land with tree owned by government and undetermined, etc .
Land use	The land use type of the plot may be categorised as closed forests , dense forests, open forests, scrub, bamboo brakes, shifting cultivation, young plantation of forestry species, tree in line, forest roads, grass lands, and barren, agricultural land without trees in surround, agricultural land with trees in surround, non-forestry plantations, habitation and water bodies.
Genenal topography	The topography of the area may be determine from the topo sheets and the same may be confirmed by field observations. It may be categorized as flat, gently rolling, hilly.
Altitude	In meters. In case of hilly areas give lower & upper limits. .
Aspect	Main aspect and variations if any; the direction of the slope may be recorded as northern, north-eastern, eastern, south-eastern, southern, south-western, western, north-western and no aspect .
Grandient / slope	Precipitous, very steep, steep, moderate, gentle, etc .
Configuration	Rugged, undulating, flat etc.
Rock and geology	Mention main underlying rocks including alluvial deposits

Soil	Texture, depth, permeability , drainage, surface compaction, humus etc.
Soil erosion	Heavy/ moderate/ mild / no erosion
Crop composition	Mention of major tree species predominant in the area and extent of their representation in terms of percentage may be made.
Regeneration status	Regeneration status may be observed and recorded as adequate / moderate / poor / absent for major tree species.
Injury / damage to crop , if any	Insect attack, fungal infestation, leaf defoliator, top drying, girdling, scarring, lopping, damage by natural calamities/ wildlife/ fire may be observed assessed and recorded .
Grazing incidence	Depending upon the pressure of grazing exerted on the forest by livestock the incidences of grazing may be categorized as heavy/ moderate/ light/ none
Presence of bamboos	If yes, brief description of bamboo quality, bamboo regeneration and bamboo description may be made.
Presence of grasses	Ground cover on an area of about 2 ha around the plot (grid) center may be intensively observed to classify the area for grasses as very dense, dense, moderate, scanty and absent .
Presence of weeds	Ground cover on an area of about 2 ha around the plot (grid) center may be carefully observed to classify the area for presence of weeds as very dense, dense, moderate, scanty and absent .
Plantation status	If a plantation is in existence in a plot (grid) area fully or partially , the details of the plantation with regard to its area, year of plantation, species, spacing, general growth conditions, average crop diameter, any specific events or happening related to plantations may be observed, assessed and recorded .

Water bodies	Name ,type, extent, seasonality of the water body explored and recorded . potability i.e. safe enough for drinking has to be ascertained .
Drivers of degradation	Biotic : brief account of degradation sources may be given and on the basis of various factors of degradation like grazing, browsing, fire, lopping, girdling, illicit felling, mining, encroachment, etc. the intensity of degradation may be categorized as heavily degraded, moderately degraded, and not degraded . natural calamities : degradation due to calamities such as landslides, avalanches, floods, frost, cyclones, droughts may be categorized as heavily degraded, moderately degraded, mildly degraded and no calamities .
Faunal sighting; if any	The flagship species including mammals, birds, reptiles, amphibians, plants, etc. which may be very significant to the area may be identified. Suitable habitats and micro-habitats for such key faunal species may be identified and recorded so as to prescribe appropriate measures needed to conserve and improve .
Faunal traces of flagship species	The entire 2 ha area around the center of of plot (grid) may be scanned for any faunal traces of flagship species . if found the details of the same may be observed and recorded .

The description will be signed and dated by the WPO. Each heading should commence in a separate paragraph. Details shall be based on information collected in plot approach form and plot description form for plots falling in the compartment / village.

16.1.3 Compartment Enumeration (based on enumeration of sample plots falling in the compartment)

The format (ch form2) is as under :

1) General information

Block	Compartment	Sub compartment	Total area (ha)	Area enumerated	Sampling method if partial	Year of enumeration

2) Result of enumeration (if any)

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Species	Diameter class in cm. (Number in each class)									
	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90&over	total

3) Biodiversity and Regeneration Assessment

The format (CH Form3) is as under

Name of the species	Density (No. of tree/ unit area)	Frequency	Total basal area (m ² /ha)	v
Trees				
Shrubs				
Saplings				
Seedling				
Climbers				
Herbs				
Grasses / Sedges				

4) Management details

The format (CHForm 4) is as under

Working plan period			
Author WPO			
Working circle			
Felling series			
Periodic block			
Sample / research plots / preservation plots			
Forest types			
Forest cover and change			

5) Details of NTFP including Maps

The format (CHForm5) is as under

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Sr. No	Scientific name	Local name	Type of plant (Habit)	Part used	Location where found (Compartment no./beat/range)	Area in ha	Potential harvesting quantity /ha.	Estimated harvest/ ha.	Remark
1	2	3	4	5	6	7	8	9	10

16.1.4 TREES MARKED FOR FELLING

This form is to be filled by the DFO territorial from time to time as the markings take place . The format (CH Form 6) is as under :

Year	Area ha.	Species	Diameter class in cm. (Number in each class)								
			10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90 & over

16.1.5 COMPARTMENT OUTTURN

The format (CHForm7) is as under :

Year	Area felled in ha.	Species	Round timber	Sawn timber	Fuel wood	Miscellaneous	Remarks

16.1.6 HARVESTING OF NTFPs

The format (CH Form 8) is as under:

Block	Compartment	Sub-Compartment	Species,		Harvesting time	QualIntity harvested (Kg)						
			Scientific name)	Local name		Roots	Flowers	Leaves	Bark	Stem	Twig	Whole plant

16.1.17 COMPARTMENT HISTORY

The format (CHForm 9) is as under :

Range : -----, Block : -----, Compartment : -----, Beat : -----

Year	Event (since last plan)	General comment on the impact of the said event
a	b	c

If updated compartment history with full entries already exists, past entries made by the DFO will be scrutinized by WPO may edit them if necessary . Usually no condensation should be necessary.

The DFO territorial is responsible for recording current events as they occur and will make his entries on the separate sheet of the form and not on the one that is prepared by the WPO. At the next revision of the plan, the WPO will scrutinize these entries and edit them if necessary.

The principle information, which the DFO territorial should record, is as follows :

Felling, subsidiary silvicultural operations, slash disposal with costs, plantation, control burning with costs, fire incidences and damage caused, by other factor like drought, storm, snow, cloud burst, landslides, insect, fungi, grazing, etc. and remedial measures taken along with costs, gregarious flowering, seed masting, good seed or seedling year of important species, etc .

The entries should be brief concise; whole or part of a compartment that was involved should be made clear. For event timings- month or month should be given .any other activity if undertaken is to be mentioned along with costs.

16.1.5 MONITORING, ASSESSMENT AND REPORTING

CONTROL FORM

General prescription of the working plan should be written in such a way that it is quite clear as to what constitutes a performance norm each prescription. . The control forms provide the performance parameters / targets / annotations / norms for all prescription / suggestions for every working circle to be monitored, assessed and reported on annual basis during the period of the working plan. Control forms should be prepared to include each of these prescriptions.

The WPO should prepare a draft set of control forms to monitor all the important operations prescribed and suggested in his working plan such as different

types of felling, thinning, plantation works, subsidiary silvicultural operations, rotational lopping, soil and water conservation works, controlled / regulated grazing, fire protection, NTFP harvesting practices, bamboo harvesting, boundary pillars, spring recharge, lantana / weed eradication, reducing degradation, removal of firewood, etc. These forms will then be submitted to the CCF/ APCCF (WP) for approval and preparation of final sets. There shall be separate set of control forms for each working circle. In this regard, help may be taken from suggested reporting formats for sustainable management of forests (Annexure v).

Three permanent sets of control forms should be prepared in the office of the Working Plan Officer and one set each is to be sent to CCF/APCCF (WP), head territorial circle, and the Dy CF territorial.

Following are examples of control forms;

- Silvicultural Control Forms – For the control of all silvicultural operations such as felling, subsidiary cultural operations, cleanings, thinning, etc. which may be prescribed or suggested to be carried out in a given management unit for the duration of the working plan .
- Felling Control form -- For controlling and maintaining the record of all trees marked for felling and tree retained .
- NTFP Control Form -- For Controlling and maintaining a record of all NTFPs harvest so as to make the removal / harvest of NTFPs remain sustainable .

1) SILVICULTURAL CONTROL FORM

The format of coupe control form is as under .

Working circle- periodic block-		Felling- series cutting section	Localities prescribed localities suggested				Coupe control form		
							Coupe No.		page
			AS carried out				Excess (+) or deficit(--)		
Prescription in brief	W.P. para	Year due	Year	Block/ compt.	Area	Volume	Area	Volume	Remarks and sanction
1	2	3	4	5	6	7	8	9	10

2) FELLING CONTROL FORM

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The format of felling control form is as under :

Working circle-periodic block		Felling series-cutting section		Localities prescribed localities suggested (with areas)				Coupe Control Form	
								Coupe No.	Page
Range wise	Area	Species	Diameter class	Trees marked	Unit Factor	Volume marked	Trees retained	% Trees retained	Remarks
1	2	3	4	5	6	7	8	9	10

- Offence reports – prosecuted, compounded, un –detected
- Removals under rights / concessions
- Forest lands marked for individual patta under FRA- range, block area and compartment,
- mauza, revenue paper status
- iv. Forest lands allotted to community for enjoying of rights- range, block area and compartment, mauza, status as per revenue records .

3) NTFP CONTROL FORM

Format to incorporate the NTFPs :

Working circle-periodic block		Felling series-cutting collection area	Localities prescribed Localities suggested					Coupe control Form		
Prescription in brief	W.P. para	Year due	As carried out					Coupe No.	page	
								Excess (+)or Deficit(--)		
			Year	Block/ compt.	Area	Name of NTFP with scientific name of species	Vol./Qty.	Area	Vol./ Qty.	Remarks and sanction
1	2	3	4	5	6	7	8	9	10	11

Quantity may be given in specified unit viz. number / weight / volume according to type of NTFP. Bamboos may be quantified in notional tons for uniformity.

The DFO territorial will annually make entries in his copy of the control forms and send them together with the deviation statement in triplicate to the Head, territorial circle. After the entries have been checked and approved, the Head, territorial circle. Will first get his copies completed and then send it in two copies to the concerned WPO. The later will then complete his copy and finally return the DFO's set for deposit in the letter's office till next year. The WPO will send the deviation statement with appropriate justification in four copies to the PCCF (HoFF) for sanction. After the sanction, one copy each will be sent to the WPO; Head, territorial circle and the DFO territorial for there record and the CCF/ APCCF (WP) as the case may be, will retain the fourth copy for his set of control forms. The control forms. should be submitted by the DFO territorial to the Head, territorial circle by October and the latter should send to the WPO concerned by December each Year .

16.1.6 DEVIATION STATEMENT

Any large and unusual operation, variation from yield and target for plantation / regeneration and or other activities provided in control forms of the working plan constitutes a deviation.

These also should be spelt out. The check is through control forms and reporting is through deviation statements. Deviation beyond 20% of target is considered to constitute a major deviation . Following is the format of Deviation Statement.

Statement showing deviations from working plan prescriptions Year-----

Serial No. of Deviation	Control book name, form no. page	Reference to working plan		Nature of deviation requiring sanction
		Paragraph	Nature of prescription	

The DFO territorial will forward through the Head, territorial circle, types copies of this form in triplicate yearly with his copy of control forms No explanatory remarks are required on this form, but this should be given in the forwarding letter. All minor deviations, which do not permanently alter the basis of management may be approved and sanction by the Head, Working Plan organization on behalf of the PCCF (HoFF) provided he agrees with the necessity of this deviation. One copy of the statement will be return to the Dy. CF territorial through the Head , territorial circle

after the deviation have been sanctioned by the Head , Working Plan organization and the other copy will be send to WPO for record . All major deviation without altering the basis of management, the prior sanction of the PCCF (HoFF) should have been obtained in advance. The sanction number and date should be quoted in the last column .

For all major deviations with respect to prescriptions where sanction of the MoEF is mandatory, an explanatory note along with request for regularization has to be sent by PCCF (HoFF) and RAPCCF (MoEF) , the former will refer the matter to DGF & SS (MoEF), whose decision shall be final . The PCCF (HoFF) will countersign the deviation statement for reporting to the (MoFF).

Registers and record including spatial data: the following updated (till last financial year)registers and record will be maintained by the division .

1. Compartment histories
2. Divisional notebook
3. Fire records and registers
4. Register of boundary pillars
5. Plantation journals (along with list of plantation raised area and location last years)
6. Nursery register(location, permanent nursery)
7. Register of reserves
8. Register of rights and concessions
9. Record of forest produces harvested
10. Free grants
11. Register of leases
12. Register of land transferred to other department or under fc act and FRA
13. Register of soil and water conservation works (along with list of plantation raised, area and location last five years)
14. Register of rotational lopping.
15. Grassland management (last five year)
16. Wildlife management
17. Register of invasive species eradication e.g. Lantana eradication, etc.
18. Register of wildlife management may include detailed of human – wildlife conflicts that includes data on human casualties and injuries, loss domestic animals and crop damage and compensation paid etc.

19. Register of government buildings that includes log of the repairs and addition (if any) undertaken in the buildings .

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20. Register of licensed gun holder (s) in the division.

21. Register of places of religious significance that has been historically been given recognition (However, mention must be made of the fact that mere mention in the register does not automatically give legal sanctity to the structure) .

22. Register of registered saw – mills in the division.

23. The division note book must have record of water table at various places in the division.

Annual inspection of DFO territorial office by CF / CCF and range office by DFO territorial is mandatory within three month of completion of financial year to have check on annual statement in control forms and deviation statements and maintenance of registers and records.

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CHAPTER – XVII

NURSERY TECHNIQUES

SECTION 1 : INTRODUCTION:

17.1.1 The nursery operations are precursor to the production of good quality seedling stocks to be planted. Hence the nursery operations are mandatory. And as such the nursery practice is regularly resorted to. This practice is so usual that in course of time it has become indispensable routine. However in its routine character, it has failed to attract the special care which it deserves. In fact, it is the nursing aspect that should find its place in nursery.

SECTION 2: OBJECTIVES:

17.2.1 The objectives of the nursery technique are:

- i) To obtain the healthy seedlings in given period.
- ii) To obtain such seedlings in adequate numbers.
- iii) The adopt nursery practices in such a way that it obtains the seedlings timely.
- iv) To obtain such seedlings so that they are of standard size capable of successful plantation under given situation etc.

SECTION 3: SEED MANAGEMENT:

17.3.1 As the seeds are the source of seedlings and the growth of plant is mostly dependent on the seed of origin, it is imperative that seeds are genuine. Hence the special care should be taken as regards to the procurement, storage and utilisation of the seeds etc.

17.3.2. PROCUREMENT

- i) Seeds should be collected from mature and straight mother trees. Select seeds from branches growing in the sun.
- ii) As far as possible do not collect seed, which has fallen on ground; it could be rotten or infected
- iii) Do not spread the newly collected seed in the sun ; the sun heat can kill the seed.
- iv) Do not leave the seed in rain or in wet area. If the seed gets wet, it will rot and die.

17.3.3 STORAGE

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- 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 making and germination percentage etc.

2) Seed viability Test: The viability should be determined by the (1) Germination Test (2) Tetrazolium Test.

3) Pre Germination Test: Depending upon the seeds of the species, following test shall be carried out:

- a. Mechanical Scarification (or)
- b. Acid Scarification (or)
- c. Stratification (or)
- d. Soaking the seeds in water

4) Seed certification shall be done after the seed procurement as well as before actual utilisation.

Suitable site and soil bed:

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:

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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 is 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:

- Easy to fill with soil.
- Easy to check the moisture of foot growth
- Air pruning of roots produces actually growing root tips.
- Plants grow well and have a good root system.

- Produces plant that are small, light and easy to transplant.

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- Containers are reusable and last 4 to 6 seasons.

- Plastic Sacs (or tubes) shall be used

5. Hardening: In the absence of this, the seedlings turn food which promote development of new roots. Further more hardened plants do not loose water by transpiration so rapidly as those not hardened. Hence these plan to can stand transplanting shock better than those which are not hardened. Hardening shall be done by conditioning to stand adverse conditions.

6. Hygiene: Shall be maintained to avoid the insect attack and retarding infection.

7. Miscellaneous:

1. There shall be a provision for the following in the marked area of nursery:
 - i. Preparation of farm yard Manure
 - ii. Preparation of compost
 - iii. Preparation of super compost
 - iv. Preparation of Azo compost
2. Fertiliser application by virtue of soil testing shall be provided for soil to assess requirement of fertilizer. Bio fertiliser should also be used.
 - 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 followed.
 - v) Seedling obtained shall be of requisite standard and size depending upon the species.

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**EXECUTIVE SUMMARY OF DRAFT WORKING PLAN REPORT OF ALLAPALLI
FOREST DIVISION, ALLAPALLI (2017-18 TO 2026-27)**

PART - I

The working plan, by Dr. S.S. SRIVASTAVA for the period 2003-04 to 2013-14 (extension approved by Gol. in MoEF for the period 2014-15 to 2015-16), is the first plan which covered entire forest area of Allapalli Forest Division. The earlier plan by Clutterbuck, Gentle, T.M c. Donald and Mujumdar , Chandras and Gurjar , S.A.H. Qureshi , A.P.Deshmukh and S.P. Joshi, K.N. Khisti, all these plans covered different parts of forest or individual ranges. The present plan is for the period 2017-18 to 2026-27.

SECTION-1 SITUATION & CONFIGURATION OF GROUND

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

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

The total notified forest area of Allapalli Forest Division is 270957.474 ha. Area handed over to wildlife management for Chaprala wildlife sanctuary is 13364.639 ha. and area handed over to FDCM Ltd, is 44474.753 ha. Hence net forest area notified under management of Allapalli Forest Division is 213118.081ha. The digitization of 213118.081ha. notified forest area comes out to be 190303.186ha. The difference between notified area and digitized area is 22814.895ha. This difference is due to un surveyed reserved forests in Makkepalli block, Udera block, Fundi block, Chandara block, Permili block, Mirkal block of Permili range and 368.660 zudpi jungle. The un surveyed forest blocks are notified approximately block wise. The Form no. 1 maintained in Allapalli Forest Division shows notified area under management of Allapalli Forest Division proper is 213118.081 ha. Hence to confirm to notified area as per Form no 1 of Allapalli Forest Division, the 22814.895ha. difference is mentioned as Miscellaneous Area. The present working plan covers an area of 213118.081 ha of forest area of Allapalli Forest Division. Out of this 186976.173 ha is reserved forest, 25773.248 ha is protected forest and 368.660 ha is zudpi forest.

The forest area disforested prior to 1980 is 28584.458 ha. which include 10315.841ha. reserved forest and 18268.617 ha protected forest.

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

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

CLIMATE:- Climate is hot summer with well distributed rainfall during south-west monsoons. The mean daily maximum temperature in May is 48.00 degree centigrade and mean daily minimum is 9.30 degree centigrade. The humidity exceeds 72.40% in the South-West monsoon season.

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

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

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

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

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

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

SECTION-2

PAST MANAGEMENT PLANS :

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The forest of the tract dealt with form the parts of ex-Aheri Zamindari till 1951.

1) CLUTTER BUCK'S PLAN (PRIOR TO 1903)

This was first management plan for Allapalli range and implemented during 1895 to 1903. Working circle no. I and II were proposed for Allapalli range. The prescriptions were selection felling. In working circle no. I, selection felling was prescribed where in all teak trees above 24" in dbh were to be removed along with all unsound teak trees between 18" and 24" dbh. All other trees above 24" dbh, if marketable, were to be removed. Other trees were girdled or cut if found interfering growth of young regeneration of teak.

The working circle no 2 covered degraded and poorly stocked forests, in which cultural operations were prescribed. Felling cycle was fixed at 40 years. Teaks trees below 24" dbh, except unsound trees, were to be retained. Improvement felling combined with cleaning and thinning operation was prescribed for entire area of Working Circle no I and II on 10 years cycle.

In 1920 an order was passed stating that 30 % of vigorous teak trees between 24" dbh. and above were to be retained. Further A.V. Monro, Conservator of Forests, prescribed removal of unsound and badly grown trees above 16" dbh where the regeneration was completed and was assured. This operative was confined to two of the four coupes of the year in Working Circle I and II

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

forests consisted mostly of pole and middle aged teak with some scattered old trees. The teak percentage was deficient.

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2) GENTLE' PLAN (1930 TO 1946)

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

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

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

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

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

The working plan dealt with the compact block of Allapalli and Pedigundam ranges. The general objects of management were to satisfy all the local demand for forest produce and conserve as far as possible those tree species which produce edible fruits and flowers for the benefit of the aboriginal population in times of scarcity, to manage the forest on commercial lines to get optimum profit, to manage the forest as high forest under intensive working with the object of producing teak trees up to 2.13 m.(7') in girth at b.h.to maintain a judicious mixture of superior miscellaneous species with teak in the growing stock and a suitable under storey to protect and improve the soil, to increase the rate of conversion so as to complete the conversion program in the remaining period of conversion, to manage the working of bamboo on a sustained basis so as not to interfere with growth of tree species, to maintain adequate cover on the steeper slopes by judicious and conservative felling in order to prevent soil wash, to aim

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at the creation of a normal forest and all that it implies, to maintain a continued production of large sized timber of teak and other superior species on the basis of sustained yield, to rigidly fire protect the forests in order to conserve valuable timber and in order to meet the above objects of management the forest area divided into Teak Conversion Working Circle, Plantation Working Circle, Hill Working Circle, Khorgaon Working Circle, Mixed Forest Working Circle, Miscellaneous Working Circle and Bamboo (overlapping) Working Circle.

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

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

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

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

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

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

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

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

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

8) SHRI DR.S.S.SRIVASTAVA Working Plan (2004-05 TO 2013-14)

This working plan for the Allapalli Forest Division was prepared on the basis of scientific working of forests. The prescriptions have been influenced by the National Forest Policy and the general objects of management were i) To preserve and enrich the growing stock in natural forests and to restock all under-stocked and degraded areas of the forests with the help of artificial regeneration and soil and moisture conservation measures ii) To improve the quality and to increase the ratio of valuable trees species by encouraging natural regeneration and also by artificial regeneration by way of planting important timber and miscellaneous species iii) To improve the stocking of teak, bamboo and other valuable species in order to produce large size timber to meet the local and commercial demand iv) Preservation and improvement of minor forest to obtain progressively increasing yield of small timber, fire wood, and poles in order to meet the demands of local people and to provide grazing to local cattle v) To combat ill effects of soil erosion wherever it has already started and to prescribe preventive measures vi) To increase the production of non-wood forest produce and medicinal plants, and to manage the same scientifically vii) To increase the productivity and ensure progressively increasing yield of forest produce in demand viii) To achieve compatible wildlife management.

SECTION-3

RESULTS OF PAST WORKING:

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

SECTION-4

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.

SECTION-5

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.

SECTION-6

GENERAL OBJECTS OF MANAGEMENT :

- I. To preserve and enrich the growing stock in natural forests and to restock all under-stocked and degraded areas of the forests with the help of artificial regeneration and soil and moisture conservation measures.
- II. To improve the quality and to increase the ratio of valuable trees species by encouraging natural regeneration and also by artificial regeneration by way of planting important timber and miscellaneous species.
- III. To improve the stocking of teak, bamboo and other valuable species in order to produce large size timber to meet the local and commercial demand.
- IV. Preservation and improvement of minor forest to obtain progressively increasing yield of small timber, fire wood, and poles in order to meet the demands of local people and to provide grazing to local cattle.
- V. To combat ill effects of soil erosion wherever it has already started and to prescribe preventive measures.
- VI. To increase the production of non-wood forest produce and medicinal plants, and to manage the same scientifically.

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

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VIII. To achieve compatible wildlife management.

IX. To encourage active participation of local people in the management, protection, preservation and conservation of wild flora and fauna by forming joint forest protection committees under the Joint Forest Management Programme.

SECTION-7 CONSTITUTION OF WORKING CIRCLES:

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

1. Selection-cum-Improvement Working Circle.
2. Improvement Working Circle.
3. Teak Plantation Working Circle.
4. Afforestation Working Circle.
5. Protection Working Circle.
6. Bamboo (Overlapping) Working Circle
7. Non-wood Forest Produce (Overlapping) Working Circle.
8. Wildlife (Overlapping) Working Circle.
9. Miscellaneous Regulations.

1) SELECTION-CUM-IMPROVEMENT WORKING CIRCLE:-

AREA:	100283.382 ha.
CHOICE OF SPECIES:	Teak and other local miscellaneous species such ain,shisham,haldu,kalam,moha,rohan,lendia,bija etc.
SILVICULTURAL SYSTEM:	Selection-cum-Improvement
FELLING CYCLE:	20 years
HARVESTABLE GIRTH	
Group-I	Teak, 135 cm
Group-II	Ain,bija,shisham,haldu 120 cm
Group-III	Other timber species 120 cm
Group-IV	Garari and Lendia 45 cm
FELLING SERIES	45
Regulation of yield	By area

PERCENTAGE OF TREES TO BE REMOVED

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

Assessment of S.C.I. Working Circle:

The observations on working of this working circle are as under;

- The status of natural regeneration has improved as can be seen from the data of sample plots.
- The hygienic condition of forest area has improved to some extent because of operations like climber cutting, removal of dead, dying and diseased trees.
- The congestion due to growth of inferior species like garadi, lendia etc has been eased out which has resulted in improvement of general condition of forests.
- CBO works and adequate regeneration works where carried out has also helped in improving the coupe area.
- Out of 460 coupes harvesting works could not be carried out in 39 coupes as they fall within 10 km of protected area and 198 coupes due to naxal activities.

2) IMPROVEMENT WORKING CIRCLE:

AREA:	60640.152 ha.
CHOICE OF SPECIES:	Teak and other local miscellaneous species such as ain, shisham, haldu, kalam, moha, rohan, lendia, bija etc.
SILVICULTURAL SYSTEM:	Improvement Fellings
FELLING CYCLE:	20 years
FELLING SERIES :	14

Assessment :

The observations on working of areas under this working circle are as under;

- The natural regeneration got fillip because of removal of over mature trees and thinning out of congested areas.
- The hygienic condition of forest area has improved to some extent because of operations like climber cutting, removal of dead, dying and diseased trees.

- Works such as cutting back operations and cleaning were carried out as per the prescription during the past 8 years. This has helped improve the site condition.
- Out of 140 coupes, harvesting works could not be carried out in 9 coupes as they fall within 10 km of protected area and 63 coupes due to naxal activities.

3) TEAK PLANTATION WORKING CIRCLE:

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

Assessment:

- Out of 160 coupes, harvesting works could not be carried out in 28 coupes as they fall within 10 km of protected area and 40 coupes due to naxal activities.
- On an average the area has yielded 52.86 cubic metre of timber per hectare and 48.7 fuel beats per hectare.
- Cut back operations have been carried in the areas where coupe working has been done along with artificial regeneration with teak stumps. These areas are converted into valuable teak producing forests.
- Out of 247 coupes for thinning 137 coupes could not be carried out due to naxal activities.
- On an average the thinning have yielded 6.256 cubic metre of timber and 8.31 fuel beats per hectare.
- The thinning operations are opening up the forests resulting in healthy growth in terms of girth and height of the remaining stand.

4) AFFORESTATION WORKING CIRCLE:

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

The areas allotted to this working circle are mostly open, degraded having density below 0.4 and the site quality ranging from IVa to IVb and at some places site quality III is also present. Due to intensive biotic pressure, the vegetation, in these

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areas is reduced to shrubby growth. Some of these areas are subjected to heavy soil erosion. The state of natural regeneration is very poor. The total area of this working circle has been divided into 5 plantation series having 50 annual coupes each.

Assessment:

Artificial regeneration was carried out in 4527.78 hectares from 2004-05 to 2012-13. Soil and moisture conservation works like nalla bunding, CCT etc. were carried out. Under this working circle 29627.414 ha. was proposed out of which 4527.78 ha. is treated. The gap of 4 years between restorative phase and productive phase of artificial regeneration does not transform in to expected results and the gap of 4 year is quite long for continuous supervision and protection. The rate structure for artificial regeneration under different schemes like D.P.D.C., 13th finance commission and Massive forestation programme does not include restorative phase and productive gap of 4 years between these phases. Hence the results of restorative phase and productive phase are not encouraging.

5) PROTECTION WORKING CIRCLE:

Area:	6413.632 ha.
Density:	0.6 to 0.8
Silvicultural system:	No specific system.
Prescriptions:	Only seed sowing along nala banks and bush sowing along with gully plugging. No rotation fixed.

The forests are generally well stocked and mostly of III quality though few patches of II quality are met with on lower slopes. Teak is the principal species and appears at its best on gently sloping and well-drained soils. It is generally young to middle-aged with sprinkling of older trees. Regeneration is poor.

The area under nature reserves only high quality teak bearing forest famous for its quality and density in the whole of state and in order to preserve the rich genetic diversity and the gene pool it is necessary to reserve some of the promising areas of teak forest as a future stock without disturbing its natural growth and complexity. In such areas no exploitation or any other type of work shall be carried out so to preserve the ecosystem in its natural state.

In areas other than nature reserves the main objective is to maintain and improve the adequate vegetation cover and to give rest to these forests from exploitation activities. Therefore, no working in this forest is prescribed except essential cultural operations like climber cutting and removal of dead trees for fire protection. Bamboos form an understorey and its removal will generally not disturb the protective functions and hence bamboo exploitation as per the silvicultural prescriptions has been allowed. The area is divided into 3 felling series.

Assessment:**PDF Compressor Free Version**

seed sowing of neem, mahauk, salai has been dribbled with the help of local forest guard and van mazdoors. The area allotted to this working circle is more than 0.5 density and are found to have adequate regeneration and no soil erosion has been noticed, hence no artificial regeneration or soil moisture conservation works were carried out.

6) BAMBOO (OVERLAPPING) WORKING CIRCLE:

Area: 12200.473 ha.

Cutting cycle: 3 years

Assessment:

- The harvesting operations have produced 69.28 lakh long bamboo and 38.65 lakh bamboo bundles which have catered to the demand of local population to a great extent.
- It has been observed that there was profuse regeneration of new bamboo shoots in the clumps due to proper silvicultural removal of bamboos from the forest.

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

Assessment:

The forest area has huge potential of NTFP like gums, mahua flower, mahua seed, hirda, behada, lac, honey, charoli, medicinal herbs etc. Though the objective in this working circle is partly achieved as the department has to develop forward linkages for sale of minor forest produce in raw form (power form) and finished products like jells, oil, tablets etc. In the year 2012-13, an effort has been made to collect NTFP systematically by declaring Minimum Support Price (MSP) for selected NTFP through Joint Forest Management Committees. For collection of tree borne oil seeds like moha, neem, karanj, charoli etc. funds can be available from National Oil Seeds and Vegetable Oil Development Board (NOVOD), Gurgaon, Haryana. The NOVOD Board finances projects involving collection, storage, oil extraction of oil seeds. Such projects by Govt, agencies is 100% financed by NOVOD Board. such projects will assured handsome minimum support price for oil seeds. The finished and raw products can be put for sale at different cities, tourist places for which a techno economical survey will be quite useful. For sale of raw and finished products Jan Dhan Van Dhan yojana will also facilitate publicity of MFPs. The full potential of NTFP of the division will be realized in future by systematic collection, storage and marketing of produce.

7) WILDLIFE (OVERLAPPING) WORKING CIRCLE:- This is also an overlapping working circle covering entire area of the plan i.e. 217942.685 ha. and mainly comprises of habitat development works and protection of wild life.

Assessment

This plan has no prescription for habitat management of specific wild life (like Shekaru) which needs conservation measures.

The incidences of cattle kill by carnivores and crop damage by herbivores were reported in the division. The following measures were undertaken for mitigation of man- animal conflict:-

- Sensitization of people living through posters, hand bills, meetings, street plays etc.
- Sensitization of field level forest staff and regular monitoring of movement of wild animal and keeping constant touch with villagers.
- Increasing density of waterholes inside the forest.
- Timely payment of compensation.
- Timely and coordinated efforts by forest and police authorities in rescue operations.
- Warning Posters / Banners in sensitive areas.

8) MISCELLANEOUS REGULATIONS:

It covers whole area of the plan. The control forms needs to be updated as per schedule mentioned in National Working Plan Code. The unsurveyed blocks in Permili range needs to be surveyed on priority basis to ascertain the difference between notified area and digitized area. The boundary demarcation is not clear where the forest is adjoining with cultivated area and the claims under FRA 2006 are under process. The Joint Forest Management Committees are involved with active participation of women in Agarbatti making, lac cultivation etc.

PART - II

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED :

- I) Period of Working Plan is 2017-2018 to 2026-2027
- II) Area covered under the plan.

The net forest area under management of Allapalli Forest Division, as per Form No. 1 maintained in Division Office, is 213118.081 ha. (186976.173 ha. Reserved Forest, 25773.248 Protected Forest and 368.66 ha. Zudpi jungle).

This area, under management of Allapalli Forest Division, after digitization is 190303.186 ha. (162897.689 ha. R.F., 26932.551 ha. P.F., and 472.946 ha. Zudpi)

The difference between notified forest area as per Form No. 1 and digitized area is 22814.895 ha. which is termed in this plan as "Miscellaneous Area" to conform to forest area as per Form No. 1. This difference in area needs to be settled by initiating detail survey of unsurveyed forest areas in blocks of Permilli range. The unsurveyed 41011.50 ha. R.F., 1956.676 ha. P.F. and 368.66 ha. Zudpi jungle shows difference of 20660.554 ha. between notified and digitized area. These forest blocks are notified approximately area wise.

- III) The forest area of this Plan is scanned on GIS and digitized area is worked out. The distribution of crop density for the area under this plan is ascertained from vegetation cover with the help of enumeration data and satellite imageries of the area included in this plan. The basal area i.e. distribution of stems per ha. is calculated from enumeration data. With the help of inputs like basal area, crop density, the area included in this plan is proposed for treatment under following working circles.

Sr. No.	Working Circle	Dr. S.S. Srivastava's Plan Area (ha.)	Present Plan		Remarks
			No. of Comptt.	Area in ha.	
1	2	3	4	5	6
1	SCI	100283.382	494	103098.125	+2814.743
2	IWC	60640.152	231	31269.733	-29370.419
3	TPWC	20978.095	54	12489.649	-8488.446
4	AWC	29627.414	804	35597.019	+5969.605
5	PWC	6413.632	33	7848.660	+1435.028
6	Bamboo (OL) W.C.	12200.473	118	12200.473	Nil
7	NWFP (OL) W.C.	217942.685	1616	190303.186	The

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8	Wildlife Management (OL) W.C.	217942.685	1616	190303.186	difference is due to unsurveyed blocks.
9	Eco-Tourism (OL) W.C.	N.A.	5	227.18	Nil
10	Miscellaneous W.C.	N.A.	1616	190303.186	
11	Miscellaneous area	N.A.		22814.895	
12	Grand Total	217942.685	1616	213118.081	

SECTION-1 TREATMENT PRESCRIBED:

1) Selecion cum Improvement Working Circle:

Area	103098.125 ha.
No. of Compts	494 No.
Felling Cycle	20 years
No. of Felling Series	42 No.
No. of Total Coupes	820 No.
Average Area of Coupe	125.729 ha.
Average Annual Area	5280.618 ha.
Site Quality	II/III, III & IV
Harvestable Girth	Group I 135 cm Group II 120 cm Group III 120 cm Group IV 45 cm

TREATMENT PRESCRIBED.

DEMARCATON :

- One year in advance of the main felling. A coupe area will be divided into 100 mtr x 100 mtr grids.
- Each grid will be treated as per existing crop density.
- **Enumeration & Marking :** Enumeration of harvestable trees along with regeneration status will be carried out by laying sample plots of size 60 mtr x 60 mtr. with intensity 5 to 10% in each section of coupe. All the harvestable trees in Group 1 will be marked for felling and 50% of harvestable trees in each Group 2, Group 3 and Group 4 will be marked for felling.

TREATMENT MAP :

After demarcation of coupe, treatment map will be prepared by RFO and inspected by Act after coupe inspection. The treatment will show following areas.

TYPE A : PROTECTION AREAS.

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Areas with slope more than 25°. No trees will be marked for felling. Only seed sowing in blanks, along nalla banks.

TYPE B : UNDERSTOCKED AREAS :

Marking will not be carried out except cutting of high live stumps to ground level, singling of coppice shoots of valuable species, CBO of malformed seedlings.

TYPE C : POLE CROP :

Pole crop either natural or plantation area will be thinned out retaining healthy poles keeping spacement to 1/3 of pole height.

TYPE D : WELL STOCKED AREAS :

In this area main selection and improvement felling will be done. After ascertaining the sight quality, fruit trees, valuable medicinal plants will not be marked. The harvestable trees will be enumerated and 50 % Group I harvestable trees will be marked and 50% of silviculturally available trees from Group II, Group III and Group IV will be marked for felling. Under improvement felling dead, badly shaped trees will be marked for felling. Common climber cutting will be done. Singling of coppice shoots of valuable species will be taken up. Natural regeneration will be assured by strict protection measures against grazing and fire. Except D area, SMC works like CCT, WAT gully plugs, loose boulder, nalla bunds, forest ponds etc. will be taken up in the 1st year. The understocked area will be artificially regenerated by suitable species like Teak, Kalam, Moha, Behda, Bamboo etc.

2) IMPROVEMENT WORKING CIRCLE :

Area	31269.733 ha
No. of Comptts.	231
No. of Felling series	14
No. of Coupes	260 No.
Average Area of coupe	120.268 ha
Average	1683.755 ha.
Site Quality	III to IV a
Felling cycle	20 years.

- Area capable of producing large size timber but not fit for harvesting except some dense patches.
- Degraded, understocked area with density from 0.4 to 0.6.
- **Yield regulation:** Only improvement felling and removal of trees above harvestable girth class in the dense patches provided harvestable trees are silviculturally available, hence no yield regulation.

- **Treatment** : Demarcation, preparation of treatment map, marking and classification of coupe area in to A, B,C, D areas will be done as per prescription in SCI. Improvement felling in type D areas with strict protection measures from grazing and fire.

3) TEAK PLANTATION WORKING CIRCLE :

Area	12489.649 ha
No. of Comptts.	54
No. of Felling series	13
No. of Coupes	260 No .
Average Area of coupe	48.00 ha.
Average annual area	624.482 ha.
Site Quality	II to IIIa
Felling cycle	20 years.
Rotation	100 years

- Density 0.5 to 0.8, constituting 55% Teak as per enumeration data.
- Conversion to Uniform with supplemental AR raised from superior quality Teak stumps.
- Every year 250 ha. canopy removal followed by regeneration by planting A Grade Teak stumps at 2 mtr x 2 mtr spacement.
- First two thinning will be mechanical at 10th and 15th years and thereafter subsequent silvicultural thinning at every 10 year aiming at spacement in the congested crop equivalent to 1/3 of the average height of the stems. Subsidiary silvicultural operation like cleaning, singling of coppice shoots, CBO will be carried out in the 5th year from main felling. Yield regulation will be done by area. Protection measures to be taken up for growth of pole and advance crop.

4) AFFORSTATION WORKING CIRCLE :

Area	35597.019 ha
No. of Comptts.	804
No. of Felling series	15
No. of Coupes	300
Average Area of coupe	118.67 ha.
Average annual area	1780.05 ha.
Site Quality	IV a to IV b
Felling cycle	20 years.

- Degraded area with density less than 0.4
- No yield regulation. Only improvement felling.

- Intensive Soil & Moisture Conservation measures including artificial regeneration of under stocked degraded areas with suitable local species taking into account grazing and fire incidence.

5) PROTECTION WORKING CIRCLE :

Area	7848.660 ha
No. of Comptts.	33
No. of Felling series	4
No. of Coupes	70
Average Area of coupe	112.124 ha.
Average annual area	448.495 ha.
Density	0.6 to 0.8

- Well stocked area with 25⁰ and more slope. Bamboo clumps on hill slopes.
- No yield regulation as felling is not proposed.
- Only seed sowing in blank and along nalla banks.
- Strict protection measures from biotic factor.

6) BAMBOO(O.L.) WORKING CIRCLE :

- Area 12200.473 ha. spread over 118 compartments.
- Dendrocalamus strictus species in major area.
- **Silvicultural system** : Clump Selection System
- Felling Cycle 3 yrs both for PESA and non PESA areas unless deviation approved by MoEF.
- Area divided into 5 Commercial Bamboo Felling Series and 4 Nistar Bamboo Felling Series.
- **Artificial Regeneration:** The blanks will be planted by tall seedlings (1.5 mtr minimum height) of Dendrocalamus strictus and also Bambusa balcoa species raised in 25 cm x 40 cm, 600 gauge polybags. The planting should be done in 60 cm x 60 cm x 60 cm size pits with manuring by NPK, protective watering and additional soil working in the month of December, January, February for early development of rhizome and hence clumps formation.

7) WILDLIFE (O.L.) WORKING CIRCLE :

- Area 190303.118 ha.
- This working circle covers entire area of this plan aiming at development of habitat of birds, wild animals, formation of water holes, minimizing man-animal conflict and protection measures with active participation of

JFMC's, NGO's. Formation of Conservation Reserve for Shekaru in Comptt. No. 207, Konsari with earmarking 10 ha. of present habitat of Shekaru as Core Area and surrounding adjacent 20 ha. area as Buffer Area which can be developed in 1st 5 years of this plan, by planting tall seedlings of species suitable to Shekaru (Mango, Ficus, Tamarind, Behada etc.). For early establishment and growth of these seedlings the size of pits should be 1 mtr x 1 mtr x 1 mtr with close protection measures against fire, grazing and illicit cutting.

- Protection and Development habitat for Indian Otter at Aheri Forest Pond is also suggested.

8) ECO-TOURISM (O.L.) WORKING CIRCLE :

- Area 206.18 ha.
- This working circle covers eco-tourism sites where activities are yet to be taken up and some sites wherein activities are initiated. The potential sites are as below;
- Bio-diversity Garden at Allapalli, Ghot.
- Regadi reservoir.
- Shekaru habitat.

The no. of tourist visiting Hemalkasa, is on rise since last 1 year. Hence, there is scope for development of eco-tourism sites which are connected by fair weather road. Following activities are proposed.

- Preparation of development and management plan of eco-tourism sites and procuring approval from PCCF (HoFF), M.S. Nagpur
- Arranging financial resources from district level and state level schemes.
- Preparation of plan and estimates of activities as per approved plan
- Arranging training schedule for staff and JFMC members, Stake holders for capacity building and skill up gradation in cleanliness of eco-tourism sites, hospitality management, adventure sports, nature guide etc. with the help of experienced NGO's or individuals in above faculty.
- Preparation of brochures, mementos, documentary etc.

- Strengthening and Development of Government Saw Mill, Government Timber Depot, Workshop, Teak museum, which is a land mark in forestry at Allapalli.
- Installations of informative but discreet signages at eco-tourism sites.

9) NON-TIMBER FOREST PRODUCED (O.L.) WORKING CIRCLE :

- This working circle covers entire area of the division.
- Agarbatti making, lac cultivation, honey collection, non edible oil seed collection etc. has better future by involving JFMC's. Seed collection, oil extraction, processing of medicinal plant parts, packaging and labeling will further give value addition which will empower the local women and unemployed youth sustainably. The non edible oil seed collection like Moha, Karanj, Neem, Kusum etc. can be popularized by availing the schemes from NOVOD, Board, Gurgaon, Haryana which finances the Govt. projects 100% in matter of seed collection, storage, grading, oil extraction, packing and sale. The JFMC's needs to be approached and trained in above activities. The present Agarbatti making is a 1st step in this regard.

10) MISCELLANEOUS (O.L.) WORKING CIRCLE :

- This working circle covers entire area of the division.
- Coupe demarcation, marking, preparation of treatment map, maintenance of boundaries, removal of encroachments, forest protection, MFP collection and disposal, community forests rights, carbon sequestration, submission of control forms, etc. are discussed in this working circle.

--Sd/--

(A.D.Bhosale, IFS)

Conservator of Forests,
Working Plan Division, Gadchiroli



भारतसरकार
GOVERNMENT OF INDIA

पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FORESTS
& CLIMATE CHANGE

Regional Office (WCZ)
Ground Floor, East Wing
New Secretariat Building
Civil Lines, Nagpur - 440001
E-mail: apccfcentral-ngp-mef@gov.in

F.No. 12-1/2004 (FOR) 2814

Date: 02.11.2017

To,

✓ The Secretary (Forests),
Govt. of Maharashtra,
Revenue and Forest Department,
Hutatma Rajguru Chowk
Madam Cama Marg
Mantralaya, Mumbai-400032

Sub: - Approval of Working Plan of Allapalli Forest Division for the period 2017-18 to 2026-27- regarding.

Sir,

I am directed to refer to the PCCF (P&M), Maharashtra office letter No. Desk-14/WP/Allapalli/460/2016-17 dated 27.07.2016 on the above subject seeking prior approval of the Central Government under Forest (Conservation) Act, 1980 and APCCF (P & M), Maharashtra vide letter No. Desk-14/Allapalli/983/2016-17 dated 05.12.2016, PCCF (P&M), Maharashtra vide letter no Desk-14/Beed/321/2017-18 dated 06.07.2017, Desk-14/Beed/697/2017-18 dated 21.09.2017 forwarding additional information as sought by the Regional Office, vide its letter of even number dated 17.11.2016 and 16.02.2017 and to say that DWPR of Allapalli Forest Division has been examined in the Regional Office in light of relevant provisions of the Forest (Conservation) Act, 1980, Rules and Guidelines framed there under.

After careful examination of the DWPR of Allapalli Forest Division written by Shri A. D. Bhosale, IFS; the Central Government hereby accords approval to the said Working Plan for the period of 2017-18 to 2026-27 in accordance with the powers vested under Forest (Conservation) Act, 1980 and subject to the following conditions:

1. The currency of the Working Plan shall be for a period of 10 years i.e. from 2017-18 to 2026-27. Necessary corrections may be made in the final copy of the Plan.
2. The orders of Hon'ble Supreme Court in the matter of Godavarman Thirumulkpad Vs Union of India in W.P. (Civil) No. 202/95 and related interlocutory applications shall be strictly adhered to. Any prescription or operation at variance with the Hon'ble Supreme Court's order shall be kept in abeyance till the order is in force or otherwise modified.
3. Further, in compliance with order to Hon'ble Supreme Court's Order dated 22.09.2000, the Government of Maharashtra shall ensure that regeneration of forests is commensurate with felling carried out under this working plan.
4. No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurate with felling. In

the events of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/ shortfall is made up.

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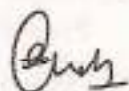
5. Following the directions of the Hon'ble Supreme Court in their order dated 22.09.2000, a Core group has been constituted under the Chairmanship of the Director General of Forests and Special Secretary for deciding the extent of harvesting that could be permitted under approved Working Plans for ensuring regeneration to be commensurate with felling. Instruction/ directions of the Central Government that may be issued in future in this regard shall be strictly complied with. Felling to be done by State Government only after seeking permission from Core Group constituted by the MoEF, New Delhi.
6. Period of last Working Plan was up to 2013-14. Present Working Plan is approved from 2017-18. Intervening period will be considered as per the prescription of last working plan and whatever work has been carried out may be got regularized/will be considered as part of last working plan, after taking approval of the competent authority, wherever needed.
7. No forests bearing naturally grown trees shall be clear felled for any purpose whatsoever.
8. Standard thinning and silvicultural operations under the strict supervision of Assistant Conservator of Forests and above will be allowed as per norms to improve the health of growing stock while executing the prescriptions of the Working Plan.
9. Prescriptions of micro plans for JFM (if made) should not deviate from the broad framework/guidelines of the Working Plan and shall be in accordance with various orders of Hon'ble Supreme Court.
10. Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/ future years to compensate this removal.
11. No deviations shall be made from the prescriptions of Working Plan read with the conditions stipulated herein without prior approval of the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. out turn plantation carried out outside the worked area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government to time.
12. Midterm review of Working Plan shall be undertaken after five years so as to make any changes, if needed to meet the objectives, with the approval of Regional Office, Nagpur.
13. The exploitable girth of tree species and period of felling cycle shall not be lower than the approved in previous working plan.
14. In the vicinity of Nalas and water bodies felling shall not be undertaken.
15. Felling shall not be undertaken near the known resting/nesting places of wild animals.
16. Removal of dead and diseased trees will be undertaken under the supervision of an

estimation of their stand volumes as per the same volume table use for the assessment of growing stock. This report shall be prepared annually working circle and compartment wise by the territorial Sub- DFO and shall be submitted to the C.F. Working Plan for this purpose within 02 months of the end of control year. Such removal shall be accounted for against the prescribed felling yield of the relevant year.

18. To ensure sustainable management of Non Timber Forest Produce (NTFP), scientific assessment of estimated quantity has to be done before their removal as per the prescription of Working Plan.
19. Status of rare, endangered and near extinct species shall be monitored closely and adequate measures will be taken for their protection and conservation.
20. Execution of Working Plan shall be in conformity with the National Forest Policy.
21. A definite plan has to be made to remove encroachment and plant the vacated area by planting suitable local species as per Government of India and Hon'ble Supreme Court Orders/Guidelines in the matter.
22. Eco-tourism shall/may be undertaken on sustainable basis. No permanent structures shall be allowed at such sites. Temporary structures made up of local forest produce may be allowed for public. Such sites will be declared Plastic free zones and these eco-tourisms sites will be managed by the forest department as per the prescriptions of the working plan and without violating FC Act.
23. Demarcation and consolidation of Forest Boundaries will be done adequately.
24. Gregarious flowering of bamboo, if any, must be reported to ICFRE and other institutes as mandated and the situation be dealt with standard protocol.
25. Exotic species should not be planted in Plan areas.
26. Proper mechanism has to be put in place to control illegal felling, grazing & fire. Proper fire plan shall be prepared and executed meticulously.
27. Only 50% of normal yield, if silviculturally available, will be allowed for removal in case of Teak, Dhawada, Bhirra, Chichawa, Salai, Mowai, Rohan, Shiwan, Shisham, Surya, Karai, Mokha, Palas, Dhaman, Bhilawa, etc. In case of Haldu, Ain, Bija, Tiwas, Kalam, Lendia, Garadi, Khair it will be 33% if silviculturally available.
28. Efforts should be made to undertake artificial regeneration of local species in such a way that it both serves the purpose of biodiversity conservation of meeting the demand of fuel wood, fodder and the timber.
29. Bahal Ban will not be expanded at the cost of local species.
30. Lac cultivation, if any, will be practiced as per the provisions of Forest (Conservation) Act, 1980.
31. Documents and appendices mandated in National Working Plan Code will be incorporated in the Working Plan.
32. Attempts shall be made to grow trees outside forest areas to meet the local demand of small timber, fuel wood & fodder.

34. Socio-economic survey is to be conducted within first year of implementation of plan and the same be appended with the Working Plan.
35. Grassland will not be expanded at the expense of natural tree cover.
36. While managing forests provisions of the Biodiversity Act, 2002 shall be fully complied.
37. Cutback operation shall be undertaken as per standard norms.
38. Prescriptions on Wildlife Management should be vetted by the CWLW and a certificate of the same be attached to the plan at the time of final printing.
39. No regularization of existing encroachment should be done without following due procedure. And an appendix may be added giving details of the encroachment of the forest area in the division.
40. Grazing to be properly regulated.
41. All the Unclassed Forest, Acquired CA areas and Acquired Private Forests should be notified as RF/PF in time-bound manner and be carried out at the earliest.
42. The Central Government reserves the right to review, modify, withdraw, this approval at any time if any of the conditions of approval are not implemented. Relevant modification in the working plan are required to be carried out so as to keep it in conformity with the orders, circulars and guidelines issued by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy from time to time.
43. This approval is further subject to a condition that in all the Working Circles where harvesting is proposed, a para will be added prescribing well defined post harvesting operations to be carried out.

Yours faithfully,


(Charan Jeet Singh)
Scientist - C

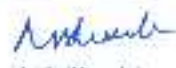
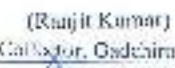
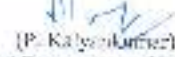
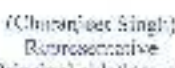
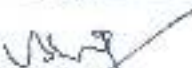
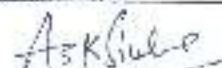
Copy to:

1. The Additional Director General of Forests (FC) Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Jor Bagh, New Delhi-110003.
- ✓ 2. The Principal Chief Conservator of Forests (HoFF) Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
3. Principal Chief Conservator of Forests (Production & Management) Govt. of Maharashtra, Van Bhawan, Ramgiri Road, Civil Lines, Nagpur-440001.
4. Guard File.

— sd —
(Charan Jeet Singh)
Scientist - C

STANDING CONSULTATIVE COMMITTEE MEETING HELD ON 16 MARCH 2016.

Draft Working Plan (DWP) of Allapali Forest Division was discussed and approved by the Standing Consultative Committee under the Chairmanship of Principal Chief Conservator of Forests (HOF), Maharashtra State, Nagpur in the meeting held on 16 March 2016 at Van Sabbhagran, Nagpur, with certain Recommendations/ Suggestions as per the minutes of the meeting.

 (A.D. Bhosale) Conservator of Forests, Working Plan, Gadchiroli.	 (Rajit Kumar) Collector, Gadchiroli.
 (E. K. Maita) Dy. Conservator of Forests, Allapali forest Division, Allapali.	 (P. Kalyankumar) Chief Conservator of Forests, Gadchiroli Circle, Gadchiroli.
 (Anurag Chaudhary) Add. Principal chief Conservator of Forests, Working Plan (East) Nagpur.	 (K. N. Kumbhare) Add. Principal chief Conservator of Forests, (Protection) M.S. Nagpur.
 (S. C. Gade) Add. Principal chief Conservator of Forests, & Nodal Officer M.S. Nagpur.	 (Dr. V. K. Chha) Add. Principal chief Conservator of Forests, (Conservation) M.S. Nagpur.
 (Dr. Dilip Singh) Add. Principal chief Conservator of Forests, (Biodiversity) M.S. Nagpur.	 (Dr. S. D. Patil) Add. Principal chief Conservator of Forests, (CAMPA) M.S. Nagpur.
 (Pravin Shrivastava) Add. Principal chief Conservator of Forests, (I & P) M.S. Nagpur.	 (Chetan Singh) Representative Add. Principal chief Conservator of Forests, (Rational) MOEF, Nagpur.
 (H. S. K. Bhoir) Add. Principal chief Conservator of Forests, (BP&D) M.S. Nagpur.	 (A. S. K. Bhoir) Principal chief Conservator of Forests, (P & M) M.S. Nagpur.
 (A. K. Nigam) Principal chief Conservator of Forests, (HOF) M.S. Nagpur.	