GOVERNMENT OF MAHARASHTRA

WORKING PLAN
FOR
THE FORESTS
OF
THANE FOREST DIVISION
FOR THE PERIOD
2009-2010 TO 2018-2019

VOL- I

BY
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INTRODUCTION :

N.J. Joshi's Working Plan for Reserved Forests of Thane District comprising of Shahapur, Dahanu and Thane Forest Divisions was in operation from 1969-70 to1988-89. F.X. Saldhana's Working Plan for Thane Woodlands of Thane District was in operation from 1938-39 to 1977-78.

A decision was taken at higher level that the revision of Working Plan of each Forest Division should be taken up. Working Plan for the Forests of Dahanu Division was revised by Ramanuj Chaudhry for the period from 1990-91 to 1999-2000. In the mean time Jawhar Forest Division was established in 1992 by carving out areas from Thane, Dahanu and Shahapur Forest Divisions. Shri Devendranath revised Working Plan for Jawhar Forest Division for the period from 1994-95 to 2004-05 and Devendranath *etal* revised Working Plan for Shahapur Forest Division for the period from 2002-03 to 2012-13.

There have been a lot of changes in the extent of land in Thane Division over the past few decades. Forest areas were transferred to Jawhar Forest Division, Sanjay Gandhi National Park, Bhimashankar Wildlife Sanctuary, and Tungareshwar Wildlife Santuary from Thane Division. Some of the areas were diverted for various developmental projects prior to 1980. Areas were added by way of Compensatory Afforestation and Mangrove forests.

Attempts have been made to revise the Working Plan for the forest of Thane Forest Division but due to many constraints the revision works could not be completed for the past nineteen years.

It was expected to revise the Working Plan immediately on expiry of the Plan in 1988-89. Even after a lapse of nearly 20 years the Working Plan for Thane Forest Division was not revised by the Working Plan Officers due to many reasons. One of the main reasons was that the Working Plan Officer of Thane Circle is overburdened with the preparation of six Working Plans in the Circle. Due to remote location of the Headquarters at Dahanu, officers posted as WPO and the subordinate staff did not join and the posts remained vacant for a long time.

The field works for the revision of Working Plan for the forests of Thane Forest Division was started in 1993-94. The Enumeration was completed and analysed by the Chief Forest Statistician. The Preliminary Working Plan Report for Thane Forests Division was prepared by Shri. P.R. Yeole,

sanctioned by the State Level Committee on 27th Aug, 1999. Shri Walke who worked as DCF Thane prior to joining as WPO, Dahanu decided to revise PWPR of Shri Yeole. He prepared the PWPR and presented at the State Level Committee on 19th May 2003 and got the PWPR approved by the Committee.

The issues that needs to be addressed while proposing various prescription in the Plan are directed by the following realities:

1. Due to illicit cutting there is a constant reduction in number of trees per hectare and number of trees above selection girth has been reduced considerably. In view of this fact, the prescription of for felling will degrade the quality of the crop. To prevent the degradation it would be appropriate to prescribe only improvement felling.

2. Large forest areas have been covered under Afforestation in the past. Due to biotic interference, successful plantations have been damaged even though the survival percentage was good in the initial stages. These plantations would be made successful if proper treatment were provided. So it was felt to make use of the rooted stock in old plantation. If soil and moisture conservation measures along with under planting bamboo were implemented, these old damaged plantations could be restored.

3. There are large extents of Reserved and Protected Forests areas lying within Municipal Corporation limits. These areas are constantly being subjected to encroachment for residential purpose and pressure due to firewood demands of the migratory labour engaged in construction activities. Special protection efforts such as removal of encroachment, special effective fencing and re-afforestation of these areas to meet the ecological demands of the urban population are required to be carried out. Therefore, special working circle viz. Urban Afforestation Working Circle is formed and the works are prescribed.

4. Many Plantations under various schemes have been raised successfully. Due to paucity of funds, the successful plantations could not be tended and thinned in the past, with the result that these successful plantations got merged with the natural forests. In order to carry out proper treatment, a separate working circle namely Old Plantation Management Working Circle is formed.

Necessary changes suggested in the PWPR have been incorporated in the Draft Plan. The Draft Plan includes the areas of Reserved Forests of Joshi's Plan, the Protected Forests of Saldhana's Plan, Acquired Forests, Unclassed Forests, and Mangrove Forests under the control of Thane Forest Division. The Draft Plan also includes the areas that were taken over from the FDCM Ltd by Thane Forest Division.

All the forest land under the control of Thane Forest Division have been included in this Plan. The Draft Plan is prepared as per the Guidelines of the new Working Plan Code, 2004. All the mandatory (Overlapping) Working Circles as given in the Code which are applicable to Thane Forest Division have been included in this Plan.

Since the revision of the previous Plan there have been paradigm shifts in the management perspectives of forests. The clearfelling system which was followed predominantly, in the previous Plans, aimed mainly for the production of timber is no more relevant in the present context. The domestic need of timber is now met with from the import from other countries. N.J.Joshi in his Plan constituted the following Working Circles for Thane Forest Division:

i) Protection Working Circle.
ii) Selection cum improvement Working Circle.
iii) Conversion Working Circle.
iv) Industrial Wood Plantation Working Circle.
v) Lake Catchment Working Circle.
vi) Pulpwood Plantation Working Circle.
vii) Fodder Reserve Working Circle
viii) Miscellaneous Plantation Working Circle
ix) Miscellaneous Working Circle.
x) Minor Forest Produce (Over lapping) Working Circle.
xi) Bamboo (over lapping) Working Circle.

The Wildlife (Protection), Act, 1972, The National Forest policy 1988, and the Panchayati Raj Act are some of the major government policies that affect the management system of forests. With the increase in human population and cattle there is tremendous pressure on the forest. The landless and marginal land holders encroach on the forest land for cultivation and hutments. There h

reduction in growing stock in the intervening period from 1967-68 to the present time. The approach of this Plan is to manage the forests for conservation, protection and improvement of existing forests in a sustained manner by employing scientific methods. Due emphasis is given for Joint Forest Management, particularly the forest areas which falls in the vicinity of human dwellings. No felling has been proposed as the tract falls in the fragile ecosystem of the Western Ghats. Most of the forest areas which are otherwise available for felling and having dense forests have been earmarked/allotted/handed over to the Forest Development Corporation. Based on the objects of management in the changing scenario it is proposed to constitute the following Working Circles:

i) Protection-cum-Catchment Area Working Circle.
ii) Improvement Working Circle.
iii) Afforestation Working Circle.
iv) Old Plantation Management Working Circle.
v) Urban Afforestation Working Circle.
vi) Mangrove Working Circle.
vii) Miscellaneous Working Circle.
viii) Non Timber Forest Produce (Overlapping) Working Circle
ix) Bamboo Plantation (overlapping) Working Circle.
x) Forest Protection
xi) Joint Forest Management (Overlapping) Working Circle
xii) Wild Life Management (Overlapping) Working Circle.

The revised Working Plan for Thane Forests replaces N.J.Joshi's Working Plan for the Reserved Forests, Saldhana's Plan for the Woodland Protected Forests, Management Plan of the FDCM by Gujjar pertaining to areas handed over to Thane Forest Division and all the Working Schemes/Plans prepared from time to time.

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DAHANU.

Dahanu
20/12/08.

LIST OF COMMON PLANTS OCCURING IN THANE FOREST DIVISON

1		2	3
Ain	:	*Terminalia tomentosa.*	Combretaceae.
Alu	:	*Meyna laxiflora*	Rubiaceae.
Ashi	:	*Morinda tinctoria*	Rubiaceae
Amba	:	*Mangiferia indica*	Anacardiaceae
Amati (Wavding)	:	*Embelia robusta*	Euphorbisceae
Anjani	:	*Memecylon umbellatum*	Melastornaceae
Apta	:	*Bauhinia racemosa*	Caesalpiniaceae
Asana	:	*Brideli aretusa*	Euphorbiaceae
Arjunsadada	:	*Terminalia arjuna*	Combretaceae
Athroon (Kakar-Bhekal)	:	*Flacourtia ramontchi* (Sys.*Flacourtia Indica*)	Bixaceae
Avali	:	*Emblica officinalis*	Euphorbiaceae
Babul	:	*Acacia arabica*	Leguminosae
Bel	:	*Aegle marmelos*	Rutaceae
Bakula	:	*Mimusops elengi*	Sapotaceae
Bava (Bhava)	:	*Cassia fistula*	Leguminosae
Beheda	:	*Terminalia belerica*	Combretaceae
Bhendi	:	*Thespesia populnea*	Malvaceae
Bhoma	:	*Glochidin lanceolarium*	Euphorbiaceae
Bhokar (Shelute)	:	*Cordia dichotoma*	Boragineae
Bhor Jambhul	:	*Ammania baccifera*	Lythraceae
Bhutkesh (Lawsat)	:	*Mussaenda frondosa*	Rubiaceae
Bhitia (Alan or Bhutaksha)	:	*Elaeodendron glaucum*	Celastraceae
Biba	:	*Semecarpus anacardium*	Anacardiaceae
Bibla	:	*Pterocarpus marsupium*	Leguminosae
Bondara	:	*Lagerstroemia parviflora*	Lythraceae
Bor	:	*Ziziphus jujuba* (Syn-*Ziziphus mauritiana)*	Rhamaneae
Chambuli	:	*Bauhinia vahlii*	Leguninosae
Chanda, Chandava	:	*Macaranga roxburghii*	

Char, Chroli	:	*Buchnania latifolia*	Anaeardiaceae
Chera	:	*Erinocarpus nimmoanus*	Tiliaceae
Chinch	:	*Tamarindus indica*	Leguminosae
Dandoshi	:	*Dalbergia lanceolaria*	Leguminosae
Daiwas (Dahivel)	:	*Cordia macleodii*	Boragineae
Datir	:	*Ficus heterophylla*	Urticaceae
Dhaman	:	*Grewia tiliaefolia*	Tiliaceae
Dhavada	:	*Anogeissus latifolia*	Combretaceae
Dikemali	:	*Gardenia lucida*	Rubiaceae
Gela	:	*Randia dumatorum*	Rubiaceae
Gol	:	*Trema orientalis*	Urticaceae
Hed	:	*Adina cordifolia*	Rubiaceae
Hirda	:	*Terminalia chebula*	Combretaceae
Humb	:	*Saccopetalum tomentosum* (Syn.*Muliusa tomentosa)*	Anonaceae
Jamba, Surya	:	*Xylia xylocarpa*	Leguminosae
Jambul	:	*Syzygium cuminii*	Myrtaceae
Kalamb	:	*Stephegyne parvifolia* Syn. *Mitragyna parvifolia)*	Rubiaceae
Kadvai	:	*Hymenodictyon excelsum*	Rubiaceae
Kakad	:	*Garuga pinnata*	Burseraceae
Kondal	:	*Sterculia urens*	Sterculiaceae
Karambel	:	*Dellenia pentagyna*	Dilleniaceae
Karlilimb(Kadilimb)	:	*Murraya koenigii*	Rutaceae
Karanj	:	*Pongamia pinnata* (Syn.*Pongamia glabra*)	Leguminosae
Karavati	:	*Ficus asperrima*	Urticaceae
Kaju	:	*Anacardium occidentale*	Anacardiaceae
Katekumbhal	:	*Sideroxylon tomentosum*	Sapotaceae
Kavath	:	*Limmonia acidissima*	Rutaceae
Khair	:	*Acaciac atechu*	Leguminoae
Kharshing	:	*Stereospermum xylocarpum*	Bignoniaceae
Khavas	:	*Sterculia colorata*	Sterculiaceae
Kinhai	:	*Albizzia procera*	Leuminosae
Kirmira	:	*Casearia tomentosa* (Syn.*Glycosmis pentaphylla*)	Rutaceae

Kokam (Ratambi)	:	*Garcinia indica*	Guttiferae
Kuda	:	*Holarrhen aantidysentrica*	Apocynaceae
Kuda (Kala)	:	*Wrightia tinctoria*	Apocynaceae
Kudi	:	*Wrightia tomentosa*	Appocynaceae
Kumbhi	:	Careya arborea	Myrtaceae
Kusumb(Koshimb)	:	*Schleichera oleosa* (Syn.*Schlienchera trijuga*)	Sapindaceae
Koral or Ambli	:	*Bauhinia malabarica*	
Kura	:	Ixora parviflora (Syn.*Ixora arborea*)	Rubiaceae
Kukari	:	*Sterculia guttata*	Stercliancеae.
Lokhandi	:	*Ixora nigricans*	Rubianceae
Muraudi	:	*Acanthus ilicifolius*	Acantaceae
Medhshing	:	*Dolichandrone falcata*	Bignoniaceae
Moha or Mohuva	:	*Madhuca latifolia*	Sapotacease
Mokha	:	*Schrebera Swietenioides*	Oleaceae
Nandruk	:	*Ficus retusa*	Urticaceae
Nana	:	*Lagerstroemia microcarpa*	Lythraceae
Nimbara	:	*Melia dubia*	Meliaceae
Niwar (Samudraphal)	:	*Barringtonia acutangula*	Mytaceae
Padal	:	*Stereospermum helonioides*	Bignoniaceae
Pair	:	*Ficus arnottina*	Urticaceae
Palas	:	*Butea monosperma*	Leguminoseae
Nagkuda, Pandarakuda	:	*Tabernaemontana heyneana*	Apocynacea
Pandhara Khair	:	*Acacia ferruginea*	Leguminoseae
Pandhari	:	*Murraya exotica*	Rutaceae
Pangara	:	*Erythrina indica* Syn.*Erythrina variegata*	Leguminosae
Par Jambhul	:	*Olea dioicia*	Oleaceae
Pendharum	:	*Gardenia turgida*	Rubiaceae
Petari	:	*Trewia nudiflora*	Euphorbiaceae
Phasi	:	*Dalbergia paniculata*	Leguminosae
Pharadi	:	*Albizzia chinensis*	Leguminosae
Phungali	:	*Excoecar iaagallocha*	Euphorbiaceae
Pimpal	:	*Ficus religiosa*	Utricaceae

Pipar	:	*Ficus amplissima*	Utricaceae
Ranlimbu	:	*Atlandia racemosa*	Utricaceae
Raktarohida	:	*Maba nigrescens*	Rhamnaceae
Ranjan (Rayan, Khirni)	:	*Mimusops hexandra*	Sapotaceae
Ritha	:	*Sapindus emarginata*	Sapindaceae
Sag (Teak)	:	*Tectona grandis*	Verbenaceae
Satvin	:	*Alistonia scholaris*	Apocynaceae
Sawar	:	*Bombax malabarica*	Malvaceae
Shemat	:	*Lannea Coromandelica*	Anacarciaceae
Shenkhair	:	*Acacia suma*	Leguminosae
Shendri or Kamala	:	*Mallotus philippinensis*	Euphorbiaceae
Shindi	:	*Phoenix sylvestris*	Palmae
Shiras	:	*Albizzia lebbek*	Leguminosae
Shiras (Kala)	:	*Albizzia odoratissima*	Liguminosae
Shivan	:	*Gmelina arborea*	Verbeoaceae
Shisam	:	*Dalbergia latifolia*	Fabaceae
Tembhurni	:	*Diospyros melanoxylon*	Ebenaceae
Tiwas	:	*Ougenia oojeinensis*	Fabaceae (Leguminosae)
Toddy palm	:	*Borassus flabellifer*	Palmare
Umbar	:	*Ficus racemosa* (Syn. *F.glomerata*)	Urticaceae
Undi	:	*Calophyllum inophyllum*	Clusiaceae (Guttiferae)
Vad	:	*Ficus bengalensis*	Urticaceae
Warang	:	*Kydia calycina*	Malvaceae
Waras	:	*Heterophragma roxburghii* (Syn.*Heterophragma quadriculata*)	Bignoniaceae
Wawali or Papara	:	*Holoptelia integrifolia*	Urticaeae

SHRUBS

Adulsa	:	*Adhatoda zeylanica* (Syn. *A. Vasica*)	Acanthaceae
Dhaiti	:	*Woodfordia floribunda*	Lythraceae
Ghaneri	:	*Lantana camara*	Verbenaceae
Ghaypat	:	*Agave americana*	Agavaceae
Gultara	:	*Lantana alba*	Verbenaceae
Kanfuti	:	*Flemigia strobilifera* Syn.*Moghania strobilifera*	Fabaceae
Karavi	:	*Carvia callosa* (Syn.Strobilanthes callosus)	Acanthaceae
Kaladhotra	:	*Datura fastuosa*	Solanaceae
Karvandi	:	*Carrissa carandas*	Apocynaceae
Kalsunda or Pivli	:	*Barleria prinonitis*	Acanthaceae
Koranti	:	*Helicteres isora*	Sterculiaceae
Kevni (Murud Sheng) Khulkhula	:	*Crotolaria retusa*	Leguminosae
Mogli or Ran-arand	:	*Jatropha curcas*	Euphorbiceae
Nirgudi	:	*Vitex negundo*	Verbenaceae
Nivdung (Prickly pear)	:	*Opuntia dillenii*	Cactacea
Phangala (Phangali)	:	*Pogostemon purpurascens*	Labiatae
Rantur	:	*Atylosia lineata*	Leguminosae
Rametha	:	*Lasiosiphon eriocephalus*	Thymeleaseaceae
Ranbhendi	:	*Thespesia lampas*	Malvaceae
Rantulshi	:	*Ocimum canum*	Labiatae
Rantulshi	:	*O.gratissimum*	Libiatae
Rui	:	*Calotropis gigantea*	Asclepiadaceae
Shikekai	:	*Acacia concinna*	Leguminosae
Suran	:	*Amorphophallas companulatus*	Araceae
Thor	:	*Euphorbia ligularia*	Euphorbiaceae
Toran	:	*Zizyphus rugosa*	Rhamnoaceae
Ukshi	:	*Calycopteris floribunda*	Combretaceae

HERBS

Anant mul (Upalasari or Indian sarsaparilla)	:	*Hemidesmus indicus*	Asclepiadaceae
Bhigguli	:	*Indigoferaenn eaphylla*	Leguminosae
Burada	:	*Blumea lacera*	Astea Cae
Chikata	:	*Desmodium palchellum*	Febaceae
Dinda	:	*Leea macrophylla*	Leeaceae
Kajra (Kuchala)	:	*Strychnos nux-Vomica*	Loganiaceae
Litchi (Van-bhendi)	:	*Urena lobata*	Malvaceae
Papadi	:	*Pavetta tomentosa*	Rubiaceae
Rankel	:	*Musa superba*	Musaceae
Ranhalad or sholi	:	*Curcuma aromatica*	Zingiberaceae
Rankanda	:	*Scilla indica*	Liliaceae
Sarp mukha	:	*Tephrosia purpurea*	Fabaceae (Leguminosae)
Sonki	:	*Senecio grahami*	Compositae
Tarota or Takala	:	*Cassia tora*	Caesalpiniaceae (Leguminosae)
Vikhara talimkhana	:	*Hygrophila amicularis* (Syn.*Asteracantha longifolia*)	Acanthaceae

CLIMBERS

Alai/Alsi	:	*Dalbergia volubilis*	Fabaceae (Leguminosae)
Bhuikohala	:	*Impomoea digitata*	Convolvalaceas
Chilhari	:	*Caesalpinia sepiaria*	(Leguminosae) Ceasalpiniaceae
Gunj	:	*Abrus precatorius*	(Leguminosae) Fabaceae
Gulvel (Amarvel)	:	*Tinospora cordifolia*	Menispermaceae
Kanguni	:	*Celastrus paniculata*	Celastraceae
Kantjaruel	:	*Capparis sepiara*	Capparidaceas
Kuhili	:	*Mucuna pruriens* Syn. *M.pruriata*	(Leguminosae) Fabaceae
Kusari	:	*Jasminum arborescens*	Oleaceae

Madvel, Modvel, Bokadvel	:	*Combretum ovalifolium*	Combretaceae
Mastod	:	*Capparis spinosa*(*Ziziphusoenoplia)*	Capparaceae (Phamnaceae)
Morvel or Ranjai	:	*Clematis triloba*	Ranunculaceae
Nandanvel	:	*Vitis repanda*	Ampelieae
Palasvel	:	*Butea suparba*	(Leguminosae) Fabaceae
Phulsun	:	*Spatholobus roxburghii*	(Leguminosae) Fabaceae
Sakalvel	:	*Ventilago madraspatana*	Rhamneae
Ukshi	:	*Calycopteris floribunda*	Combretaceae
Valbiwala	:	*Milletia recemosa*	(Leguminosae) Fabaceae
Watvel	:	*Cocculus macrocarpus*	Menispermaceae
Wagati	:	*Wagatea spicata*	Caesalpiniaceae (Legumunosae)
Wag, Govinsi	:	*Capparis zeylanica* (Syn.*C.roxburghii*)	Capparaceae. (Capparideae)

BAMBOOS

Bundhi or cher	:	*Oxytenanthera monostigma* (O.ritcheyi)	(Gramineae) Poaceae
Manvel	:	*Dendrocalamus strictus*	----,,----
Padhai or katas	:	*Bambusa arundianacea*	----,,----

GRASSES

Ber	:	*Ischaemum rugosum*	(Gramineae) Poaceae
Bhale Kusal	:	*Heteropogon triticus* (Syn.*Adropogon triticus*)	--------,,---------
Bhongrut (Phuleraphul)	:	*Themeda quadrivalvis*	--------,,---------
Bhuri	:	*Aristida paniculata*	--------,,---------
Boru	:	*Andropogon halepensis* (Syn.*Sorghum helepense*)	--------,,---------
Chirika		*Eragrostis tremula*	--------,,---------
Dongari gavat	:	*Chrysopogon fulvus* (Syn.*Andropogon monticola)*	--------,,---------
Ghanya	:	*Bothriochloa pertusa* Syn. *Andropogon pertusus*	--------,,---------

Gondvel	:	*Andropogon pumilis*	--------,,---------
Harali (Durva)	:	*Cynodon dactylon*	--------,,---------
Kunda	:	*Ischaemum pilosum*	--------,,---------
Kothar	:	*Woodrowia diandra*	--------,,---------
Kusali	:	*Heteropogon contortus* (Syn. *Andropogon contortus*)	--------,,---------
Lavhala	:	*Mnesithea laevis* (Syn.*Rottboellia perforate*)	--,,-
Marvel	:	*Dichanthium annulatum* (Syn.*Andropogon annulatus*)	-------,,---------
Pavnya	:	*Schima sulcatum* (Syn. *Ischaemum sulcatum*)	-------,,---------
Phool	:	*Themeda triandra*	-------,,---------
Rosha		*Cymbopogon schoenanthus* (Syn.*Andropogon schoenanthus*)	-------,,---------
Sheda	:	*Schima nervosum* (Syn. *Ischeamum laxum*)	-------,,---------

LIST OF SOME IMPORTANT MEDICINAL PLANTS EXPORTED THROUGH THE DIVISION

NO	LOCAL NAME	BOTANICAL NAME	PARTS USED	MAIN MONTHS OF EXPORT
1	AMALTAS	*Cassia fistula*	Pods	May, Nov.
2	ANANTMUL	*Hemidimus inducus*	Root	Jan. , May.
3	ARJUN	*Terminalia arjuna*	Bark	Aug. , Oct.
4	ASHWAGANDHA	*Withania somnifera*	Root extract	Jan. - Oct.
5	AWALA	*Emblica officinalis*	Fruits	Jan.-May. July- Dec.
6	BALA	*Sida cardifolia*	Bark	Jan.
7	BAWACHI	*Psorela corylifolia*	Seeds	Feb., Mar., May, July, Nov., Dec.
8	BEHADA	*Terminalia bellarica*	Fruits	May, July. Sept.-Nov.
9	BEL	*Aegle marmelos*	Fruits	Mar.-May, Sept.-Nov.
10	BIBA	*Semicarpus anacardium*	Seeds	Oct. , Dec.
11	BRAHMI	*hydrocoltyle asaiatica*	Leaves	Jan., Feb., June.
12	CHAKSOO	*Cassia absus*	Seed	Jan.-Mar. May-Aug.
13	DAGADPHOOL	*Parmelia peblata*	Flowers	Mar.
14	DHAWRI-PHOL	*Woodfordia floribunda*	Flowers	Jan.
15	GADBEEJ	*Litsea sebiapra*	Seeds	Jan. , Mar. May, July, Oct.
16	GOKHARU	*Hoigrophila spinosa*	Fruits	April-June, Nov.
17	GORAKHMUNDI	*Sphaeran indicus*	Fruits	April-June. Oct., Dec.
18	GUDMAR	*Gymnema sylvestre*	Leaves	Feb-Nov.
19	GUGAL	*Coomiphora mukul*	Gum	Feb., Aug-Nov.
20	GULWEL	*Tinospora cardifolia*	Powder	Jan, Feb
21	HEENA	*Lawsonia inermis*	Leaves	Mar.

22	HIRDA	*Terminalia chebula*	Fruits	Feb., Mar., May-Dec.
23	INDRAJAW	*Wrightia tinctoria*	Seeds	Feb.,May,July,Sep., Nov
24	JAMAL GOTA	*Croton tiglium*	Seed	Jan.,Feb.,May,July, Oct.
25	JOOMGOLI	*Cocculus hirsutus*	Seeds	May, July, Aug.
26	KALI MUSALI	*Curculigo orchioids*	Root	April, May, Aug-Nov.
27	KALMEGH	*Andrographis paniculata*	Plant	Jan., Feb., April, May.
28	KASNI	*Cichorium intybus*	Seeds	Jan.,Mar.,July-Dec.
29	KOKAM	*Garcinia indica*	Powder	Feb, Mar., June.
30	LENDI PIMPALI	*Piper longum*		Feb., May, Nov.
31	MURUD-SHENG	*Muruku tipili*	Fruit	Jan., Nov.
32	NARAKYA	*Mappia foetida*	Dust form	Jan.-Nov.
33	NEEM	*Axadirachta indica*	Leaves	May
34	PALAS	*Butea monosperma*	Root	May, Oct., Nov.
35	SAFED MUSLI	*Chlorophytum tuberosum*	Root	Jan.,May, July-Oct.
36	SALAI	*Boswellia sarata*	Leaves	Jan.-Nov.
37	SENNA	*Cassia angustifolia*	Leaves	Jan.-July,Sept.-Dec.
38	SHATAWARI	*Asparagus recimosa*	Root	Jan, Oct.
39	SHEVGA	*Moringa plerygosperma*	Seeds	Jan.
40	SHEVRI	*Sesbania aegyptisea*	Seeds	Jan.
41	TAKLA/TAROTA	*Cassia tora*	Seeds	Feb., Mar., Nov., Dec.

GLOSSARY OF LOCAL TERMS

Local terms			Meaning
Adiwasi	:	:	Aboriginals, the original and primitive native of the territory
Injaili species	:	:	Jungle wood or species other than teak.
Geru	:	:	a coloured earthy powder used for marking.
Jamabandi	:	:	Revenue settlement.
Kach (roads)	:	:	Temporary (roads)
Kharabas	:	:	Very steep unworkable areas.
Kolpat	:	:	Deadwood.
Kuran	:	:	Pasturage reserved for grass cutting and grazing.
Malki lands	:	:	Lands belonging to private individuals.
Mazdoor	:	:	Labourers
Nala	:	:	Stream
Rab	:	:	A patch of gound which is given a better burn and used for regeneration purposes.
Shikari	:	:	A hunter.
Tahal	:	:	Leafy branches of trees.
Tahsil, Taluka	:	:	Administrative unit of a District.
Vanamahotsawa	:	:	Festival of tree planting.
Vanmakta	:	:	Collection of forest produce on payment of fees.

ABBREVIATIONS USED.

A.C.F.	:	:	Assistant Conservator of Forests.
B.F.M.	:	:	Bombay Forest Manual.
B.H.	:	:	Breast Height
C.A.I.	:	:	Current Annual Increment.
C.B.O.	:	:	Cutting Back Operations.
Dy.C.F.	:	:	Deputy Conservator of Forests.
Divn.	:	:	Division
F.D.	:	:	Forest Department
F.D.A.	:	:	Forest Development Agency
F.L.C.S.	:	:	Forest Labourers Co-operative Societies.
F.P.C.	:	:	Forest Protection Committee.
I.F.A.	:	:	Indian Forest Act
J.F.M.	:	:	Joint Forest Management
M.A.I.	:	:	Mean Annual Increment
M.F.P.	:	:	Minor Forest Produce
M.M.C.	:	:	Mumbai municipal Corporation.
No.	:	:	Number
NTFP	:	:	Non-Timber Forest Produce
P.B.	:	:	Periodic Block
P.F.M.	:	:	Participatory Forests Management
R.F.O.	:	:	Range Forest Officer
Sec.	:	:	Section.

P A R T – I :

SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED.

CHAPTER – I

THE TRACT DEALT WITH

Section – 1:- Name and Situation.

1.1.1. The Plan Would be known as "The Working Plan for the Forests of Thane Forest Division". The Plan deals with Resreved Forests, Protected Forests, Unclassed Forests and Acquired Forests in Thane Division spread over Thane, Kalyan, Bhiwandi, Vasai, Ulhasnagar, Ambernath, Murbad, Wada (P), and Kurla Talukas and some area in Junnar Taluka of Pune District which are under the control of the Forest Department.

1.1.2. The area covered by the Plan lies between Longitudes 72^0-45' to and 73^0 – 50' East and between latitudes 19^0 – 1' to 19^0 – 37' North. It is bounded on the North by Dahanu, Shahapur and Thane Wildlife Divisions, on the East by Pune District, on the West by the Arabian Sea and on the South by Alibag Forest Division.

Section – 2:- Configuration of the Ground.

1.2.1. The tract is hilly and at places precipitous.The hills are the outer ranges of Sahyadries (Western Ghats) and runs along the eastern boundary of Thane Forests through the Nane Ghat on the border of Pune District. The Western Ghat runs from South to North in the eastern part of the Division adjoining Pune District. Area being mostly hilly with intermingled small plains is well drained. Some of the hills are devoid of vegetation owing to repeated incidence of fire and subsequent surface run off during the rains.

1.2.2 Some of the well-known peaks situated in this tract, their altitude and names of the Forest Ranges in which they are situated are as under:

Table No 1

Sr. No	Name of the Peak	Elevation above M.S.L.(M)	Name of Ranges
1)	Harishchandragad	1425.5	Tokawada
2)	Sidgad	886.3	Murbad
3)	Malangad (Hazi Malang)	790.0	Badlapur

1.2.3. The main drainage is from East to West through Ulhas and Vaitarna rivers, which flow towards West into the Arabian Sea. Its tributaries affecting this tract are Kalu, Bhatsa, Pinjal and Tansa. There are many creeks some of them extending inland upto 25 km. The main creeks are the Vasai (Bassein) Creek, the Vaitarna Creek and the Thane Creek.

Section – 3:- Geology, Rock and Soil

1.3.1. The geological information about Thane district is rather scanty. The main geological formation in the tract is:-

i) Sub-Recent-Recent : : : Soil

ii) Pleistocene-Recent : : : Laterite.

iii) Upper Cretaceous—Eocene : : : Deccan trap.

1.3.2. The Upper-Cretaceous-Eocene and the Pleistocene-Recent formation are rocks and the Sub-Recent formation is a resultant soil layer obtained on disintegration of rocks.

A- Rocks.

1.3.3. Upper-Cretaceous-Eocene: - The Deccan Trap covers almost the entire tract and consists of usual horizontal layers of basaltic lava. The rocks are generally grey to green in colour.

1.3.4. Pleistocene-Recent: - Laterite is compact and vesicular rock essentially composed of hydrated oxides of alumunium and with small amount of oxides of manganese and titanium. Generally, it is reddish brown in colour. It is found at

many places particularly on crest of hills where it forms capping over the Deccan Trap.

B—Soil

1.3.5. Sub-Recent-Recent: - The typical soil derived from the Deccan-Trap is the "*Regur*" of black cotton soil. The black cotton soil contains high Alumina and Carbonates of Calcium and Magnesium with variable amount of Potash, low Nitrogen and Phosphorous. The soil is generally porous, swells considerably on addition of water, and dries up with cracks on losing moisture. The "black cotton soil" is usually found in the flat area, which have almost pure crop of ain.

1.3.6. In the hilly areas the soil is loamy and varies greatly in colour, depth and texture. On the upper slopes it is generally light in colour, shallow and murrumy brown, fairly deep and only at some places it is rich in humus. The difference in the soil on the lower and upper slopes is reflected in the quality and composition of the crop found on these slopes. On the upper slopes, the crop is of poorer quality and consists of more xerophytic and inferior species like Kandol, Pangara, Kakad, Shemat, Tiwas etc.

1.3.7. Red soil is found in Badlapur and Tokawada ranges.

1.3.8. Deposits of bauxite are found on some of the hills. The area is stated to be of fairly better quality. The $Al_2 O_3$, content varies from 30.89 % to 58.66 %.

1.3.9. Hot springs are found at Ganeshpuri and Vajreshwari (Mandvi Range).

1.3.10. The results of soil analysis showed that soil varies in texture from loams to clays. In addition, the soils are acidic. The details of the soil analysis are shown in **Appendix No III Vol. II (Page No.4).**

Section – 4:- Climate and Rainfall.

1.4.1. The climate of the tract is generally hot and humid during summer. The temperature varies between a minimum of 12^0 C and a maximum of 45^o C. The climate is pleasant during the winter, i.e. from November to Februarv when the humidity is low; summer lasts from March to June. During this se

is very warm particularly in the eastern region of the tract. The details of the temperature are shown in **Appendix No IV of Vol. II (Page No.5).**

1.4.2. The rains are brought by the South-West Monsoon, which breaks by the 2nd week of June. Regular rainy season starts from the 3rd week of June and lasts until middle of October. Heaviest rainfall occurs during July and August. Average Annual rainfall in this are is 3200 mm. A statement showing monthly rainfall data of major places in the tract has been compiled and given in **Appendix No I of Vol. II (Page No. 1-2).**

1.4.3. Prevailing winds are from the West and are generally of moderate velocity.

1.4.4. Dew is very heavy in the month following the monsoons and persists in some places till the end of February. Frost is unknown in this area.

Section – 5:- Water Supply.

1.5.1. The various rivers, which flow through the tract, provide water to the villages situated nearby. However, many of the rivers particularly the small ones dry up during the hot season especially in April and May. The same thing happens in case of springs, nallas and ponds in which a large number of villages depend for their supply of water. The district Local Board and later on the Zilla Parishad have constructed a number of wells to supply water to the villages. Nevertheless, a large proportion of these wells too dry up in the hot season. Thus, inspite of the heavy rainfall received during the monsoons, large tract of the division suffers from acute shortage of water during the hot season.

Section – 6:- Distribution and Area.

1.6.1. The Geographical area of Thane District is 9558 Sq Km. The total area of the Division is 890.85534 Sq Km. The Registers of Reserved Forests and Protected Forests (Form No. I) has been brought up to date. The entries have been verified with the relevant Notifications. All the Compartments of the Reserved Forests have been planimetered during the preparation of the Plan by Shri Joshi and the same area has been taken as final for the compartments of Reserved Forests. There is forest area of 813.54203.Sq Km in Thane Forest Division out of

Sq Km is Reserved Forest, 8.23150 Sq Km is Acquired Forest, 262.23948 Sq Km. is Protected Forest, 2.87439 Sq Km is Compensatory areas, 0.16207 Sq Km is Unclassed Forests, and 19.74512 Sq Km of Mangrove Forest. In addition to this, 77.31331 Sq Km area is earmarked/handed over to FDCM Ltd.(RF 77.29091 Sq Km and PF 0.02240 Sq Km). They are earmarked for FDCM Ltd as per G.R.No.FDC/1074/64746-F-5 Bombay dated 27-06-78.

1.6.2. Entire area is distributed in the villages of Vasai, Bhivandi, Wada, Kalyan, Thane, Ulhasnagar, Ambernath and Murbad Talukas of Thane District, Kurla Taluka and Junnar Taluka (part) of Pune district. The forests of the Division are distributed in 11 Forest Ranges, 51 Rounds and 170 Beats for the purpose of administration and management. Forests are distributed in all the Ranges, Rounds and Beats.

1.6.3. The area Statement of the Thane Forest Division is as under:-

Table No 2.

Sr. No.	Range	Legal Class	Area in Ha.	Total Area
1	2	3	4	5
1	**Mandvi**	Reserved Forest .	4309.398	
		Protected Forest.	1766.282	
		Compensatory Forest.	166.872	6242.552
2.	**Padgha**	Reserved Forest .	6049.700	
		Protected Forest.	3356.572	
		Acquired Forest.	309.752	9716.024
3.	**Bhiwandi**	Reserved Forest .	6188.626	
		Protected Forest.	1599.290	7787.916
4.	**Thane**	Reserved Forest .	2723.068	
		Protected Forest.	558.001	
		PF (Mangrove)	1471.412	
		Compensatory Forest .	85.318	4837.799
5.	**Badlapur**	Reserved Forest .	7657.093	
		Protected Forest.	1815.122	
		Acquired Forest.	216.060	
		Compensatory Forest.	12.343	9700.618
6.	**Murbad (E).**	Reserved Forest .	2664.004	
		Protected Forest.	5207.963	
		Acquired Forest.	62.455	
		Compensatory Forest.	1.200	

1	2	3	4	5
7.	**Murbad (W).**	Reserved Forest .	4942.026	
		Protected Forest.	2625.938	
		Acquired Forest.	13.293	
		Unclass Forest.	16.207	7597.464
8.	**Kalyan**	Reserved Forest .	4485.831	
		Protected Forest.	1618.572	
		Acquired Forest.	87.885	6192.288
9.	**Tokawada (N)**	Reserved Forest .	6330.361	
		Protected Forest.	4940.291	
		Acquired Forest.	101.965	
		Compensatory Forest.	21.706	11394.323
10.	**Tokawada (S)**	Reserved Forest .	6678.840	
		Protected Forest.	2735.917	
		Acquired Forest.	31.740	9446.497
11	**Mumbai**	PF(Mangrove)	503.100	503.100
			Total :	**81354.203**

ABSTRACT

1	Reserved Forest .	**52028.947**
2	Protected Forest.	**26223.948**
3	PF (Mangrove)	**1974.512**
3	Acquired Forest.	**823.150**
4	Unclassed Forest.	**16.207**
5	Compensatory Forest..	**287.439**
	Total :	**81354.203**

1.6.5. Total forests do not generally occur in large compact blocks but are mostly distributed in numerous scattered small blocks surrounded by the cultivation or Revenue Waste lands.

Section –7:- State of Boundaries.

1.7.1. The boundaries of reserved forests, are demarcated by Cairns of loose stones (second-class boundary marks as specified in 'A' 123 of B.F.M. Volume II) but the maintenance is very poor. The pillars are difficult to trace normally and wherever they occur they are in bad shape and not numbered. In case of Protected Forests, the situation is even worse and very confusing as in many cases it is difficult to differentiate between cultivation and encroachment. Total length of boundaries of Thane Forest Division is 4929.067 Kms.

Section –8:-Legal Position.

1.8.1. The Reserved Forests covered by this Plan have been notified as Reserved Forest under section 20 of the Indian Forest Act under various notifications published from 1884 to 1957. The numbers and dates of notifications under which forests of various talukas were declared as Reserved Forests has been verified and given in **Appendix No VI of Vol. II (Page No.12).** A list of notifications on which areas have been Disforested under section 27 of the Indian Forest Act is given in the **Appendix No VII of Vol. II (Page No.13-15).**

1.8.2. The Woodland Protected Forests under report have been declared as Woodland Protected Forests under several Notifications. The earliest Notification was 4 F, dated 1st March, 1879 and the latest was No.RB/Desk-II/Forest /CR 2211- dated 12th January 2007. The entries of these Notifications were recorded against each Survey Number in forest registers maintained in the Division. The same has been verified.

Section – 9:- Rights and concessions.

1.9.1. The Reserved Forests are not burdened with any rights except that of way and water. Similarly, the only right that exists in Woodland Forests is those of way and water both for men and cattle and right of way to Temples and Shrines. The special privileges sanctioned in the Reserved Forests and Protected Forests of Thane district are available and given in **Appendix No VIII A & B of Vol. II (Page No. 16-20).** They specify the minor forest products like grass, dead leaves, bamboos, Karvi, thorns etc. that the villagers can collect and shrubs, which they can cut for wood-ash manure.

1.9.2. Under the Thane Woodland Code, a large number of privileges have been conceded to the villagers in the district to meet their domestic and agricultural needs. It is found that *Gairans* or *Gochar* lands are being used for raising plantation. Gochar lands should have been primarily developd as *Gochar* lands so that they are of use to the local populations.

CHAPTER II-A

FOREST FLORA

Section – 1:- Trees.

(A)

2.1.1. The forests can be grouped under the following types as per the "Revised Classification of Indian Forest Types" by Champion and Seth:-

i) 3B/C1 – Southern Tropical moist teak bearing forests.

ii) 3B/C2 – Southern Tropical moist mixed deciduous forests.

iii) 8A/C2- Western sub-tropical hill forests.

iv) 4B/TS1 Mangrove scrub forests.

Section 2 – General Description of the Growing Stock:-

2.2.1. **3B/C1- Southern Tropical moist teak bearing Forests**: - Major part of the forests comprises of this type. Within this main type considerable local variations in composition and quality of crop are observed. These variations are due to the edaphic factor in some cases but in majority of them, the other factor like topography, biotic influences, and past treatment are responsible for such variations. The following four main associations can be distinguished in this main type viz.

i) The teak-ain-kuda-karvand association.

ii) The teak-dhavda-kuda-takla association.

iii) The ain-khair-koshimb-karvand association.

iv) The ain-bonda association.

2.2.2. **The Teak-Ain-Kuda-Karvand Association: - T**his association is found on sites having deep, will drained alluvium or loamy soil. The forests are mostly of quality IVa, IVb with occasional patches of quality III. Density of crop of this association varies from 0.3 to 0.5 Floristic structures are as under:-

I. **Top canopy teak** (*Tectona grandis*) (a), Ain (*Teminalia tomentosa*) (Va), Khair (*Acacia catechu*) (f), Hed (*Haldina cordifolia*) (o) Kalambb (*Mitragyns parvifolia*) (o) Bibla(o) *Pterocarpus-marsupium*) (o) etc.

II. Second Storey – Second storey consists of Kuda (*Holarrhena antidysenterica*) (f) Karambel (*Dillenia Pentagyna*)(f), kumbhi (*Careya arborea*) (f) Palas (*Butea monosperma* (o) Temburni (*Diospyros melanoxylon*) (o) etc.

II. (a) Bamboo-Katas bamboos (*Bambusa arundinacea*) (f) Manvel bamboos (*Dendrocalamus strictus*)(f) are found very rarely. Clumps of both the species of bamboos died after gragarious flowering. Regeneration completely failed to establish. Frequent programmes of interplanting have also failed to introduce bamboo in the tract.

III Shrubs – Main species of shrubs of shrubs are karvand (*Carissa carandas*) (va), Ukshi (*Calycopteris floribunda*) (Va),Murud sheng (*Helicteres isora*) (f) and Rantur(*Monghania* species) (o)

IV (a) Herbs – Ranbhendi (*Thespesia lampas*) (o), Burada (*Blumea lacera*) (1a), Karvi (*Karvia callosa*) (la), litchi (*Urena lobata*) (o).

IV (B).

Climbers: - The main species of climbers are Ukshi, (*Calycopteris floribunda*) (f), Modwel (*Combretum ovalifolium*) (f), Palaswel (*Butea superba*) o) kuhili (*Mucuna Pruriata* (o), Chilhar (*Caesalpinia sepiaria*) (o), Musari (*Jasminum arborescens*) (o), etc.

Note :- (Va) – very abundant. (a) – abundant (f) – frequent (c) – Common (o) – Occasional, R – rare.
la- locally abundant

2.2.3. The teak-dhavada-kuda-takla association: - This association occurs in the upper slope or hills, which are exposed to severe winds and soil erosion and on flat top of the hills having shallow rocky soil. These are also found in areas subject to frequent fire or heavy damage by hacking and grazing due to proximity to villages. The quality of forests is generally IVa, with occasional patches of IVb and quality III. Where the soil is very poor, the quality deteriorates. Density of crop varies from 0.2 to 0.5. The floristic are as under:-

I) Teak(*Tectona grandis*), Kakad (*Garuga pinnata*), Shemat (*Lannea Coromandellica*), Sawar (*Bomhax cieba*), Dhavada (*Anogeissus latifolia*),

II) Kuda (*Holarrhena antidysenterica*), Kudi (*Wrightia tomentosa*), Chera (*Erinocarpus nimmoanus*), (a) Manvel (*Dendrocalamus strictus*), Bundi (*Oxytenanthera monostigma*)

III) Karvand (*Carissa carandus*), Ukshi (*Calycopteris floribunda*)

IV) Takla (*Cassia tora*), karvi (*Carvia callosa*).

V) Kuhili (*Mucuna pruiata*) Mastodi (*Capparis spinosa*),

2.2.4. The ain-khair-koshimb-karavand-association: - This association occurs on deep alluvial soil found along banks of rivers or nallas or lower slopes of the hills. Ain and khair are characteristic species. Quality of forest is mostly IVa with a occasional patches of quality III. Density of crop varies from, 0.2 to 0.5. The floristic are as under:-

I) Ain (*Terminalia tomontosa*), Khair (*Acacia catechu*), Hed (*Adina cordifolia*), Kalamb (*Mitragyana parvifolia*), Koshimb (*Schleichera oleosa*), Teak (*Tectona grandis*), Shisham (*Dalbergia latifolia*) Bibla (*Pterocarpus marsupium*), Nana (*Lagerstroemia microcarpa*), Shiras (*Albizzia lebbek*) kinhai (*Albizzia procera*), kala shiras (*Albizzia odoratissima*), Mango (*Mangifera indica*), Jambul (*Syzygium cumini*), Asana (*Bridelia retusa*), Arjuna (*Ternimalia arjuna*), Pharadi (*Albizzia chinensis*), Waras (*Heteropharagma guadriculata*), Chamoli (*Bauhinia faveolata*).

II)(a) Karambel (*Dillenia pentagyna*), Kumbhi (*Careya arborea*) Palas (*Butea monosperma*), Tembhurni (*Diospyros melanoxylon*). Tiwas (*Ougenia delbergioides*), Awala (*Embica officinalis*), Bhokar (*Cordia myxa*), Humb (*Miliusa tomentosa*), Karanj (*Pangomia pinnata*), Bahava (*Cassia fistula*), Lokhandi (*Ixora nigricans*) Shendri (*Mallotus philippinesis*).

II) (b) Katas Bamboo (*Bambusa arundinacea*) and Manvel Bamboo (*Dendrocalamus strictus*) are rare.

III) Karvand *(Carissa Carandas*), Ukshi (*Calycopteris floribunda*), Murud sheng (*Helicteres isora*), Rantur (*Moghania strobelifera*), Adulsa (*Adhatoda vasica*), Ghanner (*Lantana camera*), Dhaity (*Woodfordia fruticosa*)

IV) (a) Ranbhendi (*Thespesia lampas*), Karvi (*Carvia callosa*), Rankel (*Musa superba*), Litch (*Urena lobata*), Indigofera species and number of labiateae, Malvaceae, Compositeae and Solaceae families.

IV) (b) Kother (*Arundinella setosa*), Kusali (*Andropogon contortus*). Phulera (*Anthistiria ciliata*) etc. The grasses are not abundant.

V) Ukshi (*Calycoperis floribunda*), Modvel (*Combretum ovalifolium*), Palasvel (*Butea superba*), Chilhar (*Caesalpinia sepiaria*), Gunj (*Abrus precatorius*), Kuhili (*Mucuna pruriata*), Kusari (*Jamminimum arborescens*), Waghati (*Wagates spicata*), Nandanvel (*Vitis repanda*), Mastod (*Capparis spinosa*), Kanguni (*Caleastrus Paniculata*), Alsi (*Dalbergia volubilis*), Chambuli (*Bauhinia vahili*) etc.

2.2.5. The Ain-Bonda Association: - This association is mostly found on the foothills of the Western Ghats in Tokawada North and South Ranges. The soil is shallow and poor in humus content. The site quality is Iva and Ivb. The average density is 0.4. The Ain and Bonda are the most common species. The other species associated are Kakad, Shemat, Kuda and Takla but their proposition is not much. Undergrowth is sparse, while climbers are rare. Bamboos are absent.

2.2.6. 3B/C2-Southern Tropical Moist Mixed Deciduous Forest:-Some part of Reserve Forest as well as woodland protected forest comprises of this type in which Teak and Ain form the principal species. Proportion of evergreen spp is more. Climbers are numerous. Growth of grass is sparse. Site quality is mainly IVa. Density varies from 0.3 to 0.5.

2.2.7. The main species occurring in this area are Ain (*Teminalia tomentosa*), Hed *(Adina cardifolia*), Dhavada (*Anogeissus latifolia*), Shisav (*Dalbergie latifolia*), Savar (*Bombx ceiba*). Kalamb (*Mitragyna parvifolia*), Moha (*Madhuka indica*), Mango (*Mangifera indica*), Shendri (*Mallotus philippinensis).*

2.2.8. The floristic structure greatly resembles to that of the ain-khair-koshimb-karvand association and the kakad-shemat-kuda takla association.

2.2.9. 8A/C2-The Western Sub-Tropical Hill Forests :- This type is found on the higher slopes of the Western Ghats in Tokawada(N), and Mandvi Ranges. It occurs as a narrow strip between 500 to 1100 meters altitude. Locally the rainfall is higher than the average rainfall of the district. Temperature too is lower due to high altitude. The area is exposed to strong winds with the result that the height growth of the trees is poor except in the valleys. The soil is moderately deep to shallow with fair amount of humus. Site quality is mostly IVa, with occasional patches of quality III. Density is from 0.5 to 0.7. Being situated in the remote places, the forest is economically not very important. It is a semi evergreen type of forest with many evergreen species in the over wood and with Underwood and under growth almost exclusively of evergreen species. The floristrics are as under.

I- Mango (*Mangifera Indica*) (f), Karanj (*Pongania pinnata*) (o) kokam (*Garcinia indica*) (ra), Jambul (*Syzygium cumini*) (o), Undi(*Calophyllum inophllum*) (f), Katekambal (*Sideroxylon tomentosum* (f) Shisham (*Dalbergia latifolia*) (o), Waras (*Heterophargma quadriculata*) (f), Asana (*Bridelia retusa*) (f), Hirda (*Terminalia chebula*) (f) Beheda (*Terminalia belerica* (o), Wavala (*Holoptelea integrifolia*) (o), Bhoma (*Glochidion lanceolarium* (o), Payar (*Ficua arnottiana*) (o) Bher Jambhul (*Ammannia baccifera*) (o) Par Jambhul (*Olea dioica*) (o), Chandada (*Macaranga peltata*) (o).

II- Lokhandi (*Ixora nigricans*) (f), Pandari (*Murraya Paniculata*), (f) Anjani (*Memecylon edule*) (a) Kadilimb (*Murraya koenigii)* (f), Koshimb (*Schleichera oleosa*) (f) Karavati (*Ficus hispida*) (o), Shendari (*Mallotus philippinensis*) (o), Datir (*Ficus heterophylla*) (o),Ranlimbu (*Atlantia racemosa*) (o).

IIa Bamboos are absent.

III- Rametha (*Lasiosiphon eriocephalus*) (o), Thor (*Euphorbia ligularia*) (o) Khulkhula (*Crotolaria retusa*) (o) Dhaity (*Woodfordia fruticosa)* (o) Phangali (*Pogostemon purpuricaulis*) (o),

IVa – Sonki (*Senecio grahami*) (o) Rankel (*Musa superba*) (o), Karvi (*Carvia callosa*) (Va) Dindi (*Leea macrophylla* (o), Papadi (*Pavetta tomentosa)* (o), Climbers orchids ferns and other herbs are numerous.

2.2.10. 4B/TS1-The Mangrove Scrub forests: - This type is found in small patches along the coastal regions running along the Arabian Sea. It is more commonly found in the Revenue wastelands along the creeks, which have been transferred to forest Department for management. It is more or less dense forests with very low average height. The crop consists of almost exclusively of Tiwar (*Avicinnia alba*) and Maraudi (*Acanthus ilicifolius*). The area is submerged by salt water at every tide. The soil is muddy.

B) Local Types:-

2.2.11. Three local types may be distinguished for the purposes of description of the crop and its management.

1) Teak forests
2) Ain forests.
3) Mixed forests.

The forests having more than 20% of Teak in overwood are called as Teak forests. The forests having more than 50 % of ain over wood are called as 'Ain forests'. The forests with less than 20 % teak and none of the species being more than 50 % would be called as Mixed Forest. The teak or mixed forest can be further sub-divided, viz, in better quality and poor quality teak forests and mixed forests.

2.2.12. The poorest quality of forests is found in Reserve Forests and Woodland Protected Forests situated in the proximity of villages and developing large townships as forest in such areas have been subjected to great pressure by surrounding populations. Some hillocks that are very near to the

become barren lands and denuded of vegetation completely. Where the forests have been subjected to the heavy pressure of tahal lopping, non-teak species have disappeared. There is almost pure teak in such areas but of very poor quality owing to the constant exposure of soil and lack of humus. In areas where grazing is heavy and such is the case of the entire accessible tract, natural regeneration and advance growth are absent.

2.2.13. Teak Forest :- On deep, rich and well drained soil, most valuable species economically i.e. the teak occur and forms about 20 to 30 % of the crop. On poorer sites with shallow soils and particularly in areas which are subjected to frequent fires and severe damages due to hacking etc., the proportion of teak is more than 50 % but the growth is not so good. Almost pure teak forests are confined to teak plantations, but most of them have been hacked and subjected to heavy illicit cutting. On better sites, the associates of teak are valuable timber species like Ain, Khair, Hed, Kalambb, Bibla etc. while in poorer sites, the associates are drier species like Dhavada, Kakad, Shemat etc. The floristic structure of teak forest resembles to the sub-types 'moist teak forest' and "slightly moist teak forests" of the type 'moist teak forest' of Champion and Seth's classification.

2.2.14 Ain Forest: - In part of the areas, ain occurs more than 50 % in the crop. This type is very common in woodland or even in reserved forest where areas have been largely used for cultivation. This type occurs, on almost all malki land near woodlands and reserved forests. The occurrence of the species in cultivations and encroachments indicates that the species has capability of surviving against the injuries or repeated hacking, probably owing to its high coppicing power in the earlier stages and its impeccable suitability to the edaphic, climatic and other ecological or environmental conditions existing in this tract.

2.2.15. Mixed Forest: - This type of the forest has low proportion of teak in the crop. It occurs in the area, which has not been subjected to adverse effects of biotic factors like fires, grazing, over grazing, hacking etc. This type of forest occurs in the more moist areas like nalla banks and shaded valleys. Such type of forest is common in Tokawade (N & S) and Murbad (E & W)Ranges.

Section 3:-General Ecological observation –

2.3.1. It is common observation in the Thane forest that proportion of teak and other drier species like Dhavada increases with increase in the effect of biotic factors like fire, grazing, hacking etc. Thus, the forests near habitations usually have high proportion of teak while in remote places they are characterized with low proportion of teak. The forests here owe their existence to the remarkable power of these species to withstand repeated burning and to establish itself on burnt land. The purity of the present teak forest is largely attributable to the fact that its associates are less resistant and none of them appears to be able to establish into high forests in periodically burnt area. As the fire sweeps, the bark of teak having low conductivity prevents the damage of the cambium and phloem. In damp valleys and on shaded slopes the proportion of evergreen species like mango, jamun, moha, awala, shendri etc. increase while teak is practically absent. Thus the mixed forest appears to be "Climatic climax" of this areas, corresponding to the very moist teak forest of 'Southern moist mixed deciduous forest' of Champion and Seth's revised Classifications, while the teak forest is "Preclimax" and semi ever green type of forest would be the "Post-Climax". In many places, particularly where xerophytic conditions are aggravated due to biotic factors like fire, grazing and hacking, the teak forest appears to be of secondary origin because of retrogression from the climatic climax. The mixed type, which is the climatic climax, is thus the type, which is ecologically most stable and environmentally very sound.

2.3.2. The mixed type of the forests with variety of species plays an important role in sustaining the valuable population of wild fauna. Such types of the forests are important from nature conservation point of view and from environmental point of view as well. It is also felt necessary to highlight that there is always a need to give importance and preference to the local species of this kind including fruit tree species in the plantation programmes of the Govt. as these species are valuable from the socioeconomic point of view. The tribal and the local people depend a lot on this type of forest for their livelihood. The western sub-tropical hill forests, occurring on higher slopes of Western Ghat and in high rainfall Zone bears a semi evergreen type of forest. It is mainly due to topographic and climatic factors. Being situated in the remote areas, these forests have rich biodiversity and forms unique communities and genetic resources.

Section– 4: Injuries to which Crop is liable.

2.4.1. The most significant agency causing considerable damage to the forests is man. Next to it is cattle and fire. Other injurious agencies such as insect, climbers, and wild animals are comparatively less menacing. Frost is unknown while damage by drought is negligible.

2.4.2. Man damage forest mainly in four ways viz: Illicit cutting, Encroachments, setting fires and grazing of his cattle in the forestland.

Illicit cutting: -

2.4.3. The forest areas are either surrounded on sides by developing towns and honey combed cultivation due to a number of villages, padas or hamlets situated in the tract. Due to tremendous pressure of growing population, forest in adjoining areas has suffered much and shows devastating picture. The needs of a large and growing population bent upon achieving high standards of living have thrown a challenge to the very existence of forests, Damage by illicit cutting of trees for timber, firewood and fencing is very severe and accounts largely for heavy deterioration of forest. Illicit cutting of forests, particularly teak and khair is extremely heavy near townships, along highways, creeks, and around villages, almost all of which are now well connected by roads. Where as the industrial towns like Mumbai, Bhiwandi, Kalyan, Vihar, Vasai etc. provide ready market for all kinds of illicit wood, the tribes and local people provide cheap labour for initially cutting the material from remote area in the forest and bringing them to the transportable point. Part of the local population and Adivasis had developd pernicious practice of disposing of illicit timber by using the same for building new houses and selling them off at an interval of 3-4 years. The growing numbers of brick kilns, various local factories, dhabas and hotelwalas all along the National; and State highways have also contributed in increasing the demand for illicitly cut firewood. The Adivasis and labourers are also reported to consume a lot of firewood for their domestic purposes. All this firewood is collected from forest through successive lopping of green wood and hacking of young crops or plantations.

2.4.4. The decade has seen widespread reclamation activity along coastline. Hence, mangroves have also come under attack due to growing population as the easy way out of land scarcity and space crunch. Vast expanses of mangroves have been encroaced by the Builders. Reclamation disturbs the ecological balance and changes the wave pattern, it causes erosion along other parts of the coast. This vicious cycle needs to be checked by adopting various measures viz. supplying community biogas plants to the villagers raising energy plantations in and around the villages through encouraging farm forestry and application of Vanjyoti chulas etc.

2.4.5. The menace of illicit cutting is increasing and organized gangs are said to be operating on National and State highways. The local people are also co-operating either out of fear or for economic gains. In the past valuable patches of forests have been felled illegally and people involved in illicit cutting are now doing this kind of illegal thing in such pockets which had been inaccessible in the past. Though the pressure on forest is increasing day by day, the staff and particularly Forest Guard who is the person supposed to protect the forest is often neither trained nor is he equipped appropriately to deal with the situation.

Fire: -

2.4.6. Fires are sometimes accidental but more often they are intentionally caused by Shikaris for driving games to convenient spots or by graziers for getting quicker growth of grass. Fires cause extensive damage to the regenerations by killing the young seedlings while the scorching heat produces hollowness in saplings and poles. Fire also indirectly accelerates soil erosion by destroying the soil cover as well as humus. As a result of this there is less moisture absorption and more surface run off. Fire damage is more severe in Thane Division particularly in Mandvi and Padgha Ranges. Around 400 Ha. of forestland is damaged by fire every year.

Grazing: -

2.4.7. There are a large number of uneconomic cattle populations in the villages all of which depend on forest for fodder and grazing is subjecting the forest extremely heavy pressure of grazing. Even the remote areas are not free from the pressure of grazing. The adverse effects of over grazing are visible in the sense that the undergrowth in most of the forest is absent. Natural regeneration has been adversely affected as the constant trampling and browsing destroys young seedlings and coppices that lead to hardening of the soil. Complete absence of humus hinders the germination of seeds and prevents the growth and establishment of seedlings. Indiscriminate grazing and constant trampling and browsing in plantation areas must be considered as one of the main causes for failures of the various plantations in general, and particularly, the inter planting of bamboos, which have failed in many areas.

2.4.8. The process of soil erosion is accelerated due to over grazing. The effects of over grazing are environmentally hazardous and it leads to the degradation of sites. In the process, green cover in the forest floor is lost leading to the loosening of the top soil and boulders, which are finally carried off the site by subsequent run off.

Encroachments:

2.4.9. Encroachment on the forest land and lure for subsequent regularization are also causing severe damage to the forest. Most of the Wood land forests stands encroached today, the percentage of encroachment in Reserved Forests particularly in the forests, which are near human habitations and under stocked areas and plantations even in remote areas is alarming. Some plantations have failed because the sites cleared for plantations became easy for encroachments. Encroachers are sometimes responsible for altering the boundaries of demarcation. As per the data available, there are 28,726 cases of encroachment over an area of 988.257 ha in the Division. Encroachment on the forest lands also causes a lot of damage to the forests. Many areas of protected forests stands encroached today.

Rab burning:

2.4.10. (Burning the field before planting paddy) and Tahal cutting are very common agricultural practices in the entire tract. The demand for leaf litter for rab burning is extremely great and almost entire accessible area near villages is literally swept clean for the collection of the litter. The virtual cleaning of the forest floor year after must have disrupted the nitrogen cycle resulting in the deterioration of quality and fertility of forest soils. It reduces consequently the regenerating capacity of the forests. Tahal cutting leaves the existing trees as crooked, malformed and stunted crop.

2.4.11. Clear felling and subsequent failures in ensuring regeneration have brought about permanent damage to the forests. The object of converting maximum area into teak plantation has not been achieved. Even where the plantations of teak have been raised, the desired girth and height have not been achieved. The areas are subjected to heavy grazing and fires. Clear feeling the tree growth and subsequent clearing of weeds and under growth exposes the soil to the impact of falling rain drop, there by accelerating the runoff. Its contribution to the site degradation is considerable. Thus for moderate and steep slopes clear felling has been extremely harmful, subsequently the efforts for regeneration failed as the area is subjected to indiscriminate and heavy grazing. The effects are hazardous ecologically, socially, and environmentally. Forest lands are converted into waste lands and denuded forest lands which would not be capable to support tree growth on their own and it becomes a permanent lure for encroachers for cultivations. Lack of successful efforts for enforcing regulations aimed at maintaining the betterment of forests have also inflicted serious injuries to the forests. Prevailing local political, social, economic and administrative circumstances have led the people of many areas to believe that the forest and all its wealth are free resources, which are meant for the indiscriminate use, by the people. No effective safeguards for restricting, its use or abuse seem to be in existence for want of adequate personnel, human resource inputs, and, of course, funding.

Mining:

2.4.12. Mining on the forest land has been going on for sometime in the Division. Due to influx of population in the towns and city of Mu

lot of developmental activities in the recent past. Rubble being a major component for any developmental activities, there is a large quantity required for all these works. Pressure is felt in the forest areas adjoining these urban areas.

Hacking and cutting:

2.4.13. Cutting of wood for firewood causes severe damage, as here all trees irrespective of species suffer. This damge is very pronounced in the vicinity of towns where the demands for firewood are heavy. This damage near towns like Virar, Ambarnath, Badlapur, and Bhiwandi has assumed alarming proportions. It has not only upset the normal working of forest for want of exploitable material but in some cases the areas have been completely denuded eg areas near Thane, Virar and Ambernath. Here, the top soil is being washed away except where it is covered by grass. The only way left for reclothing the area is afforstation and proper protection. The damage by lopping is confined to some pockets of the Division.

Soil Erosion:

2.4.14. The accelerated soil erosion is harmful as it results in the top soil being completely washed away from the forest areas which does get impoverished. Accelerated soil erosion is invariably due to the activities of man and his cattle. Grass and weeds cover the exposed sites but during the dry spell the dried grasses are burnt and the top soil is washed away in the beginning of the monson. This cycle is repeated year after year. The exposed sites are devoid of trees.

Damage by Wild animals and insects:

2.4.15. Amongst Wild animals, deer damaged khair plantations by browsing. Porcupines and rodents damaged Sawar plantations by stripping of the barks and also by uprooting the seedlings. Wild pigs also damaged the planted seedlings by uprooting them. Among the insects, the teak defoliator (*Hyblea puera),* Teak skeletonizer (*Hapalia machaeralis*) and the root borer of babul caused some damage in the past. Climber damage in young plantations is seen in the moister areas. The climbers break the leading shoots and this leads to forking. Climbers also caused crookedness of the bole. Damage by climbers is not only confined to plantations but is also seen in the coppice growth.

2.4.16. Increase in the workload of the forestry personnel has resulted in complete dilution of the efforts for maintenance, successful regeneration, and protection of vital forestry resources. The Wildlife, population that was so abundant in these forests once upon a time, has been reduced. The disappearance of some species of wild animals from the areas must have adverse ecological impact on the growth and development of these forests. Complete absence of the natural regeneration and reduction in diversity of species is going to have serious repercussions, ecologically and environmentally in the long run.

2.4.17. Damage due to cyclones and storms in the middle of last century were reported to be very severe. Teak being a shallow rooted species was affected most particularly in the higher girth classes. More than 50 % of the trees of Teak and other timber species in the higher classes above 90 cms were affected. It was calculated that the quantity of of timber extracted from the trees uprooted in the 1948 cyclone amounted to 12 years' annual yield from the whole of Thane Forest.

CHAPTER II B

FOREST FAUNA

A) MAMMALS

Section-1

2B.1.1 The wildlife population in Thane Forest Division is dwindling. In the past the wildlife was abundant but the population has gone down due to increasing biotic pressure on their habitat. The forests areas are confined to compartments surrounded by cultivation lands on lower slopes. In addition, forests are shrinking from border due to rapid deforestation by encroachments and illicit cutting. Consequently these forests are not rich in wildlife. Wildlife has been rendered shelterless. Wildlife in search of shelter and food has started migrating and moving outside the forest areas. Forest areas forming wild life habitats were transferrred to Wildlife wing of the Deaprtment. Wildlife in the Division is now more vulnerable to damage from poachers.

2B.1.2. Wildlife Census is conducted regularly by the Thane Forest Division.The Wildlife Census conducted during the year 2005-06 shows the presence of the following mammals in the Division:-

1. Leopards- *Panthera pardus* (Bibalya Wagh): There are two Leopards reported in the Division in the 2005-06 Census Report.

2. Wild Boar- *Sus scrofa* (Ran Dukkar): There are altogether 279 Wild Boar reported from the Division. The reasons for presence of a large number of Wild Boars may be attributed to Agricultural fields in the adjoining areas. Wild Boar is the largest numbers of mammals reported during the census period.

3. Four horned antelope- *Muntiacus muntjak* (Bhekar): Barking Deer is found all over the Division. There are 77 numbers of Bhekad reported in the Division. Barking Deers are found in the areas of the Division where the density of the Forest is relatively high.

4. Blacknaped Hare- *Lepus nigricollis* (Sasa): 76 Hares were reported from the Division during the Census period.

5.Nilgai: 44 numbers were reported from all over the Division.

6. Vanar: 247 numbers were reported from all over the Division.

7.Ranmanjar (Wild Cat): There are 47 Wild Cat reported from the Division.

8. Striped Hyena- *Hyaena hyaena* (Taras): Only ten Hyenas are reported in the entire Division.

9. Kolha- 12 numbers reported from the Division. Kolha has been reported from the entire Division.

10. .Salu (Porcupine)- 2 numbers were reported.

11.. Makad: 27 numbers were reported.

12 Mongoose: 3 were reported.

13. Salindar: 2 were reported

(B) BIRDS

2B.1.3. Many bird species are found in the forest of Thane. Both migrant and resident birds are found. Presence of large dams and water bodies necesitates migration of birds from other places. Thane has a long coastal belt stretching from Vaitarna to Navi Mumbai in the western part of the Division. Both Aquatic and Terrestrial birds are spotted in the tract.

2B.1.4. The important birds found in the division are: -Peacock, Little Grebe – *Tachybaptus ruficollis* (Pandubi), Little Cormorant – *Phalacrocorax niger* (Chotapankawl), Purple Heron – *Ardea purpurea* (pavkali bagla) Smaller Egret – *Egretta intermedia*, Lesser Whisting Teal – *Dendrocygna javanica* (Mraal), Common Pochard – *Aythya ferina* (Lal chari), Ferruginous Duck – Aythya *nyroca* (Nayansari), Pariah Kite- *Milvus migrans* (Ghar), Shikra - *Accipiter badius* (Shikra), Indian Whitebacked Vulture – *Gyps bengalensis* (Gidhad), Grey Jungle Fowl – *Gallus sonneratti* (Rakhi ran kombda),Whitebreasted Waterhen – *Amaurornis phoenicurus* (Kukud Kombdi), Pheasanttailed Jacana – *Hydrophasianus chirurgus* (Panmor), Redwattled Lapwing – *Vanellus indicus* (Lalmukhi titvi), Common Greenshank – *Tringa nebularia* (Timbla), Blue Rock Pigeon – *Columba livia* (Parva), Indian Ring Dove – *Streptopelia decaocto* (Pitha hola), Spotted Dove *Streptopelia chonensis* (Thipkya kavada), Emerald Dove - *Chalcophaps indica* (Pachu Kavda), Roseringed Parakeet – *Psittacula krameri* (Popat), Blossomheaded Parakeet– *Psittacula cyanocephala* (Keera), Brain Fever Bird – *Cuculus varius* (Pavshaa), Indian Koel – *Eudynamys scolopacea* (Kokil), Crow Pheasant – *Centropus sinensis* (Bharadwaj), Spotted Owl – *Athene brama* (P[illegible]

Kingfisher – *Alcedo atthis* (Dhivar Khandya), Whitebreasted Kingfisher – *Halcyon smyrnensis* (Khandya), Crimsonbreasted Barbet – *Megalaima haemacephala* (Juktuk), Yellowfronted Pied Woodpecker – *Picoides maharattensis* (Kaudya Sutar), Common Myna – *Acridotheres tristis* (Shale), Bank Myna – *Acridotheres ginginianus* (Gnga Myna), Indian Tree Pie – *Dendrocitta vagabunda* (Takkachor), House Crow – *Corvus splendens* (kaola), Jungle Crow – *Corvus macrorhynchos* (Dom Kaula), Common Wood Shrike – *Tebhrodornis pondicerianus* (Jangli), Goldfronted Chloropsis – *Chloropsis aurifrons* (Hirva Bulbul), Goldmantled Chloropsis – *Chloropsis cochinchinensis* (Harewa), Redvented Bulbul - *Pycnonotus cafer* (Lalabudya bulbul), Yellow Eyed Babbler – *Chrysomma sinense* (Pivlya), Paddyfield Pipit – *Anthus novaeseelandiae* (Bhartriya pipit), House Sparrow – *Passer domesticus* (Chimni)

(C) REPTILES:

2B.1.5. The following species of Reptiles are found in the Tract:

Magar or Indian Crocodile - *Crocodilus Pallustris* (Muggar), Indian Pond Terrapin – *Melanochelys trijuga* (Kasau), Olive Ridley Turtle, Commonn Garden Lizard – *Calotes versicolor* (Sargota), Indian Chameleon – *Chameleon zeylanicus* (Girgit), Common Indian Monitor – *Varanus bengalensisis* (Ghorpad), Common or Russell's Sand Boa – *Eryx conisus* (Durkiya Ghoonas), Red or Blunt Tailed Sand Boa –*Eryx Johni* (Dutondya), Common Wolf Snake – *Lycodon aulicus* (Kaudya), Green Keelback – *Macropisthodon plumbicolor* – (Gautya), Buffstriped or striped Keelback – *Amphiesma stolata* (Naneti), Common Red Snake – *Ptyas mucosus* (Dhaman), Fasciolated Red Snake or Banded Race – *Argyrogena fasciolatus* (Dhul nagin), Common Indian Bronzeback – *Bendrilaphis tristis* (Rookai), Common Green Whipsnake or Vine Snake – *Ahaetulla nasutus* (Sarpatoli), Common Indian Krait – *Bungarus caeruleus* (Manyar, Kandar), Indian Cobra – *Naja naja* (Nag), Russell's Viper – *Daboia russellia* (Ghoonas), Saw Scaled Viper – *Echis carinatus* (Phoorasa).

(D) FISH

2B.1.6. Thane Forest Division has both Fresh Water and Marine fishes. The common Fresh water fishes are: Stinging Cat Fish – *Seccobranchus fossilis* (Nal Singali), Cat Fish – *Aystus gulic* , (Shingala), Mureel – *Chana gachus* (Dhokh, Daku), Fresh Water Goby – *Gobius giupeoides* (Kharadi), Major Carp – *Catla catla* (Catla), Major Carp – *Labio rhita* (Rohu), Wallago - *Wallago attu* (Shivda), and Carps – *Puntins spp*. (Khavlya, Khavil).

2B.1.7. The marine fishes found in the coastal areas of Thane Division are: Mullet – *Mugil cephalus* (Boi, Pilsa), Bombay Duck – *Harpodon nehereus* (Bombil), Cat Fish – *Techysurus Spp*.(Shingala), Golden Anchoy – *Coilia dussumieri* (Mandeli), Mudskippers – *Boleophithalmus spp.* (Nivti), and Ribbon Fish – *Trichiurus spp*. (Vagti).

Section-2:- Legal Position

2B.2.1. The Bombay Wild Animals and Wild Birds Protection Act of 1951 was applicable to this Division and according to this Act, hunting of any Wild Animals or Wild Birds (Except those declared as Vermin) without a licence was prohibited, whether in forest or non-forests areas or on private land. Before this Act came into force, the shooting of Wild Animals and the Birds in the Reserved and the Protected Forests were Regulated under Bombay Forest Rules 1942.

2B.2.2. To afford better and more effective protection to our rich wild life heritage, the Govt. of India have enacted, Wildlife (Protection) Act 1972, the same has been enforced in the State of Maharashtra with effect from 1.6.1973. The Wildlife Protection Rules namely the Wildlife (Protection) (Maharashtra) Rules 1975 under the act have been notified by the Government in Revenue and Forest Department, under their notification No. WLP 1073/75942 -X dated 4.2.1975. The same rules are applicable to these areas also.

2B.2.3. The Government of India separately notified under section 63 of the Wild Life (Protection) Act 1972 vide their Ministry of Agriculture (Department of Agriculture) No. F 11014/5/72 -FRY (WLP dated 1.6.1973 the following two sets of rules namely,

i. Wildlife (Stock declaration) Rules 1973 and
ii. Wildlife (Transactions and Taxidermy) Rules 1973.

2B.2.4. These rules have been republished for adoption by Govt. of Maharashtra, Revenue and Forest Department, under their Notification No. WLP/6172/127234 - x dated 5-7-1973. These rules are also applicable in Thane Forest Division.

2B.2.5. Government in Revenue and Forest department have under their order number WLP.1077/86854-F1 dated 5.5.1997, appeared in Government Gazette part IV-I dated 16.6.1977, appointed all Conservator of Forests, as Additional Chief Wildlife wardens, Deputy Conservator of Forests and Divisional Forests Officers in the State as Deputy Chief Wildlife Wardens and Assistant Conservator of Forests (all) have been appointed as Wildlife Wardens and Range Forest Officers (all) in the State as Assistant Wildlife Warden for the purpose of the enforcement of provisions under the Act. Govt. has also delegated the requisite powers under section 54 of the Act to appropriate level Officers upto the rank of Divisional Forest Officer. The Principal Chief Conservator of Forests, Wildlife is ex-officio Chief Wildlife Warden for the State of Maharashtra.

2B.2.6. The wildlife (Protection) Act 1972 (as amended upto 2003) are in operation in the Division.

Section:-3: - Rights and Concession

2B.3.1. No rights or privileges have been admitted for hunting of wild animals and birds in Thane Division.

Section-4:- Injuries to Wildlife

2B.4.1. Destruction of habitat is mainly responsible for the decline of wildlife in the Division. The destruction of the natural habitat forced the wildlife to take shelter near the hunting habitation and making them exposed a:

hunting. Increasing biotic pressure on forest areas, destruction of habitat, frequent droughts and illegal hunting have damaged the wildlife population in the Division.

Table No. 3
Statement showing Wild Life Offences during the period from 1992-93 to 2002-03.

Sr. No	Year	No. of offence	Material seized	Remarks
1.	1992-93	1	62 wildlife animals and birds possessed without license attached and sent to Sanjay Gandhi National Park, Borivali.	
2.	1993-94	2	1 Offence case in 4 Rabbits seized Two tiger cubs and handed over to SGN.P. Borivali.	
3.	1994-95	1	1 Bear seized and sent to SGN.P. Borivali.	
4.	1995-96	-	-	
5.	1996-97	1	18 snakes seized and released in the forest	
6.	1997-98	-	-	
7.	1998-99	3	2 peocock, 1 panther seized.	
8.	1999-00	3	1 Deer, 1 panther skin, 1 Tiger skin seized.	
9.	2000-01	4	17 parrots, 1 Taras, 1 Bhekar, 2 Snakes, 1 Mungoos, 4 Ghorpad seized.	
10.	2001-02	14	Skins of (Tiger, 1 Snake, 1 deer, 1 Samber) and live animals (2 panthers, 3 Peacock, Elephants 1 adult and 1 calf, 6 Mainas, 12 Squirrels, 8 parrots, 1 Civet cat., 6 Alexander Parrots) seized alongwith 11 trophies and Sambar horns 1950 Kg.	

Source: DCF, Thane

Section 5:- Measures Adopted for Protecting Wild Life:

2B.5.1. The Legal provisions as listed in Section 2 above are applicable to the whole Division. Efforts have been made to contain the activities of poaching and illegal transit of wild life items. However, the illegal activities of the poachers and transporters could not be stopped completely, inspite of having all the legal provisions available for protection of wild life and their hahitats.

2B.5.2. There are seven Protected Areas surrounding Thane Forest Division namely, Sanjay Gandhi National Park, Borivali, Tungareshwar Wild Life Sanctuary, Bhimashankar Wildlife Sanctuary, Kalsubai Wildlife Sanctuary, Tansa Wildlife Sanctuary and Karnala Bird Sanctuary. SGNP, Tungareshwar and Bhimashankar(Pt) were formed by carving out areas from Thane Division. These Protected Areas are now under the control of Wild Life wing of the Department. A total area of 50,823.205 ha of Thane Forest Division is within a radius of 10 Km from these Protected Areas.

CHAPTER III

UTILIZATION OF PRODUCE

Section – 1:-Agricultural customs and wants of the populations.

3.1.1. The population of Thane District exhibits a great variety of contrasts. The population at and around the industrially developd places like Thane, Kalyan, Bhiwandi, Ulhasnagar, Ambernath etc consists mainly of industrial workers. They depend on the forest for their requirements of firewood, which is available in headloads brought by the villagers from the adjoining forest areas. The forests, in the vicinity of these towns have greatly suffered from the constant hacking of trees for firewood and small timber which is readily consumed locally.

3.1.2. The population of the coastal tract consists of fishermen who require bark of Ain for colouring their nets and of horticulturists who grow bananas, beetel leaves, flowers, vegetables etc and require for use in their gardens bamboos and small sized timber. The coastal population also depends on the forests for firewood supply.

3.1.3. The local communities living in the forest tract are mainly Adivasis like Thakur, Katkaries, Kolis and Warlis etc. Agriculture is the main profession of the people in the tract. They practice mostly primitive type of agriculture. Paddy, nagli and warai are the main crops. Paddy requires good water supply and hence can be grown only in low-lying areas. Nagli and Warai are not very exacting and hence are the main crops grown in the hilly tract. A common practice followed by all the agriculturists in the tract is rab burning. Rab is a nursery for raising paddy seedlings and requires good burn before the seed is sown. For burning the rab the tribals and local people collect the fallen dead leaves from the forest. They also cut 'Tahal' from certain trees in gairans and Malki lands.The adverse affect of the removal of leaf litter on the fertility of the forest soils by depriving it of its supply of Nitrogen. These people own large herds of cattle. They depend solely on forests for grazing. The sorounding population grazes their cattle in the forest. They also need a lot of timber, which is quite often brought by illicit cutting, for construction of their houses. Their requirement of poles and fencing material like Bam

and is more often met by hacking of plantations and lopping of trees. They also need timber for preparing cowsheds and agricultural implements. The needs of firewood in the developing areas is so great that most of the tribal women collect firewood on head loads and sell these by traveling about 10 to 15 km. on average. Most of the tribal women collect firewood by head loads from nearby forests for earning their livelihood. Because of increase in population, there are instances of encroachments by the adivasis residing in the fringe areas of forests.

3.1.4. Most of the needs of the needs of the local population are met with through grants of privileges sanctioned in Reserved Forests and under Thane Woodland Code.

3.1.5. Thane Forest Division is one of the most industrially advanced areas in Maharashtra State. The total population of the areas falling under the Jurisdiction of Thane Forest division excluding Mumbai is 39, 93,000 in 1991 Census but in 2001 Census it has increased to 60,89,139.

Table No 4.

Population in Talukas of Thane Forest Division.

Sr.No	Name of the Taluka	Population
1)	Vasai	7,95,863
2)	Thane	24,86,941
3)	Bhiwandi	9,45,582
4)	Kalyan	12,76,614
5)	Ulhasnagar	4,73,731
6)	Ambarnath	3,66,501
7)	Murbad	1,70,267
Total Population		**60,89,139**

Section – 2:- Markets and Marketable Produce.

3.2.1. All sizes of timber and every stick of firewood from these forests find a market. The most important markets are Mumbai, Thane, Bhiwandi, Ulhasnager and Badalapur. Felling has been stopped from 1988-89. Only seized offence materials are brought to the depot and sold. There has always been demand of firewood throughout the tract. The major forest produce are sold as timber of teak, Ain, Khair, hed, dhawda etc. and firewood, Khair is in demand for katha manufacturing and for preparing axles and hubs of carts as well. Tiwas is also used for the preparation of axles and hubs of the carts. Hed and Kalambb is used for bobbins, shuttles and foot scales. Sawar, Kakad and shemat are used for packing cases, plywood and matchwood industries. Most of the local demand is confined to small size timber and firewood.

3.2.2. The various minor forest produces are grass, Bamboos, Apta and Tembhurni leave, bel leaves, tad palm leaves, Chilhar and Ain bark, Kadi patta, babul branches, Moha flowers and seed, hirda fruits, plantain (Rankel) leaves, kusari flowers, hirda fruits, gum etc. These products play an important role in socio economic scenario of tribals and local people, who utilize these products traditionally. The sale of these products is also conducted by forest department. Average annual revenue realized from the sale of these Minor Forest Produces from Thane Forest Division is given in the **Appendix No LXI and LXII of Vol II (Page No. 479 -481).**

Section 3: Demand and Supply of Forest Produce and pressure on forests:

3.3.1. There is a shift in the management perception of forest in the ecologically fragile areas of Western Ghats. Presently the thrust is on the conservation. The miscellaneous forests of Thane Division have few timber species of commercial importance. Percentage of Teak trees in the forests is less. Species like Ain, Bonda, Khair, Koshimb, etc are used locally for use as small timber in the household constructions. The import of Timber from other countries meets the timber requirement in Mumbai city.

3.3.2. The farmers produce a large share of the total fodder requirement themselves. Stall-feeding is not common in the Division except during the growing season of the crops. In addition the farmers grow fodders like Makka*, straws* etc. in the fields to fulfill their needs. Cases of illicit felling of trees for use as small timber and illegal grazing are reported at places in the forests.

Section – 4:- Methods of harvesting and their cost:

3.4.1. The main agencies of the exploitation of the forest produce in the tract were the forest labourer co-operative societies. Departmental exploitation was done only to a limited extent. The contractor system of working is not in practice.

3.4.2. During the year 1986-1987, 14 coupes of different working circle of Joshi's Plan were worked through forest labourer co-operative societies and during the same year, 11 coupes were worked departmentally. The total No. of viable forest labourer co-operative societies in the tract is 10. They have 1169 tribals and 43 non-tribals as their members. The total area worked by the societies was 462.063 ha. With an yield of 203.378 cum of timber 1,417.81 cum of firewood and an expenditure of Rs.7,27,098/- was incurred. The cost of working was Rs. 1,573/- per ha. Departmental working was done on an area of 325.997 ha. And the yield was 505.506 cum of timber and 1,535.00 cum of firewood and expenditure of Rs. 5,95,412.00 was incurred. The cost of working was Rs. 1,826.00 per ha. The felled material in the form of timber and firewood had been brought to the depots at Gokhivara, Bhiwandi and Saja.

Section – 5:- Lines of export.

3.5.1. Mumbai is the last Teminus for both central railway and partly Western Railway. The broad gauge railway line of central railway as well as western railway passes through the areas falling under the Jurisdiction of Thane Forest Division. Central railway traverses mainly through Kalyan, one route goes to Kasara and further to Nasik and another to Karjat and Pune. Both routes unite at Kalyan Junction, and then it goes to Mumbai C.S.T. through Thane & Kurla. Western railway traverses from Surat, goes through Virar to Mumbai central. Newly constructed line from Vasai to Bhiwandi, Diwa and part of Konkan Railway also traverse the Thane division area.

3.5.2. Within the Jurisdiction of Thane Forest Division, adequate network of higways. National, state and other roads exist. The National Highway No 2 Mumbai-Agra highway goes to Nashik from Mumbai through Thane, Bhiwandi, and Padgha. The National highway No. 8 goes to Gujarat through Ghod Bunder and Shirsad.

3.5.3. The National highway No.4 goes to Pune from Mumbai though Mumbra, Panvel. There are many State highways and other roads connecting nearly every big village in the district, seasonal roads connect small villages falling under the Jurisdiction of Thane division. Road network is very better in the area. There are a number of roads such as, National highway, State highway, district roads, village roads, other roads, and seasonal roads etc. in the tract traversing the entire length and breadth of the Division.

Section 6: Past and Current Prices

3.6.1. There has been no harvesting for the last 20 years. The prices of all the forest produce have changed drastically in the last few years. The amount of timber and other major forest produce harvested is not very high, as regular coupe working has not been done in the past few years. Minor forest produce and offence materials are sold in the Division. In fact, most of the timber and fuel wood requirements is met from other areas.

The revenue of the division in the past three years is as follows:

2002-2003	**Rs.17,27,281.000**
2003-2004	**Rs. 4,92,31,072.00**
2004-2005	**Rs.5, 21, 34,291.00**

CHAPTER IV

ACTIVITIES OF FDCM IN HARVESTING AND MARKETING OF FOREST PRODUCE, RESULTS OF ECONOMIC SURVEY.

Section – 1: Area under FDCM

4.1.1. The Forest Project Division, Thane, FDCM was established in 1974 with its headquarters at Thane. The works are undertaken in the earmarked and assigned forest areas handed over to FDCM from Thane, Dahanu and Jawhar Teritorial Forest Divisions. The Management Plan of Thane Project Division, FDCM was prepared for the period from 2006-07 to 2015-16. In the meanwhile, it was decided to hand over some of the Compartments to the concerned Territorial Forest Divsions. Some of the areas were handed back to the Divisions in the year 2006 and 2007. The distribution of the earmarked areas of the Forest Project Division, Thane from Thane Forest Division is as under:

Table No.5

Sr. No	Name of the Forest Division	RF	PF	Total Area in Ha
1	Thane	7729.09	2.24	7731.33

4.1.2. About 8.67 % of total forest area is under the management of FDCM Ltd. in this Division. The areas of the FDCM are in the form of clusters, which are referred to as Work Centres. These forests were worked earlier under Conversion Working Circle and Selection-cum Improvement Working Circles of N.J.Joshi's Working Plan. The forest type is mainly Tropical Southern Moist Teak Bearing Forest.

Section – 2: - Activities of FDCM

4.2.1. There are 112 sanctioned posts as on 19/9/03. Earlier FDCM used to work in areas of Conversion Working Circle and Selection–cum-Improvement Working Cicle of Joshi's Working Plan as an Agency of Forest Department in clearfelling, logging, transporting and marketing the forest produces and sharing the benefits on percentage basis fixed by the Government from time to time. But at present, the FDCM is working entirely independent of Forest Department on the areas leased to them. Till 1978 works were executed on ad-hoc basis but from 1978 a **"WORK PLAN FOR THE FOREST PROJECT DIVISION, THANE"** was prepared and works were executed as per the Plan. The period of the Plan was from 1978-79 to 1987-88. Subsequently, a separate **Management Plan** was prepared for the period from 1995-96 to 2005-06 for the management of Forest areas under FDCM and duly accorded sanction by the competent authority. But no works were carried out till 2000 as the GOI has given permission for over wood removal and other activities only in 2001. Most of the activities of FDCM are similar to the activities of Forest Department. Removal of overstocked crops from the forest areas and replanting with improved seedlings or nurseries stocks is presently taken up by the FDCM. It also involves in the activity of protection of forest from fire, grazing and illicit felling.

4.2.2. The various major types of activities undertaken by the FDCM are as under:

1. Plantations: From inception, a major emphasis was given for raising good quality crop. Plantations programmes/ schemes such as Teak Plantation Programme, Massive Afforestation Programme, Compensatory Aforestation, World Food Programme (Fuel wood and Bamboo),Maharashtra Forestry Projects, and Employment Guarantee Schemes were implemented.
2. Advance Root Trainer and Clonal Nursery at Wada:- Under Maharashtra Forestry Project, advanced Nursery with modern technique and infrastructure facilities for raising root trainers and clonal seedlings has been developd at Wada.
3. Soil and Moisture Conservation Works: Soil and Moisture conservation works such as Nala Bunds, and WATs are carried out under EGS Schemes.

4. The special Works of improvements undertaken by the FDCM includes, fire protection works in plantation ranging from 5-10 years, Cleaning and Climber cutting in Teak Plantations, Construction of 56 numbers of civil works and establishment of Wireless Networks.

4.2.3. In the early part of the establishment of the Forest Project Division Thane, many areas were clearfelled and regeneration could not establish due to heavy biotic pressure. After large scale harvesting of the matured crops from the forest there is a paradigm shift in the mindset of the local people and they do not co-operate in the protection of Forests.

4.2.4. Exploitation: Clearfelling System was in vogue in the earlier days; as such large areas were clearfelled and planted up with Teak. The Thinning of successful Teak Plantations are carried out. The materials obtained from thinning are brought to Depot and sold. Since 2001 the Overwood Removal activity was undertaken by the Corporation after obtaining permission from the Central government. The details of expenditure and revenue for the period from 1994-95 to 2004-05 is as under:

Table No 6

Sr. No	Year	Expenditure Incurred			Revenue Receipts		
		Crop II Exp	Harvesting IWC	Harvesting OWR	Crop II	IWC	OWR
1	1994-95	3562118.68	-	-	9311563.00	-	-
2	1995-96	3871439.10	-	-	11925925.50	-	-
3	1996-97	3146097.59	-	-	10833637.50	-	-
4	1997-98	5201485.97	-	-	12041657.00	-	-
5	1998-99	5642797.15	-	-	11698075.50	-	-
6	1999-00	9906573.97	-	-	14596388.00	-	--
7	2000-01	7557635.56	3740333.35	-	18406535.00	812350	-
8	2001-02	3818234.92	1700860.25	458045.89	7561395.00	82166515	-
9	2002-03	2451108.72	2317580.98	13443483.5	2171649.00	2410025	21581135
10	2003-04	1883592.93	1703837.95	6268162.87	6338855.00	5177565	25026665
11	2004-05	933475.71	171904.65	283430.20	26240005.00	2998810.00	8611005.00

Source: FDCM, Thane

CHAPTER –V

IMPACT OF FIVE YEARS PLANS ON ATTAINMANT OF MANAGEMENT ACTIVITIES

Section No- 1:- The Five Year Plans

5.1.1. The requirement of forest produce by the local people was met with from the forests in the early days. Forestry works provided employment to the Adivasi population of the tract. Forest dwellers were given forest land for settlement and cultivation from time to time. Prior to coming into force of Maharashtra Land Revenue Code, 1966,'Forest Village' concept existed in the far flung villages of the Division.

5.1.2. The management of forest on scientific lines was started from 1887-1917 when the first Working Plan was prepared. At the time of the First Five Year plan period all the forests were managed under Working Plans. Activities carried out during each of the Five Year Plan periods are summerised below:

Section – 2:- First Five Year Plan (1951 -1956)

5.2.1. Shri S.P Jadhav revised Starte's Plan of 1935 and was brought into force from 1951-52. The Clearfelling System of Starte's Plan was replaced by the system designated as "Clearfelling-cum-Selection-cum- Improvement Fellings" in Jadhav's Plan. The previous two Working Plans prescribed for Clearfellings all over the tract. But in Jadhav's plan clearfelling was prescribed only for non-steep areas under "Selection-cum-Improvement fellings". During the period from 1951-56, an expenditure of Rs 24,41,327.00 was incurred on Conservancy & work, establishment and Plan works as against a revenue of Rs 86,19,637.00 during the same period. An area of 387.709 ha plantations were raised from 1951-56 in clearfelled coupes. However, no other special plantations were raised. In final felling the yield are as follows- 14,146.07 tons Teak, 12,922.98 ton Injaili, 23,685.45 ton fuelwood. In the first thinning, 139 numbers of Coupes were worked, and the total yield was 3, 98,715.40 Cu ft. In the second thinning, 226 numbers of Coupes were worked and the total yield was 9, 56,712.550 Cu ft.

Section – 3:- Second Five Year Plan (1956-1961)

5.3.1. Shri Jadhav's plan was under implementation in the second Five Year Plan.The Clearfelling in steep slopes was discontinued and felling was resorted to only on non-steep slopes. Plantations were raised on 536.613 ha. The special plantations were raised as follows- Agave 185.100km, Matchwood 181.30ha, Kaju 399.83ha, and Bamboo 8.10 ha. The Agave plantations carried out in the second five year plan did not yield sufficient quantity for manufacturing robes.The yield from final felling is 12,083.48 tons Teak, 13,950.49 ton Injaili, and 22,801.82 ton Fuelwood. In the first thinning, 203 numbers of Coupes were worked with total yield of 7,53,646.94 Cu ft. In the second thinning 201 coupes were worked with total yield of 12,71,063.720 Cu ft. The total expenditure in the Second Five Year Plan was Rs 55, 92,697.00/- and the corresponding Revenue was Rs 1,77, 22,266.00/-

Section – 4: - Third Five Year Plan (1961 To1966)

5.4.1. Shri Jadhav's plan was in operation in the third five year plan. Selection felling and clearfelling was carried out and part of the areas were regenerated by articial means over 992.491 hectares.

5.4.2. Under the third five year plan special plantation of 263.04ha Kaju, 53.41ha Khair, 575.14ha Teak, 30.35 ha Bamboo, and 610.720 Eucalyptus were raised. The yield from final felling is 12,524.49 tons Teak, 14,581.23 tons Injaili, 85,648.72 ton fuelwood. In the first thinning, 186 coupes were worked with a total yield of 9,51,518.92 Cu ft. In the second thinning, 212 coupes were worked with a total yield of 1, 93, 77,781.78 Cu ft. The total Expenditure was Rs 77, 10,443/- and the Revenue was Rs. 2, 05, 92,413/-.

Section – 5: - Post Third Five Year Plan (1966-1969)

5.5.1. Shri Jadhav's plan was operational in the beginning of the fourth five year plan. In total 40.8% of the clear felled area was planted up. As against the prescription of 66% harvestable area to be worked under 'clearfelling' system, only 37.49% of the area was clearfelled and the rest was worked under 'Selection-cum-improvement' felling system. Only Teak and Agave plantations were successful but other species were not successful.

5.5.2. Shri Jadhav's plan was revised by N.J.Joshi for the period 1969-70 to 1988-89. Joshi constituted 11 working circles with two overlapping working circles. The working circles are Protection Working Circle, Selection-cum Improvement working circle, Lake catchment area working circle, Conversion working circle, Industrial wood plantation working circle, Pulpwood plantation working circle, Miscellaneus plantation working circle, Fodder Reserve working circle, Casuarina working circle, Babul working circle, Miscellaneus working circle, M.F.P. (Overlapping) working circle and Bamboo (overlapping) working circle. The entire area was stock mapped for the first time during the period from 1963-65. Enumeration was also carried out during the preparation of the Plan.

Section -6 :- Fourth Five Year Plan (1969-1974)

5.6.1. Shri Joshi's working plan continued during the fourth five year plan period. It was aimed at intensive management consistent with the modern trends. Its prescriptions were oriented to promote Forest based Industies. It envisaged annual conversion of 2,399 hectares into Teak forest, 125 hectares into Industrial wood forests and 600 hectares into Pulpwood forests by clearfelling and planting. It was proposed for raising Teak and industrially valuable species.

5.6.2. The objective of selection cum improvement working circle was to gradually increase the teak reproduction. But vigorous understorey of bamboo and grass, rugged nature of the terrain, shortage of labour, frequent fires etc, came in the way of artificial regeneration. Artificial regeneration of the annual coupe with species such as teak, khair, eucalyptus though prescribed could not be carried out to the desired extent. Illicit cutting for fire wood and overgrazing by cattle and sheep has further contributed to the deterioration of the growing stock. The yield during the period from 1969 to 1974 are as under:

Table No 7

Sr No	Year	Area worked in Ha.	Timber		Fuel (cum)	Total
			Teak (cum)	Injaily (cum)		
1	1969-70	1933.123	3195.041	4980.141	19507.400	27682.582
2	1970-71	2240.553	3054.278	5240.887	83005.787	91300.952
3	1971-72	4617.480	7736.689	13958.411	90035.340	111730.44
4	1972-73	3783.154	9482.389	22423.387	65904.243	97810.019
5	1973-74	3494.227	4872.629	9229.207	64056.950	78158.786

Source: DCF, Thane

Section -7:- Fifth Five Year Plan (1974 - 1979)

5.7.1. Shri. N.J.Joshi's working plan was in operation during Fifth Five Year Plan period. It was aimed to increase the proportion of teak and other valuable species in the crop and to build up higher dimensions. Exploitations were carried out by the Department, FDCM and Forest Labourer's co-operative Societies. A part of the mature growing stock was to be removed. The Thane Project Division, F.D.C.M Ltd was established in the year 1974. This project division carried out clear felling works in the tract. Cultural operations were not carried out. The sudden opening of canopy threw out dense tall grasses which came in the way of regeneration. The forests have become more vulnerable to fire. Separate expenditure figures are not available for this period. The yield for Thane Forest Division during the period from 1974 to 1979 is as under:

Table No 8

Sr No	Year	Area worked in Ha.	Timber		Fuel (cum)	Total
			Teak (cum)	Injaily (cum)		
1	1974-75	2526.833	3627.182	7182.686	65300.529	76110.397
2	1975-76	1722.015	3152.445	4041.589	35917.173	43111.207
3	1976-77	1645.262	1598.387	1628.814	22936.799	26164.000
4	1977-78	1930.316	1513.092	2363.960	25622.417	29499.509
5	1978-79	1688.065	1485.828	2764.782	24447.500	28698.110

Section -8 :- Annual Plan (1979 – 1980) And Sixth Five Year Plan (1980 – 85):-

5.8.1. When Janata party came to power in the year 1979, the five-year plan was discontinued and replaced by annual plans. The change in pattern of planning has not yielded appreciable results. During this period, the decision was taken to regularize the encroachments upon forest land for the encroachers of the period from 1/9/1972 to 31/3/1978. That has created a tendency among people to encroach upon forest land with the hope it will be regularized in future. Thane Forest Division suffered immensely from this decision as a large extent of areas was encroached in the Division. Afforestation works that were taken up during the period did not yield good results because of biotic pressures. Fellings were carried out all over the Division but the artificial regeneration was not carried to the extent desired. The Yearwise areas worked, materials obtained both Teak and Injaili Timber and fuelwood during the period from 1979 to 1985 are tabulated below:

Table No 9.

Sr No	Year	Area worked in Ha.	Timber		Fuel (cum)	Total
			Teak (cum)	Injaily (cum)		
1	1979-80	1477.611	1113.974	3401.608	24179.498	28695.020
2	1980-81	1574.449	875.140	2481.412	21028.783	24385.335
3	1981-82	1316.470	1037.386	3669.654	21265.260	25972.300
4	1982-83	1257.961	720.295	2873.898	17207.493	20801.686
5	1983-84	1249.811	514.555	2007.155	13413.554	15935.264
6	1984-85	797.674	236.221	1699.757	11276.496	13212.474

Source: DCF Thane

Section -9 :- Seventh Five Year Plan (1985-90):

5.9.1. During this five year plan N.J Joshi's Plan was in operation till 1988-89. Felling and other Silvicultural operations and protection works continued along with Massive Afforestation Program (MAP) and E.G.S. works.This period experiences tremendous development in case of infrastructure development. The remote areas were beginning to be connected through all weather roads. Various schemes under special components and special action plan through Tribal Development Schemes were launched. People got glimpses of real development. After the expiry of Joshi's Plan in 1988-89, the revision of the Plan was not taken up for various reasons.

Section - 10:-Eighth Five Year Plan (1992--1997)

5.10.1. There was no sanctioned Working Plan in Thane Forest Division but special improvement works like General Utility Timber (GUT) Bamboo, Plantation of Minor forest produce, Reforestation of degraded forests, Massive Afforestation Program (MAP), Reforestation of Degraded Forest (RDF), Industrial and Commercial plantation schemes were implemented during this period. The tract received adequate attention in mitigating the agony of the people through several schemes launched by the State Government, through its various developmental agencies. World Bank Aided Project called "Maharashtra Forestry Project" was implemented during the period. During this period many areas were brought under afforestation though the success rate were much below expectation. Government of Maharashtra took a landmark decision in forestry on 16th of March 1992, which envisages involving the local people through Joint Forest Management (JFM) for degraded forests. In 1996-97 two villages were selected under JFM for the first time and works were executed. The works included entry point activities, Plantations and protection of the forest in the adjoining areas of the villages. JFM being a new concept, there were apprehensions and mistrust in the beginning among the local people and the forest officials.

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

Section -11:-Ninth Five Year Plan (1997 - 2002)

5.11.1. State Government had started various schemes in consonance with Central Government schemes. Forest Department was one of the implementing agencies. World Bank aided Forestry Project was implemented and one of the focus of this project was Joint Forest Management. This project succeeded in certain areas where the staff took special personal interest.

Section -12:-Tenth Five Year Plan (2002-2007)

5.12.1. The Working Plan is under revision. No felling works were carried out but Regeneration works have been carried out all over the Division. A mjor emphasis is now given to JFM in the management of forests. FDA is implemented through JFM committees in the tract.

Section -13:-Eleventh Five Year Plan (2007-2012)

5.13.1. MREGA was enacted by Parliament in 2007, and emphasis was made for forestry works to be implemented under MREGS. Besides, many Forestry activities were taken up under earstwhile EGS in Maharashtra. In the Eleventh Plan period a major emphasis is given for FDA (Joint Forest Management). People are sensitized and the Scheme is implemented in a huge way in the Division. Mangrove areas, which were in possession of other Departments are now transferred or in the process of transfer to Forest Department for scientific management.

CHAPTER– VI.

STAFF AND LABOUR SUPPLY.

Section – 1:- Staff

6.1.1. The following statement shows the sanctioned staff in Thane Forest Division.

Table No 10

1	2	3
1	Conservator of Forests	1
2	Assistant Conservator of Forests	3
3	Range Forests Officer.	16
4	Forester	83
5	Guard	273
6	Surveyor	4
7	Head Clerk	1
8	Accountant	17
9	Clerks	27
10	Drivers	9
11	Motor Launch Driver	1
12	Junior Engineer	1
13	Head Constable	1
14	Armed Constable	2
15	Peons	12
16	Watchman	4
17	Majur	2
18	Van Majur	32
19	Chain man	2
Total		**491**

Source: CF, Thane

Section – 2 Labour Supply

6.2.1. The local people and tribals belonging to the communities like *Thakurs, Kathkaris, Kunbis, Kolis and Warlis* constitute the main sources of labours for the forestry operations. Warlis are expert in woodcutting but they are lazy by nature. Katkaris are hard working and they have specialized in the preparation of charcoal. Most of the forestry activities has been stopped from 1998—89 and now they are mostly engaged for afforestation and other works.

6.2.2. It has been reported that areas near metropolis and cities are facing shortage of labourers for various forestry operations. The shortage of labourer is more acute in the areas around Bhivandi, Thane, Vasai, Padgha etc. which are the industrial areas and the rates of wages being offered to the labourers are almost double the rates paid for forestry works. Sprawling building constructions business covering quarrying and brick manufacturing also accentuate this problem. The labourers available for various forestry operations particularly for plantations and nursery operations get diverted to agricultural work during the plantation season as both coincide with each other.

6.2.3. However, for the exploitation works, since most of the coupes were worked by members of the forest labourer co-operative societies there was hardly any difficulty for labourers.

6.2.4. Due to more emphasis on afforestation and plantation activities, the requirement of labourers has increased many fold and extra labourers are required to be brought from outside the Division. The local labour prefers working in industries, godowns, quaries, Brick Kilns etc. as they earn more on those works. The work is available nearer or in the village itself compared to the remote locations of forestry works.

CHAPTER – VII

PAST SYSTEMS OF MANAGEMENT

Section – 1: General History of the Forests.

(A) Forest covered by Shri. N.J.Joshi's Plan: Reserved Forests.

7.1.1. Maratha Period: - Prior to 1800, the Maratha regime exercised sovereign authority over the public forests. Certain portions of the forests were set apart for meeting the requirements of the Government while cutting was permitted from the rest of the area. Local population was free to obtain all the produce they needed for domestic and agricultural purposes from the forests.

7.1.2. Early British Period: - The necessity of conserving the forest was not recognized till about 1840. During this period, the exploitation of tree growth was very unsystematic. Customs duty was levied on the value of the wood cut and removed from the forests. The rates of duty varied from taluka to taluka. Demarcation of the village reserves was carried out from 1840 onwards. In 1845, Forest Department was organized for the first time and the system of management consisted in reserving Teak and nine other species. The main sources of revenue were the thinning in the teak reserves and collections under the fee system (Vanamakta) introduced in 1852. The whole of the Thana District formed only one division and the staff for protection of forests as well as for supervision over felling was inadequate. Consequently, illicit felling occurred on a large scale. The fee system was applied in 1862 and the system of departmental felling put some check on the wholesale destruction of the forests but under this system only the best teak trees were normally cut. Excessive felling was made in the easily accessible forests. Unrestricted and unregulated lopping of injaili trees for tahal caused much destruction of forests. The "Kolpat" contract system by which right of collection of deadwood in the forests was disposed of annually also caused great damageto the forest.

7.1.3. The first working plan (1887 to 1917) – In 1882, one Forest Division is split into two Forest Divisions which were split up into three Forest Divisions in1897. The system of dividing the forest of each Range into Blocks and annual coupes was introduced in 1887-88 and regular felling under the "coppice-with-standard" system were started from the year, though the first regular Working Plan (for the forest of Bhiwandi) incorporating the system was sanctioned in 1894. Working Plans for the forests of other Ranges followed e.g., Working Plan for the forests of Bassein, and Mahim Ranges drawn up by Millet in 1895, Murbad Range drawn up by Fisher in 1902 etc. All the forests of the tract were brought under regular working plan by 1905. All these Plans, which were drawn up in 1905, prescribed the "coppice-with-standard" system with a rotation of 40 years for the coppice.

7.1.4. The various Working Plans drawn up between 1894 and 1905 for the forests of different Ranges were brought together in 1922 under the 'Thane Forest Working Plan' prepared by Aitchison and Hamilton. This plan prescribed "Clearfelling system" with a rotation of 80 years. The clear felling was actually started from 1917-18 only, as the "Coppice-with-Standards" system was considered economically unsound and as the standards tended to suppress the coppice growth. The 1922 Plan was revised by Starte in 1935 who prescribed the continuation of the cleafelling system with a rotation of 80 years. Starte's Plan was revised by Jadhav in 1951, in which the clear felling system was replaced by the system designated as "Clearfelling-Cum-improvement fellings". Jadhav's Plan was revised by Shri. N.J. Joshi in 1967 and was in force till 1988-89.

B) Forest covered by Saldhana's Working Plan – Thane Woodland Protected Forests.

7.1.5. The Woodland Protected Forests in Thane District, were declared Protected Forests and were assigned to meet the agricultural and domestic needs of the people. Complete ownership vested in Government. No rights of private persons or public rights other than those of way existed over them after completion of demarcation and settlement of forest which were regarded as complete and ample. The woodland settlement was made from 1897 to 1902. This sett

remarkable for the liberality of its allocation of land to woodland and the comprehensiveness of the privilege admitted in the woodlands. The people indiscriminately exercised these privileges as these woodlands remained for a long time under the control of the Revenue Department who managed them solely for the interests of the public. The privileges particularly the privileges of cutting injaili trees for 'tahal' supply has been misused from time to time, so as to cause depletion of these forests. Rules to regulate the lopping of 'tahal' were framed and received legal sanction as it was universally admitted that regular supply of 'tahal' should be maintained as same is necessary for the burning of soil in seed beds for the cultivation of Rice, Nagli and Warai in the tract. To begin with, the supply of 'tahal' was ample and before the original survey in the district all woodlands were recorded as government wastelands and 'tahal' were freely lopped from all kinds of trees. But with the completion of forest demarcation and settlement under the Forest Act, looping of tahal was prohibited in the Reserve forest with the result that the area available for this privilege was diminished considerably. Nevertheless, owing to the large number of tahal species in Malki, varkas lands and in woodlands tahal was still available in sufficient quantities to meet the full requirements of the agriculturists. Rules to regulate the lopping were made applicable.

7.1.6. In 1892, injaili trees in Varkas lands and all trees in rice lands were handed over to the occupants. With the growing increase in the demard for and the value of charcoal, the sale of injaili trees from varkas lands led rapidly to a shortage of tahal. Small timber merchants often purchased trees in malki varkas lands from the ignorant Tribals for a mere sum. On the disappearance of the injaili from varkas lands, the agriculturists rushed to the neighboring woodlands, for their tahal supply and the tree growth in woodlands had to bear the complete burden of tahal supply, which hitherto had been shared by trees in reserved forests and varkas lands. It was at this stage (1905), that the Thane woodland code was framed to regulate the exercise of privileges in woodlands (Woodland) Protected Forest *vide* Government Resolution, Revenue Department No. 7742 of the 25th September, 1905.

Section –2:-Past systems of management and their results.

(A) Reserved Forests.

I- The First Working Plan.

7.2.1. The first working plan of 1905 prescribed 'coppice with standards' system generally with a rotation of 40 years. In some places, the method was described as coppice standards partaking of the nature of severe improvement fellings. However, earlier the working plan for the forests of Bhiwandi taluka was drawn up in 1894 and that was the first working plan to be introduced in the forests of Thane district. The working plan for the forests of Mubad Ranges was first drawn up in 1902. By 1905 all the forests of the district were covered by working plans. The working plans prescribed "Coppice-with-Standard" system with a rotation of 40 years. The number of standards was generally fixed at 30 to 40 per acre for Thane. In 1909, instructions were issued to aim at reservation of 40 or even 50 trees/ acre and all stems under 12" circumference were to be reserved in addition.

7.2.2. As a preliminary method of treatment the system was the best that could have been devised and on the whole, it worked well in as much as the large number of over mature, badly shaped and unsold trees which the forests contained were profitably exploited and replaced by vigorous young growth. The system, however, in some respects appeared unsuitable. In the first place, it was economically unsound as the standard reserved were often of a species which and no value as a timber while some of the standards were over mature, crooked, and did not put on any increment. It was, thus unprofitable economically to retain such trees, though it must have been ecologically advantageous to the tract. In addition, the large number of standards, which were retained as per the instructions, issued in 1909, adversely affected regeneration and also retarded the growth of the coppice (As per observations mentioned in Joshi's plan).

II - The Aitchison and Hamilton's Plan 1922.

7.2.3. This plan revised all the previous plans for various forests and prescribed the clear felling system. Though the Plans was published in 1922, the clear felling was actually introduce from 1917-18 itself. The rotation was fixed at 80 years. The regeneration was mainly to be natural by coppice and se

supplemented by artificial regeneration where necessary. As the forests were capable of producing big sizes timber, the clear felling system provided the necessary impetus in the form of operation in concentrated manner. Since there was no emphasis on ensuring regeneration, forests were heavily exploited and artificial regeneration was confined to only dibbling of seeds on charcoal kiln sites. Though, in most of the areas natural regeneration did not come up well, as natural seedlings had little chance of survival against the rampant growth of weeds and grasses that followed clear felling, the coppices of inferior species and the weeds suppressed the coppice and recruits of superior species and all this affected the stocking badly.

7.2.4. The plan prescribed removal of old standards under improvement felling along with thinning in the areas worked under the previous plan. This helped in improving the crops of teak and other species as the old standards along with congested growth of coppices were hampering the growth of the promising coppices.

III - <u>Starte's Plan of 1935.</u>

7.2.5. Starte's plan prescribed the same system of exploitation viz. the 'clear felling' system and maintained the same rotation, felling series, and coupes. He prescribed the system of rab plantation of teak (stump planting) and of khair, shisav, Tiwas and Ain by dibbling seeds. This did put as emphasis on regeneration by artificial means in clear felled areas, which was lacking in Hamilton's plan. Starte further attempted to ensure the success of regeneration by prescribing intensive tending operations.

7.2.6. The stump planting on rab sites prescribed by 1935 plan produced excellent results and some very successful plantations of teak and khair could be seen in the coupes worked under the plan, viz. Coupe No. 17 & 35 of the main working circle, particularly on the lower slopes in better quality areas. The burning of rabs kept down the weeds and thus helped the growth of seedling and stumps. Starte's plan also prescribed that artificial regeneration should be carried out to the extent of at least 12 ½ percent of the total area of the exploitation coupes. However, the rab plantations were scattered throughout the coupes and were thus lost in the

vigorous coppice growth, which came up after clear felling. Though the clear felling system followed by artificial regeneration gave better results on better quality areas, its application to all areas irrespective of the topography and the quality of locality was not correct as it resulted in soil erosion on steep sloppes, while on poor quality areas, artificial regeneration was not a success. Even where the site was suitable for raising plantation, artificial regeneration was done in not more than 12 ½ percent of the areas and the major part of clear felled areas was regenerated by coppice of inferior species which largely suppressed the coppice of superior species like teak.

IV - Jadhav's Plan

7.2.7. As in the case of two previous Plans, the major portion of the forest was set apart for clear felling and included in the main (timber) working circle. However, the minor change in this Plan was that the clear felling system was replaced by a system designated as "clearfelling-cum- selection-cum-improvement fellings". Thus, instead of applying the clear felling system uniformly to all the forests irrespective of topography or site quality, clear felling was prescribed only for non-steep areas while the steep areas were to be worked under the selection-cum-improvement system. The proportion of the artificially regenerated areas was also sought to be increased by prescribing artificial regeneration of at-least 33 % of the clear felled areas. However, the results of this prescription were not satisfactory as some steep areas were also clear felled resulting in erosion. Some areas fit for clear felling and planting were not planted but worked under selection-cum-improvement felling. All clear felled areas were not planted and as such left over areas gave rise to the forests of coppice origin of poor quality or the areas were left blank or under stock. Most of the areas worked under selection-cum-improvement felling were over exploited. The rotation fixed in this working circle was 80 years.

7.2.8. In order to meet the requirement of poles, and to minimize the impact of heavy illicit cutting the poor quality forests were recommended for working at a short rotation of 40 years and designated as 'Pole Working Circle'. The results of these prescriptions were similar to that described in the previous plan. It appears that none of the forests of Thane Forest Division had been worked under this working circle.

7.2.9. The areas which were situated on very steep slopes and from where extraction of material was difficult and which if exploited would cause landslips and soil erosion were put under "unexploitable working circle". These difficult areas were called 'Kharaba'. All these 'Kharabas' were mapped in the various working plans prepared before 1905 and since then their boundaries have remained unchanged.

7.2.10. In addition to the working circles mentioned above, there were three over lapping circle constituted for the production of Matchwood, Bamboo and Minor Forest Produce. Under Matchwood over lapping 'working Circle' concentrated plantations of Sawar in exploited coupes near railway stations, which were within easy reach to the match factory, were proposed. The plantations were not successful mostly due to damage by rodents and lack of protection of suitable fencing etc. No other matchwood species other than Sawar though recommended in the the plan, were tried.

7.2.11. In bamboo Working Circle, there was no regular exploitation. All bamboos particularly Manvel and Katas died due to gregarious flowering in 1959-60 and since then there has been no regular exploitation of bamboo. The dead bamboos have been removed on permits. Profuse regeneration was observed in some of the area, but it failed to develop into clumps.

7.2.12. Under "Minor Forest Produce Overlapping Working Circle" the Plan prescribed for the preservation and propagation of trees yielding minor forest produce. It prescribed planting of 'Agave' along the demarcation line as Agave plantations which were taken up under second' Five Year Plan' were hardly sufficient for rope making industries. No plantations of any other trees yielding Minor Forest Produce were raised.

7.2.13. During Jadhav's plan, plantations were raised over and area of 7,234.509 ha. In total 40.8 % of clear felled are were planted against the Plan's prescription of 33 % minimum. However, against the prescription of 66 % of the exploitable area to be worked under the 'clear felling' system, only 37.49 % of the areas was clear felled and the rest was worked under 'Selection cum improvement' felling system.

7.2.14. Special plantation of agave, teak, khair and matchwood species were undertaken under the 5 years plan scheme. However, none of these plantations, except teak and agave, were very successful.

7.2.15. Thinning were generally carried out as prescribed under the plan.

V - N.J. Joshi's Plan

7.2.16. Shri.N.J. Joshi, combined all the schemes and plans under operation of the Reserved Forests of Thane District and wrote a single Working Plan for all the Reserved Forests of the District comprising of Dahanu, Shahapur and Thane Forest Divisions. The period of this plan was fixed for 20 years from 1969-70 to 1988-89. He constituted 13 Working Circles in all but only 11 Working Circles were applicable for the areas of Thane Forest Division. These Working Circles were:-

i) Protection Working Circle.
ii) Selection cum improvement Working Circle.
iii) Conversion Working Circle.
iv) Industrial Wood Plantation Working Circle.
v) Lake Catchment Working Circle.
vi) Pulpwood Plantation Working Circle.
vii) Fodder Reserve Working Circle
viii) Miscellaneous Plantation Working Circle
ix) Miscellaneous Working Circle.
x) Minor Forest Produce (Over lapping) Working Circle.
xi) Bamboo (over lapping) Working Circle.

The special objects of Management, main prescriptions, extent and quality of implementation and their results for each Working Circle are described as under:-.

I) The Protection Working Circle.

7.2.17. The working circle comprised of unworkable areas known as "Kharabas" which were not fit for exploitation as they were too steep and inaccessible. The site quality is usually IVb to IVa. Occasional patches of III quality

are seen on the gentler slopes or in valleys. The forest belongs to local type "Mixed Forests" with teak either totally absent or accuring in small numbers. On high altitudes e.g. on the main ridge of Western Ghats in Tokawada Range, the forest is semi evergreen and belong to the "Western Sub-Tropical hill forests". In rest of the area, the forest belongs to the type" the moist teak bearing forest" The special objects of the management were the preservation and improvement of the existing Vegetal cover to prevent soil erosion and improving the microclimatic and micro edaphic conditions of the site. On account of the steepness of the terrain, exploitation was not prescribed so as to prevent the possibility of severe soil erosion. The areas have been simply shown as unworkable. The area included in the Working Circle was 7633.694 ha.Owing to their inaccessibility the areas have remained protected till date.

II) <u>Selection-cum-Improvement Working Circle</u>.

7.2.18. In this working circle all workable areas which were then considered unfit for clear felling on account of steep slopes (more than 25^0) were included. Most of the areas in part of Tokawada and Murbad Ranges are steep and hence have been allotted to this Working Circle. The area of Thane Forest Division included in this working circle was 18,977.709 ha. The Forest mostly belongs to the type "moist teak bearing forest". Both the local types viz. Teak forest and mixed forests occur. Mixed forests were more common in Murbad Range of Thane forest division, while teak forest was more common in other areas. The site quality was mostly IVa with patches of III quality occurring locally on more gentle slopes and in the valleys. The density of the crop varied from 0.4 to 0.6. Important species occurring in the crop are teak, khair, Shisam, ain, dhawada, hed, Kalambb, bibla, etc.

7.2.19. The special objects of the management of the forest in this working circle were:

(i) To maintain, improve the soil cover and to preserve and improve the site quality.

(ii) To obtain big sized timber of teak and other important species.

(iii) To increase the proportion of valuable species by proper treatment and by planting.

7.2.20. The Silvicultural System prescribed was "Selection-Cum-Improvement" and felling cycle of 20 years was fixed. The exploitable size of teak was fixed at 105 cms. G.B.H. and for other timber species 90 cms. gbh. Yield was regulated by Brandis Method as modified by Smithies' formula and was prescribed at 33 % of the available trees in respect of teak. For other species, yield was regulated by areas. A minimum plantable area to the extent of 5 % of total area of the coupes was fixed. All sound fruit trees and medicinally valuable species were to be reserved except in the plantable areas. In plantable areas, clear felling was to be done and in unworkable areas only dead trees were to be felled.

7.2.21. While implementing the prescriptions of this working circle, no special measures were taken to improve the quality of the existing forests. While marking trees for felling, it had been found that treatment and stock map have not been prepared. The workable and unworkable areas have not been distinctively marked on the ground. The list of teak having attained exploitable size of 105 cms girth were generally marked for felling and were felled has resulted in over exploitation of forests. Till the year 1988-89, most of the the areas were worked as prescribed.

III) <u>Conversion Working Circle.</u>

7.2.22. All workable areas which were situated on moderate slopes (i.e. less than 25^0) and had better site quality *viz.* **III** and above had been included in this working circle. Smaller patches of steep areas when found intermingled with better quality areas on moderate slopes, were included in this Working Circle on the ground of practicability. The forests mostly belong to the type "moist teak bearing forests". Both local types *viz* Teak forest and mixed forest occurs. Mixed forest is common in part of Mandvi and Gokhivare Ranges. Important species occurring in the crip are teak, ain, khair, shisham, hed, Kalambb etc.The total area allotted to this Working Circle was 47,046.034 ha.

7.2.23. Special object of this working circle was to convert the existing uneven aged crop of inferior species into an even aged crop of valuable timber species timber species like teak and khair and thus to derive maximum possible sustained yield of large size timber of teak etc.

7.2.24. The silvicultural system prescribed was "modified clear felling system" followed by artificial regeneration. The clear felling system was modified in the sense that such areas, which were unsuitable for planting with valuable species, and such areas, which had steep slopes and were unfit for clear felling were not to be clear felled.

7.2.25. Teak was prescribed as main species and tiwas and bamboo were recommended for under planting. Rotation fixed was 80 years and conversion period at 60 years. Teak was to be planted by root shoot method. The entire area under this working circle was divided in three periodic blocks.

7.2.26. All the three periodic blocks in this working circle were fully allotted. P.B.I. contained the area to be regenerated in the first phase, in order to minimize the sacrifice of young crop, which was inevitable in conversion. Compartments containing areas which had not been clear felled till the operation of this plan had been allotted to P.B.I. Compartments containing areas which had been harvested 40 years back, had been allotted to P.B.II. Areas worked during the last 20 years from the period of revision of Joshi's plan, were allotted to P.B.III.

7.2.27. P.B.I. areas of each felling series were divided into 20 annual coupes. The area of the annual coupe was to be clear felled and planted mainly with teak, except patches which were not clear felled for various reasons.

7.2.28. The area under P.B.II and P.B.III. were also divided in 20 annual coupes and sequences of working were given in the appendix. Where as only thinning, timber cutting, and cutting back of green stools of illicit shoots were prescribed in P.B.III., the prescription in P.B.II. was silivicultural thinning and improvement felling. As there were very few big size trees, no selection felling was permitted either in P.B.II or P.B.III. Thinning was prescribed in favor of teak and other valuable species like khair, ain, bibla, hed , shisham, Kalamb, tiwas, dhavada etc. in the order in which they are mentioned here. The intensity of thinning was to be maintained so as to have the resulting spacing roughly equal to 1/3 of the average height of the dominant trees in the coupe.

7.2.29. Cleaning operation in the 4th year and Ist thinning (mechanical) in 7th year, IInd thinning in 12th year, IIIrd thinning in the 20th year and Ivth thinning in the 40th year were prescribed for the plantations after the operation of this plan as well as for the areas planted from 1959-60 onwards.

7.2.30. During cleaning operations, in addition to the climber cutting and cutting back of all malformed and badly damaged saplings, all the multiple leaders except the most vigorously growing shoot, were to be cut down, along with the persistent branches 15 cms. away from the stems of the most vigorous leader without damaging the same.

7.2.31. The soil conservation measures were prescribed for entire areas of all the coupes. The workable coupes of P.B.I. were to be fire traced for six years and those of P.B.II and P.B.III for 3 years. The worked coupes of P.B.I. were to be closed to grazing for a period of 6 years and those of P.B.II and P.B.III for 3 years.

7.2.32.1. There were 26 felling series in Conversion Working Circle in Thane forest division. Total area of P.B.I. was 15,807.526 ha. Only 9,976.00 ha. area was tackled till 1988-89. At least 60 to 70 % of the area should have been clear felled and planted. However, the actual area clear felled and planted was 2,919.450 ha. This is almost one fifth of the total area tackled under P.B.I. coupes. Thus the object of converting maximum area into teak plantation was not at all achieved. Even where the plantations of teak have been raised, it was noticed that the plantation were not successful as the desired girth and height have not been achieved. Further, the areas were also subjected to heavy grazing and fires, which had adverse effect on plantations. The cultural operations including thinning have not been carried out as per the prescriptions, under planting of Bamboo, which had been taken up in the teak plantations has been a failure.

(IV) <u>Industrial Wood Plantation Working Circle</u>.

7.2.33. It included the better quality areas situated on moderate slopes in the main lines of communications. The areas allotted to this working circle were to be planted with industrial woods like khair, hed, Kalambb, sawar, muharukh etc. The forest area of Thane Forest Division included in this working circle was 1406.198 ha.

7.2.34. The special object of the management of the forest of this working circle was to raise plantations of industrial wood species like khair, hed, Kalamb, sawar, maharukh etc. required for forest-based industries like manufacture of kath, bobbin shuttles, etc. The object was to be achieved by clear felling the existing crop and planting the desired species. A rotation of 40 years was fixed because big size timber of at least 90 cm. girth at b.h. could be obtained in about 40 years. The area of each felling series was divided into 40 annual coupes and the yield was to be regulated by area. The method of executing the felling was the same as prescribed for P.B.I. of Conversion Working Circle. Subsidiary cultural operation like weeding, cleaning, and thinning were prescribed in Conversion Working Circle, Cleaning in 6th year, first thinning in11th year and second in 20th year were prescribed. The planted area was prescribed to be closed for grazing for a period of seven years from the year of planting. Also the planted up area were to be fire traced for seven years from the year of planting.

7.2.35. While implementing the prescription of this Working Circle it was noted that only 67.00 ha. out of 1406.198 ha. areas was clear felled till 1988-89 and planted with species that provide the raw material to the industries. It is noted that the purpose of raising large scale plantation of certain species was not at all achieved. Hardly 5 % area had been clear felled, it is further noted that the results of whatever plantations which had been taken were also not encouraging.

(V) <u>The Lakes Catchment area Working Circle</u>.

7.2.36. This working circle included all the workable areas situated in the catchment of the Vaitarna, Tansa and Bhatsai lakes. The total forest area in Thane forest division allotted to this working circle was 726.815 ha. The forest belongs to the type "moist teak bearing forest". Both the local types viz, teak and mixed forests occur. All the associations constituting this type except the ain, bonda association were found in the area. The crop density varied from, 0.4 top 06. Important species occurring in the crop were *teak, shisham, ain, khair, hed, Kalamb , bibla* etc. the site quality varies from III to IVa, Ivb.

7.2.37. **The special objects of the management were :-**

i) To maintain vegetal cover on the soil to prevent soil erosion.

ii) To prevent silting up of the lakes by taking suitable soil conservation measures and to conserve moisture in the soil so as to ensure adequate supply of water to the lakes.

iii) To improve the forest in density and value.

iv) Consistent with the above, to derive maximum sustained annual yield.

7.2.38. Silvicultural system prescribed was Improvement Felling, which involved removal of the dead, dying and unsound trees. The crop also included valuable timber species like teak, ain, khair, etc. and the area was capable of producing big sized timber of these species. it was felt that over matured trees of these species must be removed if silviculturally available. Existing blanks had to be planted up with suitable species. In order to achieve the object to provide and effective soil cover so as to ensure soil and moisture conservation, planting would be carried out with species which are evergreen and are deciduous for a very short time. Teak was to be planted in the areas not situated near to the lakes. The felling cycle of 20 years was prescribed. Yield was to be regulated by area. It was noted that marking rules were not adhered to strictly as a result of which over exploitation had been done. The over exploitation and failure to improve the stock has led to the deterioration of the crop.

VI) <u>Pulpwood Plantation Working Circle</u>.

7.2.39. This Working Circle included areas of predominantly mixed forest in Murbad, Gokhiwara, Badlapur ranges of Thane Forest Division. The areas were situated at a convenient distance from the site of the proposed pulp wood plant. The area included was 7137.532 ha.

7.2.40. The special object of the management of the area of this working circle was to raise plantations of Eucalyptus and bamboo sufficient to sustain a pulpwood factory.

7.2.41. The treatment prescribed was clear felling the existing area and regenerating artificially with desired species like Eucalyptus hybrid and bamboo (katas and manvel) to obtain long fibred pulpwood, rotation of 10 years for Eucalyptus had been fixed. Bamboos were to be exploited on a felling cycle of 3 years. The yield was to be regulated by area. The area of each felling series was divided in 15 annual coupes. The method of executing the felling was clear felling the existing growth and the regenerating the area artificially with the desired species.

7.2.42. In actual practice it revealed that only 538.788 ha. area out of total area of 7137.532 ha. allotted under this working circle, had been clear felled and planted up with eucalyptus species. Initially the plantations were reported to be successful but these plantation were subjected to hacking for firewood needs as a result of which the plantations could never be productive, the object was said to be totally defeated.

VII) <u>Miscellaneous Plantation Working Circle</u>: 3126.453 ha was allotted to raise miscellaneous plantations in the Division.

VIII) <u>Miscellaneous Working Circle</u>.

7.2.43. This working circle included all the Dalhi Plots (Reserved Forests) which were not covered in any of the Working Circles. The total area of this working circle was 244.394 ha Dalhi plots were plots meant for being given out for cultivation with the object of encouraging human habitants in the lonely part of the forest for the supply of labourers of forest works in some ranges. The tree growth of injaili species on "Dalhi" plots not included in the coupes were to be retained for tahal cutting by the plot holder and that of teak, tiwas and shisham were to be sold along with the adjoining coupes.

IX) <u>Fodder Reserve Working Circle</u>: 966.014 ha. It was to be reserved for the growth of fodder species.

Minor Forest Produce (Over Lapping) Working Circle.

7.2.44. The Overlapping Working Circles covered the whole area dealt with under Joshi's plan. Special treatment had been proposed for increasing the yield of some of important Minor Forest Produce like moha flowers and fruits, Karanj seed, tembhurni leaves, kadipatta, raufolfia serpentina plants etc. It was proposed that moha and karanj seeds should be sown on suitable sites in the areas under Conversion, Selection-cum-Improvement, and Lake Catchment Working Circle.

7.2.45. None of the prescriptions except selling of the items of MFPs annually by auction was followed. As a result, there has been very sharp decline in the availability of all minor forest products in the tract.

X) <u>Bamboo (Over lapping) Working Circle</u>.

7.2.46. Under this overlapping working circle, inter planting of bamboo was recommended in all the bamboo bearing area. The total area covered by bamboo (overlapping) working circle was 84,179,524 ha. Three species of bamboo i.e. manvel, katas and bundi were found. Most of bamboo ha died after gregarious flowering, which took place in 1959-60. Profuse regeneration had come up but it had not established at all the places in the tract.

Management of Woodland Protected Forests.

7.2.47. F.X. Saldhana had prepared a working plan for the entire District called "The Working Plan for Thane Woodlands" for the woodland protected forests for a period of 40 years from 1938-39 to 1978-79. Only one working circle was constituted for the management of woodland protected forest. He prescribed similar treatment for the whole area. It included all protected forest of Thane Forest Division. The total area included in West Thane Division was 77,805 Acres, 19 ¼ Gunthas.

7.2.48. The basic objectives were-

(a) To replace the mature injaili trees by coppice growth and encourage advance growth and natural regeneration so as to maintain a perpetual an sustained yield of tahal supply to serve as manure for seed beds, and indispensable need of the population in the predominantly agricultural district.

(b) To increase the growing stock of tahal species in areas where it does not exist in sufficient density by conserving the natural regeneration and by artificial plantations.

(c) To improve the condition of the crop by cleaning, thinning, and other cultural operation.

(d) To maintain or produce suitable stocking of teak in areas where it is scarce, in order to meet the requirements of the people for agricultural implements.

(e) To attain the highest financial returns.

7.2.49. The felling were regulated by area and controlled by girth limit. The method of treatment prescribed was the "selection felling" of trees above 3' gbh and shade/fruit trees like vad, pimpal and koshimb growing in Gavthans and shrines were not to be felled. No sowing and planting prescriptions were given for ensuring regeneration of the worked forests, though strong necessity for the same was mentioned. These forests have been transferred to forest department for management and protection since 1956, but no successful attempts have been made for restoring its ecological status. Forest maps of the area were not readily available and boundaries are difficult to trace in the field. Cleaning or thinning operations as prescribed in the plan have not been carried out.

Section -3 Special works of Improvements.

A - Maintenance of Boundaries.

7.3.1. A scheme for boundary maintenance on a five-year cycle had been prepared and recommended for scrupulous implementation in Reserved Forests by Shri.N.J. Joshi. The boundaries of the Reserved Forests are maintained on a five-year cycle. The maintenance of boundaries is poor at present even for Reserved Forest.

7.3.2. The survey and demarcation of the plots given out for cultivation on permanent basis in Reserved Forest was recommended, but no permanent settlements have been made in case of such plots either in Reserved Forests or in Protected Forests. As a result it is difficult to differentiate between legal holders of the plot and the encroachers.

B - Wildlife Management and Protection.

7.3.3. The position of wild game in the entire district, which included Thane Forest Division, was very bad. Very drastic steps were required to be taken. Otherwise, it was feared, there would not be any wildlife left in the tract. It was suggested that whole of Thane district should be completely closed for shooting for a period of 10 years. It was also recommended that strict measures for prevention of poaching should be taken up by providing special check posts at vantage points. Government of Maharashtra, *vide* its G.R.No.GS/1072/3915/F dated 31st January 1976, declared its intention to declare an area of 68.977 sq.kms. from the Bombay Suburban district and Thane district as National Park. In order to enhance the protection to the area the State Government vide its G.R. No.PGS/1081/13724/F-5 dated 4.2.83 declared its intention to constitute the area of 86.915 sq.km. as a National Park. Government of Maharashtra issued the final Notification as per the provisions of the Wildlife (Protection) Act, 1972 vide Notification No.WLP/1094/177/f-1 Dated 16TH January 1995. The total area of Sunjay Gandhi National Park, Borivali is 103.67 sq km of which 58.64 sq.kms. is of Thane District and 44.45 sq.kms is of Mumbai Suburban District.

C - Buildings

7.3.4. A list buildings constructed during the period of Joshi's Plan is given in **Appendix No XIII of Vol II (Page No.33).** The residential accommodation for subordinates forest staff particularly, the Foresters and Forest Guards who had to stay at remote places, was considered very essential so that they could stay with their families at their Headquarters and devote their time to their duties instead of being required to leave their jurisdiction frequently to visit their families.

D - Fire Protection.

7.3.5. A scheme for fire protection of the tract was prepared and recommended for strict implementation. Fire protection is an integral part of all plantations carried out in the Division ranging from 5 years to 10 years of plantation.

E- Wireless Network:

7.3.6. Presently there are 17 Base Stations and Repeater Stations spread over the Division. There are 7 Mobile Sets fixed in 7 vehicles of the Division. Staff working in sensitive areas are provided with Walkie talkies.

F- Weapons and Weapon Trainings:

7.3.7. Four numbers of 7.62 mm SLR weapons with 800 bullets have been supplied to Thane Forest Division. Training was imparted to eighteen Officers of RFO and ACF levels. Six Foresters and three Forest Guards were trained to handle Rifles.

Section: - 4 Past Yield.

7.4.1. The out turn of timber and firewood during the year 1969-70 to 1984-85 are as under:-

Table No. 11

Statement Showing the Past yield from the final fellings from the year 1969-70 to 1978-79						
Sr No	Year	Area worked in Ha.	Timber		Fuel (cum)	Total
			Teak (cum)	Injaily (cum)		
1	1969-70	1933.123	3195.041	4980.141	19507.400	27,682.582
2	1970-71	2240.553	3054.278	5240.887	83005.787	91,300.952
3	1971-72	4617.480	7736.689	13958.411	90035.340	1,11,730.440
4	1972-73	3783.154	9482.389	22423.387	65904.243	97,810.019
5	1973-74	3494.227	4872.629	9229.207	64056.950	78,158.786
6	1974-75	2526.833	3627.182	7182.686	65300.529	76,110.397
7	1975-76	1722.015	3152.445	4041.589	35917.173	43,111.207
8	1976-77	1645.262	1598.387	1628.814	22936.799	

9	1977-78	1930.316	1513.092	2363.960	25622.417	29,499.509
10	1978-79	1688.065	1485.828	2764.782	24447.500	28,698.110
11	1979-80	1477.611	1113.974	3401.608	24179.498	28,695.020
12	1980-81	1574.449	875.140	2481.412	21028.783	24,385.335
13	1981-82	1316.470	1037.386	3669.654	21265.260	25,972.300
14	1982-83	1257.961	720.295	2873.898	17207.493	20,801.686
15	1983-84	1249.811	514.555	2007.155	13413.554	15,935.264
16	1984-85	797.674	236.221	1699.757	11276.496	13,212.474
Total		**33,255.004**	**44215.531**	**89947.348**	**605105.222**	**7,39,268.081**

Section- 5:-Past Revenue and Expenditure.

7.5.1. Following is the statement of revenue and expenditure from 1990-91 to 2001-02.

Table No. 12

Year	Expenditure (Lakh Rs.)	Revenue (Lakh Rs.)
1990-1991	323.27	66.52
1991-1992	312.54	52.51
1992-1993	248.07	99.49
1993-1994	244.51	70.66
1994-1995	343.63	44.20
1995-1996	403.29	108.80
1996-1997	224.44	95.97
1997-1998	244.44	198.04
1998-1999	316.40	151.36
1999-2000	254.80	104.94
2000-2001	190.63	93.24
2001-2002	111.22	89.63
Total	**1875.31**	**442.18**

7.5.2. N.J.Joshi's working plan for Thane Forest Division was expired in 1988-89. Since then, working of forests remain suspended except the routine activities like boundary demarcation, fire tracing etc. However, plantations under various schemes were taken regularly. Various schemes under which afforestation works are carried out are G.U.T., E.G.S., Western Ghat Development Programme, Reafforestation of Degraded Forest, Industrial and Commercial Plantation, Bamboo under planting, Massive Afforestaion Programme etc.

7.5.3. Year-wise details of successful plantation in the Division have been shown in **Appendix No XL of Vol II (Page No. 379-383).**

7.5.4. Following species of trees have been planted in different plantation areas Teak (*Tectona Grandis*) Sirus (*Albizia lebbeck*) Bamboo (*Dendroculumus Strictus*) Eucalyptus, Subabul (*Leucaena Leucocephala*) *Acacia aurculiformis*, Amba (*Mangifera indica*), Moha (*Madhuca indica*) Anwala, (*Phyllanthus emblica*), Hirda (*Terminalia chebula*) Behda (*Terminalia belerica*), Khair (*Acacia catechu*), Siwan (*Gmelina arborea*), Sisoo (*Dalbergia Sisoo*), Jamun (*Syzygium cumini*), Bor (*Zizyphus mauritiana*), Karanj (*Pongamia pinnata*) etc.

7.5.5. Wherever sites were available, the plantations have been carried out but they are not as per schedule of any working plan programme or working scheme. Even gairans or gurcharans lands are used for raising plantations. Based on the Evaluation reports of these plantations, the sites have been included in the list of old plantations. As the area receives better rainfall, normally plantation remains successful for initial period but after a few years when protection gets withdrawn plantation suffers due to grazing, repeated hacking, lack of attention in terms of sivicultural operations, fires etc. and thus they grt deteriorated.

CHAPTER – VIII

STATISTICS OF GROWTH

Section 1: Growth.

8.1.1. Record from Aitchison and Hamilton's Plan.

The rate of growth of teak trees in the tract was first studied by felling sample trees in 'good' quality and 'medium' quality areas at the time of preparation of the 'Aitchison and Hamilton's Plan of 1922. The growth data converted into metric system is as under:-

Girth in Cms.

Table No. 13

Sr.No.	Age in year	Girth in cms.	
		Good quality Teak	Medium quality Teak
1.	45	94.48	69.59
2.	50	107.69	82.55
3.	60	117.85	94.48
4.	65	122.42	102.87
5.	70	124.96	103.88
6.	75	125.22	111.76
7.	80	128.52	113.53
8.	90	131.82	117.09
9.	100	135.63	120.65

8.1.2. At the time of preparation of Starte's Plan of 1935, the results of stem analysis of 480 teak trees of quality III and 220 teak of quality II, carried out in 1930-31 were considered. The average rate of growth of each quality was found to be as under:-

Table No.14

Sr. No.	Age in year	Girth in cms.	
		II quality Teak	III quality Teak
1.	10	25.55	20.37
2.	20	33.04	33.07
3.	30	58.57	43.28
4.	40	73.03	56.11
5.	50	81.48	68.66
6.	60	89.61	78.79
7.	70	96.32	86.28
8.	80	104.93	94.11
9.	90	113.39	

8.1.3. No stem analysis of Teak trees was done at the time of Jadhav's Plan. Before Joshi's Plan the stock mapping of the forest was not done at all. The term "medium" and "Good quality" or Quality II and III, used in the previous Plans, were vague and did not correspond to any specific Quality classification based on top height. It was therefore, felt advisable to carry out Stem Analysis of Teak trees from Quality III and IVa areas which account for more than 90% of the total forest area.

8.1.4. Stem analysis of 156 Teak trees from quality III forest s and 30 trees from quality IV-a forest was carried out during Joshi's plan. The mean diameter at 50 years which was taken as reference age and the standard deviation of the mean were calculated. Data from trees which had diameters at 50 years falling outside the range of mean +/- 2 S.D. was rejected. Accordingly, datas from 5 trees of quality III was rejected. The standard error of the mean of the remaining 151 trees was calculated. It came to 0.42 cms which works out to 1.5 % of the mean. This corresponds to a margin of error of + 3% at 95 % confidence level. For quality IVa data, 30 years was taken as refence age. The Standard error of the mean came to 1.3 cms which works out to 9% of the mean. This corresponds to a margin of error of +18 % at 95 % confidence level.

8.1.5. The results of the stem analysis of teak trees for quality III and IV a areas are as under:are tabulated below:-

Result of stem analysis of Teak trees from quality III forests.

Table No. 15

Age in year	Diameter at B.H. in Cm.		Height in Metres	Volume in Cubic Metres	C.A.I.	M.A.I.
	U.B.	O.B.				
1.	2.	3.	4.	5.	6.	7.
10	6.90	7.70	5.00	0.015	0.0045	0.0010
20	11.60	13.00	8.70	0.055	0.0079	0.0029
30	16.30	17.50	11.70	0.135	0.0091	0.0045
40	19.90	21.40	13.80	0.220	0.0097	0.0056
50	23.00	24.50	15.40	0.325	0.0098	0.0065
60	25.40	27.00	16.70	0.420	0.0096	0.0070
70	27.70	29.50	17.80	0.510	0.0090	0.0073
75	29.05	30.50	18.30	0.552	0.0086	0.0074
80	29.80	31.50	18.70	0.598	0.0081	0.0075
85	30.73	32.50	19.10	0.634	0.0075	0.0075
90	31.60	33.20	19.40	0.670	0.0088	0.0075
100	33.00	34.80	19.80	0.734	0.0049	0.0074
110	33.60	36.00	20.00	0.738	0.0(	

Results of Stem Analysis of Teak trees from quality IVa forests.

Table No. 16

Age in year	Diameter at B.H. in Cm.		Height in Metres	Volume in Cubic Metres	C.A.I.	M.A.I.
	U.B.	O.B.				
1.	2.	3.	4.	5.	6.	7.
10	5.50	6.00	4.00	0.0070	0.00130	0.00070
20	10.00	11.00	6.40	0.025	0.00240	0.00129
30	13.30	14.60	8.45	0.052	0.00320	0.00176
40	16.00	17.40	10.24	0.084	0.00390	0.00216
50	18.20	19.80	11.80	0.126	0.00440	0.00255
60	20.80	22.20	13.00	0.170	0.00475	0.00289
70	22.80	24.40	13.90	0.220	0.00490	0.00315
75	23.70	25.40	14.20	0.240	0.00489	0.00326
80	24.75	26.40	14.42	0.265	0.00479	0.00337
85	25.60	27.40	14.65	0.285	0.00464	0.00345
90	26.60	28.40	14.80	0.310	0.00645	0.00351
100	28.70	30.50	15.00	0.362	0.00406	0.00370
110	30.70	32.60	15.20	0.428	0.00355	0.00395

The curves derived from the above datas is reproduced in the Appendix No **XVI-XXI of Vol II (Page No. 36-41) .**

8.1.6. The rate of growth of teak plantations in quality III locality was also obtained by taking actual measurements in plantations of various ages during preparation of Joshi's plan. The measurements were taken in the plantations in Coupe Nos 16 to 47 of Felling Series no 22 of the Main Working Circle of Jadhav's Plan(situated in Kasa Range). The girths and heights were plotted against age and smooth curves were drawn. The final reading obtained from these curves are as under :-

Table No. 17

Age in years	Girth (Diameter at B.H. cm.)	Height in Metres
1.	2.	3.
5	17.50 (5.57)	3.42
10	26.00 (8.27)	6.19
15	33.00 (10.50)	8.50
20	38.25 (12.17)	10.21
25	43.00 (13.68)	11.70
30	46.25 (14.74)	23.01

8.1.7. On referring to the top height by site quality and age curve given in the Yield Table, it is seen that the fractional site quality of teak plantations is 1.5 of IV. Plantations were thus of a little higher quality than teak in mixed uneven aged forest of local quality III as was evident from the results of stem analysis of quality III teak which corresponded to a fractional quality of 1.08 of IV. This conclusion led to the prescription of regular tending operations like thinning which were recommended for strict compliance during Joshi's plan as such operations were bound to result into better growth of the trees.

8.1.8. For the rate of growth of Sawar, Stump analysis of six trees was done at the time of preparation of Jadhav's plan and data obtained were as under :-

Table No. 18

Age in years	Diameter at B.H. in Cm.
1	**2**
10	7.38
20	13.46
30	21.08
40	27.18
50	33.27
60	37.59

Section – 2 Stocking:

8.2.1. At the time of the preparation of Jadhav's plan, the enumerations as contemplated were not carried out for want of staff. However, at the time of preparation of N.J. Joshi's plan 10 % enumeration was carried out in the entire Thane Forest under the scheme of 'Survey of Forest Resources' sanctioned under the third five year plan. The whole work was carried out between November, 1962 and November, 1966. The number of enumeration parties (each party consisting of 2 foresters and one surveyor) varied from 3 in the beginning to 12 in the end with 3 ranges forest officers and one sub-Divisional Forest Officer supervising the work. The sampling design was given by forest statistician and the data were also analysed by him. Topographical units which were defined by natural features were selected for sampling. All the species were enumerated in 15cm. girth classes and separate data was collected for each felling series. Girth wise estimate of

trees, species wise in respect of 24 important species and rest of the species taken together was compiled for different working circles and tabulated range wise. Also girth wise stock per hectare and species wise percentage distribution in various girth classes for ain, bonda,kakad, shiras, sawar, teak, tivas, beheda, Kalamb, Khair, shisam and rest of the species taken together, was also compiled for each working circle for each range.

8.2.2. From the results of enumeration, it was found that the percentage of valuable species in the crop in the forest of the Main Working Cirlce of Jadhav's plan was as under: Teak (18.32%), Ain (16.75%), Kakad (4.04%), Bondara (2.35%), Hed (2.09%), Shisam (1.78%), Khair (1.73%) Kalamb (1.64%), Sawar (1.05%), Beheda (0.78%), Bibla (0.76 %) and Tiwas (0.26%)

8.2.3. The total number of trees for Main Working Circle as reported was 410.20 per ha. The percentage of area covered for enumeration under Main Working Circle was 8.97 %. The total area under Main Working Circle was 2,12,436 ha, out of which 19,065 ha area was enumerated.

8.2.4. Based on these enumerations, the total growing stock of the area was compared with the stocking in well-stocked-uneven aged crop of similar locality (Dang's forest)and it was found that the comparative density of the crop was only 0.56 and that gave an idea of the extent to which the stocking was required to be built up. It was also found that the stocking was greatly deficient in 31-45 cm. girth class. Further analysis showed that density of teak in these forests was only 0.18 and therefore massive plantations were suggested for introducing teak for converting these into fully stocked teak forests. The density of the mixed crop was, however, found to be 0.8. Even the number of teak trees per hectare area of 30cms girth and above was found to be 112, as compared to a compartment with maximum density in Dang's forest, where it was 198. It is observed that the crop has become deficient in stocking. The reduction in stocking can be attributed to biotic interference. The understocked and degraded areas are now being taken up for raising plantations of various schemes.

Enumeration during 1994:

8.2.5. The enumeration works were carried out by the SOFR, Unit Nashik between March 1994-May 1994. The Sampling Design was given by the Chief Forest Statistician, Nagpur. The enumeration was carried out according to the system of Random Stratified Sampling with topographical units. The Sampling Intensity was about 9% in all the Working Circles.

8.2.6. The total area enumerated in the forest of various working circles of Shri N.J. Joshi's plan is as under:-

Table No. 19.

Working Circle	Population Area(Ha)	Sample Area(Ha).	Intensity of Sampling
1.	2.	3.	4.
Conversion Working Circle	19454.719	1352.035	6.95
Selection-cum-Improvement Working Circle	13818.568	1201.778	8.69
Industrial Wood Plantation Working Circle.	1406.192	110.877	7.88
Pulp wood plantation W.C.	6571.760	633.55	9.64
Misc. working Circle.	1884.09	173.72	9.22

8.2.7. From analysis of the composition of the trees available in clear felling areas of P.B.I. of Conversion Working Circle it was found that total number of sound trees of all species per hectare in P.B.I. of Conversion Working Circle as per N.J.Joshi's Plan comes to 75.043 tree/ha. The percentage of teak and other species comes out as follows.

8.2.8. Percentage of species :- (I) Teak (22.44 %), (ii) Ain (23.17%), (iii) Bibla (0.53%) (iv) Bondara (1.92%) (v) Kakad (1.13%) (vi) Beheda (1.21%), (vii) Hed (0.35%), Kalamb (0.63), Khair(3.72%), Sawar(6.63%) and others spp (38.27%).

8.2.9. It is observed that the crop has become deficient in stocking. The stocking has reduced due to the increased biotic interferences to the extent that a large percentage of the area can safely be categorised as under-stocked. The results of enumeration carried out by the forest resources survey unit Nasik during March, 1994 to May, 1994, is given below:

The number of sound trees/ha

8.2.10. The numbers of sound trees per hectare in each of the Working Circle under N.J.Joshi's Plan are as under:

1. Conversion Working Circle: PB I-75.043
   PB II- 103.669
   PB III- 83.78
2. Selection-cum-Improvement Working Circle-114
3. Industrial Wood Plantation working Circle-16.83
4. Pulpwood Plantation Working Circle-33.11
5. Miscellaneous Working Circle – 19.64

There are 82 number of sound trees per ha.

i. Most of the vegetation is below 15 cm girth, due to hacking.

ii. CWC, SCIWC areas are mostly handed over to FDCM.

8.2.11. Due to the above factors, there is considerable decline in natural regeneration. Remedial measures for restocking have been prescribed in the various working circles by seeking participation of local people.

8.2.12. As per the 'State of Forest Report 2005' (SOFR), published by Forest Survey of India, Dehradun, the 'Actual forest cover' of Thane District is 2,857 $km^{2.}$ The forest cover is 29.89 % of the geographic area. 43.06 % of forest is 'Moderately dense' and 56.94% of the area is 'Open forest cover'.

PART – II :

FUTURE MANAGEMENT DISCUSSED AND PRESCRIBED

CHAPTER – I

: BASIS OF PROPOSAL:

Section-1: National Forest Policy, 1988

1.1.1. Over the years, forests in the country have suffered serious depletion because of relentless pressure arising from ever increasing demand for fuel wood, fodder and timber, inadequacy of protection measures, diversion of forest land to non forest uses without ensuring compensatory afforestation and essential environmental safeguards and the tendency to look forests as revenue earning resources. With a view to mitigate the above problems a new comprehensive forest policy based on preservation, maintenance, sustainable utilization, restoration and enhancement of the natural environment was enunciated in December, 1988. The basic objectives governing the new National Forest Policy of 1988 are as under:-

1.1.2. (i) Maintenance of environmental stability through preservation and where necessary restoration of the 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 forest 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 river, lakes, and reservoirs in the interest of soil and water conservation for mitigating floods and droughts and for retardation of siltation of reservoirs.

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

(v) Meeting the requirement of fuel wood, fodder, minor forest produce and small timber of the rural and tribal populations.

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

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

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

1.1.3. The policy also enunciated that the derivation of direct benefit must be subordinated to environmental stability and maintenance of ecological balances, including, atmospheric equilibrium which are vital for sustenance of all life forms human, animals and plants.

1.1.4. **The Maharashtra State Forest policy 2008:** It envisages a tree cover of 33% in the State. This will be achieved by protection of the existing forest cover and regeneration of the suitable areas under various afforestation schemes.

Section: 2- Factors Influencing and General objects of Management.

1.2.1. The main factors that influence the general objects of management are :-

a. The forests are in vicinity of developing places like Thane, Bhivandi, Vasai, Kalyan, Murbad etc. well connected either by rail or road with big cities like Mumbai. Due to increasing population and rapid industrialization in Mumbai and neighboring areas the forest has come under tremendous pressure of biotic interference. In these areas a great demand for large sized timber and fire wood exists. A large number of hutments have come up, Quarrying, illicit felling, encroachment, brick kilns etc. are severely degrading the forests of this area.

b. Massive influx of migrants into Mumbai due to spurt in industries, trade centers and small factories has simultaneously increased population in villages and nearby townships. This has resulted into booming construction business, mushrooming of hotels, resorts, dhabas, etc., which have the requirement of wood, firewood, thatching and fencing materials. Demand for resources has gone very high and as a result, there is over exploitation of some of these areas and they have become denuded.

c. A number of sawmills have come up as a result of which demand for teak and other species is very high.

d. On account of favorable climatic and edaphic conditions, the forests are capable of growing large sized timber of teak and other valuable species like khair, for which too a great demand exists.

e. Most profitable tree is teak and natural regeneration of teak and other miscellaneous species, except ain, is almost absent in the entire forests.

f. On account of the heavy rainfall occurring in the locality and heavy pressure of grazing, frequent fires, and felling on the slopes results into severe soil erosion and consequent deterioration of site quality. Though the area receives better rainfall and there is plenty of surface water but there are no watershed development programmes. As a result percolation of water into the soil is very less. Moreover water scarcity is felt during summer. Scarcity of drinking water in summer is a nightmare to women folk.

g. It is necessary to improve water supply by constructing reservoir and water harvesting structures at suitable places. Some of the dense forests are situated in the catchment areas of the important lakes and dams from which water is supplied to Mumbai and other townships. The forests in the catchment of these lakes and dams need to be protected completely for conserving water. Forests are required to be protected also for preventing the silting up of the lakes and to maintain their life.

h. Forests in the tract form an important part of fragile Western Ghats eco-systems and their preservation for the conservation of biodiversity and sustenance of basic life support systems like soil, air and water is very significant and their over exploitation in any form must be stopped.

i) Historically, along with tribals many local communities have been heavily dependent on forests for supply of a broad range of raw material for housing, fuel wood, medicines, tool making, food, gums, fibres and fruits. With the ever increasing population. demands have also increased substantially causing drain on forests.

j) The existence of Mumbai as the biggest trade and export centre of N.T.F.P. requires the appropriate systems of checks and controls.

k) There is a need to internalize the provisions of 73rd Constitutional Amendment and the GR of April 2003 on JFM for the benefit of the local people in the Working Plan.

Section-3: General objects of the management.

1.3.1. In view of the National Forest Policy of 1988 and considering the factors mentioned above, the general objects of the management of the Thane forests would be :-

a. To maintain ecological balance and improve environment.

b. To preserve the forest cover on all slopes and high ranges and in the catchment area of lakes, rivers and dams so as to prevent soil erosion and conserve water for maintaining perennial supply for meeting the needs of drinking water and for meeting the other needs.

c. To enrich the growing stock in natural forests and to restock all the under stocked areas, thus increasing the productivity of forests.

d. To increase the forest cover through afforestation especially on denuded and degraded lands.

e. To meet the requirement of Fuelwood, Fodder, Non-Timber Forest Produce and small timber, for rural and tribal population.

f. To address the problems of protection, encroachment, and biotic interference to ensure effective conservation of Forest and Wildlife resources.

g. To protect, conserve and restore Mangroves as a special marine/coastal wetland eco-system.

h. To develop and manage NTFP with emphasis on their conservation for the local masses.

i. To provide complete protection to natural flora and fauna and promote eco-tourism.

j. To institutionalize the controls on NTFP trade practices with a view to effectively conserve this vital resource base of the country.

k. To develop and manage forest areas within municipal limits as centers of creation of mass awareness and also for mitigating the problems of pollution.

Section-4: Classification of Forest:-

1.4.1. The broad and general principle for the classification of the forest are embodied in the resolution No.MEP-1365/1322(2)/Y dated December 6, 1968 issued by Govt. of Maharashtra in Revenue and Forest Department. Taking the above principles into consideration, the forest dealt with under this plan have been classified as follows:-

a. **Protection Forests :-** these include all the forest situated on very steep slope (i.e. above 25^0) and forests situated in the catchment of rivers, lakes and dams.

b. **Tree Forests :-** These are the forests situated on steep and moderate slopes i.e. less than 25^o , and are suitable for growing large sized timber trees like teak and other economical and socially important species.

c. **Minor Forests :-** This category includes the forest which are situated near the towns, heavily populated parts of the tract, villages, which have suffered in the past due to illicit cutting, hacking, over grazing and encroachment and are now capable of producing only small timber and firewood.

d. **Remaining Forests: -** This category includes areas, which are not proposed for any forestry works.

Section – 5:- Method of Treatment Proposed.

1.5.1. Taking into consideration the principles enunciated in the National Forest Policy and the objects of the management, the treatment to be adopted to the various classes of the forests is proposed as under :-

a. **Protection Forests :-** For such type of the forest, the objects of the management will be to keep the area fully covered with vegetation. Such areas will be protected from illicit felling, fire and grazing to prevent soil erosion.

b. **Tree Forest :-** Teak is the most prominent species in these forests. The main object of the management of these forests will be to grow

of teak and other important indigenous species. Due to over harvesting in the past many of the areas have become under stocked and top soil over is also washed away in many of the areas, Therefore, clear felling is such areas is out of question However, the growing stock presently is depleted and therefore improvement and restoration of these forests is essential. The existing natural regeneration will be tended to help the present advance growth to come up. As the site the quality of forest is III to IV, they will be managed to produce large size timber. Area will be strictly fire protected. Grazing will be controlled. Soil and Moisture Conservation works will be taken up.

c. **Minor Forests :-** The forests are easily accessible to neighboring population and hence they are in more depleted state. Such eroded and under stocked areas would be enriched by afforestation and soil conservation measures. Soil and moisture conservation measures will be taken on the watershed basis. Some suitable areas will be afforested with the fodder species of better varieties. In such areas grazing will be restricted as far as possible and cutting of the grasses will be encouraged. It is also proposed to prescribed singling operations in congested and stunted coppice growth which will improve the quality of existing crop. The object will be also to meet the local demand in respect of small timber, firewood, tahal and grazing. Such areas falling within municipal limits will be conserved to tackle the issues of pollution, mass awareness creation etc. Artificial Regeneration will be taken up by JFM/FDA.

d. **Mangrove Forests :-** Forests in small patches along the creeks and revenue wastelands along the creeks termed as mangrove forest will be protected, conserved and where ever necessary it will be suitably regenerated. No exploitation is proposed in these areas.

e. **Remaining Forests : -** No work is proposed.

Section 6: Constitution of Working Circle and their Distribution:

1.6.1. Based on the general objects of management and different methods of treatments required by different areas, the following Working Circles are constituted and a brief summary is as under:-

i. Protection-cum-Catchment Area Working Circle.

ii. Improvement Working Circle.

iii. Afforestation Working Circle.

iv. Old Plantation Management Working Circle..

v. Urban Afforestation Working Circle.

vi. Mangrove Working Circle

vii. Miscellaneous Working Circle.

viii. Non-Timber Forest Produce (Overlapping) Working Circle.

ix. Bamboo Plantation (Overlapping) Working Circle.

x. Forest Protection

xi. Joint Forest Management (Overlapping) Working Circle.

xii. Wildlife Protection (Overlapping) Working Circle.

Table No.20.

Distribution of the Areas into Working Circles

Status of Forest	P.W.C.	I.W.C.	Aff. W. C.	Urban Aff. W.C.	Old. Pl. Mang. W.C .	Mangrove W.C	Misc. W.C.	Total Area (Ha.)
Reserved Forest	7598.022	29983.302	8824.087	3262.891	1445.000	--	915.645	**52028.947**
Protected Forest.	1599.965	--	22623.185	1399.128	601.670	--	--	**26223.948**
Acquired Forest	39.123	--	764.447	19.580	--	--	--	**823.150**
Unclassed Forest.	--	--	--	--	--	--	16.207	**16.207**
Compensatory Forest.	--	--	185.575	85.318	16.546	--	--	**287.439**
Mangrove Forest (P.F.)	--	--	--	--	--	1974.512	--	**1974.512**
Total :-	**9237.110**	**29983.302**	**32397.294**	**4766.917**	**2063.216**	**1974.512**	**931.852**	**81354.203**

1.6.2. Protection-cum-Catchment Area Working Circle: It would include unworkable area which is not fit for any working on account of very steep slopes and those falling in catchment areas. In the accessible areas Soil and moisture conservation works will be carried out along with Artificial Regeneration in suitable sites in the Lake Catchment areas. The total area allotted to this Working Circle is **9237.110 Ha**

1.6.3. Improvement Working Circle: This Working Circle would include well-stocked areas of Reserved Forests. These are forests having around 0.4 density. Most of them belong to young to middle aged crop. There are many rooted stocks and with tending operations areas can be improved. Improvement felling of congested poles will be carried out along with artificial regeneration wherever spaces have been created. The total area allotted to this Working Circle is **29983.302 Ha.**

1.6.4. Afforestation Working Circle: The areas included in this working circle would be the under-stocked areas of Reserved Forests, Protected Forests, Acquired Forests, and Compensatory areas which have degraded due to tremendous biotic pressure. These areas will be regenerated artificially. The total area included in this working circle is **32397.294** ha.

1.6.5. Old Plantation Management Working Circle: This Working Circle will include successful plantations raised over the past years in the Division. Thinning, CBO, and other cultural operations have been prescribed. The total area under this Working Circle is **2063.216** ha.

1.6.6. Urban Afforestation Working Circle: This working circle includes forest areas lying within the limits of ***Mahanagar Palikas*** of Thane, Navi Mumbai and Ulhasnagar. It would also include the forest areas situated within the ***Nagar Palika*** limits of Kalyan, Dombivali, Vasai, and Badlapur. These areas are capable of producing better tree growth and if protected and planted with preferably evergreen species would provide aesthetic value and also cater to the ecological and environmental needs of the urban people. The total area allotted to this Working Circle is **4766.917** Ha.

1.6.7. Mangrove Working Circle: This working circle comprises of the mangrove forest under the control of Thane Forest Division. All the mangrove areas in possession of Forest Department as on 31/3/08 have been included in this Plan. The areas will be protected from felling and grazing. In the blank areas mangrove species will be planted. The total mangrove area under this Working Circle is **1974. 512 Ha**.

1.6.8. Miscellaneous Working Circle: This working circle areas are primarily the Dalhi Plots (Reserved Forests), Unclassed Forests and Reserved Forests that were handed over to CIDCO. There are no vegetation but the areas continues to be in Form No 1 of the Division. No work is prescribed. The total area is **931.852 Ha.**

1.6.9. Non-Timber Forest Produce (Overlapping) Working Circle: This is an overlapping Working Circle and would cover all the areas under the proposed plan where the items of NTFP are collected and the potential areas where there is scope for their development and management.

1.6.10. Bamboo Plantation (Overlapping) Working Circle. This is an overlapping working circle and would cover all the bamboo bearing and plantable forest areas included in other working circles. It will also cover the area where bamboo plantations have been carried out in the past.

1.6.11. Forest Protection: This has been included as a chapter instead of a Working Circle. It delsa with problems of Encroachments, Grazing, and Fire.

1.6.12. Joint Forest Management (Overlapping) Working Circle. This is an overlapping Working Circle comprising the areas which has good potential to raise plantations under JFM/FDA. The areas included mostly in Afforestation Working Circle and Urban Afforestation Working Circle will be taken up with the active co-operation of the local people.

1.6.13. Wildlife Protection (Overlapping) Working Circle: This is an overlapping working circle and covers the entire area of the Division. This working circle will deal with forest areas around some important spots which have the potential of development from the point of view of eco-tourism and the protection of wildlife in the tract.

Section – 7:- Blocks and Compartments.

1.7.1. The area of Reserved Forests covered by this Plan has been divided into Blocks which have further been divided into serially numbered Compartments and shown in **Appendix XXIII of Vol. II (Page No.46).** The areas of Woodland Protected Forests, Acquired Forests, and Unclassed Forests are, however, identified on the basis of Revenue Survey Numbers/Gat Numbers.

Section – 8: Analysis and Valuation of the Crop.

1.8.1. All the compartments of Reserved Forests have been stock mapped.and most of the Woodland Protected Forests, Acquired Forests, and Unclassed Forests have been stock mapped and the analysis is shown in **Appendix Nos XXVI to XXIX of Vol II (Page No. 50-102).** The stock has been analysed and evaluated. Enumeration has been carried out and the results of Enumeration in respect of Reserved Forests are given in the **Appendix No LXIII of Vol II (Page No. 482-525).**

Section – 9:- Period of the Plan.

1.9.1 It is proposed to keep the period of this Plan for 10 years from 2009-10 to 2018-19. A review of the prescription is recomended after 5 years.

CHAPTER – II

WORKING PLAN FOR PROTECTION- CUM - CATCHMENT AREA WORKING CIRCLE.

Section 1:- General Constitution.

2.1.1. ` This Working Circle would include steep and precipitous slopes mostly above 25^0 and lake catchment areas. The areas included in the Protection Working Circles of N.J.Joshi's Plan, and the Management Plan of the FDCM is allotted to this Working Circle. Most of these areas are inaccessible to work on account of the steepness and ecological fragility of the area. Working in such areas would expose the site and increase the chances of land slides and severe soil erosion. These forests would not be subjected to any felling and would be completely protected. However, soil and moisture conservation works will be carried out along with seed sowing in suitable sites. It includes Reserved Forests, Protected forests and Acquired Forest. The total area allotted to this working circle would be **9237.110** ha.

Section 2:- General Character of the Vegetation.

2.2.1. The forests mostly belong to the types "Moist Teak Bearing Forests" and Western Sub-Tropical Hill Forests in a few pockets. Both the local types viz. Teak Forests and Mixed Forests are found. On account of the steepness of the area, there is considerable soil erosion and site quality has deteriorated. The Site Quality is of **IVa** and **IVb**. The density of the crop varies from 0.2 to 0.5. The important species occurring in the crop are *teak, shisham, ain, khair, mango, karanj, jambul, bibla* etc. Regeneration of the species is scanty. Some areas of this Working Circle in the past have been worked under Selection Felling system. On account of heavy grazing, repeated fires and over-exploitation in the past, the crop is conspicuously deficient in natural regeneration. In some parts, *karvi* is found abundantly.

Section – 3:- Blocks, Compartments and felling series.

2.3.1. The number of compartments allotted to this working circle is given in the **Appendix No XXXI Vol. II (Page No. 203-211).** Six Working series have been formed in this Working Circle. Each Working Series consists of 20 annual coupes. The details of the Working Series, Coupes and the sequence of working are given in **Appendix No XXXII** and **XXXIII of Vol. II (Page No. 2**

Section - 4:- Special objects of the Management.

2.4.1. The special objects of the management would be:

i. To protect the existing vegetal cover in order to prevent soil erosion and further degradation of soil with a view to maintain the micro-climatic and micro-edaphic conditions of the site and maintain the ecological balance in the tract.

ii. To protect the catchment area from biotic interference and facilitate the process of regeneration supportive of water conservation.

Section – 5:- Analysis and Valuation of the Crop.

2.5.1. The forest areas have been stock mapped and the results are tabulated as under:

Table No.21

Teak Forest (Ha)		Mixed Forest (Ha)			Other (Scrub) (Ha)	Plantation (Ha)	Under stock (Ha)	Cultivation (Ha)	Eroded (Ha)	Blank (Ha)	Area Not Stock Map Survey (Ha)	Total Area (Ha)
IVa	IVb	III	IVa	IVb								
1	2	3	4	5	6	7	8	9	10	11	12	13
--	15.770	--	113.216	693.190	1727.345	43.770	386.087	275.890	440.717	2393.322	147.803	9237.110

Section – 6:- Method of Treatment.

2.6.1. No felling is prescribed as the areas are on steep slopes. The area should be completely protected and improved by taking suitable soil and moisture conservation measures. Gaps that are suitable for dibbling seeds will be treated accordingly. Soil binders including shrubs will be planted at suitable locations. Soil and Moisture Conservation works will be carried out in the catchment areas. Collection of NTFP will be permitted if it can be collected without causing injury to the trees.

Section 7:- Choice of species.

2.7.1. Seeds of local species of NWFP value like *Moha, Jambul, Hirda Siwan, Siris,* and *Karanj* etc as well as soil binders will be tried.

Section – 8:- Harvestable girth and Rotation.

2.8.1. Since no havesting is to be carried out, havestable girth and rotation need not be fixed.

Section – 9:- Formation of Coupes.

2.9.1. A working Cycle of 20 years is prescribed. In each Series 20 Annual Coupes have been prescribed.

Section – 10:- Demarcation of Coupes and Marking Techniques.

2.10.1. The Rules for demarcation of Coupes, Sub- Coupes, Unworkable areas and the Marking Techniques are prescribed in para 15.1.1. to 15.1.6. All Coupes will be demarcated one year in advance of the year when the Coupe is due for working.

Section -11: Method of executing the Works

2.11.1. Prior to commencement of works, a stock map and a treatment map of the area will be prepared by an Officer not below the rank of a Range Forest Officer. The Range Forest Officer will inspect the area and prepare a stock map using standard conventional signs. The treatment map shall show the following categories:

A) Protection Areas: i. All areas above 25^0 slope

ii. Two chains wide strip on both sides of nalas, rivers and tanks.

iii. Eroded areas or areas liable to erosion.

B) Understocked Areas: All the areas below 0.4 density.

C) Old plantations and group of young poles.

D) Well-stocked Areas: Areas having tree crop of and above 0.4 density.

2.11.2. The following works will be carried out all over the area:

1. All illicitly cut live stools will be cut back and dressed to produce vigorous coppice shoots.
2. Climbers cutting will be carried out wherever the growth of the crop is adversely affected.

2.11.3. The following works will be done in each category:

Category A- No felling will be done.

Category B- i. Dibbling of seeds of evergreen and edible local species will be done prior to onset of monsoon.

ii. Gully plugging, nala bunding and other suitable soil and moisture conservation works will be taken up.

Category C- No felling will be done in these category areas.

Category D - No felling work is proposed in Category D areas.

Section 12: Other Regulations

2.12.1. **Fire Protection:** The areas covered under this Working Circle will be rigidly protected from fire. All precautionary and preventive measures in respect of fire as provided under Miscellaneous Regulations will be taken up in order to ensure that no fire breaks out in these areas.

2.12.2. **Grazing:** All areas in this Working Circle will be closed for grazing.

CHAPTER – III

WORKING PLAN FOR IMPROVEMENT WORKING CIRLCE.

Section – 1:- General Constitution.

3.1.1 This Working Circle would include areas of Reserved Forests which were allotted to Conversion Working Circle, Industrial Wood Plantation Working Circle and Selection-cum-Improvement Working Circle of N.J.Joshi's Plan. The areas are having young to middle aged crop which requires improvement through silvicultural operations. The total area allotted to this working circle is **29983.302** ha.

Section – 2:- General character of vegetation.

3.2.1. The area under this working circle comprises of valuable forest in this tract. The forest mostly belongs to the type "Moist teak bearing forests". The common associations are *teak-dhavada-kuda- takla association, the kakad-kuda-takla and the ain-bonda* association. The site quality is mostly IVa and IVb with patches of III quality occurring locally on more gentle slopes and valleys. There is presence of a large number of rooted stock which can be tended to produce majured crop. The important species in the area are *teak, shisham, khair, ain, dhawada, hed, Kalamb, and bibla* etc. Natural regeneration of the species is scanty. The area has been worked under clear felling system and the teak plantations have been raised, but the quality of the forest has not improved. The density of the crop varies form 0.3 to 0.6. On account of heavy grazing, illicit fellings, repeated fires and over harvesting in the past the crop is conspicuously deficient in natural regeneration as well as higher girth classes.

Section – 3:- Blocks, compartments and felling series.

3.3.1. The Compartment allotted to this Working Circle are given in the **Appendix No. XXXIV Vol. II (Page No. 226-230).** In this Working Circle 30 Feling Series has been formed. The details of felling Series and the Coupes are given in **Appendix no XXXV of Vol II (Page No. 231-246).** Each Felling Series consists of 20 Annual Coupes.

Section – 4:- Special objects of the management.

3.4.1. The special objects of management of the forest of this working circle would be:

I) To improve the forest both in composition and density by suitable tending operations and regeneration.

II) To utilize the full potential of the site to derive maximum sustained yield in future under one of the Selection Systems.

Section – 5:- Analysis and Valuation of the crop.

i. Stock Mapping;

3.5.1. The entire area under this Working Circle has been stock mapped on 8''-1 mile toposheets and the details of the stock mapping is given in the **Appendix No XXVI -B of Vol II (Page No. 54-62).** The extent of Growing Stock is as under:

Table No.22

Teak Forest (Ha)		Mixed Forest (Ha)			Other (Scrub) (Ha)	Plant ation (Ha)	Under stock (Ha)	Cultiva tion (Ha)	Eroded (Ha)	Blank (Ha)	Area Not Stock Map Survey (Ha)	Total Area (Ha)
Iva	Ivb	III	IVa	IVb								
1	2	3	4	5	6	7	8	9	10	11	12	13
334.150	233.880	2342.944	8307.209	11841.578	1807.642	213.200	3985.331	297.553	92.828	526.987	--	29983.302

ii. Enumeration:

3.5.2. The Enumeration carried out by the Survey of Forest Resources Unit, Nashik in 1994 are given in Appendix No. **LXIII of Vol. II (Page No. 482-525).**

Section 6:- Silvicultural System.

3.6.1. In view of the steepness of the terrain and the high rainfall prevalent in the area, severe soil erosion is bound to result if harvesting is resorted to on a large scale. The object is to improve the growing stock and it will be achieved by carrying out "Improvement Fellings" by removal of dead/ dying trees and tending operations. Thinning of congested group of poles, planting of understocked and blank areas is prescribed. Thinning will be carried out in favour of Teak and superior injaili species like Ain, Hed, Khair, Kalamb, Bibla etc.

Section – 7: Choice of Species.

3.7.1. The existing gaps would be planted up with important species like *teak, ain, khair, siras, shivan*, *Bamboo, Jamun,* etc. Fruit trees like *Moha, Mango* etc. will also be encouraged. Medicinal species like *Awla, hirda, karanj, bibla* etc. will also be planted. Preferences will be given to indigenous local species.

Section 8:- Rotation

3.8.1. In the improvement felling, rotation has no meaning. Hence it is not considered necessary to fix any rotation.

Section 9:- Felling cycle and sequence of felling.

3.9.1. Since only improvement felling will be carried out in the coupes, felling cycle should be short so as to ensure maximum coverage of the area during the operation of this Plan. Considering all factors a felling cycle of 20 years is prescribed and the sequence of felling is given in **Appendix No. XXXVI of Vol II (Page No. 247-249).**

Section – 10:- Regulation of Yield.

3.10.1. The yield would be negligible from improvement fellings.

Section – 11:- Method of Executing the Work.

3.11.1. **Demarcation of Coupe:** Coupes due for working will be demarcated one year in advance of the year of working. Rules for demarcation of coupes and marking techniques have been given in Miscellaneous regulations in para 15.1.1. to 15.1.6.

3.11.2. **Preparation of Treatment Map:** A Treatment Map shall be prepared by the Range Forest Officer. The Treatment Map will be verified by the A.C.F. All the field staff including the Forester and the Forest Guard should be clearly instructed in the field, regarding the Treatment Map and the prescriptions to be followed. The Treatment Map shall show the following areas:

A) Protection Areas: i. All areas above 25^0 slope

ii. Two chains wide strip on both sides of nalas, rivers and tanks.

iii. Eroded areas or areas liable to erosion.

B) Understocked Areas: All the areas below 0.4 density.

C) Old plantations Areas: group of young poles. The patch should not be less than 1 Ha.

D) Well-stocked Areas: Areas having tree crop of and above 0.4 density.

3.11.3. The minimum area to be shown on the Map will be 0.4 ha. Protection areas and understocked areas will be demarcated on the ground with the help of two geru rings and cross painted with geru on the boundary trees. The width of the geru bands would be 3 cms. The lower band will be at breast height and the upper band would be 30 cm above it. For demarcation in the areas where there are no trees, stone/wooden posts will be used. After making the treatment map, a detailed estimate of the expenditure should be made and got it sanctioned from the CF before taking up the works.

3.11.4. The Officer preparing the Treatment Map will also prescribe the type and extent of fencing for protection of regeneration. The fencing could be TCM, Live hedge, Rubble wall etc. The treatment plan will give well studied details about Soil and Moisture Conservation works and the species of plants to be planted in different types of soil and soil depth.

Marking:

3.11.5. The marking will be done by the Round Officer and checked by the Range Forest Officer. It will be closely supervised by the ACF. CF will inpect the majority of the coupes and give timely instructions to the subordinate staff.

A Category area-

No marking will be carried out in this area.

B-Category Area-

1. No trees will be marked for felling.
2. Live high stumps shall be cut flush to the ground and shall be dressed so as to get vigorous coppice shoots.
3. Multiple coppice shoots and poles will be reduced to 1or 2 most vigorous shoot(s).

C - Category area-

1. All congested young poles shall be marked for felling.
2. Dead, dying, diseased and malformed poles will be marked for felling.
3. Multiple poles will be reduced to one per stool.
4. Marking for thinning in groups of poles by spacing them out by 1/3rd of their average height. The marking will be done in favour of valuable species in such a manner that no single species exceeds 50 % of its proportion in the crop.

D-Category

i. All dead/dying trees will be marked for felling, retaining 4 dead trees per ha for the benefit of wildlife.

ii. All live high stumps shall be cut flush to the ground and shall be dressed so as to get vigorous coppice shoots.

iii Multiple coppice shoots/poles will be reduced to one/two per stool.

iv. Climbers obstructing the growth of trees will be cut at the time of marking.

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

Harvesting:

3.11.6. Felling and extraction will be started immediately after the rainy season is over and completed before the month of January of the year prescribed for the main felling.

i. Felling will be by saw/Axe only.

ii. The trees should be felled close to the ground. The stump should not be more than 15 cm from the ground level.

iii. Coppice stumps should be dressed properly with sharp implements to get vigorous coppice shoots.

Soil & Moisture Conservation works and Regeneration:

3.11.7. Soil & Moisture Conservation works and Pre-Monson works should be completed by March and planting completed in the ensuing monsoon.

i. **A- Category area-** Artificial Regeneration will be done by dibbling of suitable seeds.

ii. **B- Category area-**

   a. Soil and Moisture Conservation works will be done.

   b. All the living high stumps will be cut to 15 cm height. The stumps will be dressed with sharp implements to obtain vigorous coppice shoots. The coppice emerging from the stools should be tended.

   c. Artificial Regeneration will be carried out- Plantation Model-I is prescribed, 1100 seedlings will be planted. However, other plantation Models may also be adopted depending on the situation as decided by the CF, Thane.

All the pits will be dug before March and soil allowed to weather during summer. Pits will be refilled before 15th May.

Planting: After the monsoon has set in, planting of seedlings should be immediately started in pits. Adequate planting stock should be raised well in advance.

C & D Category area- No artificial regeneration is necessary as the area is well stocked.

Section – 12:- Subsidiary Silvicultural operation.

3.12.1. (A) CBO: Cutting Back Operation will be carried out in the entire coupe in the next year of felling. It will consist of cutting back of all malformed growth of Teak and valuable species of 20 cm in girth and below at b.h. Trees damaged during felling will be felled and stools dressed for good coppicing. Climbers obstructing the growth of trees will be cut.

3.12.2. (B) Cleaning: This operation will be carried out in the 7th year of felling. The following operations are prescribed all over the coupe.

i. All unwanted climbers shall be cut.

ii. Coppice shoots on each stump shall be reduced to 2-3 well spaced out vigorous shoots.

iii. All inferior growth interfering with the young crop shall be cut.

Section – 13:- Other Regulations.

3.13.1. Fire Protection: The area of the worked coupe shall be rigidly protected from fire for a period of 5 years from the year of working. The details as elaborated in the Miscellaneous Working Circle shall be followed.

3.13.2. Closure to Grazing: The area shall be closed to grazing for a period of 5 years from the year of working.

CHAPTER – IV

WORKING PLAN FOR AFFORESTATION WORKING CIRCLE

Section 1: - General constitution of the working circle.

4.1.1. The areas included in this working circle would be the under-stocked areas of Protected Forests, Reserved Forests, Compensatory Areas and Acquired forests which have degraded due to tremendous biotic pressure. These forests are relatively sparse as compared to areas included in the Improvement Working Circle. However, since these areas includes eksali plots,Encroachments, and areas with other Agencies, the effective areas available for treatment is much less than the total area of the Working Circle. The total area included in this working circle is **32397.294** ha.

Section 2:- General character of vegetation.

4.2.1. Most of the areas included in this Working Circle are degraded due to heavy biotic interference like illicit cutting for timber along with the persistent hacking for fuel wood and over grazing. The vegetation has reduced to scrubby growth with scatterred middle aged crop of miscellaneous species. The areas consist of high stumps of original tree growth with numerous coppice shoots, pollarded or otherwise shoots growing from each stump. Due to proximity of these areas to human habitations, these areas are under tremendous biotic pressure. Fires are frequent in this area. The heavy pressure of grazing has resulted in compaction of soil and soil erosion. Due to this factor the natural regeneration is almost absent and many patches have been rendered almost blank. In some patches miscellaneous crop of density upto 0.4 exist. Common species found are *teak, ain, semal, lendia etc*. Site quality is IVb in a few places. The area needs extensive soil and moisture conservation works and afforestation works.

Section 3: Blocks and Compartments:

4.3.1. The details of areas allotted to this working circle are given in **Appendix No XXXVII Vol. II (Page No. 250-305).** There are 36 Plantation Series in this Working Circle. The details of plantation Series and Coupes are given in **Appendix No. XXXVIII of Vol. II (Page No. 306-376)**. Annual Coupes were formed each of them have been treated as a single production unit in Protected Forest and Acquired Forests.

Section 4:- Special objects of management.

4.4.1. Keeping in view the above facts special object of management of these areas will be as follows :-

i) To reclaim the areas by intensive soil and moisture conservation works and afforestation.

ii) To enhance the productivity of the forest land.

iii) To encourage the participation of local people in forestry activities.

iv) To meet the demand of local people in regard to forest produce especially fire wood, grasses and small timber.

Section 5:- Analysis and valuation of the crop.

4.5.1. Stock mapping:

Table No.23.

Mixed Forest			Other (Scrub) (Ha)	Plantation (Ha)	Under stock (Ha)	Cultivation (Ha)	Blank (Ha)	Area Not Stock Map Survey (Ha)	Total Area (Ha)
Site Quality (Ha)									
III	IVa	IVb							
1	2	3	4	5	6	7	8	9	10
36.876	51.577	4294.222	11274.722	392.040	12251.629	1998.704	12.800	2084.724	32397.294

Section 6:- Choice of species.

4.6.1. The choice of species will depend on the soil type, depth of the soil, drainage and the local requirements. However, for general guidance the species to be planted will be selected from,, *Teak, Khair, Siwan, Sisso, Shiras, Kuda, Chinch,*

Bibla, Ain, Pimpal, Awla, Beheda, Moha, Bor, Karanj, Babul, Mango, Simal, Hed, Kalamb, Tiwas, and Bamboo etc.

Section 7: Method of Treatment:

4.7.1. The object of management will be achieved by taking up plantations of suitable species in the understocked areas along with soil and moisture conservation works. Most of the area is endowed with appreciable numbers of rooted stocks. The existing rooted stock shall be tended. Participation of the local people in the management of forests shall be encouraged. The treatment will be done in a period of 20 years. Soil and Moisture Conservation works, and Afforestation will be carried out along with the Bamboo underplanting. Subsidiary Silvicultural operation will be carried out.

Section 8- Afforestation period:

4.8.1. All the areas suitable for raising plantations will be covered in 20 years.

Section 9: Working Series and Annual Coupes.

4.9.1. The areas of the Working Circle have been divided into 32 Plantation Series and each Plantation Series is divided into 20 annual Coupes. In Protected Forests, the Coupes are formed by clubbing several Survey Numbers in the same or adjoining villages. Some Survey Numbers with sizable areas are partitioned and coupes formed keeping in view of the annual areas to be treated. The areas of Reserved Forests are divided into 5 Plantation Series and each Plantation series divided into 20 annual coupes.The sequences of works are given in **Appendix No. XXXIX Vol. II (Page No. 377-378)**

Section 10- Agency of Working

4.10.1. All works will be done departmentally and by employing members of JFM in the JFM/FDA areas.

Section 11: Regulation of Yield

4.11.1. The areas falling under this Working Circle are mostly understocked and devoid of vegetation. The yield from such Coupes will be negligible.

Section 12:- Demarcation of Coupe:

4.12.1. The annual coupes will be demarcated one year in advance. Eksali plots, Eligible encroachments and areas with other Agencies will be demarcated clearly in the coupes.

.**Section 13:- Method of Executing the work.**

4.13.1. Preparation of Treatment Map: Soon after the demarcation of the main working Coupe, a Treatmant Map will be prepared, after thoroughly inspecting the area by the R.F.O. and it will be verified by the A.C.F. The Treatment Map shall show the following areas distinctly:

Category A: Protection Areas : These areas will include

i. Steep Slopes above 25^{0} .
ii. Nala banks and river courses 1 Chain wide on both sides.
iii. Eroded areas or areas liable to erosion.

Category B: Understocked Areas: Areas upto 0.4 density.

Category C: Old Plantation areas**:** include areas under old plantations.

Category D: Well stocked areas above 0.4 density

4.13.2. Marking Rules: The marking will be done by the Round Officer and checked by the Range Forest Officer. The ACF will closely supervise all the marking works. CF will inspect majority of the coupes and guide the staff in order to avoid excessive marking.

The marking rules for each category of areas will be as follows:

I: <u>All over Coupes</u>

i. All climbers except Shikakai shall be cut at the time of marking.
ii. All healthy trees bearing edible fruits and flowers like tendu, moha, chinch etc will be retained.
iii. All live stools of illicit felling shall be marked for felling.
iv. All live stumps after felling will be dressed with sharp implements.

II: <u>In Category C and D areas</u>

i. Dead trees will be marked for felling.

ii. Multiple shoots will be reduced to 2-3 vigorously growing best shoots.

iii. Thinning will be carried out in the congested patches without creating permanent gaps in the canopy at an escapement equal to 1/3rd of the average height of the crop.

iv. Shrubby undergrowth will be removed.

4.13.3. Treatment of different categories of Areas:

Category A:

i. Areas with slope more than 25 ^{0} – Dibbling of fruit bearing seeds.

ii. Areas situated 1 chain wide on each bank of river and nala- Bamboo plantation will be done.

Category B: This is the area for raising plantations. The detail treatment to be given in these areas has been described in the foregoing Section 13.

Category C: The prescription as given in section 11 under the Old Plantation Management Working Circle shall be followed.

Category D: No operation will be carried out except gully plugging wherever necessary.

Section 14: Plantation Technique.

4.14.1. After completion of the treatment map, the RFO will prepare site specific estimatesand get it sanctioned by the CF. Micro plans will be prepared on the basis of information gathered by PRA and RRA excercises. Plantation Model as given in Appendix No LX A is prescribed for afforestation. However, any Plantation Model of the Department may be adopted for raising plantations depending on the suitability of the species and the local requirements. Irrigated plantation may be tried wherever feasible. The Pre-Monson works will be completed before 31st March. The following items of works will be carried out on the sites:

a. **Soil and moisture conservation works:**

i. Gully plugs will be carried out where gully formation has taken place.

ii. Nala bunding works will be taken up in a well defined nalas in the area of operation. Trenches will be dug wherever necessary as per the plantation model adopted. CCT works will be carried in suitable sites.

b. **Digging and refilling of pits : -** Pits of appropriate sizes will be dug, and refilled after it is weathered properly prior to onset of monsoon.

c. **Seed Sowing:** Freshly collected viable seeds of Moha, Khair, Mango, Karanj, Shivan, Sagargota, Chillar etc will be sown on the mounds of TCMs. Vegetative cuttings of Sabar, and bulbil of Agave will be planted.

d. **Planting:** Superior quality seeds from known source will be raised in root trainers in the nursery. Immediately after the onset of monsoon, seedlings will be planted in the pits. The seedlings should be 6-9 months old. Adequate planting stock should be raised in the nurseries well in advance. Naked stumps will be planted in case of Teak.

e. **Weeding:** Three weedings and soil working will be carried out in the first year, two weddings in the second year and one weeding in the third year. Fertilizers will be applied during the first and second weeding in the first year. The dose and type of fertilizers will be decided after the soil samples are analysed. Casualty replacements will be carried out in the first and second year wherever needed.

Section 15:- Subsidiary Sivicultural Operation.

4.15.1. Cleaning: In the 7th year from the year of planting, the following operation will be carried out:-

i Climbers will be cut all over the area.

ii. Inferior species interfering or likely to interfere with the growth of natural or planted seedlings will be cut.

iii. Damaged seedlings or trees due to Wildlife and illicit cutting will be cut.

iv. Coppice shoots in each stump will be reduced to not more than 2 well spaced out vigorous shoots.

4.15.2. Thinning: The following works will be carried out in the 10th year of plantation:

i. Climber will be cut all over the area.

ii. All dead trees or badly damaged trees will be felled after retaining 2 dead trees per ha.

iii. Coppice shoots on each stump will be reduced to 1 vigorously growing shoot.

iv. Thinning will be carried to the extent of 1/3rd the average height of the plants if there are more than 1250 plants/ha.

Section 16:- Other regulations:

4.16.1. Fire Protection: Main working coupes will be rigidly protected from fire for a period of 5 years. Fire tracing will be done for the plantation areas.

Grazing: Areas of the main working coupes will remain closed to grazing for a period of 5 years from the year of planting.

Evaluation: All plantations will be evaluated from time to time and observation noted and informed to Territorial and Working Plan Officers.

Removal of encroachments: All encroachments will be removed with the help of the members of **FPC/JFMCs** and the area afforested.

The Tribes and Other traditional Forest Dwellers (Recognition of Forestry Rights) Act, 2006: After the rights are settled as per the provision of the Act, in the Forest lands, the implementation of the prescriptions of this Plan will remain suspended.

CHAPTER – V

WORKING PLAN FOR OLD PLANTATION MANAGEMENT WORKING CIRCLE.

Section - I - General Constitution of the working circle.

5.1.1. This Working Circle will include successful plantations raised by the Deaprtment and the plantation areas handed over by the FDCM. Many plantations have been raised under various schemes in the past. The plantations raised in Thane Forest Division in Reserved Forests, Protected Forests, and Compensatory Forests are included in this working circle. The total area in this working circle is **2063.216** ha.

Section 2:- General character of the vegetation.

5.2.1. Under various schemes, plantations of Teak and Miscellaneous species have been taken up. Because of inadequate availability of fund no tending operation were carried out in these plantations which has resulted in unhealthy growth and it has been seen that the increment put on by these plantations is not upto expectation. The crop is young and density varies from 0.3 to 0.5. Plantation sites are spread all over the Division.

Section 3:- Special object of Management

5.3.1. Keeping in view the above facts the special object of management of these plantations will be:-

i) To promote healthy growth by carrying out the required silvicultural operations.

ii) To enhance the productivity of forests.

iii) To meet small timber, firewood and fodder demands of the local population.

Section 4:- Analysis and Valuation of the crop.

5.4.1. The details of the stock map is given in **Appendix No XXVI and XXVII of Vol II (Page No. 50-95).**

Section 5:- Method of treatment.

5.5.1. The primary object is to accelerate the increment and increase productivity. Therefore, cleaning and thinning operations will be carried out at suitable times. The rooted stock present in the area which is constantly hacked for fuel wood will be dressed properly to achieve vigorous growth.

Section - 6:- Rotation.

5.6.1. In absence of any data on growth of various species in these plantations in degraded areas, it would not be needed to fix the rotation.

Section - 7:- Regulation of yield.

5.7.1. The yield obtained from the plantations will be quite negligible.

Section - 8:- Sequence of working

5.8.1 A statement showing the sequence of coupes due for cleaning, thinning etc. is given in **Appendix No XLI of Vol II (Page No. 384-386).**

Section - 9:- Demarcation of coupes and marking technique.

i. Demarcation:

5.9.1. The cleaning and thining coupes will be demarcated one year in advance of working.

ii. Marking Technique:

5.9.2. The Marking technique and demarcation as prescribed in para 15.1.1. to 15.1.6. in Miscellaneous Regulation will be followed.

Section - 10:- Method of executing works.

Preparation of treatment map:

5.10.1. After the coupe is demarcated the treatment map shall be prepared by an Officer not below the rank of a Range Forest Officer after thoroughly inpecting the coupe and will be verified by the Assistant Conservator of Forest. The RFO will prepare the stock map using standard conventional signs.

Section 11- Treatment of different categories of plantations.

5.11.1. Many plantations were raised in the past but some have not attained growth as desired. In the normal circumstances, the plantations are to be given timely prescribed silvicultural treatments. Topography, soil type, climate and biotic factors contribute to success/failure of plantations. Some patches of the sites have not attained the desired growth for carrying out thinnings. In such areas, thinning will not be carried out. The treatments proposed are as under:

i. Climbers and creepers obstructing growth of desired species shall be cut.
ii. All live stools of illicit felling shall be removed.
iii. Multiple shoots will be reduced to 2-3 vigorously growing best shoots.
iv. Shrubby undergrowth will be removed.

5.11.2. Successful plantations raised by the Department as well as by the FDCM over the past years will be thinned as per the thinning regime fixed by the FDCM. The following works are prescribed:

Teak Plantations:

The teak plantations mostly comprises of low percentage of trees in higher girth classes. The coppice growth in lower girth classes hinders the growth of other plants. Most of the plants raised in the plantations are subjected to heavy biotic pressure. Due to heavy rainfall and good soil in the tract, there are a good number of rooted stock and they need tending and protection. The number of plants in the higher girth classes gets drastically reduced in the older plantation as a result of selective illicit felling by the local people. There is abundant coppice growth in the areas where illicit felling has occurred. The young coppice growth also affect the growth of other plants.

Cleaning:

5.11.3. Cleaning will be carried out in the 7^{th} year of plantation. Cleaning is an operation made in a young crop in order to remove any growth interfering with the proper development of the principal species. It is observed that many old plantations are infested with profused growth of undesirable tolerant species both of seed and coppice origin. It is essential to remove this undergrowth for better aeration and to avoid unhealthy competition. Therefore, cleaning to the extent

necessary as determined by the CF, Thane shall precede all thinnings. Cleaning rules are as under:

i. Tolerant spp capable of capturing the site shall be felled wherever found. Other inferior species including bamboo interfering with the proper growth of superior species shall be felled.
ii. Damaged or badly shaped trees of coppice origin shall be cut back.

Climber Cutting:

i. Climber cutting will be carried out prior to every thinning.
ii. Small climber will be pulled out from the roots.
iii. Large creepers will be cut both at the base and at breast height, the cut portion should not be left lying on the ground.

Thinning:

1st thinning: It will be carried out in the 10th year of planting. The first thinning will be mechanical thinning. During the first mechanical thinning trees in alternate diagonals will be removed. The subsequent thinning will be carried out every after 5 years till the age of 70.

Section- 12:Other Regulation:

5.12.1. i. **Fire Protection:** The areas of the plantations will be protected from fire by enlisting the help of the Forest protection Committees in the locality

ii. **Grazing:** Areas of the main working coupes will remain closed to grazing for a period of 5 years from the year of working.

CHAPTER - VI

WORKING PLAN FOR URBAN AFFORESTATION WORKING CIRCLE.

Section 1:- General constitution.

6.1.1. This working circle includes forest areas lying within the limits of *Mahanagar Palikas* of Thane, Navi Mumbai, Bhiwandi, Ulhasnagar, and Kalyan-Dombivali, Greater Mumbai and *Nagar Palikas* of Ambarnath, Kulgaon/Badlapur, Virar, Nala Sopara, and Vasai. These forest areas are extremely sensitive for encroachment. These areas are capable of producing better tree growth and if protected and planted with preferably evergreen species, would provide aesthetic value to the cities. They would also cater to the ecological and environmental needs of the urban people. The different classes of forests are: Reserved Forests, Protected Forests, and Acquired Forests. The total area allotted to this Working Circle is **4766.917** Ha.

Section 2:- General character of vegetation.

6.2.1. The forest mostly comprises of the types moist teak bearing forests and western sub topical hill forests. These areas, being in the vicinity of urban population are subjected to encroachment, illicit felling for firewood and mining for earth as well as rubble and stones for
building materials. Most of the areas are devoid of vegetation.

Section 3:- Blocks and Compartment.

6.3.1. The compartments of Reserved forests, and Survey Numbers of Protected Forests allotted to this working circle has been given in **Appendix No XLII of Vol. II (Page No. 387-392).**

Section 4:- Special Object of Managements.

6.4.1. The special object of management would be:

i. To preserve the environment of the thickly populated urban areas and maintain micro climatic and ecological balance.

ii. To conserve greenery within city limits so as to keep air, water, and noise pollution under control. These areas will also provide shelter to wild life especially birds within city areas.

iii. To develop as awareness creation centres for conservation of forests and wildlife.

iv. To meet the objects of aesthetic consideration and to serve as green lungs to the urban dwellers.

Section 5:- Analysis and Valuation of the crop.

6.5.1. The areas have been stock mapped and the analysis of the stock map is as under:

Table No.24

Teak Forest (Ha)		Mixed Forest (Ha)			Other (Scrub) (Ha)	Plantation (Ha)	Under stock (Ha)	Cultivation (Ha)	Eroded (Ha)	Blank (Ha)	Area Not Stock Map Survey (Ha)	Total Area (Ha)
IVa	IVb	III	IVa	IVb								
1	2	3	4	5	6	7	8	9	10	11	12	13
-	-	-	-	370.680	2584.007	122.231	1075.373	260.273	30.00	181.428	142.925	4766.917

Section 6:- Method of treatment.

6.6.1. It is proposed to protect these areas by taking up effective protection measures at hypersensitive spots and by traditional TCM or rubble walls in less vulnerable places. All the plantable areas will be planted up with socially and religiously important local species along with soil and moisture conservation works. These areas are surrounded by thickly populated urban area and hence are subjected to constant encroachment for residential purpose. These areas are of high economical value, organized encroachments have been experienced in the past. The migratory building workers coming from other States often stay in the open and they meet their firewood demands from these forests. Hence these areas are constantly degrading. As envisaged in Govt. of Maharashtra G.R.No. MSC/2000/C.R.No.143/F-2, dated 25-04-2003 special efforts will be made to rehabilitate these forests.

Section 7:- Choice of Species.

6.7.1. The species to be planted should be Evergreen/semi-evergreen, hardy, wind-firm, fast growing and having aesthetic value. It should have a good crown. The following species are favoured for planting: *Dalbergia sisso, F. bengalensis, Mangefera indica, Pongamia pinnata, Tamarindus indica, Syzygium cumini, Bauhinia variegata, Delonix regia, Grevillea robusta, Polyalthia longifolia, Acacia* spp, *Eucalyptus* spp, Rain tree, Vad, etc. Clusters of *Bougaivilloeas* and other thorny spp etc can be planted near human habitation along the boundaries.

Section 8: Working Series and Annual Coupes.

6.8.1. The areas of Protected Forests have been divided into 4 Plantation Series and Reserved Forests into 3 Planation Series. Each Plantation Series is divided into 20 annual Coupes. In Protected Forests the coupes are formed by clubbing several Survey Numbers in the same or adjoining villages. Some Survey Numbers with sizable areas are partitioned and coupes formed keeping in view of the annual areas to be treated. The details of plantation series and coupes are given in **Appendix NoXLIII (Page No. 393-400)**and the Sequence of work is given in **Appendix No. XLIV of Vol. II (Page No. 401).**

Section 9:- Harvestable girth and Rotation.

6.9.1. The primary objective is to maintain these areas under constant cover to meet the environmental and ecological need of the urban people; therefore, no harvesting has been prescribed. Hence harvestable girth and rotation is not fixed.

Section 10:-Method of Executing the works

6.10.1. A treatment map will be prepared as prescribed in para **3.11.2.** Artificial regeneration will be carried out in the patches. Planting stock will be raised in Nurseries and planted out with ball of earth.

Section 11: Plantation Technique.

6.11.1. Plantation technique as described in para **4.14.1., Section 14** in Afforestation Working Circle will be followed in raising plantations

Section 12: Subsidiary Cultural Operation.

6.12.1. Three weedings in the first year, two in the second year and one in the third year will be carried out. There is no need to carry out cleaning and thinning as the greenery is to be maintained and most the areas are devoid of vegetation.

Section 13: Other Regulations

6.13.1. Closure to Grazing: The planted areas are in the vicinity of human dwellings. The areas will be closed strictly to grazing for a period of 5 years.

Fire protection: The coupes will be fire traced for a period of 5 years from the year of planting.

CHAPTER - VII

WORKING PLAN FOR MANGROVE WORKING CIRCLE.

Section 1:- General Constitution.

7.1.1. This working circle comprises of the mangrove forest in small patches along the coastal areas of the Arabian Sea. Mangrove vegetations are found in scattered areas in creeks on the Western part of the Division. The mangrove areas in possession of Forest Department as on 31/3/08 have been included in this Plan. This Working Circle will deal with the mangrove forests which have not been managed under any system of management in the past. The total mangrove area included in this Working Circle is **1974. 512** ha.

Section 2:- General character of vegetaion.

7.2.1. The Mangrove forests belong to the Group "Littoral and Swamp Forests", sub-group "4B/TS1-Mangrove Scrub forests" under Revised Classification of Indian Forest Types by Champion and Seth. The Mangrove forests consist mostly of evergreen trees and shrubs belonging to several unrelated families and share similar habitat preferences and a similar physiognomy. They are predominantly associated with wetness. The root system is modified into a specialized structure called *pneumatophores* in *Avecennia* and *Sonneratia,* stilt roots in *Rhizophora* and *Braguira* spp which serves to meet inadequate aeration consequent on a submerged and water-logged soil. They possess an exclusive ability to thrive in saline environment. Mangroves have rich biodiversity. Mangrove plays the role of a nursery for a large array of aquatic organisms. Mangrove vegetation along the creeks is more or less dense forest of very low average height. Some species attain a height of 10 m at favourable places. The density varies from 0.2 to 0.8. The tidal vegetation consists mostly of Tiwar (*Avicenia alba*), and Maraudi (*Acanthus ilicifolius*). The area remains submerged by salt water during the high tides. As a result of constant movement of water currents the soil is muddy. Due to various uses of Mangrove trees, the mangrove forests in the tract were exploited to a considerable extent. Reclamation of mangrove areas for human habitation, grazing, salt pans, fishing and paddy cultivation are some of the main factors responsible for destruction of mangrove forests.

Section 3:- Survey/Gat Numbers, and Working Series.

7.3.1. The Survey Numbers allotted to this working circle has been given in **Appendix No XLV of Vol. II (Page No. 402-405)**

Section 4:- Special objects of management.

7.4.1. The special objects of Management are:

1. To protect and conserve mangroves as a special marine/coastal wetland eco-system.
2. To restore the mangrove areas by way of afforestation which have been degraded much due to biotic interference.
3. To create awareness for Mangrove conservation.

Section 5:- Analysis and valuation of the crop.

7.5.1. The area was not stock mapped but the maps depicting various categories such as Dense mangrove, Sparse mangrove and mud flats are available from the maps provided by MRSAC.

Section 6:- Method of treatment.

7.6.1. The main object of management is to enrich the under stocked and degraded areas by way of plantation of appropriate mangrove species. Well stocked mangrove areas will be protected from biotic interference. No harvesting will be proposed. Hence, no silvicultural system is prescribed.

Section 7:- Choice of species.

7.7.1. Following species are proposed for planting in the plantation: *Rhizophora mucronata, Rhizophora apiculata, Avicennia officinalis, A.alba, A. marina, Bruguiera gymnorhiza B. cylindrica, Sonneratia alba, S.apatala, Acanthus ilicifolius, Aegiceras corniculatum, Ceriops decandra, C.tagal, Lumnitsera racemosa, Sesuvium portulacastrum, Sucada maritima, Salvadora persica, and Aerostachium aerium. etc.*

Section 8:- Rotation.

7.8.1. The object of Management of this working circle will be protection and suitable rehabilitation of the degraded area. Harvesting of mangroves is not proposed as these areas are higly fragile and they form a very good breeding ground for marine life. Hence there is no need for fixing rotation.

Section 9:-Praparation of Treatment Map:

7.9.1. A Treatment Map will be prepared, after thoroughly inspecting the area by the R.F. O. and it will be verified by the A.C.F. The Treatment Map shall show the following areas distinctly:

A-Unworkable Areas:
B-Plantable Areas
C-Dense Mangrove

Section 10: Method of Executing the Work

7.10.1. Works will be carried out in each of the categories.

A-Unworkale areas: No work will be carried out. Protection will be given.

B-Plantable Areas: Plantation of Mangrove species will be raised.

C-Dense Mangrove: No work will be done. Only protection will be given.

Protection is the most important work in this Working Circle. The areas fall in the vicinity of cities like Mumbai, Navi Mumbai and Thane. It is extremely vulnerable to encroachment. Mobile Squad and the local Staff will constantly patrol the areas under their jurisdiction and prevent encroachments and damage to mangrove forest.

Plantable areas under category **B** will be planted as under:

Section 11:- Nursery Technique.

7.11.1. Mangrove nursery will be selected near the Estuary or Sea in the low lying areas which gets inundated during the high tide. This will facilitate watering of the seedlings twice a day thereby reducing the cost of raising seedlings in the nursery. The nursery should be located near the site of the plantation to minimize the cost of transportation of the seedlings. The matured propagules of viviparous species like *Rhizophora, Bruguiera* and *Kandelia* should be collected and planted directly in the plantation. They need not be raised in the nurseries. Other species species like *Avecennia, Sonneratia* etc should be raised in the nurse

7.11.2. To raise mangrove species in the nursery, perforated polybags will be filled with sandy/silty clay and arranged in the beds.The filled bags will be supported by a framework made up of bamboo splits placed along the boundary of each bed. The filled bags may also be placed in a dug up place similar to sunken beds but water should be regulated so that the salinity does not increase. The works will be done during the low tide.

7.11.3. The fruits get matured in the month of July to September. The fruits containing matured seeds drops from the trees and they get deposited on the banks. These seeds should be collected and sown in the filled bags. Seed should be placed around 12mm deep in the soil. One year old seedlings should be used for planting.

Section 12:- Planting Technique.

7.12.1. In the areas of high salinity, species of *Rhizophora mucronata, Avicennia marina, Bruguiera parviflora* and *Sonneratia alba etc* should be planted while in a relatively lower salinity areas species of *Rhizophora apiculata, Avicennia officinalis, and Kandelia rheedi etc* should be planted. In order to preserve the existing local species the following species should also be tried in the Mangrove plantations; *Avicennia alba, Bruguiera gymnorhiza, B. cylindrical, , Sonneratia apatala, Acanthus ilicifolius, Aegiceras corniculatum, Ceriops decandra, C.tagal, Lumnitsera racemosa, Sesuvium portulacastrum, Sucada maritima, Salvadora persica, and Aerostachium aerium.* Plantation Model I given in **Appendix No LX -B Vol. II (Page No. 477-478)**will be adopted.

Based on their mode of regeneration two planting techniques will be adopted.

i. **Planting of Viviparous Species:** Viviparous genus like *Rhizophora, Bruguiera, Ceriops* and *Kandelia* produces propagules on the mother plant itself. Matured and healthy propagules having a band of pale tissues near the fruit wall will be collected and planted from April to July. The propagules will be planted 4 cm to 8 cm deep in the soil. The propagules will be planted within seven days from the day of collection.

ii. **Planting of Non-Viviparous Species:** Species like *Avicennia* and *Sonneratia* will be raised and maintained in the nurseries for a year before planting. When the seedlings attain a height of about 4(

6months to 12 months the seedlings will be planted during the low tide period. The transportation of seedlings will be done by means of boat wherever necessary.

Section 13:- Subsidiary Cultural Operation.

7.13.1. Casualty replacement will be done in the second year of plantation. No weeding will be required but debris and garbage collected at the base of the seedlings should be removed and heaped above the tidal limits. No cleaning and thinning is prescribed.

Section 14:- Other Regulations.

7.14.1.

i. **Closure to grazing:** The plantation will remain closed to grazing for a period of 10 years and fishing for a period of 5 years from the year of planting.

ii. **Removal of Encroachments:** The mangrove forests are extremely vulnerable to encroachment. No encroachments will be allowed to take place under any circumstances. Constant patrolling will be done by the Mobile Squad. Boats and life jackets should be provided to the protection staff.

iii. **Dumping**: Dumping of any form will be strictly prohibited.

iii. **Demarcation:** Most of the mangrove areas have not been demarcated. The class I and II pillars used in Forest Department for demarcations are not suitable in wetlands. Therefore, the models of the pillars should be adopted from other departments after it is duly approved from the competent authority.

CHAPTER – VIII

WORKING PLAN FOR MISCELANEOUS WORKING CIRCLE.

Section 1:- General Constitution.

8.1.1. This working circle will include the remaining areas of 915.645 ha of Reserved Forests and 16.207 ha Unclassed Forests which have not been allotted to any other Working Circle. The total area under this working circle is **931.852** ha.
The different types of areas under this category are as under:

i. ***Dalhi plots***: These plots were given out to the villagers for cultivation with the object of encouraging human habitation in the remote part of the forest for supply of labour for forest works. The total area of Dalhi plots is 140.847 ha. Dalhi plots are recorded as Reserved Forests but excluded from the Coupes. CF, Thane will take suitable action as and when the decision is taken by the GOI/Government of Maharashtra in this context.
ii. ***CIDCO:*** ***774.798 ha*** of Reserved Forests have been handed over to CIDCO. The land is recorded as Reserved Forests but in possession of CIDCO.
iii. ***Unclassed Forest*** : 16.207 ha of Unclassed forest is in Thane Division. A suitable treatment will be given by the CF Thane.

Section 2 :- General Character of the Vegetation.

8.2.1. There is no vegetation in Dalhi plots as the areas are under cultivation. The forests have been subjected to persistent and unregulated biotic pressure by way of cultivation by the forest dwellers. The Compartments that were handed over to CIDCO remains with them and are now under habitation.

Section 3 :- Method of treatment.

8.3.1. Under the prevalent circumstances it is not possible to prescribe any method of treatment to the areas. As far as the Dalhi plots are concerned, the CF shall follow the decision of the State/ Central government as per the provision of the FCA, 1980.

CHAPTER- IX

WORKING PLAN FOR NON-TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE.

Section- 1:- General Constitution.

9.1.1.. This is an overlapping working circle and would cover all the areas under the proposed plan.The Non- Timber Forest Produce includes both Minor Forest Produce and Medicinal Plants occurring in the Tract.

Section -2:- Non-Timber Forest Produce occurring in the area:

(A) Minor Forest Produce:

9.2.1. There is a number of Minor Forest Produce available in the tract and are found in almost all the Ranges with varying extent. The important Minor Forest Produce of the tract as listed in the previous Working Plan is given below:

1. Grasses 2. Babul datans 3. Apta Leaves 4. Tembhurni leaves. 5. Bel leaves & fruits 6. Kadhipatta leaves. 7. Myrobalans 8. Chilhar bark. 8. Ain bark. 9. Wavding. 10. Agave leaves. 11. Tad leaves and fruits. 12. Kusari flowers. 13. Moha flowers and seeds. 14. Rankel leaves. 15. Honey. 16. Karaya gum. 17. Ain gum. 18. Jathropa. 19. Beheda fruits. 20. Awala fruits. 21. Palas fruits. 22. Katha & Khair seeds. 23. Bhava seeds & barks 24. Katha.

9.2.2. The details of quantity of NTFP items sold by the Division during the last five years are given in **Appendix LXI and LXII of Vol II (Page No. 479-481).** The items sold are listed as under:

Tendu Leaves , Apata Leaves , Gum, Adulasa,Ramnakhi, Shatavari,Dukarkand Gulvel, Gunj Leaves, Karvi, Rankeli leaves, Vavding, Sarpagandha, Palas flower & Leaves, White Musli, and Medicinal plants.

(B) Medicinal Plants:

9.2.3. The lists of medicinal plants are not well documented. However, the tract is rich in medicinal plants which are used for curing various ailments by the local people and therefore medicinal plants occupy an importan

socio-cultural, religious and medicinal arena of the local people. Their sustainable management will conserve biodiversity, sustain human and environmental health and generate employment and earn foreign exchange by promoting exports. Efforts have been made to collect datas for medicinal plants found in the tract. The list of medicinal plants found in the tract have been compiled and given in **Appendix No LI of Vol. II (Page No. 419-422).**

Section -3:- Special objects of Management.

9.3.1. The special objects of management for this working circle would be:

1. To ensure the protection, improvement, regeneration, of Non Timber Forest Produce by involving local population.
2. To ensure appropriate value addition, transparent trade practices and proper utilization of non-Timber Forest Produce.

SECTION: 4: OWNERSHIP AND MONOPOLY PROCUREMENT OF THE NTFP:

9.4.1: Parliament has enacted a law "The Provisions of the Panchayat (Extension to the Scheduled Areas) Act, 1996 (Act No.40 of 1996)". The said Act provides for endowing by the States, the Panchayats in the Scheduled areas, with such powers and authority as may be necessary to enable them to function as institution of self Govt. It further provided that a State Legislature should ensure inter-alia that the Panchayats at the appropriate level and the Gram sabhas are endowed specifically with the ownership of minor forest produce.

9.4.2: Govt. of Maharashtra has enacted a law "Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas Act, 1997 and has amended Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 (Act No.45 of 1997)", vide which ownership of 33 MFP specified in the Schedule, found in the Govt. land has been transferred to the Panchayats. The MFPS included in the Schedule are [1] Mahuwa flower,[2] Mahuwa fruits,[3] Gum,[4] Hirda ,[5] Charoli,[6]Awala,[7] Baheda,[8] Neem seeds,[9] Karanj seeds,[10] Amaltas seeds,[11] Tamarindus indica ,[12] Tamarind seeds,[13] Lac of Butea monosperma,[14] Lac of Schleichera oleosa ,[15] Seeds of Jatropa carcus,[16] Takda/ Pauda Clerodendron phburidis ,[17] Nirmali/ Kapi,[18] Gu

bee(seed),[20] Kunchala kari,[21] Shikakai, [22] Reetha,[23] Biba, [24] Gunj seed,[25] Broom grass ,[26] Mango seed ,[27] Wawding,[28] Baphali,[29] Cut Grass and fodder,[30] Honey ,[31] Palas leaves,[32]Sitaphal ,[33] Cashew nuts.

9.4.3: Panchayats are to strictly adhere to the prescriptions contained in the Working Plan with regards to the harvest of minor forest produce. In the areas not covered under the Working Plan the Panchayats are to adhere to the rules made, with regard to the harvesting of minor forest produce, by the Chief Conservation of Forests.

Section -5:- The Method of Treatment.

9.5.1. The trade of minor forest produce is governed by Minor Forest Produce (Regulation of trade) Act 1969.

9.5.2. The trade of tendu leaves in particular is governed by Maharashtra Forest Produce (Regulation of tendu leaves) Rules 1969. In this regard Ordinance R& F.D. 10 Dec 1997 published in part IV of Maharashtra State Gazette 18 Dec 1997 (pp 682) should be considered by the C.F, Thane. The method of treatment for each of the important minor Forest Produce are summarized below.

TENDU:

9.5.3. Tendu leaves collection is monopoly of the state government under the Maharashtra Forest Produce (Regulation of Trade) Act, 1969. The tendu leaf collection shall be carried out in the manner prescribed by the Principal Chief Conservator of Forests from time to time.

9.5.4. Collection of tendu leaves: The collection of Tendu Leaves as compared to other Divions are very less. In some of the years it was not collected at all. Tendu was also a revenue generating NTFP of this tract. Tendu leaves are used for manufacturing bidis. The collection season of tendu leaves is short, and is hardly a month, from the last week of April to the last week of May. The unit should be departmentally collected once in every five years. Necessary budget provisions should be made one year in advance.

9.5.5. Pruning of young Tendu plants does help in increasing the leaf yield. Pruning in the compartments may be allowed at 3-year interval. However, felling of Tendu trees or branch lopping for leaf collection shall be should not be allowed. Tendu should be planted in the miscellaneous planatations wherever sites are suitable for growing them.

KANDOL

Kandol (*Sterculia urens*)

9.5.6. Kandol is found all over the Division and it is a good source of gum. It has not been exploited even once. It is prescribed for tapping gum from kandol trees. To ensure enhanced quantity of gum from Kandol trees the rules for tapping, derived by the FRI, Dehradun, can be adopted as detailed below:

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

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

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

iv) Each tree will be tapped continuously for 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.

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

vi) Blaze may be made horizontally leaving approximately equal space between the blazes. The blazes should not have any loose fiber.

Table for Blazes on Each Tree.

Table No.25

Sr.No	Girth at breast Height	Max. No. of blazes to be made on each tree
1.	M to 1.3 M	2
2.	M to 2.0 M	3
3.	M to 3 M	4
4.	Over 3 M	1 blaze for every 45 cm girth in addition to category 3 above

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

b) Each blaze will be in a shape of parabola with a 2.5 cm wide base. The curved side of the parabola will be upwards and of height not more than 7.50 cm and the depth of the blaze will not exceed 0.6 cm in the wood.

c) At the end of the session, 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.

d) 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.

e) In the second cycle i.e. in the 7^{th} year (after three years rest) new blazes will be made in the same way in the unblazed portion, in between the blazed portions of the first cycle. This blazing will continue for another three years in the manner described above and the operation will be repeated till unblazed portion is fully covered.

9.5.7. Grading: The collected gum is graded into three classes:

i) white, ii) yellowish, iii) Black coloured.

White coloured gum fetches higher price in the market compared to yellowish and black gum. Yellowish gum fetches fewer prices as compared to white one. Black gum fetches the lowest price. When gum is collected it is a mixture of all the three grades. By grading the gum the trader is able to assess correctly and offers correct price. So skill for grading should be provided to the people by organizing training to the gum collectors.

The colour of the gum is dependent upon the climatic conditions. It is said that clear sky in the night will exude white coloured gum.

Apta leaves (*Bauhinia racemosa*):-

9.5.8. These leaves are also used for making beedis .The trade is by and large confined to Gujarat state. The Apta seedlings should be planted in plantation areas to increase their relative proportion.

Section -6:- Other Non Wood Forest Produces with Potential in the Division.

Moha Seeds And Flowers:

9.6.1. Moha collection: Moha trees are found all over Thane forest division. The tree produces flower which on fermentation and distillation gives a local brew much relished by the the Adivasis residing in the tract.The villagers in the tract have local system for allocation of collection rights of moha flowers. The flowers are also eaten as food during famine. The seed yield oil, which is used in cooking and soap making etc. It is proposed to number the moha trees and document the trees in each village. Beat wise and girth class wise moha trees should be enumerated by the territorial staff both on forest and non forest lands.

9.6.2. Moha regeneration: NR of moha shall be provided by dibbling of moha seeds in the coupes and by carrying out weeding and soil working along with other planted seedlings during coupe operations of area specific working circles.

9.6.3. Moha is prescribed to be included in the list of species prescribed in various area specific working circles.

Biofuel Plants:

Jatropha seeds (*Jatropha curcas*):-

9.6.4: The seed produces oil which is in great demand. The oil can also be used as biofuel and can supplement our depleting petroleum resources. The plant can be raised from cuttings or by dibbling seeds and it also forms a very good live hedge. It should be planted on TCMs, nallah bunds, boundaries and other suitable areas.

Karanj

Karanj (*Pongamia pinata*)

9.6.5: The oil obtained from the seeds of Karanj is used for soap making, burning and also in the preparation of medicines. This oil can also be used as biofuel and the oil can also be used for arthritis cure. The seed is also used for Brochoitis cure. Seed sowing shows a good result and hence it should be raised by sowing seeds along Nullas and Rivers. It should be raised in the plantations on all suitable sites. The seed of this plant should be sown on TCM and seedlings should also be raised in plantations

Awla fruits (Emblica officinalis): -

9.6.6: These fruits are eaten raw and in pickled form. Being one of the richest sources of vitamin 'C' it also forms a major component in most of the ayurvedic system of medicine. It is one of the three ingredients of "Triphala", an important ayurvedic preparation. This species does well in afforestation areas, and should be made part of the plantation programme all over the area.

9.6.7: **Agave leaves** (*Agave sisilana, Agave americana*) :-

Agave leaves have demand because of it fibers. It is a good live-hedge and should be planted on the TCM and nallah bunds.

9.6.8: Khair wood (katha) (*Acacia catechu*):-

Khair has great demand in Katha industry. Thane Forest has some patches having good Khair trees. However there is a marked depletion of the stock of these trees due to over exploitation and heavy illicit felling in the past decades. And it needs to be built up by taking up plantations of this species in suitable areas and making this species a must in regular afforestation programmes. Besides production katha this tree also exudates gum and acts as a good lac insect host plant. It is used for making hubs and axles of carts.

9.6.9: Honey:- Honey produced by honeybees is a very important product because of its medicinal and nutritional value. The extraction of honey should be done scientifically to get more yields. It can be a very good cottage industry for the people living in the midst of forests. The processing and marketing can be managed by forming co-operatives.

Section -7:- Conservation of Medicinal Plants.

9.7.1: Many valuable species of medicinal plants grow in this tract. The following measures should be adopted for the conservation of medicinal plants in the tract:

1. Forest Protection Committees/ JFM Committees should be entrusted with the responsibility of protecting patches rich in medicinal plants from biotic interference.

2. Training programmes should be organized at regular intervals to familiarize members of FPCs /JFMCs with the medicinal plants, their sustainable management, non-destructive harvest and utility in treating various diseases.
3. The FPCs/JFMCs should be encouraged to prepare an exhaustive inventory of medicinal plants in their territory.
4. Efforts should be made to artificially propagate those species of rare medicinal plants categorized as "endangered", "vulnerable" or "near-threatened".

Section -8:- Research Works:

9.8.1: There are so many Non Timber Forest Produce and Medicinal Plants in the forest which are unidentified and untapped. The efforts of the department shall be to explore them and manage them scientifically. The identification of medicinal plants in the field needs to be taken up for study immediately.

Section- 9 :- Other Important Principles and Procedures:

9.9.1: The following are important principles and procedures:

The annual estimates for collection of Non Timber Forest Produce and Medicinal Plants shall be made based upon the experience. The annual estimates for collection of NTFP shall be approved by the Chief Conservator of Forests, Thane. The Range Forest Officer for the respective range shall issue the passes for transportation of NTFP items. Scheme shall be formulated for improving yields of Non Timber Forest Produce and Medicinal Plants e.g. plantations, protection against disease etc. Transport of MFP items such as Palas Leaves, and, Rankeli Leaves, are not properly regulated at present. Large quantities of these items are found in various markets in Mumbai which is the main consumption centre. A concious effort should be made to control unauthorized transport of MFP.

9.9.2. Measures shall be taken to maintain and improve the present output of the Non Timber Forest Produce and Medicinal Plants.

CHAPTER-X

WORKING PLAN FOR BAMBOO PLANTATION

(OVER LAPPING) WORKING CIRCLE

Section- 1:- General Constitution.

10.1.1. This is an overlapping working circle and would cover all the bamboo bearing and plantable forest areas included in other working circles. It will also cover the area where bamboo plantations have been carried out in the past.

Section -2:- General Character of Vegetation.

10.2.1. The Bamboo species mainly found in the tract are:-

Manvel (*Dendrocalamus Strictus*)

Katas (*Bambusa arundinacia*)

Bundhi (*Oxytenanthera stocksii*.)

10.2.2. Manvel is the most common and important of the above species. Most of the bamboos died after the gregarious flowering which took place in 1959-60. Profuse regeneration had come up at many places but it did not develop into clumps except in some remote hilly areas where damage by cattle and fire was negligible. Several Schemes have been implemented for raising Bamboos but the attempts have been unsuccessful due to heavy biotic pressure in the locality.

10.2.3. Katas is a thorny bamboo with bright shining culms. It occurs mostly on river banks, valleys and ravines.

10.2.4. Bundhi is a slender bamboo with 7m high; culm-sheaths 15.0 to 22.5 cm long, 7.5 to 15.5 cm wide at base.

Section -3:- Blocks, Compartments and Felling Series.

10.3.1. The Compartments allotted to this working circle are given in the **Appendix No. XLVIII of Vol II (Page No. 411-416).** The areas of this working circle will be divided into 3 Working Series and each of this Working Series will be divided into 3 Coupes. The details of working Series and Coupes are given in the **Appendix No.XLIX of Vol II (Page No. 417).**

Section -4:- Special objects of Management.

10.4.1. The special objects of management would be:-

1. To harvest bamboos on scientific lines so as to get the maximum sustained yield.
2. To regenerate bamboo artificially where natural regeneration has failed or is not adequate so as to increase future yield.
3. To meet the local demand of bamboos in future.

Section -5:- Method of Treatment.

10.5.1. Selection fellings of mature culms in each clump will be done. In some areas the crop is in various stages of development and the clump formation is yet to complete. Therefore, hygienic operations will be done in such areas.

10.5.2. Under planting of bamboo would be taken up in all areas suitable for bamboo planting in suitable sites.

Section -6:- Choice of Species.

10.6.1. Manvel will be planted on slopes and drier areas. Katas will be raised in valleys and along the rivers.

Section -7:- Felling Cycle.

10.7.1. The Felling Cycle of three years will be adopted. Each cutting series will be divided into three coupes approximately as equiproductive as possible. However actual exploitation of bamboos should be started only after ascertaining that bamboos have reached exploitable stage. A statement showing the sequence of working of the coupes is given in **Appendix No L of Vol II (Page No. 418).**

Section -8:- Method of executing cutting.

10.8.1. The Compartments included in the Coupes due for working will be demarcated one year in advance of actual harvesting. The demarcation of the Coupes will be done by numbered poles or two bands on standing trees. The word 'Bamboo' along with Compartment Number, name of the Felling series, and Coupe Number will be marked on the poles or trees below the bands. For better supervision

and control on the felings, the DCF will order the successive opening of only one or two Compartments at a time in the Coupe, during the year of working so as to ensure proper observance of the felling rules.

10.8.2. The rules for the working of Bamboo areas are indicated 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 any other green (living) culms available for harvesting as per the prescribed rules or not.
   a) Dead and Decaying
   b) Culms of which the growing shoots have been cut to a length of more than 1/3rd of the normal length or the culms which are badly damaged and rendered unsound.
   c) Twisted, bent, or otherwise malformed culms.

10.8.3. A clump will not be considered mature for harvesting unless it contains more than 8 mature (more than one season old) culms.

10.8.4.. In a mature clump, the following types of culms (green and living) will be retained.

a) All current season's i.e. less than one year old culms.
b) From the rest, culms equal in number to the current season's (less than one year old) culms or eight which ever is more.

10.8.5.. Culms to the extent available for harvesting after retention as per rule (4) above should be exploited in such a manner that the clump is evenly worked throughout and that the Bamboos to be retained are evenly spaced out in the clump.

10.8.6.. 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.

10.8.7.. The height at which the culms shall be cut must not be lower than 15cms and more than 45 cms from the ground level but in any case not higher than the second internode and lower than the first internode.

10.8.8. In case of flowering clumps, harvesting should be deferred till the seeding is completed.

10.8.9. The following acts should be strictly prohibited.

a) Digging of rhizomes

b) Cutting of tops of Bamboos for fodder.

c) Use of tender Bamboos for bundling.

10.8.10. Use of sharp instruments should be insisted upon during extraction.

10.8.11. All climbers infesting the Bamboo clumps should be removed.

Section -9:- Other Regulations.

These will be as under:-

10.9.1. **Fire Protection:** - The planted areas will be completely fire protected for a period of 10 years.

Grazing: - The coupes and planted areas will be closed to grazing from the year of planting and will remain so for a period of ten years.

CHAPTER –XI

FOREST PROTECTION

Section -1:- General Constitution.

11.1.1. This Chapter covers the areas under the proposed plan. Good qualities of forest are found in the lower elevation in close proximity to villages. The forest areas are prone to illicit cutting, Fire, Encroachment, Grazing and Poaching of wild animals.

Section.-2 :-. Status of forest offence cases.

11.2.1. The Range Forest Officer, the Assistant Conservator of Forests and the Deputy Conservator of Forests shall take review of forest offence cases at least once, every month. Shifting of boundary marks along the forest boundary shall be viewed seriously, and the encroachers shall be prosecuted in the court for omission or commission causing obliteration of the forest boundary. Charge sheets regarding all cases of forest encroachments shall be submitted before the Judicial Magistrates within stipulated time. Similar time-bound action is recommended in all cases of timber theft. Failure of submitting charge sheets within the statutory time limit shall be considered willful negligence of duty. All cases of violation of the Forest Conservation Act, 1980 shall be dealt with firmly as per the law.

Section - 3:- Special Objects Of Management.

11.3.1. The special objectives of management are:

1. To enforce the Indian Forest Act 1927, Wildlife Protection Act 1972 as amended till 2003 for the effective control of Illicit felling, grazing, encroachments poaching and fires.
2. To develop the database to monitor various offence cases in a systematic manner.

Section -4:- Illicit Felling:

11.4.1. Thane Forest Division is very sensitive from the point of view of illicit cutting. Organized gangs operate in the Forest area.

A statement showing the information pertaining to the illicit cutting of forests in forest division is given below:-

Table No.26

Sr.No	Year	No.of stools detected	Value of the material involved i.e. stools (Rs.)	Value of the material seized (Rs.)
1.	1990-91	14186	44,29,883/-	51,35,207/-
2.	1991-92	14314	48,70,709/-	50,60,235/-
3.	1992-93	12346	49,07,050/-	45,52,809/-
4.	1993-94	20482	81,32,467/-,	62,12,438/-
5.	1994-95	8261	34,64,,530/-	36,86,756/-
6.	1995-96	5744	25,56,584/-	35,69,965/-
7.	1996-97	4569	25,71,260/-	36,50,808/-
8.	1997-98	5978	25,54,214/-	78,59,019/-
9.	1998-99	4647	30,40,086/-	5,12,993/-
10.	1999-00	4168	22,72,325/-	37,11,254/-
11.	2000-01	4930	11,91,942/-	26,51,953/-
12.	2001-02	4319	13,85,591/-	13,56,244/-

Source: DCF, Thane

11.4.2. Illicit felling in the forest area is growing at an alarming rate. Mostly Khair and Teak trees are felled and carried away after converting them to square logs or planks at the site itself. Faster communication including vehicle facilities, adequate defense capabilities and frequent training to staff are recommended to control illicit felling and wildlife offences. Establishing intelligence network for this purpose is strongly recommended.

11.4.3. In addition to addressing supply-side management by augmenting wood production on forest and other community land, the demand-side management should take up efficient wood utilization and energy efficient alternatives like Biogas, Solar cookers, etc. The following general principles are prescribed for the effective protection of the forest.

11.4.4. A separate Protection Plan will be drawn up for proper control of illicit felling in the Division**.** The Protection Plan will classify the forest areas as highly sensitive, sensitive and normal beats. The sensitive route

identified. Need-based protection plan should be revised from time to time. Beat wise offence cases will be reviewed with special emphasis on the unknown offenders and efforts shall be made to find out the offenders in each case.

11.4.5. Every year case having more than Rs.2,000/- worth forest produce/loss to the forest invariably should be submitted to the court within the prescribed time. Monitor the occurrence of all the offence cases daily through wireless. Identify and list all the paths used for the transportation of illicit material. Place effective patrolling squads at all important routes to prevent the transportation of illicit material. Use the provisions of rewards for gathering of information. Patrolling squads shall be not less than 10 in number to over come the gang of offenders. History sheets of all the offenders along with their photo and bio-data should be maintained at Round Level, Range and Division Level. Prepare the list of offenders, showing the offence cases involved by him, against the each offender. The provisions of the G.R. No. TRS-06/2001/CR No.209/F6 dated 8/5/2003 shall be implemented.

11.4.6. Sufficient funds for patrolling and honorarium of advocates be made available on top priority. Efforts should be made to appoint the forest counsel as directed by PCCF office. Beat inspection should be carried out as per the existing Standing Orders. Every stump in the forest should be numbered with digit nail set both on the top of the stump as well as on the base with a serial number followed by year. After one year all the high stumps should be dressed to ground level to obtain good coppice**.** The supervisory officers, during the beat inspection, verify the registered stumps and unregistered stumps. The beat guard shall be held responsible for non-registering the illicit stumps. Every Range and Division office shall maintain the Xerox copies of the judgments of all forest cases for the guidance and improvement purposes. Sections of IPC having the trial jurisdiction of District Court be used in the complaints and in the FIR**.** Court Guards duties be assigned to a special duty Guard for each Range office and Division office to monitor the dates and for timely communication to the witnesses. Effort should be made to enlist the support of the local villagers in catching the offenders (JFM Committees)**.**

Section -5:- Fire Protection.

11.5.1. Forest fires are common occurrence in this area. Recurrence of fire cause extensive damage to the flora, fauna and ecology. Considering the extent and nature of damage caused by fire, the present effort for fire protection is very inadequate. The fire fire protection measures in the tract need to be intensified. It has been prescribed that the planted area under various working circles should be fire traced for a period of ten years. In addition all boundaries, inter Range boundaries and demarcation lines will be cleared of bush growth, grass and fire-traced. Similarly, fire tracing will be carried out on either side of metal road and cart tracts passing through the tract. Inter Range boundaries will be fire traced to a width of 30 meters. Every Range Forest Officer will be responsible for clearing the line upto 15 meter width on each side. Burning the line should be carried out in co-ordination with the adjoining Range Forest Officer. The width of the fire line on either side of roads, cart tracts etc should be 10 meters, while along coupe and Compartment boundaries, it should be 3 meters. All the operation of fire tracing and burning should be over by 31 January. Fire protection should be carried out as per the rules given in the Appendix.

11.5.2. For the purpose of fire protection the areas will be classified as under;-

Class I:

Complete Protection - This class will include;

1. Sample plots, Experimental plots and all Plantation upto the prescribed age.
2. All forests of Protection Working Circle.
3. All the regenerated Coupes of various Working Circle for a period for which they are closed to grazing.
4. Any other areas of special importance as per the order of the Chief Conservator of Forests.

Class II:

11.5.3. General Protection : - This will include all the remaining area of Reserved Forests not included in Class I above. In addition to the fire tracing the other measures to be adopted to ensure fire protection are:

a. Appointment of fire watchers.

b. Erection of Watch Towers and

c. Enlist co-operation of local people without which fire protection cannot be successful

1. Necessary strength of Fire Watchers should be appointed during the fire season from February to May as per Fire Protection Scheme of the Division. Their duty will be to patrol the fire area constantly and extinguish, with the help of local people any fire that may be detected.
2. Watch Towers should be constructed at suitable places where large tract of forest will be kept under watch. These Watch towers should be provided with wireless sets etc. so that information about the occurrence of fire could be communicated to Range Headquarters.

11.5.4. At suitable place, along the roads, display Boards, Hoardings requesting the people to protect the forest from fires should be put up during Von Mahotsav, World Forestry Day, and Wild Life Week and other suitable occasions, lecture accompanied by films should be delivered to impress on the people the importance of fire protection.

11.5.5. <u>Legal Provision for Fire Protection</u>:

There are many legal provisions for enforcing fire protection by Forest Officers. However, very few cases appear to have been booked against offenders. Some of these legal provisions are:

1. Indian Forest Act 1927, Section 26(b), (c), (f), (g), Section 28(3) for Reserved Forest, Section 33 (1) a, b, and c for Protected Forests.
2. Maharashtra Forest (Protection of Forest from fire) Rules, 1982.
3. Wild Life (Protection) Act, 1972.
4. The Maharashtra Minor Forest Produce (Regulation of Trade) act, 1969.
5. Maharashtra Felling of Trees (Regulation) Act, 1964.

11.5.6. Rules and Regulation for Fire Protection:

1. Bombay Forest Manual Vol II, Part IV
2. Protection of Bamboo areas from fire after flowering.
   Rules to be followed by Conservator as per Draft Agreement Vide Revenue and Forest Department No V.M./D/1283/ 77/831/F1 dated 21/7/1983.

NOTE: Control Form for fire protection must be kept upto date and sent to Conservator of Forests, Working Plan timely.

Section 6:- Grazing Control.

11.6.1. Grazing Policy was formulated by the Govt. of Maharashtra vide its resolution No.MFP-1365/13222-Y dated 6-12-1968 and Grazing Rules issued vide No. MFP-1371/237035-Z dated November3, 1973.

11.6.2. Grazing will be regulated strictly according to the Grazing Policy and instructions issued by the government from time to time. Grazing settlement report for the tract is contained in the Grazing Settlement Report for the Reserved Forests of Thane Division by Shri B.L.Rathod, Assistant Conservator of Forests. This Grazing Settlement Report has been sanctioned by government of Maharashtra. To obtain successful regeneration, the forest coupes shall be closed to grazing for a period of 5 years or even more in cases where it is difficult to get successful regeneration in a shorter period as per provisions contained in the A-259 of BFM. Vol-II Part-III. Keeping in view the above provisions and prescriptions in various working circle of this plan, grazing will be appropriately regulated.

11.6.3. Permissible number of cattle in the nearby Reserved Forest of each Village will be prepared by the Conservator of Forest, every year and Grazing Passes will be issued to the Units contained in the Village strictly to the extent grazing is permissible as per the Settlement Rules. No grazing will be beyond Carrying Capacity of the Reserved Forest. The grazing capacity of the Forest and permissible number of cattle unit in each class of forests as per the provision of grazing Settlement records, carrying capacity of forest village-wise may be prepared by the Conservator of Forests and the same may be circulated to all concerned for information.

Section -7:- Encroachments.

11.7.1. The problem of encroachment in Thane Forest Division is a very serious problem and is continuing since these are near growing metropolis. There is tremendous pressure of the exploding population on these areas for industries, housing, and building material. Most of the Beat Guards do not have updated Beat Maps and the forest boundaries are not known to them. The problem is more acute in the case of Protected Forests. A lot of encroachments take place due to this reason. The Conservator of Forest should supply the updated Maps within six months from the implementation of this Plan. A record of encroachment Compartment/Survey number-wise should be shown on maps in the Compartment History files. There are irregular and illegal settlements also on forest land. It is necessary to settle this problem once and for all.

11.7.2. As the civil powers of eviction are entrusted with ACF and DCF by Govt. Resolution. They should proceed as per the procedures laid down in the Land Revenue Code and evict the encroachments at once. The powers vested with the DCF should now be vested with the CF, as the post has been elevated.

11.7.3. All external boundaries shall be demarcated with concrete pillars. The sensitive and important boundaries and disputed areas should be surveyed with DILR and concrete pillars constructed immediately.

11.7.4. Use of Cr. P. C. Provisions like section 106 and 110 be used to obtain good character of offenders before Tahsildar and SDO respectively to smoothen the eviction operations as well as to prevent the tendency of future encroachments.

11.7.5. For the encroachments on the un-classed forests, FIR shall be lodged in the concerned police station for the prosecution.

Section 8 :- Wireless Network:

11.8.1. Wireless Network has been established in Thane Forest Division. Presently there are 17 Base Stations and Repeater Stations spread over all the Ranges except Murbad West. The Mobile Sets are fixed in 7 vehicles of the Division.Walkie talkies are provided to the staff having sensitive areas under their jurisdiction. There is a necessity to maintain the wireless network, especially the instruments and the buildings in the remote areas.

Section 9:-Weapons and Weapon Trainings:

11.9.1. Four numbers of 7.62 mm SLR weapons with 800 bullets have been supplied to Thane Forest Division. During the period from 2002 to 2004, eighteen Officers of RFO and ACF levels were trained for handling Pistol. In 2002 and 2003, six Foresters and three Forest Guards were trained to handle Rifles. Forest staff should be trained frequently to handle the Rifles and Pistols.

CHAPTER-XII

WORKING PLAN FOR JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE.

Section -1:- General Constitution of the Working Circle

12.1.1. The traditional system of management of forests have failed due to increase in population in the country. As envisaged in the National Forest Policy, 1988 MOEF, issued guidelines vide their letter No 6-21/89 F.P. dated 01/06/1990, 22-8/2000-JFM (FPD)/ dated 21/02/2000 and DO/21.01.7/99/B-2/ dated 31/5/2002. The last two letters mentioned above elucidates for taking up JFM even in better quality forest. On the basis of the above letter dated 1/6/1990, Government of Maharashtra issued GR NO SLF-1091/CASE No 119/91/F-11 dated 16/03/1992. Government of Maharashtra issued a consolidated instruction vide their GR No MSC/2000 / CASE-143/F-2 dated 25/04/2003 for the implementation of the JFM in the State. JFM is sharing of responsibilities, authority, and usufructs between the Village community or the Forest User Group and the Forest Department on the basis of an agreement between the two.

12.1.2. The JFM overlapping working circle will include the entire area of the Division where there are forest areas in the villages. The Revenue Village will be the unit for JFM. The prescriptions of this Working Circle are subject to the constitution of the Forest Protection Committees (FPCs), JFMCs and the preparation of Micro Plans. The Micro Plans will follow the broad guidelines of the Working Plan. This Working Circle, therefore, includes the importance of participatory approach prescriptions for micro planning and other regulations for implementation.

12.1.3. The Programme of joint forest management will be implemented on degraded and denuded forest lands and non-forest lands in rural areas with the co-operation of concerned Gram Panchayats.

12.1.4. The degraded and denuded forest land will be protected by the forest protection committees (F.P.C.) of the village. The Conservator of forests will select the beneficiaries in the jurisdiction of F.P.C. in consultation with concerned Gram Panchayat and form forest protection committee. Almost all the families will get representation in the forest protection committee. The responsibility of forest

protection and conservation will be shouldered by Forest Protection committee / Local People.

12.1.5. The degraded forests/understocked areas of the division will be treated with the active participation of the local people. The priority will be given to severely degraded areas.

Section-2:- Special Objectives of Management

12.2.1. The special objectives of management will be :

1. Protecting and conserving the natural resources through active involvement of the people in a sustainable manner.
2. Conserving and improving NTFP and medicinal plants.
3. Promoting eco-tourism in forest areas to increase awareness amongst people regarding importance of conservation and protection of forests and wildlife.
4. Generating employment to the disadvantaged section of the society, particularly Scheduled Tribes/Castes and landless rural labours inhabiting the forests and the adjoining areas.

Section-3:- JFM Status in the Division

12.3.1. There are 642 Revenue Villages in Thane Forest Division. Out of which 518 are in the fringe of forests. JFMCs have been formed in 266 villages so far. 13,324 people are members of the JFMCs and the total area covered is 72,035.00 ha. This division is one of the most vulnerable divisions from the point of view of illicit cutting and encroachment on forestland. To overcome the problem of illicit cutting and encroachment in forestland Joint Forest Management programme was introduced in the division in the year 1996-97. During the period from 1996-97 to 1999-2000, 19 villages were brought under JFM in Maharashtra Forest Project. 24 villages were taken up under FDA, Thane 2003-04 to 2008-09. Another 43 villages were brought under JFM in FDA, Thane, which was sanctioned for the period 2007-11. During the period from 2006-07 to 2007-08, JFM works were implemented in 8 villages under State Plan. In 94 villages JFM works have been implemented so far and the rest are under various stages of process for implementation.

Section- 4:- Analysis of the JFM Works:

12.4.1. JFM has been implemented in the Division from the year 1996-97. The first JFM villages were selected under World Bank Aided "Maharashtra Forestry Project". Since then, JFM is implemented from funds made available from various sources viz: District Plan, State Plan and Centrally Sponsored Scheme under National Afforestation Programme (NAEB).

12.4.2. JFM has been taken up in the Division since the last 12 years. There were a lot of apprehension and mistrust among the people in the initial stages. Some of the staff members were also not convinced about the success of the Scheme. There were misconceptions that JFM is a plantation scheme, inspite of the fact that Plantation is just a component of the JFM.

12.4.3. Presently, people are sensitized but at the same time active participation is localized to parts of the Division where their livelihood is direcly or indirectly dependent on forest. People residing near the urban areas do not show interest in JFM.

12.4.4. In order to boost the local people, Government of Maharashtra, instituted "Sant Tukaram Van Gram Yojna" award for carrying out excellent JFM works in the State. During the period 2008-09, Bhuwan village of Murbad (E), received the second price in the State carrying an award of Rs. 5,00,000/-. In 2007-08 the same village received 1st price in the Thane District, under this yojna. Another village, Khandpe of Murbad (E) received 2nd price in the same year.

12.4.5. Internal Mid-term Evaluation of National Afforestation Programme and JFM implemented through FDA, Thane was carried out by Sevanivrutt Van-Karmachari Sangh, Pune in 2005. SEVAK has evaluated 24 villages on 12 parameters with grading on scale of 1-10. They found that the average grading is 6.29. This means there is scope for improvement.

Section- 5:- Powers of JFM Committees

12.5.1. The Government of Maharaashtra vide Order No MSC/2000/CASE-143/ F-2 dated 25.04.2003 has taken the following important decisions regarding implementation of JFM.

1. The Forest areas having density more than 0.4 and falling within 2 km of village boundary will also be taken under JFM along with degraded and wet forestry lands.
2. The non-forest areas adjacent to forest areas can be included in JFM areas if the area is provided by villagers and the Gram Panchayats for the purpose.
3. In villages the JFM Committees will be registered under the Society Registration Act, 1860.
4. The areas for JFM Committees will be selected by concerned ACFs and these areas should be within 5 km distance for degraded forest from the village. The CFs will approve the areas selected by the ACFs.
5. Biodiversity Conservations and forest Medicinal Plants Conservation will be the important part of micro plan for the JFM areas. The members of JFM Committees have also been assigned following important responsibilities under various Forest Acts.

a) The members of JFM Committees will protect forest areas and plantation areas and once in a month the members will work for the development of natural regeneration. These will be 'Shram Dan' activity.

b) The JFM members will help the Forest Officers in arresting the offenders in forest offences and prosecuting them.

c) The members will also take preventive action against illicit felling, encroachments, fire, and illegal grazing. They will also disclose the names of offenders to Forest Officers.

d) The areas allotted to JFM and reserved for fodder development can be used for restricted rotational grazing upto carrying capacity of the areas on the rates fixed by the JFM Committees. The Committee will permit to cut and carry the grasses from other areas at the rates decided by them. The members who prefer stall feeding will be encouraged by the JFM Committees.

Section- 6:- Micro Plan Preparation

12.6.1. Micro Plan will follow the broad out line of this working Plan. Microplan is a site specific management plan of an area prepared with the active participation of local people. This plan includes map of total area, land use pattern, demographic details, socio-economic profile, and status of available natural resources, demand and supply for biomass requirement of the local population, and other relevant information. It also clearly defines proposed action plan to ameliorate the ecology of the area and to provide basic needs of the local people such as fuelwood, fodder and timber. However, sufficient flexibility exists in the action plan so that change or modification if desired at the later stage of the project, can be incorporated into the Microplan. Therefore it is a document to guide the project in order to achieve ecological and socioeconomic goals in a specific area. Microplan for management of natural resource will be prepared with the active participation of local community by Participatory Rural Appraisal (PRA) and RRA methods to include their opinions in deciding the management plan so that their biomass requirement is taken care of properly. This also gives them sense of responsibility in taking active role in the participatory approach.. The micro plan should be prepared keeping in view the following guidelines / regulations:

1. Base Line Data :

12.6.2. The base line date should invariably include the physical & financial resources, extent & type of existing land degradation, human & cattle population with relevant details, socio economic profile and specific information relating to forest area and its past history.

2. Technical Plan :

12.6.3. Joint Forest Management is sharing of responsibilities authority between the village community or the Forest user Group and the Forest Department on the basis of an agreement between the two. The management of the forest is done through the provision of a micro plan prepared by the community and by Forest Department jointly on PRA basis and with the technical help of the official of the Forest Department. Since the micro plan is prepared with the technical guidance of Forest officials, there are little chances of any conflict between the working plan and micro plan prescriptions. Micro plan prescriptions do not violate

prescription of the working plan especially those related to sustainable forest management and regulation of yield of major forest produces.

Section- 7. Working Circles

12.7.1. The compartments/Survey numbers have already been sub divided into different working circles and as such the Micro plan will have the same working circle that has been given in Working Plan. The technical prescription for the micro plan will remain the same as of the Working Plan. Any deviation from Working Plan prescriptions will require prior approval of competent authority as per the National Working plan code 2004.

Section -8. Period of Micro Plan

12.8.1. The period of micro plan will be for 10 years. After the expiry of micro plan period the fresh micro plan shall be approved or the prescriptions of working plan will continue over the area for the rest of the working plan period. In case working plan period expires before micro plan period, the provisions of micro plan will continue till its expiry.

Section -9. Entry Point Activities

12.9.1. Community participation is essential for successful implementation as well as for the maintenance of community assets created under the JFM community. Mobilization is an important mechanism through which the responsibilities of common property resource management could be transferred back effectively to the people for the productive sustainable and equitable development For promoting people's participation and community mobilization a thorough exercise of PRA methods should be adopted. After PRA exercise the committee should analyze certain activities proposed for the community. The most important activity, which ensures the peoples participation and community mobilization in taking up the JFM , should be identified. Such activities are termed as Entry Point Activities. Entry point activity should not be overlapping with the activities of other department.

12.9.2. The forest officials can also co-ordinate with other district authorities to sort out the difficulties of villagers with these departments. Fo

lead the development activities of Gram pahchayat. The good will of forest official is also one of the most effective tool to get the co – operation of local villagers.

12.9.3. The utilization of JFM funds can be regulated to the maximum advantage and development of the village and village community as a whole. Forest department should play an important role in facilitating the village development. The proposal of any entry point activity should be approved by executive committee of JFM and Range Forest Officer concerned after ascertaining the financial implications and the utility of the proposal in the larger interest of the community. The Range Forest Officer will submit the proposal to Conservator of Forests Thane and Conservator of Forests, after satisfying himself that the activity can only be done using JFM funds and it is not possible through other funds shall issue the order allowing JFM committee to utilize the funds for that activity. Till such time the suitable activity is identified, the funds may be kept in Fixed Deposit with any Nationalized Bank.

Section 10: Implementation of the JFM Programme.

12.10.1. The success of JFM rests on management decentrilization by establishing effective communication channels, formulating agreements on rights and responsibilities, implementing efficacious dispute arbitration mechanisms and nurturing trust between the foresters and the villagers.

12.10.2. The areas allotted to JFM committee will fall in IWC, Afforestation WC, Urban Afforestation WC. The prescriptions have already been given in the respective working circles.

12.10.3. However, following specific prescriptions are proposed in JFM areas.

(a) AfforestationWC

12.10.4. The areas of this working circle will be developd purely on the basis of requirement of concerned villagers. The grasses and fodder species suitable for JFM village will be taken up

Soil and Moisture conservation works will be taken up.

Live hedge will be given preference over TCM in JFM areas.

Fuelwood and medicinal plants can also be raised in some areas.

(b) IWC Areas

12.10.5. The fruit species at least 30% of the planting stock will be taken up. Soil and Moisture conservation works, will be taken up.

The medicinal plant species at least 30% of the planting stock will be taken up.

Live Hedge will be given preference over TCM in JFM villages.

The JFM committee will help in removing the encroachments and the evicted areas will be developd by JFM committee as per their requirements. Encroachment areas will be planted with medicinal plants. The local fruit species will also be planted in these areas. Energy plantation on certain portion of encroachment areas will be raised to meet the daily fire wood requirement of the JFM committee and local villagers.

(c) Urban Afforestation Working Circle Areas:

12.10.6. To boost the increase in the vegetation cover of the areas under this Working Circle local people will be involved to raise plantations wherever feasible.

Section 11. Choice of Species.

12.11.1. The species suitable to area and also beneficial to JFM village will be taken up in the plantation areas. The species proposed to be planted in JFM areas are as under:

PLANT SPECIES: (Medicinal, fruit and Energy etc)

Teak, Bamboo, Babul, Sitafal, Bel, Chinch, Jamun, Apta, Moha, Khair,Pimpal, Tendu, Umber, Nilgiri. etc.

FODDER SPECIES:

Sissoo, Shiras, Shivan, A. Babul, Subabul etc.

GRASSES

Sheda, Marvel, Hemata.etc.

Section 12: Community Development.

12.12.1. This intervention is necessary to shape the concept of sustainable forest development. Following activities will be given special thrust:

i. Providing professional expertise by establishing rural training centres and field offices.
ii. Liaising with the local administration to solve the problems of the villagers and create good will of the people.
iii. Alternative income generation activities will be given importance and training will be given.
iv. Productivity enhancement of the agriculture land will be taken up.
v. Empowerment of woman is the most important and valuable aspect of successful JFM. Self Help Groups (SHG) will be promoted in all JFM committees. The members of SHG will be trained to generate income through various activities and to market them effectively. Forest department will initiate and strengthen group based income generation activities.

Section- 13:- Other Regulations

12.13.1. JFM Committee will hold meeting once in a month and minutes of the meeting will be recorded in the Register. The Conservator of Forest will take review of the monthly meetings of JFM from time to time and rectify any shortfall in the implementation of JFM works. Monthly meetings of executive Committee of JFM are mandatory. Minutes of the meeting should be recorded in the meeting register. Range Forest Officer concerned should attend monthly meetings as far as possible and check the minutes of the meeting regularly in Range meeting. Conservator of Forests should take review of monthly meeting of JFM during every meeting at division level. The forest official's tour programme should be intimated to JFM committee also.

CHAPTER -XIII

WORKING PLAN FOR WILD LIFE MANAGEMENT
(OVER LAPPING) WORKING CIRCLE.

Section 1:- General Constitution of the working circle.

13.1.1. This is an overlapping working circle and covers the entire area of the Division. This working circle will deal with forest areas where wildlife in found and around 10 kms from the Protected Areas. The important protected areas around Thane Forest Division are: Sanjay Gandhi national Park, Tungareshwar Wildlife Sanctuary, Tansa Wildlife Sanctuary, Kalsubai harishchandra Wildlife Sanctuary, Bhimashankar Sanctuary, Karnala Bird Sanctury. Thane Forest Division offers a wide variety of features such as Creeks, hot water springs, wilderness and wildlife area. The areas falling in catchement of important dams and lakes are suitable for promoting awareness amongst tourists about the need of protecting environment and ecology. Such areas serves as habitats of water birds as well as shelter for some migratory birds. Some of the areas in protection working circle contain representative natural vegetation of evergreen type in the tract which needs to be highlighted to bring awareness and concern for the protection of such areas. Total area in this working circle is 44906.00 ha.

Section 2:- General character of the vegetation and fauna.

13.2.1. Diversity of vegetation is represented by various forest types such as tropical southern moist teak bearing forests, tropical southern moist mixed deciduous forests, and mangrove forests. In the damp valleys and shaded areas the proportion of ever green species like mango, Jamun, Moha, Awala, shendri etc. increases and in drier conditions on ridges and high slopes teak and other drier species like dhawada and kandol dominates. The density varies between 0.3 to 0.7 and on ridges and slopes between 0.1 to 0.4. The general condition of wildlife is not satisfactory. The wildlife reported in the area are Panther, fox, and hares. A number of resident and migratory birds also found in the area.

Section 3:- Special object of Management.

13.3.1. The special object of management of this working is given below.

1) To conserve and protect our natural and cultural heritage.
2) To protect the vegetal cover in the catchment of important takes and dams to maintain their life.
3) To improve wildlife habitat by taking ameliorative measures for augmenting the supply of food, fodder, water and to provide shelter.
4) To provide opportunity for nature study and viewing and encourage forest and wildlife tourism without disturbing the wildlife and its habitant.
5) To develop some important tourist spots in the forests to promote eco-tourism and to create awareness amongst the people and visitors.

Section 4:- Method of Treatment.

13.4.1. In so far as the Ecosensitive zones are concerned, when the conflict arises, the prescriptions given in the Notifification of the Ecosensitive Zone will have precedence over Working Plan prescriptions. No regular schemes are prescribed for management of wildlife in this area. But following prescriptions are made for the protection of wildlife.

(i) While preparing the treatment map of a coupe for felling in any of the working circles, potential habitats of wildlife and existing water holes will be identified and will be shown on the treatment map.

(ii) Marking of dead trees in any felling coupe will be done only if their number is more than 4 trees/ ha. These trees will be required to provide snag and dead trees for nesting and resting of the wildlife. Trees of commercially low utility may be preferred for the purpose.

(iii) During harvesting some unsound and hollow logs of commercially low utility, not exceeding 4 per ha. will be left in the forest to serve as shelter for wildlife.

(iv) In the plantation trees of edible fruit species will also be planted on the intersection of base line and grid lines to provide food for wild life.

(v) The water holes which are frequented by wild animals will be excluded from grazing by making a special mention of such areas in grazing permit license.

(vi) A vigilant watch will be kept on poachers also at the checking gates erected to check/prevent the transport of illicit forest produce.

(vii) The existing grass lands and meadows will be maintained along with their adges.

(viii) The labour camps and transit depots will be established away from the high wildlife density areas.

(ix) Hoarding on the importance of wildlife and its protection will be exhibited at strategic locations.

(x) Artificial water holes will be constructed to provide water to the wildlife.

(xi) The provisions contained in the Wild Life (Protection) Act, 1972 as amended in 2003 will be strictly implemented.

(xii) Suitable infrastructure for tourism including the requirements for heir boarding, lodging, observation towers for nature viewing and interpretation facility may be developd at suitable places.

(xiii) Scenic view points will be developd along with the trekking paths.

This prescription should be explained to the field staff and it will be ensured and it is strictly followed while doing regular working in the respective working circles.

Section 5 :- Survey and monitoring of wildlife Resources.

13.5.1. Census of population of major species occurring in the area will be carried out at every 4th year along with the census of Tiger & Panther during summer season and report will be submitted to Chief Wildlife warden of the state. This will exhibit the trend of wild life population in the tract i.e. whether they are increasing or decreasing as a result of managerial practices being taken in the area. The pugmark analysis method may be followed for the tigers and panthers and waterhole count method may be followed for the herbivorous populations.

Section 6 :- Eco-tourism.

13.6.1. Creating awareness amongst people about forests and natural resources will be attempted by enabling them to have opportunities for nature viewing so as to make them understand, appreciate the attributes of nature and significance, necessity and urgency of conservation in their life and environment. To achieve this it is suggested that suitable infrastructure may be dev

sites where appropriate facilities for boarding, lodging and viewing along with services of interpreters and guides can be provided.

13.6.2. The important tourist spots in Thane Forest Division are:

Vasai Fort, Geneshpuri Temple, Vajreshwari Hot Spring, Malshej Ghat, Arnala Beach, Barvi Dam, Haji Malang Gadh, Amarnath &Titvala Pilgrim Centre, Birla Temple at Shahad, and Trekking path in the foot hills of Matheran.

CHAPTER XIV

GENERAL FINANCIAL FORECAST AND FINANCIAL PLAN OF OPERATION

Section -1: Revenue.

14:1.1: Revenue: Felling of coupes is not prescribed in the current Plan and as such the revenue from major forest produce will depend on the timber seized in offence cases and removal of dead and wind fallen trees from the forest area. However, the regular removal of non timber forest produce (NTFP) will fetch revenue to the division. Since the present system of exploiting NTFP is not properly quantified and recorded and the NTFP unit are sold in auction on the basis of approximation and hence there is huge under estimation of the quantity. The field staff will make systematic efforts to quantify NTFP as prescribed in NTFP working circle. During the plan period the NTFP will be managed (Except Tendu) by JFM committees or gram panchayats. The details of the revenue received in the division are given as under:

14.1.2: The estimated annual revenue from sale of Forest produce is as under:

Table No.27.

Forest produce	Annual revenue	Total Plan period.
Major Forest Produce	9,68,000	96,80,000
Tendu	52,000	5,20,000
Gum	1,40,100	14,01,000
Apta	5,000	50,000
Medicinal Plants	9,999	99,990
Karvi	77,363	7,73,630
Gunj Leave	22,400	2,24,000
Rankel	4,200	42,000
Gulvel	36,000	3,60,000
Vavding	3,000	33,000
Musli	86,010	8,60,100
Metal(Dabar)	8,92,5000	89,25,000

14.1.3. The estimated revenue during the plan period i.e. 2009-10 to 2018-19 is 2.29 crores.

14.1.4. The intangible benefits of the forests e.g. mitigating climatic changes, carbon sequestering and providing shelter to the wildlife etc are very high. It is, however not easy to assign economic value to the intangible benefits. Yet some of the parameters contributing to the environmental services provided by a medium sized tree of 50.0 tonnes during its 50 years life span (excluding the value of timber, fruits and flowers) have been assigned notional values by Professor TM Das in 1980 using surrogate market techniques as given in 'The value of a tree by TM Das 1980- Proceedings of Indian Science Congress'.

Table No. 28.

Environmental benefits derived from a medium sized tree

Sr. No	Environmental benefits	Single tree Rs (Lakhs)	Forest type	
			Tropical Lakhs/ha	Sub tropical Lakhs/ha
1.	**Oxygen Production**	2.50	22.50	20.50
2.	**Conversion to animal protein**	0.20	01.80	01.64
3.	**Control of soil erosion**	2.50	22.50	20.50
4.	**Recycling of water & control of humidity**	3.00	27.00	24.60
5.	**Shelter for birds, squirrels, insects, plants**	2.50	22.50	20.50
6.	**Control of Air Pollution**	5.00	45.00	41.00
	Total	**15.70**	**141.30**	**128.74**

14.1.5. So, according to Das, from 1 hectare of subtropical forest, environmental benefits worth Rs. 128.74 lakhs are accrued over a period of 50 years i.e. benefits worth Rs. 2.60 lakhs per hectare are accrued per year at 1980-81 rates. Hence the intangible benefits being accrued from the forests of Thane Division (approx. 85,000 hectares) are worth Rs. **2,210** crores per year at 1980-81 rates. Hence, the total revenue would be **2210.229** crores per year.

Section 2: Expenditure.

14.2.5 The expenditure anticipated for the period of the Plan is as under:

Table No.29

Sr. No	Working Circles	Total Area (Hectares)	Expenditure during plan period (Rs. In Lakhs)
1	**Protection-cum Lake Catchment Working circle**	9237.110	23.550
2	**Improvement working circle**	29983.302	742.12
3	**Afforestation working circle**	32397.294	886.72
4	**Old Plantation Management Working Circle**	2063.216	91.99
5	**Urban Afforestation Working Circle**	4766.917	243.19
6	**Mangrove Working Circle**	1974.512	74.68
7	**Survey and Demarcation works**	4929.726 km	615.49
8	**1/5 Boundary maintenance**	-----,,------	14.81
GRAND TOTAL			**2692.55**

The total expenditure for the plan period will be 26.92 crores. The details of works and the rough estimates of expenditure has been worked out and shown in **Appendix No LVII of Vol. II (Page No. 453).** As against revenue of Rs 2210.229 crore there will be expenditure of Rs. 26.92 crores. Therefore, the cost benefit ratio works out to **1:82.10.**

Section -3: Funding Agencies: The works proposed can be executed from the following funds.

14.3.1. MREGS Schemes: The works which full fill the conditions of MREGS norms will be executed from this fund. The works like TCM, fire lines, van tale, nala bunds, plantations may be executed under MREGS schemes.

14.3.2. Participatory Approach: Participation of NGOs, Financial Institutions, Corporates and other government institutes may be encouraged for afforestation works.

14.3.3. FDA Scheme: The funds for all the works proposed in working plan in selected villages under Forest Development Agency (FDA) can be executed from the funds of FDA, funded by Ministry of Environment and Forests, Government of India.

14.3.4. For the works of afforestation in Urban Afforestation Working Circle, Industrial Houses and other agencies can be involved. The option should be fully explored.

14.3.5. **PLAN & NON PLAN SCHEMES:** The funds from the plan and non plan will be demanded by Conservator of Forests, Thane Forest Division.

Section 4: Cost of the Plan:

14.4.1. The total expenditure incurred for preparation of this plan is Rs 25,59,764.00 which works out to Rs 31.46 per hectare of Thane Forest division.

CHAPTER – XV

MISCELANEOUS REGULATIONS.

Section 1:- Harvesting and Disposal of Forest Produce.

(A) Major Forest Produce.

Demarcation of Coupes and Working of Trees:

15.1.1 The Coupes shall be demarcated one year in advance by the number of years as mentioned under the concerned Working Circle. The first Coupe will be demarcated in the year of working itself. After demarcation the Coupes shall be inspected by the concerned Range Forest Officer and a Coupe Demarcation Certificate furnished to the Conservator of Forests in the following Format

" I…….Range Forest Officer……..certify that , I have personally inspected the demarcation of Coupe(s) No…….

F.S……W.C……..on the ground on dates……..month……year……

……..and found that the Coupes has been laid down on the ground and demarcated as prescribed in the Working Plan. The areas of the Coupe is……..hectares."

Signature of the RFO with date

After demarcation Stock Map and Treatment Map shall be prepared by the RFO concerned as given in the Working Circle.

Demarcation of Coupes (Units)

15.1.2 Annual Coupes (Units) will be demarcated by cutting and clearing 3 meters wide lines and erecting pillars of posts in the middle of the lines at suitable intervals except where the Coupe boundaries along big Nullahs, fire lines or roads. Coupe Numbers and the names of Felling, Plantation/ Working Series, will be written on the Pillars on the side away from the area of the Coupe.

15.1.3. Along the entire periphery of the Coupe on the edge of 3 meters cut line, boundary trees will be so selected as trees on either side will be visible from one another. On the boundary trees, two tar bands and a red band in between will be given. The lower tar band will be at best height and the upper one will be 15 cm above it. Just below the lower band, serial number of the trees in Arabic numerals will be paint in tar. Before giving the bands and the numbers, the loose barks will be carefully scraped. A list of boundary trees and trees of medicinal or fruit trees not marked for felling will be prepared in the following forms.

Sr. No.	Species	GBH	Remarks
1	2	3	4

The boundary trees and other trees specifically categorized will not be marked for felling.

Demarcation of Sub-Coupes

15.1.4 To control extraction of the harvested materials, each coupe will normally be divided into sub- coupes. The sub-coupes will be demarcated as under:

1. By 1.5m wide, cut and cleared lines with post erected in the middle of the lines at suitable intervals. The post will bear section or sub-coupes Numbers on the side away from the area which it will denote.
2. Selected trees at suitable intervals on the (outside edge of) cut and cleared lines will be given two tar bands. The lower bands will be at Breast Height and the other one 50 Cm above it.

15.1.5. Demarcation for Unworkable Areas :

Selected trees on the periphery of the areas to be excluded from working will be given two red bands 15 cm apart, the lower band being at breast height. In addition to the bands across in red will be given between the bands on the side away from the unworkable areas. Just below the lower bands and on the side bearing the cross, serial number of the trees in Arabic will be given. All the unworkable (Protection) patches will be serially numbered in Roman numerical and this number will also be given on each boundary trees e.g. Sl. No. III/5 will denote boundary tree number 5 of unworkable patch no. III. A list of boundary trees will be prepared in the form given above.

15.1.6. Marking Technique

Following Rules are laid down:

(A). For Timber:

1. All trees to be marked for felling will bear a distinct marking hammer marks at breast height and at base on a clear blaze of at least 10 cm X 10 cm. In addition all trees of 30 cms girth and over at breast height will bear digit serial numbers at base and breast height.
2. All unnumbered trees marked for felling will be enumerated in 15 cm girth classes or as will be ordered by the Chief Conservator of Forests, Thane.

(B). Non-Timber Forest Produce.

15.1.7. Ownership of other 'minor forest produce' found in the Government lands in the scheduled areas vest in Panchayats. The trading of some NWFP is entrusted to the Maharashtra Tribal Development Corporation on monopoly basis in tribal sub plan areas. This corporation is at present trading in gums, mahua, hirda, etc. Their performance, however, is far from satisfactory. For areas where the tribal Development Corporation is not functioning, the NWFP in schedule areas and all NWFP in non-scheduled areas are proposed to be systematically managed by duly empowering J.F.M. committees.

Tendu and Apta leaves: -

15.1.8. Tendu and Apta leaves are traded by Forest Department through contractors and harvesting of these leaves is regulated under the Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 and the rules under the Act.

Section- 2: Irregular Harvesting

15.2.1. Irregular harvesting of Timber and Bamboos is prohibited except in the following cases:

a. Forest Produce required for Departmental works may be removed by the Conservator of Forests. This felling should preferably be made within the Coupe of the year or Coupes shortly to be worked. The felling should be on Silvicultural lines.

b. The felling and disposal of forest produce on boundary lines, road alignment, paths, buildings sides, camping ground etc may be permitted by the Conservator of Forests.

c. The Conservator of Forests may permit felling of Timber and Bamboos required for free grants and concession in accordance with the provisions of the Forest Manual and subject to the Silvicultural availability of the same and without endangering the health and well being of the existing forest.

d. In all the above cases prior approval should be obtained from the competent authority before the execution of works.

Section 3:- Roads.

15.3.1. Roads in the tract are normally maintained by Zilla Parishad. Since the formation of the Zilla Parishad in 1961 construction of roads received a great impetus as it aimed at achieving the targets according to which no village should be more than 8 km from the metal road. Though roads have been constructed in large numbers maintenance of most of the interior roads is poor. There is better network of roads in the tract except few hilly areas of Tokawade (E), Tokawada (S), and Mandvi Ranges. In Joshi's plan Mhasa to Dhasai 35 km road was proposed. The Roads are shown in the management maps. Since the entire Division is now well connected by all weather roads, no prescription is made for construction of roads.

Section -4:- Buildings.

(A) Residential Quarters.

15.4.1. There is great shortage of housing accommodation in forest division. It is very necessary to provide quarters to all category of the staff. In particular, the lower subordinate staff like forest guards and foresters should be provided residential accommodations at their respective head quarters. This will help in the works of forest protection and management. A list of such requirement is proposed and shown in **Appendix No.XIV of Vol II (Page No. 34)**

(B) Rest houses and Inspection huts.

15.4.2. There is insufficient Forest Rest Houses and Inspection Huts in the Division. In Joshi's plan, forest rest houses were proposed to be constructed at Badlapur, but recommendation was not implemented. The Rest

should be repaired. It is proposed in the revised plan to contruct a Forest Rest House near Barvi dam.

Section 5:- Maintenance of Boundaries.

15.5.1. In view of the fact that the encroachments of the forest area is an extremely serious problem, the boundaries of reserved and protected forests will be maintained scrupulously under a five year maintenance scheme. In order to stop wasteful practice and recurring expenditure, it is proposed that cement and stone pillars with engraved numbers may be erected in all the areas in a phased manner. Forest areas in and near municipal and city areas are more prone to encroachments and in such areas masonry wall fencing may be constructed.

15.5.2. A. External Boundaries: The external boundaries have been demarcated by erecting second class boundary marks consisting of stone cairns and in many places by cement pillars. Generally the cairns are being maintained but the boundary lines required to be kept clean upto a width of 25 feet are seldom being cleared. To ensure that boundary lines / marks are kept in a proper state, a scheme for boundary maintenance of Reserved Forest on a five year cycle is prepared and given in **Appendix No.LII and LIII of Vol II (Page No. 423-447).** The survey and demarcation for PF, Acquired Forests and Unclassed Forests have been shown in the above Appendices. The Scheme should be scrupulously followed. The work should be done departmentally.

15.5.3. The Range Forest Officer will check the annual target as per the scheme while verification will be done by Assistant Conservator of Forests. The Range forest Officer will annually submit to the Conservator of Forest a Certificate in the following Form:

"I……(RFO) certify that the annual length of the boundary lines under the Scheme given in the Appendix No……of the Working Plan for the reserved/ Protected Forest of the Division has been verified by me and that the boundary lines and cairns are found to be correct as per the demarcation Register and the maps. I, further certify that the next cairn on either side of the cairn is visible. They are in proper condition and bear correct serial number. There are no encroachments."

(B) Internal Boundaries:

15.5.4. The Compartment boundaries in case of Reserved Forests follow the natural features and hence no demarcation is needed. In case of Protected Forests it should be cleared to a width of 3 m. Permanent Pillars bearing Survey Numbers should be erected at suitable points. This work should be completed in five years, annually the work being done in 1/5 of the total number of Survey Numbers in a Round. After the demarcation of boundaries has been completed, they should be verified annually under the five year cycle as prescribed in para above.

15.5.5. At many place plots have given out for cultivation on permanent basis. This forest areas include Eksali plots, land allotted under High power Committees, and 1972-78 Encroachments. Very few of these plots have been demarcated, surveyed and shown on the Maps. The result is that it is not known exactly how much area is under cultivation and it is extremely difficult to detect the illegal extensions of cultivation. The survey and demarcation of all such plots is an urgent necessity from the protection point of view. The Conservator of Forests should therefore, get the work done in the first cycle of 5 years as given in **Appendix No.LI of Vol II (Page No. 419-422)** All the Protected Forests and acquired forests should be surveyed, demarcated and boundary pillars fixed as prescribed. In some of the areas, fixing of boundary pillars have been done, the Conservator of Forests, Thane, should ensure that the works are not duplicated. The work shall be taken up on priority basis. The achievement of annual targets of boundary should be certified by the ACF.

Section 6:- Eskali Cultivation.

15.6.1. The eksali cultivation plots with an area 2040.518 ha. had been given out for cultivation with the object of encouraging human habitations in lonely parts of the forests for the supply of labour for forest works in some ranges. These "eksali" plots are on the record of reserved forests but have been excluded from the coupes while executing the works. "Eksali" plots were given out on annual leases which were renewed year after year. These plots are not subject to the right of succession. If any occupant died or deserted his land, the same was to be given for cultivation to another deserving applicant. The situation and facts on the ground need examination in view of F.C. Act provisions.

Section 7:- Compound Wall Fencing.

15.7.1. Those areas falling in the Urban Afforestation Working Circle are extremely prone to encroachment. Need based provision should be made to fence the areas in hyper sensitive spots.

Section -8:- Soil and Moisture Conservation.

15.8.1. Water is an important parameter for survival of both mankind and wildlife. The productivity of the forest land can be increased if rain water is arrested and allowed to percolate in to the ground. The maximum rainfall in the year that has been received in the tract is around 3000 mm. Usually it is seen that more than 50 % of the water flows away from the forest lands. If most of this water is arrested and utilized for the development of vegetation in the forest, the productivity of the land will increase. The need for soil conservation is also great in the area with high population, where soil productivity can not be allowed to dwindle by erosion. To safeguard against the danger of soil erosion and excessive surface runoff of water soil conservation works such as gully plugging, Nalla Bunding, Construction of Bandharas on all major nallas, should be taken up in annual Coupes of all Working Circle due for working each year.

The watershed approach is now a well known and acceptable approach. The work of soil and water conservation will be done on water-shed basis wherever feasible..

Section 9 :- Wildlife Management.

15.9.1. At present in India about 2 % of the geographical areas are being treated as protected areas. The entire forest of the tract is closed to shooting and with the strict provisions of ban on hunting as per WildLife (Prot.) Act 1972, question does not arise for issue of any license for hunting of game. Adequate powers have been given to forest officers under Wildlife Protection Act and its amendments and rules made there under to deal with the wildlife offences. The only need is to ensure that all the categories of forest officers working in the tract are alert and vigilant in this regard.

Section 10: Deviations

15.10. 1. The following works will not be constituted as deviation from the Plan:

1. Removal of dead fallen firewood.

2. Petty fellings carries out as mentioned in para under irregular harvesting.

15.10.2. The following works will constitute a deviation from the Working Plan:

All deviations can be classified into following categories as per National Working Plan Code 2004:

1. Change in Silvicultural System;

2. Clear felling of Natural Forests;

3. Formation of New Felling Series and

4. Large Scale felling due to natural calamities, which canot be adjusted against future yield.

15.10.3. The sanction to all these deviation will be obtained. Application for sanction to such deviation will be submitted sufficiently in advance, so that , such may be revised as far as possible before the deviation occurs and without fail before the annual list of deviation is submitted along with the Control Forms.

Procedure for obtaining sanction for Deviation.

15.10.4. The CF Thane will forward through the Chief Consrvator of Forest, Thane typed copies of the deviation statement form in triplicate yearly with the copies of Control Forms. No explanatory remarks are required on this form, but these should be given in the forwarding letter. One copy of the statement will be returned to the CF, Thane and another to the Chief Conservator of Forests, Thane after the deviations have been sanctioned by the PCCF. If the PCCF or the CCF, WP's sanction has been obtained in advance, the sanction number and date should be quoted in the last column.

15.10.5. All deviations will require prior sanction of the PCCF. All deviations, which do not permanently alter the basis of management and with the necessity of which he agrees, may be approved and sanctioned by the CCF, WP. Pune on behalf of the PCCF. In case there is difference of opinion between the CC

Territorial, the former will refer to the PCCF for instructions. The PCCF/CFWP, as the case may be, will countersign the deviation statement.

15.10.6. Minor deviations will be sanctioned by the CCF, WP/PCCF but PCCF, before sanctioning the major deviations as given in para **15.10.2.** above, will obtain prior approval of the Regional CCF, Bhopal, MOEF.

15.10.7. A proposal for deviation must be entered in a Register of Deviation maintained by the Division Office. The standard proforma for submission of deviation proposal will be used.

Section 11:- Survey and maintenance of Maps.

15.11.1. As per the provisions contained in the National working Plan Code, 2004 two uncut and un-mounted sets coloured as a stock map is prepared on 1: 50,000 scales. One set is for Territorial Division Office and the other for the Conservator, Working Plan Office. The maps show the details of blank areas, crop composition, density, quality, age classes, and regeneration.

Management Maps:

15.11.2. Two uncut and un-mounted master copies are prepared on 1:50,000 scale. These copies have been replicated and sent to Territorial Circle, Division, Sub-Divisions and all the Ranges of the Division. These maps show Divisional, Range, Block, Compartment, and Sub-Compartment boundaries and boundary pillars with their numbers.Different colours and symbols denoting Working Circles, Felling/Working Series, Block and Coupe Numbers and other important features are shown on the maps.

Working Plan Maps:

15.11.3. Working Plan Maps are prepared on 1:8,000 and 1:4,000 scale cut and mounted. In addition to the Silvicultural units shown in the Management Maps, the Working Plan maps also show management, administrative and physiographic features of the Division.

Reference Map:

15.11.4. A small reference map is prepared and enclosed on the inside of back cover of the Working Plan. It shows all the details of Management Map and the Working Plan Map.

CHAPTER-XVI

ESTABLISHMENT AND LABOUR

Section -1:-Establishment

16.1.1. Reorganisation of Beats: - The Government of India has laid down the area norms for the constitution of a Territorial Division. This norm is 500 to 1000 Sq.km.for hilly terrain and 1000 to 1500 Sq.km.for plain areas. The terrain of Thane Forest Division is both hilly and plains. The total area of Thane Forest Division is 806.288 Sq.km.which fits into the norm prescribed by Govt.of India.

16.1.2. On account of rising prices of timber and increased demand for land by the local population, the problem of protection of forest lands has assumed gigantic proportions. Looking into the enormous task of protection of forest land and its resources there have been re-organization of the Division based on the report of Tata Consultancy Services. Thereafter, a further re-organization within the Ranges has been carried out in June 2007. The Plan was revised as per the areas after the re-organization. This Plan does not prescribe any further changes in the present set up.

Section -2:-Labour

16.2.1. Thane Division is one of the most industrilised Division in the State and the shortage of labour is felt in most of the Talukas. The areas around the major cities and Towns are developd industrially and the rates of wages being offered to the labourers for forestry works are less than the rates available for industrial works. The rates for forestry works are revised every year.The Department should make efforts to bring the wages for forestry works at par with rates being paid for industrial works locally. The Territorial staff should also form organized labour gangs for the different kinds of forestry works. Such labour gangs would be useful in case of any labour problem in critical times. Also these labour gangs would be useful for the extraction of illicitly felled materials from the forests and for other forest protection works.

CHAPTER- XVII

CONTROL AND RECORDS

Section-1: Control Forms:

17.1.1. The records of all harvesting, subsidiary silvicultural operations, regeneration works and soil and moisture conservation works carried out in each Working Circle as per the Working Plan prescriptions will be maintained in the control forms. The prescribed performae of the coupe control forms and felling control forms are given in **Appendix No LIV of Vol II (Page No. 448).**

17.1.2. The CF (T) will annually make entries in his copy of the control forms and send them together with the deviation statement in triplicate to the CCF WP Pune through the CCF (T) Thane. After the entries have been checked and approved, the CCF WP will first get his copy completed and then send the CF's copy to the CCF (T). The later will then complete his copy and finally return the CF's set for deposit in the latter's office till next year. The CCF WP Pune will send three copies of deviation statement to the PCCF for sanction. After the sanction, one copy each will be sent to the CCF (T) and the CF for their record and the CCF WP will keep the third copy for his set of control forms.

17.1.3. The control forms should be submitted by the CF to the CCF (T) on or before December 1 and the latter should send them to the CCF WP on or before January each year.

Section 2: Compartment Histories

17.2.1. Compartment histories i.e. the record of various forestry activities and observations made in the past year will be maintained in Form Nos. 1 to 5 as given below.

i. Form No. 1 : Compartment description to be filled by the CF WP
ii. Form No. 2 : Compartment enumeration to be filled by the CF WP
iii. Form No. 3 : Trees marked for felling to be filled by the CF (T)
iv. Form No. 4 : Compartment out-turn to be filled by the CF (T)
v. Form No. 5 : Compartment History to be filled by the CF (T)

The formats for the different forms are given in the **Appendix No. LV of Volume II (Page No. 449-451).**

17.2.2. If compartment history with full entries already exists, past entries made by the CF will be scrutinized by the CF WP Thane who may edit them if necessary. Usually no condensation should be necessary.

17.2.3. The CF(T) is responsible for recording current events as they occur and will make his entries on the separate sheet of the form and not on that prepared by the CF WP. At the next revision of the WP, the CF WP will scrutinize these entries and edit them if necessary.

17.2.4. The principal information, which the CF(T) should record, is as follows:

Felling, Subsidiary Silvicultural Operations, Slash disposal with costs, Plantations, Control burning with costs, Fire incidences and damage caused, Damage by other factors like drought, storm, snow, insect, fungi, grazing etc. Remedial measures taken along with costs, good seed or seedling years of important species.

17.2.5. The entries should be brief and concise; whole or part compartment that was involved should be made clear. For event timings- month or months should be given.

Section 3: Plantation and Nursery Registers

17.3.1. Plantation registers will be maintained for all the areas regenerated artificially in the Form Nos. 1 to 9 in standard format.

Nursery registers will be maintained in Form Nos. 1 to 10 in standard format.

Section 4: Divisional Note Book

17.4.1. The matters of divisional importance will be recorded under standard headings for records and ready reference in the divisional note-book. A brief note of the plantations will also be recorded by the Conservator of Forests, Thane Division under the appropriate heads.

CHAPTER-XVIII

SUMMARY OF PRESCRIPTIONS

Section-1: The general objects of management of forests:

18.1.1 The general objects of management are:

1. To prevent soil erosion on steep slopes and in the catchment areas of lakes and rivers.
2. To aim at creation of normal forest
3. To protect, conserve and manage forest to meet the local demands of forest produce to the extent possible by involving local people.
4. To derive maximum sustained annual yield.

Section 2: Working circle and their Distribution:

18.2.1. Based on the general objects of management and different methods of treatment required by different areas, the following Working Circles are constituted and a brief summary is as under:-

i. Protection-cum-Catchment Area Working Circle.
ii. Improvement Working Circle.
iii. Afforestation Working Circle.
iv. Old Plantation Management Working Circle..
v. Urban Afforestation Working Circle.
vi. Mangrove Working Circle
vii. Miscellaneous Working Circle.
viii. Non-Timber Forest Produce (Overlapping) Working Circle.
ix. Bamboo Plantation (Overlapping) Working Circle.
x. Forest Protection
xi. Joint Forest Management (Overlapping) Working Circle.
xii. Wildlife Protection (Overlapping) Working Circle.

18.2.2. Protection-cum-Catchment Area Working Circle: It would include unworkable area which is not fit for any working on account of very steep slopes and those falling in catchment areas. The area needs protection and as such no felling is prescribed

Treatment Proposed: In the accessible areas Soil and moisture conservation works will be carried out along with Artificial Regeneration in suitable sites in the Lake Catchment areas. Seed sowing is proposed in suitable areas. The areas will be protected from fire, illicit cutting, and grazing. The total area allotted to this Working Circle is **9237.110 Ha**

18.2.3. Improvement Working Circle: This Working Circle would include areas having rooted stock of Reserved Forests. These are forests having around 0.4 density. Most of them belong to young to middle aged crop. There are many rooted stocks and with tending operations areas can be improved.

18.2.4. Treatment Proposed: Improvement felling of dead/dying trees will be carried out. Thinning of congested poles will be carried. NR aided artificial regeneration will be carried out wherever spaces have been created. Soil and moisture conservation works will be done.The total area allotted to this Working Circle is **29983.302 Ha.**

18.2.5. Afforestation Working Circle: The areas included in this working circle would be the under-stocked areas of Reserved Forests, Protected Forests and areas of unclassed forests which have degraded due to tremendous biotic pressure.

18.2.6. Treatment Proposed: These areas will be regenerated artificially. Major emphasis will be given for survey and demarcation. Maximum areas will be covered by soil and moisture conservation works. Bamboo under planting will be taken in suitable areas in the 4th year of plantations. The total area included in this working circle is **32397.294** ha.

18.2.7. Old Plantation Management Working Circle: This Working Circle will include plantations raised in the past. The successful plantations have been included in this working circle. The total area under this Working Circle is **2063.216** ha.

18.2.8. Treatment Proposed: The plantations will be given silvicultural treatments as per the time schedule. Cleaning works will be carried out in 7th of plantation. Ist thinning will be carried out in 10^{th} year of plantation, and every after 5 years, till the age 70 years..

18.2.9. Urban Afforestation Working Circle: This working circle includes forest areas lying within the limits of ***Mahanagar Palikas*** of Thane, Navi Mumbai and Ulhasnagar. It would also include the forest areas situated within the ***Nagar Palika*** limits of Kalyan, Dombivali, Vasai, and Badlapur.

18.2.10. Treatment Proposed: These areas are capable of producing better tree growth and if protected and planted with preferably evergreen species would provide aesthetic value and also cater to the ecological and environmental needs of the urban people. These areas are very prone to encroachment. In hyper sensitive spots effective protection measures will be taken up and afforestation will be carried out. It shall be developd as green lungs for the urban people. The total area allotted to this Working Circle is **4766.917** Ha.

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18.2.11. Mangrove Working Circle: This working circle comprises of the mangrove forest under the control of Thane Forest Division. The mangrove areas in possession of Forest Department as on 31/3/08 have been included in this Plan.

18.2.12. Treatment Proposed: The forest areas and the mangrove trees will be protected from encroachment. No felling and grazing will be allowed. In the blank areas mangrove species will be planted. The total mangrove area under this Working Circle is **1974. 512** ha.

18.2.13. Miscellaneous Working Circle:

This working circle areas are primarily the Dalhi Plots, Unclassed forests and those areas that were handed over to CIDCO. There are no vegetation but the areas continues to be in Form No 1 of the Division. No work is prescribed. The total area is **931.852 Ha**

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18.12.14. Non-Timber Forest Produce (Overlapping) Working Circle: This is an overlapping Working Circle and would cover all the areas under the proposed plan where the items of NTFP are collected and the potential areas where there is scope for their development and management.

18.2.15. Bamboo Plantation (Overlapping) Working Circle. This is an overlapping working circle and would cover all the bamboo bearing and plantable forest areas included in other working circles. It will also cover the area where bamboo plantations have been carried out in the past. It is prescribed for a 3 year cycle for exploitation. Bamboo under planting in the 4^{th} year of plantation is prescribed.

18.2.16 Forest Protection: Protection measures for controlling encroachments, illicit feeling and hunting have been prescribed.

18.2.17. Joint Forest Management (Overlapping) Working Circle: This is an overlapping Working Circle comprising the areas which has good potential to raise plantations under JFM/FDA. The areas included mostly in Afforestation Working Circle and Urban Afforestation Working Circle will be taken up with the active co-operation of the local people.

18.2.18. Wildlife Protection (Overlapping) Working Circle: This is an overlapping working circle and covers the entire area of the Division. This working circle will deal with forest areas around some important spots which have the potential of development from the point of view of eco-tourism and the protection of wildlife in the tract. Eco-tourism spots are identified.

Section – 3 :- Period of the Plan.

18.3.1. It is proposed to keep the period of this Plan for 10 years from **2009-10-09 to 2018-19.**

A review of the prescription is recomended after 5 years.