



GOVERNMENT OF MAHARASHTRA

**WORKING PLAN
FOR
THE FORESTS
OF
DAHANU FOREST DIVISION
FOR THE PERIOD
2010-2011 TO 2019-2020**

VOL- I

BY

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Introduction

N.J. Joshi's Working Plan for the Reserved Forest of Thane District comprising of Shahpur, Dahanu and Thane forest Divisions was in operation from 1969-70 to 1988-89. Shri. Ramnauj Choudhary's Working Plan for Dahanu Forest Division was sanctioned for the period from 1990-91 to 1999-2000. The Plan included Reserved Forests and Protected Forests of the present Dahanu Division and parts of Jawahar Forest Division. However, the present Dahanu Division includes Reserved Forests, Protected Forests, Acquired Forests and Unclassed Forests areas of Dahanu, Palghar, Talasari and parts of Vasai and Vikramgad Talukas.

A decision was taken at higher level that the revision of working plan of each forest Division should be taken up. Accordingly, the working plan for the forests of Dahanu Division was revised by Shri. Ramanuj Choudhary for the period 1990-1991 to 1999-2000. In the mean time Jawahar Forest Division was established in 1992 by carving out areas from the Thane, Dahanu and Shahapur Forest Divisions. Shri. Devandranath revised the Working Plan for Jawahar Forest Division for the period from 1994-95 to 2004-05 and Shri. Jeet Singh have revised the Working Plan for Jawahar Forest Division for the period from 2009-10 to 2018-19. Shri. Devendranath revised Working Plan for Shahpur Forest Division for the period from 2002-2003 to 2012-2013. Similarly, the Working Plan for the forests of Thane Division was revised by Shri. M.M. Ngullie for the period 2009-10 to 2018-2019.

There have been a lot of changes in the extent of land in Dahanu Division over the past few years. Forest areas were transferred to Jawahar Forest Divisions and some forest areas were handed back to the Dahanu Forest Division from the Forest Development Corporation Limited, Project Division, Dahanu. Areas were also added by way of Compensatory Afforestation and Mangrove Forests.

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

One of the main reasons was that due to preoccupation of the Working Plan officers with the revision of working plan of Thane and Jawahar Forest Divisions, the revision works of the Working Plan for the forests of Dahanu Forest Division could not be taken up on schedule.

The field works for the revision of the Working Plan for the forests of Dahanu Forest Division was started in 2004- 2005. The Enumeration was completed and analyzed by the Chief Forest Statistician. The First Preliminary Working Plan Report for the Dahanu Forest Division was prepared and presented by the Chief Conservator of Forest, Thane which was approved by the State Level Committee on 18.01.2006. The Second Preliminary Working Plan Report for the Dahanu Forest Division was presented by Shri. M.M. Nugullie, Conservator of Forest, W.P.O. Dahanu on 13th March, 2007 and got the approval of the State Level Committee with minor modifications which has been addressed in this Draft Plan.

The issues that need to be addressed while preparing various prescriptions 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 the 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. In order to prevent the degradation, it would be appropriate to prescribe only improvement felling.
2. Large 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 of bamboo were implemented, these damaged old plantations could be restored.
3. 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 forest. In order to carry out proper treatment a separate working circle namely Old Plantation Management Working Circle in formed.
4. Similarly all along the west coast in the Western part of the Division Mangrove Plantations have been raised and also includes the areas allotted to Casuarina Working Circle in Shri. Chowdhary's Plan. It forms a fragile ecosystem due to its proximity to the Arabian Sea. In order to carry out proper treatment a separate working circle namely Coastal belt working circle is formed.

Necessary changes suggested in the P.W.P.R. have been incorporated in the Draft Plan. The Draft Plan includes the areas of Reserved Forests, Protected Forests, Unclassed Forests and Acquired Forests of Chowdhary's Plan under the control of Dahanu Forest Division. The Draft Plan also includes the areas that were taken over from the F.D.C.M. Ltd. By the Dahanu Forest Division.

All the forest land under the control of Dahanu Forest Division has 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 Dahanu 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 clear felling system, which was followed predominately, in the previous plans carried mainly for production of timber, is no more relevant in the present contest. The same was also acknowledged in the prescriptions as suggested in the Chowdhary's Plan, which constituted to following working circles for Dahanu Forest Division :-

1. Protection Working Circle.
2. Improvement Working Circle.
3. Afforestation Working Circle.
4. The Casuarina Working Circle.
5. The Babul Working Circle.
6. Natural Conservation, Wildlife Preservation and Forests and Wildlife Tourism Working Circle.
7. Fuel wood Working Circle.
8. Fodder Reserve Working Circle.
9. Miscellaneous Working Circle.
10. The Minor Forest Produce (Overlapping) Working Circle.
11. The Bamboo Plantation (Overlapping) Working Circle.

The Wildlife (Protection) Act, 1972, The National Forest Policy 1988 and the Panchayat Raj Act are some of the major government policies that affect the management system of forests. With the increase in human population and cattle population there is tremendous pressure on the forests. The landless and marginal land holders encroach on the forest land for cultivation and hutments. There has been reduction in the growing stock in the intervening period.

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 Join 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 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 Working Circle.
- ii) Improvement Working Circle.
- iii) Old Plantation Management Working Circle.
- iv) Fodder Reserve Working Circle.
- v) Fuel Wood Working Circle.
- vi) Coastal Belt Working Circle.
- vii) Bamboo Plantation (Overlapping) Working Circle.
- viii) Non-wood forest produce (Overlapping) Working Circle.
- ix) Forest Protection.
- x) Join Forest Management (Overlapping) Working Circle.
- xi) Wildlife Management (Overlapping) Working Circle.

The revised Working Plan for Dahanu Forests replaces Shri. Ramanuj Chowdhary's Working Plan for the Reserved Forests, Protected Forests, Acquired Forests and Unclassed Forests, Management Plan of the F.D.C.M. by Shri. S.B. Khairnar (2006-07 to 2015-16) pertaining to areas handed over to Dahanu Forest Division and all the Working Schemes / Plan prepared from time to time.

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Place: - New Mumbai.

Date:-31.08.2010.

(K.P. Singh)
Conservator of Forests
Working Plan, Dahanu,
At Konkan Bhavan,
Navi Mumbai.

LIST OF COMMON PLANTS OCCURING IN DAHANU FOREST
DIVISON

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

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

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

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

SHRUBS

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

HERBS

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

CLIMBERS

Alai/Alsi	: <i>Dalbergia volubilis</i>	Fabaceae (Leguminosae)
Bhuikohala	: <i>Impomoea digitata</i>	Convolvulaceae
Chilhari	: <i>Caesalpinia sepiaria</i>	(Leguminosae) Caesalpiniaceae
Gunj	: <i>Abrus precatorius</i>	(Leguminosae) Fabaceae
Gulvel (Amarvel)	: <i>Tinospora cordifolia</i>	Menispermaceae
Kanguni	: <i>Celastrus paniculata</i>	Celastraceae
Kantjaruel	: <i>Capparis sepiaria</i>	Capparidaceae
Kuhili	: <i>Mucuna pruriens</i> Syn. <i>M. pruriata</i>	(Leguminosae) Fabaceae
Kusari	: <i>Jasminum arborescens</i>	Oleaceae

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

BAMBOOS

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

GRASSES

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

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

**LIST OF SOME IMPORTANT MEDICINAL PLANTS EXPORTED
THROUGH THE DIVISION**

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

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

PART-I :

SUMMARY OF FACTS ON WHICH THE **PROPOSALS ARE BASED**

CHAPTER – I

THE TRACT DEALT WITH

Section – 1:- Name and Situation.

1.1.1. The Plan deals with 787.03 Sq.km. of forests in Dahanu, Palghar and Talasari, Tahasils of and some areas in Vikramgad and Vasai Taluka of Thane District. The Plan will be known as “The Working Plan for the Forests of Dahanu Forest Division”. It would deal with 506.683 Sq.km of Reserved Forests, 269.928 Sq.km. of Protected Forests, 8.791 sq.km.of Acquired Forests and 0.113 sq.km of Unclassed Forests and 1.518 Sq.km. of Compensatory Forests, at present under the control of Dahanu Forest Division in the Thane District of Maharashtra State.

1.1.2 The area covered by the Plan lies between longitudes $70^{\circ}-42'$ and $73^{\circ}-03'$ East and between latitudes $19^{\circ}-28'$ to $20^{\circ}-14'$ North. It is bounded on the North by Valsad District of Gujarat State and Forests of Dadra Nagar Haveli, on the East by Jawhar Forest Division, on the South by Vaiterna river and on the West by the Arabian Sea.

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) which run along the eastern boundary of Thane District through the Naneghat on the border of Pune District. The area is mainly divided into jangalpatti and kinarpatti. The well known peak of Gambhirgad which has an elevation of 686.40 mtr (2252') is situated in Udhava Range of the Division.

Table No.1

Sr.No	Name of the Peak	Elevation above M.S.L.	Name of Range
1)	Gambhirgad	686.4 m	Udhawa

Area being mostly hilly with intermingled small plains is well drained.

1.2.2. The main drainage is from East to West through Vaitarna River which flow towards West into the Arabian Sea. The main tributaries affecting this tract are Deherje, Jamdari, Varoli, Pinjal, Surya and Khadki. There are two main creeks extending inland upto long distances inland. They are Dahanu Creek and Vaitarna Creek.

Section – 3:- Geology, Rock and Soil

1.3.1. The Geological information about Dahanu Forest Division is rather scanty as thorough geological survey of the area has not been made by the Geological Survey of India. The main Geological formations in the tract would be:-

- i) Sub-Recent-Recent : : : Soil
- ii) Pleistocene-Recent : : : Laterite.
- iii) Upper Cretaceous—Eocene : : : Deccan trap.

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

A -- Rocks.

1.3.2. Geology, Rock and Soil 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. The non-vesicular forms are hard, tough, compact and medium to fine grained, breaking with a conchoidal fracture. The vesicles are filled with various minerals such as quartz, amethyst, calcite, agate, zeolite, and jasper.

1.3.3. Pleistocene-Recent: - Laterite is compact and vesicular rock essentially composed of hydrated oxides of aluminium and iron 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 cappings over the Deccan trap.

B—Soil

1.3.4. Sub-Recent-Recent: - The typical soil derived from the Deccan-trap is the “Regur” or black cotton soil. The black soil contains high alumina and carbonates of calcium and magnesium with variable amount of potash, low nitrogen and phosphorous. The soil is generally porous and 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.

1.3.5. 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, Shemad, Tiwas etc.

1.3.6. Deep soil is found in the coastal areas and along the banks of rivers. The soil in the Casuarina Plantations on the coast is almost pure sand while the soil in the Babul Plantations along with Vaiterna River is deep Alluvium. The details of Soil analysis is given in **Appendix No III of Vol. II.**

Section – 4:- Climate.

1.4.1. The climate of the tract is generally hot and humid. The temperature varies between a minimum of 17 °C and a maximum of 35 °C.

1.4.2. The figures of monthly mean Maximum and mean Minimum temperature has been compiled and given in the Appendix. The climate is pleasant during the winter, i.e. from November to February when the humidity is low; summer lasts from March to June. During this season the climate 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.**

1.4.3. 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 till middle of October. Heaviest rainfall occurs during July and August. Average Annual rain fall in this area is 2500 mm. A statement showing monthly rainfall data of major places in the tract is compiled and given in **Appendix No I of Vol. II.**

1.4.4. Prevailing winds are from the West and are generally of moderate velocity. Sometimes the area is hit by Cyclones particularly in the months of October and November. The Cyclones of 1903, 1940 and 1948 caused heavy damage to the forests by uprooting matured trees of Teak which is more susceptible to wind damage on account of its shallow root system. 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. But a large proportion of these wells do 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. A statement showing the depths of static water levels of observatory wells in Dahanu Forest Division is compiled and given in **Appendix No. II of Volume - II**

Section – 6:- Distribution and Area.

1.6.1. The registers of Reserved Forests and Protected Forests (Form No.I) has been brought upto date. The entries have been verified with the relevant notifications.. All Compartments of the Reserved Forests have been planimetered during the preparation of Chaudhary's Plan. At present there is forest area of **787.035 Sq.km.** in Dahanu forest division out of which **506.683 Sq.km.** is Reserved Forests **269.928 Sq. km.** is Protected Forest, **8.791 Sq.km.** is Acquired Forest, **0.113 Sq.km.** is Unclassed Forests .and **1.518 Sq.Km.** is Compensatory Forest. **193.02 Sq.Km.** area is handed over/allotted/earmarked to FDCM Ltd. The entire area is distributed in 459 villages of Dahanu Forest Division. The area of forests including the are;

FDCM Ltd. Works out to 24.53 % of the total Geographical area. The forests of the Division are distributed in 10 forest ranges, 51 rounds and 144 beats for administration and management purposes. A statement showing the Range, Round and Beats with their headquarters is compiled and given in **Appendix IX of Volume-II** Reserved forests are distributed in all ranges rounds and beats, they normally occur on the hillocks and slopy terrains away from Malki lands. The Woodland Protected Forests are also distributed all over the 10 Ranges but they are sandwiched between Reserved Forests and the Malki lands.

1.6.2. The area statement of Dahanu Forest Division is as under :-

Table No. 2

Sr.No.	Range	Legal Class	Area in Has.	Total Forest Area of the Range.
1	2	3	4	5
1	Bordi	Reserved Forest	6166.018	8529.164
		Protected Forest	2316.273	
		Aq.Forest	36.768	
		Unclassed Forest	10.105	
2	Dahanu	Reserved Forest	6919.612	8281.873
		Protected Forest	1360.309	
		Acquired Forest	0.738	
		Unclass Forest	1.214	
3	Udhawa	Reserved Forest	6269.274	9641.568
		Protected Forest	3270.359	
		Acquired Forest	101.935	
4	Kasa	Reserved Forest	4206.127	7308.653
		Protected Forest	3081.002	
		Acquired Forest	21.524	
5	Boisar	Reserved Forest	7554.836	11381.803
		Protected Forest	3730.752	
		Acquired Forest	96.215	
6	Palghar	Reserved Forest	3702.114	6479.123
		Protected Forest	2664.819	
		Compensatory Forest	112.190	
7	Manor	Reserved Forest	2616.878	7472.175
		Protected Forest	4528.100	
		Acquired Forest	327.197	
8	Dahisar	Reserved Forest	4249.841	6958.479
		Protected Forest	2708.638	
9	Safale	Reserved Forest	5030.504	7115.553
		Protected Forest	2035.747	
		Acquired Forest	9.642	
		Compensatory Forest	39.660	
10	Bhatane	Reserved Forest	3953.150	5535.139
		Protected Forest	1296.846	
		Acquired Forest	285.143	
		Unclassed Forest	--	
Total :-				78703.530

Source: DCF Dahanu

ABSTRACT :

SR.NO.	LEGAL CLASS	AREA (Has.)
1.	RESERVED FOREST	50668.354
2.	PROTECTED FOREST	26992.845
3.	ACQUIRED FOREST	879.162
4.	UNCLASSED FOREST	11.319
5.	COMPENSATORY FOREST (MANGROVE)	151.850
GRAND TOTAL		78703.530

1.6.3. 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 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. The total length of boundaries of Dahanu Forest Division comes to **4543.384 Kms.** Out of which **62.20 km** is natural boundary.

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 1898. The numbers and dates of notifications under which forests of various talukas were declared as Reserved forests have been verified and given in **Appendix No.VI of Vol.II.** A list of notifications on which areas have been disforested under section 27 of the Indian Forest Act is also given in **Appendix No.VII of Vol.II.**

1.8.2. The woodland Protected Forests have been declared as woodland protected forest under several notifications. The earliest notification being 4 F, dated 1st March, 1879 and the latest being 43/28 /A, dated 3rd September, 1933. 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 right 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**. 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 agriculture needs. It is found that Gairans or Gochar lands are being used for raising plantation. Gochar lands should have been primarily developed as Gochar lands, so that they are of use to local population.

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 – Tropical Southern moist teak bearing forests.
- ii) 3B/C2 – Tropical Southern moist mixed deciduous forests.
- iii) 8A/C2- Western sub-tropical hill forests.
- iv) 4B/TS1 Mangrove scrub forests.

Section 2 – Genral Description of the Growing Stock:-

2.2.1. 3B/C1-Tropical Southern 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: - This association is found on sites having deep, well drained alluvium or loamy soil. The forests are mostly of quality III, IVa with occasional patches of quality II, Density of crop of this association varies from 0.4 to 0.6 Floristic structures are as under:-

I. Top canopy teak (*Tectona grandis*) (a), Ain (*Terminalia tomentosa*) (VA), Khair (*Acacia catechu*) (f), Hed (*Haldina cordifolia*) (o) Kalamb (*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 gregarious 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*) (1a), 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 IVb, with occasional patches of IVa and quality III. Where the soil is very poor, the quality deteriorates to IVb. 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 pruriata*) 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 and II. Density of crop varies from, 0.2 to 0.6. The floristic are as under:-

- I) Ain (*Terminalia tomentosa*), Khair (*Acacia catechu*), Hed (*Adina cordifolia*), Kalamb (*Mitragyna 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 quadriculata*), 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) Ranbhedndi (*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 (*Calycopteris floribunda*), Modvel (*Combretum ovalifolium*), Palasvel (*Butea superba*), Chilhar (*Caesalpinia sepiaria*), Gunj (*Abrus precatorius*), Kuhili (*Mucuna pruriata*), Kusari (*Jamminimum arborescens*), Waghata (*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 in the Bhatane, Palghar range on the foothills of the Western Ghats. 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 proportion is not much. Undergrowth is sparse, while climbers are rare. Bamboo is 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. Site quality of teak forest is mainly IVa. Density varies from 0.3 to 0.5. Its occurrence is more marked in damp valleys.

2.2.7. The main species occurring in this area are Ain (*Terminalia tomentosa*), Hed (*Adina cardifolia*), Dhavada (*Anogeissus latifolia*), Shisam (*Dalbergia latifolia*), and Savar (*Bombax ceiba*). Kalam (*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 on the Gambhirgad hills in Udhava. 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 g

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 between 0.5 to 0.7 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 floristics are as under.

I- Mango (*Mangifera Indica*) (f), Karanj (*Pongania pinnata*) (o) kokam (*Garcinia indica*) (ra), Jambul (*Syzygium cumini*) (o), Undi(*Calophyllum inophyllum*) (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 from Bordi to Safale. 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. Five 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.
- 4) Babul Forests.
- 5) Casuarina Forests

Babul and Casuarina forests are artificial forest consisting of plantations of these species. 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 forest 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 which are very near to the townships have 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, Kalam, bibla etc. while in poorer sites, the associates are drier species like dhavada. kakad. shemal etc. The floristic structure of teak forest resembles to the sub-

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 reserve forest where areas have been largely used for cultivation. This type occurs, on almost all malki land near woodlands and reserve forest. 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 Manor and Dahisar Ranges.

2.2.16. Casuarina Forests:- This forest type consists of the plantations of *Casuarina equisetifolia* (Suru) along the sea coast in Palghar, Dahanu and Bordi Ranges of the Division. These are pure Suru plantations and have no underwood or undergrowth, whereas, older plantations are very successful and have been harvested in the past, they are also important from aesthetic point of view as they form good shelterbelts on the coast.

2.2.17. Babul Forest: - This type occurs in narrow strip along the Vaiterna river. Babul was raised artificially by sowing of seeds. The area is flat and has deep loamy soil. Almost pure crop of Babul was reported to be occurring as a result of regeneration efforts in the distant past. The crop is reported to have been regularly harvested. However, at present most of the areas under this forest type are blank and efforts for regeneration have not been made.

Section 3:-General Ecological observation –

2.3.1. It is common observation in the Dahanu 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 appear 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 menacing 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.

Illicit cutting:-

2.4.2. The forest areas are either surrounded on sides by developing towns and honey combed due to number of villages, padas or hamlets. 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 Boisar, Palghar 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 developed 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.

2.4.3. The decade has seen widespread human 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. Any activity in the Mangrove area 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.

2.4.4. Illicit cutting of forests worth lakhs of rupees is detected every year in Dahanu Forest Division. The menace of illicit cutting is increasing and organized gangs are also 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 activities in such pockets which had been inaccessible in the past. Though the pressure on forest is increasing many-folds day by day, the staff and particularly Forest Guard who is the person supposed to protect the forest is often neither trained on proper line nor is he equipped appropriately.

Fire: -

2.4.5. Occurrence of fire is a common phenomenon in this area. They not only damage the plant growth but also disturb the eco-system. Fires are rarely accidental. They are mostly intentional and are ignited by the local people and hunters for driving the game to a convenient spot, or by graziers for getting better growth of grass in the next season. Fire is also caused by local people sometimes to remove the on the spot evidences of illicit felling. Fires are also set sometimes for clearing the under growth of other weeds for facilitating encroachments. Fires cause extensive damage to the regeneration by killing the young seedlings. The scorching heat produces hollowness in saplings and poles. Substantial damage also occurs due to fires as they tend to accelerate soil erosion and site degradation by destroying the soil cover as well as humus as a result of which there is less moisture absorption and more run off. The forest fire protection plan for controlling and suppressing the fire based on principles of preventive measure, early detection, suppression and organization of may power and resources available would have to be drawn. During the fire season the field staff needs to be constantly put on alert round the clock and patrolling of the area has to be constantly taken up. More-over the co-operation of local people will have to be sought to in preventing and controlling the out break of fires.

Grazing: -

2.4.6 Heavy grazing has deleterious effect on forest. Forest in this area is also subjected to heavy pressure of grazing through large number non-productive cattle population in the villages as these cattle depend on the forest for fodder and grazing. The adverse effects of over grazing are very visible in the sense that the under growth in most of the forest is absent. Natural regeneration has become a thing of the past. Constant trampling and browsing not only destroys the young seedli

but the consequent hardening of the soil and complete absence of humus hinders the germination of seeds and prevents the growth and establishment of recruits. 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. Unless this trend is reversed, grazing may ruin permanently the delicate ecology of this area. To overcome this deleterious effect on forest, concept of rotational grazing has to be strictly implemented so that the areas which are presently overgrazed get respite to regain their full forage potential. Along with this, measures like stall feeding reduction in number of scrub cattle, encouraging the people to have improved breed of cattle etc. will need to be taken up. More over in the areas where cattle grazing are permitted as per provision in grazing settlement, it will need to be regulated strictly as per carrying capacity of the area.

2.4.7. 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. To check soil erosion and increase the productivity of land, adequate soil conservation measures also will have to be taken on watershed basis.

Encroachment:-

2.4.8. Encroachment on the forest land and lure for subsequently regulations area also causing severe damage to the forest. Most of the Woodland Forest stands encroached today, the percentage of encroachment in Reserved Forest, particularly in the forests, which are near human habitations and under understocked areas and plantations even in remote areas is alarming. Some plantations have failed because the sites cleared for plantations became easy for encroachment. Encroachers are sometimes responsible for altering the boundaries of demarcation. As per the data available there are **6472** cases of encroachment over an area of **6193.07 Ha.** in the Division. Encroachment on the forest lands also causes a lot of damage to the forests. Many areas of Protected Forests stand encroached today. Effective action as per the law in force needs to be taken to prevent its continuance.

Rab burning:-

2.4.9. 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.

2.4.10. 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, As such lands are converted into waste lands and denuded forest lands which would not be capable to support tree growth on their own and be a permanent lure for being taken over by encroachers for cultivations. Lack of successful efforts for enforcing regulations aimed at maintenance and betterment of forests has also inflicted serious injuries to the forests. Prevailing local political, social, and economic 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:-

2.4.11. 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 Mumbai, there are a 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:

2.4.12. Cutting of wood for firewood causes severe damage, as here all trees irrespective of species suffer. This damage is very pronounced in the vicinity of towns where the demands for firewood are heavy. This damage near towns like Boisar, Palghar, Bordi and Dahanu 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 Dahanu, Palghar and Boisar. Here, the top soil is being washed away except where it is covered by grass. The only way left for reclothing the area is afforestation and proper protection. The damage by lopping is confined to some pockets of the Division.

Soil Erosion:-

2.4.13. 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 monsoon. This cycle is repeated year after year. The exposed sites are devoid of trees.

Damage by Wild animals and insects:-

2.4.14 Amongst Wild animals, deer damage khair plantations by browsing. Porcupines and rodents damage Sawar plantations by stripping of the barks and also by uprooting the seedlings. Wild pigs also damage the planted seedlings by uprooting them. Among the insects, the teak defoliator (*Hyblea puer*), Teak skeletonizer (*Hapalia machaeralis*) and the root borer of babul cause 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 cause crookedness of the bole. Damage by climbers is not only confined to plantations but is also seen in the coppice growth.

2.4.15 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

diversity of species is going to have serious repercussions, ecologically and environmentally in the long run.

2.4.16. 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 timber extracted from the trees uprooted in the 1948 cyclone amounted to 12 years' annual yield from the whole of Thane district Forest.

CHAPTER II B

FOREST FAUNA

Section-1

A) MAMMALS

2B.1.1. The wildlife population in Dahanu Forest Division is dwindling in spite of having a relatively good forest. In the past the wildlife was abundant but the population has gone down due to increasing biotic pressure on their habitat. The forest 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 the search of shelter and food has started migrating and moving outside the forest areas. They are now more vulnerable to damage from greedy poachers.

2B.1.2. From the Wildlife Census conducted by the Dahanu Forest Division during 2001 and 2005-06 the following mammals are found:-

1. Leopard- *Panthera pardus* (Bibalya Wagh): In 2001 Census, only one Leopard was reported in the Division but it has increased to six in numbers. The increase may be due to migration from other forest areas.

2. Striped Hyena- *Hyaena hyaena* (Taras): Hyena is found in parts of Palghar and Manor Ranges of the Division. In the rest of the Ranges it has not been reported.

3. Wild Boar- *Sus scrofa* (Ran Dukkar): There are altogether 207 Wild Boar reported from all the Ranges of the Division. The maximum numbers of Wild Boar were reported from Boisar Range having 60 in numbers. In Udhwa only 4 Wild Boar have been reported. The reasons for presence of a large number of Wild Boars may be attributed to Agricultural fields in the adjoining areas.

4. Common Langur- *Presbytis entellus* (Langur): Langur is found in all the Ranges except Udhwa Range. The maximum number of Langur is found in Safale, Palghar and Kasa Ranges.

5. Barking Deer- *Muntiacus muntjak* (Bhekad): Barking Deer is found in all the Ranges except Boisar and Dahanu. Maximum numbers of Barking Deers are found in Manor, Bhatane, Dhisar and Safale Ranges. Barking Deers are found in the areas of the Division where the density of the Forest is relatively high.

6. Mouse Deer- *Tragulus meminna* (Pisori, Aheda): Mouse Deer is found in large number in Manor Bhatane and Palghar.

7. Blacknaped Hare- *Lepus nigricollis* (Sasa): Hare is the most abundant wild animal found distributed all over the Division. Maximum numbers of Hare are found in Boisar and Manor Ranges as most of the grasslands are located in and around Boisar Range.

2B.1.3. In the Biodiversity Documentation of Dahanu Taluka, the Bomabay Natural History Society has reported the presence of the following wildlife:-

Bonnet monkey-*Macaca radiata* (Makad), Rhesus monkey- *Macaca mulatta*, Jungle Cat – *Felis chaus* (Baul), and Spotted Deer- *Axis axis* (Chital).

(B) BIRDS

2B.1.4. Many bird species are found in the forest of Dahanu. Both migrant and resident birds are found. Presence of large dams and water bodies necessitates migration of birds from other places. Dahanu has a long coastal belt stretching from Bordi to Kelve in the western part of the Division. Both Aquatic and Terrestrial birds are spotted in the tract.

2B.1.5. Whitebellied Sea Eagle – *Haliaeetus leucogaster* (Sagari garud) is the only Scheduled I bird found in the sea near Dahanu. The important birds found in the division are: - Little Grebe – *Tachybaptus ruficollis* (Pandubi), Little Cormorant – *Phalacrocorax niger* (Chotapankawl), Purple Heron – *Ardea purpurea* (navkali haḡla) Smaller Egret – *Egretta intermedia*, Lesser Whisting Teal – *Dend*

(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* (Pingla), Common 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.1.6. The following species of Reptiles are found in the Tract:

Magar or Indian Crocodile - *Crocodilus Pallustris* (Muggar), Indian Pond Terrapin – *Melanocheilus trijuga* (Kasau), Olive Ridley Turtle, Commonn Garden Lizard – *Calotes versicolor* (Sargota), Indian Chameleon – *Chameleon zeylanicus* (Girgit), Common Indian Monitor – *Varanus bengalensis* (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* (Kaudva), Green Keelback – *Macropisthodon plumbicolor* – (Gautya), Buffstriped or

– *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.1.7. Dahanu Forest Division has both Fresh Water and Marine fishes. The common Fresh water fishes are: Stinging Cat Fish – *Seccobranthus fossilis* (Nal Singali), Cat Fish – *Aystus gulf* (Shingala), Mureel – *Chana gachus* (Dhokh, Daku), Fresh Water Goby – *Gobius giupeioides* (Kharadi), Major Carp – *Catla catla* (Catla), Major Carp – *Labeo rohita* (Rohu), Wallago - *Wallago attu* (Shivda), and Carps – *Puntius spp.* (Khavlya, Khavil).

2B.1.8. The marine fishes found in the coastal areas Dhanu Division are: Mullet – *Mugil cephalus* (Boi, Pilsa), Bombay Duck – *Harpodon nehereus* (Bombil), Cat Fish – *Techysurus Spp.*(Shingala), Golden Anchovy – *Coilia dussumieri* (Mandeli), Mudskippers – *Boleophthalmus 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 Rules 8-39 of the Bombay Forest Rules 1942 framed under Section 26(i), Section 32(j) and Section 76 (d) of the Indian Forest Act, 1927.

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) Rul

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 wildlife (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 Bombay under their Notification no. WLP/6172/127234 - x dated 5-7-1973. These rules are also applicable in Dahanu 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) and have been appointed as wildlife wardens and Range Forest Officers (All) in 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 officer's upto the rank of divisional forest officer. The Principle chief Conservator of Forests wildlife is ex-officio Chief Wildlife warden for the state of Maharashtra.

2B.2.6. The wildlife (Protection) Act 1972 (Amended upto 2003) which contains amendments to 1972 Act are in operation now and the Govt. of Maharashtra has to frame suitable rules in accordance with the latest provisions of the Act.

Section:-3: - Rights and Concession

2B.3.1 No rights or privileges have been admitted for hunting of wild animals and birds anywhere in Thane Circle covering Thane and Raigad Districts.

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

Section -5:- Man-Animal Conflicts

2B.5.1 Panther attacks on human life have been observed in the recent past. There were cases of fatal attack of Panther in the Division. These unfortunate incidences can be controlled by educating the local populace about precautionary steps to be taken. The required medical treatment should be given to the effected person within time and the compensation of human being killed / seriously injured should be given within shortest possible time.

Section- 6: Management of Fauna

2B.6.1 No specific Wild life management in the division was taken up in the past plan periods as no specific wild life management techniques were adopted during the plan periods. The main carnivorous species exist in the division require only water arrangements in the pinch periods. Existing grasslands and meadows should be maintained and provided with salt licks for herbivora species. Panther population has created problem in the division. The death of human beings due to Panther attack in the division was alarming in the last few years and human beings died due to panther attacks. Forest field staff should be trained both in mechanical as well as chemical capture and rehabilitation of problem animals after proper medical treatment.

2B.6.2 The wildlife related offences should be dealt with all seriousness within shortest possible time. The concerned ACF should take regular review of cases related to wildlife and the help of local police should be taken to deal with offences.

2B.6.3 There is only one Protected Area, namely Tungareshwar Wildlife Sanctuary situated adjoining to the Southern boundary of Dahanu Forest Division. These Protected Areas are now under the control of the Wildlife Wing of the Department. Approximately total of **5143.667 Ha.** of Dahanu Forest Division is within radius of 10 Km. from this Protected Area.

CHAPTER III

UTILIZATION OF PRODUCE

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

3.1.1. The human population in the tract exhibit great contrast, the population in and around the industrialised townships like Dahanu, Palghar, Boisar and Tarapur consists mainly of industrial workers, business men and horticulturists who have their farms of Chickoo, Coconut, Papaya, Banana and flowers. Tarapur Atomic Power Station is situated just 20 km from Dahanu. Business men who have their farms depend on the forest for the requirement of firewood and small timber most of which are supplied to them through headloads brought by villagers from adjoining forests. Sporadically growing number of brick kilns, quarries, and saw mills all of which attract illicit wood from nearby forests meet the increasing demands of bricks, stones and timber required for the construction of the domestic and industrial houses for these people. The Total population of the coastal tract extending from Bordi to Dahisar consists of fishermen who require bark of aint for colouring their nets, poles and fencing material for the mast and repair of their boats and construction of dwelling huts. The entire population depends on the forest for supply of firewood.

3.1.2. The local communities living in the forest tract are mainly Adivasis like Thakur, Katkaries, 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 grows in the low lying areas and nagli and warai are the crops grown in the hilly tract. A common practice followed by Agriculturist in the tract is rab burning. These people own large herds of cattle. They depend solely on forests for grazing. For burning the rab the tribals and local people collect the fallen dead leaves from the forest. They also cut 'Tahal' from certain trees of the reserve forests where ever the opportunity is available. 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 Karvi and Bamboo is also very great and is more often met by hacking of plantations and lopping of

require timber for preparing cow sheds and agricultural implements. The need 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 an average. Most of the tribal women collect firewood by head loads from nearby forests for earning their livelihood. They also engage in encroachment of forest land for cultivation. Shifting cultivation is still practiced in parts of the forests. The large herds of cattle belonging to Adivasis graze on forest lands all over the Division.

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

3.1.4. Dahanu Forest Division is in close proximity to Thane and Mumbai, which are one of the most industrially advanced areas in Maharashtra State. The total population of the areas falling under the Jurisdiction of Dahanu Forest Division as per 2001 census is given as under:

Table No.3

Sr.No.	Name of the Taluka	Population
1	Palghar	4,54,635
2	Dahanu	3,31,829
3	Talasari	1,21,217
4	Vasai	7,95,863

Section – 2:- Market 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 Palghar, Boisar and Dahanu which are consumption centres for round timber of teak and superior non-teak species. There has always been demand of firewood throughout the tract. The major forest produce sold are 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 kalam is used for bobins, 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 sized timber and firewood.

3.2.2. The various minor forest produces are grass, Bamboo, Apta and Tembhurni leaves, bel leaves, tad palm leaves, Chilhar and Ain bark, Kadi patta, babul branches, Moha flowers and seed, hirda fruits, plantain (Rankel) leaves, kusari flowers, Tad fruits and seeds, hirda fruits, gum etc. These products play an important role in socio economic conditions of tribal 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 Products from Dahanu Forest Division is given in the **Appendix No. LXI and LXII of Vol. II.**

Section – 3:- Lines of Export.

3.3.1. Mumbai is the last Terminus for Western Railway. The broad gauge railway line of western railways passes through the areas falling under the Jurisdiction of Dahanu Forest Division. Western railway traverses from Surat, Dahanu, and Palghar and goes through Virar to Mumbai Central.

3.3.2. Within the Jurisdiction of Dahanu Forest Division, adequate network of highways. National State and other roads exist. The National highway No. 8 goes to Gujarat through entire length from South to North of the Division. There are many state highways and other district roads connecting nearly every big village in the district, seasonal roads connect small villages falling under the jurisdiction of Dahanu Forest Division. Road network is very good in the entire tract and traverses the entire length and breadth of the Division.

Demand and Supply of Forest Produce and Pressure on Forests.

3.3.3. There is a shift in the management perception of forests in the ecologically fragile areas of Western Ghats. Presently, the thrust is on the conservation. The Miscellaneous Forests of Dahanu Division have few timber species of commercial importance. Percentage of Teak trees in the forests is less. Species like Ain, Bonda, Khair, Bija, Bibla, Tiwas, and Kalamb etc. are used locally for use as small timber in the household construction. The imported timber from other countries meets the timber requirements in Mumbai City and its suburbs.

Section – 4:- Methods of Exploitation and Transport to the depots.

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.

Harvesting of Timber and Firewood were done by the FLCS during the NJ Joshi plan. In the year 1986-1987, 43 coupes of different working circle of Joshi's Plan were worked through forest labourer Co-Operative societies and 14 coupes by the Department.. There were 38 Forest Labourers Co-operative Societies working in Dahanu Division but at present no work is carried out. The felled material in the form of timber and firewood were brought to the depots at Bharad, Netali.

But since the last Working Plan no fellings were carried out in the entire Division as it was not prescribed. Although no felling is carried out by the Division illicitly cut materials are confiscated and sold in the designated Depots in the Division.

The crops falling in the projects areas under Forest Conservation Act were felled transported and sold in the depots. Other notified NWFP are generally collected by the local people and sold to Tribal Development Corporation. Grass is sold by means of auction by the DCF every year. In the earlier days Tendu and Apta leaves were auctioned by tender. But presently Tendu and Apta leaves are not sold as traders do not come forward for purchasing the units owing to their non profitability.

Section – 5:- Cost of Harvesting:

3.5.1. Various types of harvesting operations were carried out either on 'job work' basis or 'daily wage' basis. The wage rates for different forestry operations are sanctioned annually by the wage Board Committee under the Chairmanship of the Chief Conservator of Forest, Thane. The wage rates. A statement showing the Wage Board rates as sanctioned for different works for the year 2009-2010 is shown in **Appendix No.XI of Volume –II.**

Section – 6:- Past and Current Prices.

3.6.1. There has no harvesting for the last 10 years. The prices of all the forest produce have changed drastically in the last few years. Minor forest Produce and Offence materials are sold in the Division.

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

Table No.4

Sr.No.	Year	(Rs.)
1	2006-2007	30,91,959.00
2	2007-2008	62,51,708.00
3	2008-2009	46,16,063.00

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 Dahanu forest Project Division, FDCM was established in 1974 with its headquarters at Dahanu. The works are undertaken in the earmarked and assigned forest areas handed over to FDCM Ltd. From Dahanu and Jawahar Territorial Forest Divisions. The Management Plan of Dahanu Project Division, FDCM was prepared for the period 2006-07 to 2015-16 by Shri. S.B.Khairnar, which was duly approved by the Government of India, Ministry of Environment & Forest vide its letter no. 12-27/99(FOR)/1960, Bhopal dated 03.11.2006. In the meanwhile, it was decided to hand over some of the compartments to the concerned Territorial Forest Divisions. Some of the areas were handed back to the Divisions in the year 2006 and 2007. The total area earmarked for FDCM Ltd from Dahanu territorial Forest Division is 19302.285 hectares, ie, 13460.656 ha. of Dahanu Project Division and 5842.629 ha. of Thane Project Division. The distribution of Forest area of FDCM Ltd is as under-

Table No.5

Sr.No.	Name of the Forest Division	Reserved Forest Ha.	Protected Forest Ha.	Total Area in Ha.
1	2	3	4	5
1.	Dahanu	19302.285	1.00	19303.285

4.1.2. About 24.53 % 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 in this Division, which are referred to as work centres. There are Eight such work centres in the Dahanu Project Division, Viz.(1) Manor, (2) Somta, (3) Pimpalset, (4) Girgaon ,(5) Kasa Depot & Nursery , (6) Jawahar, (7) Vehelpada and (8) Chalani. Out of these the last three work centres are in Jawahar Forest Division. These were worked earlier under Conversion Working Circle and Selection cum Improvement Working Circle of N.J.Joshi's Working Plan. The Forest type in mainly Tropical South Most Teak Bearing Forest.

Section – 2: - Activities of FDCM

4.2.1. There are 106 sanctioned posts as on 31st March, 2006. Earlier FDCM used to work in areas of Conversion Working Circle and Selection –cum- Improvement Working Circle of Joshi's Working Plan as an Agency of the Forest Department in clearfelling, logging, transporting and marketing of the forest produces and sharing the benefits on percentage basis fixed by the Government from time to time. But at present the FDCM Ltd. is working entirely independent of the Forest Department on the areas leased to them. Till 1976 a “**WORK PLAN FOR THE FOREST PROJECT DIVISION, DAHANU**” was prepared and works were executed as per the Plan. The period of the plan written by Shri.V.J.Vaidya was from 1996 to 2006. Presently the management plan written by Shri. S.B.Khairnar for the period 2006-07 to 2015-16 is in operation, which has been duly accorded sanction by the Component Authority. Most of the activities of the FDCM are similar to the activities of the Forest Department. Removal of the overstocked crops from the forest areas and replanting with improved seedlings or nursery stocks is presently taken up by the FDCM. It also involves in activity of Protection of Forests from fire, grazing, encroachment and illicit felling.

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

1. **PLANTATIONS:** From its inception, a major emphasis was given for raising good quality crop. Plantation programmes / schemes such as Teak Plantation Programme, Massive Afforestation Programme , Compensatory Afforestation , World Food Programme (Fuelwood & Bamboo), Maharashtra Forestry Projects and Employment Guarantee Schemes were implemented.
2. **NURSERY:** ASWE nursery admeasuring an area of 13 ha was established near KASA for cultivation of Rosha and Citronella oil. The scheme was later abandoned as it was not economical. Thereafter teak stumps were raised and sold but as the plantaion targets were reduced there is no demand for Teak stumps.
3. **SOIL AND MOISTURE CONSERVATION WORKS:** Soil and Moisture conservation works such as Nala Bunds, CCT, and Check Dams etc were carried out under EGS Scheme. Besides digging of TCM along the compartment boundaries were taken up.

4. The special works of improvements undertaken by FDCM includes fire protection works in plantations ranging from 5 to 10 years, cleaning and climber cutting in Teak Plantations. Turn-key projects are also taken up to a limited extent.

4.2.3. In the early part of the establishment of the Forest Project Division Dahanu, 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 earlier days as such large areas were clear felled 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 1993-94 to 2005-06 is given as under:

Statement showing Revenue & Expenditure of last 10 years (in Rs.)

Table No.6

Sr. No.	Financial year	Expenditure incurred (Rs.)	Revenue receipts (Rs.)
1	2	3	4
1	1996-1997	1119229.64	3683298
2	1997-1998	2129403.16	5576880
3	1998-1999	3011427.17	10187845
4	1999-2000	5006735.17	13720064
5	2000-2001	6054141.42	130688305
6	2001-2002	1867102.74	8318700
7	2002-2003	12512315.34	26623055
8	2003-2004	13733889.52	32823865
9	2004-2005	5976875.24	26750450
10	2005-2006	4665710.00	18879208

CHAPTER –V

IMPACT OF FIVE YEARS PLANS ON ATTAINMENT OF MANAGEMENT ACTIVITIES

Section No- 1:- The Five Year Plans.

5.1.1. The Forest area of Dahanu Forest Division is 787.03 sq km. In the earlier days there were pockets of dense forests and the requirement of forest produce of the local people was met. 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. Social Forestry activity had been going on for quite sometime but positive impact has not been created so far as production is concerned.

5.1.2. Attempts had been made for management of forest on scientific lines. The first Working Plan was prepared for the period from 1887- 1917. The system of dividing the forest into Blocks and Annual Coupes was introduced in 1887-88. Regular fellings under 'Coppice with Standard' system were followed with the rotation of 40 years.

5.1.3. In 1922, 'Thane Forest Working Plan' was prepared by Aitchison and Hamilton by clubbing together various Working Plans drawn between 1894 and 1905. This Working Plan prescribed the "Clearfelling" system with rotation of 80 years. In 1935 the Plan was revised by Storte where in he prescribed continuation of Clearfelling System with a rotation of 50 years.

5.1.4. All the Plans described above were of Reserved Forests. The Working Plan of Thane Woodland Protected Forests was prepared by Saldhana. The Woodland Settlement was made from 1897 to 1902 after demarcation and settlement of forests which were regarded as complete and ample. In 1905, Thane Woodland Code was framed to regulate the exercise of privileges of Woodlands (Woodland Protected Forests) vide Government of Maharashtra Resolution, Revenue Department, No. 7742 of the 25th September, 1905. The Code conceded the privileges of Grazing Cattle and cutting 'Tahal' with the prior permission of Mamlatdar. It also facilitated the grant of Woodland Plots for cultivation on easy terms.

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

5.2.1. Starte's Plan of 1935 was revised by S.P Jadhav and the revised Plan was brought into force from 1951-1952. 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". Fellings were carried out on 7859.51 hectares. An average expenditure of Rs 8,32,663.00 was incurred on Conservancy & work, establishment and Plan works during the period from 1953-54 to 1954-55 as against an average revenue of Rs 32,55,133.50 during the same period. 880.406 Ha. of plantations were raised from 1951-52 to 1954-55 in clearfelled coupes. However, no other special plantations were raised. Only about 11% of the felled area was regenerated.

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

5.3.1. Shri Jadhav's plan was continued in the second five year plan. The Clearfelling in steep slopes was discontinued and felling was resorted to only on non-steep slopes. Fellings were carried out in 12601.43 hectares. Plantations were raised on 1980.80 ha. These plantations were inclusive of special plantations such as Agave and Matchwood. The Agave plantations carried out in the second five year plan did not yield sufficient quantity for manufacturing robes. In the year 1959-60 most of the Bamboos, particularly, manvel and katas died after gregarious flowering since then bamboo has not been fully established. The total expenditure in the second five year plan was Rs 14, 12,466.80/- and the Revenue was Rs 51, 14,704.00

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

5.4.1. Jadhav's plan was in operation in the third five year plan. Selection felling and clearfelling was carried out in 14354.24 hectares and part of the areas were regenerated by artificial means over 3303.653 hectares. In 1960 an area of 191.50 ha of Casuarina Working Circle was transferred to Gujarat State on the bifurcation of ex-Bombay State. In 1962 Eucalyptus hybrid was introduced along with casuarinas in Casuarina Working Circle. A scheme to exploit Khair was drawn up in 1962 to ensure a sustained supply of Khair wood to the Swastik Kath Factory at Dahanu. Khair was to be exploited from the unworked coupes (Coupe No 51 to 80); the exploitable girth was fixed at 91.44 cm with a felling cycle of 20 years. The yield calculation was based on the enumeration carried out in the year 1946-47. Khair Factory stopped operating in the mean time and Khair trees were sold by tender.

5.4.2. Under the third five year plan schemes of “ Development and supply of substitutes for teak” an integrated unit consisting of a saw mill, a wood seasoning kiln and a preservative plant was installed at Dahanu with a cost of Rs 15,85,725/-.

5.4.3. During the period from 1960-61 to 1964-65, an area of 8232.01ha under Selection-cum-improvement system and 4818.98 ha under clearfelling system were worked. Plantations on 1440.102 ha on the clearfelled area and 728.425 ha special plantations were raised.

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. 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, Miscellaneous plantation working circle, Fodder Reserve working circle, Casuarina working circle, Babul working circle, Miscellaneous 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 Industries. It envisaged annual conversion of 2399 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.

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

5.7.1. 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. However, only 24 coupes in 4 felling series from 1966-1975 had been worked by Dahanu Division. The Dahanu Project Divisi

came into existence in the year 1974. This project division clear felled 1705.6 hectares area in 3 felling series from 1975-83. Cultural operations were not carried out. The sudden opening of canopy threw out dense tall gasses which came in the way of regeneration. The forests have become more vulnerable to fire. Separate expenditure figures are not available for this period.

Section -8:- Annual Plan (1979 – 1980) And Sixth Five Year Plan (1980 – 1985):-

5.8.1. Janata party came into power in the Centre in the year 1979. The five year plan was followed 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. Though Dahanu forest division suffered immensely from this decision as a large extent of areas were encroached in the Division. Afforestation works that were taken up during the period did not yield good results because of biotic pressures.

Section -9:- Seventh Five Year Plan (1985-1990):

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 undertaken and Ramanuj Choudhary's Plan started from 1990-91 onwards.

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

5.10.1. Choudhary's Plan was in operation during this plan period. Due to insufficient funds felling of trees was not carried out during this period. However, 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

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. A land mark decision in forestry was taken by Government of Maharashtra 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.

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

5.11.1. Prescription of existing plan continued till 1998-99. 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 main 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 (2002-2006)

5.12.1. On expiry of Choudhary’s Plan in 1999-2000, the Working Plan is under revision. No felling works were carried out but Regeneration works have been carried out all over the Division.

CHATER – VI

STAFF AND LABOUR SUPPLY.

Section – 1:- Staff

6.1.1. The following Statement Shows the Sanctioned Staff in Dahanu Forest Division.

Table No.7

Sr.No.	Name of Post	Sanctioned Post
1	2	3
1	Deputy Conservator of Forests	1
2	Assistant Conservator of Forests	3
3	Range Forest Officers	14
4	Foresters	62
5	Forest Guards	193
6	Ranger Surveyor	1
7	Surveyor	1
8	Assistant Junior Statistician	1
9	Chief Accountant	1
10	Accountants	16
11	Clerk cum Typist.	21
12	Driver	7
13	Motor Launch Operator	1
14	Wireless Operator	1
15	Police Constable	3
16	Chainman	2
17	Peons	4
18	Watchman	6
19	Khalasi	2
20	Tandel (Motor Launch Helper)	1
21	Van Majur	21
	Total	362

Source: DCF, Dahanu

Section – 2 Labour Supply

6.2.1. The Division in its industrialized Talukes such as parts of Vasai, Boisar, Palghar and Dahanu faces an acute shortage of Labour. The wages being offered to the labourers for forestry works are less than the rates available for industrial works. However, the local people and mostly the tribals belonging to the community like Thakurs, Katkaris, and Warlis etc are the main source of labourers for the forestry operations. The rates for forestry works are revised every year.

Wages

6.2.2. Wages paid to the labour are governed by the minimum wage rates fixed by the State Government for the forest and forestry sector. The dearness allowance is linked with the price index and is revised from time to time. The job rates are governed by the Wage Board Rates, which are revised annually. The wage Board Rates sanctioned for the year 2009-2010 is given in **Appendix No.XI of Vol. II.**

CHAPTER – VII

PAST SYSTEMS OF MANAGEMENT

Section – 1: General History of the Forests.

A. Reserved Forest.

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 (Vanmakta) 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 the felling was inadequate. Consequently illicit felling occurred on a large scale. The fee system was abolished in 1862 and the system of departmental felling was introduced. The 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 “contract system” by which right of collection of dead-wood in the forests was disposed of annually also caused great damage to the forest.

7.1.3. The first Working Plan (1887 to 1917) – In 1882, the sole forest division for the entire Thane district was split up into two Divisions and the same was split up into three Divisions in 1897. 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) for the Thane forest was sanctioned in 1894. The forests of the tract were brought under regular working plan only in 1905. All these plans, which were drawn range wise, prescribed except the Plan for Talasari forest drawn in 1905. “The coppice with standard system” with the rotation of 40 years for the coppice.

7.1.4. The various working plans drawn 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 “Clear felling system” with a rotation of 80 years. The clear felling was actually started from 1917-18 only as the “Coppice with Standard System” was considered economically unsound and as the standard tended to suppress the coppice growth. The 1922 plan was revised by Starte in 1935 who prescribed the continuation of the “Clear Felling System” with a rotation of 80 years. The 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 still in force in all the divisions of Thane Forests. Shri Joshi’s Plan for Dahanu was revised by Shi Chaudhary for the period 1990-91 to 1999-2000.

B: Protected Forests

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 agricultural and domestic needs of the local people. Complete ownership vested in government. No rights of private persons or public rights other than those of ways 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 settlement is chiefly remarkable for the liberality of its allocation of land to woodland and the comprehensiveness of the privilege admitted in the woodlands. These privileges were indiscriminate.

by the people as these woodlands remained for pretty 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 have been misused resulting into 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 waste lands" and 'tahal' were freely lopped from all kinds of trees. But with the completion of forest demarcation and settlement under the Forest Act, lopping of tahal was prohibited in the Reserved 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 applicable, not only in woodlands and government wastelands, but also in occupied land of Dahanu Taluka where occupants were recognized until 1892 as the owner of the trees on their holdings.

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 demand 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 local people 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 *vides* Government Resolution, Revenue Department No. 7742 of the 25th September, 1905.

7.1.7. The Thane Woodland Code conceded the privileges of grazing cattle, of cutting Tahal (Subject to Rules) and, with the previous permission of Mamlatdar, the cutting of branches of Injaili and Teak trees for agricultural implements. It also facilitated the grant of woodland plots for cultivation on easy terms, such plots being continued to the selected tenants from year to year for so long as they protected the tree growth. Para 12 of the Code directed that the Woodlands should remain in-charge of Revenue Officers and of the villagers themselves without any interference from the forest department. While Para 44 suggested the gradual clearance of Teak from Woodlands by the Forest Department and required that the aftergrowth of Teak be managed by Revenue Department for the benefit of cultivators who were permitted to cut even Teak shoots for Tahal or fuel, provided that from each main stump at least two main stumps were permanently reserved.

7.1.8. The Tahal cutting rules contain in the Code, the objective of which was to prevent the destruction of tree growth which Tahal cutting involves, were made to be followed by people through education, intensive campaign and field demonstrations for suitable treatment of tree growth while cutting Tahal. In the latter period however, the pernicious methods of lopping leading shoots were adopted by tahal users, causing gradual destruction of several Woodlands. In 1923, Mr. Perry was appointed as a Gurcharan Settement Officer to probe the causes of distruction of Woodlands and suggest remedies.

7.1.9. Mr. Perry suggested “Modified Clear Fellings” i.e. cutting of considerable portion of Injaili also along with Teak against the existing system of cutting merely Teak even in those Woodlands where there was no demand for Tahal. During such felling “Advanced Growth” of Injaili was to be left unfelled. The main object of these proposal was to replace the matured crop of Injaili trees by new Copice growth, by felling them at an age when they could throw vigorous and healthy shoots, in stead of allowing them to die a natural death.

7.1.10. The Woodlands were brought under Regular working by Saldhana's Plan which provided for the felling of Injaili in all closely wooded areas along with Teak following the principle "Modified Clearfelling" proposed by Perry. The Woodlands remained however, in-charge of Revenue Department till 1956; the areas were brought in- charge of Forest Department in 1956.

Section – 2:- Past System 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. The working plan for the forests of Dahanu Range was first drawn up in 1902. By 1905 all the forests of the Thane District were covered by working plans. The number of standards was generally fixed at 30 to 40 per acre. In 1909, instructions were issued to aim at reservation of 40 or 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 matured, 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 reserves were often of a species which had no value as a timber while some of the standards were over mature and 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. Also 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. For the Talasari forests "Selection System" was prescribed, the harvestable age was fixed at 120 years corresponding to a diameter of 18 inch (45cm o.b). As the harvestable diameter was high and very few sound Teak trees were to be available for harvesting, no contractors came forward to undertake the fellings. However, the objective of keeping the forest cover mostly undisturbed must have been achieved under this prescription.

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 plan was published in 1922, the clear felling was actually introduced from 1917-18. The rotation was fixed at 80 years. The regeneration was mainly to be natural by coppice and seed and was to be 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 operational convenience for taking up the harvesting of these forests 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 - Starte's Plan of 1935.

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, shisham, 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 and 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 seedlings and stumps. The 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 slopes, 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 “clear-cum- selection-cum-improvement’ felling. 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 plant 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 of Palghar Range were recommended for working at a short rotation of 40 years and designated as ‘Pole 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 land slips and soil erosion were put under “unharvestable working circle”. These difficult areas were called ‘Kharabas’. All these ‘Kharabas’ were mapped in the various working plans prepared before 1905 and since then their boundaries have remained unchanged. However, the basis on which these areas were selected is not known. The Plan prescribed that such “Kharabas” which contained valuable material could be worked under scheme formed by the Territorial DFO in consultation with Working Plan DFO. However, no such working was done in such areas. The Plan also prescribed working circle for the management of Kurans in an area of 424.1 hectares scattered in 7 villages in Bordi and Palghar Ranges under “Kuran Working Circle”. It also prescribed for the plantation and harvesting of Babul at a rotation of 30 years in 70.82 hectares area situated along the bank of Vaiterna River. The system followed for ‘Babul’ Working Circle was clear felling with artificial regeneration by sowing Babul seeds.

7.2.10. In addition to the working circles mentioned above, there were three overlapping circle constituted for the production of Match wood, 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 or suitable fencing etc. No other matchwood species other than Sawar though recommended by 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 yields fiber which is used for rope making. The scattered 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. A separate scheme for harvesting of Khair trees was drawn up in 1962 by Wagle in order to ensure sustain supply of Khair trees to Swasti Katha Factory of Dahanu. Harvestable size of Khair was fixed at 36” (91.44cms) and the felling cycle was 20 years. The yield collection was based on the enumeration carried out in 1946-47 and the yield was prescribed by number of trees. Kath factory stopped operating in the mean time and Khair trees were sold by tender. Planting of trees, yielding various MFPs and Bamboos were prescribed but no such plantations were raised. Special works of improvement like fire protection, plantations, thinnings and construction for required roads and buildings were carried out mostly as per recommendations of the plan. All harvested coupes and rab plantations in the area of main working circle and pole working circle were fire traced for a period of 5 years from the year of regeneration as prescribed in working plans.

7.2.13. During Jadhav’s plan, plantations were raised over an area of 7,234.509 ha. In total 40.8 % of clear felled 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 were 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 successful. Thinnings were generally carried out as prescribed under the plan.

V - N.J. Joshi's Plan

7.2.15. Shri.N.J. Joshi combined all the schemes and plans under operation of the reserved forests of Thane Circle and wrote a single working plan for all the reserved forests of the circle comprising of Dahanu, Shahapur and Thane Forest Divisions. The period of this plan was fixed for 20 years from 1st July, 1969. He constituted 13 working circles and out of which Lake Catchment Working Circle and Pulpwood plantation working circle were not applicable to Dahanu Forest Division. Only 11 working circle were applicable for the areas of Dahanu Forest Division.

7.2.16. The special objects of Management, main prescriptions, extent and quality of implementation and their results for each of the 11 Working Circle are as under:-.

1) The Protection Working Circle.

7.2.17. The working circle comprised of unworkable areas known as “Kharabas”. The site quality is usually IVb, IVa and III. The forest belongs to local type “Mixed forests” with teak either totally absent or occurring in small numbers. In rest of the area, the forest belongs to the type “the most 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 **2726.721 ha.**

7.2.18. Owing to their inaccessibility, the areas have remained protected till date. However, while managing these forests it is seen that fire protection could not be provided for want of budgetary provision which has resulted in the deterioration of the quality of vegetation in these forests.

II) Selection-cum-Improvement Working Circle.

7.2.19. All workable areas which were unfit for clear felling on account of steep slopes (more than 25 degrees) were included in this working circle. The Forest mostly belongs to the type “moist teak bearing forest” with the local types, viz. Teak forest and mixed forests. The site quality was IVa and III. The density of the crop varied from 0.3 to 0.6. Important species occurring in the crop are teak, khair, Shisam, ain, dhawada, hed, kalamb, bibla, etc.

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 Smythies’ 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. No special measures were taken up to improve the quality of the existing forests. Most of the coupes were over harvested. 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.

III) Conversion Working Circle.

7.2.22. All workable areas which were situated on moderate slopes (i.e. less than 25 degrees) and had better site quality viz. III and above had been included in this working circle. The forest mostly belongs to the type “moist teak bearing forests”.

7.2.23. Special object of management is to convert the existing uneven aged crop of inferior species into an even aged crop of valuable timber species like teak and khair in order to derive maximum possible sustained yield.

7.2.24. The Silvicultural system prescribed was “modified clear felling system” followed by artificial regeneration.

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. 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. All the P.B. areas of each felling series were divided into 20 annual coupes.

7.2.26. Subsidiary cultural operations of CBO, Cleaning, and thinning were prescribed. The areas were to be fire traced, and protected from grazing. Soil conservation works were also prescribed to be taken up.

7.2.27. The areas which were not fit for clearfelling were clearfelled and taken up for plantation. The prescription given for unplantable areas for PB I and all areas of PB II and PB III were ignored. It was noted that the coupes of PB II and PB III due for thinning and improvement fellings were being marked for felling. Even in thinning coupes for plantations, selection fellings were resorted to as against the prescription of mechanical and Silvicultural thinning. Such indiscriminate operation of felling has resulted in reducing the growing stock in PB II and PB III. After clearfelling in PB I most of the areas were planted with Teak, but the result of such plantations were not successful. Wrong site selection, biotic interference, fire and hacking are responsible for failure of regeneration. Encroachments for cultivation have increased in the tract. Bamboo under-planting taken up in Teak plantations has failed in most of the areas. Neglect of cleaning and thinning operations has adversely affected the plantations.

(IV) Industrial Wood Plantation Working Circle.

7.2.28 It included the better quality area situated on moderate slopes near the main lines of communication. The areas allotted to this working circle were to be planted with industrial woods like khair, hed, kalam, sawar, muharukh etc. The forest area of Dahanu Forest Division included in this working circle was 1817.967 ha.

7.2.29. The special object of the management of the forest of this working circle was to raise plantations of industrial wood species required for forest based industries like manufacture of kath, bobbin shuttles, and matches 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 regulated by area.. Subsidiary silvicultural operation like weeding, cleaning, and thinning 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 was to be fire traced for seven years from the year of planting.

7.2.30. While implementing the prescription of this working circle it was noted that only 67.00 ha. out of 1817.967 ha area 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) Miscellaneous Plantation Working Circle.

7.2.36. All such areas which were degraded due to severe effects of maltreatment and consists of continuously hacked trees subjected to illicit cutting for over a long period, were kept under this working circle and hect.2214.237. The site quality was IV a and Ivb and where hacking was not taking place the density varied from 0.4 to 0.5. The special object of management was to raise plantations of fast growing species like Eucalyptus, Albizzia fulcata, Dalbargia Sisoo etc. so as to meet local demand for firewood. The method of treatment prescribed was clear felling with artificial regeneration. Cleaning fire protection and closure to grazing were also prescribed. Applications of fertilizers were also prescribed for boosting the growth of plantations.

7.2.37. Very negligible areas have been tackled under this working circle with the result that entire area remained degraded and probably in most of the cases the sites have deteriorated to alarming situations. Even during the year 1987.88 when top priority was to be given for plantations and afforestation of such degraded areas, the coupes due for plantations under this working circle were not taken u

VI. Fodder Reserve Working Circle

7.2.38. This working circle included the denuded and blank areas which were classed as miscellaneous forest{fodder reserved}. These areas were situated near Boisar and Vangaon where the pressure of population is so tremendous that it would have been very difficult to protect plantation in such areas. Most of the areas had been completely denuded due to continuous hacking for firewood. The area was however suitable for growing grass which is in great demand. The total area allotted to this working circle was 1817.967 ha.

7.2.39. The special object of management was to protect the areas vulnerable to soil erosion by maintaining soil cover and also to produce good quality grass which could be used as fodder to be supplied to milk colonies near Bombay and Dapchari near Talasari and scarcity areas.

7.2.40. The areas were proposed to be developed as cutting Kurans. They were to be closed to grazing permanently and were to be fenced with barbed wire. Details of species of grasses and techniques for raising and harvesting were also given. Each Kuran was divided into 4 annual units so as to cover the area in 4 years.

7.2.41. None of the prescriptions recommended under this working circle have been followed except that the grasses have been auctioned annually.

VII. Casuarina Working Circle:

7.2.42. This working circle included the Casuarina plantations in Bordi, Dahanu and Palghar Ranges. Total area included in this working circle was 72.343 hectares in the sea coast. The entire area consisted of plantations carried out right from 1955-56.

7.2.43. Eucalyptus hybrid had been interplanted on trial basis in the Casuarina plantations raised in 1962-63 and they have survived well.

7.2.44. The special objects of management mentioned were to make the otherwise barren, unproductive, sandy areas, to a productive area by planting Casuarina. The method of treatment prescribed was clearfelling with artificial regeneration. Rotation was fixed at 15 years. The old plantations o

been successful and had given good results. However, plantations during the last few years had been failure. Since 1986-87 neither the felling nor the plantations of the species had been attempted. Brick method of planting had not been resorted to anywhere and most of the plantations were reported to be failure due lack of watering during lean season and lack of protection.

VIII. Miscellaneous Working Circle.

7.2.45. This working circle included Eksali Plots. The total area of this working circle was 613.653 ha. Eksali 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 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.

7.2.46. The Preservation Plot at Compartment No 238 of Kasa Range containing a mixed type of forest of III quality was maintained by the Research wing. For ecological studies, the preservation plot was to be wire-fenced and strictly protected from fire and grazing. Periodical study of flora in the plot was recommended for adjudging the progress of natural succession in the locality. However, no headway had been made in this respect.

X) Minor Forest Produce (Over Lapping) Working Circle.

7.2.48. The over lapping working circle covered the whole area dealt with under Joshi's plan. Special treatment had been proposed for increasing the yield of some of important forest produce. The minor forest produce listed in the plan were:-grass, Bamboos, thorns, babul, datans, apta, tembhurni leaves, bel, Kadipatta, myrobalans, chilhar bark, ain bark, vavding, tad leaves and fruits, Moha flowers and seeds, kusari flowers, rankle leaf, honey and karya gum. The special object of management were to ensure proper collection of various minor forest produce and to take measures so as to increase or at least to maintain the sustained yield of various minor forest produce in the tract. None of the prescriptions except selling of the minor forest produce annually by auction were followed. As a result there has been very steep decline in the availability of all minor forest produce in the tract

X) Bamboo {overlapping} working circle

7.2.49. Under this overlapping working circle, inter planting of bamboo was recommended in all the bamboo bearing areas. The total area covered by bamboo {overlapping} working circle was 109725.688 ha. Three species of bamboo i.e. manvel, katas and bundhi were found. Most of bamboo had died after gregarious flowering which took place in 1959-60. Profuse regeneration had come up but it had not established. The special objects of management set for this working circle were to ensure the scientific harvesting of Bamboo and to provide artificial regeneration where natural regeneration was inadequate. Attempts had been made to regenerate the areas by taking up bamboo plantations in the tract but could not establish primarily due to biotic interference.

XI. Management of Woodland Protected Forests.

7.2.50. F.X. Saldhana had drawn a working plan for the woodland protected forest for a period of 40 years from 1938 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 Dahanu Forest Division.

The basic objectives postulated were:-

1. To replace the mature injaili trees by coppice growth and encourage advance growth and natural regeneration so as to maintain a perpetual and sustained yield of tahal supply to serve as manure for seed beds, and indispensable need of the population in the predominantly agricultural district.
2. 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.
3. To improve the condition of the crop by clearing, thinning, and other cultural operation.
4. 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.

7.2.51. The fellings were regulated by area and controlled by girth limit. The method of treatment prescribed was the selection felling and shade trees like vad, pimpal and koshimb growing in Gaonthans and shrines were not to be felled.

7.2.52. No sowing and planting prescriptions were given for ensuring regeneration of the worked forests, though strong necessity for the same was mentioned. Though these forests have been transferred to forest department for management and protection right since 1956, no successful attempt have been made for restoring its ecological status. Forest maps of the area are 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.

Ramanuj Choudhary's Plan:-

7.2.53. Shri. Joshi's Plan was revised by Shri. Ramanuj Choudhary for Dahanu Forest Division for the period from 1990-91 to 1999-2000. The erstwhile Dahanu Division included four Ranges of Jawahar Forest Division and 8 Ranges of Dahanu Division. The period of this was fixed for 10 years {1990-91 to 1999-2000} He constituted 11 working circle. The working circles with their prescriptions and the results were as under:-

1) Protection Working Circle:-

7.2.54. This working circle contained unworkable areas not fit for harvesting on account of very steep slopes (above 25°) or in inaccessibility. Total area included in this Working Circle was **13263.38 ha**. On account of the steepness of the area, and shallow soil depth no felling was prescribed. The site Quality is poor and belongs to quality IVa and IVb with density ranging from 0.1 to 0.4. The forest belongs to the type "moist Teak bearing Forests" The special object of management was to protect and improve the existing vegetal cover so as to prevent soil erosion and degradation of site. No Silvicultural system was prescribed as no harvesting was proposed. Raising of plantations of fruit yielding species or shrubs and herbs at the suitable sites or else seed sowing in understocked areas was prescribed. Soil and Moisture Conservation works were also prescribed to be taken. The entire area was to be protected from fire and was to be kept closed to grazing.

7.2.55. Demarcation of coupe Number IX, X were taken up during 1998-99, 1999-2000, except a few Soil and Moisture Conservation works here and there, most of the prescriptions were not followed mainly because of the inaccessibility of the areas and lack of funds. There are frequent fire incidences in some of the exposed areas. The forests have remained protected till date due to their inaccessibility and rough terrain.

2) Improvement Working Circle:

7.2.56. This working circle included all workable areas below 25 degree slope except the area below density 0.4. It included almost all the Plantations carried out in the areas of Conversion Working Circle of Joshi's Plan. The total area pertaining to Dahanu Forest Division included in this working circle was 13262.647 ha. The area had been divided into 39 working series.

7.2.57. The special objects of management were:-

- 1) To enrich the growing stock by artificial regeneration and tending of natural regeneration without changing the climax status of the forests.
- 2) To achieve normality of growing stock in the shortest possible time to derive maximum sustained yield in future under one of the selection systems.

7.2.58. The prescription included, improvement fellings of dead trees, thinning of congested group of poles along with cutting back of illicitly cut live high stumps, enrichment plantations etc. The prescribed felling cycle was of 10 years. A treatment map showing protection areas, plantation areas and plantable areas was to be prepared before marking. Only dead trees were to be marked for felling in workable areas except in cases where their retention was essential for site protection. Subsidiary silvicultural operations, like cutting back operation, cleaning in the 5th year of the coupe working and 1st thinning in the 10th year of planting were prescribed for plantations. Fire tracing around the worked coupe was to be done for 10 years. The worked coupes were to be closed for grazing for 10 years.

7.2.59. Demarcation of coups No IX, X was taken up during 1998-99, 1999-2000. No marking was taken up. Similarly cleaning, climber cutting etc. was also not taken up, mainly due to budgetary constraints. Hence condition of the crop does not show any improvement.

3) Afforestation Working Circle:

7.2.60. All the under stocked areas of Reserved Forests were included in this working circle. The total area of this working circle was 12279.071 ha. The objects of management were:-

- 1) To re-establish the forest cover over the entire forest area so as to prevent soil erosion and further degradation of land
- 2) To meet the local demand of small timber, firewood, tahal supply and fencing material.

7.2.61. The area was divided into 45 plantation series. The system prescribed was improvement felling with gap planting by mixed species. Plantation areas were to be categorised as Zone I, Zone II and Zone III, depending on the soil depth. Treatment maps were to be prepared and treatments given as per prescriptions. No rotation was fixed. Subsidiary silvicultural operations included cut back operations during the year of working, Cleaning in 5th year and thinning in 10th year. The worked coups were to be fire traced for 10 years and also closed to grazing for 10 years.

7.2.62. Plantations taken up have not grown as per objectives of scheme. Various plantations were found to be hacked by natives for fencing or other domestic requirement once they reach the pole stage. The survival of plantations under various schemes is less and due to repeated hacking and biotic pressure growth is also stunted.

4. Miscellaneous Working Circle:

7.2.63. This W.C. included an area of 10.227 ha. This area of 10.227 ha. is covered by preservation plot, in compt. No 238 of Kasa Range is being maintained by research Department.

5. Nature Conservation and Wildlife Preservation Working Circle:

7.2.64. This W.C. included the high slope areas situated in the catchments of important lakes & dams of the area. The areas included in the W.C. constituted potential wild life habitat and were significant from ecological, aesthetical and tourism point of view. Total area put under this working circle was 8966.701 ha. The area had been divided into habitat series and each series is divided into 10 units. The approach of management was ecosystem approach. Special object:

were to provide complete protection to natural flora, fauna, to improve natural habitats and to introduce forest and wild life tourism in the tract. Maintenance of natural meadows by removing obnoxious species was prescribed.

7.2.65. No special works with a thrust towards the habitat improvement of the wildlife were taken up mainly due to lack of adequate funds, though soil and moisture conservation works have been done at some places.

6. Fuelwood Working Circle:

7.2.66. This Working Circle included the areas of woodland protected forests, acquired forests & unclassed forests; The area under this W.C. was 26718.540 ha. Each village included in this W.C. was taken as a unit for production and harvesting. Silvicultural system used was improvement fellings with concentrated regeneration in available gaps. This working circle was meant to produce small timber, fuel wood and fodder on intensive basis primarily to meet the requirements of the villagers. Entire area was to be generated by artificial regeneration.

7.2.67. Prescriptions were hardly followed. The large portion of protected forest have been given as Eksali Plots and the same is with the beneficiaries. In addition to this, the identification of the eligible beneficiaries as per S.L.P. No. 1778/86 and Govt. G.R. of 10/10/2002 is not yet finalized by the revenue department. This is leading to difficulty in controlling honey combing cultivation and removal of wood by the villagers for their needs. Because of these encroachments prescriptions for fuel wood working circle could not be implemented. Further attempts to undertake plantations in these protected forest areas have not been successful.

7) Fodder Reserve Working Circle:

7.2.68. This working circle included the denuded and blank areas in the tract which are fit for growing grasses. Area included in this working circle was 1391.237 ha. out of this, area under cultivation is 350 ha which was reportedly allocated to beneficiaries by the high power committees during 1965. Further 54.675 ha. was handed over to forest Research circle. The scrubby land extents to 163 ha.

7.2.69. The prescriptions provide for maintenance of these areas as grass reserve fencing was proposed to entire area. S.M.C. works were prescribed to improve site conditions. Superior fodder grasses have to be introduced.

7.2.70. Harvesting of grass is being done in accordance with w.p. prescription. However its disposal is governed by orders from divisional commissioner on year to year basis. Inadequacy of funds is leading to non development of scrub area is this W.C.

8. Casuarina Working Circle:

7.2.71. The area included in this working circle was old Casurina plantations raised along sea coast in Palghar, Dahanu & Bordi ranges. Total area under this working circle was 72.343 ha. The prescription was that these plantations to be retained for aesthetic value. Only dead and dying trees were to be removed and blank areas planted.

7.2.72. Working Plan prescriptions have been followed. The plantations taken up under artificial regeneration are successful.

9. Babul Working Circle:

7.2.73. The prescription was clear felling followed by artificial regeneration. Total area under this working circle was 73.045 ha.

Result: - No artificial regeneration was taken up. Therefore, the prescription could not be tested.

Section- 3: - Special Works Of Improvement Taken.

7.3.1. Choudhary's Plan expired in 1999-2000. 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., and Western Ghat development programme, Afforestation for soil and moisture conservation, Reafforestation of degraded forest, Industrial and commercial plantation, Bamboo under planting, massive afforestation programme etc. Year-wise details of plantation taken in the Division from 1990-91 to 2008-2009 are given below.

Table No.8

Sr.No.	Year of Plantation	Area (in Ha.)
1.	1990-91	230.00
2.	1991-92	173.00
3.	1992-93	350.00
4.	1993-94	290.00
5.	1994-95	717.00
6.	1995-96	1071.00
7.	1996-97	780.00
8.	1997-98	803.00
9.	1998-99	713.50
10.	1999-00	954.03
11.	2000-01	744.00
12.	2001-02	289.00
13.	2002-03	30.00
14.	2003-04	40.00
15.	2004-05	704.125
16.	2005-06	480.70
17.	2006-07	199.87
18.	2007-08	156.00
19.	2008-09	1597.83
	Total Area in Ha.	9196.025

7.3.2. Following species of trees have been planted in different plantation areas Teak (*Tectona Grandis*) Sirus (*Alibizia lebbeck*) Bamboo (*Dendrocolumus Strictus*) Eucalyptus, Subabul (*Leucaena Leucocphala*) Acaciaaurculiformis, Amba (*Mangifera indica*), Moha (*Madhuca indica*) Anwala, (*Phyllanthus emblica*), Hirda (*Terminalia chebula*) Behda (*Terminalia belerica*), Khair (*Acucia catchu*), Siwan (*Gmelina arborea*), Sisoo (*Dalbergia Sisoo*), Jamun (*Syzygium Cumini*), Bor (*zizyphus mauritiana*), Karanj (*Pergemia pinnata*) etc.

7.3.3. The special works of improvement carried out during the preceeding few years were Providing Wireless Sets, Procurement of Vehicles for protection works, and supply of Arms to the Staff members, Construction of Residential Quarters and Office buildings in the Ranges. A World Bank aided “Maharashtra Forestry Project” was implemented with a view to augment the existing facilities in the Forest Division. A major emphasis was given for Plantation and Wildlife protection activities. On the recommendation of Tata Consultancy Services, internal reorganization of the Forest Divisions was done. The areas were classified as Highly Sensitive, Sensitive and Normal beats based on the problems of illicit felling, encroachment and other forest

protection problems. Accordingly, 8 Ranges were bifurcated to form 10 Ranges in the Division.

Section -4:- Past Revenue and Expenditure.

7.4.1. There was no fellings in the last Working Plan period. Hence yield is not calculated. However, minor forest produce are collected and sold. The main revenue is by sale of illicitly cut offence materials. Following is the statement of revenue and expenditure from 1990-1991 to 2008-2009.

Table No.9

Year	Expenditure (Lakh Rs.)	Revenue (Lakh Rs.)
1	2	3
1990-91	21911121/-	13558130/-
1991-92	23104551/-	21800632/-
1992-93	16754047/-	12150594/-
1993-94	20403672/-	14410402/-
1994-95	26206921/-	14944684/-
1995-96	97709431/-	24427833/-
1996-97	34389739/-	15030161/-
1997-98	37267722/-	15213218/-
1998-99	42219426/-	12714781/-
1999-00	52538278/-	10942514/-
2000-01	46781253/-	10070331/-
2001-02	36193317/-	16522431/-
2002-03	34726203/-	6391646/-
2003-04	39507667/-	6756736/-
2004-05	40665749/-	3707689/-
2005-06	83390139/-	3330133/-
2006-07	53000919/-	3091959/-
2007-08	64475420/-	6251708/-
2008-09	11647761/-	461603/-
Grand Total	782887336/-	325285245/-

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:-

Table No. 10

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.11

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	96.62

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 forests 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, data 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 reference 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:-

Table No. 12

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

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	0.00	

Table No. 13
Results of Stem Analysis of Teak trees from quality IVa forests.

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 are reproduced in the **Appendix No XVI to XXI of Vol. II.**

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 readings obtained from these curves are as under:-

Table No. 14

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. 15

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 total

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 Circle 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 2006-07 to 2007-08

8.2.5. The tree enumeration work was carried out by the Survey of Forest Resources, Nashik Division during 2006-07 to 2007-2008. The entire Dahanu Forest Division area was covered in sampling enumeration plan. The “Systematic line plot sampling with random start – the statistical sampling method” was resorted to with plot size 30m X 30m at an interval of 600 meters. This data have been analyzed by the Chief Forest Statstician, Maharashtra State, Nagpur and the results are presented below.

Table No.16

Working Circle	General Utility Species		Total of General Utility Species	Special Utility Species	Minor Forest Produce Species	Other Species
	Teak	Non Teak				
1	2	3	4	5	6	7
% of Stock to total growing stock	32.730	23.060	55.790	12.940	10.620	20.650

8.2.6. The results of enumeration show that the percentage of general utility species to that of the total growing stock is 55.790 out of which Teak is the major species constituting 32.73% of the total growing stock. The percentage of special utility species and minor forest produce species in the growing stock is 12.94 and 10.62 respectively. The share of remaining species in the growing stock is 20.65%.

8.2.7. A comparison has also been made between the availability of Teak per hectare (Enumeration period of 2006-07 to 2007-08) to that of what was available per hectare (Enumeration period of March- 89 to June – 89). The data reveals that the growing stock with reference to availability of Teak per hectare during 1989 was only 18%, which has considerably increased to 32.73 % during the current enumeration.

Table No.17

Sr No.	Name of Working Circle	Total Growing Stock	Teak (Ha)	% of Stock of trees to the total stock
1	2	3	4	5
1.	Nature Conservation, Wildlife Preservation and Forest & Wildlife Tourism Working Circle.	161.985	35.229	21.75
2.	Improvement Working Circle.	276.882	97.987	35.39
3.	Protection Working Circle	161.745	66.424	41.07
4.	Afforestation Working Circle	263.052	79.537	30.24
	Total (Weighted Average)	225.236	73.731	32.73

Table No.18

Availability of Teak (Enumeration period of March, 89 to June, 89)

Sr No.	Name of Working Circle	Total Growing Stock	Teak (Ha)	% of Stock of trees to the total stock
1	2	3	4	5
1.	Selection cum Improvement Working Circle.	282.290	42.150	15
2.	Conversion Working Circle	180.770	37.220	21
3.	Industrial Wood Plantation Working Circle.	365.08	67.690	19
	Total (Weighted Average)	228.27	40.030	18

8.2.8. The total area enumerated in the forests of various working circles of Shri. Ramanuj Chowdhary's Plan is as under.

Table No.19

Sr. No.	Name of Working Circle	Population area in Ha. as considered.	Sample area in Ha.	Intensity of sampling %
1	2	3	4	5
1.	Natural Conservation, Wildlife Preservation and Forest & Wildlife Tourism Working Circle.	7416.638	18.99	0.26
2.	Improvement Working Circle.	11586.016	26.82	0.23
3.	Protection Working Circle.	9977.178	32.94	0.33
4.	Afforestation Working Circle.	13332.558	30.69	0.23
	Total	42312.390	109.440	0.26

8.2.9. Working Circle wise, number of sound Trees per hectare are as follows :

Table No.20

No. of Sound Trees per Ha.

Sr. No.	Name of Working Circle.	Total	General Utility Species	Special Utility Species	Minor Forest Produce Species	Other Species
1	2	3	4	5	6	7
1.	Nature Conservation Wildlife Preservation & Forest & Wildlife Tourism Working Circle.	161.985	76.409	33.229	13.113	39.234
	% of Stock to total Stock	100	47.17	20.51	8.10	24.21
2.	Improvement Working Circle.	276.882	174.200	27.292	32.922	42.468
	% of Stock to total Stock	100	62.91	9.86	11.89	15.34
3.	Protection Working Circle.	161.745	102.488	16.666	19.643	22.948
	% of Stock to total Stock	100	63.360	10.30	12.14	14.19
4.	Afforestation Working Circle.	263.052	128.185	37.831	25.319	71.717
	% of Stock to total Stock	100	48.73	14.38	9.63	27.26
	Total (Weighted Average)	225.236	125.650	29.148	23.923	46.515
	% of Stock to total Stock	100	55.79	12.94	10.62	20.65

8.2.10. Some noteworthy results on current enumeration is described as follows :

- 1 There is marginal decrease in the total number of trees per hectare in current enumeration (2006-07 to 2007-08) from 228.294 to 225.236 over the past enumeration done in 1989.
- 2 In all the four major working circle enumerated 55% of the trees are in the lower most girth class ,i.e. 15 U 30 and 30 U 45.
- 3 The percentage of Teak per hectare has increased from 18 % to 32.73 % over a period of 18 years.
- 4 Ain is the second largest species after Teak in all the four major working circles enumerated during the current enumeration.

It is observed that the crop has become deficient in stocking. Most of the tree species are in the lower most girth classes, i.e. 15 U 30 & 30 U 45, which is due to hacking and delay in carrying out the hygienic silvicultural operations, such as cleaning , thinning , CBO etc. in old successful plantations. The stocking has reduced due to increased biotic interferences to the extent that a large percentage of the area can be safely categorized as understocked. The detailed results of the enumeration carried out during 2006-07 to 2007-08 are given in the **Appendix No LXIII of Vol. II.**

8.2.11. Due to above factors, there is considerable decline in the natural regeneration. Remedial measures for restocking have been prescribed in the various working circle by seeking participation of the 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 2857 Km² The forest cover is 29.89% of the geographical area. 43.06% of forest is “ Moderately dense “ and 56.94 % 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 at 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 restorations 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 Boisar, Dahanu, Vasai, Palghar and Talasari etc. which are 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 favourable 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 Dahanu 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°) 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° , 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 large size timber 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 suc

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 prescribe 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. **Miscellaneous Forests:**
 - i) **Grass Reserve :-** Open forests that are inter spersed with cultivate lands mainly suitable for producing fodder are included in this category. The area uner grass reserve is **1363.237. Ha.**
 - ii) **Remaining Areas:** - Areas needed for other purposes is **10.14 Ha.**

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 Working Circle.
- ii. Improvement Working Circle.
- iii. Old Plantation Management Working Circle..
- iv. Fodder Reserve Working Circle.
- V. Fuelwood Working Circle
- vi. Coastal Belt Working Circle.
- Vii. Non-Timber Forest Produce (Overlapping) Working Circle.
- viii. Bamboo Plantation (Overlapping) Working Circle.
- ix. Forest Protection
- x. Joint Forest Management (Overlapping) Working Circle.
- xi. Wildlife Protection (Overlapping) Working Circle.

Table No.21

Distribution of the Areas into Working Circles

Status of Forest	P.W.C.	I.W.C.	Old. Pl. Mangt. W.C	Fodder Reserve W.C.	Fuel wood W.C	Coastal Belt W.C.	Total Area (Ha.)
Reserved Forest	18197.471	29809.303	1226.000	1363.237	--	72.343	50668.354
Protected Forest.	--	--	286.432	--	26606.413	100.000	26992.845
Acquired Forest	--	--	69.957	--	809.205	--	879.162
Unclassed Forest.	--	--	--	--	9.195	2.124	11.319
Compensatory Forest.	--	--	--	--	--	151.850	151.850
Total :-	18197.471	29809.303	1582.389	1363.237	27424.813	326.317	78703.530

1.6.2. Protection 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 **18197.471 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 **29809.303 Ha.**

1.6.4. 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 **1582.389 Ha.**

1.6.5 Fodder Working Circle: This working circle includes the denuded and blank areas in Dahanu Division. The areas are situated near Vangoan, Boisar and Palghar. The areas are suitable for growing grass which is in great demand. The total area allotted to this working circle is **1363.237 Ha.** out of which **354.200 Ha** has been distributed by high power committee to beneficiaries, **54.675 Ha.** is handed over to research circle.

Areas are to be developed as cutting kurans, bushy under growth and stumps of trees which hamper the growth of grass will be removed. S.M.C. measures like gully plugging will be carried out to improve the site conditions. Superior fodder Grasses will be introduced. Whole area will be protected by suitable fire tracing measures and TCM.

1.6.6. Fuel Wood Working Circle: Areas of Wood land protected forest, unclassed forest and acquired forest are included in this working Circle. The total area under this Working Circle is **27424.813 Ha.** Due to the scattered nature of forest lands adjoining villages the forests have been subjected to heavy biotic interference.

In this working circle each cluster of villages will be treated as one production unit or Working Series. Area will be divided in 10 units and each unit will be tackled each year with the active participation and co-operation of F.P.C. F.P.C. will be formed where it is not formed and they will be strengthened where it is formed. Proposed area will be tackled in two stages.

First Stage: - First five year, only soil and moisture conservation works will be carried out extensively to improve soil condition and to develop rooted stock.

Second Stage: - After five years Dy. Conservator of Forest will inspect the sites and decide about further treatment to these areas like planting of fuel wood species, small timber species, grasses etc.

1.6.7. Coastal Belt Working Circle: This Working Circle will include Mangrove Plantations raised in the Division and areas allotted to Casurina Working Circle in **Shri.Ramanuj Choudhary** Plan. All these areas run along the West Coast in the Western part of this Division. It forms a fragile ecosystem due to its proximity to the Sea. The total area allotted to this Working Circle is **326.317 Ha.**

1.6.8. 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.

1.6.9. 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.

1.6.10. Forest Protection: This has been included as a chapter instead of a Working Circle. It deals with the problems of Encroachments, Grazing, Fire and matters related to Forest Protection.

1.6.11. 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 Fuelwood Working Circle and Improvement Working Circle will be taken up with the active co-operation of the local people.

1.6.12. 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.** 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.** 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.**

Section – 9:- Period of the Plan.

1.9.1 It is proposed to keep the period of this Plan for 10 years from 2010-11 to 2019-20. A review of the prescription is recommended after 5 years.

CHAPTER – II

WORKING PLAN FOR THE PROTECTION WORKING CIRCLE.

Section 1:- General Constitution.

2.1.1. This Working Circle would include Kharabas, i.e. Steep and Precipitous slopes mostly above 25⁰ which is not fit for any working. Such 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 landslides and severe soil erosion. These forests would not be subjected to any fellings and would be completely protected. However, soil and moisture conservation works will be carried out along with seed sowing in suitable areas. It includes areas allotted to Protection Working Circle, Nature Conservation & Wildlife Preservation Working Circle of the previous plan and areas handed over by the FDCM Ltd. to Dahanu Forest Division. The total area allotted to this Working Circle would be **18197.471 Ha.** The range wise detail of the area allotted to this Working Circle is as under:

Table No.22

Sr.No.	Range	Total area of range	Area allotted to Working Circle	Percentage of range area.
1	2	3	4	5
1.	Bordi	8529.164	1463.373	17.16 %
2.	Dahanu	8281.873	1184.092	14.30 %
3.	Kasa	7308.653	1102.068	15.08 %
4.	Udhawa	9641.568	752.228	7.85 %
5.	Manor	7472.175	761.142	10.19 %
6.	Dahisar	6958.479	2468.779	35.48 %
7.	Boisar	11381.803	2350.233	20.65 %
8.	Palghar	6479.123	2568.455	30.64 %
9.	Safale	7115.553	2489.782	34.99 %
10.	Bhatane.	5535.139	3057.319	55.23 %
Grand Total		78703.530	18197.471	

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 & IVb with patches of III quality occurring locally on more gentle slopes and in the valleys. The density of the crop varies from 0.1 to 0.4. 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 in the past, the crop is conspicuously deficient in natural regeneration. In some part, Karvi is found abundantly. Bamboo has not established well after their gregarious flowering and therefore their occurrence is very scanty.

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. Ten 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 & XXXIII of Vol. II.**

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 details of stock mapping is given in the **Appendix No. XXVI (A) of Vol.II**. The extent of Growing stock is as under.

Table No. 23

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
13.440	7.100	0	894.182	3712.167	579.801	844.368	9706.072	706.790	1339.953	393.598	--	18197.471

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*, *Shiras*, and *Karanj* etc as well as soil binders will be tried.

Section – 8:- Harvestable girth and Rotation.

2.8.1. Since no harvesting is to be carried out, harvestable 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 14.1.1. to 14.1.5. 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° slopes
- 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 Improvement Working Circle, parts of Afforestation Working Circle of Choudhary's Plan and parts of areas handed over by FDCM Ltd. to Dahanu Forest Division. The areas are having young to middle aged crop which requires improvement through silvicultural operations. The total area allotted to this working circle **29809.303 Ha.** The range wise details of area allotted are given below.

Table No.24

Sr.No.	Range	Total area of range (Ha)	Area allotted to working circle (Ha)	Percentage of range area (%)
1	2	3	4	5
1.	Bordi	8529.164	4572.859	61.01
2.	Dahanu	8281.873	5437.166	65.00
3.	Kasa	7308.653	3079.059	42.13
4.	Udhwa	9641.568	5405.046	56.06
5.	Manor	7472.175	1810.736	24.23
6.	Dahisar	6958.479	1530.062	21.99
7.	Boisar	11381.803	4059.900	35.67
8.	Palghar	6479.123	987.154	15.23
9.	Safale	7115.553	2031.490	28.55
10.	Bhatane	5535.139	895.831	16.180
Grand Total		78703.530	29809.303	37.87

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 stocks which can be tended to produce matured 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 from 0.3 to 0.6. On account of heavy grazing, illicit fellings, and repeated fires and over harvesting in the past the crop is conspicuously deficient in natural regeneration as well as higher girth classes. Some of the areas which were not clearfelled have density ranging from 0.4 to 0.6, but are deficient in higher girth classes due to heavy selection fellings resorted earlier.

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

3.3.1. The Compartment allotted to this Working Circle are given in the **Appendix No. XXXIV of Vol II**. In this Working Circle 25 Felling Series has been formed. The details of felling Series and the Coupes are given in **Appendix No XXXV of Vol II**. 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.

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**. The extent of Growing Stock is as under:

Table No.25

Teak Forest (Ha)		Mixed Forest (Ha)			Other (Scrub) (Ha)	Planta tion (Ha)	Under stock (Ha)	Cultivati on (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
202.500	264.827	85.822	2211.660	8273.341	298.488	2606.724	12820.925	2152.753	337.007	555.256	---	29809.303

ii. Enumeration:

3.5.2. The Enumeration carried out by the Survey of Forest Resources Unit, Nashik in 2006-07 to 2007-08 are given in **Appendix No.LXII of Vol. II**.

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.N.R. will be supplemented with A.R. wherever needed.

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.**

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 14.1.1. To 14.1.5.

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° 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.

Treatment map will be prepared on graph paper in 1:5000 scales. Laying of grids in B, C & D type area shall be done after classifying the areas into various treatment Types. In B type areas where adequate rooted stock / natural regeneration is present grids of 1 ha. size shall be laid and where plantations are prescribed grids of size 0.5 ha. shall be laid. In C and D type areas grids of 1 ha size shall

3.11.3. 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 Dy.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.

Section – 12:- Nature of Treatment.

The various categories of areas shall be given treatment as prescribed here. Marking shall be done under close supervision of the R.F.O. and constant guidance of the A.C.F. concerned. The D.C.F. shall himself inspect majority of the coupes to impart proper guidance and instructions to the staff as well as to guard against excessive marking if any. Grid wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons for marking such as dead, dying, malformed, live high stumps, singling of coppice shoots etc. will be recorded. Grid wise record of operations mentioned under Natural Regeneration, eg. Tending, root –stock management, singling of coppice, weeding etc. shall be maintained. Marking technique for the trees to be marked for felling is discussed in the chapter on ‘Miscellaneous Regulations’. The treatments to be given for the above mentioned areas are as follows:

3.12.1. Area ‘A :

- i The SMC works including nalla –bundling and gully plugging will be carried out wherever essential.
- ii. Seeds of local suitable species will be dibbled in the accessible understocked areas having good soil depth and cutting of suitable species such as Ficus, Vitex, (Nirgudi) shall be planted. Bulbils of A

used for planting. Bamboo will be planted in accessible under stocked area within twenty meters wide strip on either side of water course.

- iii. Felling is not prescribed. No tree shall be marked for felling.
- iv. All live high stumps shall be cut flush to the ground and shall be dressed thereafter with a sharp axe to get vigorous coppice shoots.

3.12.2. Area 'B' :

- i The SMC works including nalla-bunding and gully plugging will be carried out wherever required.
- ii Suitable species will be planted in accessible understock areas having good soil depth. Artificial regeneration will be carried out. Plantation Model – I is prescribed – 1100 seedlings will be planted. However, other plantation model may also be adopted depending on the situation as decided by Dy.C.F. Dahanu.
- iii Rooted stock shall be properly tended. Areas with adequate rooted stock shall be excluded from planting. Separate grids should be shown for the rooted stock area clearly mentioning the number of rooted stock present in that particular grid.
- iv All live high stumps shall be cut flush to the ground and shall be dressed thereafter with a sharp axe to get vigorous coppice shoots.
- v The established multiple coppice shoots and poles shall be reduced to one per stool retaining the vigorous one while the newly risen coppice shoots shall be removed.
- vi The undesirable under-growth which is preventing or likely to prevent the development of seedling regeneration of the desired species shall be removed.

3.12.3. Area 'C' :

- i No planting shall be done in these areas.
- ii Marking for thinning shall be done in the young pole crop as prescribed in the chapter on ' Old Plantation Management W.C.' The congested young poles shall be marked for thinning to remove the congestion by bringing down the number of poles per hectare as prescribed under the chapter on ' Old Plantation Manag

- iii The dead, dying , diseased and malformed poles shall be marked first for thinning.
- iv The multiple pole crop shall also be thinned to one pole per stool retaining the most promising one.
- v Care should be taken to remove the poles of coppice origin first while retaining the poles of seedling origin.
- vi All live high stumps shall be cut flush to the ground and shall be dressed thereafter with a sharp axe to get vigorous coppice shoots.
- vii The undesirable under growth which is preventing or likely to prevent the development of seed based NR of the desired species , shall be removed.

3.12.4. Area 'D' :

- i No planting shall be done in these areas.
 - ii Climbers obstructing the growth of trees will be cut at the time of marking.
 - iii Only dead, dying and malformed trees shall be marked for felling , retaining four dead trees per hectare for the benefit of the wild-life. To avoid reckless felling, it is prescribed that only malformed trees having bole less than 2.5 meters in height shall be marked for felling.
 - iv All live high stumps shall be cut flush to the ground and shall be dressed thereafter with a sharp axe to get vigorous coppice shoots.
 - v The entire multiple coppice tree or pole crop shall be marked to reduce the number of stems or poles to one per stool retaining the most promising one.
 - vi The undesirable undergrowth which is preventing or likely to prevent the development of seedling regeneration of the desired species, shall be removed.
- a. Malformed tree:** A tree with a badly shaped and defective stem occupying more space than its future value warrants and includes conditions like stag headedness, gnarls, twists, or constrictions due to climbers or crookedness etc., heavily burnt by fire at its base and likely to fall down, with general cavities dug in the stem for taking out honey or has many ant holes or fungus, rots or other diseased portion.

Section – 13:- Soil and Moisture Conservation Works:

The area gets heavy average rainfall of about 2500 mm. per year but most of the valuable rain water goes waste as run-off into the streams, rivers and ultimately into the sea. Therefore a large tract of this division faces an acute shortage of water during the summer months. The soil has also become compact over the years due to heavy grazing and frequent fires resulting in poor drainage as well as poor aeration of the soil. To raise the water table in general and to help the young regeneration to establish, intensive soil working viz. gully plugging, nalla bunding, brush wood, bandharas and other appropriate water harvesting structures such as loose boulders structures and vegetative- checks dams should be undertaken.

Section – 14:- Regeneration:

3.14.1. Natural Regeneration :

The young recruits of teak and other species noticed in patches at certain places usually die before getting established mainly due to the following reasons.

- i Heavy unregulated cattle grazing resulting thereby in the trampling of young recruits.
- ii Recurrent fires.
- iii Compact soil structure with bad drainage and bad aeration.

In order to help the young recruits of teak and other valuable species to establish and to further induce the NR, the following prescription shall be followed:

- i The areas containing promising NR shall be identified inside the coupe.
- ii The undesirable undergrowth as well as climbers which are preventing or likely to prevent the development of seedling regeneration of the desired species shall be removed.
- iii Identified NR patches shall be rigidly fire-protected and suitably tended.
- IV Coppice shoots interfering with the development of young seedlings shall be removed.
- V A little opening up of upper canopy by felling of marked trees and the ground cover at certain places shall help in establishment of NR of Teak and other by providing better light conditions.
- vi The NR should be cleared of weeds within the diameter of one meter and these weeds, grasses, leaf litter, leaves, twigs and branches

in a 6 inches high layer all around the seedlings within the cleared area to act as organic mulch. Two or three spadefull of earth shall be thrown over it to keep it in place. It will keep the soil around the plants free from weeds as well as help securing the loosening and aeration of the soil by worms and insects.

In addition, stone mulching shall be resorted to around the current year recruits in the areas where surface stones are abundantly available, small stones shall be arranged in a circle closed around the very young seedlings. Stone mulching shall help in retention of surface moisture as well as accidental trampling by cattle or others.

3.14.2. Artificial Regeneration :

The under stocked area will be regenerated artificially. The choice of the species to be planted shall depend upon the area suitability of the species and its local demand and shall be decided upon in close consultation with the local village communities. The species indigenous of the area like teak, dhawda, ain, arjun, tiwas, shivan, chinch, jamun, ber, kuda, biba, anjan, amba, apta etc. shall be preferred. Care shall be taken to give due representation to fuel and fodder tree species (another 15% of the misc. stock) as well as to the edible fruit and NTFP tree species (another 15 % of the misc. stock). Teak will be planted by stumps and rest by the seedlings raised in polypots or root-trainer containers. 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 Dy. C.F., Dahanu.

Section – 15:- Subsidiary Silvicultural Operations:

3.15.1. CBO: The cutting back operations shall be carried out one year after the main felling in the coupe as per the following rules.

- i All left over established multiple coppice shoots and poles shall be reduced to one per stool.
- ii All newly risen coppice shoots from the freshly felled trees stumps shall be reduced to two per stool retaining the most promising ones.
- iii All newly risen coppice shoots from the old stumps shall be removed retaining the old promising shoot.
- iv NR shall be tended as per the guidelines given above.

3.15.2 Cleaning: It shall be carried out during the 7th year of the main felling as per the following rules.

- i. All inferior species including the undesirable undergrowth interfering or likely to interfere with the growth and development of seedling regeneration of teak and other valuable misc. species shall be cut back.
- ii. Only the most promising coppice shoot out of the two kept from the freshly felled tree stumps previously shall be retained and the established seedling regeneration of teak and other miscellaneous species shall be spaced out suitably. All newly risen coppice shoots shall be removed.

3.15.3. Thinning: It shall be done as prescribed in the chapter on “Old Plantation Management W.C.”

Section – 16:- Other Regulations:

3.16.1. Fire Protection: Main Improvement coupe shall be fire- traced and rigidly protected from fire for a period of five years from 1st Year of its working. The area shall be cleared off all the dry and cut remains of bushes, leaves etc. by end of February to avoid fire hazards to standing crop as well as to NR. Effective protection against fire for a period between Feb-15 to June-15 is must to ensure survival and establishment of NR of all species for developing it into the future growing stock. “Village forest protection committees’ shall be formed and a comprehensive fire fighting scheme shall be chalked out, the details of which are given in the ‘Miscellaneous Regulations.’

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

3.16.3. Micro plans to JFM: If any area allotted to this W.C.is also included for treatment in a Micro Plan under FDA or JFM, then the said area shall be treated in accordance with the special objects of management pertaining to this W.C.

CHAPTER IV

WORKING PLAN FOR OLD PLANTATION

MANAGEMENT WORKING CIRCLE:-

Section- 1:- General Constitution of the Working Circle.

4.1.1. This Working Circle will include successful plantations raised by the Department and the plantation areas handed over by the FDCM. Many plantations have been raised under various schemes in the past. The plantations raised in Dahanu Forest Division in Reserved Forests, Protected Forests, and Acquired Forests are included in this working circle. The total area under this Working Circle is **1582.389 Ha.** which makes it 2.01% of the total area being dealt in this Plan. The range wise detail of the area allotted to this Working Circle as given below.

Table No.26

Sr.No.	Range	Total Area of range	Area allotted to Working Circle	Percentage of range area.
1.	2	3	4	5
1	Bordi	8529.164	105.000	1.23%
2	Dahanu	8281.873	---	---
3	Kasa	7308.653	36.950	0.51%
4	Udhawa	9641.568	128.440	1.33%
5	Manor	7472.175	180.000	2.41%
6	Dahisar	6958.479	284.000	4.08%
7	Boisar	11381.803	136.007	1.19%
8	Palghar	6479.123	221.992	3.43%
9	Safale	7115.553	490.000	6.89%
10	Bhatane	5535.139	--	--
Grnad Total		78703.530	1582.389	2.01%

Section 2:- General Character of Vegetation.

4.2.1. Under various schemes, plantations of Teak and Miscellaneous species have been taken up. Because of inadequate availability of fund no tendir

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 Objects of Management.

4.3.1 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: Compartment and Working Series:

4.4.1. The details of the Compartments and the Survey/Gat numbers are given in **Appendix No.XXXVII (A, B, C&D) of Vol.II.**

Section 5:- Analysis and Valuation of the Crop.

4.5.1. The details of the Stock map are given in **Appendix No.XXVI-D, XXVII-B and XXVIII-B of Vol.II.**

Section 6:- Method of treatment.

4.6.1. 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 -7:- Rotation.

4.7.1. In absence of any data on growth of various species in these plantations in degraded areas, it would be difficult to fix the rotation.

Section - 8:- Regulation of yield.

4.8.1. As the areas are mostly understocked the yield derived from the worked coupes will be negligible.

Section - 9:-Sequence of working.

4.9.1. A statement showing the sequence of coupes due for cleaning, thinning etc. is given in **Appendix No.XXXVIII (A, B &C) of Vol. II.**

Section - 10:- Demarcation of coupes and marking technique.

4.10.1. Demarcation: The cleaning and thinning coupes will be demarcated one year in advance of working.

4.10.2. Marking Technique: The Marking technique and demarcation as prescribed in para **14.1.1.** to **14.1.5.** in Miscellaneous Regulation will be followed.

Section - 11:- Method of Executing works.

Preparation of treatment map:

4.11.1. 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 inspecting the coupe and will be verified by the Assistant Conservator of Forest. The Treatment maps shall be prepared on graph paper in 1:50,000 scale. Grids of 1 Ha. Size shall be laid. The RFO will prepare the stock map using standard conventional signs.

4.12.1. CLEANING:

It is carried out in a sapling crop and involves the removal of inferior species, if they are interfering with the individuals of the favoured species. It is done to improve the light conditions, reduce the root competition and transpiration water losses. Cleaning shall be done in the 7th year of the plantations, if required RFO concerned shall inspect the plantations in the 7th year and submit his report through ACF to the DCF. The report must clearly mention the reasons for cleaning operations. DCF should inspect the plantations and satisfy himself whether the plantations really need cleaning operation or not. The following operations will be carried out:

- i. All climbers shall be cut in the Plantations area.
- ii. Individuals of inferior species interfering or likely to interfere with the growth of planted saplings shall be cut back.
- iii. Malformed, diseased and damaged individuals of the planted saplings shall also be cut back.
- iv. All the multiple shoots will be reduced to one. The most vigorous shoot will be retained.

4.12.2. THINNING:

These are felling made in an immature stand for the purpose of improving the growth and form of the trees, without permanently breaking the canopy. A few years after the plantations are raised; there starts an intense competition amongst the saplings for limited light, minerals and water. Therefore to avoid the adverse effects on the growth of the future crop, thinning is required to gradually reduce the number of saplings, poles and trees per unit area, as the crop advances in age. It consists of series of successive felling operations before the crop matures. The interval between two successive felling may be fixed depending upon the time required for canopy closure.

1. Thinning in Teak Plantaions:

Thinning shall be done after 10th, 15th and 20th and 30th year of the plantation. This will consist of removal of inferior individuals of the crop, starting from the suppressed class to the dominated class to some of the dominants but not creating any permanent gap in the canopy. The trees selected for retention are the trees with good boles and crown, evenly distributed over the area, with space on all sides for proper development. A few suppressed or dominated trees whose removal is of no economic or hygienic value may be left as soil cover in the gaps created by the removal of dominant trees.

Thinning shall be done as per the Yield Table which gives the number of trees to be retained per unit area after thinning at different ages as per the site qualities. Site quality of the area and the age of the crop shall be ascertained. Site quality is measured in terms of average height of dominant trees in the plantaions area. Girth class wise distribution of poles in the plantaion area shall be obtained by random sampling. Sample plots of size 0.5ha i.e. of 100X50 meters dimensions shall be laid with sampling intensity of 10%. Cooresponding to age and site quality, the number of stems per ha.and their distribution among different girth classless shall be obtained form the yield Table. Then it shall be compared with the number of stems actually available per ha. in the stand. Based on this, the number of stems to be retained girth class-wise after the thinning will be decided. The deficiency in stems in any girth class shall be compensated with the surplus in nearest girth classes on the basis of basal area. After sample marking, basal area per ha. of the stand excluding trees already marked for felling, shall be obtained by using wedge prism. This shall be compared with that of Yeild Table value, to ascertain the correc

marking. Deficient species, if any, shall be removed and thinning marking shall be completed by the RFO. The detailed marking list shall be prepared which shall be checked and verified by the Concerned ACF and the DCF in the field. The following rules shall be observed while thinning.

- i. The dead, dying, diseased and malformed poles shall be marked first for thinning.
- ii. The multiple poles shall also be thinned to one pole per stool retaining the most promising one.
- iii. Care shall be taken to remove the poles of coppice origin first while retaining the poles of seedling origin.
- iv. The established multiple coppice shoots shall be reduced to one per stool retaining the vigorous one.
- v. The undesirable under growth which is preventing or likely to prevent the development of the desired species, shall be removed.

II. Thinning in Mixed Plantations:

As the mixed plantations consist of species with varying rates of growth and different silvicultural requirements, thinning in such plantations are difficult. Elite Thinning, a kind of silvicultural thinning shall be done after 10th, 20th and 30th year of plantation depending upon the species raised in the plantation. In the elite thinning, evenly spaced selected stems of elites are retained up to maturity. Thinning is directed to remove the other stems hindering their optimum growth. This method envisages the selection of the future trees right from the beginning in favour of the selected elites. The prescriptions for the miscellaneous plantations are indicative only as the growth pattern and maturity age for various species varies greatly. The following rules shall be observed.

- i. At the time of first thinning, RFO shall select the elites under the guidance of the ACF, in the grids of 0.5 ha. Each in the entire plantation. The elites shall be spaced about 4 to 5 meters apart or more depending upon the plantation model and the number of plants planted per ha. Selection shall be done on grounds of the objective of the plantation model, the species, their utility, growth pattern, vigour and stem form etc. The DCF shall verify and approve the selection of the elites.
- ii. The selected elites shall be ringed at breast height with paint and the record shall be maintained.

- iii. In the 1st Thinning, saplings around the elites which are interfering with their growth shall be removed.
- iv. In the 2nd thinning also, the removal of other stems shall be done solely in favour of the elites. Any elite that may have been damaged or injured since the last thinning shall be replaced by the nearest available healthy pole preferably of the same species or of other species.
- v. In the third thinning, C or D grade thinning shall be done in the entire crop including the elites, reducing their number to about 2/3rd of the original and spacing them as evenly as possible.
- vi. Bamboo clumps in the plantation will be cleaned and if needed, some culms of bamboo will be removed at the time of thinning to boost the growth of new culms.

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

Section – 13:- Other Regulation:

4.13.1. Fire Protection: - The areas of the Plantation will be protected from fire by enlisting the help of the Forest Protection Committee in the locality.

4.13.2. Grazing: - The areas of the main working coupes will remain closed to grazing for a period of five years from the year of working.

4.13.3. JFM Micro Plans: - If any area allotted this Working Circle is also included for treatment in a Micro Plan under FDA or JFM, then the said area shall be treated in accordance with the special objects of management pertaining to this Working Circle.

CHAPTER V

WORKING PLAN FOR FODDER RESERVE WORKING

CIRCLE:

Section -1:- General Constitution :-

5.1.1. The areas included in this Working circle are blank areas classed as miscellaneous forests (Fodder Reserves) situated around Vangaon and Boisar villages of the Division. The areas are denuded and attempts to raise plantations have failed due heavy hacking by the local people. The area is now unfit for growing trees and there is tremendous pressure of population as a result of which protection has become extremely difficult. However, the area is suitable for growing grasses which is in great demand. The total area allotted to this working circle is **1363.237 Ha.** The range wise detail of the area allotted to this working circle in as given below.

Table No.27

Sr.No.	Range	Total area of range	Area allotted to Working Circle	Percentage of range area
1	2	3	4	5
1.	Bordi	8529.164	--	--
2.	Dahanu	8281.873	296.534	3.58%
3.	Kasa	7308.653	--	--
4.	Udhawa	9641.568	--	--
5.	Manor	7472.175	--	--
6.	Dahisar	6958.479	--	--
7.	Boisar	11381.803	1066.703	9.37%
8.	Palghar	6479.123	--	--
9.	Safale	7115.553	--	--
10.	Bhatane	5535.139	--	--
Grand Total		78703.530	1363.237	1.73%

Section -2:- General Character of the Vegetation:-

5.2.1. The original tree growth might have belonged to the Type “Moist Teak bearing Forest” which is the most common type of forest occurring in Dahanu Division. However, due to heavy illicit felling and constant hacking for firewood, the original tree-growth has either completely disappeared or has been reduced to stools with a number of pollarded shoots. As the area is more or less flat, erosion is not severe. The soil is deep clay. Past efforts to raise plantations have failed due to bad drainage and problems of protection due to proximity to human habitation.

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

5.3.1. The numbers of Compartments allotted to this Working Circle and the Series is given in **Appendix No.XXXIX of Vol.II**. The details of Working Series and coupes are given in **Appendix No.XL of Vol.II**.

Section -4:- Special Objects of Management:-

5.4.1. The objects of management are:

1. To protect areas vulnerable to soil erosion by maintaining adequate soil cover.
2. To produce good quality grass to meet the local fodder requirements and to supply to the scarcity affected areas in times of famine.

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

5.5.1. The area of this Working Circle has been stock mapped. No enumeration was carried out in this area in view of the absence of any tree growth. The stocking details are summarized as below.

Table No.28.

Area under Teak Forest Quality (Ha)		Area under Mixed Forest Quality (Ha)			Other (Ha)	Plantation (Ha)	Under stock (Ha)	Cultivation (Ha)	Eroded (Ha)	Blank (Ha)	Total Area (Ha)
Iva	Ivb	III	IVa	IVb							
1	2	3	4	5	6	7	8	9	10	11	13
--	--	--	--	--	1056.92	25.000	201.032	80.285	--	--	1363.237

Section -6:- Method of Treatment:-

5.6.1. Demarcation :

The main coupes shall be demarcated one year in advance of the prescribed year of working.

5.6.2. Treatment Map :

A treatment map shall be prepared by the R.F.O. showing the following details.

I. Area “A” – Protection Areas: It shall include the following areas.

1. Areas with steep, slopes, i.e. more than 25°
2. Eroded areas or areas liable to erosion.
3. Twenty meters wide strip on either side of the water courses.

II. Area “B” – Understocked Areas: includes areas with crop density less than 0.4

III. Area “C” –Pole crop and Old Plantation Area: It includes patches of well grown pole crop of teak and other species suitable for retention as a future crop in addition to old plantations. The patch should not be less than one hectare.

IV. Area “D” – Well stocked areas: Includes areas with crop density more than 0.4.

Treatment map will be prepared on graph paper in 1:5000 scales. Laying of grids in B, C and D type areas shall be done after classifying areas into various treatment types. In B areas where plantations are prescribed, grids of size 0.5 ha. shall be laid. In C and D type areas grids of 1 ha size shall be laid.

Section- 7:- Method of Executing the Works.

The area will be developed as cutting Kurans, Kuran development work will be completed in four years by taking up $1/4^{\text{th}}$ area on each year.

5.7.1. Area “A”

- i) Soil and Moisture Conservation works such as gully plugging will be carried out to improve the site conditions.
- ii) Felling is not prescribed.
- iii) Seeds of suitable species shall be dibbled and cuttings of species such as ficus, vitex (Nirgudi) shall be planted.

5.7.2. Area “B”

- i) Gully plugging and nalla bunding works shall be taken up at suitable sites in the area under treatment.
- ii) Suitable areas will be selected for fodder development. The selected area will be sown with seeds of superior fodder grasses like Marvel, Dinanath, NB21, Hamata, Pawnya etc. at the onset of the monsoons. The seeds of superior grasses will be sown after ploughing the area or making the beds or V- shaped furrows depending upon the condition of the site. Weeding will be carried out if necessary in favour of the fodder grasses raised.
- iii) All obnoxious weeds and thorny shrubs and bushes shall be uprooted. The unpalatable grasses growing in the areas shall be eradicated in the pre-flowering stage only.
- iv) The Fodder grasses raised shall not be permitted to be cut in the first three years of their introduction. So as to allow them to seed and multiply.
- v) All existing trees shall be retained.
- vi) Local fodder and NTFP tree species like anjan , sirus , moha , tendu amba etc shall also be planted preferably at 6 X 6 meterd by pit –planting in the suitable areas with adequate soil depth at the onset of the monsoons.
- vii) The area under treatment shall be fenced either by vergtative fencing or cattle proof trenches shall be dug around the area to effectively protect it from illicit grazing.
- viii) The area shall be fire traced every year. Harvesting will be done in the middle of October after seeding. In the 2nd and 3rd year no operation are done except broadcasting of seeds, manuring and removal of weeds. The first year operation will be repeated in the fifth year.

5.7.3. Area “C”

- i) No planting shall be done in these areas.
- ii) Marking for thinning shall be done in the young pole crop as prescribed in the chapter on “Old Plantation Management Working Circle “

5.7.4. Area “D”

- i) No planting shall be done in these areas.
- ii) Climbers obstructing the growth of desired trees shall be cut. Only dead , dying and malformed trees shall be marked for felling retaining four dead trees per hectare for the benefit of the wildlife.
- iii) All live high stumps shall be deemed thereafter with a sharp axe to get vigorous coppice shoot.
- iv) The entire multiple coppice tree pole crop shall be marked to reduce number of stems or poles to one per stool retaining in most promisonry one.
- v) The underisable growth which is preventing or likely to prevent the development of seedling regeneration of the desired species shall be removed. Gridwise record of enumeration and marking wil be maintained. In remarks column of marking register, reasons for marking such as dead, dying, malformed, high stumps, singling of coppice shoot etc. will be recorded.

5.7.5 Storage:-

All the cut grass will be baled at site and the baled grass stored at specially built sheds at Vangaon and Boisar for supplying to the local people or for supplying to the scarcity affected areas during years of famine.

Section- 8:- Choice of Species:-

5.8.1. Cultivation of fodder grasses is done on a large scale on private lands near Palghar, Boisar and Vangaon. The grasses grown in private lands will be suitable for growing in the forest lands as they have similar climatic and adaphic conditions. These grasses are:-

1. *Ischeamum rugosum (ber)*
2. *Themeda triandra (phool)*
3. *Iseilema wightii (mushi)*
4. *Andropogon annulatus (marvel)*
5. *Ischeamum laxum (shedya)*
6. *Dinanath etc.*

Section -9:- Other Regulations:

5.9.1. Closure to Grazing:-

Kurans will be closed to grazing for the entire period of the Plan.

5.9.2. Fire Protection:-

The entire areas of the Kuran will be protected from fire.

5.9.3. JFM Micro Plan Area:-

If any area allotted to this W.C. is also included for treatment in a Micro Plan under FDA or JFM, then the said area shall be treated in accordance with the special objects of management pertaining to this W.C.

CHAPTER VI

WORKING PLAN FOR FUELWOOD WORKING

CIRCLE:

Section -1:- General Constitution of the Working Circle

6.1.1. This Working Circle includes woodland protected forests, Acquired Forests and unclassed Forests .The total area under this working circle is **27424.813 Ha.** but some of the areas have been given as Eksali plots/ cultivation etc. Therefore, the effective areas under this working circle are reduced. This can only be determined after carrying out survey & demarcation of the entire area as laid down in para 14.5.5 under miscellaneous regulations. The range wise detail of the area allotted to this Working Circle is as given below.

Table No.29

Sr.No.	Range	Total area of range	Area allotted to Working Circle	Percentage of range area
1	2	3	4	5
1	Bordi	8527.040	2361.022	27.68%
2	Dahanu	8281.873	1362.261	16.44%
3	Kasa	7296.703	3090.576	42.35%
4	Udhawa	9625.128	3355.854	34.86%
5	Manor	7337.175	4720.297	64.33%
6	Dahisar	6925.479	2675.638	38.63%
7	Boisar	11223.796	3668.960	32.68%
8	Palghar	6264.941	2562.827	40.90%
9	Safale	7075.893	2045.389	28.90%
10	Bhatane	5535.139	1581.989	28.58%
Grand Total		78093.167	27424.813	35.11%

Section- 2:- General Character of the Vegetation

6.2.1. It is a mixed deciduous forest with Teak and Ain as the dominant species. Isolated patches of pure crop of Teak or pure crop of Injaili are found in the tract. Major tract of the forest have poor growth of forest as these forests have been used indiscriminately by the local people for meeting their requirements of Tahal lonning. fire wood, small timber and agricultural implements. Due to clos

human dwellings, forests have been put to tremendous pressure as a result of which quality of forest has deteriorated. Hacking, grazing, illicit felling and trampling by cattle have caused constant exposure of the soil and disappearance of humus. Natural regeneration is absent in such places. Most of the areas present barren look except during the rainy season when some weeds and shrubs appear in the areas. Bamboos are seen in the form of some scanty bushes along the nullah beds and depressions. The areas are very vulnerable to encroachments by the local people. Most of the areas have been given as 'Eksali Plots' or are under the scheme for regularization of encroachment. The areas are scattered and small in extent spreading all over the Division.

Section -3:- Blocks, Compartments and Felling Series

6.3.1 Most of the Protected forests and Acquired forests and all Unclassed forests have been put in this working circle spread over 459 villages in the Division. Each cluster of villages will form a production unit or working series. The forests will be identified by Village Survey/Gut Numbers. The details of are given in **Appendix No. XLII (A,B&C) of Vol.II.**

Section- 4:- Special Objects of Management:

The special objects of management are:

1. To develop the forest according to its land capacity for production of maximum annual yield of fuelwood, small timber, tahal and fodder to meet the local requirements in a sustained manner.
2. To motivate and involve the local people in joint management of forests and sharing its resources under JFM/FDA schemes.
3. To replenish the site condition by carrying out extensive soil and moisture conservation works.

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

6.5.1. Areas under this working circle have been stock mapped and the results are given in **Appendix No. XXVII (A), XXVIII (A) of Vol.II.**

Section- 6:- Method of Treatment.

6.6.1. The proposed area will be treated in two stages. In the first stage of five years only soil and moisture conservation works will be carried out extensively so as to improve the soil condition and to develop the existing rooted stock in the area. It is prescribed that high density plantations of suitable fuelwood and fodder species will be taken in all suitable sites. Areas which are scattered and less than 5 ha. in extent will be planted up with fruit bearing species, or other socially valuable species like *Pimpal, Vad, Bel, Umber and Mango* etc. which also have religious value. Areas upto 10 ha. will be planted up with non browsable species like *Teak, Suru, and Eucalyptus* etc. All the areas more than 10 ha in extent will be planted up with high density fuelwood and fodder species like *Luecaena leucocephalia, Eucalyptus (hybrid), Suru, Acacia auriculiformis* etc. The areas will be tackled with the active participation and cooperation of the Forest Protection Committees. The FPCs will be formed where it has not been formed and they will be strengthened where it has been formed.

Section -7:- Choice of Species.

6.7.1. Local species of fuelwood and fodder will be planted according to site requirements. *Suru, Ain, Teak, Eucalyptus, Prosopis, Acacia, Vad, Pimpal, Umber, Subabul, Ber, Bamboo, Anjan, Khair* etc are to be favoured. However, other species also may be planted as decided by the Dy conservator of Forests.

Section -8:- Silvicultural System.

6.8.1

Model 1 : No Silvicultural system is necessary for Model 1

Model 2: Coppice selection system at 5 years felling cycle with 30 cm harvestable girth for Teak and Ain is prescribed.

Model 3:

- a) Teak- Coppice Selection system at 5 years felling cycle with 30 cm harvestable girth.
- b) Subabul- Pollarding at 2 m height every 3 years for production of firewood and fodder from 3rd year onwards till felling.
- c) Babul Felling will be carried out over the lines equal to 1/30th of the total lines occupied by Babul.

Section -9:- Rotation

- 6.9.1** The selection size for felling of Teak and Ain will be 30 cms.g.b.h. Therefore, rotation corresponding to this size will be 10 years.
- 6.9.2** For Subabul Rotation is fixed at 12 years as it is expected to yield 2 m long pole of 30 cm girth.
- 6.9.3** For Babul Rotation is fixed at 30 years.

Section-10:- Regulation of the Yield

- 6.10.1.** The yield will be regulated by area.

Section- 11:- Sequence of Working

- 6.11.1.** The list of clusters of villages with the sequence of working is given in Appendix **No. XLIV of Vol.II** Soil and moisture conservation works will be carried out for the first five years. Thereafter, all Model III areas will be tackled from the sixth year to 10th year, Model II areas will be tackled in the sixth and seventh year and Model I areas will be tackled in the sixth year.

Section -12:- Demarcation of Coupes and Marking Techniques.

- 6.12.1.** Rules of demarcation of coupes and marking Technique are given in the Miscellaneous Regulations. The demarcation will be carried out one year in advance of working.

Section- 13:- Method Of Executing the Works:

For execution of plantation works in this working circle, the following steps should be followed scrupulously;-

- 6.13.1.** Survey and Demarcation: Prior to the commencement of the SMC works, the survey numbers due for works shall be surveyed and their boundaries demarcated properly by the Surveyor. Such demarcation should be completed one year in advance.
- 6.13.2.** Preparation of treatment Maps: After the Survey numbers are properly demarcated on the ground the RFO will proceed to prepare the treatment maps of the area. The same area will be planted in the sixth year if required. The treatment mans will have the following categories:-

- (A) Areas falling within 3 chain width of river banks, or perennial nallah
- (B) Patches containing successful plantations.
- (C) The remaining areas.

6.13.3. Plantation Models for the above area:

- (A) No felling will be done in this area. Blank areas, if any, shall be planted up after soil and moisture conservation works with Babul and Bamboo.
- (B) Plantation area will be tended as per requirement.
- (C) In the remaining area Soil and Moisture Conservation works will be carried out and blanks, if any, will be planted up with suitable species as per the planting models given below.

Treatment map will be prepared on graph paper in 1:5000 Scales. Laying of grids in A, B, & C type area shall be done after classifying areas in various treatment types. In A & C type areas grids of size 0.5 ha. shall be laid and in B areas grids of 1 ha. Size shall be laid.

The detail Plantation Models will be given in the Plan.

I Planting Model – 1 :- (Area in scattered patches of extent less than 5 ha.)

- i) All such forest survey numbers of a village which have the remaining area as categorized above, less than 5 ha. will be planted up with such species which have social and religious value for the villagers. These species are Vad, Umber, Moha, Neem, Bel, Amba etc. The spacing will be 6m X 6m.
- ii) A live fence of 5 rows of agave or euphorbia species will be erected by planting or sowing in continuous lines at a spacing of 30cm. One year in advance. The prosopis or Ramkati babul may also be useful for live fencing.
- iii) The live fence should be erected on small bunds of the size of agriculture bunds.
- iv) Existing coppice growth will be tended as per the requirement.
- v) No trees will be felled.
- vi) The Plantation in these areas is prescribed only for aesthetic and environmental purposes.
- vii) The Plantations in these areas shall be carried out through co-operation and active participation of the villagers concerned.
- viii) The areas will be closed to grazing till the plants establish with the co-operation of villagers.

II Planting Model – 2:- (Area compact but less than 10 ha. and contiguous to Reserved Forests.)

The Forest survey numbers in the villages, which have area less than 10 ha. But have compact patches of more than 5 ha. will be planted up with Teak and Ain in the following manner.

- (i) The area will be divided in to Zone-I, Zone-II and Zone-III areas by usual method.
- (ii) In Zone-I areas bush sowing of Neem, Bel and Babul will be carried out in selected patches.
- (iii) In Zone-II and Zone-III areas, plantations of Teak and Ain at a spacing of 2m X 2m will be taken up.
- (iv) 4 month old Teak and Ain seedlings raised in polythene bag of size 60 X 15 cm. will be used for such plantation.
- (v) All around such plantains, 7 rows of live hedge will be created by planting / sowing of Babul, Prosopis and Suru, Agave and euphorbia species may also be used for live fences as is often seen in agricultural fields / orchards.
- (vi) The sowing / planting of species for live hedge will be done on bunds similar to ones used in agricultural fields.

III Planting Model – 3 :- (Area more than 10 ha.)

- (i) Area will be divided in Zone-I, Zone-II and Zone-III by usual methods.
- (ii) Zone-I and Zone-II areas will be treated as per the provisions contained in planting model-2.
- (iii) Zone –III areas will be used for raising high density plantations of Teak.,Acacia species and babul (Ramkathi Babul) as prescribed in Plantation Model given in **Appendix No.LX(A) of Vol. II.**

6.13.4. Marking Rules: - The following marking rules are prescribed.

(a) All over the coupes:-

- (i) All climbers interfering with growth will be cut.
- (ii) All edible fruit trees will be reserved against felling.
- (ii) Four dead miscellaneous trees / ha should be retained for the benefit of wildlife.

- (vi) Gridwise record of enumeration and marking will be maintained. In remarks column of the marking register, reasons for marking such as dead, live high stump, singling of coppice shoot ect.will be recorded.

(b) Category “A” area:-

- (i) No trees shall be marked for felling and shall be retained for site protection.

(c) Category “B” area:-

- (i) The area will be marked for thinning when the existing plantation is due for the same.

(d) Category “C” area:-

Model -1 – No marking will be done.

Model -2 –

- (i) All dead trees will be marked for felling at time of first formation i.e. when the area is being taken up for plantations retaining 4 dead trees per hectare for the benefit of the wildlife.
- (ii) At the time of subsequent harvesting, i.e. after 10 years of plantations all trees of harvesting size of Teak and Ain will be marked for felling.

Model -3 –

- (i) All dead trees will be marked for felling at the time of first formation, i.e. when the areas are being taken up for plantation.
- (ii) At the time of subsequent harvesting marking will be done as given below:-

Teak –

- (i) Teak poles over 30 cms girth at breast height will be marked for felling. Their numbers will be restricted to $1/3^{\text{rd}}$ of Total Teak poles standing in the coupe.
- (ii) Multiple coppice shoots shall be reduced to one, which is vigorous.

Subabul –

- (i) For pollarding at 2 meters, Subabul trees need be marked.
- (ii) On completion of 12 years all subabul trees will be marked for felling.

Babul –

- (i) On completion of 30 years of age, Babul trees from line equal to 1/30th of the total line of Babul in the coupe will be marked for felling.
- (ii) Babul will be cleared and thinned when congestion is noticed.

Section- 14:- Disposal of the Forest Produce

6.14.1. The Fuelwood working circle shall primarily be maintained to meet requirements of the villagers. The scheme will be taken up through active participation and involvement of the villagers. The works will be done departmentally. The fodder and firewood will be placed at the disposal of the Gram Panchayat for distribution at the price fixed by the Deputy Conservator of Forests. The Timber poles will be made available on the schedule of rates fixed by the Chief Conservator of Forests. The surplus forest produce will be sold by public auction. Minor Forest Produce will be reserved for the Village Gram Panchayats in Scheduled areas.

Section- 15:- Involvement of the Village Communities.

6.15.1. Village people will be involved in the management of forests. As far as possible all the plantations and protection works will be carried out by the JFM/FDA on usufruct sharing basis.

Section -16:- Other Regulations:

6.16.1. Closure to grazing: The plantation will be closed to grazing for the entire harvesting cycle. This should be ensured through cooperation of the villagers. Grazing has to be regulated strictly on rotational basis and restrained in most of the cases.

Fire Protection: The area will be fire protected for the entire period of the plan.

CHAPTER VII

WORKING PLAN FOR COASTAL BELT WORKING

CIRCLE

Section -1: General Constitution

7.1.1. This working circle comprises of Mangrove Forests in small patches along the costal areas of the Arabian Sea as well as the Casuarinas plantations in Bordi, Dahanu and Palghar ranges of the division allotted to Casuarina Working Circle in Shri. Chaudhary's Plan. It forms a fragile ecosystem due to its proximity to the sea. The total area allotted to this Working Circle is **326.317 Ha.** This includes **251.850 Ha.** Of Mangrove Forest and **74.467 Ha.** Of old Casurina plantation along the coast. The range wise detail of the area allotted to this Working Circle is as given below.

Table No.30

Sr.No.	Range	Total area of range	Area allotted to Working Circle	Percentage of range area
1	2	3	4	5
1	Bordi	8529.164	26.910	0.31%
2	Dahanu	8281.873	1.820	0.02%
3	Kasa	7308.653	--	--
4	Udhawa	9641.568	--	--
5	Manor	7472.175	--	--
6	Dahisar	6958.479	--	--
7	Boisar	11381.803	139.660	1.23%
8	Palghar	6479.123	138.695	2.14%
9	Safale	7115.553	19.232	0.27%
10	Bhatane	5535.139	--	
Grand Total		78703.530	326.317	0.41%

Section – 2:- General character of vegetation.

7.2.1. The area under this Working Circle comprises of Mangrove species and Casuarina species. The Mangrove forests belong to the Group “Littoral and Swamp Forests “sub-group “4 B/ TSI - 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 *Bruguiera* 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, and fishing and paddy cultivation are some of the main factors responsible for destruction of mangrove forests. On the other hand along the western coasts forests consisting of plantations of Suru (*Casuarina equisetilolia*) have been raised. There is no underwood or undergrowth. In the younger plantations there is some ground cover consisting of herbs and grasses. But in older plantations even this is absent and the ground is covered with the fallen needles of suru trees. Eucalyptus hybrid has been interplanted in Suru plantations raised in 1962-63.

Section – 3:- Survey / Gut Numbers and Working Series.

7.3.1. The Survey numbers / compartment number allotted to this Working Circle has been given in **Appendix No. XLV (A, B&C) of Vol.II**. A statement showing the classification of the area into Working Series and Coupes is given in **Appendix No. XLVI (A, B&C) of Vol.II**.

Section – 4:- Special objects of the management.

7.4.1. The special objects of management are:-

- I) to protect and conserve Casuarina and mangrove forests as a special marine / coastal eco-system and safeguard the ecological sensitivity of the coastal area and also to enhance its aesthetic value.
- II) to restore the Mangrove areas by way of afforestation which have been degraded due to biotic interference.
- III) to make the otherwise barren, unproductive , sandy area a productive area by planting casuarina which is the species that can thrive well in area.
- IV) to minimize erosion and protect the in land cultivation from shifting sands, winds and storms.

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

7.5.1. The area under mangrove forest 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.

7.5.2. The areas under Casuarina Plantations have been stock mapped. No enumerations were however carried out. The crop is generally young to middle aged. In some coupes, mature crop is also there as the felling has not been resorted to since few years due to aesthetic reasons. The stocking details are summarized as below :-

Table No.31

Plantation (Suru) Ha.	Research Plot (Ha)	Blank (Ha)	Cultivation (Ha)	Total effective area (Ha)
1	2	3	4	5
46.165	4.750	17.974	3.758	72.647

The total area of Casuarina Plantation is 74.467 Ha. However, 1.820 Ha. area of Compartment No. 1167 is not included as it is in the premises of Dy. C.F. Dahanu.

Section 6:- Method of Treatment.

7.6.1. For Mangrove Forest the main object of management is to enrich the understocked and degraded areas by way of plantation of appropriate mangrove species. Well stocked mangrove areas will be protected from biotic interference. No harvesting is being proposed. Hence no Silvicultural system is prescribed.

7.6.2. Since, Casuarina in this Working Circle occurs almost along the coasts, the plantations are proposed to be retained as green belt for aesthetic and environmental reasons. Only the gaps will be planted up with Suru. Dead, illicitly gridled and windfallen trees will only be removed.

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. decentraliz*, *Sonneratia alba*, *S.apatala*, *Acanthus ilicifolius*, *Aegiceras corniculatum*, *Ceriops decandra*, *C.tagal*, *Lumnitsera racemosa*, *Sesuvium portulacastrum*, *Sucada decentra*, *Salvadora persica*, and *Aerostachium aerium*. Etc.

7.7.2. *Casuarina equisetifolia* (Suru) is the species that can be grown well in the coastal sands and hence the same species is recommended for the areas under this Working Circle.

Section 8:- Rotation

7.8.1. The object of Management of this Working Circle will be protection and suitable rehabilitation of the degraded areas. Hence there is no need for fixing rotation.

Section 9:- Regulation of Yield.

7.9.1. Since no fellings are prescribed, the question of regulating yield does not arise.

Section – 10:- Method of Executing the Work.

7.10.1. A treatment Map will be prepared for the Mangrove Forests after thoroughly inspecting the area by the RFO and it will be verified by the ACF. The Treatment Map shall show the following areas distinctly.

- A Unworkable Areas**
- B Plantable Areas**
- C Dense Mangrove.**

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

A-Unworkable 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, Boisar and Vasai. 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.

7.10.3. As far as Casuarina Plantations are concerned only dead and fallen trees will be marked for felling. For this the entire belt of Suru Plantation will be inspected by the R.F.O. concerned and verified by the A.C.F. The trees should be felled 0.3 to 0.5 meter above the ground level and all the stumps uprooted whenever possible. This will remove obstacle in the way of planting. All the gaps will be planted with Suru soon after the fellings, if the gap created so permits. Four dead miscellaneous trees per hectare should be retained for the benefit of the wildlife.

Section – 11:- Nursery Techniques.

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 like *Avecennia*, *Sonneratia* etc should be raised in the nursery.

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 drop 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 case of Mangrove plantation 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 Decentra*, *Salvadora persica*, and *Aerostachium aerium*. Plantation Model given in **Appendix No .LX (B) Vol. II** 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 40cm to 45 cm in 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 wh

7.12.2. Detailed model and estimate about raising Casuarina Plantation is given in **Appendix No.LX(C) of Vol. II**. Presently the Plantable gap is about 17 Ha. This should be planted during the operation of this Working Plan. Subsequent plantations should be raised as and when the gap is available.

Section – 13:- Subsidiary Cultural Operation.

7.13.1. In case of Mangrove Plantation casualty replacement will be done in the second year of plantaion. 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.

7.13.2. In the case of Casuarina Plantations :-

- (a) **Weedlings** – There is very little growth of weeds in the area. No weeding will threofore ordinarily be necessary.
- (b) **Cleanings** – Since no thinning in prescribed and the area being sandy no cleaning will therefore ordinarily be necessary

Section – 14:- Other Regulation.

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.
- iv. **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.

7.14.2. Fire tracing and closure to grazing is prescribed in the planted areas of Suru from the year of planting.

CHAPTER VIII

WORKING PLAN FOR BAMBOO PLANTATION **(OVER LAPPING) WORKING CIRCLE**

Section- 1:- General Constitution.

8.1.1. 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.

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

Manvel (*Dendrocalamus Strictus*)

Katas (*Bambusa arundinacia*)

Bundhi (*Oxytenanthera stocksii.*)

8.2.2. 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.

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

8.2.4. 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.

8.3.1. The Compartments allotted to this working circle are given in the **Appendix No. XLVIII of Vol II**. 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**.

Section -4:- Special objects of Management.

8.4.1. 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.

8.5.1. 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.

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

Section -6:- Choice of Species.

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

Section -7:- Felling Cycle.

8.7.1. 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**.

Section -8:- Method of executing cutting.

8.8.1. 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 Dy.CF 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.

8.8.2. 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.

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

8.8.4. 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 whichever ever is more.

8.8.5. 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.

8.8.6. 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.

8.8.7. 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.

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

8.8.9. 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.

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

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

Section -9:- Other Regulations.

These will be as under:-

8.9.1. 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- 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. Kadhupatta 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**. 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 important position in the

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 data 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.**

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 Schleicheria oleosa ,[15] Seeds of Jatropa carcus,[16] Takda/ Pauda Clerodendron phburidis ,[17] Nirmali/ Kapi,[18] Guggul,[19] Bapchi 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

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 Dy.C.F.Dahanu. The method of treatment for each of the important minor Forest Produce is 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 Divisions is 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 No 32

Table for Blazes on Each Tree.

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 7th year (after three years rest) new blazes will be made in the same way in the unblazed portion, in between the blazed portions of the first cycle. This blazing will continue for another three years in the manner described above and the 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.

9.5.8. Apta leaves (*Bauhinia racemosa*):- 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 Dahanu 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:

9.6.4. Jatropha seeds (*Jatropha curcas*):-

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

9.6.5. Karanj (*Pongamia pinnata*)

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.

9.6.6. Awla fruits (*Emblica officinalis*): -

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 □eutral*):-

Agave leaves have demand because of its 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. Dahanu 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. All efforts 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

FOREST PROTECTION

Section -1:- General Constitution.

10.1.1. 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.

10.2.1. 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.

10.3.1. 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:

10.4.1. Dahanu 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.33

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	13012	72,54,122/-	93,64,411/-
2.	1991-92	12342	92,35,258/-	11027020/-
3.	1992-93	7721	60,55,355/-	55,17,224/-
4.	1993-94	17400	16091642/-	83,15,053/-
5.	1994-95	5431	62,07,487/-	63,57,411/-
6.	1995-96	8935	89,10,031/-	79,41,737/-
7.	1996-97	5933	60,94,543/-	61,61,719/-
8.	1997-98	7338	97,41,298/-	1,13,97,714/-
9.	1998-99	5051	69,65,412/-	82,12,226/-
10.	1999-00	5359	58,13,612/-	50,79,819/-
11.	2000-01	3839	46,61,261/-	51,07,030/-
12.	2001-02	3606	36,13,499/-	35,45,512/-
13.	2002-03	3202	23,35,873/-	22,72,943/-
14.	2003-04	3455	21,43,756/-	30,90,303/-
15.	2004-05	3464	20,60,250/-	17,26,345/-
16.	2005-06	2731	14,68,716/-	9,84,727/-
17.	2006-07	2679	12,44,107/-	9,59,441/-
18.	2007-08	6782	14,13,907/-	13,76,506/-
19.	2008-09	2752	9,33,762/-	6,25,023/-

Source:Dy.CF Dahanu

10.4.2. 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 defence capabilities and frequent training to staff are recommended to control illicit felling and wildlife offences. Establishing intelligence network for this purpose is strongly recommended.

10.4.3. 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.

10.4.4. 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 routes also should be 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. Forest areas identified as highly sensitive, sensitive and normal beats in the Dahanu Forest Division is given in **Appendix No.LXIV of Vol.II** .

10.4.5. Every year cases having more than Rs.2000/- 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.

10.4.6. 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.

10.5.1. 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 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.

10.5.2. 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:

10.5.3. 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.

10.5.4. At suitable place, along the roads, display Boards, Hoardings requesting the people to protect the forest from fires should be put up during Van 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.

10.5.5. Legal Provision for Fire Protection:

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.

10.5.6. 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.

10.6.1. 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 November 3, 1973.

10.6.2. Grazing will be regulated strictly according to the Grazing Policy and instructions issued by the government from time to time. Grazing in the reserved forests of Dahanu Division shall be regulated in accordance of the provisions of the sanctioned grazing settlement report of the tract. 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.

10.6.3. Permissible number of cattle in the nearby Reserved Forest of each Village will be prepared by the Deputy 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 Deputy Conservator of Forests and the same may be circulated to all concerned for information.

Section -7:- Encroachments.

10.7.1. The problem of encroachment in Dahanu 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 Deputy 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.

10.7.2. 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.

10.7.3. 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.

10.7.4. 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.

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

Section 8:- Wireless Network:

10.8.1. Wireless Network has been established in Dahanu Forest Division. Presently there are 14 Base Stations and Repeater Stations spread over all the Ranges. The Mobile sets are fixed in 5 Vehicles and 57 Walkie –Talkie are provided to the field 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. Apart from the wireless network about 18 mobile phones have also been provided to the officers involved in Forest Protection Work for efficient communication purposes. A list of the officers provided with Mobile phones along with their mobile number is given in **Appendix No. LXV of Vol.II** .

Section -9:- Weapon & Weapon Training

10.9.1. Eight number of 7.62 m.m. SLR Rifles have been supplied to Dahanu Forest Division and 9 Pistols have also been provided for forest protection purposes. They have been accordingly distributed to the field staff as given below.

Table No.34

Sr.No.	<u>Designation</u>	Weapon Supplied	
		Pistol	Rifle`
1.	<u>ACF(MAP)</u> Wada at Dahanu <u>RFO-</u> Dahanu, Kasa, Manor, Dahisar, Bardi, Palghar. <u>RFO Mobile Squad</u> – Kasa and Dahisar.	9	--
2.	Forester / Forest Guard	--	8

During the period from 2002 to 2004 11 officers of Dy.C.F. ACF and RFO levels were trained for handling pistols. In the year 2002 and 2003 7 Foresters were trained to handle Rifles. Foresters and Forest Guards should be trained frequently in the methods of handling and maintenance of weapons provided to them.

Section -10:- Forest Check Nakas.

10.1.1. National Highway No, 8 passes through the Dahanu Forest Division which in turn is connected with a dense network of other district roads. The Dahanu Forest Division has its boundary with the neighbouring Gujarat state and hence a number of permanent and seasonal forest check nakas have been constructed and these nakas are manned 24/7 by Forest Guards deputed for his purpose. All suspicious vehicles are thoroughly checked at these Nakas. Transit passes are examined and even at times Naka Bandi is carried out to catch suspicious offenders along with their Vehicles, when prior information of the same is received at these Nakas. The Dahanu Forest Division has a total of 5 permanent Forest Check Nakas functioning 24 hrs, whose list is given as follows :-

Table No.35

Sr. No.	No. of Forest Check Post	Place	Forest Guard deployed
1	1	Bhalivali	3
2	1	Ten	3
3	1	Charoti	3
4	1	Talasari	3
5	1	Acchhad	3

Two seasonal forest check Nakas have been constructed. One at Malyan in Dahanu Range and the other at Warai in Dahisar Range, where Forest Guards are deputed when they are made operational.

Section -11:- Future Forest Protection Measures Proposed:

10.11.1. A separate protection plan will be drawn up for proper control of illicit felling and other forest related offences in the Division. It will classify the forest areas as highly sensitive, sensitive and normal beats. The sensitive routes should be identified and properly monitored and patrolled. Need based Protection plan should be revised from time to time as per the requirement. As per the Protection Plan prepared by Deputy Conservator of Forest, Dahanu Forest Division for 2009-2010, the following requirements have been identified as essential for the Forest Protection purpose, which can be phased out over a period of ten years (i.e. the Plan period). They include:-

- (a) Providing of Jeeps for patrolling and protection purpose to all the ten territorial ranges in order to ensure quick mobility and effective protection.

- (b) Providing of Motor cycles to 51 Foresters entrusted with the task of Forest protection for effective mobility and control over the forest beats under their jurisdiction.
- (c) Since most of the Forest areas are covered by the Mobile Phone Network, it is proposed to provide all the 51 foresters with Mobile Phones as provided to the Dy.CF, ACF & RFO's for fast and effective communication.
- (d) The Forest areas in Dahanu Forest Division is remote and inaccessible and with highly undulating topography. Hence it is proposed that watch towers should be constructed on hillocks overlooking the deep valleys so that effective control and monitoring can be done on illicit cutting of timber and fuelwood from forest areas and also will help in control and monitoring of forest fires. A total of 10 watch towers, one in each range over a period of 10 years is proposed for this purpose. The location of these watch towers shall be decided by the Dy.C.F. in consultation with Chief Conservator of Forest, Thane Circle, Thane.
- (e) The Dahanu Forest Division falls predominantly in the tribal Talukas of Thane district and hence the local field staff has to face accommodation problems in their designated headquarters. They tend to stay away from their designated headquarters wherever good residential accommodation is available. Hence, it is proposed that Type- I, II, III & IV quarters at various locations be constructed during the Plan period in order to ensure that the field staff entrusted with the task of forest Protection stay in their designated headquarters and are able to concentrate to their main task of Forest Protection in these highly sensitive areas. A list of the buildings proposed to be constructed during the Plan period is given in **Appendix No. XIV of Vol.II.**
- (f) At suitable places, along the roads, display boards, hoardings requesting the local people to protect the forest from fires and other forest offences should be put up. During Van Mahastav, World Forestry day and Wildlife Week and other suitable occasion lectures accompanied by documentary films on Forests and Wildlife Conservation should be screened in order to impress upon the local population of the importance of forest protection. School children should be encouraged to perform short plays and street plays on Forest and Wildlife Conservation in their villages.

CHAPTER-XI

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

Section -1:- General Constitution of the Working Circle

The traditional system of management of forests has 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 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.

11.1.2. 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.

11.1.3. 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.

11.1.4. The degraded and denuded forest land will be protected by the forest protection committees (F.P.C.) of the village. The Deputy 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.

11.1.5 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

11.2.1. 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

11.3.1. Dahanu Forest Division has a total 459 revenue villages out of which 303 villages are on the fringe of the forests. The concept of participatory management was started in the division during World Bank Aided Project. The scheme of JFM was implemented in 16 villages. Under World Bank Aided Project, this has got strengthened over the period. Now the Forest Protection Committees have been formed in 226 villages and in 199 villages the FPCs have been registered as well. JFM works in 9 villages are also being implemented under the state plan in this division. The status of J.F.M. in the division can be summarized as under.

Table No.36

Total No. of villages	Villages having Micro plans	Villages having FPC's registered	Total members of the JFMC's	Total Forest Area (Ha)	Forest Area covered under JFM (Ha)	Percentage of area coverage.
1	2	3	4	5	6	7
459	226	199	39340	78703.530	11560.00	14.69%

Recently MOEF has also sanctioned the project of FDA for Dahanu Forest Division. The Micro Plans for 60 villages have been prepared and sanctioned by the Committee.

Section- 4:- Analysis of the JFM Works:

11.4.1. 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).

11.4.2. 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.

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

11.4.4. 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, Kiraipada village of Safale Range, received the third prize in the district. In 2009-10 the Pochade village in Manor Range received 2nd prize in the Thane District and Nawje village in Dahisar Range received third prize in the same year under this yojna.

11.4.5. Internal Mid-term Evaluation of National Afforestation Programme and JFM implemented through F.D.A., Dahanu was carried out by National Afforestation and Eco-Development Board, Bangalore in 2006, NAEB evaluated 29 villages on 14 parameters with grading on scale of 1-10. They found that the average grading in 7.15. This means that there is scope for improvement.

Section- 5:- Powers of JFM Committees

11.5.1. 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 of degraded forest from the village. The CFs will approve the areas selected by the ACFs.
5. Biodiversity Conservation 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

11.6.1. 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:

11.6.2. Base Line Data: The base line data 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.

11.6.3. Technical Plan: 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 the silvicultural prescription of the working plan especially those related to sustainable forest management and regulation of yield of major forest produces.

Section- 7. Working Circles

11.7.1. 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

11.8.1. 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

11.9.1. 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.

11.9.2. The forest officials can also co-ordinate with other district authorities to sort out the difficulties of villagers with these departments. Forest officers will 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.

11.9.3. 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 Deputy conservator of Forests Dahanu and the Dy. 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.

11.10.1. The success of JFM rests on management decentralization 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.

11.10.2. The areas allotted to JFM committee will fall in IWC and fuelwood WC. The prescriptions have already been given in the respective working circles.

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

(a) IWC Areas

11.10.4. (a) IWC Areas

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 developed 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.

(b) FWC Areas

11.10.5. The areas of this working circle will be developed purely on the basis of requirement of concerned villagers. Grass, Fodder and Fuelwood species suitable for JFM villages shall be taken up. Soil and Moisture Conservation works will be undertaken. Live hedge will be given preference over T.C.M. in J.F.M. areas.

Section 11. Choice of Species.

11.11.1. 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 Fuelwood etc)

Teak, Bamboo, Babul, Sitafal, Bel, Chinch, Jamun, Apta, Moha, Khair, Pimpal, Tendu, Umber, Nilgiri, Shiras etc.

FODDER SPECIES:

Sissoo, Shiras, Shivan, A. Babul, Subabul etc.

GRASSES

Sheda, Marvel, Hemata.etc.

Section 12: Community Development.

11.12.1. 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

11.13.1. JFM Committee will hold meeting once in a month and minutes of the meeting will be recorded in the Register. The Deputy 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. Deputy 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 –XII

WORKING PLAN FOR WILDLIFE MANAGEMENT **(OVERLAPPING) WORKING CIRCLE.**

Section -1:- General Constitution of the Working Circle.

12.1.1. This is an over lapping working circle and covers the entire area of the division in general and area of protection working circle in particular. This working circle will deal with forest areas around some important spots which have Wildlife habitats and there is potential of development from the point of view of eco-tourism. Dahanu Forest Division area has virtually everything a tourist wants: Creeks, hot water springs, and range of monuments like Gambhirgad, Mahalaxmi temple, wilderness and wildlife area. The areas falling in catchments of important dams and lakes are suitable for promoting awareness among the tourists about the need of protecting environment and ecology because such areas are 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.

Section -2:- General Character of the Vegetation and Fauna.

12.2.1. 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 from 0.3 to 0.7 and on ridges and slopes from 0.1 to 0.4. The general condition of wildlife is not satisfactory. The wildlife reported in the area is Panther, fox, and hares. A number of resident and migratory birds also occur in the area. The list is given in Chapter II Part I of this Plan.

Section- 3:- Special Object of Management.

12.3.1. Special object of Management of this working is given below.

1. To conserve and protect to our natural and cultural heritage.
2. To protect the vegetal cover in the catchment of important lakes 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 fro wildlife during stress period.
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 awareness amongst the people and visitors.

Section- 4:- Method of Treatment.

12.4.1. No regular schemes are being 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 2 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 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 edges.

- (viii) The labour camps and transit depots will be established away from the high wildlife density areas.
- (ix) The habitat of sea turtles, along the western coast falling from Kelwa beach in the South to Bordi in the North of this division where they lay their eggs in the months of July to September under the beach sands for hatching shall be protected for a period of 60-65 days till the turtles hatch and move back to the high seas. Protection of these eggs laid in groups should be effectively ensured from wild animals as well as other biotic factors for eg. street dogs and local dwellers.. One such instance of nesting by sea turtles has been reported near Chikle village on the Bordi Sea Coast by R.F.O., Bordi on 27th August, 2007. Of the five species of marine turtles occurring on the Indian Coast, all except the loggerhead sea turtle (*Caretta caretta*) have been reported from the coast of Maharashtra. Of these, the olive ridley (*Lepidochelys olivacea*) also commonly known as 'Tupalo' and the Green turtles (*Chelonia mydas*) nests sporadically along the coast. The main cause of turtle mortality is due to illegal trawl fishing in the offshore waters where turtles die as incidental catch. The BNHS, Mumbai under the GOI-UNDP sea turtles project report titled "Survey of Marine turtles along the coast of the Maharashtra and Goa" have submitted a comprehensive document in this regard.
- (x) Hoardings on the importance of wildlife and its protection will be exhibited at strategic locations.
- (xi) Artificial water holes will be constructed to provide water to the wildlife during pinch periods.
- (xii) The provisions contained in the Wild Life (Protection) Act, 1972 as amended in 2003 will be strictly implemented.
- (xiii) Suitable infrastructure for tourism including the requirements for their boarding, lodging, and observation towers for nature viewing and interpretation facility may be developed at suitable places.
- (xiv) Scenic view points will be developed along with the trekking paths.

This prescription should be explained to the field staff and it will be ensured that it is strictly followed while doing regular working in the respective working circles.

Section -5:- Survey and Monitoring of Wildlife Resources.

12.5.1. Census of population of major species occurring in the area will be carried out at every 4th year along with the census of Tiger and 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.

12.6.1. 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 its significance. To realize the necessity and urgency of conservation of wildlife and forest. To achieve this it is suggested that suitable infrastructure may be developed on suitable sites where appropriate facilities for boarding, lodging and viewing along with services of interpreters and guides can be provided.

12.6.2. The important tourist spots in Dahanu Forest Division are:

Dahanu Fort, Dahanu Beach, Bordi Beach, Mahalakshmi Temple, Mahim Beach, Surya Dam, Vaitarna Creek, and Trekking paths in the forest areas.

CHAPTER XIII

GENERAL FINANCIAL FORECAST AND FINANCIAL PLAN OF OPERATION

Section -1: Revenue.

13:1.1: 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:

13.1.2: The estimated annual revenue from sale of Forest produce is as under:

Table No. 37

Forest produce	Annual revenue (Rs)	Total Plan period. (Rs)
Major Forest Produce	13,50,000	1,35,00,000
Tendu	8,000	80,000
Dry Grass	17,000	1,70,000
Apta	39,000	3,90,000
Karvi	600	60,000
Gunj Leave	3,000	30,000
Rankel	3,500	35,000
Gulvel	6,000	60,000
Palas Leaves and Flowers	70,000	7,00,000
Total	14,97,100	1,49,90,000

13.1.3. The estimated revenue during the plan period i.e. 2009-10 to 2018-19 is **Rs. 149 Lakhs.**

13.1.4. 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. 38
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

13.1.5. 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 Dahanu Division, 78,000hectares) are worth Rs. 2028 Crores per year at 1980-81 rates. Hence, the total revenue would be 2029.49 Crores per year.

Section 2:

13.2.1 Expenditure:

Table No. 39

S.No	Working Circles	Total Area (Ha.)	Expenditure during plan period (Rs. in Lakhs)
1	Protection Working circle	18197.471	66.000
2	Improvement working circle	29809.303	1388.820
3	Old Plantation Management Working Circle	1582.389	72.860
4	Fodder Reserve. Working Circle	1363.237	49.510
5	Fuel Wood Working Circle	27424.813	1490.09
6	Coastal Belt Working Circle.	326.317	21.570
6	Boundary demarcation works	3882.714 Kms.	483.198
7	1/5 Boundary maintenance	3882.714 Kms.	11.650
8	Wildlife (Overlapping) Working Circle.	---	35.000
GRAND TOTAL		78703.53 (3882.714 Kms)	3619.48

The total expenditure for the plan period will be 36.19 Crores. The details of works and the rough estimates of expenditure has been worked out and shown in Appendix No LV of Vol. II.

As against revenue of Rs.2029.49 Crores there will be expenditure of Rs. 36.19 Crores. Therefore, the cost benefit ratio works out to 1:56:06.

Section -3: Funding Agencies: The works proposed can be executed from the following funds.

13.3.1. 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, and plantations may be executed under MREGS schemes.

13.3.2. Participatory Approach: Participation of NGOs, Financial Institutions, Corporates and other government institutes may be encouraged for afforestation works.

13.3.3. 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.

13.3.4. Plan & Non Plan Schemes: The funds from the plan and non plan will be demanded by Deputy conservator of Forests, Dahanu Forest Division.

Section 4: Cost of the Plan:

13.4.1. The total expenditure incurred for preparation of this plan is Rs.4296715 which works out to Rs 55.08. per hectare of Dahanu Forest division.

CHAPTER – XIV

MISCELANEOUS REGULATIONS.

Section 1:- Harvesting and Disposal of Forest Produce.

(A) Major Forest Produce.

Demarcation of Coupes and Working of Trees:

14.1.1 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 Deputy 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)

14.1.2 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.

14.1.3. 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 painted 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

14.1.4 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.

14.1.5. 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.

14.1.6. 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.
3. Grid wise record of enumeration and marking will be maintained. In remarks column of marking register, reasons for marking such as mature, dead, malformed diseased, live high stump. Singling of coppice shoot etc. will be recorded. Grid-wise record of operations mentioned under Natural Regeneration, e.g. Tending, Root Stock Management, Singling of coppice, Weeding etc. shall be maintained.

(B). Non-Timber Forest Produce.

14.1.7. 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: -

14.1.8. 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

14.2.1. 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 Deputy 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 Deputy conservator of Forests.
- c. The Deputy 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

14.3.1. 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. At present the Forest Department maintains only the roads in the tract i.e. Karhe – Akre Road (length 6 km) murum road.

Section -4:- Buildings.

(A) Residential Quarters.

14.4.1. There is great shortage of housing accommodation in the Dahanu 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, i.e., the list of buildings to be constructed during the Plan Period is given in **Appendix No.XIV of Vol.II.**

(B) Rest houses and Inspection huts.

14.4.2. There is insufficient Forest rest Houses and Inspection Huts in the Division. It is proposed in the revised plan that existing forest rest houses in Haloli should be repaired and one inspection hut in each range should be constructed.

Section 5:- Maintenance of Boundaries.

14.5.1. 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.

14.5.2. 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. LIII of Vol. II**. 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.

14.5.3. 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 Deputy 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:

14.5.4. 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.

14.5.5. At many place plots have given out for cultivation on permanent basis. These forest areas include Eksali plots- 5889.80 Ha, land allotted under High power Committees -6341.427 Ha. and 1972-78 Encroachments – 303.270 Ha. approximately. 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 Dy.Conservator of Forests should therefore, get the work done in the first cycle of 5 years as given in **Appendix No.LII (A to D) of Vol.II**. 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 Deputy conservator of Forests, Dahanu, 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:- Eksali Cultivation.

14.6.1. The eksali cultivation plots with an area 5889 .80 Ha. approximately 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:- Preservation Plots.

14.7.1. Some preservation plots would be suggested in the tract. Some plots having occurrence of sound and healthy trees of superior species can be protected as seed plots for producing superior quality seeds. One Preservation Plot in Compartment No 238 in Kasa Range over an area of 10.920 Ha. is maintained by the Research Wing.

Section -8:- Experimental Plots

14.8.1. Experimental Plots have not been laid in the forests of Dahanu Division. Dahanu forest has one of the most important Teak and Khair bearing forests in the State. There are no data available about the effects of various grades and frequencies of thinning on the growth of Teak and other species in the plantations. It is, therefore, proposed to lay out a set of thinning Researched Plots in the existing plantations for the purpose. A total of nine research plots over an area of 260.90 Ha. have been laid down by the research wing in Dahanu Forest Division. Similarly, Experimental Plots to study whether existing local species like Ain, Suru etc can be grown in large scale under High Density tree plantation schemes to meet the demands of fuel wood, fodder and timber. Effect of “Tahal” cutting on forest also needs to be studied as to whether this practice needs to be stopped in view of the deteriorating state of forest. Fast growing species from amongst the local as well as exotic species particularly, prosopis and various other fuel wood and timber species will have to be paid more attention in the future plan as done in this Plan and it is, therefore, essential to study the best method for raising the plantations and their rate of growth and for this purpose, suitable sample plots will have to be laid out..

Section -9:- Soil and Moisture Conservation.

14.9.1. 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 produc

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 10:- Wildlife Management.

14.10.1. 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 11: Deviations

14.11. 1. The following works will not be constituted as deviation from the Plan:

1. Removal of dead fallen firewood.
2. Petty fellings carried out as mentioned in para under irregular harvesting.

14.11.2. 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 cannot be adjusted against future yield.

14.11.3. 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.

14.11.4. The Dy.C.F, Dahanu 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 Dy.C.F, Dahanu 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.

14.11.5. 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 CCF, WP and CCF, Territorial, the former will refer to the PCCF for instructions. The PCCF/CFWP, as the case may be, will countersign the deviation statement.

14.11.6. Minor deviations will be sanctioned by the CCF, WP/PCCF but PCCF, before sanctioning the major deviations as given in para **14.11.2.** above, will obtain prior approval of the Regional CCF, Bhopal, MOEF.

14.11.7. 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 12:- Survey and maintenance of Maps.

14.12.1. 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:

14.12.2. 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:

14.12.3. Working Plan Maps are prepared on 1:8,000 and 1:4,000 scales 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:

14.12.4. 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-XV

ESTABLISHMENT AND LABOUR

Section -1:-Establishment

15.1.1. 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 Dahanu Forest Division is both hilly and plains. The total area of Dahanu Forest Division is **962.445 Sq.km.**which fits into the norm prescribed by Govt.of India.

15.1.2. 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 on **1st May, 2000**. 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

15.2.1. Dahanu situated near Mumbai and on Mumbai –Ahmedabad Highway and township such as Boisar, Palghar and Dahanu are fairly industrialized with big chikoo orchards and farm house. The shortage of labour is felt in most of the Talukas. The areas around the major cities and towns are developed 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- XVI

CONTROL AND RECORD

Section-1: Control Forms:

16.1.1. 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**

16.1.2. The Dy.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 Dy.CF's copy to the CCF (T). The later will then complete his copy and finally return the Dy.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 Dy.CF for their record and the CCF WP will keep the third copy for his set of control forms.

16.1.3. The control forms should be submitted by the Dy.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

16.2.1. 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 Dy.CF (T)
- iv. Form No. 4 : Compartment out-turn to be filled by the Dy.CF (T)
- v. Form No. 5 : Compartment History to be filled by the Dy.CF (T)

The formats for the different forms are given in the **Appendix No. L**

16.2.2. If compartment history with full entries already exists, past entries made by the Dy.CF will be scrutinized by the CF WP Thane who may edit them if necessary. Usually no corrections should be necessary.

16.2.3. The Dy.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.

16.2.4. The principal information, which the Dy.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.

16.2.5. 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

16.3.1. 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

16.4.1. 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 Deputy Conservator of Forests, Dahanu Division under the appropriate heads.

CHAPTER-XVII

SUMMARY OF PRESCRIPTIONS

Section-1: The General objects of management of forests:

17.1.1 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:

17.2.1. 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 Working Circle.
- ii. Improvement Working Circle.
- iii. Old Plantation Management Working Circle..
- iv. Fodder Reserve Working Circle
- v. Fuelwood Working Circle
- vi. Coastal Belt Working Circle.
- vii. Bamboo Plantation (Overlapping) Working Circle.
- viii. Non-Timber Forest Produce (Overlapping) Working Circle.
- ix. Forest Protection
- x. Joint Forest Management (Overlapping) Working Circle.
- xi. Wildlife Protection (Overlapping) Working Circle.

17.2.2. Protection Working Circle: It would include unworkable areas which are not fit for any working on account of very steep slopes and those falling in catchment areas. The area needs protection and such no felling is prescribed.

Treatment Proposed: In the accessible areas soil and moisture conservation works will be carried out on 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 **18197.471 Ha.**

17.2.3. 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 adequate rooted stocks and with tending operations areas can be improved.

Treatment Proposed: Improvement fellings of dead / dying trees will be carried out. Thinning of congested poles will be carried out 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 **29809.303 Ha.**

17.2.4. 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 **1582.389 Ha.**

Treatment Proposed: The Plantations will be given Silvicultural treatments as per the time schedule. Cleaning works will be carried out in the 7th year of plantation. 1ST thinning will be carried out in 10th year of the Plantation and every 5 years till the age of 70 years.

17.2.5. Fodder Reserve Working Circle: This Working Circle includes the denuded and blank areas in Dahanu Division. The area is situated near Vangaon, Boisar and Palghar. The areas are suitable for growing grass which is in great demand. The total area allotted to this Working Circle is **1363.237 Ha.**

Treatment Proposed: Areas are to be developed as cutting Kurans. Bushy undergrowth and stumps of trees which hamper the growth of grass will be removed. Soil and Moisture Conservation works like gully plugging will be carried out to improve the site conditions. Superior fodder Grasses will be introduced. Whole area will be protected by suitable fire tracing measures and vegetative fence

17.2.6. Fuelwood Working Circle: Areas of Woodland Protected Forest and Acquired forest are included in this Working Circle. The total area under this Working Circle is **27424.813 Ha.** Due to the scattered nature of Forest land adjoining villages, the forest has been subjected to heavy biotic interference.

Treatment Proposed: In this Working Circle each clusture of villages will be treated as one protection unit or working series. Area will be divided into 10 units and each unit will be tackled each year with the active participation and co-operation of F.P.C. The F.P.C. will be formed where it is not formed and they will be strengthened where it is formed. Proposed area will be talked in two stages.

First Stage: First five year, only soil and moisture conservation works will be carried out extensively inorder to improve soil condition and to develop the rooted stock.

Second Stage: After five years Dy. Conservator of Forest will be inspect the sites and decide about further treatment to these areas like planting of fuel –wood species, small timber species, grasses etc.

17.2.7. Coastal Belt Working Circle: This working circle will include the areas along the stretch of the costal belts of the Arabian Sea in the Western part of the Divison. It will include the Mangrove Plantation and the areas treated in the Casuarina Working Circle of Chaudhary's Plan. The total area allotted to this Working Circle is **326.317 Ha.**

Treatment Proposed: The casuarinas plantations and the Mangrove areas shall be protected from encroachment. No felling and grazing will be allowed. In the blank areas Magrove and Casauarina species will be planted. The Mangrove area in possession of the Forest Department as on 31.03.2010 has been included in this Plan.

17.2.8. 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.

17.2.9. 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 4th year of plantation is prescribed.

17.2.10. Forest Protection: Protection measures for controlling encroachments, illicit feeling and hunting have been prescribed.

17.2.11. Joint Forest Management (Overlapping) Working Circle: This an Overlapping Working Circle comprising the areas which have good potential to raise plantaions under JFM/FDA. The areas included mostly in the Fuelwood Working Circle and Improvement Working Circle will be taken up with the active co-operation of the local people.

17.2.12. 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.

17.3.1. It is proposed to keep the period of this Plan for 10 years from **2010-11 to 2019-20.**

A review of the prescription is recomended after 5 years.

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