GOVERNMENT OF MAHARASHTRA

WORKING PLAN

FOR THE FORESTS
OF
SHAHAPUR FOREST DIVISION

THANE CIRCLE MAHARASHTRA

FOR THE PERIOD

1997-1998To2006 -2007

VOLUME - I

BY

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INTRODUCTION

The earlier Working Plan for the Reserved Forests of Thane District as a whole was written by Shri. N. J. Joshi, IFS, and it remained operational till 1988-89. The work of revision of this Working Plan was taken up from May, 1985 but it was decided that Working Plans were to be prepared with a Forest Division as a unit and all types of Forests viz. Reserved, Protected and Acquired were to be taken up for the same. Accordingly the revision work for Dahanu Forest Division was started in 1987. The revised Working Plan of Dahanu Forest Division was sanctioned in November, 1991. The Jawhar Forest Division was created on 1/5/1992 from parts of Dahanu, Shahapur and Thane Forest Divisions. It was decided to complete the Working Plan for Jawhar Forest Division by preparing a Plan for the remaining area viz - East Wada, West Wada and Mokhada Ranges. Accordingly the Working Plan for these three Ranges were written and sanction got in March, 1996.

The work pertaining to the PWPR of Shahapur Forest Division was delayed due to the preparation of Working Plan for the aforementioned three Ranges of Jawhar Forest Division. The PWPR of Shahapur Division was prepared by Dr. Devendra Nath And it was approved by the State Level Committee in April 1995.

This draft of Working Plan of Shahapur Forest Division for 2002-2003 to 2011-2012 revises the following Working Plans which dealt with the Forest in question.

1) *Working Plan for the Reserved Forests of Thane District by Shri. N. J. Joshi (1969-70 to 1988-89).*

2) *Working Plan for the Protected Forests in charge of the Forest Department and Nominal Reserves of Thane District by Shri. F. X. Saldanha (1938-39 to 1978-79).*

This draft of Working Plan has been prepared as per the guiding principles of the National Forest Policy, 1988. It also takes into account guidelines for preparation of Working Plans from the M.E.F. Govt. of India, as well as instructions issued by the Chairman and members of the State Level Committee while dealing with various Working Plans from time to time. The tract dealt with forms the catchment for the great lakes Tansa, Vaitarna and Bhatsa which feed water to an estimated 15 million people in downstream Mumbai, Thane and neighbouring townships including industrial units located in the area. Hence

these forests are invaluable for the ecological security of these urban centres which form the hub of the Nation's Economy. On the other hand forest fringe populations belonging mainly to the deprived sections of society like Tribals are dependent on the Forests for their NTFP requirements. Management prescriptions are required to address these aspects amongst others Accordingly,

Participatory Forest Management has been proposed for the forest areas which are near to settlements and where deterioration in the crop owing to biotic factors is evident. A chapter on Participatory Forest Management including modalities and options has been given. Moreover, to have an understanding of the Socio-Economic linkages of Tribals and Forests in the areas, a chapter on the Tribals in the tract has been included. To enable proper understanding of the basic Natural Resources on which plants grow, the soil, a brief chapter on Soil and Water Conservation including few measures for conservation of these invaluable resources has been given.

The draft of Working Plan Report prepared by Shri. Mafiul Hussain and Dr. Deventra Nath was discussed in the meeting of IInd State Level Committee held on 13/01/98 and following modifications and suggestions were made.

a) *Past Management lacked the information for not carrying out the works of thinning and cleaning. The reasons for the same should be incorporated in the Plan.*

b) *No financial outlay should be allowed for collection of seed, cost of seed dibbling operation in Protection Working Circle areas. It is to be done Departmentally.*

c) *No wier bunds to be proposed. Such big structure if at all necessary it should be with proper justification. No felling of trees should be proposed in these areas Formation of "Protection Squad" should be proposed to guard the Lake Catchment Areas.*

d) *Areas along nalla banks within 20 meters width will be considered workable area for Bamboo Plantating in Selection Cum Improvement W. C. area.*

e) *Area of Miscellanies W. C. should be merged into Afforestation W. C. and a separate J.F.M.W.C. (OL) should be constitued.*

f) *Standardising categorization of areas of The Working Circle into protection areas, blank and eroded areas, areas more than 0.4 density, under stocked areas, old plantation area for preparing Treatment Map of the area.*

g) *Bamboo areas should be worked annually and instead of Oziytenamthera monostigruna, Cziytenanthera stocksly should be planted.*

In the Part-I of the Text all changes as suggested during the Draft Plan discussion have been made and accordingly Part - II of Text has been re-arranged. In the revised prescription standardisation of the areas for Treatment Plan has been made. Special Protection Squad to patrol the areas of Lake Catchment W. C., categorisation of N.T.F.P. in Scheduled areas in view of new legislation.

I would like to express my gratitude to Shri. K. A. Kate, I.F.S., Conservator of Forests, Working Plans, Pune for his valuable, guidance during the course of preparing this Plans Shri. M. G. Gogate, I.F.S., Conservator of Forests, Working Plan, Pune has kindly gone through the draft and made important suggestions for which I am greatful. I am also greatful to Shri. B. M. Parab, I.F.S., Retd. Chief Conservator of Forests for his suggestions from time to time. I am also indebted to the Chairman and members of the State Level Committee for Working Plans for the guidelines issued with regard to various Working Plans. This allowed us to work in the proper direction. The undersigned would also like to express thanks for the cooperation and suggestions from the Conservator of Forests, Thane, Shri. K. J. Singh, I.F.S., as well as Shri. M. M. Ngullie, I.F.S., Shri. A. R. Salunke, I.F.S., Dr. Dinesh Tyagi, I.F.S. the Dy. Conservator of Forests, Shahapur Forest Division along with the officials and Staff of the Division.

The Chief Forests Statistician, U. M. Vaidya, Nagpur has helped immensely by supervising Enumeration Work through the Forest Resources Survey Wing, Nashik and also statistically analysing and evaluating the Enumeration Data.

The entire staff of this Division worked diligently under severe constraints of infrastructure and man power and I would like to record my sincere appreciation to all of them, knowing the actual circumstances under which this Plan was prepared in record time.

I would like to make special mention of Shri. M. B. Ahmed, Range Forest Officer and Shri. R. K. Lawand, Range Surveyor who were constantly involved during the preparation of the Plan. Shri. V. S. Channe, R.F.O., Shri. T. J. Gaikwad, R.F.O., Shri. Kambli, Range Forest Officer, Shri. B. N. Patil, Surveyor, Shri. R. P. Gawari, Surveyor were also closely associated in field work, preparation of maps, preparation of appendices. They deserve my sincere appreciation.

Late Shri. C. S. Katke, R.F.O. of Shahapur Division had done some field work which is appreciable, Other office staff of this Division namely Shri. N. N. Raut, Accountant, Shri. C. V. Patil, Clerk and Sau.

helped immensely in typing and sorting work. Shri. D. N. Churi, Guard and Shri. D. S. Mahadi, Peon assisted us from time to time. Shri. S. R. Sakdeo, Ranger Surveyor and Shri. Mishra, R.F.O. from Working Plans, Panvel office assisted us for a short while also. I would like to thank them all.

I am very much obliged to Dr. Devendra Nath, I.F.S., Conservator of Forests, Shri. Asthana, I.F.S., Conservator of Forests, Working Plans Circle, Pune and J. N. Saxena, I.F.S., Chief Conservator of Forests (Production), Maharashtra State, Nagpur for their timely and valuable guidance in finalisation of the draft of this management plan. I also take this opportunity to put on record special efforts of the Principal Chief Conservator of Forests MS Nagpur Shri. S. K. Bali, I.F.S. and Shri. M. K. Sharma, I.F.S. who ensured allocation of scarce resources which enabled this management plan to see the light of the day. The revised draft management plan for Shahapur ForestsDivision is now submitted for early approval and implementation.

Date : 14th January, 2002

(V. K. Walke)
Deputy Conservator of Forests,
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IST OF COMMON PLANTS OCCURING IN SHAHAPUR FOREST DIVISION

Local Name	Botanical (latin) Name	Natural Order
(1)	(2)	(3)
Ain	Terminalia alata var-tomentosa	Combretaceae
Ashi	Morinda pubescens	Rubiaceae
Amba	Mangiferia indica	Anacardiaceae
Amati (Wavding)	Embelia tsjeriam-cottam	Euphorbiaceae
Anjani	Memecylon umbellatum	Melastomaceae
Apta	Bauhinia racemosa	Caesalpiniaceae
Asana	Bridelia retusa	Euphorbiaceae
Arjunsadada	Terminalia arjuna	Combretaceae
Athroon		
(Kakar-Bhekal)	Flacourtia ramontchi	

	(Syn. Flacourtia indica)	Bixaceae
Avali	Phylanthus emblica	Euphorbiaceae
Babul	Acacia nilotica varindica	Leguminosae
Bel	Aegle marmelos	Rutaceae
Bakula	Mimusops elengi	Sapotaceae
Bava (Bhava)	Cassia fistula	Leguminosae
Beheda	Terminalia bellerica	Combretaceae
Bhendi	Thespesia populnea	Malvaceae
Bhoma	Glochidion Ellipticum	Euphorbiaceae
Bhokar (Shelute)	Cordia dichotoma	Boragineae
Bhor Jambhul	Ameania baccifera	Lythraceae
Bhutkesh (Lawset)	Mussaenda frondasa	Rubiaceae
Bhitia		
(Alan or Bhutaksha)	Cassine glauca	Celastraceae
Biba	Semecarpus anacardium	Anacardiaceae
Bibla	Pterocarpus marsupium	Leguminosae
Bondara	Lagerstroamia parviflora	Lythraceae
Bor	Ziziphus jujuba	
	(Syn-ziziphus mauritiana)	Rnamnaea
(1)	**(2)**	**(3)**
Chambuli	Bauhinia vahlii	Leguninosae
Chanda, Chandva	Macaranga peltata	Euphoribiaceae
Char, Charoli	Buchanania lanzan	Anacardiaceae
Chera	Erinocarpus nimmonii	Tiliaceae
Chinch	Tmarindus indica	Leguminosae
Dandoshi	Dalbergia lanceolaria	Leguminosae
Daiwas (Dahivel)	Cordia macleodii	Boragineae
Datir	Ficus heterophylla	Urticaceae
Dhaman	Grewia tiliaefolia	Tiliaceae
Dhavada	Anogeissus latifolia	Combretaceae
Dikemali	Gardenia resinifera	Rubiaceae
Gela	Randia spinosa	Rubiaceae
Gol	Trema orientalis	Urticaceae
Hed	Adina cordifolia	Rubiaceae
Hirda	Terminalia chebula	Combretaceae
Humb	Saccopetalum tomentosum	Anonaceae
	(Syn. Millusa tomentosa)	
Jamba, Surya	Xylia xylocarpa	Leguminosae
Jambul	Syzygium cuminii	Mytaceae

Kalamb	Stephegyne parvifolia (Sys. Mitragyna parvifoilia)	Rubiaceae
Kadvai	Hymenodictyon orixerse	Rubiaceae
Kakad	Garuga pinnata	Burseraceae
Kondal	Sterculia urens	Sterculiaceae
Krambel	Dillenia pentagyna	Dilieniaceae
Karlilimb (Kadilimb)	Murrya koenigii	Rutaceae
Karanj	Pongamia pinnata (Syn. Pongamiya glabra)	Leguminosae
Karavati	Ficus asperrima	Urticaceae
Kaju	Anacardium occidentale	Anacardiaceae
Katekumbhal	Xantolis tomentosa	Sapotaceae
Kavath	Limmonia acidissima	Rutaceae
Khair	Acacia catechu	Leguminosae
(1) **(2)**	**(3)**	
Kharshing	Rdermachera xylocarpa	Bignoniaceae
Khavas	Firmaiana colorata	Sterculiaceae
Kinhai	Albizzia procera	Leguminosae
Kirmira	Casearia tomentosa (Syn.Glycomis pentaphylla)	Rutaceae
Kokam (Ratambi)	Garcinia indica	Guttiferae
Kuda	Holarrhena antidysenterica	Apocynaceae
Kuda(Kala)	Wrightia tinctoia	Apocynaceae
Kudi	Wrightia arboera	Apocynaceae
Kumbli	Careya arborea	Myrtaceae
Kusumb (Koshimb)	Schleichera oleosa (Syn.Scheleichera trijuga)	Sapindaceae
Koral or Ambli	Bauhinia malabarica	-----
Kura	Ixora parvuflora (Syn. Ixora arborea)	Rubiaceae
Kukari	Streculia guttata	Stercliaceae
Lokhandi	Ixora nigricans	Rubianceae
Muraudi	Acnthus ilicifolius	Acanthaceae
Medhshing	Dolichandrone falcata	Bignoniaceae
Moha or Mohuva	Madhuca longifoliavarlatifolia (Bassialatofolia)	Sapotacease.
Mokha	Schrebera Swietenioides	Oleaceae
Nandruk	Ficus microcarpa	Urticaceae
Nana	Lagerstromia microcarpa	Lythraceae

Nimbara	Melia dubia	Meliaceae
Niwar(Samudraphal)	Barringtonia acutangula	Myrtacea
Padvale	Stereospermum chelonoides	Bignoniaceae
Pair	Ficus arnottina	Urticaceae
Palas	Butea Monosperma	Leguminoseae
Nagkuda		
Pandarakuda	Tabernaemontana heyneana	Apocynacea
Pandhara khair	Acacia ferruginea	Leguminoseae
Pandhari	Murraya exotica	Rutaceae
(1)	**(2)**	**(3)**
Pangara Leguminosae	Erythrina indica (Syn.Erythrina	variegata)
Par Jambhul	Olea dioicia	Oleaceae
Pendharum	Ceriscoides turgida	Rubiaceae
Petari	Trewia nudiflora	Euphorbiaceae
Phasi	Daldergia paniculta	Leguminosae
Pharadi	Albilzzia chinensis	Leguminosae
Phungali	Excoecarica agallocha	Euphorbiaceae
Pimpal	Ficus religiosa	Utricaceae
Pipar	Ficus amplissima	Utricaceae
Ranlimbu	Atlantia racemosa	Utricaceae
Rantarohida	Rhamnus wightii	Rhamnaceae
Ranjan(Rayan,Khirni)	Manilkara hexandra	Sapotaceae
Ritha	Sapindus emarginata	Sapindaceae
Sag (Teak)	Tectona grandis	Verbenaceae
Satvin	Alstonia scholaries	Apocynaceae
Sawar	Bombax ceiba	Malvaceae
Shemat	Lannea coromandelica	Anacardiaceae
Shenkhair	Acacia polycantha	Leguminosae
Shendri or Kamala	Mallotus philippinensis	Euphorbiaceae
Shindi	Phoenix sylvestris	Palmae
Shiras	Albizzia lebbek	Leguminosae
Shiras (Kala)	Albizzia odoratissima	Liguminosae
Shivan	Gmelina arborea	Verbeoaceae
Shisam	Dalbergia latifolia	Fabaceae
Tembhurni	Diospyros melanoxylon	Ebenaceae
Tiwas	Ougenia oojeinensis	

		(Leguminosae)
Toddy palm	Borassus flabellifer	Palmae
Umbar	Ficus racemosa (Syn. F. glomerata)	Urticaceae
Undi	Calophyllum inophyllum	Clusiaceae (Guttiferae)
(1)	**(2)**	**(3)**
Vad	Ficus benghalensis	Urticaceae
Warang	Kydia calycina	Malvaceae
Waras	Heterophragma roxburghii	Bignoniaceae
	(Syn. Heterophragma quadriculata)	
Wawali or Papara	Holoptelea integrifolia	Urticaceae
SHRUBS		
Adulsa	Adhatoda zeylanica (Syn. A. Vasica)	Acanthaceae
Dhaiti	Woodfordia floribunda	Lythraceae
Ghaneri	Lantana camara	Verbenaceae
Ghaypat	Agave sisalana	Agavaceae
Kanfuti	Flemigia strobilifera	Fabaceae
Karavi	Carvia callosa (Syn. Strobilanthes callosus)	Acanthaceae
Kaladhotra	Datura fastuosa	Solanaceae
Karvandi	Carrissa carandas	Apocynaceae
Kalsunda or Pivli	Barleria prinonitis	Acanthaceae
Koranti		
Kevni (Murud sheng)	Helicteres isora	Sterculiaceae
Khulkhula	Crotolaria retusa	Leguminosae
Mogli or Ran-arand	Jatropha curcas	Euphorbiceae
Nirgudi	Vitex negundo	Verbenaceae
Nivdung (Pricklypear)	Opuntia dillenii	Cactacea
Phangala (Phangali)	Pogostemon purpurascens	Labiatae
Rantur	Atylosia lineata	Leguminosae
Rametha	Lasiosiphon eriocephalus	Thymeleaeaceae
Ranbhendi	Thespesia lampas	Malvaceae
Rantulshi	Ocimum canum	Labiatae
Rantulshi	Ogratissimum	Libiatae
Rui	Calotropis gigantea	Asclepiadaceae
Shikekai	Acacia concinna	Leguminosae
Suran	Amorphophallas companulatus	Araceae

(1)	(2)	(3)
Thor	Euphorbia ligularia	Euphorbiaceae
Toran	Zizyphus rugosa	Rhamnoaceae
Ukshi	Calycopteris floribunda	Combretaceae
HERBS		
Anant mul (Upalasari	Hemidesmus indicus	Asclepiadaceae
or Indian sarsaparila)		
Bhigguli	Indigofera enneaphylia	Leguminosae
Burada	Blumea lacera	Asteacae
Chikata	Desmodium palchellum	Febaceae
Dinda	Leea macrophylla	Leeaceae
Kajra (Kuchala)	Strychnos nux-Vomica	Loganiaceae
Litchi (Van-bhendi)	Urena lobata	Malvaceae
Papadi	Pavetta tomentosa	Rubiaceae
Rankel	Musa superba	Musaceae
Ranhalad or sholi	Curcuma aromatica	Zingiberaceae
Rankanda	Scilla indica	Liliaceae
Sarp mukha	Tephrosia purpurea	Fabaceae
		(Leguminosae)
Sonki	Senecio grahami	Compositae
Tarota or Takala	Cassia tora	Caesalpiniace
		(Leguminosae)
Vikhara Talimkhana	Hygrophila amicularis	Acanthaceae
	(Syn. Asteracantha longifolia)	
CLIMBERS		
_____Alai	Dalbergia volubilis	Fabaceae
		(Leguminosae)
Bhuikohala	Ipomoea digitata	Convolvalaceae
Chilhari	Caesalpinia sepiaria	(Leguminosae)
		Ceasalpiniaceae
Gunj	Abrus precatorius	(Leguminosae)
		Fabaceae
Gulvel (Amarvel)	Tinospora cordifolia	Menispermaceae
Kanguni	Celastrus paniculata	Celastraceae
(1)	**(2)**	**(3)**
Kantharyel	Capparis sepiara	Capparidaceae
Kuhili	Mucuna pruriens	(Leguminosae)
	(Syn mucuna pruriata)	Fabaceae

Kusari	Jasminum arborescens	Oleaceae
Madvel, Modvel,	Combretum Ovalifolium	Combretaceae
Bokadvel Mastod	Capparis spinosa	Capparaceae
	(Ziziphus oenoplia)	(Rhamnacea)
Morvel or Ranjai	Glematis triloba	Ranunculaceae
Nandanvel	Vitis repanda	Ampelideae
Palasvel	Butea suparba	(Leguminosae)
		Fabaceae
Phulsun	Spatholobus roxburghii	(Leguminosae)
		Fabaceae
Sakalvel	Ventilago madraspatana	Rhamneae
Ukshi	Calycopteris floribunda	Combretaceae
Valoiwla	Milletia recemosa	(Leguminosae)
		Fabaceae
Watvel	Cocculus macrocarpus	Menispermaceae
Wagati	Wagatea spicate	Caesalpiniaceae
		(Leguminosae)
Wag, Govinsi	Capparis zeylanica(Syn.	Capparaceae
	Capparis roxburghii)	(Capparideae)

BAMBOOS (Bambusoliceae)

Bundhi or cher	Oxytenanthera monostigma	(Gramineae) Poaceae
	(= o. riteheyi)	
Manvel	Dendrocalamus strictus	—”—
Padhai or katas	Bambusa arundinacea	—”—
	(= B. bambos)	

GRASSES

Ber	Inchaemum rugossus	(Gramineae) Poaceae
Bhale Kusal	Heteropogon triticus	-”- -”-
	(Syn. Andropogon triticus)	
Bhongrut (Phuleraphul)	Themeda quadrivalvis	-”- -”-
(1)	**(2)**	**(3)**
Bhuri	Aristida paniculata	-”- -”-
Boru	Andropogon halepensis	-”- -”-
	(Syn. Sorghum helepense)	
Chirika	Eragrostis tremula	-”- -”-
Dongari gavat	Chrysopogon fulvus	-”- -”-
	(Syn.Andropogon monticola)	
Ghanya,marvel	Bothriochloa pertusa	-”- -”-
	(Syn. Andropogon pertusus)	

Gondvel	Andropogon pumilis	-”-	-”-
Harali (Durva)	Cynodon dactylon	-”-	-”-
Kunda	Ischaemum pilosum	-”-	-”-
Kothar	Woodrowia diandra	-”-	-”-
Kusali	Heteropogon contortus	-”-	-”-
	(Sys. Andropogon contortus)		
Lavhala	Mnesithea laevis	-”-	-”-
	(Syn. Rottboollia perforata)		
Marvel	Dichanthium annulatum	-”-	-”-
	(Syn. Andropogon annulatus)		
Pavnya	Schima sulcatum	-”-	-”-
	(Syn. Ischaemumsulcatum)		
Phool	Themeda triandra	-”-	-”-
Rosha	Cymbopogon schoenanthus	-”-	-”-
	(Syn.Andropogon schoenanthus)		
Sheda	Schima nervosum	-”-	-”-
	(Syn. Ischeamumlaxum)		

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GLOSSARY OF LOCAL TERMS

Local term	**Meaning**
Adiwasi	Aboriginals, the original and primitive natives
	of the territory.
Injaili species	Jungle wood or species other than teak.
Geru	A coloured earthy powder used for marking
Jamabandi	Revenue Settlement.
Kacha (roads)	Temporary(roads)
Kharabas	Very steep unworkable areas.
Kolpat	Deadwood.
Kuran	Pasturage reserved for grass cutting and grazing.
Malki lands	Lands belonging to private individuals.
Mazdoor	Labourers.
Nala	Stream.

Rab	A patch of ground which is given a good 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.

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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.L.C.S.	Forest Labourers Co-operative Societies.
F.P.C.	Forest Protection Committee.
I.F.A.	Indian Forest Act.
J.F.M.	Joint Forest Management.
M.A.I.	Mean Annual Increment.
M.F.P.	Minor Forest Produce.
M.M.C.	Mumbai Municipal Corporation.
No.	Number
NTFP.:	Non Timber Forest Produce.
P.B.	Periodic Block.
P.F.M.	Participatory Forests Management.
R.F.O.	Range Forest Officer.
Sec.	Section.

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SUMMARY OF PRESCRIPTIONS

1. A brief Outline of Important Prescriptions of this Working Plan are as under :

The proposals have been based on the parameters laid down in the National Forest Policy 1988. The factors influencing the Objects of Management have been given, where in the ecological significance of the tract as a catchments for water harvesting for the millions of people living downstream, has been highlighted. Further, the need for sustainable harvesting of Non Timber Forest Produce for the deprived and forest dependent people has been stressed on. This is required to be done through 'Participatory' means. Background information on one group of forest dependent people, the tribals, has been given and modalities, rules and options of Participatory Forest Management laid out in separate chapters on these two critical subjects, later on in the Plan.

2. General Objects of Management are :

i. Maintenance of Ecological Balance and Conservation of the Natural Heritage.

ii. To Protect and Conserve the Vegetation on slopes and the catchments of rivers and streams that feed the lakes / reservoirs down stream.

iii. To meet the NTFP requirement of forest fringe dwellers through planned harvesting, augmentation of the Natural Resources and by making the forest fringe dwellers as partners in Forest Management for mutual benefits.

iv. To increase the Productivity of the Forests through concerted planned efforts in Natural Resource Management that include Aforestation and Protection.

v. To meet requirements of timber and NTFP through planned harvesting on a sustainable basis.

- **Constitution of Working Circle :**

The following Working Circles have been constituted

i. The Protection Working Circle.

ii. The Lake Catchment Working Circle.

iii. The Selection - Cum- Improvement Working Circle.

iv. The Afforestation Working Circle.

v. The Joint Forest Management Working Circle.

vi. The Bamboo (Overlapping) Working Circle.

vii. The Non Timber Forest Produce and Eco Tourism (Overlapping) Working Circle.

viii. The Wildlife and Eco-Tourism (Overlapping) Working Circle.

The period of the Plan is fixed at 10 years from 1998-99 or from the year of implementation.

I) The Protection Working Circle

1. **General Constitution :-** This Working Circle includes forests located on steep and ecologically fragile areas . These areas are not suitable for working and will be protected. The area included in this Working Circle is 3456.641 Ha.

2. **Method of Treatment :-** No felling has been prescribed and protection from biotic factors together with measures for improvement of the area has been proposed.

II) The Lake Catchment Working Circle

1. **General Constitution :-** This Working Circle includes the forests situated in the catchment of the Vaitarna, Bhatsa and Tansa lakes except the areas already allotted to the Protection Working Circle. The total area allotted to this Working Circle is 21619.541 Ha.

2. The Object of Management is to keep the area vegetated for Watershed purposes.

3. The area has been divided into 30 Working Series.

4. Gap Planting along with Soil and Moisture Conservation measures have been proposed.

5. **Method of Execution of Works. :-** Planting is to be done through local species that are evergreen or are deciduous for a brief spell only.

6. Control and Prevention of inimical biotic factors have been stressed upon.

III) The Selection - Cum - Improvement Working Circle

1. **General Constitution :-** This Working Circle includes the stocked areas of R.F. that are not included in the first two Working Circles. It also contains successful Plantations raised in the R F areas. The total area included is 11195.578 Ha.
2. The area has been divided into 15 Working Series.
3. **Silvicultural system :-** The system prescribed is removal of 50% of mature trees through selection and improvement. Dead trees are to be removed but certain species of NTFP value are not to be marked.
4. Harvestable Girth for teak as well as other species has been fixed at 105 cm. gbh. The felling cycle has been fixed at 10 years.
5. **Regulation of Yield :** 50% of the harvestable yield will be removed.
6. **Method of Execution of Works :** A treatment map depicting various category areas will be prepared prior to marking. 50% of mature trees alongwith dead and dying trees will be harvested. Plantable areas will be Planted up by teak and other local injaili species as per models in vogue and which have been elaborated in the appendix volume. Cultural operations like cleaning, thinning etc., will be done.
7. Protection against fire, etc., and closure to grazing for 10 years has been proposed.

IV) The Afforestation Working Circle:

1. **General Constitution:-** All understocked areas of RF & PF have been included. The area under this wc is Ha.
2. **Working Series :-** The area has been divided into 5 Working Series.
3. **Method of Treatment:-** The method of treatment is by tending Natural Regeneration patches alongwith Artificial Regeneration of blanks and areas of poor root stock.
4. Rotation has not been fixed
5. Yield will be negligible
6. **Planting Techniques:-** Few Plantation models have been given and local as well as naturalised exotic species are to be Planted. Soil and Moisture Conservation measures are to be taken up. Improved grass

are to be sown for improving the fodder. Bamboo under Planting has been proposed.

7. Subsidary Silvicultural Operations like cleaning, thinning etc. has been prescribed.
8. Protection against fire, etc. and closure to grazing for 10 years has been proposed.

V) The Joint Forest Management Working Circle :

1. **General Constitution :-** The areas of woodland Protected Forest and Acquired Forest have been included in this Working Circle. The area of PF is Ha. and area of Acquired Forest is 405 Ha.
2. The areas are near settlements and biotic factors have affected the vegetation immensely. Hence JFM measures have been proposed for these areas.
3. Due to scattered locations and small sized areas at many places, the PF areas are to be worked villagewise. i.e. the village is the unit of working.
4. The PF areas have been divided into 6 Working Series.
5. **Method of Treatment :-** This has to be decided as per PRA exercise and prescriptions of the MicroPlan. Two years have been kept for preparing the MicroPlans and Treatment is to begin by 1999-2000. The areas are to be vegetatively rehabilitated through tending of natural areas and vegetal covering of blank areas according to the land capability is to be done. Soil and Moisture Conservation measures are to be taken up.
6. **Choice of Species :-** This will be governed by local needs as well as technical feasibility. Local fast growing species as well as exotics are proposed. N T F P species of trees , shrubs as well as seasonals have been suggested.
7. **Plantation Models :-** Various options of Plantations have been given for reference. Three models for vegetative rehabilitation of areas as per condition of crop, area available etc. has been given. Further, a model on high density Plantation and notes on cultivation of sabai and

grasses has been included in the Appendix No. CXXI to CXXIII and CXVIII.

8. Harvesting will depend on the type of use as well as species. Usufruct sharing is to be done as per rules in force.
9. Miscellaneous Regulations for working the areas has been put forward.

VI) The Bamboo (Overlapping) Working Circle :

1. **General Constitution :-** This is an Overlapping Working Circle and includes the areas which have a reasonable population of bamboo. The total area included is 7116.275 Ha.
2. Working Series The area has been divided into 3 Working Series and each of these has been divided into 3 coupes.
3. **Method of Treatment :-** The method of Treatment is Selection felling of mature culms in each clump.
4. **Felling Cycle :-** The felling cycle is of 3 years and hence each Working Series is divided into 3 coupes
5. **Method of Harvesting :-** The detailed method of harvesting has been given in the text.

VII)The Non Timber Forest Produce (Overlapping) Working Circle

1. **General Constitution :-** This is an overlapping Working Circle and covers all the R. F. areas.
2. NTFP of the area include Grass, Apta, Bel Leaves, Kadi Patta, Gum, Myrobalans, Karvi, Chilar & Ain Bark, Hirda, etc. apart from bamboo which has been dealt in a different Working Circle.
3. **Method of Treatment :-** The treatment proposed for some NTFP has been outlined e.g. Moha, Karanj, Tembhurni, Hirda, Kandol, Kadipatta, Agave, Karvi, Apta .

   It is necessary to prepare information of collection, market forces, role in the economy of forest fringe dwellers, scope for J F M in NTFP collection etc.

   This will allow to evolve, better norms for NTFP production, collection, processing, value addition, marketing, etc. I will also

throw light on proper harvesting on a sustainable basis for these items which have an important bearing in the life of forest fringe dwellers.

VIII) The Wildlife and Eco-Tourism (Overlapping) Working Circle

1. **General Constitution :-** This Overlapping Working Circle covers the entire R F areas.
2. The area is adjoining to the Tansa Wildlife Santuary and allows to and fro movement of wildlife. A note on the Tansa Wildlife Sanctuary has been given.
3. **Objects of Management :-** Improvement of habitat as per the prescriptions given in various Working Circles of the R F will go a long way in better prospects for wildlife. In ecosystem evolution, good prospects for both flora and fauna go hand in hand, as they are interrelated. Various other measures for Wildlife Management including proper coordination with personnel of the Wildlife Division, Thane has been recommended.
4. **Object of Management :-** To provide opportunity for nature viewing and encourage Forests and Wildlife Tourism while preserving our heritage and ecology.
5. To aim at maximising the benefits of Tourism, while minimising their negative impacts.
6. **Method of Execution of Works :-** Suitable infrastructure for Tourism including the requirement for their boarding, lodging, moving around in the Forest. Machans, Watch Towers and Interpretation facilities will be developed on the frings of these areas or other suitable places.

Miscellaneous Regulations :

Eksali Plots and School Forest Working :- These two categories of RF have been excluded from the Working Plan owing to the pecularities of treatment required. Hence the Dy. CF Shahapur / School authorities should initiate the action and modalities.

1) <u>Harvesting and Disposal of Forest Produce</u>

A. <u>Demarcation of Coupes</u> :

1. Annual Coupes will be demarcated by clearing 3m wide lines and by erecting pillars or posts on the lines.

2. Selected trees on the periphery will be given two tar bands and one red band in between and will be numbered serially.
3. Unworkable areas will be demarcated by giving two geru bands and a serial number on selected trees on the periphery.

B. Marking Techniques :

1. All trees to be felled will bear distinct hammer marks at breast height and at base.
2. Trees of valuable timber species of 30 cm girth and above and all other species of 60 cm girth and above, will be given digit numbers at breast height and at base, serially.
3. Un numbered trees marked for felling will be enumerated in 15cm Girth Classes.

2) Preparation of Girth Class Enumeration

After completion of demarcation an Enumeration Statement of 10 to 15 valuable species is to be prepared. This Enumeration is to be done for a Coupe. As a unit from this An Enumeration Abstract in 15cm girth classes is to be prepared. Enumeration of the species is to be done from 30cm girth upwards. The consolidated figures for Number of Trees per Species per Compartment is to be kept with Compt. History files and one copy is sent to the Dy. CF Working Plan for record.

3) Maintenance of Boundaries

The boundaries, both external as well as internal are to be maintained as per prescriptions given. A scheme for one fifth boundary maintenance for both RF and PF has been prepared.

4) Regulation of Grazing

Regulation of grazing was to have been done as per the Grazing Settlement Report for the RF areas by Shri S. B. Kulkarni. The settlement will have to be revised in the light of this new Plan.

5) Fire Protection

Classification of areas into I and II has been made for nature of Fire Protection measures. Discussion on Fire Protection and Legal Provisions for the same has been focused upon.

6) Deviations

Works have been delineated so as to show the distinction between what constitutes deviation and what does not. Method for submission of deviation proposals has been given.

7) Protection

Notes on Encroachments and Beat Checking has been given. The need for regular Beat Checking has been stressed upon.

8) Survey & Maintenance of Maps

The types of maps and survey done is given. The toposheets that are applicable to the tract have been mentioned.

9) Control and Records

1. Control Forms have been prescribed for each Working Circle for keeping records of important operations. Sample Forms have been given in the Appendix. Control Forms for Fire Protection, Grazing and Boundary Maintenance and Verification is also to be maintained in the forms given.
2. **Compartment Histories :-** Compartment History Form Numbers 1 to 5 are to be maintained in the Divisional, Sub Divisional and Range levels as per forms given in the Appendix No. CVII.
3. Plantation and Nursery Registers :- These Registers should be maintained in the forms given in the Appendix CVIII and CIX.

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SUMMARY OF FACTS ON WHICH PROPOSALS ARE BASED

CHAPTER - I

THE TRACT

Section -1 : General

1. This Plan would be known as the " Working Plan for the Forests of Shahapur Forest Division of Thane District, Maharashtra." It would deal with the Reserve Forests of 392.91 Sq. Km, Protected Forests of 210.18 Sq. Km and Acquired Forests of 4.05 Sq. Km that are under the control of Shahapur Forest Division of Thane Forest Circle, in the Thane District of Maharashtra.
2. The area covered by the Plan lies between Longitudes 73 0- 12' and 73°- 48' East and between Latitudes 19 o- 18' and 19 o- 46' North. It is bordered on the North by Jawhar Forest Division, on the East by Nashik and Ahmednagar Districts, on the West by Wildlife Thane and Thane Forests Divisions, and on the South by Thane Forest Division.

Section - 2 : Configuration of the Ground

3. The tract is hilly and at places precipitous. These hills form the outer Ranges of the Sahyadries i.e. Western Ghats, which run along the Eastern boundary of Thane through the Nane Ghat on the border of Pune District. Some well known peaks in the area are given below :-

Peak	Elevation	Range(Forest)
Ajoba Hill	1381.6m	Dolkhamb
Bhatgad	1099.1m	Vihigaon
Mahuli fort	814.4m	Shahapur

4. The main drainage is from east to west through the Vaitarna which originates in Nashik District, enters at Vihigaon and meanders to the Arabian sea. Its tributaries in the tract includes Kalu, Bhatsa, and Tansa.

Section - 3 : Geology, Rock and Soil

5. The main geological formation in the tract are :-

   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

6. **Upper Cretaceous Eocene :-** The Deccan trap covers almost the entire District consists of the horizontal layers of basaltic lava. The rocks are generally gray to greenish in colour .The non vesicular forms are filled with various minerals such as quartz,calcite, agate, amethyst, zeolite and gasper.

7. **Pleistocene Recent :-** Lateraite is a compact and vesicular rock essentially composed of Hydrated Oxides of Alumillium and Iron with some Oxides of Manganese and Titanium. It is reddish brown in colour. Laterite is found at many places, particularly on the crest of hills where it caps over the Deccan trap, but it is not very common in forest areas.

B - Soils

8. **Sub-Recent-Recent :-** The typical soil derived from the Deccan trap is the black cotton soil. This soil contains high Aluminia and Carbonates of Calcium and Magnesium with variable amount of Potash, low Nitrogen and Phosphorus. The soil is generally porous and swells considerably on addition of water and dries up with cracks on losing moisture. Black cotton soil is usually found in flat areas where Ain crop is found in preponderance.

9. In the hilly areas the soil is loamy and varies in colour, depth and texture. On the upper slopes it is generally lighter in colour , shallow and murummy in texture. On steep slopes soil erosion has resulted in bare rock with shallow soil trapped in pockets. The quality and composition of the crop deteriorates with elevation as a result of soil

depth. The upper slopes contain Xerophytic Species and Inferior Injaili like Kandol, Pangara, Kakad, Shemat etc.

10. Red Soil is found in some areas of Vihigaon Range.

11. The results of soil analysis showed that soil varied in texture from sandy loams to clays and the soils are towards acidic side.

12. A few years ago small tremors were reported in areas near Khardi. Seismologists attribute these tremors to the weight of water bodies in the lakes/dams in this area which had been classified as geologically stable earlier. Since 1994 no tremors have been reported in Khardi area.

Section - 4 : Climate

13. The climate is hot and humid with temperatures varying between a minimum of 12°C and maximum of 45°C. The climate is pleasant, cool with low humidity during the winter month of November to February. Summer months from March to June are very warm.

14. The South-West Monsoons break by the second week of June with the months of July and August having heaviest rainfall. The rainy season lasts from June to October and the Average Annual Rainfall is about 3000 mm. The compilation of monthly rainfall at major places is given at Appendix no. IV. Vol – II.

15. Prevailing winds of moderate velocity blows from the west. Dew is very heavy after the monsoons and dew fall occurs in places upto February. There is no frost in the tract.

Section - 5 : Water Supply

16. The rivers and streams flowing in the area provide water to the villages but many of these rivers dry up especially during April and May. Springs, Nallas and Ponds dry up earlier. A number of wells have been constructed by various Government agencies but many of these either dry up or the water level goes very low. This problem is acute in the elevated areas towards the East. Hence despite heavy rainfall there is water scarcity during summer and people are required to transport potable water from deep wells from a distance.

Parts of this tract fonn the watershed to the rivers and streams that feed the great dams Vaitarna, Tansa and Bhatsa which form the main source of water supply down stream to Mumbai, Thane and neighbouring urban areas. It is estimated that 15 million people and many industrial units are fed water through a network of distribution reservoirs, huge metallic pipes of over one meter diameter, pumping stations and smaller pipes. In recent times there were demands to share some water with the local popultion of drier areas. It is reported that work is in progress to supply water to various difficult sites.

17. Considering the vital significance of this tract as a watershed, an attempt has been made to prescribe treatment on the basis of different watersheds in the area. The forest fringe villages have been listed watershed numberwise and given in the Appendix XV P. 24/ Vol-II

Section - 6 : Environmental Significance

18. The tract of Shahapur Forest Division is located in Biogeographic Zone 5 The Western Ghats. The Western Ghat Ecosystem is regarded as a fragile ecosystem which needs careful planned management to preserve the habitat for posterity. Much of the area forms the watersheds of various streams, nallas and rivers that form the main source of Vaitama, Tansa and Bhatsa reservoir systems on which huge dams have been constructed to supply water to about 15 million people living downstream in the congested urban areas of Mumbai, Thane etc. These forests are vital to the survival of these urban areas and the industrial areas surrounding them. Management prescription will have to address this aspect and a separate Lakes Catchment Working Circle has been assigned for the same since Jadhav's Plan. To ensure environmental security to Mumbai, Thane etc. it is imperative that proper planning, status evaluation, impact assessment and corrective measures for (Forest and other) Resource Management for these areas be undertaken in an integrated way through inter agency co-ordination.

    It is felt that the benefited people of Mumbai etc. should pay for Management of the watersheds through the Mumbai Municipal Corporation, This would solve the Financial Resource Crunch at the

Forest Department as well as bring to focus the vital significance of these forest areas for survival of those who derive sustenance downstream. Some Irrigation Projects are also located **in** the tract and these have been shown in the map.

Section - 7 : Distribution and Area

19. The Registers of Reserved Forests i.e. Form No. I, have been brought upto date. The entries as far as possible have been verified with Notifications. Shahapur Forest Division is spread over 621.34 sq.km, the break up being 407.11 sq.km Reserve Forest, 210.18 sq.km protected Forest and 4.05 Sq.Km, Acquired Forest (acquired under Private Forest Acquisition Act of 1975). This includes RF area of 14.12 Sq. Km. of School forest and Dalhi Plots.

20. The Forests of Shahapur Forest Division have been distributed into 6 Forest Ranges, 32 Rounds al1d 94 Beats for Administration and Management. The Reserve Forests are distributed in all Ranges, Rounds and Beats. These are sometimes honeycombed by non forest areas and pushed to hillocks and undulating terrain by disforestation in the last many decades. The Protected Forests are generally adjoining habitation and are also distributed in all Ranges. These Protected Forests are even more accessible to biotic pressure than the Reserved Forests.

21. The area of Reserved, Protected and Acquired Forests in the Six Ranges of Shahapur Forest Division, the geographical area of the Taluka, etc. have been given below :-

Division	**Range**	**Taluka**	**Legal class of the Forest**	**Forest Area**	**Remarks**
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
				(In Sq.Km.)	
Shahapur	Vihigaon	Shahapur	Reserved	67.10	Talukawise
			Protected	18.53	Geographical
			Acquired	00.18	Areas
	Washala	Shahapur	Reserved	80.35	Taluka Area
			Protected	23.72	Shahapur 572.00

		Acquired	00.52	Bhivandi 690.00
Dolkhamb	Shahapur	Reserved	77.19	Area of Reserved
		Protected	34.95	Forest
		Acquired	00.31	Yearly marked to F.D.C.M. Ltd. in Shahapur Division Nil
Dhasai	Shahapur	Reserved	65.82	
		Protected	60.49	
		Acquired	00.56	
Khardi	Shahapur	Reserved	51.14	
		Protected	27.18	
		Acquired	01.28	
Shahapur	Shahapur	Reserved	58.64	Includes 14.20
		Protected	45.30	Ha. of School
		Acquired	01.20	Forest and Delhi Plots of the whole Division.
Shahapur	Bhivandi	Reserved	06.87	
Total		**Reserved**	**407.11**	
		Protected	**210.18**	
		Acquired	**4.05**	
Total Forest Area			**621.34**	

Section - 8 : State of Boundaries

22. The boundaries of Reserve Forests are demarcated by cairns of loose stones at suitable intervals. The cairns are second class boundary marks as specified in “A” 123 of B.F.M. Vol. -II. In case of Protected Forest the demarcation boundaries are less discernible.

The length of boundaries are given below in Kilometers :-

	Natural	Artificial	Total
Reserve Forest	94.90	1205.351	1300.251

Protected Forest	--	--	2169.983
Acquired Forest	--	--	59.861
		Grand Total	**3530.095**

Cement Concrete cairns could be used in RF and PF boundaries where demarcation lines are not discernible or are likely to be violated.

Section -9 :- Legal Position

23. Most of the Reserved Forests have been notified as Reserve Forest U/S 20 of the Indian Forest Act. The details of Reserve Forest Notifications are given at Appendix No. II.P.7 Vol-II. A List of Notifications through which areas have been disforested under section 27 of the Indian Forest Act is given in Appendix No.IX, P.5 Vol-II.

24. The Protected Forests have been declared as Woodland Protected Forest under several Notifications, the earliest being 43 / 28 / A of 3rd September, 1933 and the latest being 4 F of 1 st March, 1979. The Entries of these Notifications have been recorded against the Survey Numbers in Forest Registers maintained in concerned Forest Offices.

Section - 10 : Rights and Concessions

25. Background :- There are no rights specified in the Reserve Forests except the right of way and water. In the Protected Forests the rights specified are those of way and water for man and cattle, and right of way to shrines and temples. The special privileges sanctioned in the tract is given in Appendix No-X, P.16 and XI, P.18. An idea of. P. F. Land - Population Ratio is got from Appendix No. LXVII, P.168. where P. F. areas and Adjoining village population is given alongwith Cattle population.

26. Present Scenario :- There has been tremendous social, economic and political changes since fixing these privileges ‘Forest villages’ no longer exist, forest area has dwindled, biotic pressure on forest areas has increased, population of man and cattle has increased, the forests are honeycombed by settlements, and movement of forest produce by rail and road is prevalent; there is virtually open access to forests .On the other hand the role of forest cover for improving the basic quality

of life rather than as a source of revenue alone has brought focus on sustainable management in place of exploitation of Forests. Further, Participatory Forest Management has brought new possibilities for improving the lot of the Forests as well as the forest fringe dwellers.

27. Review of Rights and Concessions :- In the changed environment it is necessary to review the Rights and Concessions on the basis of the New Forest Policy, 1988 of Govt. of India. It is suggested to initiate this on the following broad parameters :

    A : Identification of forest areas and forest products available from the area.

    B : Identification of the requirement of forest products for each category i.e. landless, marginal farmers, small farmers etc.

    C : Identification of beneficiaries within PFM parameters and allotment of forest products to each beneficiary.

    D : Guide lines for harvesting.

    E : Regulation and Recording of the forest products.

    F : Restriction and check of illegal trafficking of forest products by rail and road, and ban on use / sale of certain forest products in urban areas/markets.

    G : Augmentation of certain forest products in community / waste lands through Eco Development, Social Forestry etc.

28. Grazing :- In order to allow for pasturage without deterioration of Forests, the Grazing Policy of Govt. Resolution for Reserved Forest areas was promulgated on 6th December, 1968. This provided “Grazing Rules” for Reserve Forest Areas. The G.R. and accompanying Grazing Rules are appended at Appendix No. LXVIII, P.174 and LXIX P.177, Vol-II.

29. Grazing Settlement :- The Grazing Policy and Rules in Thane District was a sequel to ‘Grazing Settlements’ based on a report by the Grazing Settlement Officer. The GSO’s report which allowed for Scientific Grazing in the forest areas for the period 1969- 70 to 1988-89, has mentioned some problem areas as given below :

A : Grazing settlement was carried out for R. F. only. The P. F .was subjected to illegal cultivation in a big way, hence implementing grazing settlement in P.F. was not considered feasible. Regeneration areas were closed for certain period.

B : The export of fodder to urban areas like Mumbai brings artificial scarcity and increases cost of fodder in rural areas thus decreasing stall feeding and increasing grazing incidence in forest areas.

C : There are professional cattle breeders who raise cattle on very little diet. These cattle are sold to cultivators and leads to unhealthy cattle population.

D : During monsoons, when there is abundant fodder in forests, coastal farmers send those cattle which are not useful for agriculture to the farmers in the hilly areas for purposes of grazing.

E : There is migration of cattle from fodder deficient areas e.g. Nashik and Ahmednagar, to the Forests of Thane District for grazing. At that time, i.e. 1968-69, such migrated cattle numbered between 15 to 20 thousand per annum.

F : 'Protection Forests' including some areas of Lake Catchment Forest areas had been excluded from grazing. However in actual practice grazing does occur in these areas as there are villages with cattle population in these areas. Hence until there is shifting of these village settlements, prohibition of grazing could not be done.

30. Grazing Units :- The G.S.O. had formed grazing units and listed villages to various grazing units. Each cultivator family had been allowed upto two plough units free grazing in the R.F. areas as per the G.R. of 6/I2/ 1968. One plough unit has been defined as equal to four cattle units. The cattle units are computed as under :

1)	Adult buffalo	2 units
2)	Cow, bull ,or bullock	1 unit
3)	Buffalo calf (below 3 years)	1 unit
4)	Cow calf	½ units

Priorities for grazing in the event of excess cattle had been given. Further nominal grazing fees had been introduced for cattle in excess of free grazing limit.

Sheep and goat grazing in the R.F. was not to be allowed due to various harmful affects on seedlings and soil.

The P. F. areas were allowed to be grazed in as per privileges already in existence. Hence as already stated, the Grazing Settlement Report was prepared for the R.F. areas only.

31. Staff for Implementation :- The G.S.O. advocated the need to appoint separate staff, other than Territorial Staff, to have meaningful implementation of the grazing settlement. Further, checking of grazing permits was suggested through Forest officers, Executive officers of the Revenue Department etc.

32. Present Scenario :- During my discussion and observations with field level staff there were wide ranging suggestions. In fact many suggested complete ban on grazing in the forest areas to avoid damage to ground flora and plantations. Further, they felt that grazier -illicit felling-fire kindling nexus exists. Others felt that grazing prevents big fires. It was learnt that grazing incidence is very heavy near settlements and it has become difficult to regulate the Cattle-Forest Area ratio as per provisions of the Grazing Settlement. The matter is complicated by movement of grazier and cattle beyond 8 km as per availability of fodder which was not stipulated in the G.S. Further the browsing of goats in forests is detrimental to Forests as well as in creating shortage for cattle. Goats are the most rapacious of all grazing animals and it is reported that their acrid saliva prevents proper development of shoots.

33. The P. F. Land to cattle population is 5 to 6 animals per ha. on an average Please see Appendix LX VII P-168, for the 19828.201 ha. of recorded P. F. cover the cattle census figures were 111943 in 1991. However, factors like migratory cattle, cattle going beyond the listed villages, pressure of grazing near settlements and away from steep slopes, browsing by goat herds, collection of grass for export, difficulties in conduction cattle population census, decrease in actual

forest cover and lack of clear zonation of free PF zone and regulated RF zone make the issue more complicated than the ratio of land to animal suggests.

34. New Direction :- The Grazing Settlement of 1968-69 was computed with sound scientific premises, but there have been difficulties in implementing as had already been investigated by the G.S.O. It is necessary to revise the same based on the changed scenario as well as the change in the role of forests today. Grazing represents one point of the multifaceted prong that is pricking at the heart of sound forestry.

The Grazing Policy may be within the following parameters :

A) The Carrying Capacity of the Forest Areas should be worked out in various categories of Forest Land.

B) The R.F. areas as far as possible should be excluded from grazing to allow re-establishment of ground flora and stabilization of soil for 2 to3 years and Assessments of the effects should be noted.

C) The P. F. areas should be utilised for raising NTFP including fodder crops under PFM Schemes. Selected R. F. areas of heavy grazing incidence and accessibility may also be selected for the same.

D) In P. F. areas not selected for PFM, grazing as a privilege should be restricted to those villagers whose rights / privileges are recorded in Forest Settlements. These beneficiaries should form a committee under the Sarpanch / Police Patil for Protection and Exercise of their privileges and aid the F. D .in safeguarding the areas from outside cattle pressure.

E) At present the T.D.C. regulates fodder trade. A provision for sale of some percentage of fodder by their contractors to local identified villagers at concessional rates should be introduced to reduce complete export of fodder to urban areas and ease fodder pressure on Forests.

F) A drastic reduction in cattle population in the tract and particularly in the forest fringe P.F. and other villages should be attempted in consultation with villagers, local leaders, animal husbandry experts, etc.

G) Non forest community agriculture fallow and Revenue lands should be used for augmentation of the production of NTFP like fodder and fuelwood. The Agricultural Department may provide a package of inputs like improved seeds.

H) No grazing should be allowed except in areas mentioned in (D) and in these areas villagers should link with the F .D. to regulate grazing.

I) There is need for proper recording of all privileges including grazing so that quantification of the 'Forest Output' is possible in terms of money as well as in terms of social service.

35. The above suggestions are rudimentary in nature and needs to be enlarged at the time of the exercise. It would be suitable to engage some non F.D. Personnel e.g. some Consultancy Service for such exercise Forest Circle wise, especially because some sensitive and controversial issues will have to be addressed. The Conservator of Forests (Territorial) and Dy. C.F. Working Plan etc. can guide the direction of the exercise.

CHAPTER - II

THE FORESTS

Section -1 :- Composition and Condition of the Crop :

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

- 3B / C1 - Tropical Southern Moist Teak Bearing Forests.
- 3B / C2 -Tropical Southern Moist Mixed Deciduous Forests.
- 8A / C2 -Western Sub- Tropical Hill Forests.

37. 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 factors in some cases, but in majority of them, the other factors like topography, biotic influences and past treatment are responsible for such variations. The following five main associations can be distinguished in this main type. viz.,

i) The Teak-Ain-Kuda-Karvand Association.
ii) The Teak-Dhavada-Kuda-Takla Association
iii) The Ain-Khair-Koshimb-Karvand Association.
iv) The Ain-Bonda Association.
v) The Kakad-Shemat-Kuda-Takla Association.

38. 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 IV with occasional patches of quality III. Density of crop of this association varies from 0.4 to 0.6 .Floristics are as under :-

I) Top canopy Teak (Tectona grandis) (a), Ain (Tenninalia tomentosa) (va), Khair (Acacia catechu) (f), Hed (Adina cordifo1ia) (0), Kalamb (Mitragyna parvifo1ia) (0), Bibla (Pterocarpus marsupium) (0), etc.

II) Second Story :- Second story consists of Kuda (Holarrhena antidysenterica) (f), Karambel (Dillenia pentagyna), Kumbhi (Careya arborea) (f) Palas (Butea monospenna) (o), Temburni (Diospyros melanoxylon) (o) etc. II(a). Bamboos -Katas bamboos (Bambusa arundinacea), Manvel bamboos (Dendrocalamus strictus) are found occationally. Clumps of both species of bamboos died after gregarious flowering in 1960 and regeneration has occured only in remote hill areas.

III) Shrubs :- Main species of shrubs are Karvand (Carrissa carandas) (Va), Ukshi (Calycopteris floribunda) (Va), Murundsheng ((Helicteresixora) (t), and Rantur (Atylosia lineato) (0).

IV) (a) Herbs :- Ranbhendi (Thespesia larnpus) (0), Burada (Blumealacera) (la), Karvi (Carvia calloSa) (la) Litchi (Urena lobata) (0).

(b) Climbers :- The main species of climbers are Ukshi, (Calycopteris f1oribunda) (t), Modvel (Combretum ovalifolium) (t), Palasvel (Butea superba) (0) Kuhili (Mucuna Pruriata) (0) Chilllar (Caesalpilnia sepiaria) (0), Kusari (Jasminum arborescens) (0), etc.

Note :- (Va) = Very abundant, (a) = abundant, (f) = frequent, (c) = Common, (o) = Occasional , (r)= rare. (la) = locally abundant.

39. The Teak-Dhavada-Kuda-Takla Association :- This association occur in the upper slope or hills which are exposed to severe winds and soil erosion and on flat tops of the hills having shallow rocky soil. These are also found in areas subject to frequent fire or heavy damage by backing and grazing due to proximity to villages. The quality of forests is generally IV b to V with occasional patches of quality IVa and quality III. Where the soil is very poor, the quality deteriorates to V. Density of crop varies from 0.1 to 0.5. The floristics are as under :-

I. Teak (Tectona grandis), Kakad (Garuga pinnata), Shemat (Lannea Coromanelica), Sawar (Bombax cieba) Dhavada (Anogeissus latifolia).

II. Kuda (Holarrhena antidysenterica) Kudi (Wrightia tomentosa), Chera (Erinocarpus nimmonil).

III. (a) Manvel (Dendrocalamus strictus), Bundi (Oxytenanthera monostigrna).

(b) Karvand (carissa carandas), Ukshi (Calycopteris floribunda).

IV. Takla (cassia carandas), Ukshi (Calycoopteris floribunda).

V. (a) Takla (Cassia tora), Karvi (Carvia callosa).

VI. Kuhilli (Mucuna pruriata), Mastodi (Capparis Spinosa).

40. The Ain-Khair-Koshimb-Karvand-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 IV a with occasional patches of quality III. Density of crop varies from 0.2 to 0.6 The floristics are as under :

I) Ain (Tenninalia tomentosa), Khair (Acacia catechu), Hed (Adina cordifolia), Kalamb (Mitragyna parvifolia), Koshimb (Schleichera oleosa), Teak (Tectona grandis), Shisham (Dalbergia latifolia), Bibla (Pterocarpus marsupim), Nana (Lagerstroemia microcarpa), Shiras (Albizzia lebbek) Kinhai (Albizza procera), Kala shiras (Albizzia odoratissima), Mango (Mangifera indica) Jambul (Syzygium cumini), Asana (Bridelia retusa), Arjuna (Tenninalia arjuna), Pharadi (Albizzia chinensis), Waras (Heterohrfagrna quadriculata) Chambuli (Bauhinia vahlii).

II) (a) Kararnbel (Dillenia pentagyna) Kumbhi (Careya arborea), Pa1as (Butea monosperma), Tembhurni (Diospyros melanoxylon), Tiwas (Ougenia ogenensis), Awa1a (Emblica officinalis), Booker (Cordia myxa), Humb (Miliusa tomentosa), Karanj (Pongamia pinnata), Bava (Cassia fistula), Lokhandi (Ixora nigricans), Shendri (Mavotus philippinesis).

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

III) Karvandi (Carissa carandas), Ukshi (Calycopteris floribwda), Murudsheng (Helicteres isora) Rantur (Atylosia lineata), Adulsa (Adatoda vasica), Ghaneri (Lantana camera), Dhaity (Woodfordia – fruticosa).

IV) (a) Ranbhendi (Thespesia lampus), Karvi (Carvia callosa), Rankel (Musa superba), Litchi (Urena lobata), Indigofera species and number of Labiateae, Malvaceae, Compositeae and Solanaceae families.

(b) Kother (Woodrowia diandra), Kusali (Andropogon contortus), Phulera (Anthistiria ciliata) etc. are not abundant.

V) Ukshi (Calycopteris floribunda), Modvel (Combretwn ovalifolium), Palasvel (Butea superba), Chilhar (Caesalpi

(Abrus precatorius), Kuhili (Mucuna pruriata), Kusari (Jasminum arborescens), Waghati (Wagates spicata), Nandanvel (Vitis repanda), Mastod (Capparis spinosa), Kanguni (Celastrus paniculata), A1si (Dalbergia volubilis), Chambuli (Bauhinia vahili) etc.

41. The Kakad-Shemat-Kuda-Takla Association :- This association occurs on poorer sites i.e. upper slopes of hills or locally on patches with exposed rocks. The site quality is generally IV a with occassional patches of low III quality. Where the soil is very poor, the quality deteriorates to IVb. Density of the crop varies from 0.3 to 0.5 .The floristics are as under :-

I. Kakad (Garuga pinnata) (f), Shemat (Lannea coromandellica) (f), Teak (Tectona'grandis) (0), Sawar (Bombax ceiba) (0), Dhavada (Anogeissus latifo1ia) (f), Pangara (Erythrina variegata) (0), Bondara (Lagerstroemia parviflora) (0), Kando1 (Sterculia urens) (0), Kadwai (Hymenodictyon excelsum) (0), Kukeri. (Sterculia guttata) (r), Khavas (Firmiana co1arata) (r).

II. Kuda (Holarrhena antidysenterica) (f), Kudi (Wrighta tomentosa (0), Chera (Erinocarpus nimmonii) (0), Bor (Zizyphus mauritiana) (r), Kinnira (Casearia tomentosa) (0), Petari (Trewia nudif1ora) (la) etc.

II. (a) Manvel (Dendrocalanius striCtuS) (0) Bundi (Oxytenanthera monostigma) (0)

III. Karvand (Carissa Carandas) (f), Ukshi (Calycopteris floribunda) (f),Dhaity (Woodfordia f1oribunda) (0), Ghaneri (Lantana camara) (R) Thor (Euphorbia ligularia) (r) etc.

IV. (b) Kusali (Andropogon contortus), Kother (Woodrowia diandra) , Phulera (Anthistiria ciliata), Phool (Themeda quadrivalvis).

42. **Climbers are rare :-** The Ain-Bonda Association -This association is mostly found in Washala Range on the foothills of Western Ghats. The soil is shallow and poor in humus content. Site quality is IV a and IV b. The density varies from 0.3 to 0.6 Ain and Bonda are the most common species. Teak is almost absent. Other association in the overwood are the same as in The Kakad-Shemat-Kuda-Takla Association, but tlleir proportion is less. Underwood mainly consists of Kuda and Kudi. Climbers are rare and bamboc

Southern Tropical Moist Mixed Deciduous Forest :

43. 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 namely IV a. Density varies from 0.3 to 0.6. Its occurrence is more marked in damp valleys.

44. The main species occuring in this area are Ain (Tenninalia tomentosa), Hed (Adina cordifolia), Dhavada (Anogeissus latifolia), Shisav (Dalbergia latifolia), Savar (Bombax ceiba), Kalam (Mitragyna parvifolia) Moha (Madhuca indica) Mango, (Mangifera indica), Shendri (Mallotus philippinensis).

45. The floristic structure greatly resembles to that of The Ain-Khair-Koshimb- Karvand Association and The Kakad-Shemat-Kuda-Takla Association.

46. The Western Sub-Tropical Hill Forests :- This type is found on the higher slopes of the Western Ghats in Vashala Range. It occurs as a narrow strip between 500 to 1100 metres Altitude. Locally the rainfall is higher than the rainfall of the district. Temperature too is lower due to high altitude. The area is exposed to strong wil1ds with the result that the height growth of the trees is poor except in the valleys. The soil is moderately deep to shallow with fair amount of humus. Site quality is mostly IV a, with occasional patches of quality.

    Density is between 0.4 to 0.6 It is a Semi Evergreen type of Forest with many evergreen species in the overwood and with underwood and under growth almost exclusively of evergreen species.

47. The floristics are as under :-

I) Mango (Mangifera indica) (f), Karanj (PongarniaPinnata) (0), Kokam (Garcinia indica) (ra), Jarnbu1 (Syzygium cuminii) (0), Undi (Calophyllum inophyllum) (f), Katekumbal (Sideroxylon tomentosum) (f), Shisham (Dalbergia latifolia) (0), Waras (Heterophragrna quadricu1ata) (f), Asana (Bridelia retusa) (f), Hirda (Tenninalia chebu1a) (f) , Beheda (Tenninalia bellerica) (0), Wahala (H010ptelea integrifolia) (0), Bhoma (Glochidion lanceolarium) (0), Payar (Ficus arnottiana) (0), Bhor Jambhu1 (Ammania baccifera) (0), Par Jambhu1 (Olea dioica) (0), Chandada (Macaranga roxburg

II) Lokhandi (Ixora nigricans) (f), Pandari (Murraya exotica), (f) (Anjan) (Memecylon edule (a) Kadulimb (Murraya koenigii) (f), Koshimb (Schleichera oleosa) (f), Karavati (Ficus asperrima) (0), Shendari (Mallotus philippinensis) (0), Datir (Ficus heterophylla) (0), Ranlimbu (Atlantia racemosa) (0).

(a) Bamboos are absent.

III) Rametha (LasioSiphon eriocephalus) (0), Thor (Euphorbi ligularia) (0), Khulkhula (Crotolaria retusa) (0), Dhaity (Woodfordia fruticoSa) (0) , Phangali (Pogostemon purpuria)

IV) Sanki (Senecio grallami) (0), Rankel (Musa superba(0), Karvi (Carvia callosa) (va), Dindi (Leela macrophylla) (0), Papadi (Pavetta tomentosa) (0) , climbers, orchids, ferns and other herbs are numerous.

Local Types :-

48. Three Local Types may be distinguished for the purpose of description of the Crop and its Management :-

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

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

50. The Poor Quality of Forests is found in Reserve Forest and Woodland Forest situated in the proximity of villages and developing townships as Forest in such areas have been subjected to great pressure by surrounding populations. Where the forests have been subjected to the heavy pressure of Tahal lopping, Non Teak species have diminished to great extent. 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 Natural Regenaration and advance growth are absent.

51. Teak forest :- On deep, rich and well drained soil, most valuable species economically i.e. Teak occurs 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 confirmed to Teak Plantations, but most of which have been hacked and subjected to heavy illicit cutting. On better sites, the associates of Teak are valuable timber species like Ain, Khair, Hed, Kalarn, Bibla, etc., while in poorer sites, the associates are drier species like Dhavada, Kakad, Shemat, etc. The floristic structure of Teak Forest resembles to the Sub-Type Moist Teak Forest and Slightly Moist Teak Forest of the type Moist Teak Forest of Champion and Seth's Classification.

52. Mixed Forest :- This type of the Forest has low proportion of Teak in the crop. It occuts in the area which have notbeen subjected to adverse effects or biotic factors like fires, over grazing, hacking etc. This type of forest occurs in moist areas like nalla bunds, and shaded valleys. Such type of Forest is common in Washala Range of Shahapur Division. Three kinds of association are commonly found in this sub-type, they are :- "Ain-Khair-Koshimb-Karvand Association", "Kakad-Shemat-Kuda-Takla Association" and "Ain-Bonda Association". The first association forms the better quality Sub-Type, while the later two association forms poorer quality Sub-Type.

53. Ain Forest :- In part of the areas, Ain occurs more than 50% in the crop. Such type are very common in Woodland or even in Reserve Forest where areas have been largely used for cultivation. The type occurs on almost all 'Malki Land' near Woodlands and Reserve Forests. The occurrance of the species in cultivations and encroachments indicates that the species has capability of surviving against the injuries of repeated hacking, probably owing to its high coppicing power.

Section - 2 :- Injuries to the Forests

54. The Forests in the tract have been subjected to tremendous biotic interference. This has been more pronounced near settlements and roads. As has been mentioned earlier, the Revenue first approach had led to settlement of people in interior forests. This begun unregulated use of the forest resources and forest land at many points. With the regularisation of settlements from time to time and resultant construction of roads, the forests have become honeycombed and easily accessible. The Forest Department lacked the man power and infractructural facilities to tackle the problem at hand. Further the urban interests made use of the weaknesses and exploited the timber, fuelwood, other NTFP, soil boulders and other Natural Resources. Frequently new settlers in forest fringe villages formed contact points between urban vested interests and forest fringe dwellers to indulge in illicit cutting and movement of timber and NTFP. With rise in human and cattle population in forest fringe areas, socio-political groups with anti forest stance were mobilised to align against the FD. Moreover, populist decisions to regularise forest encroachments further reduced forest areas and put pressure on remaining forests.

55. Illicit Cutting of forest trees, particularly middle aged to mature sized Teak and Khair, has been heavy near townships, along main roads and near settlements. A well connected network of roads caters to illegal movement of forest produce, and Government buses have been reportedly used for transporting planks and NTFP to urban areas. The following railway outlets have been used for the same purpose.

1) **Atgaon (Local) :-** This is an open station and planks, rough squared logs and fuelwood billets of good quality have been known to go via this station at odd hours.

2) **Umbarmali Village:-**This is not a station but locals are known to stop or slow down owing to signal or other reasons. Fuel wood billets in the non-rush hours of the day, and planks and squared logs at night have been known to move out from this place.

3) **Kasara Station:-** This station has been known to allow loading during night and early morning of a range of forest produce like

grass, leaves of Palash / Teak, fuel billets, small timber, forest fruits, charcoal and wood chips.

4) **Tunnel number 4, Vihigaon :-** This is not a station but a point for checking of brakes enroute to Kalyan Jn. Early morning trains especially goods and passenger / shuttle trains are loaded with fuelwood billets, small timber and planks.

56. With the decrease in Teak of proper size and demand for Khair, there is tremendous selection of this species for illicit felling. It was learnt that Khair market forces of North India have spread their area of operation upto Thane District.

57. The main markets for timber, small timber, fuelwood, other NTFP are Kalyan, Ulhasnagar, Nashik and smaller towns like Shahapur. Fuelwood is in demand in highway dhabas, satellite townships and even in Kalyan. It is not unusual to see head loads being taken by tribal and other villagers in the mornings to far off locations. The local tribal and other forest fringe dwellers are also known to provide logistic support and cheap labour for illicit felling and carrying to transportable points. Fuelwood headloads for sale and for own use make a considerable biomass depletion, for local villagers and free accessibility results in improper use leading to wastage fuelwood.

58. As there are no norms of counting trees below a certain girth (30cm) the quantmn of non-timber wood biomass does not get reflected in records. The NTFP collected also do not get reported in records. Hence the actual, biomass removal is unknown. However, it is necessary to device norms for counting and recording these so as to know the productivity of our forests. This aspect has been partly addressed in the chapter on PFM and paragraphs on Rights and Concessions. However, there is need to evolve the same further in the near future.

59. Plantations of 4 to 5 years and above are subjected to pressure of illicit cutting and it was learnt that this is one of the main reasons for failure of Plantations in the tract. Even the good Plantations are reduced to stools and shrubby growth by illicut cutting towards the end of third or fourth year, or after watch and ward is discontinued

60. A statement of illicut fellings of Shahapur Division below shows the considerable quantity of trees cut illegally.

Sr. No.	Year	No. of stools detected	Value of the material (Rs.)
1.	1985-86	10,160	7,19,794
2.	1986-87	6,257	8,24,870
3.	1987-88	4,197	11,08,446
4.	1988-89	7,269	14,75,849
5.	1989-90	14,859	28,75,233
6.	1990-91	11,204	48,20,673
7.	1991-92	10,671	64,45,949
8.	1992-93	6,662	23,72,584
9.	1993-94	10,844	32,58,428
10.	1994-95	6,528	21,56,983

61. Instances of staff involvement in illicit cutting has also been reported in this regard Mixing of Govt. forest trees and privatly owned trees, use of a single Transit Pass over and over again, permission for transporting illicit timber under guise of old house material, permission for illegal movement of NTFP. removal including stone and soil have been cited. Moreover non reporting or under reporting of illicit felling of trees, encroachments, NTFP collection and other offences by Beat Guards etc. take its toll. For proper supervision, the ratio of executive to supervisory staff should be increased on a Rationale Plane, Flying Squads introduced per Division (These should be independent without Area, Range or Work Specific) for cross checking and protection, intelligence gathering machinery should be formed, enquiries and checks should be conducted by officials / staff from outside the Territorial Division/Circle, proper check of assets and property of self and dependents should be done etc. The above are some suggestions by various officials / staff and these factors, however distant have a bearing on the forests and their proper Management.

62. The forests are subjected to fires year after year, especially during the period from February to May. The majority

reportedly due to careless smoking, frisking of wild animals like hares to a convenient spot, preparation of an area for cultivation, spread from fires on roads, spread from rab bumming areas and also caused intentionally by graziers others to get a good flush of grass or shrubs. Sometimes accidental fires from villages or from fire lines due to wind are also known. Fires are also intentionially put to remove evidences of illicit felling and for expanding / encroaching into forest land.

It is routine to see curling smoke in forest areas during the summer months. The Plantations are protected from fire by Fire Watchers, Watch and Ward Labour. No fire lines in the forest areas have been prepared and only streams, rocky patches, roads and blanks form barriers to spreading of fire.

63. The forest fires in the tract are mainly surface fires which sweep over the ground surface rapidly. The flames consume the litter, living herbaceous vegetation, shrubs, seedlings, pole crops, and scorch tree bases. The reproduction is burnt and surviving poles develop hollowness and scars that allow disease and breakage. Fires bring about tremendous alteration of such environmental factors as nutrient cycles, soil fauna, light, soil moisture, fertility of soil, litter and humus contents of soil and P^H. The destruction of habitat and encouragement of soil erosion in the area, tends to take back the area in time and together with other biotic factors, may ultimately lead to waste land that are fit only for Primary Colonisers.

64. Rab burning and Tahal cutting are common agricultural practices in the area. These are priveleges for certain villagers. However, the pressure for these are so great that cartloads are removed and frequently sold to outside villagers. Areas near settlements are swept for rab and this has affected the humus content of the soil resulting in poor or non existent detritus cycle which has a bearing on ecological process and habitat maintenance. Tahal cutting for enriching paddy forests and nurseries is also done indiscriminately and cart loads are transported. This damages the plants, arrests growth, leads to poor flowering and fruiting, desease prone plants leading to death of trees without proper regeneration. The soil deteriorat

and movement of mall and his cart / cattle, leaving behind denuded areas.

65. Encroachment on Forest Lands with a view to get regularisation subsequently has been a major factor dalnaging the forests. Whereas Encroachments are frequent in PF areas the RF has not been spared either. Many PF areas e.g. Kasara, Mokhavane have become extension of villages with permanant structures. Encroachment not only destroys forests but also leads to illicit felling in the neighbouring forest areas. Certain schemes had allowed people to settle inside forest areas by giving small plots of forest land. These areas form nuclei of forest damage including encroachment. There is a pernicious practice among forest fringe dwellers to prepare cultivable blanks in forest areas, some what on the lines of shiftillg cultivation and then use these areas for cultivation during monsoons. As per rules in force there has been a practice to allow reaping of cultivated crops prior to removal of encroachment. Such temporary encorachments may not be recorded but none the less damage to forests occur.

66. In case of Tribal Populations, there has been a policy to accommodate their encroachments among other infringrnent of forests, due to their socio-economic and cultural association with forests. However laudable this effort may be, it is necessary to realise that forest depradation and tribal deprivation / poverty are directly interlinked. Thus the need for PFM like efforts to regulate and use forests in a sustainable manner. This has been touched upon on the chapters on PFM and Tribal Welfare.

67. The following Statement of Enchroments has been given by Dy CF, Shahapur.

Sr. No.	**Year**	**Encroachments in R.F.**				**Encroachments in P.F.**			
		Tribal		**Non -Tribal**		**Tribal**		**Non-Tribal**	
		No.	Area(Ha)	No.	Area(Ha)	No.	Area(Ha)	No.	Area(Ha)
1.	1990-91	126	60.249	11	0.9115	30	11.5924	35	1.8216
2.	1991-92	138	44.8951	9	2.1413	29	4.6228	356	9.1416

3.	1992-93	92	44.8127	9	2.9038	53	3.6743	370	10.6754
4.	1993-94	105	28.8357	14	1.7522	25	3.3450	26	6.6722

68. Grazing Pressure is extremely heavy near forest fringe villages and far flung areas are also not free from unregulated grazing. Further, Plantations are also subjected to grazing and together with factors like illegal cutting are responsible for failure of Plantations. The incidence of grazing is much over the Carrying Capacity. Constant trampling and browsing along with other factors affects regeneration and accelerated soil compaction and erosion. Various aspect of grazing has been dealt with in chapter I.

69. Overfelling, clear felling and felling on slopes and erosion prone areas, and subsequent failure in ensuring proper regeneration have encouraged soil erosion, site deterioration and resulted in degraded forests in the tract. Furtller replacement of local species with monoculture of timber species like Teak is regarded as also a contributing factor to degradation of site quality on slopes and erosion prone areas.

70. **Attitude Of Local Forest Fringe Dwellers :-** The forest fringe dwellers mainly comprising of Tribal people have developed on inimica feeling towards the Forest Department as they considered certain rules and policy decisions against their interests. This has resulted in enormous damage to the Forests. Their alienation may have been compounded by the policing mode of the FD and lack of communication between the FD and Tribals. Further, various vested interests and Anti-FD Socio Political Groups had driven a wedge between the two. As long as these forest fringe dwellers do not identifity with the FD, Forest Protection, Regenaration and in fact the whole gamut of Forestry Management Operations is at peril. PFM is one way of building bridges. This subject has been elaborated in the chapter on PFM.

71. **Personnel Management :-** There has been a big increase in the work load of Forestry Personnel. Paper work, meetings and travelling consume considerable time.

72. This has resulted in little time being available for Forestry Management works including movement inside the Forest. This trend could indirectly have deleterious effects on the Forests. Some officials feel that division of labour for different types of works e.g. Protection, Production, Plantation, Conservation etc. should be done instead of concentrating all jobs and powers in Territorial Staff.

73. **General : -** The Forests of the tract are subjected to so much injuries that its role to provide goods and services to man are severely restricted. Demands of timber/NTFP to a burgeoning population have distrupted ecological processes and the habitat, leaving the vegetation as biotic climaxes of varying degrees and frequent alterations. This is contradictory to the minimal critical role of these forests for :-

1) Ecological Security to be provided to downstream urban areas and
2) Economic as well as socio-cultural security to numberous poor tribal / other forest fringe dwellers who are dependent for their very survival on the forests.

It is evident that man inflicted injuries have prevented the forests potential to meet the aforementioned roles as well as providing timber / NTFP on a sustainable basis as harvested timber / NTFP. However the quantum of unregulated exploitation items if assessed properly for timber as well as NTFP would show that the forests potential productivity has been tremendous. For harnessing these on a sustainable basis for the proper target groups the Dy. Conservator of Forests should submit workable proposals to the higher authorities. The following parameters may be adopted as guide lines for submittimg the proposals / schemes :-

- PFM schemes for target areas along guidelines given should be initiated
- Integrated Developement including NTFP/Timber Augmentation Schemes for forest Fringe villages in consultation with the Collector. Tribal Dept., Zilla Parishad, Social Forestry and other concerned Departments sholud be planned and initiated.
- Proposals for ban on Transportation of Timber/NTFP through Govt. Transport in consultation with the Collector.

- Proposals for Restriction of Sale of certain NTFP in Urban/Semi Urban localities in consultation with the Collector.
- Proposals for Maintaining Improvement of Degraded Lake Catchment Areas through MMC, Mumbai should be submitted after consultation with Higher Authorities.
- Proposed for Relocation of Dalhi Plots, Old Forest Villages etc. in Fringe Areas of Forests or PF.
- Protection Plan for tackling illicit felling should be prepared. Provisions for extra staff, vehicles arms, extra powers (e.g. Forest chowki), restricted movement of Non Governmental vehicles on forest accessable village roads metalled roads and M.D. roads, wire less system / watch tower, etc. should be proposed.
- Proposal for Review of Privileges on the basis of Carrying Capacity of the forests and in a regulated manner for P. F. should be prepared. This would also include grazing. Privileges should be distributed on PFM lines.
- Proper Allotment of Funds as per the Working Plan Prescriptions should be asked for under concerned Heads to allow for Scientific Management of Forests.

74. The aforementioned parameters may require time to assess and formulate. However it is imperative that the Division, or the F. D., put up the enormous constraints being faced by field staff to execute and manage Forests. Proposals may appear fanciful now but could yield desired results later. However failure to alert the Govt. and Higher Echelons will surely continue the present state of affairs and result in the FD being blamed for the state of the Forests and other associated problems. The wide concern for forests and environment should be taken advantage of at this oppurtune time.

CHAPTER - III

UTILISATION OF THE FOREST PRODUCE

Section -1 :- Agricultural Customs and Wants of The Population :

75. The local forest fringe communities living in the tract are mainly Adivasis like Thakur, Kathkaries, Warlis, etc. A

profession of the people in the tract. They practice mostly primitive type of agriculture. Paddy, Nagli and Warai are the main crops. A common practice followed by agriculturist in the tract is Rab burning. These people own large herds of cattle. They depend on forests for grazing. For burning the Rab the Tribals and local people collect the fallen dead leaves from the forests. They also cut Tahal from trees of the forests from species like Ain wherever 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 Bamboo is also great and is more often met by hacking of Plantations and lopping of trees. They also need small wood and timber for preparing cowsheds and agricultural implements. The need of firewood in the developing areas is so great that most of the tribal women collect fIrewood on headloads and sell these by travelling about 10 to 15Km. on average. Many tribal women collect firewood by headloads from nearby forests for earning their livelihood.

Section -2 :- The Markets and Marketable Products :

76. All size timber and firewood from these Forests have a market. The most important markets are Mumbai, Nashik, Thane and Bhiwandi and developing areas nearby. In the tract there are some Forest Labourer Co-operative Societies. These handled the extraction of major produce from the forests in the past. There has always been demand of firewood throughout the tract. The Major Forest Products are sold as Timber of Teak, Ain, Khair, Hed, Dahawada etc. and firewood. Khair is in demand for Katha Manufacturing and for preparing axles and hubs of carts. Tiwas is also used for the preparation of axles and hubs of carts. Hed and Kalam is used for bobins, shuttles and footscales. Sawar, Kakad and Shemat are used for packing cases, plywood and matchwood industries. Most of the local demand is confuled to small size timber and firewood. However, only a small fraction of such products is consumed locally and most of these products are sold to outside market. The various Non Timber Forest Products are Grass, Bamboos, Apta and Tembhurni leaves, Bel, Chilhar And Ain Bark, Kadi Patta, Babul Bra

And Seed, Hirda Fruits, Kusari Flowers, Tad Fruits and Seeds, Hirda Fruits, gums etc. These products play an important role in the Socio-Economic life of Tribals and local people, who utilise these products traditionally. The sale of these products is also conducted by Forest Department. Average Annual Revenue realised from the sale of these Non Timber Forest Products in the tract is given in the Appendix No. XVIII, P.30, Vol-II.

Section -3 :- Lines of Export

77. The broad guage railway line of Central Railway passes through the areas falling under the jurisdiction of Shahapur Forest Division. It traverses through Asangaon, Atgaon, Khardi and Kasara in Shahapur Taluka.

78. The areas falling under the jurisdiction of Shahapur Forest Division have adequate net work of roads in form of National Highway, State Highway, Major District Roads and Village Roads etc. The National Highway No. 3 leads to Nashik through Shahapur and Kasara. There are other State Highways connecting Vashind, Shahapur, Atgaon, Khardi, Kasara and Vihigaon and there are Seasonal Roads connecting important places all through the areas falling under the jurisdiction of Shahapur Forest Division. These roads are maintained by the B & C Department and Zilla Parishad.

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

79. The main agencies of Exploitation of the Forest Produce in the tract have been the Forest Labourer Co-operative Societies. Departmental exploitation was done to a limited extent.

    During the year 1986-87, 45 Coupe of different Working Circles of Joshi's Plan were worked through Forest Labourer Co-operative Societies and during the same year 21 Coupes were worked Departmentally. The total area worked by the Societies was 2083.094 ha. with an Yield of 3844.338cum. of timber and 8296.930cum. of firewood and an Expenditure of Rs. 4271761/- was incurred. The cost of working was Rs. 1720/- per ha. Departmentally 638.068 ha. was worked with 448.673 cum. of timber and 1397.816 cum. of firewood

and an Expenditure of Rs. 244551/- was incurred. The Cost of the working was Rs. 383 *1*- per ha. The felled material in the form of timber and firewood had been brought to the Depots at Khardi, Asangaon, Khodale and Pali.

80. The latest Wage Board Rates for piece works have been given in the Appendix No.XIV, P-22. There has been a steady rise in the Daily Wages of the Forest L-abours and the current Daily Wage Rates are given in the following table. The Rates of Allowance is from 1.8.96 to 31.7.97.

Working Hours

Sr. No.	Kind of work living	For 8 Hours	For 6 Hours	Cost of Allowance
1.	Light work	14	10.50	24.10
2.	Unskilled work	16	13.00	24.10
3.	Skilled work	16	13.50	24.10

The current minimwn EGS rates for this zone is Rs.35/- per day.

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CHAPTER - IV

STAFF AND LABOUR SUPPLY

Section -1 :- Staff

81. The following statement shows the Sanctioned Staff for Shahapur Forest Division.

Class of service	Name of the post	Under Plan schemes			Under non PlanGrand schemes			Total
		Perm	Temp	Total	Perm	Temp	Total	
I.	Dy. C.F.	--	--	--	1	--	1	1
I	A.C.F.	--	1	1	1	--	1	2
II	R.F.O.	2	2	4	5	1	6	10
III	Forester	--	34	34	23	8	31	65
	Guard	8	44	52	69	45	114	166
	Rager Survey	--	--	--	--	--	--	--
	Surveyour	--	1	1	2	--	2	3
	Head Clerk	1	--	1	1	--	1	2
	Accountant	2	2	4	3	6	9	30
	Steno	--	--	--	1	--	1	1
	Clerk	--	3	3	16	2	18	21
	Driver	--	3	3	1	--	1	4
	Constable	--	10	10	--	--	--	10
IV	Peon	--	--	--	5	--	5	5
	Khalashi	--	--	--	--	--	--	--
	Watchman	--	2	2	1	1	2	4
	Mali	--	2	2	--	--	--	2

Grand Total	**13**	**104**	**117**	**129**	**63**	**192**	**309**

82. Nature of Details for The Field Staff is given below :-

Field Staff

a) R.F.O.s	: Ranges	+ Others	Mobiles		Squad
1					
10	6	4	Local		Checking
1					
			Sale		Depot
1					
			Western		Ghat
1					
					4
b) Foresters	: Rounds	+ Others	Plantations		24
65	32	34	Adivasi Malki		4
			Mobiles Squad		1
			Local Checking		**2**
			Central Nursery		1
			Sale Depot		1
			Court Duty		1
					34
c) Guards	: Beats	+ Others	I & C.		8
166	94	72	Office Guard		6
			Orderly Guard		6
			F.L.C.S.		8
			Fire & Forest Protection		7
			Adivasi Malki		6
			Maint. Of Depot		8
			G.U.T. Plantation		6
			Central Nursery		1
			Western Ghat		6
			M.A.P.		10
					72

Section - 2 :- Labour Supply

83. The chief source of labour for the Forests are local people and Tribals belonging to different Communities like Thakur's, Kathkaries, Kunbis, Kolis and Warlis. Katkaries are hard working and had earlier specialised in the preparation of charcoal. Generally the availability of labour for various forestry operations particularly for Plantations and Nursery operations is much below the requirement, as the season of Plantation coincides with agricultural crop sowing season. With the increasing emphasis on Afforestation and Plantations and high targets the requirement of labourers has increased many fold and more labourers are reported having been imported from outside areas. However, for exploitation works, since most of the Coupes have been worked by members of the Forest Labourer Co-operative Societies, there was hardly any difficulty. The shortage of labourers in the forestry work is felt in some developing areas of Shahapur Taluka.

CHAPTER – V

PAST SYSTEMS OF MANAGEMENT

Section -1. :- General History of the forests

a) Forest covered in the Working Plan for Reserve Forests by N. J. Joshi.

84. **Maratha Period :-** Prior to 1808 , 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.

85. **Early British Period :-** The necessity of conserving the forests was not recognised 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 organised for the first time and the system of management consisted in Reserving Teak and nine other species. The main sources of Revenues were the thinning in the Teak Reserves and collections under the Fee System (Vanmakta) was introduced in 1852. The whole of Thana district formed only one Division and the staff for Protection of Forests as well for supervision over the fellings was inadequate. Consequently illicit fellings occured on a large scale. The Fee System was abolished in 1862 and the system of Departmental Fellings was introduced. The Departmental Felling put some check on the whole sale destruction of the Forests. Under this system only the best Teak trees were cut normally. Excessive fellings were made in the easily accessible Forests. Unrestricted and unregulated lopping of Injaili trees for Tahal caused much destruction of Forests. The "Kolpat" contract system by which Right of collection of dead wood in the Forests was disposed of annually also caused great damage.

86. 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 Coups was introduced in 1887-88 and regular felling under the Coppice with Standard System was started from that year, though the first regular Working Plan (for the Forests 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, "The Coppice With Stanqard System" with a rotation of 40 years for the Coppice.

87. 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 Aitchson and Hamilton. This Plan prescribed the "Clearfelling system" with a rotation of 80 years. The clearfelling was actually started from 1917-18 only as the

"Coppice With Standard System" was considered economically unsound and as the Standards tended to supress the coppice growth. The 1922 Plan was revised by Starte in 1935 who prescribed the Continuation of the Clearfelling System with a rotation of 80 years. Starte's Plan was revised by Jadhav in 1951 in which the Clearfelling System was replaced by the system designated as "Clearfelling-cum-Selection-cum Improvement felling." Jadhav's Plan was revised by Shri .N. J. Joshi in 1967 and was in force in all Divisions of Thane Forests till 1988-89. Shri. Joshi's Plan for Shahapur Forest Division is now under revision.

88. b) Atgaon and Khativali Inam Forest :- i) The Atgaon Forests were taken over by Government for Management in 1904. There was no regular Management of these Forests till 1930. In 1930 Shri -Patkar, Divisional Forest Officer, East Thane drew up a Felling Scheme for working these Forests under the Clearfelling System with a rotation of 40 years.

ii) The Khativali forests were handed over to the Forest Department for Management in 1886. They continued to be worked under the Coppice System with a rotation of 30 years as per a scheme drawn by the then D.F.O. South Thane. By 1900, the D .F .0. South Thane prepared a revised scheme according to which the area was divided into 40 Coupes and each year one Coupe was to be worked under Thinning combined with Improvement-Cum Selection Felling. In 1918, the system was changed to Clearfelling and one rotation was completed by 1951-52. Since 1951-52 the areas have been worked in the 2nd rotation. In 1951-52 the prescriptions were modified and the area on steep slopes were left unworked for being worked under Selection Felling.

89. c) **Forest covered by Saldhana's Working Plan-Thane Woodland Protected Forest :** The woodland Protected Forests in Thane District which included the Woodland Forests of the Divisoin, were technically constituted Protected Forests and were assigned for local exploitation in accordance with the agricultural and domestic needs of the local people. Complete ownership vested in Government No rights of private persons or public rights other than

over them. After completion of demarcation and settlement of Forest which was regarded as complete and ample, the Woodland Settlement was made from 1897 to 1902. This settlement is remarkable for the liberality of its allocation of land to woodlands and the comprehensiveness of the privileges admitted in the woodlands. These privileges were indiscriminately excercised 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 has been misused from time to time which cause depletion of these Forests. Rules to regulate the lopping of Tahal were frame 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. As per the original survey in the District, all woodlands were recorded as Government Waste Lands and Tahal was 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 Reserve Forests with the result that the area available for this privilege diminished considerably. Nevertheless, owing to the large number of Tahal species in ma1ki, varkas lands and in woodlands, Tahal was available in sufficient quantities to meet the full requirements of the agriculturists. Rules to regulate the lopping were applicable, not only in Woodland and Government Waste Lands, but also in occupied land of Shahapur and part of Wada Taluka where occupants were recognised until 1892 as the owner of the trees on their holdings. 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 lead rapidly to a shortage of Tahal. On the disappearance of Injaili from Varkas lands, the agriculturists moved to the neighbouring woodlands for their Tahal supply and the tree growth in woodlands had to bear the complete burden of Tahal supply. It was at this stage (1905), that the Thane Woodland Code was framed to regulate the excercise of priv

(Woodland Protected Forest) vide Government Resolution, Revenue Department, No.7742 of 25th September, 1905.

90. The Thane Woodland Code conceded the privileges for grazing cattle, of cutting Tahal (subject to Rules) and, with the previous permission of Revenue Officers, Tahal 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 for the villagers themselves without any interferance from the Forest Department. 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 Dept. for the benefit of cultivators who were permitted to cut even Teak shoots for Tahal or fuel, provided that from each stump at least two main coppice shoots were permanently reserved.

91. The Woodlands were brought under regular working by Saldhana's Plan which provided for the felling of Injaili in all closely wooded areas alongwith Teak following the principal of 'Modified Clearfelling' proposed by Mr. Perry. The Woodlands remained in charge of Revenue Dept. Till 1956. There after the areas were brought in charge of Forest Department.

Section :- 2 Past system of Management and their Results :

A) Reserve Forests

I) The First Working Plan

92. The first Working Plan of 1905 prescribed 'Coppices With Standards System' generally with a rotation of 40 years. The number of standards was generally fixed at 75 per ha. In 1909 instructions were issued to aim at reservation of 100 or 125 trees per ha. and all stems under 30 cms circumference were to be reserved in addition.

93. As a preliminary method of treatment the system was the best that could have been devised and on the whole, it worked well as the large

number of over matured, badly shaped and unsound trees were profitably exploited and replaced by vigorous young growth. The system, however, in some respects appeared unsuitable. Firstly it was economically unsound as the standard reserved were often of a species which had no value as a timber while some of the standards were overmatured and crooked and did not put any increment. It was, thus unprofitable economically to retain such trees. 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.

II - The Aitchison and Hamilton's Plan -1922

94. This Plan revised all the previous Plans for various Forests and prescribed the Clearfelling System. Though the Plan was published in 1922, the Clearfelling was actually introduced from 1917-18 itself. The rotation was fixed at 80 years. The regeneration was mainly to be Natural by Coppice and seed and was to be supplemented with Artificial Regeneration. As the Forests were capable of producing big sized timber, the Clearfelling System provided the necessary impetus in the form of operational convenience for taking up the exploitation of these Forests in a concentrated manner. Since there was no emphasis for ensuring regeneration, Forests were heavily exploited and Artificial Regeneration was confined to only dibbling of seed 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 rampamt growth of weeds and grasses that followed Clearfelling, the Coppices of inferior species and the weeds supressed the Coppice and Recruits of superior species and all this affected the stocking badly.

95. 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.

III -Starte's Plan of 1935

96. Starte's Plan prescribed t11e same system of exploitation viz. the Clearfelling system and maintained the same rc

and Coupes. He prescribed the system of Rab Plantation of Teak (Stump Planting) and of Khair Shisav, Tiwas and Ain by dibbling seeds. This did put an emphasis on regeneration by artificial means in clearfelled areas, which was lackiIlg in Hamiltion's Plan. Starte further attempted to ensure the success of regeneration by prescribing intensive tending operations. The Stump Planting on Rab sites prescribed by 1935, produced excellent results and some very successful Plantations of Teak and Khair have been raised in the Coupes worked under the Plan. The burning of Rab kept down the weeds and thus helped the growth of seedlings and stumps. Starte's Plan also prescribed that Artificial Regeneration should be carried out to the extent of at least 12.5 percent of the total area of exploited Coupe. Though the Clearfelling System followed by Artificial Regeneration gave good 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 Plantatjons, Artificial Regeneration was done in not more than 12.5 percent of the area and the major part of the clearfelled area was regenerated by coppice of inferior species which largely suppressed the coppice of superior species like Teak.

IV- S. P. Jadhav's Plan (1951- 1952 to 1968- 1969)

97. As in the case of two previous Plans, the major portion of t1le forest was set apart for Clearfelling and included in the main (Timber) Working Circle. However, the major change in this Plan was that the 'Clearfelling System' was replaced by a system designated as 'Clear-Cum-Selection-Cum-Improvement Felling'. Clearfelling 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 result of this prescription were not satisfactory as some steep areas were also clear felled resulting in erosion. All clearfelled areas were not planted and as such left over

areas gave rise to the forests of coppice origin of poor quality. Most of the areas worked under Selection-Cum-Improvement Felling were over exploited. The rotation fixed in this Working Circle was 80 years.

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

99. The area 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 Inexploitable Working Circle. These difficult areas were called 'Kharabas'. The Plan prescribed that such areas which contained valuable material could be worked under a scheme formed by

    Territorial D.F.O. in consultation with Working Plan D.F.O. However, no such working was done.

100. In addition to the Working Circle mentioned above, there were three Overlapping Circles constituted for the Production of matchwood, bamboo and Minor Forest Produce. Under Matchwood Overlapping Working Circle concentrated plantations of Sawar in exploited Coupes 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. In Bamboo Working Circle, there was no regular exploitation.

101. All the bamboo particularly Manvel and Katas died in Thane Circle due to gregarious flowering in 1959-60 and since then there has been no regular Exploitation of bamboos except in parts of Shahapur Division. The dead bamboos had been removed on Permits. Profused Regeneration was observed in some of the area, but failed to develop into clumps in most areas.

102. Under 'Minor Forest Produce Overlapping Working Circle' the Plan prescribed for the preservation and propagat

Minor Forest Produce. It prescribed Planting of' 'Agave' along the demarcation lines. 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.

103. A separate scheme for Exploitation of Khair trees from entire Thane Forests was drawn up in 1962, by Wagle in order to ensure sustained supply of Khair trees to the Swastic Katha Factory of Dahanu. However, the forests of Shahapur Division were excluded from this scheme as growth of Khair trees in this Division was not well concentrated.

104. Special Works of Improvement like Fire Protection, Plantation, Thinnings, and Constructions of required roads and buildings were carried out mostly as per Recommendations of the Plan.

105. All Exploited Coupes and Rab Plantations in the areas 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 Plan. Fire Protection in other areas was neither done nor prescribed. Fire tracing along the roads and cart tracks passing through Forest was done at some places. The expenditure incurred on the Fire Protection during 10 years from 1953-54 to 1962-63 comes to Rs. 72,400 /- approximately giving an Average Annual Expenditre of Rs. 7240/- per year for the Shahapur Forest Division.

A total of 40.8% of clear felled areas were planted against the Plan Prescription of 33% minimum. However, against the Prescription of 66% of the Exploitable Areas to be worked under the 'Clearfelling System', only 37.49% of the area was clearfelled and the rest was worked under 'Selection-Cum-Improvement Felling System'.

106. Special Plantations of Agave, Teak, Khair and Matchwood species were under taken under the 5Year Plan Schemes. However none of these plantations except Teak and Agave were successful.

Thinning were generally carried out as prescribed under the Plan.

V- N. J. Joshi's Plan

107. Shri N.J.Joshi combined all the Schemes and Plans under operation for the Reserve Forest of Thane Circle and wrote a single working for all the Reserve Forests of the Circle comprising of Dahanu, Shahapur and Thane Forest Devision. The period of this Plan was fixed for 20 years from 1st July 1969. He constituted 13 Working Circle s in all with Special Objects of Managements. The part of the Plan applicable for the Reserve of Shahapur Forest Division is under revision at present. Out of 13 Working Circle s, prescribed in Joshi's Plan, only 9 Circles were applicable for the areas of Shahapur Forest Devision. This Working Circle were:-

- Protection Working Circle.
- Selection-Cum-Improvement Working Circle.
- Conversion Working Circle.
- Industrial Wood Plantation Working Circle.
- Lake Catchment Working Circle.
- Pulpwood Plantation Working Circle.
- Miscellaneous Working Circle.
- Minor Forest Produce (Overlapping) Working Circle.
- Bamboo (Overlapping) Working Circle.

The Special Objects of Management, Main Prescriptions, Extent & Quality of Implementation and their results for each Working Circle :

(I) The Protection Working Circle

108. This Working Circle comprised of unworkable areas known as "Kharabas" which were not fit for exploitation as they were too steep and inaccessible. On account of the area, the site quality was poor due to the soil erosion that had taken place. The site quality was usually IV b to IV a. Occassional patches of III quality were seen on the gentler slopes or in valleys. The forest belongs to local type "Mixed Forests" with teak either totally absent or occuring in small numbers. On high Altitudes e.g. on the main ridge of Western Ghat in Washala Range, the Forest was Semievergreen and belonged to the Western Sub-Tropical Hill Forest. In rest of the areas. the

forest belonged to the type “Moist Teak Bearing Forest”. The special objects of the Management were the Preservation and Improvement of the existing vegetal cover to prevent soil erosion and improving the Micro Climatic 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 had been simply shown as unworkable. The area included in the Working Circle was 3456.651 ha.

Owing to their in accessibility, the areas have remained protected till date.

(II) Selection-Cum -Improvement Working Circle

109. In this Working Circle all workable areas which were then considered unfit for Clearfelling on account of steep slopes (more than 25^0) were included. Most of the areas in part of Vihigaon and Washala Ranges are steep and have been allotted to this Working Circle. The area of Shahapur Forest Division included in this Working Circle was 4111.885 ha. The Forest mostly belongs to the type “Moist Teak Bearing Forests”. Both the local types viz. Teak Forests and Mixed forests occur. Mixed forests were more common in Washala Range of Shahapur Forest Division, while Teak Forest was more common in other areas. The site quality is mostly IV a with patches of III quality occuring locally on more gentle slopes and in the valleys, The density of the crop varied from 0.3 to 0.6. Important species occuring in the crop were Teak, Khair, Shisham, Ain, Dhawada, Hed, kalamb, Bibla etc.

110. The Special Objects of Management of the Forest in this Working Circle were :

a) To maintain and improve the soil cover and to preserve and improve the site quality.

b) To obtain big sized timber of Teak and other important species.

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

111. The Silvicultural System prescribed was “Selection-Cum-Improvement” and Felling Cycle of 20 ye

exploitable size of Teak was fixed at 105cm. gbh. and for other timber species 90cm 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 area. A minimum plantable area to the extent of 5% of total area of the coupe was fixed. All sound fruit trees and medicinally valuable species were to be Reserved, except in the plantable areas. In plantable/workable areas, clear felling was to be done and in unworkable areas only dead trees were to be felled.

112. While implementing the prescriptions of the Working Circle, no special measure were taken to improve the quality of existing Forest. Very negligible area to the extent of 31 ha. have been clearfe1led and planted. While marking trees for felling, it has been found that Treatment and Stock Maps have not been prepared. The workable and unworkable areas have not been distinctly marked on the ground. Till the year 1985-86 the area worked under this Working Circle in Shahapur Forest Division was 3386.785 ha. Biotic factors like illicit cutting grazing & fires have deteriorated this areas.

(III) Conversion Working Circle

113. All workable areas which were situated on moderate slopes (i.e. less than 25^0) and had better site quality viz. III and above had been included in this Working Circle. Smaller patches of steep areas when found intermingled with better quality areas on moderate slopes, were included in this Working Circle on the ground of practicability. The Forest mostly belong to the type “Moist Teak Bearing Forest”. Both the local types viz. Teak Forest and Mixed Forest is occur. Mixed Forest is common in part of Shahapur Range in Shahapur Division. Important species occuring in the crop are Teak, Ain, Khair, Shisham, Hed , Kalam etc.

114. Special Objects of this Working Circle was to Convert the Existing uneven aged crop of Inferior species into An even aged crop of Valuable timber species like Teak and Khair, thus to derive maximum possible sustained yield of large size timber of Teak etc.

115. The silvicultural system prescribed was “Modified Clear Felling System” followed by Artificial Regeneration. The Clear Felling System was modified in the sense that such areas which were unsuitable for planting with valuable species and also such areas which had steep slopes and were unfit for clear felling, were not to be clear felled.

116. Teak was prescribed as main species and bamboo was 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 Working Circle was divided in three Periodic Blocks.

117. All the three Periodic Blocks in this Working Circle were fully allotted PBI contained the area to be regenerated in the first phase. In order to minimise the sacrifice of young crop, which was inevitable in conversion, Compartments containing areas which had not been clear felled till the operation of this Plan, had been allotted to PBI, Compartments containing areas which had been harvested 40 years back, had been allotted to PBII Areas worked during the last 20 years from the period of Revision of Joshi’s Plan, were allotted to PBIII

118. The P.B.I. areas of each Felling Series were divided into 20 Annual Coupes. The area of the Annual Coupe was to be clear felled and planted mainly with Teak, except patches which were not suitable for clear felling for various reasons.

119. The area under PBII and PBIII were also divided in 20 Annual Coupes and sequences of working were given in the Appendix-XXV, P.58. Whereas only thinning, climber cutting and cutting back of green stools of illicit shoots were prescribed in PBIII, the prescription in PBII was Silvicultural Thinning and Improvement Feeling. There were very few big size trees, no selection felling was pem1itted either in PBII or PBIII. Thinning was prescribed in favour of Teak and other valuable species like Khair, Ain, Bibla, Hed, Shisam, Kalam, Tiwas, Dhavada etc. in the order in which they are mentioned here. The intensity of thinning was to be maintained so as

to have the resulting spacing roughly equal to 1/3 of the average height of the dominant trees in the Coupe.

120. Cleaning operations in the 4th year and Ist thinning (Mechanical) in 7th year, IInd thinning in 12th year, IIIrd thinning in the 20th year and IVth thinning in 40th year were prescribed for the Plantations after the operation of this Plan as well as for the areas planted from 1959-60 onwards.

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

122. The Soi1 Conservation measures were prescribed for entire area of all the Coupes. The workable coupes of PBI were to be fire traced for 6 years and those of PBII and PBIII for 3 years .The worked coupes of PBI were to be closed to grazing for a period of 6 years and those of PBII and PBI for 3 years.

123. There were 4 Felling Series in Conversion Working Circle in Shahapur Forest Division and Total area of PBI was 1939.30 ha. Out of this area 1542.734 ha. area was tackled till 85-86. At least 60 to 70% of the area should have been clear felled and planted. However, the actual area clear felled and planted was 451.940 ha. This is almost one third of the Total area tackled under Conversion PBI Coupes. Thus the object of converting maximum area into Teak Plantation was not at all achieved. Even where the Plantations of Teak have been raised, it was noticed that the plantations were not successfull as the desired girth and height have not been achieved. Further, the areas were also subjected to heavy grazing and fires, which had adverse effects on Plantations. The cultural operations including thinning have not been carried out as per the prescriptions. At the time the crop was not well grown and it was sparse in nature. As crop had not attained the required growth and was not of adequate density due to repeated hecking and illicit cutting the

thinning and cleaning operation were not carried out. Under planting of bamboo which had been taken up in the Teak plantations has been a failure mainly due to grazing and damage caused by wild animals.

(IV) Industrial Wood Plantation Working Circle

124. In this Working Circle such area had been included which would have been otherwise allotted to the Conversion Working Circle. It included the better quality area situated on moderate slopes. The areas allotted to this Working Circle was to be planted with industrial woods like Khair, Hed, Kalam, Sawar, Maharukh etc. The Forest area of Shahapur Forest Division included in this Working Circle was 1416.675 ha.

125. The Special Objects of the Management of the Forest of this Working Circle was to raise Plantations of Industrial wood species like Khair, Hed, Kalam, Sawar, Maharukh etc. required for Forest based Industries like Manufacture of Katha, Bobbin Shuttles and Matches etc, The object was to be achieved by Clearfelling 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 in to 40 Annual Coupes and the yield was the same as prescribed for PBI of Conversion Working Circle. Subsidiary cultural operations like weeding, cleaning and thinning, were prescribed. Cleaning in 6th year, first thinning 11th year and second in 20th year were prescribed. The planted area was prescribed to be closed for grazing for a period of seven years from the year of planting and the planted area was to be fire traced for seven years from the year of planting.

126. While implementing the prescription of this Working Circle it was noted that only 67.00 ha. area out of 1416.675 ha. area was Clearfelled till 1985-86 and planted with species that provide raw material. It is noted that the purpose of raising large scale plantations of certain species was not at all achieved. Hardly 5% area has been Clearfelled. It is further noted that the results of

whatever plantations which have been taken were also not encouraging.

(V) The Lakes Catchment Area Working Circle

127. This Working Circle included all the workable area situated in the Catchment of Vaitarna, Tansa, and Bhatsai lakes. The Total Forest Area in Shahapur Forest Division alloted to this Working Circle was 21149.451 ha. The Forest belongs to the type “Moist Teak Bearing Forest”. Both the local types viz. Teak and Mixed forests occur. All the associations constituting this type except the Ain-Bonda, Association were found in the area. The density of the crop varied from 0.3 to 0.6. Important species occurring in the crop were Teak, Shisham, Ain, Khair, Hed, Kalam, Bibla etc. The site quality varied from III to IV a, IV b.

128. The Special Objects of Management were :-

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

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

c) To improve the Forest and density value.

d) Consistent with the above derive Maximum and Sustained Annual Yield.

129. Silvicultural System prescribed was Improvement Felling which involved removal of the dead, dying and unsound trees. The crop also included valuable timber species like Teak , Ain, Khair etc. and the area was capable of producing big sized timber of these species. It was felt that over matured trees of these species must be removed if silviculturally available. Existing blanks had to be planted with suitable species. In order to achieve the object to provide an effective soil cover so as to ensure soil and moisture conservation, planting was to be carried out with species which are evergreen and deciduous for a very short time. Teak was to be planted in the areas not situated near to lakes. The Felling Cycle of 20 years was prescribed. Yield was to be regulated by area. The method of executing the felling had been ill

The Marking Rules for the felling operations had also been led down clearly. Biotic factors and failure to improve the stock had laid to the deterioration of the crop.

(VI) Pulpwood Plantation Working Circle

130. This Working Circle included areas of predominantly Mixed Forests in Dhasai Range. The areas were situated at a convenient distance from the site of a proposed pulpwood plant at Kalyan .The area included was 3696.757 ha. Some areas of Thane Division were also included in the Working Circle.

131. The Special Object of the Management of the area of this Working Circle was to raise Plantations of Eucalyptus and Bamboos, sufficient to sustain a pulpwood factory.

132. The Treatment prescribed was Clear felling the existing area and planting the same with desired species like Eucalyptus hybrid and bamboo (katas and manvel) to obtain long fibred pulpwood. Rotation of 15 years for Eucalyptus had been fixed. Bamboos were to be exploited on a Felling Cycle of 3 years. The yield was to be regulated by area. The area of each Felling Series was divided in 15 Annual Coupes. No cleaning and thinning were prescribed for this Working Circle. Fire Protection measures for a period of 6 years and closure to grazing for a period of 6 years from the year of planting had been prescribed.

133. In actual practice it was revealed that only 729.500 ha area out of Total Area of 3696.757 ha. allotted under this Working Circle, had been clear felled and planted up with Eucalyptus species. Initally the plantations were reported to be successful but later these plantation were subjected to hacking for firewood needs as a result of which the plantations could never be productive. The objective was found to be totally defeated.

(VII) Miscellaneous Working Circle

134. This Working Circle included School Forest and Dalhi Plots. The Total area of this Working Circle was 1807.595 ha of School Forest and 21.854 ha of Dalhi Plots. Dalhi Plots were plots meant for being

given out for cultivation with the object of encouraging human habitation in the remote parts of the forest for the supply of labourers for forest works in some Ranges. The tree growth of Injaili species on Dalhi Plots not included in the Coupes, were to be retained for Tahal cutting by the plot holder and that of Teak, Tiwas, and Shisam were to be sold along with the adjoining Coupes.

(VIII) Minor Forest Produce (Overlapping) Working Circle

135. This Overlapping Working Circle covered the whole area dealt with under Joshi's Plan. Minor Forest Products listed were Grass, Bamboos, Thorns, Babuldatans, Apta, Tembhurni leaves, Bel, Kadipatta, Myrobalans, Chilhar, bark, Ain bark, Vavding, Tad leaves and fruits, Moha flowers and seeds, Kusari flowers, Rankel leaf, Honey and Karaya gum. Special Treatment had been proposed for increasing the yield of some important products like Moha flowers and fruits, Karanj seed, Tembhumi leaves, Kadipatta, Sarp Gandha plants etc. It was proposed that Moha and Karanj seeds should be sown on suitable sites in the areas under Conversion, Selection Cum Improvement and Lakes Catchment Working Circle.

136. The Special Objects of Management were to ensure proper collection of various Minor Forest Products and to take measures so as to increase or at least maintain the sustained yield of various Minor Forest Products occuring in the forests as such.

137. None of the prescriptions except selling of the products annually by auction were followed. As a result there has been very sharp decline in the availability of all Minor forest Products in the tract.

(IX) Bamboo (Overlapping) Working Circle

138. Under this Overlapping Working Circle, Inter planting of bamboo was recommended in all the bamboo bearing areas. The total area of the Division was covered by Bamboo (Overlapping) Working Circle. 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. Profused Regeneration had come up but it had not established in the tract except in remote hill

Objects of Management set for this Working Circle were to ensure the scientific harvesting where Natural Regeneration was inadequate.

Management of Woodland Protected Forests

139. 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 Forests of Shahapur Forest Division.

The Basic Objectives Postulated Were :

a) 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, indispensible need of the population in a predominantly agricultural District.

b) To increase the growing stock of Tahal species in areas where it does not exist in sufficient density, by conserving the Natural Regeneration and by Artificial Plantations.

c) To improve the condition of the crop by cleaning, thinnings, and other cultural operations.

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

e) To attain the highest financial return.

140. The fellings were regulated by area and controlled by girth limit. The method of treatment prescribed was Selection Felling and shade trees like Vad, Pimpal and Koshimb growing in gavthans and shrines were not to be felled. No sowing and planting prescriptions were given for ensuring regeneration of the worked forests, though strong necessity for the same was mentioned. Though these forests have been transferred to Forest Department for Management and Protection 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.

Section -3 : Special works of Improvements

A-Maintenance of Boundaries

141. A scheme for boundary maintenance on a five year cycle had been prepared and recommended for scrupulous implementation in Reserve Forests but for Protected Forests no such any scheme was proposed.

142. The survey and demarcation of the plots given out for cultivation on a permanent basis in Reserve Forest was recommended, but no head way appears to be made in case of such plots either in Reserve Forest or in Protected Forest. As a result, it is difficult to differentiate between legal holders of the plots and the encroachers.

B - Firewood and Charcoal Depots.

143. In order to minimise the destruction of the forests by hacking and illicit cutting of poles and trees for firewood, it was recommended that fair price fuel depots should be opened at Shahapur. The Contractors or the Forest Labourers Co-operative Societies working the coupes were required to bring the estimated quantity or firewood and charcoal to these depot and to sell them at prices fixed by the Department. After closure of felling, these depots have been closed.

C-Preservation plots and Experimental plots.

144. No Preservation Plots had been proposed in forest areas of Shahapur Forest Division. Some Experimental Plots had been suggested to be laid out by silviculturist but that also does not appear to have materialised.

D- Wildlife Management and Protection.

145. The position of wild game in the entire Thane District which include Shahapur Forest Division was very bad. Very drastic steps were

required to be taken, otherwise, it was feared, there would not be any wildlife left in the tract. It was suggested that whole of Thane District should be completely closed for shooting for a period of 10 years. It was also recommended that strict measures for preventation of poaching should be taken up by providing special Check Posts at vantage points. The forests around Tansa Lake was already declared closed to shooting. It was recommended in Joshis Plan that all the forest around the Tansa and Vaitarna Lakes should be constituted into a regular Game Sanctuary. As per the recommendations, Tansa Wildlife Sanctuary has been declared in the tract vide Govt. of Maharashtra, R & F.D. Notifications No.139 / dated 12th February, 1970 and 1085/dated 16th September, 1985. Accordingly 304.81 kms., Forest area of Shahapur Forest Division, which was suitable for harbouring wildlife was earmarked and Tansa Wildlife Sanctuary came into existance. Later, the sanctuary was transferred to Wildlife Division, Thane for the Management purposes.

146. Later after 18 years of the recommendations made in Joshi's Plan, the remaining areas of the tract have been closed for shooting. At present most of the wild animals have been reported to be missing in the tract and panthers are sighted only occasionally.

E - Buildings

147. A list of places for the quarters for subordinates to be constructed was given in Joshi's Plan and recommended for the implementation within a period of five years. The residential accomodation for subordinates forest staff, particularly the foresters and guards who had to stay at remote places, was considered very essential so that they could stay with their families at their head quarters and devote their time to duty instead of being required to leave their jurisdiction frequently to visit their families.

148. It has been observed that no major head way has been made in this direction during the implementation of the Plan and most of the subordinates particularly field staff still depend on hired accomodation in the remote villages.

F. Rest Houses

149. For facilitating adequate supervision and control from close quarters, the necessity for constructing inspection bunglows or forest rest houses for the use of inspecting officers was recommended at places like Shahapur and Dolkhamb. However, it was observed that these recommendations have not been implemented.

G. Survey and Demarcation

150. A scheme for boundary maintenance was prescribed on a five year cycle in Joshi's Plan in which external boundaries have to be demarcated by second class boundary marks consisting of stone cairns. It is observed that maintenance of boundaries and cairns has been done satisfactorilly.

H. Fire -Protection

151. A Scheme for Fire Protection of the tract was prepared and recommended for strict implementation. But the same has not been followed.

I. Control and records

152. Control Forms :- Separate control forms had been prescribed for each Working Circle. Control forms for fire protection and boundary verifications were also prescribed. Other records like Compartment histories, Plantation and nursery registers were also prescribed.

J. Deviations from Sanctioned Plans

153. The Data showing Deviations in the tract during the year 1983-84 to 1987-88 is given below :-

Sr. No.	**Year**	**Area of coupe allotted as per Working Plan in ha.**	**Area of the coupes deviated in ha.**	**Percentage deviation**
1	1983-84	3962.159	737.698	
2	1984-85	4154.904	1013.416	
3	1985-86	4420.087	1176.949	
4	1986-87	4209.657	950.922	deviation is
5	1987-88	4269.864	1522.275	25.70 %
	Total	**21016.671**	**5401.360**	

Section - 4 :- Past Yield

154. The out turn of timber and firewood during the year 1986-87 was 4293.011 cum and 9694.746 cum respectively.

Section - 5 :- Past Revenue and Expenditure

155. Following is the Statement of Revenue and Expenditure from 1990-91 to 1994-95.

Year	Expenditure (Rs.)	Revenue (Rs.)
1990-91	1,22,95,292	1,51,89,906
1991-92	1,95,24,507	1,23,44,998
1992-93	1,37,08,273	069,50,066
1993-94	1,61,07,459	057,39,994
1994-95	2,20,42,444	036,94,008
Total :-	**8,36,77,975**	**4,39,18,972**
Average/year	**1,67,35,595**	**087,83,7944**

CHAPTER – VI

STATISTICS OF GROWTH AND YIELD

Section -1 :- Growth

156. The rate of growth of teak tree in the tract was first studied by felling sample trees in ‘good’ quality and ‘medium’ quality areas at the rime of preparation of the Aitchison and Hamilton’s Plan of 1922. No stem analysis of teak trees was

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.

157. Stem analysis of 156 teak trees of quality ill areas was carried oui at the time of preparation of Joshi's Plan. The Results are Tabulated below :

Results of stem analysis of teak trees from quality III forests

Age in Year	Diameter at b.h. in cm		Height in meters	Volume in Cubic Meters	C.A.I.	M.A.I.
1	2	3	4	5	6	7
10 - -	06.90	07.70	5.00	0.015	0.00045	0.0010
20 - -	11.60	13.00	8.70	0.055	0.00700	0.0029
30 - -	16.30	17.50	11.70	0.135	0.00910	0.0045
40 - -	19.90	21.40	13.80	0.220	0.00970	0.0056
50 - -	23.00	24.25	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	33.50	19.40	0.670	0.0068	0.0075
100 - -	33.00	34.80	19.80	0.734	0.0049	0.0074
110 - -	33.60	36.00	22.00	0.738	0.0026	0.0071

Results of Stem Analysis of Teak trees from quality IVa Forests :

Age in Year	Diameter at b.h. in cm		Height in meters	Volume in Cubic Meters	C.A.I.	M.A.I.
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
41 - -	16.00	17.40	10.24	0.084	0.00390	0.00216
51 - -	18.20	19.80	11.80	0.126	0.00440	0.00255
61 - -	22.80	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	0.00289
80 - -	24.75	26.40	14.12	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

158. The rate growth in the 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 results are tabulated below :-

Age in year	**Girth (Diameter at b.h.) /c.m.**	**Hieght in meters**
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

159. The growth rate data for all important species is available in the previous Working Plans. The growth rate data of species like Ain, Hed, Kalam, Dhavada, Kakad, Bonda and Sawar are reproduced from Jadhav's Plan as below :-

Statement showing relation of diameter in cms and age for some of the important species.

Species	Age in Years							
	10	20	30	40	50	60	70	80
Ain	8.33	13.72	19.60	19.60	28.42	32.10	35.53	38.71
Hed	7.84	13.25	18.62	24.01	28.67	33.32	36.57	39.20
Kalam	8.575	13.23	18.62	24.01	28.67	32.59	36.02	39.20
Dhavada	8.085	12.74	16.66	20.09	23.03	25.48	27.69	29.40
Kakad	8.575	13.475	17.89	21.81	24.50	26.95	29.16	31.12
Bonda	8.330	13.230	17.15	20.83	25.73	25.73	27.93	29.89
Sawar	7.36	13.46	21.08	27.18	33.27	37.59	--	--

Section - 2 :- Stocking

160. At the time of the preparation of Jadhav's Plan, the enumeration were not carried out for want of staff. Hqwever, 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 work was carried out between November, 1962 and November, 1966. All the species were enumerated in 15cm. girth classes and separate data was collected for each felling series. Girthwise estimate of total number of trees, species wise in respect of some important species was compiled for different Working Circles.

161. From the results of enmneration, it was found that the percentage of valuable species in the crop in the forest of the main Working Circle of Jadl1av's Plan was as under :-

Teak (18.32) , Ain (16.75%) , Kakad (4.04 %), Bonda(2.35%) , Bed (2.09%), Shisam (1.78 %) , Khair (1.73 %) , Kalam (1.64%), Sawar (1.05%) ,Beheda (0.78%) , Bibla (0.76%) , and Tiwas (0.26%).

162. The total number of trees for the 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.

163. Based on these enumerations, the total growing stock of the area was compared with the stocking in a well stocked uneven aged crop of similar locality (Dangs 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. girthc1ass. 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 areas 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 acre of 30 cms. girth and above was found to be 112 , as compared to a Compartment with maximum density in Dang's forest, where it was 198.

164. **Present Enumeration :-** Sample tree enmneration was done during May 1992 to October 1994 by the system of stratified Random Sampling with topographical unit. The sampling intensity was about 10% and the statistical design etc. were given by the Chief Forest Statistician MS, Nagpur. The stratification procedure for different Working Circles adopted for giving sampling design is given below :-

(I) Selection -cum-Improvement Working Circle

In S.C.I. Working Circle there were 20 coupes in each felling series. One stratem of 5 coupes, each starting from serial number one was formed; Thus four strata of each felling series were formed. Each coupe was again devided into four equal parts considering the topographical boundries and the extent of area. Hence there were 20 parts in each strata. Out of these 20 parts 2 parts were selected randomly and demarcated on topomaps for Sample Tree Enumeration.

(II) Lake Catchment Working Circle

The method described for SCI Working Circle was adopted for this Working Circle as well as for Pulpwood Working Circle.

(III) Industrial Wood Plantation Working Circle

In each felling series there were 40coups. 4strata having 10coupes each were formed and each coupe was again devided into 2 parts.

(IV) Conversion Working Circle

PB-I, PB-II and PB-III unallotted have been considered. In each strata there were 20 coupes. For 10 coupes each 2 sub strata were made 2 parts were formed for each coupe from each sub strata, Thus 2 parts out of 20 parts were selected randomly and demarcated on the coupe maps.

165. The Forest Resource Survey unit, Nasik undertook the tree enumeration work in t1le field under the guidance of the Chief Forest Statician, MS, Nagpur. The data was processed and population, estimates were calculated by the office of the Chief Forest Statistician. Accordingly the infonnation regarding estimate for each Working Circle in the following 4 profonna was tabulated.

Statement I: Estimated growing stock. Number of sound trees.

Statement II : Estimated growing stock. Number of sound trees per hactore.

Statement III : Percentage distribution of total stock of species over all girth classes.

Statement IV : Percentage ofstock of species in girth class to the total stock in that particular girth

166. Results : Comparison of percentage and past data obtained from the enumerations are given below :-

Sr. No.	Working Circle	No of trees per Ha. (1962 to 1996 in Main WC-Enu.	No of trees per Ha. Current enumeration
1.	SCI	368.11	297.90
2.	Lake Catchment	368.11	225.14
3.	Conversion	368.11	158.92
4.	Industrial Wood	368.11	365.31
5.	Pulpwood	368.11	119.64
6.	Miscellaneous	368.11	

Total Weighted Average	**368.11**	**218.57**

Note : The main Working Circle of shri Jadhav's Plan was spread over the above six Working Circles.

From above table it is seen that 59% of standing trees stocking is available in the current enumeration compared to the previous one. This change has occurred over a period of 25 years.

167. Using the data of the recent enumeration the information regarding number of sound trees per Ha. Has been calculated as below :-

Sr. No.	Working Circle	General Utility Species	Special Utility Species	Other Species	Total
1.	SCI	125.21	18.97	153.72	297.90
2.	Lake Catchment	110.71	8.70	105.74	225.14
3.	Conversion PB I	65.81	10.30	99.71	—
	PB II	101.40	13.18	77.44	192.02
	PB III	84.30	14.21	67.92	166.42
4.	Industrial wood	141.39	19.33	204.59	365.31
5.	Pulp wood	49.82	13.33	56.49	119.64
6.	Miscellaneous	95.75	36.25	82.11	214.11
Total (Weighted Average)		108.07	12.68	97.83	218.57
% Stock of Total Stock		49.44%	5.8%	44.76%	100%

From the above it is observed that species of general utility viz. Ain, Bibla, Bondava, Kakad, Shisam, Tiwad, Teak are 49% of the total growing stock. The species of special utilities viz. Behada, Kalamb, Khair, Sawar, Hed are 6% and miscellaneous species are 45% to the total growing stock. Further the growing in descending order occuers in Industrial WC, Selestion cum Improvement WC, Lake Catchment WC, Miscellaneous WC, Conversion WC and Pulpwood WC.

The availability of Teak in the enumaration of 1992 to 1993 is tabulated below :-

Sr. No.	Working Circle	Total Growing stock per Ha.	Teak Per Ha.	% of stock of Teak Stock
1.	SCI	297.90	25.46	9%
2.	Lake Catchment	225.14	33.80	15%
3.	Conversion PB I	125.82	32.85	26%
	PB II	192.02	43.62	23%
	PB III	166.42	32.85	26%
4.	Industrial wood	365.31	44.11	19%
5.	Pulp wood	119.64	18.91	16%
6.	Miscellaneous	214.57	31.83	15%
Total (Weighted Average)		218.57	31.83	15%

It is seen that teak is the prominent species in the various circles and accounts for about 32% stock of the total growing stock.

A Comparative Statement of the Growing Stock in the enumeration results of 1962-1966 and 1992-1993 are given below :

Year of survey	General Utility Species		Special Other Species	Misc trees	Total (No. of per Ha.)
	Teak	Others			
1962-1966	66.3	123.34	21.3	157.17	368.11
% of Stock of 1992 survey to stock of survey in1962-66	31.83	76.24	12.68	97.83	218.57

It is seen from the above that the overall stock has been reduced by 41% as compared to the 1962-67 survey. This has occurred mainly due to boitic factors and certain areas have been degraded and understocked. Such areas are to be taken up for raising plantations in future.

The detailed results of enumeration carried out in the track are given in the Appendix No. CXXIV to CXXVIII, P. 464 to P. 485 Vol- II.

168. **Statistical Analysis :** The statistical analysis of the data has been carried out by personnel of the Chief Forest Statistician, MS, Nagpur .The calculated estimates are not 100% accurate and the percentage standared error calculated for each Working Circle is depicted below :-

Sr. No.	Working Circle	No of felling Series	Population Area (Ha)	Sample Area (Ha)	Intensity of Sampling	% Std. Error of Estum
1.	Selection cum Improvement	3	4455.327	4610686	10.36	6.07

2.	Catchment	14	19903.039	1860.209	9.35	2.58
3.	Conversion	4	5269.114	512.928	9.73	4.72
4.	Industrial Wood	1	1389.957	129.49	9.32	18.98
5.	Pulpwood	3	3696.757	362.55	9.81	12.02
6.	School Forestry	1	1782.855	180.631	10.13	7.42
	Total	**26**	**36497.049**	**3507.494**	**9.61**	**2.39**

Note : The statistical analysis comparisons of 1962-66 and 1992-93are indicatory in nature and do not depict actual comparative figures as the areas selected for enumeration are different in then two periods. Further the analysis was carried out for selected areas of the entire RF areas of Thane District in the previous enumeration, whereas the latter enumeration was restricted to the areas pertaining to the present Shahapur Division.

Section - 3 :- Yield

169. The figures of total yield obtained as well as the proportion of timber and firewood in the total yield has been compiled and given in the Appendix P.108 Vol-II in 1986-87 i.e. the last year of large scale fellings, 66 coupes had been worked in the tract covering an area of 2721.162 ha. The total yield from tllese areas was 4293.011 cum of timber and 9694.746 cum of firewood. This yield was from various coupes worked under different Working Circles.

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CHAPTER - VII

ESTIMATE OF CAPITAL VALUE OF FOREST

Section - 1 :- Capital Value or the Expectation value :

170. Capital Value or the Expectation value is the value based upon future income. It is the discounted value of future income minus future expenses. The forest in the tract have been managed under a regular Working Plan on the principles of obtaining the maximum sustained yield in perpetuity. The Capital Value is

C .V. = r / 0.0 p Where r = Net annual income

p = Rate of Interest.

The net average annual income for five years from 1982-83 to 1986-87 in the tract is Rs. 122 ≠ 63 lakh. The total area involved is 60713.46 ha. The annual income per ha. works out to be Rs.202/00

171. Taking 10% rate of interest , the capital value of these forest by the above formula works out to Rs. 2020 per ha. Thus the Capital Value of these forests works out as Rs. 12.26crores.

From this the value of ecological / environmantal services rendered by a medium sized tree during its life span of 50 years has been calculated to be Rs. 15.70 lakh in monetary terms.

Section - 2 : Capital value of Forests based on Enviornmental Benefits

172. To Govt of India vide their letter no. 11 - 61 / 85 - FRY (CONS) , Govt of India, Dept of Environment Forests and Wildlife, Krishi Bhavan, New Delhi dated 13th January, 1986 had fixed a thumb rule

to work out Environmental value for Cost-Benefit Analysis for disforestation proposals in order to ensure uniformity : One ha of fully stocked forests of density 1.0

- Avoids soil erosion
- Effects hydrological cycle.
- Provides wild life habitation.
- Improves micro climate & maintains Ecological Balance
- Worth Rs. 120.74 lakhs to accrue over 50 years.

173. The Environmental value as per the GOI norms above and calculated as per the value given in 1986 is given below.

1) Protection Working Cycle :- The area is 3456.641 Ha and presuming an average density of 0.3 , the EV comes to 120.74 x 0.3 x 3456. 641 Ha = Rs. 125206.45 lakhs for 50 yrs. i.e. Rs. 2504.13 lakhs per year.

2) Lake C.Working Circle :- The area is 21619.541 Ha. and presuming an average density of 0.35 , the EV comes to 120.74 x 0.35 x 21619. 541 = Rs. 913620.18 lakhs for 50 years i.e. Rs. 18272.40 lakhs peryear.

3) SCI Working Circle :- The area is 11195.578 Ha and presuming an average density of 0.4 , the E.V. comes to 120.74 x 0.4 x 11195.578 = Rs. 540701.64 lakhs for 50 years or Rs. 10814.03 lakhs peryear.

4) Other forests :- It include an area of 24442 .123 Ha. and presuming an average density of 0.2 , the EV comes to 120.74 x 0.2 x 24442.123 = Rs. 590228.38 lakhs for 50 years or Rs. 11804.57 lakhs per year.

174. The Environmental Value of all the forests under consideration in this Plan works out to Rs. 43395.13 lakhs per year. As the total area of forests is this Plan is 60713.883 ha an Environmental value of Rs. 0.715 lakh per ha. per annum accrues from these forests as per the above norms and as per the monetary value of 1986.

175. One school of environmentalists dissuade such valuation of environmental value in terms of money as the cost of reversal of environmental degradation is many times more or too prohibitive to consider, and there is no option but to preserve natural resources like forest areas for their ecological & other benefits in perpetuity.

176. Not only this but the present area of this Working Plan constitute the catchment of important lakes and reservoirs like Tansa Bhatsa and

Vaitarna which form the main source of water supply downstream to Mumbai, Thane and neighbouring Urban areas. It is estimated that 15 million people and many industrial units are fed water through these reservoirs. As such the forests in this catchment is “Life Line” of Mumbai and Thane therefore value can not be estimated. It is rather invaluable.

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CHAPTER - VIII

WILD LIFE

Section -1 : General History of Wild Life

177. The entire tract of Thane District was fairly rich in the past in the number and varieties of wild animals. The following para reproduced from the Thane District Gazetteer (Vol-XIII, Part-I, 1882 edition) gives fair idea about the occurrence of tigers & panthers in the tract.

About a century ago (1874), the hills in the tract were infested by tigers who came freely down to the plains. In the five year ending 1879,99 tigers & 55 panthers were slain.

178. During the last 100 years, there had been a considerable reduction in the population of tigers, panthers & other wild animals. The main reason for rapid dwindling of wild animals was extensive poaching done by the local people & so called “Shikaris”. The liberal issue of gun licenses for crop protection had also led to the destruction of wildlife. Now, there is hardly any area in Shahapur Division which can be reliably said to be harbouring big carnivores like tigers & panthers. Sometimes panthers are spotted in some parts of the tract. A check list of wild animals& birds found in the tract alongwith their status has been prepared & given in the Appendix. LIX P.127. The ZSI has prepared a detailed list of vertebrate animals & this is given at Appendix No LXV P142 VOL. II Also please see chapter on Wild life Overlapping Working Circle for some information.

Section - 2 :- Legal Position

179. The Wild life (Protection) Act, 1972 was made applicable to Maharashtra State from 1st June, 1973. Following Rules were made by the Government of Maharashtra under this act :-

i) Wildlife (Stock Declaration) Rules,1973 (Effective from 1st June, 1973)

ii) Wildlife (Transaction & Taxidermy) Rules, 1973 (Effective from 1st June, 1973)

iii) Wildlife (Protection Maharashtra) Rules 1975 (Effective from 6-3-1975)

iv) The Wildlife (Protection) Licensing (Additonal matter for Consideration) Rules 1983 (Effective from 13th April 1983)

Recently Govt of India has amended the Wildlife Protection Act of 1972. The New Act has further stengthened the measures adopted to protect the wild life in the tract. Few years ago the entire forests of Thane District have been declared as "closed" under the relevent provision of Wildlife (Protection) Act, 1972 which have helped to protect wildlife to a great extent.

Section - 3 :- Rights & concessions in respect of Wild Animals & Wild Birds

180. There are no rights given to any body in respect of hunting.

Section - 4 :- Injuries to Wildlife

181. In the past injury to wildlife was caused by man through poaching. However, now the greatest injury to wildlife is being caused through habitat destruction by grazing, fires, etc throughout the tract. With more stringent laws coming into force for protection of wildlife & the area having been declared closed to shooting, the incidences of poaching have reduced but destruction of natural habitats which are essential for wildlife to flourish needs to be stopped.

Section - 5 : - Measures Adopted for Protecting Wildlife

182. Except declaring the area "closed" under the provisions of Wildlife Protection Act ,1972,no other measures appears to have been taken for the protection of wildlife.

Section - 6 : - Statistics of Wildlife Captured, Hunted or otherwise Dead.

183. The Statement showing the wildlife capture or hunted during the period 1982-83 to1990-91 is as follows :-

Sr. No.	Year	No. of offences	Wildlife Hunted	Material seized
1	1982-83	1	Panther	

2	1983-84	-	-	-
3	1984-85	-	-	
4	1985-86	-	-	-
5	1986-87	-	-	-
6	1987-88	2	Chousinga	Hunting Net, Dead Chousinga
7	1988-89	3	-	Car, Search, light 3, Torch, Rifle Cartridges 7 , Nets 4
8	1989-90	-	-	-
9	1990-91	-	-	-
10	1991-92	-	-	-

Section -7 :- Special works of Improvement undertaken.

184. Tansa Wildlife Sanctuary was declared in the tract during the implementation period of N.J.Joshi's Plan vide Govt.of Maharashtra R& F. D. Notifications No.

1. 139/ dated 12th February, 1970 &
2. 1085/ dated 16th September, 1985

185. Accordingly 304.81 sq.kms. areas of Shahapur Forest Division which was suitable for harbouring wildlife have been transferred to Wildlife Division, Thane for the Management. In the tract little work of habitat improvement for wildlife appears to have been done. Suggested lines of Wildlife Management for a complementing the works of Wildlife Division, Thane has been given in the chapter on Wildlife (Overlapping) Working Circle.

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PART – II

FUTURE MANAGEMENT

CHAPTER - I

BASIS OF PROPOSALS

Section - 1 :- National Forest Policy

186. The National forest Policy 1988 was enunciated with the background of serious depletion and degradation of the forests owing to various factors like disforestation without ensuring compensatory afforestation and environmental safeguards, excesss pressure on forests for ever increasing demand for timber and NTFP, over exploitation of forests on commercial considerations,among others. The new forest policy of 1988 lays stress on maintenance of environmental stability through forest preservation and restoration of ecological balance, conserving the national heritage for biodiversity and gene pool, managing river catchments for water and soil conservation, meeting domestic requirements of timber and NTFP of forest fringe dwellers and tribal populations and meeting rights and concessions as per carrying capacity of forests or through eco development programmes near the forest areas. The policy also mentions that forest based industries should raise raw material through cultivators & in their own lands and wood substitution is to encouraged . The earlier role of forests as a revenue earning source was to be discarded and forests managed for both goods and services on a sustainable basis. The NFP, 1988 is appended in the Appendix no. I

Section - 2 :- Factors Influencing the General Objects of Management

187. The factors influencing the general objects of management are mentioned below :

1) The forests in the tract form the catchment of the rivers that feed the lakes reservoirs from which water is supplied to urban down stream populations in Mumbai, etc. The forests need to be protected for ensuring soil and water conservation.

2) The forests are located in the ecologically fragile western ghats where felling needs to be severely restricted to prevent site deterioration and preservation of ecological processes.

3) The forests are near developing places and well connected by road and rail to urban centres like Kalyan,Nashik, Thane and Mumbai. Owing to demand of timber and fuelwood, the forests are prone to illegal fellings.

4) The requirements for timber and NTFP of forest fringe dwellers, especially tribal people have gone up for domestic as well as outside consumption. Possibilities for conservation of these forest produce as well as increased production and regulated harvesting through Participatory Management needs to be explored.

5) Natural Regeneration of Teak and other injaili species except Ain is almost absent. Owing to favourable factors some areas in the tract are capable of growing good sized Timber of valuable species through afforestation.

188. During the implementation of the Working Plan currently under review, cultural operations like cleaning, thinning etc. have not been carried out. Over emphasis had been given to felling and exploitation. The stocking has decreased tremendously. Thus there are no suitable areas which can be taken up for clear felling in the revised Plan. Similarly, the areas under other working circles have not been regenerated in the past or have been over exploited. Therefore only selection and improvement fellings have been recommended in the revised Plan.

Severe biotic interference and encroachments near settlements especially in some Protected Forest areas occurs. These areas would require considerable time & acumen for taking under affforestation or other Forestry related programmes, as also efforts to regulate NTFP harvesting & grazing.

Section - 3 :- General Objects Of Management

189. On the basis of the above factors the General Objects of Management of the Forests in the tract would be :-

1) Maintenance of the ecological balance & conservation of the natural heritage.

2) To protect & conserve the vegetation on slopes & in the catchment of rivers & streams that feed the lakes / reservoirs so as to ensure perennial supply of water for drinking, irrigation and other uses.

3) To meet the requirements of small timber, fuelwood, fodder and other NTFP of forest fringe dwellers, especially the tribal people through planned harvesting, inputs for augmenting the natural resource and by making the forest fringe dwellers as partners in protection and management of forests for mutual benefits. Separate microplans based on ground realities and within the broad parameters of the objects of the Working Plan will have to be prepared for PFM programmes.

4) To increase the Productivity of the Forest as well as the forest cover and density by concerted planned efforts of Forest/ Natural Resource Management including protection and afforestation.

5) To meet requirement of timber, small wood, fuel wood, fodder and other NTFP which are surplus and available for outside consumption through planned harvesting on a sustainable basis.

Section - 4 :- Functional Classification of the Forests and Method of Treatment.

190. Based on the prevalent norms in vogue, the forests have been classified broadly as under and general outline of treatment given based on the NFP, 1988.

1) Protection Forests : These include the forests located on steep slopes and in the catchment of rivers, lakes, reservoirs and dams.

The Main Object of Management is to keep these areas covered with vegetation and provide protection from biotic interference.

2) Tree forests : These are forests located on moderate to gentle slopes and are suitable for growing timber sized trees.

The growing stock is depleted especially near settlements, roads and other accessible areas. However in some patches matured trees exist, which can be subjected to selection and improvement fellings. Plantations in gaps and degraded areas will be taken up.

3) Minor Forests - These are forests located near towns, heavily populated areas and settlements near main roads and rail lines. These areas have deteriorated due to illicit cutting, overgrazing, encroachments, fires, etc. and are capable of producing small timber, fuelwood and other NTFP.

These areas would be improved by planting and soil conservation measures, preferably under PFM programmes as far as possible.

4) Remaining Forests : These are forests under 'School Forests' and 'Dalhi Plots'

The School Forests would be maintained with the aim of imparting training to forest guards. The school authorities are to prepare a working scheme to meet their training needs and get approval from the competent authorities for the same.

The Eksali Plots are to be proposed for shifting to forest fringe areas. In the mean time, monitoring and check of trees in such plots should be done as trees from these areas can be mixed with trees of private areas for transportation under malki material.

Section - 5 :- Working Circles,their Areas, Distribution & reasons for their Constitution

191. The following Working Circles have been constituted.

1) <u>The Protection Working Circle :</u> This includes forests located on steep & ecologically fragile areas.These areas are not suitable for working & will be protected . The area alloted to this Working Circle is 3456.641 Ha.

2) <u>The Lake Catchment Working Circle :</u> This includes the forest areas situated in the catchment of Vaitarna, Tansa & Bhatsa which feeds the great lakes,reservoirs & dams in & near the forest tract.These forest areas are invaluable for perennial water supply & these 'Mini' & 'Micro' watersheds are to be protected from felling & other biotic interference, soil conservation measures are to be taken up & mixed semi everygreen species planted wherever required. The area alloted to this Working Circle is 21619.541 Ha.

3) The Selection-Cum-Improvement Working Circle : These are the forests that are by & large well stocked & located in moderate to gentle slopes & contains the areas of Selection Cum Improvement, Conversion, & Industrial Wood plantation & Pulpwood Plantation Working circles of RF areas of the earlier Plan that meets the criteria. Successful plantations raised under various schemes have also been included in this area.

Due to over harvesting in the past, only conservative fellings have been prescribed. Silvicultural operations & Protection measures for the plantations have been stressed on. The total area alloted to this Working Circle is 11195.578 Ha.

4) The Afforestation Working Circle : These are the forest areas not included in the first three working circles & are the under stocked & degraded areas of Reserved Forests, Protected Forests. These areas have been subjected to biotic pressure especially near settlements. The areas are to be treated for reestablishment of the vegetal cover for providing goods & services. The total area included in this Working Circle is Ha.

5) Joint Forest Management (Overlapping) :- This Working Circle consists of primarily the PF and RF areas. The PF areas of 21018.041 Ha are scattered over 179 villages. In each village small areas denoted by survey numbers make up the PF and degraded RF Compartments in vicinity of villages will also be included in this Working Circle.

The PF areas were managed through a separate Working Plan, by Saldhana, for the distribution of various privileges to local people. However excess demands have reduced these areas to degraded lands. Vegetative rehabilitation of these areas have been proposed for the twin objectives of habitat improvement & NTFP supply to the local people. These areas are to be managed through Participatory Forest Management so that, while improving the degraded environment, the local people will continue to get benefits of NTFP on a sustainable basis.

This Working Circle also includes 405 Ha of Acquired Forests. These areas are to be treated along similar lines as the PF.

6) The Bamboo (Overlapping) Working Circle :- This is an overlapping Working Circle & would cover the Reserved forests that contain bamboo in the tract.

Bamboo was prevalent in the tract earlier. During 1959-60 gregarious flowering had occurred in Thane District, & natural regeneration had occurred but could not come up satisfactorily. Bamboo occurs in patches & can be encouraged by proper management and planting.

The total area covered by the Working Circle is 7116.275 Ha.

7) The Non Timber Forest Produce (Overlapping) Working Circle :- This is an overlapping Working Circle & covers all the Reserved Forest areas in the Tract.

The NTFP are a very important sources of livehood for forest fringe dwellers & tribal people. It is necessary to regulate the harvesting of these NTFP as well as improve the output wherever possible.

8) The Wildlife (Overlapping) Working Circle :- This is an overlapping Working Circle & covers all the Reserved Forest areas in the tract. The Tansa Wildlife Sanctuary was carved out of Shahapur Division & shares a common boundary along Shahapur & Khardi Ranges. Hence the tract forms corridors for wildlife movement as well as an extra buffer zone, especially during distress of food & water in the months of March, April & May. This Working Circle highlights some aspects of Wildlife Management as well as stresses the need for coordination with the Wildlife Division, Thane.

9) Eco Tourism (overlapping) Working Circle :- This is an overlapping Working Circle and covers forest area of tourism importance. Such spots inside the forest area will be developed to provide nature viewing and encourage forests and wildlife tourism while preserving our heritage and ecology.

Section - 6 :- Blocks and Compartment.

192. The area of Reserve Forest covered by this plan has been divided into blocks which have further been divided into serially numbered Compartments. The areas of Woodland Protected Forests are identified on the basis of Revenue survey numbers.

Section - 7 :- Period of the Plan

It is proposed to keep the period of this plan as 10 years from the year 1998-99 or from the year of implementation.

Section - 8 :- Analysis and Valuation of the Crop

All the Compartments of Reserve Forest and the area of Woodland Protected Forest have been stockmapped. Enumeration has been carried out by “Survey of Forest Resources Wing of the Working Plan Circle” and data analysed by the Chief Forest Statistician. Results of enumeration in respect of Reserved Forests are given in the Appendix No. CXXIV to CXXVIII, P - 468 - 485, Vol. II.

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CHAPTER – II

THE PROTECTION WORKING CIRCLE

Section - 1 :- General Constitution

193. This Working Circle comprises mainly of the 'Kharabas' i.e. the areas on steep slopes. These areas are not suitable for working due to inaccessibility and ecological fragility. Any disturbance of these areas would lead to severe soil erosion. Hence no working will be done and efforts for complete protection from biotic interference is necessary.

These forest areas occur compactly on the upper reaches of the Sahyadris in Vihigaon, Dolkhamb and Washala Ranges along the border with Nashik and Ahmednagar Districts. These also occur scattered on the steep or precipitious slopes in Khardi and Shahpur Ranges, with a little in Dhasai Range.

Section - 2 :- General Character of the Vegetation

194. The forest belongs to the type 3 B / C1, Tropical Southern Moist Teak Forests and 3 B / C 2, Tropical Southern Moist mixed Deciduous Forests of Champion and Seth's classification. However on the main ridges of Washala Range Semi Evergreen Forests corresponding to 8A/C2, Western Sub Tropical Hill Forests, are also located. As the gradiant changes there is considerable variation in the site quality and resultant density. Upper precipitious slopes and ridge areas have very shallow soil and rarely contain tree growth except in areas where soil has been trapped. Such latter type of areas have scattered and stunted trees of species like Sterculia urens but more frequently lack tree growth. Hilly areas have steep slopes that gradually become precipitious. These precipitious areas have very shallow to no soil. Repeated fires, grazing and high rainfall have all contributed to soil erosion and exposure of rock at many places on the ridges and near the hill tops. The lower slopes have more dense vegetation but stunted growth in most areas. The site quality in these areas attains upto quality IV and the density is from 0.1 to 0.5

Important species occuring in the vegetation are Teak, Ain, Shisham, Khair, Mango, Karanj, Jambhul, Kalamb, Bibla etc. Natural Regeneration is scanty. Karvi is seen as a dense undergrowth and grasses come up in open patches. Bamboo (Manvel) had gregariously flowered in 1959-60 and their regeneration and occurrence is scanty.

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

195. The number of compartents allotted to this Working Circle are given in Appendix LXXXI, P. 213 The number of Working Series formed is 5 and each Working Series consists of 10 Annual Coupes. The details of the Working Series and Coupes are given in Appendix No. LXXXII, P. 214, Vol. II.

Section - 4 :- Special Objects of Management

196. The special Object of Management of these forest areas is to protect the existing vegetal cover and prevent deterioration of conditions of site in order to prevent soil erosion and maintain ecological processes to improve habitat.

Section - 5 :- Analysis and Valuation of the Crop

197. The areas allotted of this Working Circle have been stock mapped and this is shown in the Appendix LXXVIII, P.198 The Enumeration results of this Working Circle are given in the Appendix also.

The Stock Analysis Results are depicted below.

Teak Forest Quality			Mixed Forest Quality			Plantation
III	IVa	IVb	III	IV a	IVb	
42.56	41.54	34.325	54.669	360.056	65.622	134.379

Understocked	Cultivation	Eroded	Blank	Scrub	Total Area (Ha)
657.582	3.510	555.338	7.060	-	3456.641

Section - 6 :- Method of Treatment

198. These areas are located on steep slopes and are ecologically fragile. Hence no tree felling will be done. Instead the area should be

completely protected and improved in a careful manner so as to prevent further soil erosion and facilitate habitat developement. The area will be protected from grazing and fire.

199. Soil and moisture conservation measures are to be taken up. Gaps that are conducive for dibbling are to be planted with medicinal plants. This work of dibbling right from collection of seeds will be done by Forest Guards. Illegal cultivation not qualifying for regularisation would be evacuated and areas will be treated as above. Soil binders including shrubs are to be planted at suitable locations.

Section - 7 :- Choices of Species

200. Seeds of local species of NTFP value like Moha, Jambhul, Hirda, and other suitable species like Siwan, Siris and Sissoo are to be dibbled .

Section - 8 :- Harvestable girth and Rotation

201. The harvestable girth and rotation are not fixed as no felling is to be carried out .

Section - 9 :- Working Cycle

202. A Working Cycle of 10 years is prescribed. In each Working Cycle 10 Annual Coupes have been formed.

Section-10 :- Demarcation of coupes

203. Rules for demarcation of coupes have given in the chapter on miscellaneous regulations. All coupes are to be demarketed one year in advance of the year when the coupe is due for treatment .

Section - 11 :- Execution of Works

204. Initially the area has to be inspected thoroughly and a stock map, treatment map and girthwise details of valuable species prepared as per the method given below :

Preparation of stock map, treatment map and girth enumeration of valuable trees : After the coupe is demarcated, the accessible areas will be inspected by the responsible officers not below the rank of Range Forest Officer. He will prepare a stock map using conventional signs. There after enumeration of all valuable species girth classwise is to be done and details noted-this will be useful in keeping data of actual number and size of valuable species in the area and projections for future Management. Further, note on occurance of NTFP, illicit cutting, soil erosion, signs of wild life, under growth, religious or other significance etc will be noted.

205. There after a Treatment Map of the area is to be prepared showing categories :-

1) Area having tree cover over 0.4 density.

2) Understocked areas with below 0.4 density - proposed dibbling areas to be depicted.

3) Old plantations and dense cover of undergrowth - shrubs, grasses etc.

4) Areas of illegal cultivation.

206. The Treatment Map should be site specific and checked by superiors. On sanction of estimate and availability of funds the works will proceed. The following are to be carried out :-

General

1) No felling of trees or removal of shrubs etc will be done.

2) Illicitly cut live stools will be cut back and dressed to give good coppice shoots.

3) Climbers affecting growth will be cut.

207. **Categorywise Prescriptions :**

Category (1) :- No works are to be carried out.

Category (2) :-

a) Dibbling of seeds of the species recommended are to be done in the beginning of June.

b) Blank patches of 0.4 Ha and above on gentle slopes or trapped soil should be planted up if possible with local medicinal plant species and soil binding shrubs and grasses.

c) Soil Conservation measures are to be carried out.

Category (3) :- Should not be disturbed but soil conservation measures taken up where necessary.

Category (4) :- These areas are to be evicted and dibbling of seeds of aforementioned trees,soil binding shrubs and grass done to stabilise and prevent soil erostion.

208. The Progress of Regeneration is to be evaluated in the 2nd, 3rd, 4th, 5th, 7th and 9th years by superior officers. They should note down the special observations of the site if any.

Section - 12 : Other Regulations

209. **Fire Protection** : The Entire area will be protected from fire .

Closer to grazing : The entire area will be closed to grazing .

Note : The stock map, enumeration abstract, treatment maps and notes are to be kept with the Compartment History file for record. Any special observations are to be entered in the Compartment History form. These are to be sent to Dy. Conservator of Forests, Working Plan during the revision of the current Plan.

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CHAPTER - III

THE LAKE CATCHMENT WORKING CIRCLE

Section - 1 :- General Constitution

210. This Working Circle includes all the areas situated in the catchment of the Vaitarna, Bhatsa and Tansa Lakes except those allotted to the Protection Working Circle. These areas are mainly located in the Vihigoan, Washala and Khardi Ranges, with a little in Dolkhamb, Dhasai and Shahapur Ranges.

The total area allotted to this Working Circle is 21619. 54 Ha.

Section - 2 :- General Character of the Vegetation

211. These areas contain both the main forest types, viz. 3B/C1 Tropical Southern Moist Teak Forests and 3B/C2 Tropical Southern Moist Mixed Deciduous Forests, that occurs in the tract. The site quality varies from IVa to IVb and occasional patches of quality III on gentle slopes or near the river banks. The species that are found includes Teak, Ain, Shisham, Khair, Beheda Kalam, and Bibla. Bamboos are found in patches. Various associations of these forest types are found. The density of the crop varies from 0.1 to 0.5. The crop is not uniform and have been worked under different silvicultural systems in the past.

During the previous plan period, improvement fellings had been prescribed in areas away from the lakes but the areas have been over harvested.

Section - 3 :- Blocks, Compartments and Working Series

212. The Number of Compatments and area allotted to this Working Circle have been divided into 30 Working Series and each Working Series divided into 10 Coupes. The details are given in the Appendix no. XCI, P 230, VOL II.

Section - 4 :- Special Objects Of Managements

213. The Special Objects of Management of the Forests are :

1) To maintain the vegetal cover of the soil, to prevent soil erosion and allow percolation of water into soil and there after in to soil aquifers in the soil for perennial feeding of water to the lakes and reservoirs.

2) To prevent the siltation of lakes through protection of vegetation and Soil and Water Conservation measures.

3) To improve the vegetation through gap plantation and allow minimal felling of only dead and dying trees.

Section 5 : Analysis and evaluation of crops

214. The Forest area has been stock mapped on 8"-1 mile toposheet. The results of Stock analysis is given in the Appendix No. LXXVIII, P. 198, VOL - II.

The summary of stock analysis is given below :

Teak Forest Quality [Ha]		**Mixed Forest Quality**			**Others (Submerged- etc.)**
IVa	IVb	III	IVa	IVb	
528.248	925,342	1697.691	2224.599	5598.081	271.650

Plantation	**Understocked**	**Cultivation**	**Eroded**	**Blank**	**Total area [Ha]**
1949.293	6347.303	241.496	1560.258	258.580	21602.541

215. Enumeration of 10% of the area has been done and the results are depicted in the Appendix CXXVIII P 485 VOL II Comparative Data on Enumeration has been discussed in the chapter on Statistic of Growth and Yield.

216. In Vihigoan and Washala Ranges all 28 and 34 Compartments respectively contains areas of this Working Circle. In Vihigoan Compartments 565, 591, 590 and 639 have high under stocked areas, whereas Compartments 640, 646, 593 have considerable areas that are understocked. Some cultivations occurs in 17 Compartments but notably in Compartments 562 and 643.

217. In Washala Range high understocked areas are noticed in Compartments 647, 648, 667, 668, 635, 635, 636 and 637 whereas Compartments 649, 650, 661, 669, 671, 624, 625,626 and 629 have considerable areas that are understocked Cultivation occurs in some Compartments but 635 has a big patch and 637,631 and 647 have appreciable areas under cultivation. Compartment 635 requires urgent treatment after due inspection.

218. In Khardi Range all 17 Compartments have areas under this Working Cycle. High understocked areas are located in Compartments 577, 582, 578, 583, 656 and 665, whereas considerable understocking occurs in 663,664 and 659. Cultivation had been noticed in 15 Compartments and Compartments 579, 589 and 577 have considerable cultivation.

219. In Dolkhamb Range 8 Compartments have areas under Lake Catchment Working Circle. Out of these considerable understocked areas have been noticed in Compartments 613,614and 619. Cultivation has been recorded in Compartments 616, 617, 619 , 620 and 621.

220. In Dhasai Range 5 Compartments have areas under the Lake Catchment Working Circle. Out of these Compartments 672 and 673 have some understocked areas, whereas the latter also has cultivation in 3 locations. In Compartment 674 a ‘Vadi’ or settlement of about 15 ha exists right in the heart of the forest. The Bhatsa dam is located adjoining to Compartment 676.

221. In Shahapur, 3 Compartments have areas under this Working Circle and all these i.e. 677, 678 and 679 are located near the Bhatsa dam. The Compartments 677 and 679 have some understocked areas.

222. Some of the upper ridges of these areas have eroded and have very shallow soil or rocky areas are exposed. This has occured due to biotic pressure and resultant soil erosion and inability of the site to allow habitat for tree growth. The areas of this Working Circle were conservatively worked under Clear Felling - Cum - Selection - Cum - Improvement System under Jadhav’s plan. However owing to over

felling in some areas as a result probably of misunderstanding of the prescriptions or stress on revenue, the crop had deteriorated and exposed the soil for erosion. Further biotic factors like grazing and fires have deteriorated the habitat and hindered natural regeneration. Clearfelling in the areas had been discontinued in 1939 due to siltation of lakes.

223. Some of the understocked areas have vegetation cover in the form of pole crops, seedlings and shrubby growth and are shallow soiled, e.g. 623, 625, 624, 629, 667, and 675. The Compt. 675 has underlying rock owing to which the tree density is less. Although understocked in terms of tree density these under stocked areas are patches of good vegetation but could not support trees due to edaphic factors.

224. Biotic interference has resulted in understocking as well as general deterioration in the forest areas of Compartments that are easily accessible. Some of these Compartments are 590, 591 (these are near Kasara), 581, 582 (these Compartments are both divided in two parts each by malki land), 631(has a Dalhi plot of 3.88 Ha inside the Forest Area) 632, 635, 636, 637, 638, 639, 640, 659, 661 and 669. Some areas are poorly stocked due to unsuccessful plantation e.g. 644. Numerous plantations have been taken up by the FD as well as the FLCS.

225. Certain areas near the dams, exhibit submergence of rocky patches. These occur along the river banks and are submerged during rains when the dams are full. Such areas are noticed in Compartments 672, 673, 676, 662, 668. The water line should be corrected in the maps for record after proper survey.

226. In areas of Washala Range it has been noticed that the southern facing sides of hills has dense forest due to gentle slopes. However the northern sides of hills are steep and harbour poorer forest due to erosion of soil.

Section - 6 :- Silvicultural System

227. Considering the Special Object of Management and the vital significance of these forest areas for Ecological security of the down stream populations in Mumbai, etc. it is necessary to allow minimum disturbance of these areas and measures to regenerate poorly vegetated areas by gap planting is to be done. Further, soil and water conservation measures are to be done along with protection in areas of Biotic pressure.

Section - 7 :- Choice of Species

228. Local species are to be planted and as far as possible evergreen or species that are deciduous for a brief spell are suitable. Some such species are Karanj, Moha, Bibla, Neem, Shisham and Bamboo (Dendrocalamus strictus).

229. In areas of soil erosion and shallow soil, suitable species including soil binders and shrubs are to be planted.

Section - 8 :- Rotation

230. No rotation needs to be fixed.

Section - 9 :- Working Cycle

231. A Working Cycle of 10 years is prescribed. In each Working Cycle Annual Coupes have been formed.

Section - 10 :- Regulation of Yield

232. As all felling activities will be prohibited in such areas hence no need to regulate the yield.

Section - 11 :- Demarcation of Coupes

233. Rules for demarcation of Coupes have been given in the chapter on miscellaneous regulations.

Section - 12 :- Method of Execution of Works

234. The coupes will be inspected throughly and a stock map, treatment map prepared as per the method below :

Preparation of stock map, treatment map and growth wise enumeration.

235. Once demarcation is over, the area of the coupe will be inspected by an officer not below the rank of RFO and a stock map prepared. Thereafter girth class wise enumeration of 10 to 15 valuable species, from 30 cm onwards at 15cm intervals is to be prepared. The stock map and enumeration data should be inspected by superior officers and two copies submitted to the Dy. CF office for record. Occurrence of NTFP, details of illicity cut stools, soil erosion signs of wildlife, type of undergrowth and other information of significance are to be also noted & submitted to the Dy. CF office for record.

236. There after a treatment map of the area is to be prepared depicting information including.

(1) Area of tree cover over 0.4 density.

(2) Understocked areas with below 0.4 density.

(3) Old plantations and areas of root stock with over 500 stems per Ha. Also areas of dense shrubby undergrowth in stocked areas are to be depicted.

(4) Areas of blanks and eroded areas along rills and gullies along with proposed location of nalla bunds and gully plugs. Bigger soil and moisture conservation works like weir bunds etc. are not advisable. If at all necessary to take up bigger soil and moisture conservation works. Proposed location of costly soil conservation measures e.g. weir bunds gabbian structures will be prepared with full justifications. Such works are to be implemented only after due consultations with Mumbai Municipal Authorities who should give technical guidance and also give grants from their funds for the same.

(5) Areas of illigal cultivation.

237. The treatment map of all items except (5), which should be proposed separetly as it involves elaborate procedures, should be submited for approval after verification of superior offi

specific estimate as per prescription given. The funds can be allotted from the available schemes. It is also proposed that funds for Lake Catchment WC and Protection WC from the Mumbai and Thane Municipal corporations should be made available as these forests are catchment for the lakes and reserviors that feed water to Mumbai etc. As such the forests are invaluable for water and this value is incomparable to the revenue value ordinaraly associated for the timber, etc. of the area. This should be pursued by frequent contact so that a policy to this effect is permenantly incorporated into the annual plan of TMC and MMC.

238. It is very essential to form a Protection Squad to patrol the area and render the necessary protection to the areas from heavy biotic pressure. The Protection Squad should be constituted with the logistic support like Jeep and Wireless sets. TMC and MMC should be persuaded to bear the entire Expenditure of the Squad.

239. **Category wise Prescriptions :**

Category (1) :- No working is to be done.

Category (2) :-

a) Dibbling of seed is to be done in the beginning of June with the recommended species.

b) Blank patches of 0.4 Ha and above are to be planted with nursery raised seedlings of tree species or with soil binding shrubs /grasses.

c) Soil Conservation measures are to be carred out.

Catagory (3) :-

a) Dibbling in blank patches should be done.

b) Soil Conservation measures are to be carried out.

Category (4) :- Soil Conservation measures of gully plugging, nalla bunding, nalla training, vegetatative stabilization of gully head, etc. are to be done. Proposal for preparing costly Soil Conservation measures like weires, bunds, gabbian structures, etc. are to be first prepared according to the nature of work and if necessary under technical guidance of the Civil Engineering Wing of the concerned

branch of Mumbai Municipal Corporation. These works are to be done after due consultation of Lake/ Reservoir Authorities and funded as far as possible from the Municipal Corporations.

Category (5) :- The cultivation areas should be treated by dibbling or planting, and simple soil consevation measures are to be taken up if necessary. The progress of regeneration is to be evaluated every year.

Section - 13 :- Other Regulations

240. **Biotic factors :-** Man controlled factors like grazing, fire, illicit cutting, etc. is not consistent with management of multiple tiered vegetation for watershed. This is especiallly so in these areas of vital eological significance for huge urban populations and industrial establishments. On the other hand forest fringe dwellers, especially pristine inhabitants like the tribal people can not be deprived for the benefit of far of urban people. Hence it is suggested that zonation of the areas is to be made and following steps taken to provide mutual benefits on a rational plan.

[A] Areas near the lakes / Reservoirs

241. These areas are to be completely conserved and no biotic interference allowed. Settlements in these areas or those settlements that can approach forest areas should be shifted to forest fringes near to other Working Circle like AWC. Various development activities e.g. alternate fuel, employment, should be provided to people of these areas under J F M schemes in the new areas, through funds of the Mumbai Municipal Corporation and executed through the F. D.

For the total protection from biotic interference various other measures could be adopted e.g. high fencing, to conserve these areas, by funding from the Mumbai Municipal Corporation.

[B] Areas away from the Lakes

242. These pertain to settlements away from the Lakes. In these areas regulated harvesting of NTFP without cutting of trees is to done for the domestic use of forest fringe dwellers. This should be done

within PFM scheme and NTFP Working Circle parameters. The local forest fringe dwellers will use these NTFP only for domestic purpose and other rural development facilities are to be allowed for them (including non wood fuel energy) through Municipal Corporation funds. The forest zones for their use should be demarcated and their co operation in forest conservation including protection should be utilised.

The Compartments and areas subjected to biotic interference are to be identified and preliminary information has been given in the section on Analysis of the crop and the stock analysis details may also be referred to.

243. Other Mumbai Municipal Corporation sponsored activities can also be supervised jointly by the Forest Department - e.g. studies by NGOs, and Scientific Organisations. Such studies may be in the form of Impact assessment of JFM activities, Vegetation Analysis, Habitat Status of areas of different treatments, etc.

244. The suggestions for funding from the M.M.C. Authorities has been given to allow for their participation in Management of the areas that afford ecological security to the people, etc. in downstream Mumbai and nearby areas. It has been requested to Conservator of Forests, Thane to take steps to consult the MMC authorities and submit necessary proposals for Government Consideration as per procedure.

Note : One copy each of stock map, enumeration abstract , treatment map and notes are to be kept with the Compartment History file and special observations entered in the Compartment History form .These are to be handed over to the Dy CF Working Plans during revision of the current Plan.

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CHAPTER - IV

THE SELECTION CUM IMPROVEMENT WORKING CIRCLE

Section - 1 :- General Constitution

245. This Working Circle includes the stocked areas of Reserve Forest that have not been included in the Protection and Lake Catchment Working Circles. Areas of Selection Cum Improvement, Conversion, Pulpwood Plantation as well as Industrial Wood Plantation Working Circles of N.J. Joshi's plan have been mainly kept in the Working Circle. Successful plantations as well as moderately stocked areas on steep slopes have been also included.

The total area allotted to this Working Circle is 11195.578 Ha.

Section - 2 :- General character of vegetation

246. The forest mostly belongs to 3B/C1 Tropical Southern Moist Teak Forest and 3B/C2 Tropical Southern Moist Mixed Deciduous Forests. The latter is more common in Washala and Dolkhamb Ranges while the former is more common in the other Ranges of the

Division. The common associations are the Teak - Dhawda - Kuda - Takla Association, The Kakad - Shemat - Kuda - Takla Association and the Ain - Bonda Association.The density is generally between 0.4 to 0.5 but there are patches of moderately stocked areas with low to medium density. These patches occur on steep areas along erosion prone banks or on shallow soiled locations and have been included along with adjoining areas in this Working Circle.

247. Important tree species occurring in these areas are Teak, Shisham, Khair, Hed, Bibla, Ain etc. Bamboo occurs in patches. Natural Regeneration is less owing to biotic factors like grazing and fires. Heavy shrubby under growth is noticed in patches.

Section - 3 :- Blocks, Compartments and Working Series

248. The number of Compartments allotted to this Working Circle is given in the Appendix No. LXXXIV, P.217. The number of Working Series constituted is 15 and each Working Series consists of 10 Annual Coupes. The details of Working Series and Coupes are given in Appendix No. LXXXV, P.219, Vol. II.

Section - 4 :- Special Objects of Management

249. The special object of management of the forest allotted to this Working Circle are given below :

a) To maintain vegetal cover and prevent deterioration of site in order to conserve water and soil.

b) To harvest available timber and NTFP without allowing site to deteriorate by selection harvesting in a conservative manner.

c) To improve the forest crop through Artificial Regeneration. Silvicultural operations, Soil Conservation measures etc. in order to obtain maximum sustained yield in future.

Section - 5 :- Analysis and Valuation of the Crop

250. The area of this Working Circle has been stock mapped on 8” = 1 mile toposheets. The Results of Stock Analysis is given in the Appendix No. LXXVIII, P. 198, Vol. II. Summary of Stock Analysis is given below :

Teak Forest Quality			Misc. Forest Quality			Plantation	Understocked
III	IVa	Ivb	III	IVa	Ivb		
988.811	503.017	97.274	191.556	2750.760	911.238	2626.052	1656.794

Cultivation	Eroded	Blank	Scrub	Total[Ha]
77.252	1114.963	18.45	262.411	11195.578

251. Areas of this Working Circle are located in the RF areas of Dolkhamb, Dhasai and Shahpur Ranges with a little in Vihigaon Range.

252. In Dolkhamb Range these forests occur below the Protection Working Circle areas, and are on steep slopes with shallow soil, owing to erosion. Cultivation patches have been noticed in some Comparments e.g. 606, 607, 618, 689, 694.

253. In Dhasai Range some areas are covered with extensive plantations, coppice growth, root stock and scattered trees. There are areas which have been reduced to scrubby growth owing to biotic factors including hacking. These areas are capable of improvement by natural factors through protection and cooperation of local people. Such areas should be considered for PFM e.g. Compartments 698, 699, 852, 853, 854, 855. Cultivation is noticed in some areas e.g. in Compartments 688, 699,855, 856 etc. Compartment 853 has an extensive area with Palash.

254. Shahapur Range has some areas under this Working Circle that show sheet/ gully erosion, coppice and root stock, and biotic pressures. Such areas have slope and rocky patches. These areas have been incorporated in to this Working Circle alongwith adjoining well stocked areas, although the density is between 0.3 and 0.4. Cultivation is noticed in some Compartments. Compt 850 is divided into two areas by Malki land.

Section - 6 :- Silvicultural System

255. The distribution of various girth classes is not uniform over the areas allotted to this Working Circle. This has been largely due to clearfelling in the areas of conversion Working Circle and over exploitation in Selection - Cum-Improvement Working Circle, during the previous Plan, together with biotic factors. Hence the true 'Selection System' cannot be applied. The system 'Selection-Cum-Improvement' has been found suited for these areas and has been proposed to be applied. The trees of harvestable girth are to be felled to a limited extent, without creating gaps. and improvement fellings by removal of dead & dying trees, are to be taken up alongwith thinning of congested even aged poles/ trees. Blank and understocked areas will be planted. Thus the main aim will be improvement of the growing stock.

Section - 7 :- Choice of species

256. Local valuable species are to be planted according to site requirement. Teak, Khair, Sisham, Shivan, Siris, Bibla and Bamboo are to be favoured . Fruit and other NTFP yeilding trees like Moha, Mango, Hirda, Awla, Karanj, Biba etc. are also to be planted.

Section - 8 :- Rotation

257. The harvestable girth of Teak is fixed at 105 cm and the rotation tentativaly fixed at 80 years. As the areas are to be worked under Selection - Cum-Improvement System, the rotation need not be fixed very accurately.

Section - 9 : - Harvestable Size

258. The harvestable size for Teak is fixed at 105cm girth at b.h. Other timber yielding species are better marketable in big sizes, Hence harvestable size for these species is also fixed at 105 cm gbh.

Section - 10 :- Felling Cycle and Sequence of Working

259. Under the Selection - Cum - Improvement System, the shortest possible cycle is most suited to cover the areas. Hence a Felling - Cum - Improvement, - cycle of 10 years is fixed. The sequence of working is given in the Appendix No. LXXXV

Section - 11 :- Regulation of yield

260. Prior to Joshi's Plan yield was regulated by area only. This had resulted in over exploitation and depletion of stock. Hence Joshi regulated yield through Smythie's method.

Background

One of the important aspects of forest management is to ensure maximum sustained yield of timber , etc. in successive felling cycles. Yield regulation by area alone can lead to over exploitation. Further, yield regulation on the basis of estimate of the growing stock i.e. Von Mantle's formula, is not possible as there is no "normal" stocking of the forest. Hence regulation of yield by area cum number of trees of exploitable size has been proposed by various authors.

The two accepted methods of regulating the yield of trees of the exploitable class in terms of number of trees to be harvested annually, are the Brandis method and the Smythies method. Brandis method is based on harvesting trees equal to the average annual recruitment of trees to the harvestable class for the total period required for the trees of the lowest girth class to reach the harvestable class. However as the distribution of trees in the various girth classes is abnormal, the yield varies greatly in successive felling cycles.

Smythies method is based on harvesting trees of harvestable size that are recruited during a felling cycle and expresses the number of trees to be removed as a percentage of the number of harvestable trees available for marking in the coupe. This harvesting on the basis of percentage, safeguards future yield as all available trees are not harvested . Moreover it is also easier to follow in practice if the prescribed percentage are in some round figure e.g. 50% i.e. 1 in 2 trees to be marked.

Smythies method is expressed as a formula as given below :

$Y = (X / (I + X / 2)) \times 100$

Where,

Y = Yield

X = Number of class II trees passing into class 1 within the felling cycle.

I = Area under SCI x No. of trees / ha. in class I.

Calculation of Yield

Harvestable girth is 105 cm gbh From the enumeration data, the information is

1. Total Area of Enumeration = 4455.327 Ha
2. In the harvestable group (> 105 cm) i.e. Class I,

   Total No of trees = 137498
3. In the approach class (90 to 105 cm) i.e. class II,

   No of trees = 116708

   i.e. No of trees / ha in Class I = $\frac{137498}{4455.327}$

   = 30.86

   i.e. No of trees / ha in Class II= $\frac{116708}{4455.327}$

   = 26.20

Total Area under SCI = 11195.578 Ha.

Total no of trees (Class II) for the whole WC = 293324

Considering 5 % mortality , no. of such trees = [293324 / 100] x 5= 14666

The No. of class II trees passing into class I

within the felling cycle = X

X = f / t (II - Z % of II)

Where

f = felling cycle i.e. 10 years

t = Time taken for class II trees to pass into Class I i.e. 15 years.

Z % = Percentage of Class II trees which trees do not pass into Class I i.e. 14666.

Therefore X = 10 / 15 (293324 - 14666)

= 185772 trees

= 16 trees / ha.

Thus Yield = (X / (I + X/2)) x 100

Where I = Area under SC I x No. of trees / ha in Class I

= 11195.578 x 30.86

= 345495

i.e. Y = $\frac{185772 \times 1001}{345495 + \frac{185772}{2}}$

= 42 %

Total trees available for harvesting will be selection trees available at the time of enumeration plus one half the no. of recruitment trees :

i.e. = 3455495 + 185772 2

= 438381

Taking into account the percentage of yield (i.e. 42 %), there will be

$\frac{438381 \times 42}{100}$

or 184120 trees available. in 15 Working Series in 80 years.

Hence the number of trees of 105 cm and above girth available for harvesting annually on an average will be

= $\frac{184120}{15 \times 80}$

= 153 trees

However only 50 % of harvestable yield is to be extracted, meaning thereby that 76 trees per coupe on an average will be available for harvesting as per the method applied.

261. It should be noted that illicit fellings are also done by selecting the big size trees. Hence the actual trees available in the harvestable size may be lower. It may also be noted that the area of enumeration and area of current SCI may not be the same and this may lead to error in calculations. Further, number of trees in the lower girth classes should be higher than the higher girth classes which is not case here. Hence fluctuation of yield is likely in successive felling cycles. Considering the above points, marking is to be done as per silvicultural availability and as per guidelines 50% of marked trees are to be harvested.

Section - 12 :- Demarcation of Coupes & Marking Technique

262. Demarcation of coupes and marking technique has been given in the chapter on Miscellaneous Regulations.

Section -13 :- Method of Executing the works

263. The coupe will be demarcated one year in advance of fellings. The coupe will be inspected thoroughly and a stock map , treatment map and girth wise details of 10 to 15 valuable species prepared as suggested below. :

Preparation of Stock Map, Treatment Map and Girth wise enumeration

264. The inspecting officer of rank not below R.F.O. will prepare a stock map of the coupe area using conventional signs and norms. Thereafter girth class wise enumeration of 10 to 15 valuable species from 30 cm upwards at 15 cm intervals is to be prepared. The stock map and enumeration data should be inspected by superior officers and two copies submitted to the Dy CF office for record. Occurrence of NTFP, details of illicit felling stools, soil erosion, type of undergrowth, signs of wild life and other information of significance should be noted and submitted to the Dy. C F office for record.

Preparation of Treatment Map

265. Thereafter a treatment map of the area is to be prepared showing various information including.

(A) Protection Areas
Areas that are unworkable
Unworkable Areas will depict
Precipitious and very steep slopes

(B) Blank & Eroded Areas

(C) Under Stocked Areas

Areas that are suitable for planting will be shown. These are the understocked patches that do not have root stock, coppice or pole crop. Areas along nalla banks within 20 meters with will be considered as plantable areas.

(D) Old Plantation Areas

These areas include successful plantations and thinning is prescribed in congested patches.

(E) Workable Areas

These balance areas of the coupe will be worked. Site specific estimates are to be prepared.

Prescriptions for executing works and Marking Rules :

The following guidelines are given for marking officers :

General Rules

i) All live illicitly cut stumps will be cut back and dressed.

ii) Climbers should be cut.

iii) Some dead trees , 2 to 4 per Ha. , of miscellaneous species are to be kept for wildlife and detritus cycle.

Categorywise Rules

Category A and B : No work is to be taken except soil conservation measures which may be minimal.

Category C : In these areas plantation will be taken where required . Planting of Bamboo along the nalla banks and for other areas. The species have been suggested. Suitable models of planting have been

given in the Appendix no. CXII to CXVI and no. CXXI to CXX III, P. 421-438 & 461-463,

Vol. II.

Category D : Thinning in congested plantations is to be done. C grade thinning roughly corresponds to a spacing equal to one third of average height of crop.

Category E :

a) All healthy trees of N T F P / medicinal importance are not to be marked. e.g. Moha, Mango, Chinch, Tendu, Phanas, Char, Tad, Apta, Hirda Ritha, Karanj, Behara, Bel, Kala - Kudi, etc.

b) One out of every two teak trees of over 105 cm g b h will be marked. The trees to be retained will be sound and vigorous.

c) With regard to other valuable injaili one out of two trees of over 105 cm gbh. will be marked e.g. Ain, Khair, Shisham, Bibla, Hed, Shivan, Dhawda, Sawar, Nana, Kalam etc.

d) Trees of other species not taken account at i), ii) or iii) above will be marked if they interfere with the growth of future crop of teak and injaili species of timber value.

e) Unsound, malformed, dead and dying trees will be marked irrespective of girth class.

Note :- A tree will be considered as

- Unsound when its bole emits a hollow sound when struck hard or when it has no marketable timber.
- Malformed when it is defective or abnormal either in crown, or bole and includes stag headedness, gnarls, twists or constrictions due to climbers, crookedness, etc.
- Apart from marked trees, out turn of small timber and firewood from dressing of stools in small quantities is likely too.

Section - 14 :- Cultural Operations

266. 1) Cut Back Operation :- C B O will be done in April / May.

2) All standing trees marked for felling but left unfelled will be felled.

3) All trees badly damaged during harvesting if any will be felled after submitting the list and obtaining permission from Dy CF.

4) Damaged coppice will be cut back.

5) All stools will be cleared of felling debris.

The above operations should be inspected by supervisory officers.

Cleaning : To be carried out in 5th year of plantations and include

a) Removal of dense undergrowth (subsequent to NTFP harvesting, if any) interfering with young crop.

b) Singling of coppice and leaving two to three healthy coppice per stump.

Thinning : To be done in the 10th year in the artificially regenerated patches. C grade thinning is to be done i.e. where spacing is about one third of average height of poles.

The sequence of cultural operations of old plantations are given in the Appendix No. XXVII, P. 60, Vol. II.

Section - 15 :- Other Regulations

267. a) **Fire Protecion** of the coupe will be done for 10 years.

b) **Grazing** - The area is to be closed to grazing for 10 years.

Note : One copy each of stock map, enumeration abstract, stock maps and notes are to be kept with the Compartment History file and special observations entered in the C. H. form. These are to be handed over to the Dy. CF, WP during revision of the Plan.

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CHAPTER - V

AFFORESTATION WORKING CIRCLE

Section - 1 :- General Constitution

268. This Working Circle includes all the understocked areas of Reserved Forest which have not been covered in the Protection, Lake Catchment and Selection Cum Improvement Working Circles. In addition it includes21008.223 ha. of Woodland Protected Forests scattered over all six Ranges and in proximity to villages. The areas are depicted through survey numbers. The details of protected forests are given Appendix No. -XCIX, P.

includes 405 ha. of Acquired Forest which have been acquired under the Maharashtra Acquisition of Forest Act 1975.

Section - 2 :- General Character of Vegetation

269. The vegetation has been overexploited in the past and proper regeneration could not be effected owing to biotic pressures from the public. The areas have been subjected to illicit felling, unregulated grazing, trampling, hacking for fuel wood and Tahal coppice, and repeated fires as they are located near settlements and accessible points. These areas contain coppice crop. Many areas have turned to scrub land or been reduced to denuded waste having score tree growth.

The Reserved Forest include both 3B / C1 and 3B /C2. Forest types site quality discernible is IVb to Iva. The density is mainly below 0.4.

Section - 3 :- Blocks; Compartments and Working Series

270. The number of Compartments of Reserved Forest are allotted to this Working Circle has been divided into 8 Working Series and each series into 10 Annual Coupes. This division of areas is depicted in Appendix No. LXXX VIII. P. 224 Vol.-II. And the areas of P. F. are divided into 6 series as per the Ranges. The areas of P. F. have been divided into Ranges, villages and the applicable survey numbers and have been shown in Appendix XCIX.

Section - 4 :- Special Objects of Management

271. The Special Objects of Management of this Working Circle is

1) To reestablish the vegetal cover in these areas for

(A) Prevention of further degradation of forests.

(B) Soil and Water Conservation and

(C) To meet demand for small timber, fuelwood, agricultural implements, bamboo, fencing material etc.

Section - 5 :- Analysis and Valuation of the Crop

272. The entire area of this Working Circle has been stockmapped and this is depicted at Appendix no. LXXX VIII, P. 224, Vol. II. Enumeration has also been done (10%) by the Resource & survey wing and the results computed by the Chief Statistician office of PCCF, is depicted in the Appendix No. CXXIV to CXXVI, P. 468 - 476, Vol. II.

A Summary of Stock Mapping is given below :

Teak Forest Quality			Mixed Forest Quality		
III	IV a	IV b	III	IV a	IV b
-	-	-	0.490	97.242	108.636

Plantation	Understocked	Cultivation	Eroded	Blank	Scrub	Total (Ha)
229.123	2303.123	28.335	105.457	0.950	112.267	2985.623

The Woodland Protected Forest areas have been stock-mapped and the results are summarised below :-

Mixed Forest Quality			Plantation	Under stocked
II	IV a	IV b		
79.117	115.381	1253.972	1784.856	10804.086

Cultivation	Edoded	Others (Blank etc.)	Scrub	Total Area (Ha.)
1977.992	705.666	1198.839	3088.314	21018.041

The detailed Stock Analysis is depidted at Appendix No.

Sr. No.	Range	Stocked Area (Ha)	Understocked (Ha)	Total Area
1.	Shahapur	367.925	3956.300	4324.225
2.	Khardi	824.139	1893.561	2717.700
3.	Vihigaon	-----	1853.357	1853.357
4.	Washala	-----	2372.663	2372.663
5.	Dolkhamb	263.214	3231.640	3494.854

6.	Dhasai	2032.927	4222.315	6255.242
	TOTAL	**3488.205**	**17529.836**	**21018.041**

Section - 6 :- Method Of Treatment

273. The object of management will be achieved by taking up plantation of local and exotic naturalised suitable species as per site capability and where PFM is proposed, by choice of the local population. Needless to say the plantation models would be varied with both indigenous as well as exotic species, trees, as well as shrubs and herbaceous vegetation. Existing root stock will be tended and allowed to regenerate. Planting will be done in understocked areas as well as in plantable blanks.

274. There is preponderance of root stock in understocked areas. Hence actual planting will be much less than 2500 seedlings per hectare. Some officials have suggested models of about 1100 seedlings per hectare. It will be thus necessary to prepare site specific estimates after thorough scrutiny of the area in question.

Section - 7 :- Choice of Species

275. The choice of species would depend on many factors including the needs of the PFM beneficiaries. It will also depend on the status of the habitat. In well drained shallow soils tree species (local) to be planted are Neem, Sissoo, Khair, Shivan, Shiras, Karanj, Palash, Bamboo, Kuda (Kala), Moha, Maharukh, Vilayati Babul, Wawli etc. In deep well drained soils the following species can be planted are Teak, Bibla, Dhawda, Chinch, Ain, Semal, Hed, Acacia mangium, Kalam, Tiwas, etc. In clayey soils Ain, Arjuna, Babul etc. On difficult sites that are shallow and rocky hardy species recommended are Wrightia tinctoria (Kudu Kala), Kaju, Cassia siamea, Acacia holosericea, Shiras, Shitaphal, Moha, Neem, Palash, Bamboo, Australian Babul, Karanj, Wawali, etc. Out of these two acacia A. holosericea & Acacia auriculiformis are popular for their fast growth, biomass production, fuelwood suitability, etc. The former can be dibbled in failed areas during 2nd year of plantations for both

cheap reboisement and stocking of area. Acacia auriculiformis is a popular species in the tract but is less hardy than the former and requires medium depth soil, but has naturalised to such an extent that it is accepted as a local species.

It is necessary to plant a mixture of local as well as exotic species as per site limitations.

Section - 8 :- Rotation

276. No rotation is being fixed as there is no available data on growth of plantations in these degraded areas. It can be fixed subsequently on the basis of species and usage, among other factors.

Section - 9 :- Working Series and Annual Coupes

277. The areas of Reserved Forests of this Working Circle have been divided into five Working Series and each Working Series divided into 10 Annual Coupes. And areas of Protected Forest are divided into 6 Working Series as per the Range. Each series will have the number of villages under it as a unit of working.

Section - 10 :- Regulation of yield

278. As the areas are understocked and with blanks, yield will be negligible from the various coupes to be worked except for firewood in minor quantities.

Section - 11 :- Agency of Working

279. All works will be done departmentally and by employing PFM members as far as possible in PFM areas.

Section - 12 :- Demarcation of Coupes & Marking

280. The coupes is Reserved Forest should be demarcated one year prior to working. Rules for demarcation have been given in the chapter on Miscellaneous Regulations. No tree will be marked for felling except dead and dying. However 3 to 4 dead and dying trees per ha are to be left for wildlife, including the detritus cycle fauna. Protected

Forest will have the number of villages under it as a unit of working as per the availability of the area.

Section - 13 :- Execution of works

281. The coupe will be inspected thoroughly and a treatment map and girth wise details of valuable species from 30 cm onwards at 15 cm intervals are to be prepared.

I. Preparation of Treatment Map

282. The treatment map is to be prepared on 4" = 1 mile toposheet copies. The following areas are to be depicted where minimum 0.4 Ha. patch occurs.

A) Unworkable Area

i) Areas of steep slope

ii) Eroded areas alongwith proposed location of nalla bunds.

B) Forest Patches that have 0.4 or more density.

In these areas dead trees will be marked for felling after leaving 3 to 4 per ha, and climber cutting, singling, cut back operation, etc will be done.

C) Old Plantation Areas

Thinning will be done where there is congestion. Other cultural operations are to be carried out.

D) Workable Areas

283. These consist of blanks and understocked areas on gentle to moderate slopes and includes following.

a) Patches with root stock capable of giving 500 to 600 coppice shoots per ha. These areas are to be tended and protected to allow for natural regeneration of trees, shrubs and seasonals.

b) Patches with root stock not capable of giving 500 to 600 coppice shoots per ha. These areas are to be taken up for planting. Trial pits of 30cm size are to be dug at fixed points on base line as well as grid lines. On base line 100m intervals and on grid lines 50m

intervals of trial pit locations are in practice. After trial pits are dug, the locations will be shown on a map on graph paper. On the basis of trial pit depth and clustering, three zones will be fixed with > 30 cm depth, 10 to 30 cm depth and < 10 cm depth, corresponding to zone III, zone II and zone I.These zones are then to be superimposed on the treatment map.

c) Banks of streams - One chain wide (20 m) strip along banks of main water course and well defined nallas are to be planted with bamboo.

II. Demarcation of different areas on the ground

284. The areas at (A) above can be identified easily on the ground with the help of the treatment map, and therefore need not be demarcated on the ground. The areas at (B) and (C) can be demarcated by painting two coal tar rings of 5 cm width at BH on the peripheral trees, after careful scrapping of surface of the bark. The areas at (D) can be marked by digging broken channels at 10 m intervals, each channel being 4 m length and 30 x 20 cm cross section.

III. Marking Rules

The following rules are to be followed.

In category A areas

a) No harvesting of any trees including dead and dying, and no removal of undergrowth shrubs, is to be done.

b) All live stumps are to be cut back and dressed for coppice.

In category B, C, & D areas

a) Dead trees are to be removed but 3 to 4 per ha are to be left.

b) Singling of coppice is to be done so that 2 to 3 vigorous spaced out coppice shoots only remain.

c) In congested patches, thinning is to be carried out to ease congestion so that approximate space between stems is one third the average height. This can be done in old plantations and patches of advance growth.

d) The shrubs and shrubby undergrowth should ordinarily not be cut except in (C) and (D) areas, and should not be removed except in zone II and III areas of (D) where their removal will facilitate the survival and growth of the seedlings to be newly planted.

IV Method of Treatment

285. On completion of treatment map and due inspection by superiors, the RFO will submit the site specific estimate alongwith other documents. Alternatively the microplan will be prepared for PFM scheme after due PRA, etc.

On sanction of the estimate within the available scheme the treatment can follow the following process in case of a plantation scheme.

Felling and transportation if any will be completed well before premonsoon works. The premonsoon works should be completed by December / January and should be inspected by superior officers. Premonsoon works include TCM, digging of pits, Soil Conservation works etc.

TCM or stone wall of standard size will be made along the periphery. On the sides where forest areas are adjoining, vegetative fencing with species like Chilhar, Sabar, Agave, Sagargota, Bamboo, etc. can be prepared on TCM. Seed sowing of Chilhar, Sagargota etc. and planting of cuttings of Nilgudi, Sabar, Ipomea etc. can be done as per necessity / availability.

V. Treatment of different categories of areas

i) <u>Category A</u>

No works except for dibbling of seeds of species like Shivan, Sissoo on blank patches and Soil Conservations works like gully plugging and nalla bunding.

ii) <u>In category B and C areas</u>

No plantation works to be done. Some items of work prior to premonsoon works have been mentioned above. Soil Conservation measures are to be taken up where necessary.

iii) <u>In category D (I) areas</u>

As for category B and C.

iv) <u>In category D (II) Areas</u>

These areas are to be planted up. As per the prevalent norms, no tree planting work is to be taken up in zone I. In zone II and III pit planting of local species is to be taken up. Soil conservation measures like gully plugging and nalla bunding are to be taken up. Fodder developement is to be encouraged by sowing improved varieties of grass like Mooshi- 13 (Iscilema wighti) Ber-276 (Ischeamum rugosum) Marvel-40 (Dichanthium caricosum), and Phool (Themeda triandra).

Grass seed sowing will be done on V furrows on gentle slopes. Bamboo under planting in 3rd or 4th year is to be taken up.

Area along nalla banks within 20 meters width are to be planted with bamboo.

Section - 14 :- Techniques of Plantation

286. The site specific estimates will bring a varied mixture of planting techniques. As no single technique can be applicable to the plantation sites the following have been given for reference :

1) Three world Bank Plantation Models have been given in the Appendix CXXI to CXXIII, P. 461-465. These include items of work, mandays, labour cost etc. These 'WB' models are being undertaken in Thane Circle.

2) A General Model of Afforestation with items of work, mandays, etc have been given in the Appendix CXX, P. 120. This models covers various items of work that are taken up in different schemes / areas and can form the basis for various plantations.

3) Four Models of Plantations have been given in the Appendix.

4) A Model for Bamboo Plantation is also included in the Appendix No. CXV, P. 435, Vol - II.

5) Brief notes on raising of some local species has been given for reference.

Problem of Implementation

287. One of the critical problem areas that prevent regeneration, afforestation and other treatment prescribed in Working Plans is the non availability of assured grants to the FD. Hence the Dy CF has to seek other sources of funding, like the district pool, which are neither assured in terms of amount nor available in a timely manner. This results in tremendous deviations and where grants are available, these grants cater to piecemeal working as per provisions of the scheme under which the grants are available.

288. Thus prescriptions are followed only partly, if at all. This obviously calls for policy review so that Natural Resource Management as per the Working Plan prescriptions can be implemented. There are so much funds for forestry related activities in the state that the real problem is not lack of funds but lack of focus in integrating these funds for a comprehensive package for Forestry / Natural Resource Development. Hence need for single window funding is felt.

Section - 15 :- Subsidiary Silvicultural Operations

289. Cleaning : The following operations will be carried out in the 5th year of plantations.

1) Climbers interfering with plants will be cut.

2) Singling of coppice shoots to 2 to 3 well spaced out vigorous shoots will be done.

3) Bushes of Lantana etc. that are interfering with the growth of seedlings will be cut.

Thinnings :

290. Thinnings will be carried out in areas of planting in the 10th year. Prior to thinning thorough evaluation of these patches and inspection by superior officers should be done. Thinning of ordinary D grade may be done if there is congestion, say more than 1250 seedlings /

coppice per ha. The resultant spacing after thinning should not be more than one third the average height of the average height of crop.

In practice thinning may be necessary in patches so as to give sufficient space for the plants to grow. If Local Yield Tables are available then the space between stems is read from the corresponding average dbh/gbh in the table. Accordingly sticks of the length of spacement can be prepared and given to all staff to do thinning markings.

The proposed years of cleaning and thinning of plantations in this Working Circle are given at Appendix no. LXXXIX, P. 226, Vol. II.

Section - 16 :- Miscellaneous Regulations

291. **Fire protection** :- The area of the coupe will be fire protected for 10 years from the year of planting.

Closure to Grazing :- The area of the coupe will also be closed to grazing for 10 years from the year of planting.

Evaluation :- The success of the treatment including planting should be evaluated from time to time e.g. in 3rd, 5th, 7th, 9th & 10th years, and critical observations noted and informed to concerned wings including Working Plans.

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CHAPTER - VI

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

Section - 1 :- General Constitution

292. This Working Circle areas are primarily the Woodland Protected Forests and of the Division. It includes a total area of 24038.123 ha. scattered over all six Ranges and in proximity to 179 villages. The areas are depicted through Survey Numbers. The details of Protected Forests are given at Appendix No. XCIX, P.254, Vol. II.

It also includes 405 ha. of Acquired Forest which have been acquired under the Maharashtra Acquisition of Forest Act, 1975.

Section - 2 :- General Character of Vegetation

293. The vegetation of Protected Forest areas have been subjected to persistent and unregulated biotic pressure from forest fringe dwellers. Much of the areas have been subjected to uncontrolled grazing, trampling, forest fires, illegal cutting, lopping and hacking for fuelwood and Tahal, preparation of path for bullock carts and tractors, and encroachments of seasonal as well as permanent kinds. These areas contain coppice and stumps of original trees with numerous shoots growing from them. Many areas have turned to scrub-land or been reduced to denuded wastes that can support very few trees due to soil erosion/site degradation. Some areas of PF however contain tree growth especially in areas where RF areas are in proximity of settlements. Such areas contain site quality upto IV and density of 0.4 or just above. In such areas both the forest types, 3B /C1 and 3B /C2 are discernible but effects of biotic pressures including Tahal cutting have affected the vegetation, reducing some areas to scrub land.

Section - 3 :- Division into Units of Working.

294. R.F. area in the proximity of settlements are well identified by Compartments. The PF areas are identified as per the villages in the

proximity and Survey Numbers allotted to them as per Revenue Norms. Hence The Village Maps are in use for PF identification.

295. The areas of PF have been divided into Ranges, Villages and the applicable Survey Numbers. The details of Range, Village, Survey Numbers and Areas are given in the Appendix XCIX, P. 254. The areas of PF are divided into 6 Series as per the Range. Each Series will have the number of villages under it as a unit of working under JFM. Each village will have a separate Microplan. However villages with less than 10 ha. PF should include other community lands also as far as possible.

Section - 4 :- Special Objects of Management

296.

(1) To re-establish vegetal cover as per land capability in the understocked and blank areas for Soil Conservation, Water Conservation and for production of fuelwood, small timber, bamboo, fodder and other NTFP for local consumption

(2) To manage the stocked and partly stocked areas for regulated domestic needs of Tahal and other usufruct needs.

(3) To develop the stocked areas to a harvestable point so that timber can be harvested from these patches for the local people in future.

(4) To introduce and sustain Participatory Forestry Management in all these areas in the aforesaid three Objects of Management, as well as new objects that may be stipulated in future, for the benefit of the local people.

Section - 5 :- Analysis Of The Crop

297. The Woodland Protected Forest areas have been Stock - mapped and the results are summarised below : -

Mixed Forest	Quality	Plantation	Under stocked	
II	**IV a**	**IV b**		
79.117	115.381	1253.972	1784.856	10804.086

Cultivation	Eroded	Others (Blank etc.)	Scrub	Total Area (Ha.)
1977.992	705.666	1198.839	3088.314	21008.223

The Detailed Stock Analysis is depicted at Appendix No. C, P.328, Vol. II.

Regular exploitation was done by felling Teak and valuable Injaili in dense areas through the tenets of 'Modified Clearfelling' prescribed by Mr. Perry.

The Thane Woodland Code (1905) allowed vast privileges to the local people for grazing of cattle, of cutting Tahal as per rules and with the permission of Revenue Department, of cutting branches of Teak and Injaili for agricultural implements. These Forests were primarily for the NTFP and small timber needs of the local people but the Teak timber was to be removed by the FD, the coppice growth arising being also included for Tahal cutting or fuel after leaving two coppice per stump as Reserve. The PF were finally handed over to the FD in 1956.

The Acquired Forests are also scattered and complete maps / documents could not be procured from Shahapur Division. Hence these areas have not been stock mapped. Proper identification of areas on ground and corrections in Land Records & Maps should be completed early and processing for Conversion to PF and RF should be initiated.

Section - 6 :- Condition Of The Crop

298. The understocked areas are very sparsely vegetated and there are blanks that support grass and other seasonals only. There are vegetative patches that show signs of decadence with trees showing distorted growth due to continuous lopping for Tahal. Many stumps of 1 to 5 ft. are visible , especially near settlements.

Encroachments :

299. Encroachments near settlements and townships are common. These encroachments are premanent type with colonies eg. Mokhavane Kasara. In rural areas encroachments are for cultivations and some of these are seasonal.

Out of the 21018.041 Ha. PF, areas that have been described as stocked are 3488.205 Ha. and Understock / Blank / Encroached / Cultivated areas are 17529.836 Ha.

The Rangewise break up is given below :-

Sr. No.	Range	Stocked Area (Ha)	Understocked (Ha)	Total Area
1	Shahapur	367.925	3956.300	4324.225
2	Khardi	824.139	1893.561	2717.700
3	Vihigaon	-----	1853.357	1853.357
4	Washala	-----	2372.663	2372.663
5	Dolkhamb	263.214	3231.640	3494.854
6	Dhasai	2032.927	4222.315	6255.242
	Total	**3488.205**	**17529.836**	**21018.041**

Section - 7 :- Method of Treatment

300. It is not possible to give any one or two methods of treatments or plantation models for many scattered areas with such variations in vegetation and site conditions. Each site exhibits its own set of conditions made by the topography, soil, rainfall, intensity of sunshine, air movements and various ‘Micro’ factors. Over and above the impinging of tremendous biotic factors makes treatment of such areas difficult as one has to deal with not just the establishment of these living flora but ensure their growth and survival too. That is why the plantations are in a dismal condition after 2 to 3 years from planting, despite being good initially. In such a situation the chances of repeating plantations in the same areas at periodic intervals appear inevitable and the cumulative area of planting would exceed the geographic area at hand.

301. It is felt that the critical component missing in the plantation programmes is PFM. Unless and until the forest fringe dwellers who have access to these plantations and 'Control' the land are made mutually benefiting partners, nurturing of plantations to sustainable harvesting or to vegetation stands will be difficult in the prevalent environment.

302. Hence the areas are to be brought under PFM Management. For this 1 to 2 years will be necessary for undertaking PRA, preparation of Microplans and sanction of the same prior to beginning of the work. The Actual Treatment is thus proposed for 1999-2000 onwards. The village alongwith all Survey Numbers in it will be taken as a unit of PFM scheme and accordingly the works etc. will be phased out from 1999-2000 onwards. In villages with very small PF areas viz. Goteghar, Karada, Arjunali, Belwad and Pophadi the work of treatment would be completed early, say in the first year. Whereas in bigger villages treatment will be completed in phases within 4 to 5 years. Employment opportunities for the poor and landless will come along with PFM. It is necessary to refrain from importing labour for PFM activities. Only local workers are to be employed at Plantation/ Forest & Nursery Sites. However where PFM is not possible due to local factors, plantations, under various schemes may be done.

Section 8 : Choice of Species

303. The Choice of Species will be governed by the local needs and technical feasibility. However the need for quick growing fuel-wood / fodder species like Acacia, Eucalyptus, Sesbania, Subabul, Moringa, Cassias, Albizzias, Suru etc. and shrubs will be necessary. Trees that can withstand browsing, that can come up on shallow murrumy soils, that are fire resistant, that improve the soil fertility, provide small timber etc. are all important options in the areas. A list of such species is appended in the Appendix. CX, P. 417. Further the options on NTFP species of trees, shrubs or seasonal species has to be considered for productive utilisation of the land and as per feasible options of villagers. Such options have been given in the chapter on PFM and also in the Appendix. LXXV, P.

192. The use of both local species as well as tested exotics are recommended to meet the various needs. Live hedge and thorn could be better than TCM for these schemes of PFM.

Section - 9 :- Models of Vegetation Rehabilitation / Plantation

304. For establishing a productive vegetal cover for the PF areas various combinations and options will have to be selected as per the villagers need as well as technical feasibility. Accordingly the model (s) will have to be incorporated into the Microplan of the village.

305. Various options of vegetation rehabilitation have been given in Section 3 of the Chapter on PFM. The suggestions of the Research Circle may be got for better choice. Some options are given for ready reference : -

I) Options of Vegetative Rehabilitation of Areas that are (Partly Stocked)

Fencing :- Live hedge around patches to be planted.

Soil Conservation :- Gully plugging , nalla bunding to be done @ 6 m^3 per ha.Gully head stabilisation can be done by Agave, Euphorbia, Arunda donax Saccharum munja Ipomea, Nilgudi, Calotrpois, Gliricidia etc.

Stocked Areas :- Climber cutting , cut back and dressing of stumps . singling of coppice stems, clearing of under growth around Natural Regeneration seedlings etc. are to be done. No fellings are to be done except dead and dying.

In Old plantations :- Thinning of congested patches is to be done so that espacement is roughly one third of average height of the crop. Singling and cut back operations are to be done.

Blank patches :- Treatment map of soil depth is to be prepared.

Zone I : On gentle slopes V furrows for grass to be prepared. Local grass is to be allowed to grow by protection. In areas where soil is available, species that can grow on shallow soils are to be planted in pits or by patch sowing / dibbling e.g. Acacia holosericea, Sitaphal, Cassia siamea, Karanj, Bor, Grewia tenax

To have a fair chance of survival and growth, Acacia holosericea can be seed sown whereas the others can be planted by polybags/polytubes. Local shrubs are to be planted by cutting or by seed in patches.

Zone II :- In these areas high density plantation of 1m x 1m or 1.5m x 1.5m spacement is to be done with species that are quick growing and yield fuelwood / fodder/ fruit. Planing is to be done on pits of 30 cm. cube and mixed species like Subabul, Cassia siamea, Sesbania grandiflora, Maharukh, Acacia holosericea, Albizzia amara, Albizzia lebbek, Vilayati babul (Pithecelobium dulce), Grewia tenax, Manvel bamboo, Gliricidia, Acacia auriculiformis, Moringa oleifera, Behera, Arjuna are suggested.

In shallow areas grass, agave etc. are to be planted in V furrows.

Zone III :- In these areas species like Ain, Teak, Sissoo, Jambul, Khair, Apta, Moha Eucalyptus, Umbar Hirda, Hed, Bibla, Pimple, Shivan, Tiwas etc. are to be planted at 2 x 2 m or 3 x 3 espacements on pits of standard size.

In moist patches cultivation of NTFP seasonals of fodder, medicine etc. can be planted. Also shrubs of NTFP value of local species are to be planted under intensive management. These patches should be 0.5 to 2 ha. and watering facilities as mentioned in the chapter on PFM may be adopted. Species like Agave, Calotropis, Jatropa etc. can be planted in patches of dry, refactory sites.

A list of NTFP species of medicinal and other value is given in the Appendix No. LXXV, & LXXVI, P. 192-193, Vol. II.

Note :- For easy management and harvesting it would be proper to grow species according to their utility as well as mode of harvesting. It would also be helpful to plant species to be lopped / coppiced / clearfelled in groups. Numerous species have been given for wider choice but it may be easier to select fewer species. This is more pertinent for Zone II areas of high density plantations.
Various species with their characteristics and uses are given in the Appendix No. CX, P. 417, Vol. II.

II) Options of medium to small Blank patches :-

Such patches of 10 to 25 Ha. occur in some villages. These are blanks with stumps and having very scanty scrubs. It may not be possible to take up various options given in the previous paragraphs. For such areas the following is recommended :-

Fencing :- 2 to 3 rows of live hedges of Chilar, Parkinsonia, Euphorbia, Sagargota etc.

Soil & Moisture :- Conservation to be done as given earlier.

Vegetative Rehabilitation to be done by high density planting of fast growing fuelwood species, as given, with espacement of 1 x 1m, 1.5 x 1m or 2x 1.0m. The inter space is to be utilised for sowing of NTFP species like Agave, Sabai, Jatroba etc. Each selected species is to be planted in blocks to enable easy management and harvesting. The technique of planting of high density fuelwood plantation of one species is given in the Appendix.

III) Option for Small Blank Patches

These are areas of below 10 ha. in the Survey Numbers. Such areas may be scattered or continuous and many are below 5 ha. Most of these areas have been reduced to denuded waste and the demarcation lines are violated. Such areas can be treated as given below:-

Fencing :- Live hedge is to be prepared with Euphorbia, Chilar, etc.

Soil & Moisture Conservation works are to be done.

Vegetative Rehabilitation :

Tree species of fruit and shade are to be planted at an espacement of 3 x 4 m or 4 x 5m in areas of suitable depth e.g. Moha, Mango, Neem, Jambul, Pimpa, Kusumb, Umbar, Bor, Guava, Kaju, Sitaphal etc. In areas that are less deep row planting at close espacement e.g. 0.60 m x 0.60 m of NTPF value species of shrubs etc. are to be raised e.g. Jatropa, Colotropis, Agave, Karvi, Murudsheng, Mehandi, Adulsa. Fodder in the area should be allowed to grow and harvested for stall feeding by beneficiaries. The interspace between tree

species may be used for interplanting with shrubs given above and those of local value, after 2 to 3 years after the trees are established. Grasses of improved varieties and Sabai and Khus can also be planted in blocks in these spaces.

Section -10 :- Harvesting of the produce

306. The harvesting of various outputs will depend on the species as well as the type of use. The annual harvesting of grasses and NTFP, sale of collected grass seeds (or hamata seeds) to the FD annually will help benefits to accrue from the first year itself.

Fodder trees grown on blocks can be lopped after a height of 1 to 2m and in species like Subabul and Sesbania, this will be begun from the 2nd or 3rd year depending on site condition. Lopping of trees will need training as well as close supervision from the FD, so that lopping is done at proper height from the ground and at proper time.

Fire wood species with coppicing ability are to be harvested by Coppice Cum Selection from 4th year to 6th year e.g. Albizias, Melia, Subabul, Eucalyptus etc.

Fire wood species that are to be clearfelled and replanted can be done in blocks from 3rd year (e.g. Acacia holosericea, Sesbania grandiflora, Subabul, etc.) onwards depending on species and site conditions. However if Natural Regeneration occurs, then only selection of bigger plants is to be done instead of clearfelling.

NTFP collection is to be regulated as per season and species. It can begin from 1st year in case of grasses and hamata, to 3rd /4th year or thereafter.

Sharing of harvested products are to be done as per the Government Rules in force.

Note :- No felling is to be done in the PF areas that are stocked , during the course of this Plan. On the basis of the PFM measures for Protection and Management, and with proper tending, these trees and forests are likely to improve and Selection Felling is proposed

in the next plan in improved areas. The need to assess the PFM measures is required prior to the next plan.

Section 11 :- Miscellaneous Regulations

1) The Actual removal of biomass in the form of fuel, leaves, grass, Tahal, fruits, flowers, reeds, and other NTFP is required to be properly recorded in the FPC records. This will give an account of the Actual productivity of the forest areas as well as allow regulation.

2) Fire Protection in the areas will be required to prevent damage to the vegetation.

   Grazing in the plantation areas should not be allowed. Efforts for inculcating the habit of stall feeding amongst villagers should be made.

3) Tahal requirement are to be met from profusely regenerated areas of Ain dry leaves, agricultural waste, and natural shrubs in forested or in plantation areas as far as possible. If these are not available pruned lower branches of miscellaneous species like Ain are to be allowed. This should be incorporated in the FPC Agreements.

4) Demarcation of areas will have to be done carefully in order to find out about extent of encroachments, if any, so that problems like litigation do not become burden later on.

5) During PFM Microplanning the villagers should be informed about their privileges and the benefits that they will gain over and above those privileges through PFM.

6) The Actual planting work will be less than the gross area of working on account of stocked areas, coppice, plantations etc. Hence there will be difference in gross and net area to be planted.

7) These areas that are to be worked under PFM will have various prescriptions and treatment incorporated in the Microplan. These prescriptions and treatment may encompass areas other than suggested for working but they should be within the broad parameters of Silvicultural and Scientific Norms laid down or appropriate for the areas at hand.

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CHAPTER – VII

THE BAMBOO (OVERLAPPING) WORKING CIRCLE

Section - 1 :- General Constitution

307. This Working Circle is an overlapping one and covers the areas in the tract which have bamboo in a reasonable population. The total area allotted to this Working Circle is 7116.275 Ha.

Section - 2 :- General character of the Vegetation

308. The bamboo species mainly found in the tract are :

(1) Dendrocalamus strictus (Manvel)

(2) Bambusa arundinacea (Katas) - also known as Bambusa bambos

(3) Oxytenanthere stocksii (Munro) also known as Pseudo xytenanthere stockii.

D. **Strictus** is the most important of the above species. It grows widely in hill slopes, alluvial plain areas and ravines. It prefers dry areas and avoids poorly drained and moist heavy clay soils. Soil in its natural habitat is poor, coarse grained, well-drained dry soils or stony soils on hill slopes. It is a common associate of teak forests and occurs upto 1000 m in hills. D. strictus is commonly planted in private as well as forest lands. The culms are 8 to 16m high and 2.5 to 8 cm in diameter, almost solid or the internodes are thick walled. It is the most universally used bamboo for house construction, baskets, mats, furniture, agricultural implements, tool handles etc.

It is a very important raw material for paper and rayon in India. A good charcoal prefered by jewellers is produced from it. Like other bamboos it is useful for Soil Conservation due to the intricate rhizome system and roots. Seeding cycle is 30 to 45 years-studies reveal that the actual cycle varies on the seed origin, but for the

same seed origin, the length of cycle remains constant. Seed weight is 32000 per kg.

Bambusa bambos is a thorny bamboo bearing bright green shining culms 20 to 30 m high and 5 to 18cm in diameter. Occurs in most localities especially along banks, valleys and ravines. Prefers flat alluvial, moderately clayey soils that are rich and moist.
Tolerates slight waterlogging. Can come up upto 1250 m altitude. Used for rafters, house posts, ladders, tent poles, shafts of tongas, mats, baskets, scaffolding; also used for pulping and seeds and shoots are used as food. Flowering cycle 30 to 45 years.

Oxytenanthera stocksii : Slender bamboo with 7m high; culm-sheaths 15.0-22.5 cm long, 7.5-15.5 cm wide at base; ligule deeply fimbriate, leaves 10-20 x 1-2 cm, rounded or attenuate at base into a short, petiole. Panicles large, or spicate heads with many closely packed spinous spikelets, the heads supported by rounded chaffy bracts. Spiklets 1.0-1.2 cm long, narrow, mucroanate, many fertile mixed with a few sterile.

It is reported that these areas had abundant bamboo. During 1959-60 gregarious flowering occurred but the resultant Natural Regeneration could not survive fires and grazing in most areas. Hence bamboo is scanty and occurs in moderate to good stocking only in remote and hilly areas. Biotic pressure has reduced bamboos and only few areas of the tract have harvestable clumps. Improvement of the existing clumps and plantation of bamboo, prescribed in other Working Circles, would allow for their development in future.

Section - 3 :- Blocks, Compartments and Working Series

309. The Compartments allotted to this Working Circle are given in Appendix No. XC11, P.238. The area of this Working Circle has been divided into 3 Working Series and each of these Working Series have been divided into 3 Coupes. The details of Working Series and Coupes are given in Appendix No. XCIII, P. 239, Vol. II.

Section - 4 :- Special Objects of Management

310. The Special Objects of Management of the bamboo areas would be :-

1) To harvest bamboo along Silvicultural lines.

2) To obtain Sustained Yield without damaging yc

3) To provide Artificial Regeneration of bamboos in deficient areas to augment Natural Regeneration with a view to increase yield in future.

Section - 5 :- Method of Treatment

311. Selection felling of mature culms in each clump will be done. Water absorption trenches will be taken in the bamboo areas to enhance the growth of bamboo.

Section - 6 :- Working Cycle

312. Annual Working Cycle of 1 year will be adopted and for this reason whole area will be work annually. This will give more yield and hygiene of clump will be maintained. A statement showing the sequence of harvesting is given at Appendix no. XCIV, P. 240, Vol. II

It is necessary to ascertain whether the bamboos have reached harvestable stage prior to felling, especially in case of plantations. Under normal conditions Manvel can be harvested from 5 to 8 years from the year of planting.

Section - 7 :- Method of Harvesting

313. The bamboos in the Coupes are to be harvested Departmentally and under close supervision with minimum trained workers.

Demarcation of the Coupes will be done by numbered poles or by two bands, on standing trees. The word 'Bamboo' along with Compartment Number, Working Series, Coupe Number will be marked on the poles/trees below the bands. To ensure proper supervision one or two Compartments are to be worked at a time, and next Compartments will be worked after completion report along with outturn, number of clumps in each Compartment and other such details as desired by the Dy. Conservator of Forests, is submitted.

The following Rules for harvesting are to be observed :-

1) No harvesting is to be done from 1st June to 15th October, i.e. during the rains, as this is the period of formation of new culms.

2) The following culms will be removed from all clumps, whether the clump is mature or not

- Dead and dry culms
- Damaged culms if upto 1/3 height is damaged
- Malformed, twisted, bent culms.

3) A clump will be considered mature for harvesting if it contains 8 or more culms that are over one year old.

4) In a mature clump the following living culms will not be harvested :

- All current season's culms
- At least 8 culms or all current season's culms whichever is more
- All other culms are to be harvested.

5) Harvesting of culms should be evenly done so that retained culms are evenly spaced out.

In order to gain access to the mature culms inside, the outer culms may be removed in a wedge, where the outer opening is below 1 m wide and the inner part is below 2m wide all round.

6) Culms should be cut with a sharp instrument above a node between 15 cm to 45 cm above ground level. The cut should be preferably between first and second internode subject to the height stipulation.

7) In case of gregarious flowering, harvesting should be done after seeding is completed and all culms can be harvested.

8) The following acts are prohibited :-

- Digging of rhizomes
- Cutting of bamboo tops for fodder
- Use of tender bamboo for bundling

9) All climbers should be cut.

Note :- Bamboo Underplanting / Planting has been prescribed in some Working Circles and Planting Technique has been given in the Appendix No. CXV, P. 435. for augmentation of bamboo and increase in bamboo rich areas.

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CHAPTER - VIII

NON TIMBER FOREST PRODUCE (OVER LAPPING) WORKING CIRCLE

Section - 1 :- General Constitution

314. This is an overlapping Working Circle and covers the entire Forest tract.

Section - 2 :- N.T.F.P. Products Of The Area

315. As has been mentioned in the chapter on JFM, Tribal people, etc. the NTFP and forest fringe dwellers are intimately connected. They depend on leaves, wild fruits, corms, roots, tubers, etc during lean periods. Trees, shrubs, herbs, climbers all provide important products in the life of the poor forest fringe people. Some of these products are listed at Appendix No. LX XVII. Fodder for their cattle and fuelwood/small timber are indispensible for their sustenance. A number of forest fringe dwellers collect fuelwood, the sale of which may be their only source of income.

Collection of NTFP for the FD or other Govt. agencies also provides gainful employment to them. Some NTFP items of the tract are Bamboo, Grass, Apta, Tendu, Bel leaves, Kadipatta leaves, Gum, Myrobalans, Karvi, Chilar Bark, Ain bark, Wavding, Mahua, Hirda, Tad leaves & fruits, Kusri flowers, Agave, Palas leaves, Rankel leaves, Honey, Karanj seeds, Mango fruits, Shikekai, Sitaphal, Neem, Bor, etc.

As has already been mentioned in the respective chapters, there is need to regulate NTFP collection through JFM so as to monitor NTFP collection and develop the various NTFP, among other things, for sustained yield and socio economic improvement of forest fringe dwellers. And now this has been envisaged through Maharashtra Ordinance No. XIX of 1997 providing the transfer of ownership of Minor Forest Produce in the Scheduled Areas. Categorisation of N.T.F.P. in Scheduled Areas in view of new legislation should be done.

The present chapter will deal with some of these NTFP of the tract. A list of some NTFP collected and revenue realised in the tract has been supplied by the Dy.Conservator of Forests, Shahapur and this is given in the Appendix No. XVIII & XIX, P. 30-31, Vol. II.

Section - 3 :- Special Objects Of Management

316. The Objects of Management are :-

1. To regulate collection of NTFP by forest fringe dwellers

2. To develope participatory mode of harvesting and marketing of selected NTFPs.

3. To ensure sustained yield of NTFPs through JFM in forest tracts.

Section - 4 :- Method Of Treatment

317. At present NTFP are either collected as privilege or otherwise, or sold by Auction or on Permits. The latter type of NTFP are the well known marketable ones. The former are less known or produced in less quantity and are generally collected without regulation. In order to regulate proper harvesting in a sustainable manner, it is necessary to conduct a study on the quantum of NTFP collected, season and mode of collecting, damage to plants, role in the economy of the forest fringe dwellers, market forces at work, scope for Participatory Management and Improvement of these species for better yield. This study can be funded by the Tribal Dept. and conducted by some NGO group or students.

In the mean time the present mode of collection / sale may be continued. The Treatment proposed for some NTFPs are given below :

1) **MOHA** Yields important products from its fruits and flowers. The corolla of the flowers yield alcohol on fermentation and distillation. The seeds yield an oil which is used in soap industry, vanaspati manufacture, cosmetics, as a wormicide for lawns and golf courses , and in jute industries. Moha is to be dibbled / planted in regeneration areas as already given in the concerned chapters.

2) **KARANJ SEEDS** Yields oil which is useful in the tanning, pharmaceutical and perfumery industries. Direct sowing / ploughing of this species has been recommended in Plantations and Regeneration Coupes.

3) **TEMBHURNI** leaves are useful for bidi making and are collected in summer.

4) **HIRDA** fruits yield myrobalans used in tanning, ayurvedic medicines and in dye manufacturing. The tree occurs in the higher slopes and is a light demander. Hence planting can be taken up in open areas or gaps.

5) **KANDOL** Yields gum from the bark Tapping should be done as per the following Rules.

i) Tapping should be confined to the main bole.

ii) No fresh blaze should be made on partially healed blazes /wounds.

iii) The Number of blazes to be made on the stem should be as per the following.

Girth of trees	**No. of Blazes**
1.00 to 1.30 m	2
1.30 to 1.60 m	3 (Equally spaced)
1.60 to 2 m	4 (Equally spaced)
2 & above	1 (for every 45 cm girth)

iv) The lowest row or blazes should be at 1 m from the ground and the next at 1 .60 m from the ground. No two rows of blazes will have any blaze vertically above one another.

v) Freshening of blazes fortnightly can be done by scrapping on the upper side of blaze but without deepening of the existing blaze above 0.6 cm in the wood.

vi) At the end of the season the dimension of blaze should be maximum 10 cm wide, 12.5 cm height and 0.6 cm deep.

vii) Each tree should be tapped for 3 years and rested for 3 years. In the second and third year of tapping only the height of blaze can be extended and that too upto a maximum of 12.5 cm each year.

viii) After 3 years rest new blazes are to be made only in the space in between the old blazes and as per dimensions above.

NOTE : Gum is tapped from Babul and Ain also.

6) **KADIPATTA** Leaves are used for flavouring curries. The shrubs come up well in the higher slopes of the main ridge of the Western Ghats. These can be raised by patch sowing of seeds at the onset of rains in PWC and SCI Working Circles.

7) **AGAVE** is a good hedge plant and yields fibre from its leaves. Also a good soil binder and hardy plant. Agave bulbils are to be planted on the boundaries as well as areas needing Soil Conservation.

8) **KARVI** is used by the forest fringe dwellers for making walls of their huts. It occurs as a thick undergrowth in patches. It is necessary to regulate the cutting as high stalks are left alongwith small patches of Karvi. These remnants form a base for lighting fires during April - May when the fires spread and damage other vegetation including regeneration of valuable species.

9) **APTA** Leaves are used as a decoction in malaria and also given with onions for diarrhoea and as an anthelmintic. This species can be included in plantation models.

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CHAPTER - IX

WILDLIFE & ECO TOURISM (OVERLAPPING) WORKING CIRCLE

Section - 1 :- General Constitution

318. This is an overlapping Working Circle and covers all the forest areas of this Working Circle to be protected and developed for aesthetic, environmental and ecological reasons. The areas is important for wildlife as it lies adjoining to the Tansa wildlife sanctuary forms extra buffer zone. The area is also important from eco-torism and historical and religious point of view.

319. **TANSA WILDLIFE SANCTUARY**

The Tansa Wildlife Sanctuary declared vide Govt. of Maharashtra RAFD Notification No. WLP-1667/142822-Y dated 12-02-70.

Initially an area of 216.75 Sq. Km. was included from Shahapur Forest Division. In 1985 the area was increased to 304.81 Sq. Km. Proposal to add 32.18 Sq.Km. Reserved Forest areas, 28.48Sq.Km. area under rivers and lakes along with Relocation of 5 villages having an area of 2.001 are being processed.

Although the area has been constantly under threat from biotic factors, forms excellent habitat for rich flora and fauna. The Zooligical Survey of India has listed 144 genera of vertebrates in the area as per Appendix XV Management Plan for Tansa Wildlife Sanctuary By Nitin H. Kakodkar is Inforce.

Section - 2 :- Special Objects of Managements

320. In order to preserve and improve the natural habitat and existiting flora and fauna. The proper management of prescriptions in the various working circles including control and regulation of biotic factors like fire, grazing etc. will allow the survival of flora and fauna. Special Objects of Management of this Working Circle are

1) To provide complete protection to the existing Natural Flora and Fauna.
2) To co-ordinate Wildlife related Management with Wildlife Division, Thane.
3) To Provide opportunity for Nature Education.
4) To develop opportunity for Eco-tourism.

Section - 3 :- Distribution of Wildlife

321. Inspite of these forest having been management under various working plans the biotic pressure have degraded the flora as well as fauna. The Indian Bison, Tiger, Wild dogs and Wolf have become extict in the last few decades. The wildlife has decreased considerably in the trait. The Zoological Survey of India has prepared details report of fauna the same has been appended at Appendix No LXV.

Section - 4 : Method of Treatment

322. Keeping in view the Special Objects of Management following treatment is prescribed

1) All Wildlife habitat like water bodies, caves, along with flora will be protected.

2) The management prescribed under various Working Circle will be strictly followed to enoure habitat improvement.

3) Felling of hollow trees and fruits trees will not be done.

4) Infrastructure for Nature Education and Eco-tourism will be developed with technical help from wildlife Division, Thane.

5) Soil and Moisture Conservation measures such as Nala bunds, Vanbandharas and Vantalis will be taken up.

6) Areas will be protected against, biotic interference.

7) Nature camps on occasions like Wildlife week, World Forestry Day World Forestry Day will be organised.

8) Indigenous tree specied useful for wildlife such as Ficus Spp, Tendu, Jamun, Awla, Amba, Bor and Babhul etc. will be planted.

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CHAPTER - X

PARTICIPATORY MANAGEMENT OF FORESTS

Section - 1

323. **Background :** Participatory Management of Forests or Joint Forest Management had its rudimentary beginnings many decades ago when the forest fringe dwellers had a symbiotic relationship with the Forest Department whereby various usufruct rights, privileges, employment opportunities etc. were provided to them in return for responsibilities in the form of community obligation to report theft and help put off fires. However, factors like increase in commercial exploitation of Forests, decrease in resource base, increase in population of forest fringe dwellers, transfer of forest villages to the Revenue Department, change in socio-economy norms of forest fringe dwellers, use of forest dwellers by vested interests for illegal movement of forest produce and a host of other related reasons have resulted in conflict between the forest dwellers and the Forest Department. This conflict was intensified by entry of vested commercial interests, resulting in increase of prosecution measures and alienation of the local population from th

Inadvertently they resorted to organising themselves under some fora and advocated methods that could not be tackled by the Forest Department, resulting in rapid deterioration of Forests. This deterioration further intensified the poverty of the forest dwellers and pressurised the Forest Department to act more stringently, allowing vested commercial interests of far off places to exploit the situation.

To stem the tied of forest degradation 'Participatory Management' of Forest Resources was thought to be inevitable where by the forest dwellers would help in protecting and managing the forest for receiving various NTFP and other forest outputs. This process was facilitated by the 1988 Forest Policy of Govt. of India. According to this, Forests are not to be commercially exploited for industries but maintained to Conserve soil, water and environment and to meet the subsistence requirements of the local people. In pursuance of the New Forest Policy and Govt. Of India guidelines, Govt. of Maharashtra issued the Govt. Resolution For Participatory Forest Management vide G.R.No. SLF - 1091 / P/K/119191/F/11 of 16/03/1992. This gives outline of the programme guidelines for area selection, underlying principles of this Scheme, details of Work Plan to be prepared, execution authority beneficiary selection, details of Forest Protection Committee, details of Executive Committee of the FPC, duties of EC, details of work to be done method of distribution of forest produce, control on the working of the FPC, etc.

With regard to the benefits, the following guidelines have been given.

A) Members of FPC can procure without cost dry and fallen branches of trees, fruits, flowers, seeds (except Cashewnut) and leaves (except Tendu) without damaging the Forest and Plantation .

B) The Interim and Final Produce from the Forests / Plantations would be made available to the FPC members at concessional rates. The excess produce if available would be auctioned by the Forest Department and 50 % net realisation price of auction could be

distributed. The Government Resolution is appended in the Appendix .

Section - 2 :-

324. **Methodology :** The primary aim is to prepare the Micro Plan (i.e. Work Plan.) This has to be done by a process of 'Participatory Micro Planning' which is critical to the success of the PFM scheme. The following broad guidelines can be followed :-

1) The F.D. Team should visit the village and gather information by sensitisation of the community members through Participatory Rural Appraisal (PRA). The help of a local NGO group is recommended to bring the F.D. and village members on a common ground to interchange views and collect information. It is necessary to awaken them to the significance of their own repository of local knowledge and make them feel partners in Forest Management, including Protection. A solution for conflict management at the PRA level is through " Bialateral Matching Institution" as suggested by IB-RAD, a NGO group of Calcutta.

2) Participatory Rural Appraisal (PRA) involves long hours of meetings and discussion and will evolve a strategy for managing the forest tract on a co-operative basis. Various options are to be assessed through resource mapping, seasonal analysis, historical transact, villagers expectations versus scientific parameters, choice of species, socio economic profile, community profile, demographic data, condition of vegetation, monthly calendar of product use etc. It is better to select areas with good root stocking and future planning should stress on NTFP biomass production which will give frequent and regular harvesting options to the villagers. Suggested stages in PRA exercise is given.

3) The Community Action Plan or Micro Plan is to be prepared with the help of the data of PRA and presented before the Forest Protection Committee (FPC) for approval. Presently the CAP is approved by a committee which includes leaders/ representatives of the FPC.However, it is preferable to discuss the Microplan with the

member of the FPC so that there is a sense of involvement which would be translated into understanding and implementation of the CAP in the true spirit of co-operation. It would allow both partners, the FD and FPC, to appreciate their role vis a vis their rights as well as responsibilities. The Microplan should meet the following parameters.

- Be Ecologically feasible
- Technologically feasible
- Economically viable
- Socially and Politically acceptable
- & Within guidelines of Government Rules and Regulations.

4) **Implementation** : Monitoring and Evaluation of such a social oriented programme is not a single direction one but requires flexibility in decision making , sufficient time and scope of minor changes during course of implementation through participatory means by frequent interaction between the FD and FPC It is necessary to assess whether resources, needs and priorities were correctly incorporated into the Microplan, to check if works had been carried out in accordance with priorities set, to assess need for change in priorities, to verify if the assumptions made at the time of Microplan preparation and treatment were correct, site specific and appropriate. As women form an important link in the FPC-forest produce interaction, their participation cannot be over emphasised.

Selection of proper villages initially will help in maintaining morale of the FD as well as FPC. Some favourable factors are high degree of dependence on Forest Resources, high stakes in Protection, presence of good root stock compatible Land-Man Ratio for NTFP, and favourable attitude of FD personnel.

In order to streamline NTFP and other usufruct flow it would be suitable to select, amongst others, villages adjoining Protected Forest which have a good percentage of stocked forest cover with good root stock, It is recommended to initially select Ajnup, Ambivali, Gandulwad, Vehloli, Valshet and Bhatsa PF areas. Also old plantations with over 45 to 50 % survi

Presently 4 to 5 villages have been identified for PFM and work has begun at Andad and Bavghar.

Section - 3 :- Treatment of the Area

325. The Model of vegetation and improvement would vary with the locality and needs of the people apart from scientific and other considerations. The Research Wing should be consulted for suitable species selection. Various options are given.

A) Protection of Area - T.C.M., live hedge, stone wall. Watch and ward - Rewards / Punishment for theft, grazing, etc.; Fire Protection.

B) Regeneration of Existing trees - Cut back operation, dressing of stumps, singling, climber cutting, cleaning, thinning of congested old plantations.

C) Soil and Water Conservation Measures - Gully plugging, nalla bunding, contour bunding, water absorption trenches.

D) Fodder Resources - Improvement / Augmentation. Allow original grasses to grow, dibble improved grass / hamata in deficient areas on V furrows, contour ploughing, cultivate grass blocks in moist low lying areas with improved grass legume varieties (using tussocks in case of grass).

The shrub tree species yielding fodder to be planted in pits e.g. Subabul, Sirus, Babul, Maharukh, Ficus sp, Shivan, Sissoo etc.

E) Fuelwood Resource Improvement / Augmentation. - Suggested species for block planting are Acacia auriculiforms. (Its leaf litter yield is very high and this is a very good fuel), Derris indica, Gliricidia sepium, Shivan, Subabul, Guava, Sesbania grandiflora, Jamun, Badam (Terminalia catappa), Ailanthus. Some of these species also yield fruits, fix Nitrogen, yield fodder. Acacia mangium in wet locations and Acacia holosericea in dry soil tracts can be tried after getting seed from the Research Wing. The latter can come on broadcasting /dibbling on dry, shallow soils. A technique for high density block plantation for A. holosericea and suggested mixed plantation has been given in the Appendix.

F) NTFP Augmentation / Improvement - Regulation of NTFP collection by FPC and proper records of actual out turn is essential. Various NTFP's collected are Apta, (Tendu is not within purview of the PFM benefit), Moha flowers and seeds, Ain bark, Chilhar bark, Honey, Kusri flowers, Gum, Ghaipat, Karvandi, Karanj seed, Bamboo, Kadipatta, Awla, etc. apart from fodder. Various medicinal plants are also in use.

Cultivation of following NTFP species by FPC can be options :-

Sabai grass, Agave on drier / difficult patches, Kadipatta, medicinal herbs of demand are to be cultivated Jatropa for oil, Castor for oil, medicinal shrubs, Hamata for yielding seed, Bundhi bamboo etc. The Research Wing should be consulted for Selection of species. Cultivation may require irrigation and efforts can be made to get drip irrigation through subsidy or from some scheme such as 7 % Forest Grant inaid to Zilla Parishads. Identification of the suitable NTFP species for cultivation and local low cost technology will come from FPC members. Irrigation with water from bandharas is suitable for seasonals. A list of options of species is given in the Appendix.

Section - 4 :- Marketing

326. Marketing of NTFP especially the cultivated ones, will require the FD to help and regulate the trade and keep close supervision. Value addition of products at local level will help realisation of higher returns. Hence training of FPC members through various Govt. Schemes and setting up of small local units through Govt. Schemes e.g. for leaf plating, rope making, distillation, would be desirable. The Tribal Development Corporation can help in marketing and funds for training and establishing small units at village level.

Section - 5 :- Integration of PFM into Rural Development

327. The FD may not be able to generate the funds for all the programmes under the PFM. Hence it is necessary to tap other sources of funds from JRY, Water Conservation, IRDP etc. at State and District levels. The Tribal Department should be one c

Agencies for Funds and Schemes can be prepared as complement to the PFM Scheme. It is necessary to generate funds from other agencies to act as a cushioning effects on the PFM Scheme as funds within the PFM Scheme may be limited.

Section - 6 :- Orientation and Training

328. Orientation and Training of FD personnel and FPC members dealing with the PFM is necessary to adapt to the new role at hand. It is necessary to take the help of some NGO group to help in building bridges between the FD and villagers, a relationship which may have been difficult prior to PFM.

It is suggested that at the Division level a team should be established to oversee PFM activities and help in monitoring and evaluation. It is necessary to have social scientists and women members in this team. Training can be organised and funded with the help of the Tribal Development Corporation.

Section - 7 :- Critical Points

329.

1) PFM is not a panacea for all protection and other ills of the FD Certain areas in the Division may be responsive to PFM and in others, there may be need to step up protection measures. Some villagers are notorious for illegal removal of forest produce. As long as these villagers make good money at the expense of the FD, it may not be possible to initiate and strengthen then PFM in other villages. These problem villages can be initiated to PFM at a later stage.

2) Much of the present Forest Management is focused on timber. This is not likely to ensure peoples participation. Hence there is need to reorient Forest Management to NTFP. This would require change in policy and perception to meet the changing situation.

3) Target oriented PFM work could hinder interest and lead to bureaucratic inertia in programme implementation. Hence sufficient flexibility should be given to middle level officers.

4) The presumption that only Degraded Forests should come under PFM is fraught with danger. There is growing acceptance that PFM should be extended to nearby Non-Degraded Forests in order to arrest degradation.

5) The Working Plans versus Microplan controversy has been put forth. However, both are needed. The Working Plan Principles are to be continued but with added dimensions of Participatory Management and broad based prescriptions to fulfill need based objectives. A Microplan would be an extension of the Working Plan but with site specific and intensive management menu options and greater possibilities to evolve towards sustainable Forests with the help of local forest fringe dwellers who would function as both protectors and beneficiaries.

6) Integration of PFM with other Departments for realising funds and logistic support may not be easy. The deregulation of forest villages has neither helped the FD nor the villagers. Only FD has a well established infrastructure in interior Forest areas to deliver a package of benefits to ameliorate the forest dwellers lot. Hence there is need to recreate Forest Villages giving norms and checks for safeguarding villagers interests for dispelling apprehensions amongst those mistrusting the FD.

   In the meantime Inter Agency Co-ordination with Government Departments (like the Tribal Department) and various NGOs working in and near forest areas or those who have direct / indirect impact on the Forests and Forest fringe dwellers is required.

7) PFM has been taken with sceptism by many FD personnel who already doubt its efficacy. However, with the poor status of Forest Protection and illicit cutting/ grazing / fire kindling in Forest areas, even in plantation areas after the provisions of watch and ward is discontinued, it is imperative to take the forest fringe population into confidence. It is necessary to continue here evolve PFM strategies that are compatible with our local environment: Social, Economic, Political, Cultural, etc. There is little choice for FD personnel if the Forests are to be preserved.

Divisional and Range levels is required to deliver. Further it is recommended to appoint Social Scientists including women at the Divisional level to head the team and assist the Dy.C.F. This can be done by appointment against existent vacancies of foresters / clerks or by Contract System or by a Mechanism approved by Government.

8) Benefits to FPC members at regular intervals (NTFP) and interim yield are necessary to build and strengthen co-operation as the poor will not be convinced by environmental and long term promises. Accordingly various quick return options can be taken at favourable locations e.g. fodder cultivation, medicinal plant cultivation, bundhi bamboo cultivation on contour trench, agave cultivation, use of leaf litter for compost production, sabai cultivation, fodder seed production, etc.

Further through other Departments involvement, Complimentary Programmes like fuel saving chulas, surface/ground water improvement, horticulture, well / cement bandhara establishment and similar facilities can be brought in for overall improvement of FPC members. As the tribal population is high in the tract, suitable schemes and funds through the Tribal Department can be negotiated for Details of Tribal population is given in the chapter on Tribals. Further, cash incentives can be given to poor FPC members where the PFM Scheme is being implemented very well. For this the local Collector could arrange for the same under some schemes.

9) Women are traditionally more involved with NTFP collection than men. Hence the FPC should have a good number of women. Further, F.D.- FPC-NGO interaction should have sufficient women as key players.

Section - 8 :- Suggested stages for Participatory Rural Appraisal

330. **Stage-i :** Demographic and Resource Data Form Compilation.

- Village / taluka name
- Demographic data
- Land Resources
- Leadership

- NGO working in area
- Sources of fodder
- Sources of fuel
- Sources of other N.T.F.P.
- Sources of timber

Stage-ii : Community Profile

- Name of Community (Primary forest users)
- Neighbouring Communities (Secondary forest users)
- Size of common land / PF /RF
- Distance of common land / PF /RF from primary & secondary users.
- Population
- Adult population and Percentage literacy.
- Composition of primary forest users and Average land holdings.
- Live stock population.
- Land holdings
- Total area of PFM land
- Traditional uses of PFM land

User group	Nature of use	Extent of use
No. of Households		
FARMERS		
LANDLESS		

- Primary Village Occupation
- Occupations depended on PFM area.
- Migratory population.
- Schools, Co-operative Banks, PHC etc.
- Leadership patterns and related issues.

Stage-iii : Socio Economic Profile.

- Name of village and population
- No. of families/households
- No. of livestock

a) Stall fed

b) Open grazing

- Details of land use.
- Details of other business activities.

- Employment details

Landless, Poor, Daily Wages, should give details of Number of days work, earnings etc.

- Water sources - Drinking, Irrigation, Washing
- Cottage Industries
- Social/Co-operative Organisations
- Developmental criteria and Source
- Fuel Sources

Type of Fuel percentage use.

- PFM tract.
- Nature of vegetation, stocking, root stock, coppice, fodder etc.
- Flora, Fauna
- Choice of species by villagers.

Stage-iv : Assessment of Expectations and Needs of each family.

The interview should belong to different Socio Economic Strata e.g. Well to do, Small farmer, Marginal farmer, Landless worker.

- Degree of fuel shortage.
- Degree of fodder shortage
- Form of fuel used.
- Form of fodder used.
- Unemployment in man days and season
- Priority needs
- Difficulties if PFM area is closed.

Stage–v : Assessment of Expectations of Entire Village.

- Population
- Number of families
- Two main expectations per group if PFM is taken up.
- Seasonal/monthly use of various fuels
- Seasonal/monthly use of fodder.

Stage-vi : Information about Past :

Elderly people are interviewed in groups to get details of position/number of various items in five or ten year intervals.

- Population of man/cattle/buffalo/goat
- Grain availability
- Water availability-drinking/irrigation etc.

- Type and density of vegetation in PFM/outside areas.
- Rainfall pattern etc.

Section - 9 :- Microplan

331. **Skeletal Form For References**

- Summary of Microplan
- Objectives and Introduction
- The Tract Dealt With
- Future Management

1) Proposed Strategy of P.F.M.

A) Management Objectives.

B) PFM Rehabilitation Measures

C) Activities from Other Departments

D) Planting Programme.

E) Choice of species.

F) Regulation of NTFP harvesting

G) Marketing measures.

H) Thinning/coppicing procedure.

I) Final felling

J) Benefit expected from PFM area.

K) Benefits expected from other agencies.

L) Environmental /Hidden benefits.

M) Cost/Benefit exercise on PFM direct investments / Total including auxilliary.

N) Benefit sharing Mechanism

O) Protection of PFM Areas.

P) Environmental Impact Assessment (EIA)

Q) Socio Economic Impact Assessment (SEIA)

R) Cost Benefit exercise on direct investment of FD

S) Cost Benefit exercise on FD and auxilliary inputs from other Depts.

T) PCB exercise including E IA, S E I A, direct investment of FD and auxilliary investment of other Departments.

2) The Legal Framework.

A) Constitution of FPC

B) Rights and Responsibilities of FPC.

C) Approval of PFM by FPC / Statutory Committee.

(3) Control and Records

It includes Annexures, Journals, Files, Minutes, Policy decisions, Yield of various NTFP, Yield of timber / small wood, Revenue, Expenditure etc.

Section - 10 :- Present Status of PFM

332. There has been a proposal to initiate PFM in 5 to 6 villages in Shahapur Division. Two villages have already been selected viz. Andad and Bavghar, and various activities are in progress. However, it has been observed by some officials that PFM does not hold much promise. This apprehension may be due to initial problems and could have been due to lack of proper PRA. If necessary, corrective measures and frequent regulation of FPC working, may yield fruit.

The areas involved and various activities being undertaken are presented below :-

Village	RF. (ha)	PF (ha)	Total Area	Works to be done
(1)	(2)	(3)	(4)	(5)
1) Andad	-	90.04	90.04	• Afforestation (25ha) • Bamboo Interplanting (75ha) • Treatment of Natural Forests (15ha) • Boundary Demarcation.
2) Bavghar	162.360	57.34	219.70	• Natural Regeneration (69ha) • Afforestation (25ha) • Bamboo interplanting (150ha) • Van Bandhare. • Boundary demarcation.

In the forest areas of these villages, Shahapur Forest Division has carried out some works. The details of these works are as under :-

Year	Village	Type of works

1994-95	Andad	PPO- 33 ha.	1,58,000/-
1995-96			
(Till Oct,95)	Andad	FYO- 33 ha.	67,418/-
1994-95	Bavghar	PPO- 25 ha	58,650/-
		(FP- 4 Model)	
1995-96	Bavghar	FYO- 25 ha	18,527/-

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CHAPTER – XI

TRIBALS AND FORESTS

Section - 1 :- General

333. A Tribe is a social group, usually with definite areas, dialect, cultural homogeneity and unifying social organisation. It may include several subgroups, such as sibs, or villages. A tribe ordinarily has a leader and may have a common ancestor and patron deity. The families or small communities making up the tribe are linked together through social, religious, family or blood relations (Dict. of Anthropology, Winick, 1956).

Tribal people in India were termed as Depressed Class until 1919. In subsequent Census of 1931, 1941 and 1951 they were termed as Primitive Tribes, Tribes and Scheduled Tribes respectively.

The term Scheduled Tribes was inserted in the Constitution vide Article 342 (1) which empowered the President of India to specify Tribal Communities by Public Notification. In order to bring them to the socio-economic mainstream the Tribals have been allowed certain special facilities.

Section - 2 :- Demographic

334. As per the 1991 Census India has 677.58 (8.01%) lakh Tribals out of a total population of 8463.03 lakh. This is next in number to Africa only. Maharashtra has 73.18 lakh Tribals which accounts to 9.27 % of the total State population of 789.37 lakh. In all there are 47 Scheduled Tribes in Maharashtra of which the Kathodi or Katkari, Kokna, Koli-Mahadeo, Koli-Malhar, Warli, Dubla, Koli Dhor and Tokre-Koli are the Main Tribes of Thane District. The Katkaris are one of the 3 primitive tribes of the State.

Thane district has 9.51 lakh Tribals out of a total population of 54.9 lakh which works out to 18.12 % of the population. The Tribal population has increased from 7.29 in 1981 to 9.51 lakh in 1991 but

the percentage has decreased from 21.75 % to 18.12 % in the corresponding period.

Shahapur Taluka, corresponding to almost all of Shahapur Division, has 69631 Tribal people as per 1991 Census and this represents 32% of the total population in the Taluka.

Section - 3 : Relationship with Forests

335. Tribals have been referred to as Vanwasi or forest dweller. This is because they have been intimately related with the Forests in terms of area, economy, socio cultural customs and spiritual parameters.

Historically the Tribals had access to forests for land, timber and various NTFP. However, with growing population and shrinking forest area, many Tribals have migrated out of their areas. With regularisation of encroachments, disforestation owing to development projects, relocation of villages and economic compulsions many Tribal Populations find themselves away from forest areas. Many Authors have linked development with deprivation of the Tribal Communities.

At present Tribals living in specified areas are allowed certain privileges on NTFP collection and grazing in RF and PF areas. They also get employment in forestry and other works of the FD in their areas.

The relationship between Forests and Tribals has however not been defined in a way consistent with the needs of the Forests as well as the Tribals. This has resulted in conflicts in which the Forests as well as the Tribals have been losers.

Section - 4 :- Legislation

336. In earlier times the Forests were a source of economic sustenance for Tribals through Customary Law. Most of the Forests were under what could be termed social ownership where certain trees were regarded as sacred and prohibited from felling. Some Forests near temples and holy areas i.e. sacred groves, were kept intact and exploited only in times of famine.

In 1855, Lord Dalhousie laid down the Memorandum of Forest Policy whereby Teak was retained as State property and restricted its cutting. In 1856 Dietrich Brandis, the first Inspector General of Forests initiated scientific forestry management, pursuant to which the Government Forest Act was passed in 1865. This Act converted the nature of Forests from common property to state property. This sowed the seeds of role of conflict and with time also resulted in alienation of Tribals from their role of looking after the forests as their own. Consequently 'Theft' of forest produce and general apathy towards the FD was generated among the Tribal people. The 1865 Act was replaced by the Indian Forest Act, 1878 and further revised in 1927. The 1927 IFA is in force till today. Upto 1935 Forests were under jurisdiction of the Centre. Since 1935, Forests became an item in the State List. After Independence Forest was included in the State List in the VII Schedule of the Constitution. However in 1976 Forests were transferred to the Concurrent list. In some States some parts of the Act has been elaborated and made stringent to cater to local needs but these are all on the basis of the IFA, 1927.

Section - 5 :- The National Forest Policy

337.

1) The NFP of 1894 did not mention special facilities for but allowed for satisfaction of the needs of the local people free or at non-competitive rates. Moreover cultivation was given priority over forestry and cultivable land from forest area was to be relinquished for cultivation.

2) NFP 1952 did not specify special facilities for Tribals but stressed for the people in general the need for ensuring supplies for grazing, small wood for agricultural implements, and in particular, fuelwood to divert cattle dung fuel for use as manure so as to increase food production. But these were to be supplied only if the national interests were not affected. There was stress on Revenue out put through plantations, better logging techniques and improved roads for exploiting Forests.

3) The Govt. of India appointed Scheduled Areas and Scheduled Tribes Commission, 1960 emphasized the importance of forests in the life of Tribals and criticized the NFP, 1952.

4) The Committee on Tribal Economy in Forest Areas, 1965 under the Chairmanship of Shri. Hari Singh, the then Inspector General of Forests, emphasised the 'Role of Forests in Tribal economy.'

5) The NFP, 1988 has recognised the symbiotic relationship between the Tribal people and Forests and stressed the need for associating them closely in the protection, regeneration and development of Forests as well as giving gainful employment to people living in and around the Forests. The Rights and Concession of Tribals is to be protected and forest fringe dwellers' requirements of timber and NTFP for domestic consumption should be the first charge on forest produce. The document has a changed stance of revenue out put being subordinated to environmental and local needs.

The post 1952 aera was the period of maximum alienation of Forests and Tribal people (and other forest fringe dwellers). In the efforts for maximisation of timber/small wood/NTFP output for Revenue, the Tribal people saw indiscriminate felling of Forest Areas for far off urban and industrial interests. Monoculture plantations often of species alien to their surroundings were planted in place of Multi Tiered Forests. Forest areas were felled for various Development Projects, often resulting in exodus of these poor people from their cultural and socio economic roots. Tribal people were antagonised to the point of assisting directly or indirectly the urban based vested interests to cut and take away valuable timber and NTFP.

The 1988 NFP has sought to close the alienation of Tribals from Forests by understanding their needs. Further, PFM of Forests sort of takes the matter full circle to the past symbiosis.

In recent years applicability of Participatory Forest Management has been identified as a significant mode of Forest Management. In this the Tribals living near Forests would be beneficiaries and together with a package of integrated socio-economic inputs, this would go a

long way in improving the lot of the Forest based tribal people. However, this symbiotic relationship has to be evolved and founded on fair equity and is to be implemented in the proper spirit to gain momentum. Ultimately the Forests and the Tribals would stand to gain but various authors feel that there is a long way to go for the FD and Tribals (and forest fringe dwellers) to feel like partners in a game where they had been adversaries for so long.

Section - 6 : Forest Based Products

338. The list of forest based products used by Tribals is very long and ever growing. Ethnobotanical studies have revealed variety of uses. Timber, Small Timber, Fodder, Wildlife and their products, Bark, Flowers, Fruits, Roots, Tubers, Bamboo, Shrubs, Mushroom, Tubers, etc. are got from Forests. Drinks are made mainly from Mahua flowers and the Toddy Plam and form a very important facet of their social life. Research based on Tribal use of plant products have led to medicine formulations.

A List of some uncommon products in use in the tract by Tribals and other forest fringe dwellers is given at Appendix No. LXXVII.

Section - 7 :- Some Tribes of Thane

(1) <u>Katkari or Kathodi</u> :

339. It is one of the three 'Primitive Tribes' of Maharashtra and is predominately found in Thane, Raigad, Ratnagiri, Nashik and Pune. The Tribe is indigenous to the State.

The name of the tribe implies that they were makers of 'Catechu'. They had a nomadic tendency due to poor economic condition & nature of trade.

Their dialect contains a few words common among Bhils and customs also indicate a Bhil origin. Their language belongs to the Kolerian group. When conversing with each other they use 'Katois' which is a disguised form of Marathi.

The Katkaris were animists and had no sacred books or spiritual guides. The chief objects of worship was the

houses are seen cheda or devil gods and these households were feared for their powers over spirits of dead relatives. The Katkaris have returned to Hinduism. They worship the Hindu gods of the region in addition to their own gods.

The traditional occupation of katkaris was catechu making. Some are presently engaged in charcoal making. A few of them possess agricultural land holdings that are very small and less fertile being in hilly areas. Most work as labourers in Forests and other areas. The women collect firewood from nearby Forests and sell these in nearby markets. When food is over katkaris subsist by selling firewood and honey; they kill rabbits, deer, monkeys etc, with bow and arrows. But red coloured monkeys are not killed as they believe they are descendants of Hanuman. Alternatively they dig rat holes, catch these and also collect their store of grains. The Katkaris are the poorest amongst the Scheduled Tribes of the State. The women folk work harder than the men.

The Katkaris live away from the village in a locality called 'Vadi' and lead a nomadic life. They are short and medium in build. They are sturdy but lazy. They are superstitious and believe in witchcraft. Like most Tribals they use and know plants including herbs and climbers that are useful in times of scarcity and famine.

The Katkaris have a poor percentage of literacy (2.81 % in 1971) and were once known as an Ex-criminal tribe. They speak Marathi with many Gujarati and Hindi words.

Marriage ceremony is conducted by the head called Naik. The practice of bride price and early marriage is prevalent. Divorce and widow remarriages are allowed. Child birth and after care for five days is aided by a mid wife. One of the parents name the child. Guests are invited for the naming ceremony and fed with local cakes and liquor.

(2) <u>Kokna</u>

340. It is the Principal Tribe in Maharashra and mainly spread over Thane, Nashik and Dhule. They mainly live in the coastal strip of

Konkan upto the Sahyadris. They are a settled tribe and resemble the Warlis.

The language of the Koknas was Kokni dialect in the past which is based on Marathi. At present they use Marathi frequently.

The Koknas worship various gods of earlier times but are now assimilated with the Hindus. They observe most Hindu festivals. Two festivals Wagh Baras and Pitra Amavasha are their main Kokna festivals.

The Koknas are good agriculturists. They use traditional implements like nangar, alvat, datal etc. But nowadays subsidised machinery is also seen. The Main crops are paddy, Nagli, Varai, Tur, Mung, Urad, Khurasini and kulith. Rice and coarse cereals are their staple foods. Dried fish is popular. Drinking of tea and liquor is very common. Bidi smoking and tobacco chewing is common. They are fond of dancing and Dhol dance in which 'Danichala' and 'Deochala' are popular.

Apart from agriculture, Koknas are engaged in salaried jobs and small business. Subsidiary engagements are collection of forest NTFP, plying carts, forest labour, cutting and selling of grass, and transport of forest produce.

The Koknas are better educated and as mentioned earlier are also engaged in salaried jobs.

Marriage occurs early and polygamy is practiced Marriage lasts for five days. Bride price is paid in cash or kind. Widow remarriage and divorce to both spouses is permitted.

A Kokna 'Soyarin' or midwife attends to child birth. A bath on the 12th day purifies both mother and child. On the same day the child is named after the names of ancestors. The maternal uncle cuts the first hair of the new born child. Most Kokna live in 'Kachcha' house. Their hamlets are located near the fields for attending to agriculture. A Kokna house is rectangular or square shaped, simple room structure on an earth foundation or on a stone platform with a partition inside. The walls are made of karvi reeds and plastered on both sides with cow dung and clayey earth.

and made of thatch or local tiles. The house has two or three doors and windows are rare.

3) Warli

341. The Warlis are 4th largest tribe of Maharashtra and mainly live in Thane, Nashik and Mumbai. Originally they lived in Varalat or Northern part of Konkan. This area consists of the hilly tracts of Thane and some hilly areas near Surat, Nashik and Dangs.

The Warlis lead a quiet agricultural life. They once owned all the land in their area but have been pushed interior or to inferior uplands. Much of their land had gone to Money Lenders, Zamindars and Non Tribals in their areas. Presently only 30% own land, 50% are agricultural labourers and 20% do forest and other labour.

The Warli's speak a dialect which contains words of Marathi and Gujarati. However they speak Marathi with outsiders.

Warlis pray to their own deities as well as Hindu deities particularly Siva (who is called Iswar) and Gauri. They believe in evil spirits and witchcraft like most Tribals in the area. The Warlis prefer to erect a hut on the fields they cultivate although they may have to live alone. Their hut is generally square and faces the east. There is one door but rarely windows. The hut has wooden frame and earthen foundation. The walls are made of bamboo strips, karvi or reeds and plastered with cowdung mud mixture. The roof is completed by straw or dried leaves. A puccka house with tiles, bricks and mortar is a rarity and signifies unique position.

The staple food consists of rice and they also consume Nagli, Varai, Kodra, Tur, Chavali etc. Dried or fresh fish are relished. They also were known to eat tender leaves of wild trees and roots during scarcity times especially during rains.

Marriages are held young but not between members of the same clan. Polygamy is rare now but divorce and widow remarriages are allowed.

The family is a strong unit and forms part of the hamlet. Many families of different clans live in the same hamlet and celebrate important occasions in life with ceremonials and rituals where togetherness of all members is seen.

(4) Koli Malhar

342. The koli Malhar people are concentrated in Thane district. The word Malhar is derived from the Dravidian word 'Mala' meaning a hill.

The main occupation is agriculture and agriculture labour. Supplementary occupations are grass cutting, fuelwood and timber cutting/collection and collection of NTFP. Their economic condition is bad and indebtedness is prevalent.

The koli Malhar people have a high percentage of illiteracy. The boys are engaged in grazing cattle or in light field work. They feel that sending children to school would deprive the family of an earning member.

The Malhar koli speak their own dialect as well as Marathi. The house of an average Malhar koli is a square or rectangular hut and in many cases without any foundation. As in other tribes the house is forest product based.

The Malhar kolis were animists but now believe in both their own deities as well as deities of Hindus. The sun and moon are regarded as gods and some natural objects and phenomena like the sea and lightning are considered divine. The earth, cow certain trees and corn are regarded as sacred.

Rice is the staple food of Malhar kolhis and it may be eaten thrice a day. Dry fish is popular. Liqour is important in their lives and dancing during festivals and marriage is compulsory.

Marriage is held at a young age. It takes place at the girls residence at sunset on an auspicious day. Though monogamy is observed but polygamy is also known. Divorce and widow remarriage is allowed.

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CHAPTER - XII

SOIL AND WATER CONSERVATION SOME ASPECTS

Soil :-

343. Soil is a basic Natural Resource to mankind. Some pertinent aspects of soil are briefly discussed in this chapter. Generally animals including man depend on plants and plants grow on soil. Soil is a dynamic complex and contains various categories of components viz. Mineral matter, Organic matter (humus), Soil water, Soil Atmosphere and a Complex Biotic System.

Dokuchayer (1889) defined soil as- " The soil is a result of the actions and reciprocal influences of parent rocks, climate, topography, plants, animals and age of the land."

Biologically, soil is the weathered superficial layer of the earth's crust in which living organisms grow and interact by releasing products and influencing various processes. Champion and Seth defined soil as "A dynamic layer of surface material which is constantly changing and developing under processes of adjustment to conditions of climate, parent material, topography and vegetation".

It is clear that soil health will have a tremendous bearing on the health of man and any harm caused to soil will be deleterious on the health of man and his survival. Soil health is threatened by poor landuse and other affects that are a result of man's activities. Soil health also has a direct bearing on water which is regarded as basic to life.

344. **Soil Water :-** The main source of soil water is rainfall. Some of the water of rainfall is lost as run off which goes back to the sea, and some is lost as evaporation to the atmosphere. The remaining water percolates into the soil. The water content of soil is much related to its texture and structure, apart from the magnitude of capillary action, cohesion and adhesion. The water in the soil is generally present in the following states.

(i) Capillary Water : This water is held between pore spaces of the soil particles and angles between them, forming a system of capillaries. This water is held by inter particle meniscus effects and is removed by the gravity. This is the most important form of water to plants.

(ii) Hygroscopic Water : This is the water that is held tightly around the soil particles as a result of cohesive and adhesive forces. This form of water cannot be removed easily by the plants.

(iii) Gravitational Water : This is the water that moves downwards through a moist soil in response to gravity. It is surplus to the water retaining capacity of soil in the first two forms above, and thus drains from it reaching to the deep water saturated zone called ground water.

The upper surface of this ground water zone is known as Water Table.

(iv) Combined Water : This consists of Hydrated Oxides of Aluminium, Iron, Silicon etc. in the soil.

(v) Water Vapour : This is some water in the vapour state in the pore spaces. Soil water status is reflected by various terms and are used for comparative studies on different soils. These are

a) Soil Water Potential expresses the total reduction of water potential in the soil due to matrix, soluble substances, external pressure and gravitational effects.

b) Field Capacity is the water held in the soil after the gravitational water has drained. It can be defined as the water content of an undisturbed soil after it is saturated by rainfall and drainage of gravitational water has completely stopped. Thus it is the total amount of capillary, hygroscopic and combined water, alongwith water vapour,

c) Water Holding Capacity or Storage Capacity. This is the extent to which a soil can hold capillary water against gravity i.e. it is Field Capacity minus Hygroscopic Water.

d) Permanent Wilting Percentage or Wilting Co-efficient. It is the amount of water that remains in the soil when permanent wilting begins in plants growing in the soil. The water which can be extracted from the soil between the full field capacity as a maximum and the Permanent Wilting Percentage as a minimum is the available water.

The available water for plants is called Chresand, and the non available water is called Echard. Both these add up to Holard i.e. the total amount of water present in the soil.

It has been estimated that only 1.6 percent of liquid sweet water in the world exists in the form of surface water in rivers, lakes and swamps. The remaining 98.4 percent exists in the form of soil moisture and groundwater.

345. **Underground Water** :- The rain water or melting snow that do not evaporate or run off to the sea, consist of water that sinks or percolates into the soil and is known as underground water. This water is present in some quantity in the soil, sub soil and the bed rock. Underground water provides soil moisture for plant, growth supplements water in streams and lakes and is used for human consumption. At a certain level below the ground, the pore spaces of rocks fully bearing such water is called the zone of saturation. The

level below this Zone is called the water table. Hence the Water Table separates the saturated zone from the unsaturated zone.

The Water Table reaches to the land surface in springs, perennial rivers, lakes and swamps. It is controlled by the climate, rainfall and the nature of underlying rocks. The Water Table for a location is deepest at the level of Permanent Water Table. It is deeper in hilly areas and dry zones, than in valleys and humid zones. Usually it is lower in summer and comes up during rains.

The shortage of water for irrigation, practice of growing cash crops requiring high irrigation and the unregulated pumping of underground water by farmers, are some important reasons for a sharp fall in the Water Table in many regions of the country. In many areas the amount of water extraction exceeds the amount of recharge. This trend will jeopardise water availability and can bring in famine regularly. Hence the urgent need to regulate agricultural practices in a way that crops planted should be in consonance with the type of climate, including the water availability in the area. The need for regulating ground water use and fixing of the type of cash crop that could be grown during a particular season in a particular area are urgently required as water is a common property necessary for all.

In order to effectively reduce drought and enhance water availability the huge storage capacity of the soil and sub-soil strata should be utilized to the maximum possible. This is possible through Soil and Water Conservation measures to symbiotically develop hydrological, soil and biotic regimes. Soil and Water Conservation on a micro watershed basis through ridge to valley treatment alongwith a fairly widespread, effective, permanent vegetation cover will mitigate the incidence of recurrent famines and water scarcity. Such watershed treatment will help to arrest land degradation through soil erosion and help to revert the decline in agriculture. Thus forestry assumes tremendous importance in this tract due to it being a critical catchment of the Tansa, Vaitarna and Bhatsa Lakes.

SOIL EROSION :

346. Soil Erosion can be defined as detachment, movement and deposition of soil particles by wind, water, gravity or other forces, from one place to another.

In nature, erosion is in equilibrium with soil forming processes and is called Geological Erosion. Man and animals are responsible for disturbing the equilibrium and this leads to Accelerated Erosion. Soil Erosion means this form of erosion based on the agents of soil erosion and the form in which the soil is lost during erosion, various types of soil erosion have been recognized. These include Sheet Erosion, Rill Erosion, Gully Erosion, Slip Erosion, Stream Bank Erosion, Riparian Erosion, Suspension and Surface Creep. Many of these forms are seen in the tract in varying degrees. Owing to biotic factors soil erosion has been occurring in the tract and with decrease in vegetal cover with progress of time, soil and water conservation will require to be taken up in a big way. Various biotic factors and their effects have been discussed in previous chapters. Suffice to say that biotic factors, deforestation, soil and water erosion, denudation, poverty intensification, decay of the rural economy, migration of rural population to urban areas, breakdown of civic system in urban areas and social strife are all connected. These different parameters form a vicious circle and they mutually reinforce each other with time, if prevention and control is neglected. Authors attribute these problems to the excess natural resource intensive economy, where profit making at the expense of ecological/environmental conservation is considered to be the technology oriented development of the day. Such an ecologically destructive model will inevitably lead to a greater gap between the haves and have notes. This will not only increase the cost of sustaining basic amenities and average quality of life, but will further accentuate environmental related problems, leading to greater pressure on the economy and greater social strife. Hence the need to re orient development to ecology friendly parameters is necessary. In this, forestry including watershed conservation is one of the critical areas of development, where soil and water conservation will allow natural processes of the ecosystem to go on for the benefits of man in future

Structures for Soil and Water Conservation :

347. The Soil and Water Conservation structures frequently in use in the tract by the F.D. include nalla plugging and loose bounder nalla bunding which form part of the Plantation Models. In recent years Soil bandharas, Cement bandharas and Vantali have been constructed. As has already been mentioned in earlier Chapters, biotic factors have affected soil and water health. Thus in future years Soil and Water Conservation Structures especially of low technology and low cost, will be required to be built in the tract under various schemes. Further, costly structures in Protection and Lake Catchment Working Circle have been recommended through technical and financial collaboration with the M.M.C.

The following structures for Soil and Water Conservation can form options in the near future. Only brief information is given for reference and detailed estimates and design can be got from the concerned Departments.

(1) <u>Loose Boulder Nalla Bund</u>

348. To be done where loose boulders are readily available. This bund is constructed with loose boulders in the form of an arch with the convex side facing the current. The arch should be made by taking double length of the span and marking the centre of the tape in the nalla. An arch is drawn from the two span ends and themid point. When this arch is marked the foundation is dug of $1^{1}/_{2}$ ft. deep and 4 ft. width. Leaving the central half of the span, foundation for the wing walls is also dug so that they would make an angle of 30^{0} with the bank. The sides are dug upto 1 ft. for the wing walls to enter them. In front of the check dam the foundation of the apron is dug to 6".

After digging the foundation, the boulders are laid in layers with the lower layers having bigger boulders. After each layer a step of about 6" is left on the down stream side, so that the top width is gradually reduced. After reaching 2ft. height above bed a notch is left in the middle which should be of half span length and depth of about 1 ft.

Before filling above the notch, a big flat boulder, preferably of the length of the notch, is to be placed at the notch so that chances for it being washed down will be little.

Then the wing walls and end portions are built up to a height which will give the required notch depth. The apron is built from boulders on the edges. At the back of the bund the dug up earth, brushwood and bounders are piled upto the notch level with a slope of 1 : 1 towards the upstream.

(2) Gabion Structures

349. These are large wire mesh boxes of different sizes with rectangular shape and filled with clean boulders of size bigger than mesh size. These boxes are made from galvanized iron to ensure longevity under water. The gabions are used as building blocks in the construction of gabion structures. The advantages of gabions are flexibility, permeability, stability and economy. Gabion structures are used in various erosion controls like torrent control, land slips, gully control operations and river bank protection. They have been used as spurs, revetments, drop structures, low cross barriers, pallisades and debris retention barriers.

(3) Soil Nalla Bund

350. This is useful for percolation of water and increase of Water Table height, apart from Water and Soil conservation. This also helps irrigation of seasonals that can form options in PFM Schemes.

The slope of nalla should be upto 3% and the catchment should be only upto 100 ha. in Kokan areas i.e. in the tract. The width of bund should be from 5m to 20m, and depth of nalla bed should be over 1 to 2m. The area just above the bund should be more or less flat.

The cut off trench should be dug till hard strata is reached. This trench is to be filled with clayey/black cotton soil and beaten down with water. The hearting zone should be of black cotton and stream bed alluvial soil only. No stones, vegetation etc. should be used. The slope of hearting zone should be 1:1 on both sides

The outer casing should be of murummy soil with a slope of 2:1. Boulder pitching should be done on top of the casing on both sides to the height of submergence. A side drain for excess drainage is prepared on one side.

(4) Cement Nalla Bund

351. This is useful for Water and Soil Conservation, increasing the Water Table and use of the water for irrigation and other purposes. Irrigation of nursery seedlings and seasonals under PFM schemes can be done.

The catchment can be from 40 to 500 ha. The nalla slope should be upto 3 % and width upto 30 m. The nalla depth should be upto 2m and the nalla bed should have hard strata. Generally this type of bund is prepared on the lower reaches of the catchment. The site selection and estimate are to be prepared in consultation with the Minor Irrigation Deptt. During construction also their advise may be sought. The cement nalla bunds are to be constructed through skilled parties and need for monitoring proper design and depth, quantum/quality of cement and curing is of paramount importance. Some cement nalla bunds have been constructed in the division through funds from the Zilla Parishad.

Concepts in Watershed Management :

352. Soil, Vegetation and Water are the three vital Natural Resources for survival and well being of man. These three are so closely interlinked that they have to be managed together in a complementary manner. For managing these three natural resources the ideal unit of management is the watershed. Watershed means the area which covers all land which contributes run-off to a common point. It is also called catchment or drainage basin. The watershed receives incoming precipitation and then disposes it to a common point. The functioning of the water shed is determined by various characteristics like size, shape, topography, geology, rock and soil, climate, vegetation and land use.

The Forest area of Shahapur Division contains various small and large watersheds. These have deteriorated due to various man influenced factors as has been elaborated in the earlier chapters. This has resulted into degradation of these areas and the yield of biomass and water have been affected. It has been accepted that co-operation of the local people who control the biotic factors is necessary to remove the adverse factors. Hence PFM should be vigorously implemented to achieve results of Watershed Management also.

The steps in Watershed Management are given below :

353.

1) Various surveys are under taken to analyse and understand the problems. The priorities for rehabilitation and proper management of the watershed can be thus planned.

2) The watershed is treated as per priorities fixed so that the pre-deterioration stage is reached.

3) The adverse factors that had caused watershed deterioration are removed through various measures including protection.

4) The overall improvement of the watershed is required to be done. This includes development of forest lands for production as well as improving the socio economic condition of forest fringe people by reinforcing those areas that would directly or indirectly prevent watershed damage. It involves Inter Departmental Coordinated Efforts.

In forestry operations, watershed management is actually being done. Moreover, the role of Forests for providing water and other ecological benefits far outweigh the timber value of Forests in this tract.

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CHAPTER - XIII

MISCELLANEOUS REGULATIONS

Section - 1 :- Managment of Eksali Plot and School Forest of the RF

354. This Working Circle consists of the Eksali Plots and School forests of the RF.

1) EKSALI PLOTS

355. The Eksali plots were given out for cultivation with the object of encouraging human habitation in interior Forests in order to have labour for forest working. These plots total 21 - 854 ha. and are scattered in various locations.

These areas are located inside Reserved Forests and are given on Annual Lease which are renewed year after year. There is no provision for succession and if an occupant dies, or deserts his land the same is given for cultivation to some other applicant.

The Eksali plots have not been Stock mapped. These plots can form a nuclei for biotic interference in Forest areas.

It is also necessary to first Survey and Enumerate the plots to ascertain the actual number of trees in these plots and prepare the Proposal for disforestation.

2) SCHOOL FORESTS

356. The School Forests are located in RF areas of 7 Compartments i.e. 681, 682, 683, 684, 685, 686 and 881 near Shahapur Town. The total areasis 1419.524 Ha. These areas have not bee

are to be used for training for guards of the Guards Training School at Shahapur. Accordingly the school authorities are to prepare a working scheme for these areas to cater to the training needs of the guards. The scheme should be got sanctioned by the Competent Authority. At present the areas have been handed over to the school authorities for management needs. Modalities should be jointly adopted by Dy. C.F. Shahapur and school authority for Protection and Management purposes. For this they should evolve common Co-ordinated Programme.

NOTE : These two categories of RF have been excluded from the Working Plan owing to the pecularities of treatment required. Hence the Dy. CF Shahapur / School Authorities should initiate the action as given above.

Section - 2 :- Harvesting and Disposal of Forest Produce

(A) Major Forest produce

357. **Demarcation of Coupes and Working of Trees** :- The Coupe shall be demarcated in advance by the number of years as mentioned under the concerned Working Circle. After demarcations the Coupe shall be inspected by the concerned Range Forest Officer and a 'Coupe Demarcation Certificate' furnished to Dy. C.F. in the following format.

I ..... RFO ..... Range certify that I have personality inspected the Demarcation of Coupes No. ..... F.S. ..... W.C. on the ground on dates ..... Month ..... Year ..... and found that the Coupe has been laid down on the ground and demarcated as prescribed in the Working Plan. The areas of the Coupe is ..... hectares.

Signature of R.F.O.
with date

After Demarcation Stock Map and Treatment map shall be prepared by the R.F.O. concerned as given in the Workir

Demarcation of Coupes (Units)

1) Annual Coupes (Units) will be demarcated by cutting and clearing 3 metre wide lines and by erecting pillars or posts in the middle of the lines at suitable intervals except where the coupe boundary runs along a big nalla, a fire line or a road. Coupe Number and the Name Of Felling, Plantation/ Working Series, will be written on the pillars on the side away from the area of the Coupe.

2) Along the entire periphery of the Coupe i.e. on the edge of the 3 meter 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 tarband will be at breast 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 bark will be carefully scraped. A list of the boundary trees and trees of medicinal or fruit trees not marked for felling will be prepared in the following form.

Sr. No.	Species	Girth at b.h.	Remarks
(1)	(2)	(3)	(4)

The boundary trees and other trees specifically categorized will not be marked for felling.

Demarcation of Sub-Coupes

To control extraction of the harvested materials,each Coupe will normally be divided into Sub-Coupes.

These Sub-Coupes will be demarcated as under :-

1) By 1.5 metre wide, cut and cleared lines with posts erected in the middle of the lines at suitable intervals. The posts will bear Section or Sub-Coupe NSumber 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 band will be at breast height and the other one 15 cm. above it.

Demarcation of 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, a cross in red will be given between the bands on the side away from the unworkable areas. Just below the lower band 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 numberals and this number will also be given on each boundary tree e.g. Sr.No. III/5 will denote boundary tree No.5 of unworkable patch No. III. A list of boundary trees will be prepared in the form given above.

Marking technique

Following Rules are laid down

A) For Timber

1) All trees to be marked for felling will bear 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 cm 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 Conservator of Forests.

B) Non Timber Forest Produce :-

Except for bamboos, all other Non Timber Forest Produce are being sold by tender as per the practice in vogue. It has been proposed to examine the possibility of NTFP harvesting through the the PFM beneficiaries in such areas. In other areas NTFP harvesting should be done Departmentally. In the case of some NTFP that are not possible to be harvested Departmentally due to small quantity and where such harvesting will not lead to injuries to forests/soil, the

NTFP harvesting is to be done under close supervision of Department staff. The Quantum and quality of NTFP harvesting and specific locations if any should be noted down and entries in records, including Compt. History form No. 1. made for future information.

Section - 3 :- Preparation of Girth class Enumeration

358. Prior to taking up plantation or working of Coupe and after completion of demarcation, it is necessary to prepare An Enumeration Statement of all Teak, Khair, Ain, Sissoo, Bibla, Hod, Dhawda, and 7 to 8 other species as per Dy CF instructions for record. The area to be worked i.e. the Coupe, is to be enumerated from 30 cm girth along with the other areas of the Compartment, if it has not been done in the past 1 year. The Enumeration Statement of the Compt should be used to prepare an abstract from 30cm girth onwards in 15cm girth classes. The consolidated figures for number of trees per species per compt is to be kept with the compt History files and one copy handed over to the Dy. CF Working Plans prior to revision of the next Plan. The Enumeration Statement and Abstract of each Compt will also help in assessing loss of trees through illegal felling and help in various other exercises to allow proper management of the area.

Section - 4 : Irregular Harvesting

359. 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 Dy. Conservator of Forests. These felling should preferably be made within the Coupes 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 alignments, paths, building, sites, camping grounds 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 conce

with the provisions of the Forests Manual and subject to the silvicultural availability of the same and without endangering the health and well being of the existing Forests.

Section - 5 :- Maintenance of Boundaries

360.

(a) External Boundaries :- The external boundaries have been demarcated by erecting 2nd class boundary marks consisting of stone cairns. Generally the cairns are being maintained but the boundary lines required to be kept clean upto a width of 25 ft are seldom being cleared. To ensure that boundary lines/marks are kept in a proper state, a scheme for boundary maintenance of Reserved Forests as well as Protected Forest on a five year cycle has been prepared and given in Appendix No.XCVI and XCVII respectively. This scheme should be scrupulously followed. The work should be done Departmentally.

The Range Forest Officer will check the annual target as per the scheme while verification will be done by Asst. Conservator of Forests. The Range officer will annually submit to Dy. Conservator of Forests a certificate in the following form.

" I ..... (R.F.O.) certify that the annual length of boundary lines as prescribed under the scheme given in Appendix No. ..... of the Working Plan for the Reserved / Protected Forest of the Division have 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 a cairn is visible. They are in proper condition and bear correct serial number. There are no encroachments."

(b) Internal Boundaries : The Compartment boundaries in case of Reserved Forests are mostly features and hence need no demarcation. In case of Protected Forests it should be cleared to a width of 3meters. Permanent pillars bearing S

erected at suitable points. This work should be completed in five years, annually the work being done in $^{1}/_{5}$ th of the total number of survey Nos. in a round. After the demarcation of boundaries has been completed, they should be verified annually under five years cycle as prescribed in para above.

At many places, plots have been given out for cultivation on a permanent basis. Very few of these plots have been demarcated on the ground, surveyed and shown on the map. The result is that it is not known exactly how much areas is under cultivation and it is extremely difficult to detect the illegal extension of cultivation. The Survey and Demarcation of all such plots is an urgent necessity from the protection point of view. The Dy. Coservator of Forests should therefore, get the work done as early as possible, if necessary by engaging special staff for the purpose. The Annual Target of Boundary Demarcation should be checked by R.F.O. and certified by Asst. Conservator of Forests.

Section - 6 :- Regulation of Grazing

361. Grazing will be regulated strictly according to the Grazing Policy and instructions issued by the Govt. from time to time. Grazing Settlement Report for the tract is contained in the Grazing Settlement Report for the Reserve Forest of Thane district by Shri. S. B. Kulkarni, Dy. Conservator of Forests. This Grazing Settlement Report has been sanctioned by Govt. of Maharashtra in Revenue and forest Dept.vide their No.MFP/ 1371 / 75211 dt. 21/08/1971. The Grazing Settlement will now have to be revised in the light of this Working Plan. However, the grazing in the tract covered under this plan should be regularised strictly as per the provisions of this settlement till the same is revised in the light of this Working Plan. In previous chapters of this plan reference has been made to emphasis the need of closure to grazing of certain areas for certain periods during which efforts would be in hand to raise new forest or to rehabilitate and improve the degraded forest. Strict closure to grazing of such areas are to be observed as prescribed in various Working Circles. A list of all such area closed to grazing will be

annually prepared and notified by the competent authority and sent to all concerned including Grampanchayats. This list will contain the period of closures and details of the area. Further, permissible number of cattle in the nearby Reserved Forest of each village will be prepared by the Dy. Conservators of Forests, Shahapur every year and grazing passes would be issued to the units contained in the villages strictly to the extent grazing is permissible as per Settlement Rules. No Grazing will be beyond carrying capacity of the Reserved Forests. The Grazing capacity of the Forests as described in chapter I of this Plan and permissible number of cattle units in each class of Forest as per the provisions of Grazing Settlement Records Carrying Capacity of the forests village wise may be prepared by the Dy.Conservators of Forests and the same may be circulated to all concerned for information. The need for discouraging grazing and other privilages has been dealt under Injuries to Crop and 'Rights and Privileges'. Further, efforts to include grazing under PFM needs to be explored. In the mean time the proposals for grazing & other NTFP benefits should be proposed for review as per suggestion given.

Section - 7 :- Fire Protection

362. The extent of direct and indirect damage caused to Forests by fires has been indicated in Chapter II of Part-I. Considering the extent and nature of damage caused by fire, the present effort for Fire Protection are very inadequate. The Fire Protection Measures in the tract need tobe intensified.

It has been prescribed that the planted area under various Working Circles should be fire-traced for a period of 10 years. In addition all boundaries, inter Range boundaries and demarcation line will be cleared of bush growth and grass and fire traced. Similarly, fire tracing will be carried out on either side of metalled roads and cart-tracks passing through the tract. Inter Range boundries will be firetraced to a width of 30meters. Every Range Forest Officer will be responsible for clearing the line upto 15meter width on his side. Burning the lines should be carried out in Co-ordination with the

adjoining Range Forest Officer. The width of fire line on either side of roads, cart tracks, etc. should be 10 meters, while along Coupe and Compartment Boundries it should be 3 meters. All the operations of Fire Tracing and Burning should be over by 31st January Fire Protection should be carried out as per the Rules given in Appendix.

For the purpose of Fire Protection, the area 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 under various Working Circles for a period for which they are closed to grazing.

4) Any other areas of special important as per order of the Conservator of Forests.

Class – II

General Protection : - This will include all the remaining area of Reserve Forest 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 can not be successful.

1) Necessary strength of Fire Watchers should be appointed during the fire season i.e. from February to May as per Fire Protection Scheme of the Division. Their duty will be to patrol the Forest area

constantly and extinguish, with the help of local people any fires that may be detected.

2) Watch Towers should be constructed at suitable places where large tract of Forest could be kept under watch. These Watch Towers should be provided with Wireless sets, etc. so that information about occurrence of fire could be communicated to Range Head Quarter.

3) At suitable places, 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, Wildlife Week and other suitable occassions, Lectures accompanied by Films should be delivered to impress on the people the importance of Fire Protection.

Legal Provisions for Fire Protection :

363. 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) IFA 1927 Sections 26 (b), (c), (f), (g) Section 28 (3) for RF Section 33 (I) a,b, and c for PF.
2) Maharashtra Forests (Protection of Forests from Fire) Rules 1982.
3) Wildlife (Protection) Act, 1972.
4) The Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969.
5) Maharashtra Felling of trees (Regulation) Act, 1964.

Rules & Regulations 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 contractors as per draft agreement vide Revenue & Forest Dept. 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 Dy.CF , Working Plans timely .

Section - 8 :- Roads

364. The tract is well served with a net work of roads and there is no necessity for construction of new roads. The roads in the tract are normally maintained by Zilla Parishad. Though roads are being constructed in large numbers, the maintenance of most of interior roads is poor. It is recommended that roads passing through the Forests except the highways should be controlled and maintained by the Forest Department.

Section - 9 :- Buildings

365. A list of existing buildings in the tract is given in appendix XXXV. P.99 Vol-II It is felt that there is shortage of residential accomodation for subordinates in the tract. It is emphasized that the field staff can not be expected to put forth their best efforts in discharging their duties without suitable residential quarters. Hence, efforts should be made to construct additional quarters for sub-ordinates in a phased programme. It is suggested that at least one Forest guard's quarter should be constructed every year in a Range and one Foresters quarter every third year to make up the shourtage of accomodation in the tract. A list of buildings to be constructed in the tract is given in Appendix No. XXXVII.

Section - 10 :- Participatory Forest Management

366. Government of Maharashtra has taken a decision to seek help from the local villages in order to Protect and Manage the forests in the vicinity of the villages vide Government Resolution No. SLF-1091/91/F-11, dated 16th March 1992. Under the Scheme, Forest Protection Committees will be formed in the villages. The salient features, objectives, procedures, options, etc have been given in a separate Chapter. Initially the PF and Acquired Forests are to be brought under PFM.

Section - 11 :- Preservation Plots

367. No Preservation Plot had been proposed in the Forest areas of Shahapur Forest Division in the last Working P

the year 1993-94, one Preservation Plot has been proposed in the Compt. No. 599 (Dolkhamb Range) over an area of 10 ha by Assistant Geneticist, Forest Research Centre, Wada. The area of this Compt. is in the vicinity of the famous Ajoba Hill. This Compartment has good quality dense Forests with a variety of important species. Further, it is proposed that some part of Comptt No. 568 (Vihigaon Range) which contains good quality forests should also be maintained as another Preservation Plot.

Section - 12 :- Experimental Plots

368. There are no well demarcated Experimental Plots in the tract, Some Experimental works have been done by Asstt. Geneticist Van Sanshodhan Kendra, Shahapur and at one or two places elsewhere in the tract of Shahapur Forest Division. The periodical studies of the experiments are done by Asstt. Geneticist of the Research Circle.

The Research wing along with Dy CF, Shahapur can undertake trials of high density plantations and cultivation of NTFP Species in order to develop workable models for PFM. Already trials of various NFTP have been done by the Research wing and these results should be used for PFM activities.

Section - 13 :- Deviations

372. 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 irrgular harvesting.

The following works will constitute a deviation from the Working Plan

1) The Felling and Disposal of Forest Produce from Submergence areas of dams, tanks, canal sites, road sides and other cases coming under the purview of the Forest Conservation Act, 1980. The sanction to it will have be obtained under the provisions of th Act.

2) All other deviations can be classified into following two categories as per draft amendment to Article 191 and 192 of Working Plan Code vide Agriculture and Forest Department Govt. Resolutioin No.FWP/1062/5625 (ii) -J dated 25-5-1962.

(A) Deviation which would seek to alter the Schedule of Working given in the Working Plan, the examples of which are :

1) Both Non-Working of a Coupe in the prescribed year or Working the Coupe in the year not prescribed by the Plan.

2) Change in the areas of Coupe on account of disforestation or undertaking areas for execution of any Special Scheme under Plan Programme and.

(B) Deviations which would involve alteration in the Silviculural Treatment for example :

1) Stopping or curtailing felllings for planting because of shortage of labour, funds, materials for plantation work, or unsuitability of terrain and soil for undertaking plantations to the extent prescribed by the Working Plan.

2) Extensive fellings for dry trees killed by fire, fungus, insect attack or other natural calamities.

3) Fellings of unusual size and extent for special Departmental works.

4) Special fellings to meet a sudden new demand of a particular industry.

5) Fellings involving modification in the prescribed Marking Rules.

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 received as far as possible before the deviation occurs and without fail before the annual list of deviation is submitted along with the Control Forms.

Procedure for obtaining sanction for deviation :

All deviation proposal require the approval of the Inspector General of Forests as per instructions contained in Govt. of India . Ministry of Agriculture No.6-14/84/FRY/(W.P.) dated 23 - 8 - 1984.

The Dy. Conservator or Forests (Territorial) will submit 8 copies of the deviation proposals to Conservators of Forests through Dy.Conservator of Forests, Working Plans, who on scrutinizing the proposals will forward them to the Conservator of Forest of the Territorial Circle with his opinion and report as to the manner the departure decided upon should be recorded. The Conservators of Forests will then pass on the proposal to the Chief Conservator of Forests through the Conservator of Forests, working Plans Circle with his remarks.

The Govt. of India has created a Working Plan Cell in the Ministry of Enviornment & Forests under the Inspector General of Forests. This Cell has to be associated while considering any deviation from the prescriptions of the approved working plans and this deviation will be allowed only after obtaining the approval of the Inspector General of Forests. All Proposals for Deviations must be entered in a Register of Deviation maintained by the Division Office. The standard proforma for submission of deviation proposals will be used.

Section - 14 :- Encroachments

370. It has been observed that lot of encroachments are taking place on the Forest Land particularly in Protected Forest. Sometimes, the Beat Guards are also not fully aware of the boundaries of Survey Number of Protected Forest. It is necessary that all the Beat Guards should posses Beat maps and Village maps. Further encroachment on Forest land should be immediately removed as and when it come to the notice of Local Territorial Staff. A record of encroachment Comptt. wise should be shown on map in the Compartment History File.

Section - 15 :- Beat Checking

371. In order to know the extent of illicit fellings, the Dy.Conservator of forests, Shahapur should order the checking of beat in each Range as per standing instructions of CCF / CF. The details of illicit felling should be worked out Compartmentwise and such details should be mentioned in Compartment History Form No. 1.

Section - 16 :- Survey and Maintenance of Maps

372. All the Reserve Forests of the tracts are surveyed on 8” to a mile toposheets. One cut and mounted set of the maps showing the stock mapping and management details and two uncut and mounted sets showing these details will be supplied for use in the Division Office. In addition two sets of uncut and mounted maps showing the management details will be supplied for use of the Range Forest Officers and Round Officers. Toposheets on 1” to a mile scale applicable to the tract are:-

47/E-2, 47/E-3, 47/E-6, 47/E-7, 47/E-8, 47/E-9, 47/E-10 & 47/E-11.

A reference map on 1” to 2 mile scale showing Compartment Boundries, Compartment Numbers and Working Circle Boundaries, in addition to other details like Division and Range Boundries, Range Headquarters, Roads etc. in case of entire Reserved Forests in the tract, will also be supplied for the use of Division. In case of Protected Forests, the Working Circle will be shown in Village maps only and Survey Numbers will depict PF areas.

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CHAPTER – XIV

CONTROL AND RECORDS

Section - 1 :- Control Forms

373. The record of harvesting, subsidary silvicultural operations and regeneration works carried out according to the prescriptions of the Plan should be maintained in the Control Forms given in appendix CVI, Page no.402 Separate Control Forms have been prescribed for different Working Circles. The set of Control Forms for each Working Circle should be kept in a separate book which will have separate pages for each Series. Two sets of Control Forms should be prepared. One set will be kept in Divisional Office and the other set will be flying set for the use of the Dy. Conservator of Forests, Working Plans. x3 The flying set will be sent annually by Dy.Consevators of Forests, Working Plans to the Dy.Conservators of Forests, Shahapur who will return it to the Dy. C.F.W.P. concerned not later than 1st of August of each year, after making the necessary annual entries. All entries which show that the precsriptions have been deviated from, will be underlined in Red. The Dy. C.F.W.P. will scrutinise the entries and offer his remarks to the Dy. C.F. (T). On receipt of replies from him, he will submit his report to the Territorial Conservator of Forests, together with consolidated remarks, not later than 1st November. The Conservators of Forests will forward the report and consolidated remarks to the Chief Conservator of Forests through the Conservator of Forests, Working Plans not later than 1st February of the following year, for perusal and orders where required.

Control Forms for fire Protection Works, 1/5th Boundary Verification and Demarcation, 2/5th Maintenance and Verification of Boundary Lines will be kept in perscribed forms presently being followed in Division. These Control Forms will also be maintained as per details given in the above para.

Section - 2 :- Compartment Histories

374. Sample Compartment History Forms Nos.1 to 5 to be maintained are given in Appendix CVII page no.407. Each Compartment should have a separate file for its records. Form no. 1 has been written up for each Compartment during the preparation of this Plan and typed copies in duplicate will be supplied to the Dy.C.F. Shahapur. Other records should be prepared immediately and maintained by them. One copy of the Compartment History should be kept in the office concerned. Every year, in July, the Range Forest Officer should fill in the columns in the Compartment History Forms and submit the same to the Dy. C. F. Shahapur who will get them scrutinised by a Gazetted Officer, get them typed and sign them. One copy of the forms will be kept in Divisional Compartment History File and another copy will be returned to the Range Forest Officer.

Section - 3 :- Plantation and Nursery Registers

375. Plantation Registers will be maintained for all areas regenerated artificially in the form Nos.1 to 9, Samples of which are given in Appendix No. CVIII. Page no.408 Nursery Registers should be maintained in form no. 1 to 10, Samples of which are given in Appendix No. CIX. Page No. 412, Vol II

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CHAPTER - XV

ESTABLISHMENT AND LABOUR

Section - 1 :- Establishment

376. **Reorganisation of Beats :-** The Government of India have 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 total area of Shahapur Forest Division is 621.34 Sq.km.which fits into the norm precsribed by Govt. of India.

Owing to increasing prices of timber and increased land hunger of the local population, the problem of protection of forest lands has assumed gigantic proportions. It cannot be denied that the present charges at lower level particularly at Beat Guard level are large and difficult to be handled from the point of view of Protection of Forests. Looking at the problems of Protection of Forests, it is felt necessary to reorganise some important beats in the tract. The Dy. C. F., Shahapur should perpare a detailed proposal in consultation with C. F. (Territorial) and get the necessary sanction from the Competent Authority .

Section - 2 :- Labour

377. The shortage of labour is felt in only some part of Shahapur Taluka. The areas around Shahapur are being 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 per with the rates

being paid for industrial works locally. The Territorial Staff should also form organised gange of labourers for the different kinds of forestry works . Such gangs would be useful in case of any labour problem in critical times. Also such gangs would be useful for the extraction of illicit felled material from the Forests and for Protection.

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CHAPTER – XVI

FINANCIAL FORECAST AND COST OF THE PLAN

Section - 1 :- Past Yield

378. The details of past field is given in Appendix No.XXXVIII Page No 107 and XXXIX .Page No-108 VOL II

Section - 2 :- Future Yield

379. An estimate of expected yield is given in Appendix No.CIII .Page NO 399 VOL-II.

Section - 3 :- Past Revenue & Expenditure

380. It is not possible to forecast the future Revenue with a reasonable degree of accuracy owing to various factors like unstable market trend, illicit felling of trees and other biotic influences. However a rough Estimate of Annual Revenue has been worked out as per Appendix No. CIII. An estimate of likely Expenditure on the works prescribed in various Working Circles of the Plan has been worked out as per Appendix No. CIV. Page No. 104 VOL - II.

Section - 4 :- Future Revenue and Expenditure

381. The Estimated Revenue per year work out to Rs.3.0805 crores and the Estimated Expenditure to be incurred on the prescribed works of various Working Circles comes out to Rs. 1.377058 crores. In addition the following Annual Expenditure is Estimated Annually.

Sr. No. Item	Estimated Expenditure (Rs.)
1.Pay of Staff & T.E.	1,32,99,736
2.Buildings	7,00,000
3.Dead Stock	50,000
4.Boundary Maintenance	35,000
5.Office Expences including	1,50,000
vehicle Maintenance	
6.P.O.L. 55,000	
TOTAL	**1,42,89,736 or Rs. 1.429 crores**

Thus the Annual Expenditure works out to Rs.2.806 crores as per the above estimate and is lower than the Expected Revenue. However as had been mentioned earlier the Forest of Shahapur Division form the catchment for the great lakes that feed water to Mumbai, Thane and neighbouring population and industries. Therefore considering the critical enviornmental significance of the tract any monetary valuation of these forecasts would not be proper. The Annual Environmental Value has however been estimated in chapter VII as Rs.433.95 Crores as per details given in the Text. Hence the maintence and Development of these Forests will not only be a viable proposition but will be a necessity to maintain ecological security for the enormous downstream populations and the financial capital of our country.

Section - 5 :- Cost of the Plan

382. The Average Expenditure on the preparation of the Plan is about Rs.24 per hectare.

(DR. DEVENDRA NATH)
Deputy Conservator of Forests
Working Plans, Thane Circle.
DAHANU.

Dated :

(MAFIUL HUSSAIN)
Deputy Conservator of Forests
Working Plans, Thane Circle

Dated : **DAHANU.**

(P. R. YEOLE)
Deputy Conservator of Forests
Working Plans, Thane Circle.

Dated : **DAHANU.**

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APPROVED

DEPUTY CONSERVATOR OF FORESTS
WORKING PLAN DIVISION, DAHANU.

COLLECTOR, THANE DISTRICT
THANE.

COUNTERSIGNED

CONSERVATOR OF FORESTS
WORKING PLAN CIRCLE, PUNE.

APPROVED

CONSERVATOR OF FORESTS
THANE CIRCLE, THANE.

COUNTERSIGNED

CHIEF CONSERVATOR OF FORESTS
(PRODUCTION)
MAHARASHTRA STATE, NAGPUR.

APPROVED

PRINCIPAL CHIEF CONSERVATOR
OF FORESTS
MAHARASHTRA STATE, NAGPUR.

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