



GOVERNMENT OF MAHARASHTRA

WORKING PLAN

FOR

AHMEDNAGAR FOREST DIVISION & SANGAMNER FOREST SUB DIVISION

PLAN PERIOD : 2011-12 TO 2020-21

VOLUME - I

BY

**G. SAI PRAKASH I.F.S.
CONSERVATOR OF FORESTS**

**WORKING PLANS DIVISION
AURANGABAD**



सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण एवं वन मंत्रालय
MINISTRY OF ENVIRONMENT & FORESTS

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DL-28-04-2011,

No. : 12-20/2006 (FOR)/ 2962,

To,

The Principal Secretary,
Revenue and Forest Department,
Mantralaya,
MUMBAI

Sub : Approval of Working Plan of Ahmednagar Forest Division Sangamner Forest Sub-division, written by Shri. G.Sai. Prakash, IFS, for the period of 2010-2011 to 2019-2020.

Ref : Revenue and Forest Department, Government of Maharashtra letter FDM-2011/CR-23/F-2, dated 05.03.2011.

Sir,

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

- (1) The currency of the Working Plan shall be for a period of 10 years i.e. from 2010-11 to 2019-20.
- (2) The working plan is approved with the condition that the areas with revenue department shall be handed over to forest department at an early date. The department may ensure that the work of transfer of lands from Revenue Department to the Forests Department is effected in a time bounded manner.
- (3) Further, in compliance with orders of Hon'ble Supreme Court's dated 22.09.2000, the State Government of Maharashtra shall ensure that regeneration of forests is commensurate with fellings carried out under this working plan.
- (4) No felling shall be carried out without allocating necessary fund for implementation of regeneration operation so as to make regeneration commensurate with fellings. In the event of failure in regeneration or any shortfall in carrying out regeneration operation, no further felling shall be undertaken until the failure/shortfall is made up.
- (5) Following the directions of the Hon'ble Supreme Court of India in their order dated 22.09.2000, a Core Group has been constituted under the Chairmanship of the Director General of Forests and Special Secretary for deciding the extent of harvesting that could be permitted under approved Working Plans for ensuring

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C.F.W.P. Division
Aurangabad

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regeneration to be commensurate with fellings. Instruction/directions of the Central Government in the matter to be issued in future shall be strictly complied with. Felling to be done by State Government only after seeking permission from Core Group constituted by the MOEF, New Delhi.

- (6) No forests bearing naturally grown trees shall be clear felled for any purpose whatsoever.
- (7) Prescriptions of microplans for JFM (if made) should not deviate the broad framework/guidelines of the working plan and shall be in accordance with various orders of Hon'ble Supreme Court.
- (8) Felling carried out on forest land after seeking approval of the Central Government under Forest (Conservation) Act, 1980 will not be treated as deviation. However, proposed felling in the forest division shall be restricted proportionately in the current/following years to compensate this removal.
- (9) No deviations shall be made from the prescriptions of working plan read with the conditions stipulated herein without prior approval by the Central Government under Forest (Conservation) Act, 1980. However, deviations of positive nature i.e. out of turn plantations carried out outside the worked area under any project, schemes and compensatory afforestation may be approved by the competent authority of the State Government.
- (10) The Central Government reserves the right to review, modify, withdraw this approval at any time if any of the conditions of approval are not implemented or relevant modification in the working plan is required so as to keep it in conformity with the orders, circulars and guidelines issued from time to time by the Central Government or the Apex Court under Forest (Conservation) Act, 1980 or any other statute and National Forest Policy.

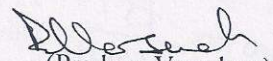
Yours faithfully,

(Pradeep Vasudeva)

Deputy. Conservator of Forests (Central)

Copy to:

1. The Additional Director General of Forests (FC), Ministry of Environment and Forests, Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi - 110 003.
2. The Additional Principal Chief Conservator of Forests, Govt. of Maharashtra, Seminary Hills, Nagpur.
3. The Chief Conservator of Forests (Working Plan Circle), Government of Maharashtra, Pune.
- ✓ 4. Conservator of Forests, (Working Plan Division), Aurangabad, Maharashtra.


(Pradeep Vasudeva)

Deputy Conservator of Forests (Central)

FOREWORD

The Working plan for Ahmednagar forest division and Sangamner forest sub-division of the Ahmednagar district in the Nashik Territorial circle, authored by Sh.G.Sai Prakash, IFS replaces the previous plan of S/Sh.Nimbalkar, IFS and A.K.Mishra, IFS., which was in operation between 1994-95 to 2003-04.

The present plan incorporates all the suggestions given by the State Level Committee on 27th February 2009, and the guidance given by Dr.S.K.Khetarpal, IFS, the Additional Principal Chief Conservator of forests (Production & Management), Maharashtra state, Nagpur, on 2nd December 2009. The Plan prescribes operations under the guidelines laid down by the Working Plan Code, 2004 for an area of 125903.92 hectares.

The plan has been prepared after detailed deliberation and joint exercises by the field staff of Ahmednagar division and the Working plan division, Aurangabad. The plan has appreciably used the utility of GIS Software-Geomedia, in area reconciliation and preparation of maps. The plan caters to both the Ahmednagar forest division and the newly created Sangamner forest sub-division.

The plan is expected to fulfil the expectations of treatment of the areas in Ahmednagar district suitably; the efforts of the author and his staff along with the officers and staff of Ahmednagar district are appreciated for submission in time and placed on record.

Pune
25th January 2010.

(Shirish Ashtana_{IFS})
Chief Conservator of forests
Working Plans Circle, Pune.

PREFACE

The present plan encompasses the prescriptions towards managing the Forests of Ahmednagar district, currently under Ahmednagar division, and foreseen to have two divisions, viz., Ahmednagar division and Sangamner forest sub-division.

The earlier plan of Sh.Nimbalkar and A.K.Mishra expired in 2004-05, necessitating revision as per the new provisions of the National Working Plan Code, 2004, and accordingly needed a fresh outlook in finalising the prescriptions for the areas.

Preparation for revision of the Working plan were started in the month of December 2006, followed by transfer of all records from the office of Conservator of forests, Working plans division, Nashik; stock-mapping of the areas in the following period with active co-operation of the territorial staff of Ahmednagar division. Discussion with the officers of the Ahmednagar division, and interactions with the Working plan staff of Nashik and Dhule assisted in speedy completion of the work.

The plan covers an area of 65668.47 hectares in Ahmednagar forest division and 60235.45 hectares in Sangamner forest sub-division of Ahmednagar district totalling to 125903.92 hectares of land. It is pertinent to note that against the two working circles of earlier plan viz., The Afforestation and the Silvi-Pasture Management Working circles, the current plan could examine the areas in greater detail, and after discussion with the field officers and in tune with the provisions of the Working plan code, 2004, and the deliberations/discussions with the State Level Committee which discussed the PWPR II in February 2009, prescribes management of the area.

Detailed joint exercises with the Survey staff of the territorial division and the Working plan division warrant co-ordination between Forest and Revenue authority in regularising land records. The areas needing further detailed examination in tune with the Law of the Land have been specifically identified and prescription suitably prescribed. Keeping in view the results of earlier afforestation, which were found successful in patches, and as per the recommendations of the State Level Committee which deliberated the PWPR II on 27th February 2009, the forest area is prescribed to be managed under working circles titled Forest Enrichment and Soil Moisture Conservation Working circle (32.28% of area), Afforestation and Soil Moisture Conservation Working circle (56.0% of area). Successful plantations of Bamboo over the years have led to prescriptions under Bamboo Management Working circle (0.68%) and the importance of channelising Fodder Resources in the district, lead to prescriptions under the Silvi-Pasture management working circle (10.40 %of area).

The note-worthy participatory initiatives of villagers of Hivre Bazar, Ralegaon Shinde and Dorje have inspired in prescribing participatory approaches and taking initiatives for

spread of the NTFP, the potential of raising Medicinal plants and steps to enrich Humus by organic farming which find place in the prescriptions of the plan.

The inspiring guidance and review by the Additional Principal Chief Conservators of forests (Production & Management), initially by Sh. A.K.Joshi, IFS, in the preparation and presentation of PWPR II, and later by Dr.S.K.Khetarpal,IFS., in implementation of the suggestions of the State Level Committee and in devising planning of the implementation process of the plan are acknowledged. The guidance and leeway given by the Chief Conservators of forests Sh.A.D.Shejale,IFS., Sh.Shirish Asthana, IFS and Sh.V.K.Mohan, IFS., have enabled the author to think objectively for arriving at prescriptions of the plan. Mid-term review of the progress and discussion with the then PCCF Sh.Jwala Prasad,IFS., fine tuned the efforts.

The plan could not have seen the light of the day without inspiring efforts of TSK.Reddy, IFS, the then Conservator of Forests, Working plans division, Dhule and his staff who had trained the staff of Aurangabad working plans division in GIS; the DCFs of Ahmednagar division Sh.M.S.Reddy, IFS and Dilip Gujela, IFS, the ACFs and RFOs along with the field staff of the Ahmednagar division, co-operated with the Working plan staff of Aurangabad division in furnishing information and actively participated in discussions.

The efforts of the Survey section of the Working Plan division office, and in particular the efforts of Sh.Vilas Bhavsar and Sh.Abhijeet Bhise, Surveyors is invaluable and placed on record. The Range Forest Officers of the Working plan division, sh. Prakash Jagat in the initial period, Sanjay Dharmadhikari, Jagannath Shekade and P.Shelke are noteworthy, without the efforts of whom the task of preparation of the working plan could not have materialised. Similarly the contribution of Jeep Driver Sh.Vasant Joshi, and the office staff of Aurangabad working plans division is acknowledged. Interactions with Professional Wildlifers working in area, Dr.Aniruddh Belsare and Ms.Vidya Athreya, assisted in fine-tuning the chapter on wildlife management.

It is expected that the said plan would meet the expectations of the people of the Ahmednagar district, and those of the forests too.

16th June 2010.

G.Sai Prakash, IFS
Conservator of forests
Working plans Division, Aurangabad

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Alphabetical list of local names

Local names	Scientific names
Aaak	Calotropis procera (Ait.) R. Br.
Aaboli	Crossandra infundibuliformis (L.) Nees
Aagia	Ammania baccifera L.
Aagya	Girardinia diversifolia (Link.) Friics
Aakashnim	Millingtonia hortensis Linn. f.
Aakhara	Lepidagathis cuspidata (Wall.) Nees ex Wall
Aasavala	Pavetta crassicaulis Bremek.
Aberjine	Solanum melongena L.
Abhai	Canavalia cathartica
Adharvel	Cassytha filiformis L.
Adhulsa	Justicia adathoda L.
Adrak	Zingiber officinale Roscoe.
African marigold	Tagetes erecta L.
Afu	Papaver somniferum L.
Agadha	Achyranthes zaririi Almeida & Almeida.
Agastha	Sesbania grandifolia (L.) Pers.
Aghada	Achyranthes aspera L.
Aghada	Achyranthes aspera var. porphyrostachya Hk. f.
Aghada	Achyranthus porphyrostachys Wall. ex Moq.
Agya	Anagallis minuta (L.) Krause
Agyra	Sopubia delphinifolia (L.) G. Don
Ahiravan	Kalanchoe pinnata (Lamk.) Pers.
Ahsaroli	Alangium salvifolium (L.f.) Wangerin.
Ain	Terminalia crenulata Roth.
Ajgandha	Ocimum canum Skms.
Ajwain	Trachyspermum stictocarpum (Clarke) Wolff.
Akada	Cynarospermum asperum (Nees) K. Vollagen
Akashvel	Cassytha filiformis L.
Akkalkada	Spilanthes clava DC.
Akra	Calotropis gigantea (L.) R. Br.
Akra	Calotropis procera (Ait.) R. Br.
Alai	Dalbergia volubilis Roxb.
Alasi	Linum usitatissimum L.
Ale	Zingiber officinale Roscoe.
Algarrobo	Prosopis Chilensis (Molina) Stunz.
Alu	Colocasia antiquorum Schott.
Amaltas	Cassia fistula L.
Amarvel	Cuscuta reflexa Roxb.
Amba pair	Ficus virens Dryand. ex Ait.
Amba, Barmasi Amba	Mangifera indica L.
Ambada	Flacourtia indica (Burm.f.) Merrill.
Ambada	Spondias pinnata
Ambadi	Hibiscus cannabinus L.
Ambati	Embelia basaal (R. & S.) DC.
Ambgul	Elaeagnus conferta Roxb.
Ambhel	Elaeagnus conferta Roxb.
Ambuli	Limnophila dubia (L.) Almeida
Ambushi	Begonia crenata Dryand.
Ambuti	Oxalis corniculata L.
Amla	Phyllanthus emblica L.
Amoni	Rhus sinuata Thunb.
Amphutavani	Dicliptera verticillata (Forsk.) Christensen
Amri	Wattakaka volubilis (L.f.) Benth.
Amrit-valli	Tinospora glabra (Burm.f.) Merrill.
Amrud	Psidium guajava L.
Ana-chunda	Solanum mammosum Lour.

Local names	Scientific names
Andabel Jensru	<i>Crotalaria orixensis</i> Willd.
Andbail	<i>Crotalaria filipes</i> Benth.
Angel's eye	<i>Veronica anagallis-aquatica</i> L.
Angur	<i>Vitis vinifera</i> L.
Anive	<i>Dioscoria</i> sp.
Anjan	<i>Hardwickia binata</i> Roxb.
Anjan	<i>Memecylon umbellatum</i> Burm. f.
Anjir	<i>Ficus carica</i> L.
Ankol	<i>Alangium salvifolium</i> (L.f.) Wangerin.
Apamarg	<i>Achyranthes aspera</i> L.
Aparajita	<i>Clitoria ternatea</i> L.
Aphumari	<i>Gymnema sylvestre</i> (Retz.) R. Br. ex Schult
Apple	<i>Pyrus malus</i> L.
Apta	<i>Bauhinia racemosa</i> Lamk.
Ari	<i>Caesalpinia decasperma</i> (Roth) Alstow.
Aritha	<i>Sapindus trifoliatu</i> s L.
Arjun	<i>Terminalia ovata</i>
Arkmath	<i>Vigna trilobata</i> (L.) Verdc.
Ashind	<i>Bridelia spinosa</i> Willd.
Ashvatha	<i>Ficus arnottiana</i> (Miq.) Miq.
Ashwagandha	<i>Withania somniferum</i> (L.) Dunal.
Asopalau	<i>Polyalthea longifolia</i> (Sonn.) Thw. var. <i>pendula</i> Benth. & Hk. f.
Astha	<i>Ocimum canum</i> Skms.
Atak	<i>Flacourtia indica</i> (Burm.f.) Merrill.
Atti-Mir-alou	<i>Ficus parasitica</i> Koen. ex Willd.
Aula	<i>Phyllanthus emblica</i> L.
Australian Acacia	<i>Acacia auriculiformis</i> A. Cunn.
Babhal	<i>Acacia nilotica</i> ssp. <i>indica</i> (Benth.) Hill.
Bach-nag	<i>Gloriosa superba</i> L.
Badak vel	<i>Aristolochia elegans</i> Littoralis Paroch
Badda	<i>Amorphophallus sylvaticus</i> (Roxb.) Kunth.
Badishep	<i>Foeniculum vulgare</i> Mill
Badmung	<i>Vigna khandalensis</i> (Sant.) Raghavan. & Wadhwa.
Baguli	<i>Calycopteris floribunda</i> Lamk.
Bahava	<i>Cassia fistula</i> L.
Bahuphalli	<i>Corchorus fascicularis</i> Lamk.
Bajari	<i>Setaria italica</i> (L.) P. Beauv.
Bakan-nim	<i>Melia azedarach</i> L.
Bakhala	<i>Paracalyx scariosa</i> (Roxb.) Ali
Bakul	<i>Mimusops elengi</i> L.
Bala	<i>Sida acuta</i> Burm. f.
Bala	<i>Sida cordata</i> (Burm.f.) Borssum.
Balantshep	<i>Anethum graveolens</i> L.
Bam	<i>Bacopa monnieri</i> (L.) Wettst
Bandgul	<i>Dendrophthoe falcata</i> (L.f.) Ettina
Bangali badam	<i>Terminalia catapa</i> L.
Banpat	<i>Corchorus olitorius</i> L.
Bar kangli	<i>Abutilon hirtum</i> (Lamk.) G. Don
Baravada	<i>Indigofera</i>
Baravada	<i>Indigofera glandulosa</i> Wendl.
Baravada	<i>Indigofera linifolia</i> (L.f.) Retz.
Barbatta	<i>Indigofera glandulosa</i> Wendl.
Bargadan	<i>Indigofera glandulosa</i> Wendl.
Barkanshi	<i>Abutilon bidentatum</i> Hoechst
Barki	<i>Geissaspis cristata</i> Wt.&A.
Barmasi	<i>Quisqualis indica</i> L.
Barmasi amba	<i>Mangifera indica</i> L.
Baroli	<i>Indigofera cassioides</i> Roth.
Bartondi	<i>Morinda pubescens</i> Sm. ex Boer

Local names	Scientific names
Bauchi	<i>Cullen corylifolia</i> (L.) Medic.
Bechaka	<i>Indigofera cordifolia</i> Heyne. ex Roth.
Bedinjan	<i>Solanum melongena</i> L.
Beef-apple	<i>Manilkara zapota</i> (L.) Van Royen
Beef-wood tree	<i>Casuarina litora</i> L.
Beet Palak	<i>Beta vulgaris</i> ssp. <i>Maritima</i> (L.) Doel.
Behada	<i>Terminalia bellerica</i> (Gaertn.) Roxb.
Bel	<i>Aegle marmelos</i> (L.) Correa
Bendrichi vel	<i>Clematis hedysarifolia</i> DC.
Berki	<i>Begonia crenata</i> Dryand.
Besharam	<i>Ipomoea carnea</i> ssp. <i>fistulosa</i> (Mortex ex Choisy) Austin
Betungli	<i>Dendrophthoe falcata</i> (L.f.) Ettina
Bhagar	<i>Setaria italica</i> (L.) P. Beauv.
Bhajichi bhendi	<i>Abelmoschus esculentus</i> (L.) Moen.
Bhaldar	<i>Crotalaria</i> sp.
Bhallantak	<i>Semecarpus anacardium</i> L.
Bhalvand	<i>Maytenus heyneana</i> (Roth) Raju. & Babu.
Bhamburda	<i>Blumea belangeriana</i> DC.
Bhandari	<i>Senecio chrysanthemoides</i>
Bhang	<i>Cannabis sativa</i> L.
Bhangda	<i>Tridax procumbens</i> L.
Bhangla	<i>Pimpinella wallichiana</i> (Miq) Gandhi.
Bhaphali	<i>Heracleum grandis</i> (Dalz. & Gibs.) Mukh.
Bharang	<i>Clerodendron serratum</i> (L.) Moon
Bhar-jambhal	<i>Olea dioica</i> Roxb.
Bhat	<i>Oryza sativa</i> L.
Bhat-vel	<i>Cissampelos pareira</i> L.
Bhauri	<i>Porana malabarica</i> Clarke
Bhendara	<i>Canthium coromandelianum</i> (Burm.f.) Alston.
Bherli-mad	<i>Caryota urens</i> L.
Bherra	<i>Chloroxylon swietenia</i> DC.
Bhesa	<i>Acacia horrida</i> (L.) Willd.
Bhint	<i>Lindenbergia indica</i> (L.) Vatke
Bhishmasan, Kate Asana	<i>Bridelia squamosa</i> (Lamk.) Gehrmann.
Bhobho	<i>Lobelia nicotianaefolia</i> Heyne ex Roth.
Bhogada	<i>Casearia graveolens</i> Dalz.
Bhogada	<i>Casearia ovata</i> (Lamk.) Willd.
Bhognal	<i>Lobelia nicotianaefolia</i> Heyne ex Roth.
Bhokar	<i>Cordia dichotoma</i> Forst.
Bhoma	<i>Glochidion sinicum</i> (Gaertn.) Hook. & Arn.
Bhopla	<i>Cucurbita maxima</i> Duch. ex. Lamk.
Bhui Tad	<i>Actinopteris radiata</i> (Sw.) Link
Bhui Tarwad	<i>Cassia kleinii</i> Wt. & A.
Bhui-auli	<i>Phyllanthus erecta</i> (Medic.) Almeida.
Bhuichauli	<i>Portulaca quadrifida</i> L.
Bhui-gend	<i>Lepidagathis cristata</i> Willd.
Bhuimug	<i>Arachis hypogea</i> L.
Bhuras	<i>Leucas ciliata</i> Benth.
Bhurambi	<i>Leucas ciliata</i> Benth.
Bhuskut	<i>Cassine glauca</i> (Rottb.) O. Kuntze.
Bhutavari	<i>Cassine glauca</i> (Rottb.) O. Kuntze.
Bhutkes	<i>Cassine glauca</i> (Rottb.) O. Kuntze.
Bhutta	<i>Zea mays</i> L.
Bibba	<i>Semecarpus anacardium</i> L.
Big marigold	<i>Tagetes erecta</i> L.
Birambola	<i>Salvia plebeia</i> R. Br.
Bis-khapra	<i>Trianthema portulacastrum</i> L.
Biti-maram	<i>Aerides praemorsum</i> Willd.
Blood flower	<i>Asclepias curassavica</i> L.

List of local names

Local names	Scientific names
Bodaga	<i>Indigofera cordifolia</i> Heyne. ex Roth.
Bogada	<i>Casearia graveolens</i> Dalz.
Bogada	<i>Casearia ovata</i> (Lamk.) Willd.
Bogan-vel	<i>Bougainvillea spectabilis</i> Willd.
Bombay ebony	<i>Diospyros montana</i> Roxb.
Bondara	<i>Lagerstroemia lanceolata</i> Wall. ex W. & A.
Bone	<i>Hardwickia binata</i> Roxb.
Bor	<i>Zizyphus mauritiana</i> Lamk.
Borachakoor	<i>Cassia sophera</i> L.
Borati	<i>Zizyphus oenoplia</i> (L.) Mill.
Bordali	<i>Tricholepis radicans</i> DC.
Bottle gourd	<i>Lagenaria ciceraria</i> (Molina.) Standl.
Bottle palm	<i>Roystenia regia</i> (Kunth.) Cook
Brahmi	<i>Bacopa monnieri</i> (L.) Wettst.
Brahmi	<i>Centella asiatica</i> (L.) Urban
Brandal	<i>Pistia stratiotis</i> L.
Bridal bouquet	<i>Porana paniculata</i> Roxb.
Brumaj	<i>Celtis timorensis</i> Spanoghe.
Buchachee zad	<i>Millingtonia hortensis</i> Linn. f.
Buggul	<i>Bursera delpichiana</i> Boiss. ex DC.
Buitarvad	<i>Cassia italica</i> (Mill.) Spr.
Buradi	<i>Tricholepis radicans</i> DC.
Bur-weed	<i>Xanthium strumarium</i> L.
Buti-dhaman	<i>Grewia</i>
Cadamb	<i>Neolamarkia cadamba</i> (Roxb.) Bosser
Cape honey-suckle	<i>Tecomaria capensis</i> (Thunb.) Spach.
Carambu	<i>Ludwigia perennis</i> L.
Carvand	<i>Carissa congesta</i> Wt.
Carvi	<i>Carvia callosa</i> (Nees) Bremek.
Cassava	<i>Manihot esculanta</i> Cranz.
Centepede Plant	<i>Homalocladium platycladom</i> (Muell.) Bailen.
Century plant	<i>Agave americana</i> L.
Chai	<i>Alysicarpus vaginalis</i> (L.) DC.
Chaie	<i>Dioscoria belophylla</i> (Prain.) Voight. ex Haines.
Chakaor	<i>Cassia obtusifolia</i> L.
Chakvat	<i>Chenopodium album</i> L.
Chamkara	<i>Colocasia antiquorum</i> Schott.
Chana	<i>Cicer arietinum</i> L.
Chanchuki	<i>Bremekempia tentaculatus</i> (L.) Sreemadhavan
Chanda	<i>Macaranga peltata</i> (Roxb.) Muell. Arq.
Chandan	<i>Santalum album</i> L.
Chandan Batawa	<i>Chenopodium murale</i> L.
Chandan Batwa	<i>Atriplex stocksii</i> (Wt.) Boiss.
Chandan-batava	<i>Chenopodium album</i> L.
Chandhara	<i>Epimeredi heyneana</i> (Benth. ex Wall.) Almeida
Chandvad	<i>Macaranga peltata</i> (Roxb.) Muell. Arq.
Chanic	<i>Trachyspermum matthewii</i> Almeida.
Chanoti	<i>Abrus precatorius</i> L.
Charas	<i>Cannabis sativa</i> L.
Charcoal tree	<i>Trema orientalis</i> (L.) Bl.
Charoli	<i>Buchanania cochinchinensis</i> (Lour.) Almeida
Chatti	<i>Lindenbergia indica</i> (L.) Vatke
Cherry tomato	<i>Lycopersicon lycopersicum</i> var. <i>ceraciformis</i> (A. Gray) Almeida
Chicharia	<i>Corchorus olitorius</i> L.
Chichonda	<i>Albizzia odoratissima</i> (L.f.) Benth.
Chichurdi	<i>Solanum violaceum</i> Ortega
Chicwa	<i>Albizzia odoratissima</i> (L.f.) Benth.
Chidriya Gavati	<i>Bothriochloa concanense</i> (Hk. f.) Honrad
Chikan-chopti	<i>Grewia aspera</i> Roxb.

List of local names

Local names	Scientific names
Chiku	Manilkara zapota (L.) Van Royen
Chilar	Acacia intsia (L.) Willd.
Chilar	Acacia torta (Roxb.) Craib.
Chillar	Caesalpinia decasperma (Roth) Alstow.
Chimed	Cassia absus L.
Chimnati	Indigofera cassioides Roth.
Chimniche pohe	Eragrostis uniloides (Retz.) Nees ex Steud.
Chinch	Tamarindus indica L.
Chinchu	Corchorus fascicularis Lamk.
Chinese black wood	Dalbergia latifolia Roxb.
Chinese hat plant	Holmskioldea sanguinea Retz.
Chipata	Alysicarpus vaginalis (L.) DC.
Chirchira	Neolitsea cassia (L.) Kosterm.
Chitra	Drosera indica L.
Chota kalpa	Trichodesma indica (L.) Lehm
Chote Gavati	Brachiaria eruciformis (Sm.) Griseb.
Christmas tree	Araucaria excelsa
Christmas plant	Euphorbia pulcherrima Willd.
Chuka	Rumex vesicarium L.
Chunna	Solanum giganteum Jacq.
Churan	Zizyphus rugosa Lamk.
Churchuri	Tragia involucrata L.
Clipti	Flemingia strobilifera (L.) R. Br. ex Ait.
Coco grass	Cyperus rotundus L.
Coconut palm	Cocos nucifera L.
Congress grass	Parthenium hysterophorus L.
Cook's comb	Celosia cristata L.
Copper leaf	Acalypha wilkesiana Muell. Arq.
Copper-pod	Peltophorum pterocarpum (DC.) Baker.
Coral vine	Antigonon leptopus Hook.
Coralwood	Adenanthera pavonia L.
Corolita	Antigonon leptopus Hook.
Cowpea	Vigna unguiculata (L.) Walp.
Cuban Royal palm	Roystonea regia (Kunth) Cook
Cucumber	Cucumis sativus L.
Cup & Saucer plant	Holmskioldea sanguinea Retz.
Cupa-vela	Catharanthus pusillus (Murr.) G. Don
Cupi	Acalypha fruticosa Forsk.
Cup-in-saucer	Breynia retusa (Dennst.) Alston.
Dabria	Anogeisus latifolia (Roxb.ex DC.) Guillem. & Perottet.
Dagadi-pala	Tridax procumbens L.
Dahan	Tricholepis glaberrima DC.
Dahan	Tricholepis montana Dalz. & Gibs.
Dalimb	Punica granatum L.
Damdaula	Flemingia strobilifera (L.) R. Br. ex Ait.
Dandus	Dalbergia lanceolaria Linn. f.
Dangar	Cucurbita
Danti	Baliospermum solanifolium (Burm.f.) Suresh Danti
Darbha	Desmostachya bipinnata (L.) Stapf
Dari	Pueraria tuberosa (Roxb.) DC.
Date-palm	Phoenix dactylifera L.
Datir	Securinega Obovata (Willd.) Almeida.
Datpadi	Gnidia eriocephala (Fren.) Gilg.
Dayali	Crotolaria leshenaultii DC.
Dedoni	Dodonaea viscosa (L.) Jacq.
Deobabhai	Acacia horrida (L.) Willd.
Deonal	Lobelia nicotianaefolia Heyne ex Roth.
Der meuser	Cajanus lineatus (Wt. & A.) Van.
Desai	Colebrookea oppositifolia (Poir) Sm.
Deshi-badam	Terminalia catappa L.

Local names	Scientific names
Dev-dangri	Cucurbita
Dhaiti	Woodfordia fruticosa (L.) Kurz.
Dhak	Butea monosperma (Lamk.) Taub.
Dhaman	Grewia inequalis Bl.
Dhamasa	Alternanthera pungens H. B. K.
Dhamasa	Fagonia indica Burm. f.
Dhamora	Anogeisus latifolia (Roxb.ex DC.) Guillemin. & Perottet.
Dhampta	Alysicarpus longifolius (Rott.ex Spr.) Wt. & Arn.
Dhan-bhaji	Ammania baccifera L.
Dhane	Coriandrum sativum L.
Dhapa	Chlorophytum glaucoides Blatter.
Dharas	Glinus lotoides L. ssp. hirta (Thunb.) Alm.
Dhauda	Anogeisus latifolia (Roxb.ex DC.) Guillemin. & Perottet.
Dhol	Lindenbergia muraria (Roxb. ex G. Don) Bruehl
Dhora	Wattakaka volubilis (L.f.) Benth.
Dhor-davana	Artemisia gratus Wall. ex DC.
Dikna	Cynarospermum asperum (Nees) K. Vollagen
Dil	Anethum graveolens L.
Dinanath	Cenchrus ciliaris L.
Dinda	Leea indica (Burm.f.) Merrill.
Dindi	Leea sambucina (L.) Willd.
Dingla	Crotalaria retusa L.
Dingla	Crotalaria leshenaultii DC.
Dingla	Crotalaria linifolia L. f.
Dita-bark	Alstonia scholaris (L.) R. Br.
Divali	Indigofera trifoliata L.
Divas-mauli	Asparagus racemosus Willd.
Dodder	Cuscuta reflexa Roxb.
Dongar Kadu	Impatiens acaulis Arn.
Dongari	Chrysopogon fulvus (Sap.) Chiov.
Dorti	Solanum violaceum Ortega
Drakha	Vitis vinifera L.
Dub	Cynodon dactylon (L.) Pers.
Dudhanali	Chamaecybe hirta (L.) Millsp.
Dudhani	Chamaecybe coccinea (Roth.)
Dudhani	Euphorbia heterophylla L.
Dudhani	Leucas longifolia Benth.
Dudhani	Oxystelma secamone (L.) Karst.
Dudhi	Chamaecybe hirta (L.) Millsp.
Dudhi	Euphorbia heterophylla L.
Dudhi	Euphorbia rothiana Spr.
Dudhi-bhopla	Lagenaria ciceraria (Molina.) Standl.
Dudh-kalmi	Operculina turpethum (L.) Manso
Dudhli	Dregea lanceolata (Cooke) Sant. & Wagh
Dukar khand	Nervillea plicata (Anders.) Schlecht.
Durva	Cynodon dactylon (L.) Pers.
Echaka	Cyanotis fasciculata (Heyne ex Roth) Schult. f.
Ekdandi	Tridax procumbens L.
Elephant creeper	Argyria nervosa (Burm.f.) Boj
Enepael	Hydrilla verticillata (L.f.) Royle
False-ashok	Polyalthia longifolia (Sonn.) Thw. var. pendula Benth. & Hk. f.
Fan-palm	Livingstonia chinensis R. Br.
Farari	Albizzia lebeck (L.) Willd.
Female fern	Athyrium hohenackerianum
Fenugreek	Trigonella foenum-graecum L.
Fetra	Ceriscoides turgida (Roxb.) Thiruveng.
Fiddle-leaved jatropa	Jatropha panduraefolia Andrews
Fish-tail palm	Caryota urens L.
Flamboyant	Delonix regia (Boj. ex Hk.) Raf.

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Local names	Scientific names
Gadha-limbu	Citrus limon (L.) Burm. f.
Gajar	Daucus carota L.
Gajar-gavat	Parthenium hysterophorus L.
Gajri	Heracleum grandis (Dalz. & Gibs.) Mukh.
Gandhati	Aristolochia bracteolata Lamk.
Gangavati	Blumea lacera (Burm.f.) DC.
Gango-gangi	Grewia tenax (Forsk.) Fiori.
Ganja	Cannabis sativa L.
Ganjava	Flemingia strobilifera (L.) R. Br. ex Ait.
Ganjva	Geissaspis cristata Wt.&A.
Gantelbua	Gantelbua urens (Heyne ex Roth) Bremek.
Garden lettuce	Lactuca sativa L.
Garmar	Coleus barbatus (Anders.) Benth.
Gathani	Borreira articularis (L.) Will.
Gaulan	Exacum lawii Clarke.
Gavati chaha	Cymbopogon citratus (DC.) Stapf
Gawler	Ipomoea obscura (L.) Ker.
Gela	Catunaregam spinosum (Thunb.) Thiruveng.
Genduli	Cissus elongata Roxb.
Ghagri	Crotalaria retusa L.
Ghagri	Crotalaria linifolia L. f.
Ghaipat	Agave americana L.
Ghaipat	Agave sisalana Perrine. ex Engleman.
Ghaneri	Lantana camara var. aculeata (L.) Mold
Ghatbor	Zizyphus xylopyra (Retz.) Willd.
Ghati-pitpapda	Rungia repens (L.) Nees
Ghetoli	Cissus elongata Roxb.
Ghetul	Cissus elongata Roxb.
Ghetuli	Boerhavia repens L.
Ghodyachi-jibh	Desmodium triflorum (L.) DC.
Ghol	Portulaca oleracea L.
Gholichi bhaji	Portulaca oleracea L.
Ghor-dhaman	Grewia flavescens Juss.
Ghosale	Luffa aegyptiaca Mill.
Ghoshyachi vel	Cajanus scaraboides (L.) Thouars.
Ghotvel	Smilax zeylanica L.
Ghule gavat	Melanocenchris jaquemontii Jaub. & Spach.
Ghulya karva	Pleocaulis reticulatus (Stapf.) Alm.
Gidesa	Spermadictyon suaveolens Roxb.
Giljaphiri	Tagetes patula L.
Gingeli	Sesamum orientale L.
Ginger	Zingiber officinale Roscoe.
Ginni gavat	Pennisetum americanum (L.) K. Schum.
Godhadi	Indigofera cordifolia Heyne. ex Roth.
Godshi	Commelina (white fls.)
Godval	Andropogon pumilum Roxb.
Gogi	Malva verticillata L. var. chinesis (Mill.) Hu.
Gojivha	Elephantopus scaber L.
Gokarni	Clitoria ternatea L.
Gokharu	Tribulus terrestris L.
Gol pani Kanthari	Capparis rotundifolia Rottl.
Gol pani Kanthari	Capparis rotundifolia Rottl. var. longispina (H. f. & Thoms.) Almeida
Goldar	Sterculia guttata Roxb.
Golden bambu	Bambusa vulgaris Schrader
Golden dew drops	Duranta erecta L.
Golvan	Peristrophe paniculata (Fork) Brummit
Goma	Leucas stelligera Wall.
Gometi	Solena amplexicaulis (Lamk.) Gandhi.
Gorakh-chinch	Adansonia digitata L.

Local names	Scientific names
Gorochan	<i>Centranthera indica</i> (L.) Gamble
Goti	<i>Zizyphus xylopyra</i> (Retz.) Willd.
Govinda	<i>Diospyros montana</i> Roxb.
Gudhghemodi	<i>Cissus elongata</i> Roxb.
Gudmar	<i>Gymnema sylvestre</i> (Retz.) R. Br. ex Schult
Guggul	<i>Commiphora wightii</i> (Arn.) Bhuneri.
Guial	<i>Agave cantula</i> Roxb.
Gulbakshi	<i>Mirabilis jalapa</i> L.
Gulchaba	<i>Polianthes tuberosa</i> L.
Gulchadi	<i>Polianthes tuberosa</i> L.
Gulchava	<i>Actinodaphne gullavara</i> (Buch. Ha. ex. Nees) Almeida
Guldaudi	<i>Chrysanthemum indicum</i>
Guli	<i>Indigofera tinctoria</i> L.
Gulmohar	<i>Delonix regia</i> (Boj. ex Hk.) Raf.
Gulvel	<i>Tinospora glabra</i> (Burm.f.) Merrill.
Gunj	<i>Abrus precatorius</i> L.
Gunpowder plant	<i>Pilea microphylla</i> (L.) Lehm.
Gurar	<i>Albizzia procera</i> (Roxb.) Benth.
Gurgi	<i>Thelepaepale ixiocephala</i> (Benth.) Bremek.
Guti	<i>Zizyphus xylopyra</i> (Retz.) Willd.
Hadga	<i>Sesbania grandifolia</i> (L.) Pers.
Hadjoda	<i>Tectaria macrodonta</i>
Hadki-Bor	<i>Zizyphus caracatta</i> Buch. Ham. ex Roxb.
Hadsandhi	<i>Dendrobium herbaceum</i> Lindl.
Haliv	<i>Vangueria spinosa</i> Roxb.
Halu	<i>Meyna spinosa</i> Roxb. ex Link.
Halunda	<i>Vigna vexillata</i> (L.) R.var.angustifolia (Schum. & Thonner) Baker.
Hamata-gavat	<i>Stylosanthes hamata</i> (L.) Taub.
Har	<i>Nyctanthus arborescens</i> L.
Haran	<i>Senecio bombaiensis</i> Balakrishnan.
Haran-dodi	<i>Wattakaka volubilis</i> (L.f.) Benth.
Harantodi	<i>Andropogon pumilum</i> Roxb.
Harawel	<i>Pistia stratiotis</i> L.
Harbhara	<i>Cicer aeritinum</i> L.
Hareri	<i>Albizzia lebbeck</i> (L.) Willd.
Hariali	<i>Cynodon dactylon</i> (L.) Pers.
Haritmanjiri	<i>Acalypha indica</i> L.
Hastipada	<i>Elephantopus scaber</i> L.
Hato	<i>Pandanus tectorius</i> Solend. ex Parkinson
Hauda	<i>Vigna vexillata</i> (L.) R.var.angustifolia (Schum. & Thonner) Baker.
Hedino	<i>Maytenus heyneana</i> (Roth) Raju. & Babu.
Helu	<i>Meyna spinosa</i> Roxb. ex Link.
Helu	<i>Vangueria spinosa</i> Roxb.
Henkal	<i>Maytenus senegalensis</i> (Lamk.) Excell.
Heorakirkin	<i>Falconeria malabaricum</i> Wt.
Hesar	<i>Colebrookea oppositifolia</i> (Poir) Sm.
Heta	<i>Terminalia bellerica</i> (Gaertn.) Roxb.
Hinganbet	<i>Balanites aegyptiaca</i> (L.) Delile
Hingatbet	<i>Balanites aegyptiaca</i> (L.) Diels.
Hingu	<i>Balanites aegyptiaca</i> (L.) Delile
Hirankhuri	<i>Emilia sonchifolia</i> (L.) DC.
Hirda	<i>Terminalia chebula</i> Retz.
Hiroli	<i>Alysicarpus vaginalis</i> (L.) DC.
Hirva chafa	<i>Artabotrys hexapetalus</i> (L.f.) Bhandari.
Hirvi-savar	<i>Ceiba pentandra</i> (L.) Gaertn.
Hivar	<i>Acacia leucophloea</i> (Roxb.) Willd.
Hollyhock	<i>Alcea rosea</i> L.
Hum	<i>Miliusa tomentosa</i> (Roxb.) Sinclair.
Humb	<i>Polyalthaea cerasoides</i>

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Local names	Scientific names
Indian borage	<i>Coleus amboinicus</i> Lour.
Indian sundew	<i>Drosera indica</i> L.
Indrajav	<i>Wrightia tinctoria</i> (Roxb.) R. Br
Jack-fruit	<i>Artocarpus heterophyllus</i> Lamk.
Jacob's coat	<i>Acalypha wilkesiana</i> Muell. Arq.
Jaie	<i>Jasminum odoratissimum</i> L.
Jakhami	<i>Dodonaea viscosa</i> (L.) Jacq.
Jaljamni	<i>Cocculus hirsutus</i> (L.) Diels.
Jambhal	<i>Syzygium cumini</i> (L.) Skeels.
Jambhul	<i>Syzygium cumini</i> (L.) Skeels.
Jangli bhendi	<i>Azanza lampas</i> (Cav.) Alef.
Jangli-Methi	<i>Sida rhombifolia</i> var. <i>retusa</i> (L.) Masters
Jarli	<i>Sarcostemma viminalis</i> (L.) R. Br
Jarul	<i>Lagerstroemia speciosa</i> (L.) Pers.
Jasondi	<i>Saraca asoka</i> (Roxb.) de Willede.
Jasvandi	<i>Hibiscus rosa-sinensis</i> L.
Jatali	<i>Exacum lawii</i> Clarke.
Jatmal	<i>Zornia</i> (erect sp.) NEW?
Javaas	<i>Linum usitatissimum</i> L.
Jensru	<i>Crotalaria leptostachya</i> Benth.
Jethmad	<i>Taverniera cuneifolia</i> (Roth.) Arn.
Jharasi	<i>Mollugo pentaphylla</i> L.
Jharvad	<i>Lagasca mollis</i> Cass.
Jhir	<i>Macrotyloma uniflora</i> (Lamk.) Vercourt.
Jitasaya	<i>Spermadietyon suaveolens</i> Roxb.
Jivanti	<i>Wattakaka volubilis</i> (L.f.) Benth.
Jungli udid	<i>Vigna trilobata</i> var. <i>pusilla</i> Naik & Pokle.
Jute	<i>Crotalaria juncea</i> L.
Jyotishmati	<i>Celastrus paniculatus</i> Willd.
Kaddu	<i>Cucurbita maxima</i> Duch. ex. Lamk.
Kadi-neem	<i>Murraya koenigii</i> (L.) spr.
Kadksumbi	<i>Goniocaulon glabrum</i> Cass.
Kadu-chinchi	<i>Corchorus trilocularis</i> L.
Kadu-khajur	<i>Melia composita</i> Willd.
Kadu-vrindavan	<i>Citrullus colocynthis</i> (L.) Schrad.
Kadvi-bhaji	<i>Glinus lotoides</i> L. ssp. <i>hirta</i> (Thunb.) Alm.
Kadya-nag	<i>Gloriosa superba</i> L.
Kailu	<i>Smithea purpurea</i> Hook.
Kaju	<i>Anacardium occidentale</i> L.
Kajuri	<i>Curculigo orchioides</i> Gaertn.
Kakad	<i>Garuga pinnata</i> Roxb.
Kakdi	<i>Cucumis sativus</i> L.
Kakjata	<i>Desmodium triflorum</i> (L.) DC.
Kakria	<i>Butea monosperma</i> (Lamk.) Taub.
Kal lave	<i>Gloriosa superba</i> L.
Kala ankra	<i>Bremekempia spinosus</i> (Lour.) Almeida
Kala kiraita	<i>Bremekempia spinosus</i> (Lour.) Almeida
Kala Umbar	<i>Ficus hispida</i> L.
Kala-dana	<i>Ipomoea nil</i> (L.) Roth.
Kala-dhotra	<i>Datura metel</i> L.
Kalagonda	<i>Diospyros montana</i> Roxb.
Kalak Bamboo	<i>Bambusa arundinacea</i> (Retz.) Willd.
Kala-kuda	<i>Holarhena antidysenterica</i> (Heyne ex Roth) Wall. ex DC.
Kalamb	<i>Mitragyna parvifolia</i> (Roxb.) Kortn.
Kala-nisurdi	<i>Adelocaryum malabaricum</i> (Clarke) Brandis
Kalapalas	<i>Ougenia oojeinensis</i> (Roxb.) Hochrest.
Kala-siris	<i>Albizia odoratissima</i> (L.f.) Benth.
Kali-kauli	<i>Cryptolepis dubia</i> (Burm.f.) Almeida
Kali-musli	<i>Curculigo orchioides</i> Gaertn.
Kali-niraudi	<i>Vitex negundo</i> var.

Local names	Scientific names
Kalmegh	<i>Andropogon paniculatum</i> (Burm.f.) Wall. ex Nees
Kalsubai	<i>Pimpinella heyneana</i> (DC.) Wall ex Kurz.
Kamala	<i>Mallotus philippensis</i> (Lamk.) Muell. Arq.
Kamarkas	<i>Salvia plebeia</i> R. Br.
Kamini	<i>Physalis minima</i> L.
Kamoni	<i>Rhus sinuata</i> Thunb.
Kanagi	<i>Ipomoea batatas</i> (L.) Lamk.
Kanak-champa	<i>Pterospermum acerifolium</i> (Gaertn.) Willd.
Kanchan	<i>Bauhinia purpurea</i> L.
Kanda	<i>Allium cepa</i> L.
Kandol	<i>Sterculia urens</i> Roxb.
Kangli	<i>Breynia retusa</i> (Dennst.) Alston.
Kangli	<i>Celastrus paniculatus</i> Willd.
Kangni	<i>Solanum nigrum</i> L.
Kanher	<i>Nerium oleander</i> L.
Kanhopatra	<i>Capparis stylosa</i> DC.
Kankar	<i>Caesalpinia pulcherrima</i> (L.) Sw.
Kankol	<i>Piper trichostachyon</i> (Miq.) C. DC.
Kanphuti	<i>Flemingia strobilifera</i> (L.) R. Br. ex Ait.
Kanthari	<i>Capparis sepiaria</i> L.
Kanvel	<i>Neolitsea cassia</i> (L.) Kosterm.
Kapalphodi	<i>Cardiospermum halicacabum</i> L.
Kapok	<i>Ceiba pentandra</i> (L.) Gaertn.
Kapurphuti	<i>Aerva sanguinolenta</i> (L.) Blume.
Kapus	<i>Gossypium arboreum</i> L.
Kar	<i>Canthium coromandelianum</i> (Burm.f.) Alston.
Kar	<i>Vangueria spinosa</i> Roxb.
Karad-kanguni	<i>Mukia maderaspatana</i> (L.) Roem.
Karad-kusumb	<i>Goniocaulon glabrum</i> Cass.
Karambal	<i>Rostellularia procumbens</i> (L.) Nees ex DC.
Karambu	<i>Olea dioica</i> Roxb.
Karandi	<i>Abutilon indicum</i> (L.) Sw.
Karanj	<i>Pongamia pinnata</i> (L.) Pierre.
Karap	<i>Memecylon umbellatum</i> Burm. f.
Karau	<i>Carvia callosa</i> (Nees) Bremek.
Kardal	<i>Canna indica</i> L.
Kardee	<i>Carthamus tinctorius</i> L.
Kardi	<i>Wahlenbergia marginata</i> (Thunb.) DC.
Karel	<i>Capparis decidua</i> (Forsk.) Edgeworth
Karindi	<i>Abutilon glaucum</i> (Cav.) Sweet.
Karit	<i>Cucumis melo</i> L. sub-sp-agrestis (Naud.) Panglo
Karivana	<i>Centella asiatica</i> (L.) Urban
Karla	<i>Guizotia abyssinica</i> (L.) Cass.
Karle	<i>Momordica charantia</i> L.
Karmal	<i>Dillenia pentagyna</i> Roxb.
Karmashi	<i>Rostellularia procumbens</i> (L.) Nees ex DC.
Karmate	<i>Securinega Obovata</i> (Willd.) Almeida.
Karnaphul	<i>Sida cordata</i> (Burm.f.) Borssum.
Kartola	<i>Momordica dioica</i> Roxb.
Karumila	<i>Indigofera coerulea</i> Roxb. var.occidentalis Gillet. & Ali.
Karumili	<i>Indigofera trita</i> L. f.
Kasai	<i>Coix lachryma-jobi</i> (L.)
Kashid	<i>Cassia siamea</i> Lamk.
Kashivada	<i>Cassia occidentalis</i> L.
Kasiti	<i>Abutilon glaucum</i> (Cav.) Sweet.
Kasod	<i>Cassia tora</i> L.
Kasood	<i>Cassia siamea</i> Lamk.
Kasturi tulas	<i>Ocimum kilimandschericum</i> L.
Kasturi-bhendi	<i>Abelmoschus moschatus</i> Medic.

Local names	Scientific names
Kate-koranti	<i>Blepharis repens</i> (Vahl.) Roth
Katel	<i>Bremekempia spinosus</i> (Lour.) Almeida
Kate-math	<i>Amaranthus spinosus</i> L.
Kateri	<i>Acanthospermum hispidum</i> DC.
Kate-ringani	<i>Solanum virginicum</i> L.
Kate-savar	<i>Bombax ceiba</i> L.
Kathria	<i>Stemodia viscosa</i> Roxb.
Kathsola	<i>Aeschynomene indica</i> L.
Kat-mendha	<i>Trichodesma inaequale</i> Edgew.
Katmora	<i>Dipteracanthus patulus</i> (Jacq.) Nees
Kaucha	<i>Mucuna pruriens</i> (L.) DC.
Kauli	<i>Hemidesmum indicus</i> (L.) Schult
Kaulicha-vel	<i>Hemidesmum indicus</i> var. <i>pubescens</i> (Wt. & Arn.) Hk. f.
Kaulki	<i>Tylophora dalzellii</i> Hk. f.
Kaulyache dole	<i>Utricularia reticulata</i> Sm.
Kavala	<i>Smithea purpurea</i> Hook.
Kavandal	<i>Trichosanthes tricuspidata</i> Lour.
Kavath	<i>Naringi crenulata</i> (Roxb.) Nicols.
Kavdodi	<i>Diplocyclos palmatus</i> (L.) Jeffrey.
Kawarak	<i>Dendrophthoe falcata</i> (L.f.) Ettina
Kawdar	<i>Ensete glaucum</i> (Roxb.) Cheesm.
Keli	<i>Musa paradisiaca</i> Linn.
Kelo	<i>Ficus virens</i> Dryand. ex Ait.
Kena	<i>Commelina benghalensis</i> L.
Kena	<i>Cyanotis fasciculata</i> (Heyne ex Roth) Schult. f.
Kerati	<i>Hydrolea zeylanica</i> (L.) Vahl
Kesia turda	<i>Arthraxon hispidus</i> (Thunb.) Makino
Ketaki	<i>Pandanus tectorius</i> Solend. ex Parkinson
Kevan	<i>Helicteres isora</i> L.
Kevan	<i>Leea sambucina</i> (L.) Willd.
Khabar-vel	<i>Cryptostegia grandiflora</i> R. Br
Khadak	<i>Glossocardia boswallea</i> (L.f.) DC.
Khadakful	<i>Cladopus hookeriana</i> (Tul.) Cusset
Khadi lavala	<i>Cyperus teneriffae</i> Poir.
Khadki	<i>Tylophora indica</i> (Burm.f.) Merrill
Khair	<i>Acacia catechuoides</i> (Roxb.) Benth.
Khajkhujli	<i>Tragia involucrata</i> L.
Khajoti	<i>Girardinia diversifolia</i> (Link.) Friics
Khajra suran	<i>Amorphophallus commutatus</i> (Schott.) Eng.
Khajur	<i>Phoenix dactylifera</i> L.
Khajuri	<i>Phoenix sylvestris</i> (L.) Roxb.
Khalypha	<i>Acalypha hispida</i> Burm. f.
Kharata	<i>Grewia aspera</i> Roxb.
Kharbuj	<i>Cucumis melo</i> L.
Kharkhoda	<i>Leptadenia reticulata</i> (Retz.) Wt. & Arn.
Kharmati	<i>Grewia aspera</i> Roxb.
Kharmati	<i>Grewia</i> sp.
Kharmati	<i>Securinega leucopyros</i> (Willd.) Muell. Arg.
Kharpudi	<i>Ceropegia lawii</i> Hk. f. var. <i>wadhwa</i> Almeida
Kharpudi	<i>Ceropegia rollae</i> Hemadri
Khatkali	<i>Merremia gangetica</i> (L.) Cufod
Khat-khati	<i>Grewia flavescens</i> Juss.
Khausi	<i>Firmiana colorata</i> (Roxb.) R. Br.
Khaya	<i>Khaya senegalensis</i> (Desf.) A. Juss.
Khetpapra	<i>Oldenlandia corymbosa</i> L.
Khira	<i>Cucumis sativus</i> L.
Khirmi	<i>Manilkara hexandra</i> (Roxb.) Dubara
Khulkhula	<i>Crotalaria</i> sp.
Khulkhula	<i>Crotalaria linifolia</i> L. f.

Local names	Scientific names
Kidamar	<i>Aristolochia bracteolata</i> Lamk.
Kinhai	<i>Albizzia procera</i> (Roxb.) Benth.
Kiraita	<i>Andropogon paniculatum</i> (Burm.f.) Wall. ex Nees
Kirat	<i>Capparis stylosa</i> DC.
Kochida	<i>Cassia occidentalis</i> L.
Kohola	<i>Cucurbita</i>
Kokali	<i>Acalypha indica</i> L.
Kolisna	<i>Hygrophila schulli</i> (Buch-Ham.) Almeida & Almeida
Kolsunda	<i>Hygrophila schulli</i> (Buch-Ham.) Almeida & Almeida
Kombadnakhi	<i>Tectaria macrodonta</i>
Kombad-tura	<i>Celosia cristata</i> L.
Koranti	<i>Barleria involucrata</i> Nees var. <i>elata</i>
Koranti	<i>Barleria prionitis</i> Linn.
Korphad	<i>Aloe vera</i> (L.) Burm. f.
Koshimb	<i>Schleichera oleosa</i> (Lour.) Oken.
Kostha	<i>Costus speciosus</i> (Koen. ex Retz.) Smith
Kothambir	<i>Coriandrum sativum</i> L.
Kothur	<i>Arundinella lawii</i> Hk. f.
Kotrak	<i>Glinus lotoides</i> L. ssp. <i>hirta</i> (Thunb.) Alm.
Kowla	<i>Smithea conferta</i> Smith.
Krishna-kamal	<i>Passiflora caerulea</i> L.
Krishna-sariva	<i>Cryptolepis dubia</i> (Burm.f.) Almeida
Kuchan-dana	<i>Adenanthera pavonia</i> L.
Kudal	<i>Diospyros montana</i> Roxb.
Kudal	<i>Sterculia villosus</i> Roxb.
Kuie	<i>Anisonema reticulata</i> (Poir.) A. L. Juss.
Kuili	<i>Mucuna pruriens</i> (L.) DC.
Kukada	<i>Celosia argentea</i> L.
Kukar	<i>Sterculia guttata</i> Roxb.
Kulci	<i>Acalypha indica</i> L.
Kuli	<i>Chlorophytum niveum</i> (Poir.) Almeida
Kulith	<i>Macrotyloma uniflora</i> (Lamk.) Vercourt.
Kumari	<i>Aloe vera</i> (L.) Burm. f.
Kumba	<i>Leucas ciliata</i> Benth.
Kumbha	<i>Lepidagathis aristata</i> Willd.
Kumbha	<i>Lepidagathis cristata</i> Willd.
Kumbhal	<i>Xantolis tomentosa</i> (Roxb.) Raf.
Kumbhi	<i>Caraya arborea</i>
Kumudini	<i>Nymphoides hydrophylla</i> (Lour.) O. Kuntze
Kund	<i>Ischaemum</i> sps.
Kunda	<i>Ischaemum pilosum</i> (Klein ex Willd.) Wt.
Kunjru	<i>Digera muricata</i> (L.) Mart.
Kunku	<i>Mallotus philippensis</i> (Lamk.) Muell. Arq.
Kurdu	<i>Celosia argentea</i> L.
Kusadi	<i>Themeda quadrivalvis</i> (L.) O. Kuntze
Kusal	<i>Heteropogon contortus</i> (L.) P. Beauv.
Kusali	<i>Aristida</i> sps.
Kusali	<i>Aristida stocksii</i> (Hook.f.) Domin.
Kusali	<i>Aristida redacta</i> Stapf.
Kusali pandhari	<i>Aristida adscensionis</i> L.
Kusali pandhari	<i>Aristida funiculata</i> Trin. & Rupr.
Kusar	<i>Jasminum malabaricum</i> Wt.
Kusum	<i>Schleichera oleosa</i> (Lour.) Oken.
Kusumba	<i>Carthamus tinctorius</i> L.
Kutaki	<i>Verbascum chinense</i> (L.) Santapau
Kutgi	<i>Bridelia spinosa</i> Willd.
Kuthada	<i>Sterculia villosus</i> Roxb.
Kutra	<i>Limnophila dubia</i> (L.) Almeida
Kutri	<i>Solanum nigrum</i> L.

Local names	Scientific names
Lajalu	Biophytum sensitivum (L.) DC.
Lajalu	Mimosa pudica L.
Lajari Tawad	Cassia mimosoides L.
Lajri	Mimosa pudica L.
Lakai	Acacia leucophloea (Roxb.) Willd.
Lal devkel	Canna orchioides Bailae.
Lal kardal	Canna orchioides Bailae.
Lal Khair	Acacia chundra (Roxb.) Willd.
Lalai	Albizzia amara (Roxb.) Boivin.
Lal-chameli	Quisqualis indica L.
Lal-math	Amaranthus caudatus L.
Lal-mirchi	Capsicum annuum L.
Lal-patta	Euphorbia pulcherrima Willd.
Lal-phuli	Ipomoea hederifolia L.
Lamtani	Gymnema sylvestre (Retz.) R. Br. ex Schult
Landgu	Zornia gibbosa Spanoghe.
Lasun	Allium sativum L.
Laval	Mariscus linctus (Forsk.) Almeida
Laval	Pycreus flavidus (Retz.) T. Koyama
Lavender-tree	Bursera delpichiana Boiss. ex DC.
Laxmiputra	Achyranthes aspera L.
Lechurdi	Adelocaryum coelestinum (L.) Brandis
Lendi-bondara	Lagerstroemia parviflora Roxb.
Lendi-jambhal	Syzygium caryophyllifolia (Lamk.) DC.
Lepti	Adelocaryum coelestinum (L.) Brandis
Lichardi	Cynoglossum zeylanicum (Hornem.) Thunb.
Litchi	Nephelium chinensis (Sonn.) Almeida.
Lokhandi	Ixora brachiata Roxb.
Lokhandi	Ixora pavetta Andrews.
Lokhandi	Ligustrum perottettii DC. var. obovatum (Cl.) Gamble
Lokhandi	Psydrax umbellatum (Wight) Brisden
Lotal	Osyris wightiana Wall. ex Graham.
Lus	Dodonaea viscosa (L.) Jacq.
Mabngium	Acacia mangium Willd.
Macadamia-nut	Macademia ternifolia F. v. Muell.
Machamul	Tagetes patula L.
Machi	Grangea maderaspatana (L.) Poir
Mad	Cocos nucifera L.
Madan ghanti	Borreira articularis (L.) Will.
Madan Ghanti	Borreira pusilla (Wall.) DC.
Madan-mast	Abutilon persicum (Burm.f.) Merrill.
Madbel	Combretum albidum D. Don
Maddam	Abutilon persicum (Burm.f.) Merrill.
Madhavi-lata	Hiptage benghalensis Kurz.
Madhiri	Corchorus depressus (L.) Stocks.
Mahaneem	Melia composita Willd.
Mahanimb	Ailanthus excelsa Roxb.
Mahesh vel	Argyreia ? Sp. (small white fls.)
Mahesh vel	Argyreia cymosa (Roxb.) Sweet
Mahiravan	Kalanchoe pinnata (Lamk.) Pers.
Mahogani	Swietenia mahogani (L.) Jacq.
Mahua	Madhuca indica Gmelin
Maiden Hair.	Adiantum capillus veneris L.
Maiden Hair.	Adiantum incisum
Maiden Hair.	Adiantum philippense L.
Mainmul	Coleus barbatus (Anders.) Benth.
Maka	Eclipta prostrata (L.) L.
Maka	Zea mays L.
Makdi	Atalantia racemosa W. & A.

List of local names

Local names	Scientific names
Malkanguni	<i>Celastrus paniculatus</i> Willd.
Mamejoa	<i>Enicostemma Verticillare</i> (Retz.) Baill
Mandar	<i>Calotropis gigantea</i> (L.) R. Br.
Mandukaparni	<i>Centella asiatica</i> (L.) Urban
Manga,	<i>Dendrocalamus strictus</i> (Roxb.) Nees
Manjishtha	<i>Rubia cordifolia</i> L.
Man-onapu	<i>Impatiens minor</i> (DC.) Bennett.
Marvel	<i>Dicanthium annulatum</i> (Forsk.) Stapf
Marvel	<i>Melanocenchris jaquemontii</i> Jaub. & Spach.
Maryadvel	<i>Ipomoea pes-caprae</i> (L.) R. Br.
Mashi	<i>Lepidagathis trinervia</i> Wall
Mat	<i>Vigna aconitifolia</i> (Jacq.) Marechal.
Matak	<i>Asclepias curassavica</i> L.
Mataki	<i>Vigna</i>
Math	<i>Amaranthus blitum</i> L.
Math	<i>Amaranthus cruentus</i> L.
Math	<i>Amaranthus graicizans</i> L. ssp. <i>polygonoides</i> (Moq.) Thell. ex Probs
Math	<i>Amaranthus viridis</i> L.
Matki	<i>Vigna aconitifolia</i> (Jacq.) Marechal.
Medshingi	<i>Dolichandrone spathacea</i> (G. Don) Steenis
Medvan	<i>Dioscoria oppositifolia</i> L.
Mehandi	<i>Lawsonia inermis</i> L.
Mendial	<i>Cassia italica</i> (Mill.) Spr.
Mendurli	<i>Triumfetta rotundifolia</i> Lamk.
Mesquite	<i>Prosopis Chilensis</i> (Molina) Stunz.
Methi	<i>Trigonella foenum-graecum</i> L.
Mhaisvel	<i>Argyreia pilosa</i> W. & A.
Mhaisvel	<i>Argyreia sericea</i> Dalz. & Gibs.
Mhatara	<i>Sonchus oleraceus</i> L.
Mhatari	<i>Sonchus oleraceus</i> L.
Mindal	<i>Catunaregam spinosum</i> (Thunb.) Thiruveng.
Mindphal	<i>Catunaregam spinosum</i> (Thunb.) Thiruveng.
Mirchi	<i>Capsicum annum</i> L.
Modi	<i>Casearia ovata</i> (Lamk.) Willd.
Mogali-erand	<i>Jatropha curcas</i> L.
Mohari	<i>Brassica juncea</i> (L.) Czern.
Moi	<i>Lannea coromandelica</i> (Houtt.) Merrill.
Mokandar	<i>Justicia betonica</i> L.
Mokha	<i>Schrebera swietenoides</i> Roxb.
Money Plant	<i>Epipremnum aureum</i> (Linden ex Andre) Bunting
Morkhad	<i>Clematis wightiana</i> Wall.
Morvel	<i>Clematis heynei</i> Rao.
Mosambi	<i>Citrus sinensis</i> (L.) Osbeck.
Motha Agadha	<i>Achyranthes coinei</i> Sant.
Motha gokharu	<i>Xanthium strumarium</i> L.
Motha Tera	<i>Alocacia macrorhiza</i> (L.) Schott.
Motha-pavna	<i>Sehima nervosum</i> (Rottl.) Stapf
Mothi	<i>Girardinia diversifolia</i> (Link.) Friics
Mothi	<i>Vernonia cinerea</i> (L.) Less.
Mothi kauli	<i>Cryptostegia grandiflora</i> R. Br
Mothi Punarnava	<i>Boerhavia chinensis</i> (L.) Aschers. & Sweinf.
Mothi-dongri	<i>Chrysopogon</i> sps
Motta-pullu	<i>Ricklielkia chinensis</i> (Osbeck) Almeida
Mottenga	<i>Kyllingia bulbosa</i> Beauv.
Mountain spinach	<i>Atriplex hortensis</i> L.
Muchkund	<i>Pterospermum acerifolium</i> (Gaertn.) Willd.
Mudra	<i>Abutilon indicum</i> (L.) Sw.
Mukal	<i>Trichosanthes tricuspidata</i> Lour.
Mukni	<i>Vigna trilobata</i> (L.) Verdc.

Local names	Scientific names
Murud-sheng	<i>Helicteres isora</i> L.
Murva	<i>Sansevieria ebracteata</i> (Cav.) Suresh
Mushik	<i>Moringa pterygosperma</i> Gaertn.
Nadi Kanthari	<i>Capparis murrayana</i> Graham.
Nagdaun	<i>Crinum asiaticum</i> L.
Naghin	<i>Sansevieria ebracteata</i> (Cav.) Suresh
Nagphana	<i>Opuntia elatior</i> Mill.
Nahehi	<i>Ensete glaucum</i> (Roxb.) Cheesm.
Naie	<i>Enicostemma verticillare</i> (Retz.) Baill
Nak-shinkani	<i>Cassine glauca</i> (Rottb.) O. Kuntze.
Nalichi-bhaji	<i>Ipomoea aquatica</i> Forsk.
Nana	<i>Lagerstroemia parviflora</i> Roxb.
Nandana	<i>Cissus repanda</i> Vahl.
Nandan-vel	<i>Cissus repanda</i> Vahl.
Nandruk	<i>Ficus microcarpa</i> L. f.
Narali	<i>Persicaria piripu</i> (DC.) Almeida
Naram	<i>Lagerstroemia lanceolata</i> Wall. ex W. & A.
Narivi	<i>Hibiscus rosa-malabrica</i> Koen. ex Hk.
Narli	<i>Cocos nucifera</i> L.
Narr	<i>Malva verticillata</i> L. var. <i>chinesis</i> (Mill.) Hu.
Navrangi	<i>Dicoma tomentosa</i> Cass.
Neem	<i>Azadirachta indica</i> (L.) Juss.
Neesam	<i>Zingiber neesana</i> (Graham.) Ramamurthy.
Neli	<i>Phyllanthus emblica</i> L.
Neurang	<i>Euphorbia neriifolia</i> L.
Nhiv	<i>Neolamarkia cadamba</i> (Roxb.) Bosser
Nichardi	<i>Triumfetta pentandra</i> A. Rich.
Nil	<i>Indigofera tinctoria</i> L.
Nilam-pullu	<i>Murdannia nimmoniana</i> (Graham) Bole & Almeida
Nilgir	<i>Eucalyptus globulus</i> Labil.
Nil-pushpa	<i>Ipomoea nil</i> (L.) Roth.
Nimurdi	<i>Blumea eriantha</i> DC.
Niorgundi	<i>Vitex negundo</i> L.
Nirda	<i>Indigofera cassioides</i> Roth.
Nirgudi	<i>Vitex negundo</i> L.
Nir-muri	<i>Alysicarpus buplerifolius</i> (L.) DC.
Nirpullu	<i>Phyllanthus virgatus</i> Forst. f.
Niruri	<i>Phyllanthus virgatus</i> Forst. f.
Nishigandha	<i>Polianthes tuberosa</i> L.
Nishottar	<i>Operculina turpethum</i> (L.) Manso
Nisurdi	<i>Adelocaryum coelestinum</i> (L.) Brandis
Nivali	<i>Pedilanthus tithymaloides</i> (L.) Poit.
Nivdung	<i>Opuntia elatior</i> Mill.
Okharda	<i>Chrozophora rottleri</i> (Geis.) Juss. ex spr.
Old maid	<i>Catharanthus roseus</i> (L.) G. Don
Omani	<i>Rhus sinuata</i> Thunb.
Onetto	<i>Bixa orellana</i> L.
Onion	<i>Allium cepa</i> L.
Orache	<i>Atriplex hortensis</i> L.
Osadi	<i>Ageratum conyzoides</i> L.
Ovali	<i>Mimusops elengi</i> L.
Pachunda	<i>Capparis grandis</i> L. f.
Pachurna	<i>Securinega obovata</i> (Willd.) Almeida.
Paddy	<i>Oryza sativa</i> L.
Pahadvel	<i>Cyclea peltata</i> (Lamk.) Hk. f.
Pahuna	<i>Cenchrus pennisetiformis</i> Hoechst. ex Steud.
Pair	<i>Ficus arnottiana</i> (Miq.) Miq.
Pair astha	<i>Ficus rumphii</i> Blume.
Palas	<i>Butea monosperma</i> (Lamk.) Taub.

List of local names

Local names	Scientific names
Pandha	<i>Pinda concanensis</i> (Dalz.) Constance & Mukhop.
Pandhara	<i>Catunaregam uliginosum</i> (Retz.) Sivarajan.
Pandhara	<i>Spilanthes paniculata</i> DC.
Pandhari	<i>Murraya paniculata</i> (L.) Jack.
Pandhari Punarnava	<i>Boerhavia erecta</i> L.
Pandhari savar	<i>Ceiba pentandra</i> (L.) Gaertn.
Pandharpali	<i>Securinega Obovata</i> (Willd.) Almeida.
Pandharpali	<i>Securinega leucopyros</i> (Willd.) Muell. Arg.
Pandhra dhotra	<i>Datura inoxia</i> Mill.
Pandhra khair	<i>Acacia leucophloea</i> (Roxb.) Willd.
Pandhra-deochapha	<i>Plumeria alba</i> L.
Pandhri	<i>Catunaregam uliginosum</i> (Retz.) Sivarajan.
Pandra gulab	<i>Rosa multiflora</i> Thunb.
Pandrunk	<i>Sterculia urens</i> Roxb.
Pangara	<i>Desmodium alysicarpoides</i> Snaap van Meuwen.
Pangara	<i>Erythrina stricta</i> Roxb.
Pan-jambhal	<i>Syzygium alternans</i> (Wt.) Miq.
Panphutti	<i>Kalanchoe pinnata</i> (Lamk.) Pers.
Pansher	<i>Synadenium grantii</i> Hk. f.
Papaie	<i>Carica papaya</i> L.
Paphati	<i>Pavetta crassicaulis</i> Bremek.
Paral	<i>Persicaria piri</i> (DC.) Almeida
Paras-Bhendi	<i>Thespesia populnea</i> (L.) Soland. ex Corr.
Paribhadra	<i>Desmodium alysicarpoides</i> Snaap van Meuwen.
Paribhadra	<i>Erythrina stricta</i> Roxb.
Parijat	<i>Nyctanthus arbortristis</i> L.
Paripath	<i>Oldenlandia corymbosa</i> L.
Pasi	<i>Dalbergia paniculata</i> Roxb.
Paspoli	<i>Dioscoria oppositifolia</i> L.
Passion-flower	<i>Passiflora caerulea</i> L.
Patangdi	<i>Cissus elongata</i> Roxb.
Patha	<i>Cissampelos pareira</i> L.
Pathari	<i>Launea obtusa</i> (DC.) Clarke
Pathari	<i>Launea remotiflora</i> (DC.) Stebbin.
Pathari	<i>Launea sarmentosa</i> (Willd.) Sch. Bip
Pathar-suvva	<i>Glossocardia boswallea</i> (L.f.) DC.
Patra	<i>Grangea maderaspatana</i> (L.) Poir
Pavana	<i>Dichanthium caricosum</i> (L.) A. Camus
Pavani	<i>Dichanthium annulatum</i> (Forsk.) Stapf
Pee-motenga	<i>Kyllingia nemoralis</i> (Forst. & Forst.) Dandy
Perin-munja	<i>Acalypha fruticosa</i> Forsk.
Perivincle	<i>Catharanthus roseus</i> (L.) G. Don
Peru	<i>Psidium guajava</i> L.
Petari	<i>Abutilon asiaticum</i> (L.) Sweet
Petari	<i>Abutilon indicum</i> (L.) Sw.
Pev	<i>Costus speciosus</i> (Koen. ex Retz.) Smith
Phalsa	<i>Grewia asiatica</i> L.
Phan vel	<i>Cayratia pedata</i> (Lamk.) A. Juss.
Phanas	<i>Artocarpus heterophyllus</i> Lamk.
Phand	<i>Rivea hypocratifomis</i> (Desv.) Choisy
Phand	<i>Rivea ornata</i> (Roxb) Choisy
Phand-bhaji	<i>Rivea hypocratifomis</i> (Desv.) Choisy
Phangla	<i>Pogostemon benghalensis</i> (Burm. f.) O. Kuntze
Phanji	<i>Rivea hypocratifomis</i> (Desv.) Choisy
Phanya	<i>Opuntia elatior</i> Mill.
Phasvel	<i>Rivea hypocratifomis</i> (Desv.) Choisy
Phetar	<i>Ceriscoides turgida</i> (Roxb.) Thiruveng.
Phutani-chirani	<i>Sida spinosa</i> L.
Piaz	<i>Allium cepa</i> L.

List of local names

Local names	Scientific names
Pilosa	<i>Euphorbia dracunculoides</i> Lamk.
Pilosa	<i>Euphorbia rothiana</i> Spr.
Pilu-khakan	<i>Salvadora persica</i> L.
Pimpernal	<i>Anagallis arvensis</i> L.
Pin cushion	<i>Lepidagathis prostrata</i> Dalz
Pipal	<i>Ficus religiosa</i> L.
Pipri	<i>Ficus amplissima</i> Sm.
Pipri	<i>Ficus tsjahela</i> Burm. f.
Pisa	<i>Actinodaphne gullavara</i> (Buch. Ha. ex. Nees) Almeida
Pithavani	<i>Securinega leucopyros</i> (Willd.) Muell. Arg.
Pithvan	<i>Desmodium gangeticum</i> (L.) DC.
Pit-karvi	<i>Thelepaepale ixiocephala</i> (Benth.) Bremek.
Pitmari	<i>Typha angustifolia</i> L.
Pitpapda	<i>Glossocardia boswallea</i> (L.f.) DC.
Pival vel	<i>Combretum albidum</i> D. Don
Pivala bhopla	<i>Cucurbita</i>
Pivala Dhotra	<i>Argemone mexicana</i> L.
Pivali devkel	<i>Canna flaccida</i> Roxb.
Pivali kanher	<i>Thevetia peruviana</i> (Pers.) K. Schum.
Pivali koranti	<i>Blepharis repens</i> (Vahl.) Roth
Pivali-tilvan	<i>Cleome viscosa</i> L.
Plantain	<i>Musa paradisiaca</i> Linn.
Pohe	<i>Eragrostis uniloides</i> (Retz.) Nees ex Steud.
Policha-vel	<i>Rivea hypocratiformis</i> (Desv.) Choisy
Polkathi	<i>Acacia fornigera</i> (L.f.) Willd.
Pol-kirait	<i>Bidens biternata</i> (Lour.) Merrill & Sheriff
Poona brown cos	<i>Lactuca sativa</i> L.
Popli	<i>Osyris wightiana</i> Wall. ex Graham.
Poppy	<i>Papaver somniferum</i> L.
Popti	<i>Physalis minima</i> L.
Pudina	<i>Mentha spicata</i> L.
Punarnava	<i>Boerhavia repens</i> L.
Pu-pal-valli	<i>Pupalia lappacea</i> (L.) Juss.
Ragatrohida	<i>Rhamnus hirsuta</i> W. & A.
Rai	<i>Brassica juncea</i> (L.) Czern.
Rai-jambhal	<i>Syzygium caryophyllifolia</i> (Lamk.) DC.
Raikuda	<i>Ixora pavetta</i> Andrews.
Rain tree	<i>Samanea saman</i> (Jacq.) Merrill.
Rajgira	<i>Amaranthus viridis</i> L.
Rajgiri	<i>Amaranthus hybridus</i> L.
Rajnigandha	<i>Polianthes tuberosa</i> L.
Rakt-roda	<i>Persicaria glabra</i> (Willd.) Gomes.
Rametha	<i>Gnidia eriocephala</i> (Fren.) Gilg.
Ramkathi	<i>Acacia nilotica</i> var. <i>Andersonii</i>
Ramphal	<i>Annona reticulata</i> L.
Ramrakh	<i>Diploclisia glaucescens</i> (Bl.) Diels.
Ram-tulsi	<i>Ocimum canum</i> Skms.
Ran bhendi	<i>Azanza lampas</i> (Cav.) Alef.
Ran Jira	<i>Baccharoides scabridum</i> (DC.) Almeida.
Ranavati	<i>Phyllanthus maderaspatensis</i> L.
Ran-bhendi	<i>Abelmoschus manihot</i> var. <i>tetraphyllus</i> (Rox ex Honem.) Borssun
Randhuni	<i>Trachyspermum matthewii</i> Almeida.
Ran-gajari	<i>Pimpinella wallichiana</i> (Miq) Gandhi.
Ran-gheuda	<i>Paracalyx scariosa</i> (Roxb.) Ali
Rangoon creeper	<i>Quisqualis indica</i> L.
Rangun creeper	<i>Antigonon leptopus</i> Hook.
Ran-hulga	<i>Teramnus</i> sp.
Ran-kel	<i>Ensete glaucum</i> (Roxb.) Cheesm.
Ran-limbuni	<i>Atalantia racemosa</i> W. & A

List of local names

Local names	Scientific names
Ran-ova	Trachyspermum stictocarpum (Clarke) Wolff.
Ran-sheer	Sarcostemma viminalis (L.) R. Br
Ran-sheuri	Sopubia delphinifolia (L.) G. Don
Ran-shevga	Moringa concanensis Nimmo.
Ran-terda	Impatiens balsamina var. rosea Hk. f.
Ran-tewan	Hygrophila serphyllum (Nees) T. Anders
Ran-tur	Cajanus lineatus (Wt. & A.) Van.
Ran-udid	Teramnus labialis (L.f.) Spreng.
Ran-udid	Vigna radiata (L.) Wilizeck.
Rasna	Aerides maculosum L.
Rasna	Tylophora indica (Burm.f.) Merrill
Rat ki rani	Cestrum nocturnum L.
Ratalu	Ipomoea batatas (L.) Lamk.
Ratan-jyot	Jatropha curcas L.
Rati	Abrus precatorius L.
Ratnaparkhi	Rubia cordifolia L.
Rat-siras	Samanea saman (Jacq.) Merrill.
Rhea Fiber Plant	Boehmeria caudata (Burm.f.) Poir.
Rhea Fiber Plant	Boehmeria nivea (L.) Gaud.
Ribbon bush	Homalocladium platycladosm (Muell.) Bailen.
Ringni	Solanum nigrum L.
Ritha	Sapindus trifoliatus L.
Rodga	Grewia
Rohan	Soymida febrifuga (Roxb.) A. Juss.
Rohitak, Sohaga	Aphanamysis polystachyos
Ronati	Mallotus philippensis (Lamk.) Muell. Arq.
Rubber plant	Ficus elastica Roxb. ex Horne
Ruhin	Soymida febrifuga (Roxb.) A. Juss.
Rui	Calotropis gigantea (L.) R. Br.
Ryan	Manilkara hexandra (Roxb.) Dubara
Sabar	Euphorbia ligulari Roxb.
Sabar-kande	Euphorbia ligulari Roxb.
Sabduli	Mirabilis jalapa L.
Sabja	Ocimum basilicum L.
Sadada	Terminalia crenulata Roth.
Sadafuli	Catharanthus roseus (L.) G. Don
Sadmandi	Emilia sonchifolia (L.) DC.
Sadori	Vernonia cinerea (L.) Less.
Safed chitrak	Plumbago zeylanica
Safed gunj	Abrus precatorius var. alba.
Safed Musali	Chlorophytum glaucum Dalz.
Safed phangli	Pogostemon frutescens Graham
Safed siras	Albizia procera (Roxb.) Benth.
Safed-gokarni	Clitoria ternatea var. alba.
Safed-kuda	Wrightia tinctoria (Roxb.) R. Br
Sag	Malva verticillata L. var. chinesis (Mill.) Hu.
Sag	Tectona grandis L. f.
Sagarghota	Caesalpinia
Sagvan	Tectona grandis L. f.
Salai	Lannea coromandelica (Houtt.) Merrill.
Salparni	Desmodium gangeticum (L.) DC.
Salphali	Bosswelia serrata Roxb. ex Coleb.
Salvan	Desmodium gangeticum (L.) DC.
Saman	Samanea saman (Jacq.) Merrill.
Sambar-vel	Argyrea capilliformis (Lamk.) Almeida
Samrat	Acacia
Samudraphen	Ipomoea pes-caprae (L.) R. Br.
Samudrashosh	Argyrea nervosa (Burm.f.) Boj
Sankasur	Caesalpinia pulcherrima (L.) Sw

Local names	Scientific names
Sapkand	<i>Amorphophallus commutatus</i> (Schott.) Eng.
Saptaparna	<i>Alstonia scholaris</i> (L.) R. Br.
Sarata	<i>Achyranthus porphyrostachys</i> Wall. ex Moq.
Sarata	<i>Tribulus terrestris</i> L.
Sardol	<i>Sterculia villosus</i> Roxb.
Sardyache zad	<i>Arisaema tortuosum</i> (Wall.) Schott.
Sarmal	<i>Cassia pumila</i> Lamk.
Sarpagandha	<i>Rauwolfia serpentina</i> Benth.
Sarso	<i>Brassica juncea</i> (L.) Czern.
Sasachi gondi	<i>Asparagus racemosus</i> Willd.
Satap	<i>Ruta graveolens</i> L. var. <i>angustifolia</i> Hk. f.
Satodi	<i>Boerhavia repens</i> L.
Satvin	<i>Alstonia scholaris</i> (L.) R. Br.
Savar	<i>Bombax ceiba</i> L.
Schunda	<i>Solanum melongena</i> var. <i>incanum</i> (L.) O.K
Sendhari	<i>Mallotus philippensis</i> (Lamk.) Muell. Arq.
Senji	<i>Macrotyloma uniflora</i> (Lamk.) Vercourt.
Sennar ebony	<i>Dalbergia latifolia</i> Roxb.
Sesame	<i>Sesamum orientale</i> L.
Shahadevi	<i>Vernonia cinerea</i> (L.) Less.
Shankhapushpi	<i>Clitoria ternatea</i> L.
Shankhapushpi	<i>Evolvulus alsinoides</i> (L.) L.
Sharpankha	<i>Tephrosia purpurea</i> (L.) Pers
Shatavari	<i>Asparagus racemosus</i> Willd.
Shatmul	<i>Asparagus gonocladus</i> Baker.
Sheda	<i>Chrysopogon fulvus</i> (Sap.) Chiov.
Shedvel	<i>Dioscoria pentaphylla</i> L.
Shegat	<i>Moringa pterygosperma</i> Gaertn.
Shembi	<i>Acacia pennata</i> (L.) Willd.
Shendri	<i>Bixa orellana</i> L.
Shendvel	<i>Cissus repanda</i> Vahl.
Shengul	<i>Moringa pterygosperma</i> Gaertn.
Shepherd's weather glass	<i>Anagallis arvensis</i> L.
Shepu	<i>Anethum graveolens</i> L.
Shepu	<i>Glossocardia boswallea</i> (L.f.) DC.
Sher	<i>Euphorbia tirucalli</i> L.
Sheral	<i>Persicaria glabra</i> (Willd.) Gomes.
Sherni	<i>Homonoia riparia</i> Lour.
Sherod	<i>Falconeria malabaricum</i> Wt.
Shervad	<i>Mussaenda glabrata</i> (Hk. f.) Hutchins.
Shetur	<i>Morus alba</i> L.
Sheula	<i>Amorphophallus commutatus</i> (Schott.) Eng.
Shevri	<i>Sesbania sesban</i> (L.) Merrill.
Shikekai	<i>Acacia sinuata</i> (Lour.) Merrill.
Shimpi gavat	<i>Arthraxon</i>
Shindal-makadi	<i>Caralluma adscendens</i> var. <i>fimbriata</i> (Wall.) Gravely & Mayurnath
Shindalvan	<i>Curcuma pseudomontana</i> Graham.
Shindi	<i>Phoenix sylvestris</i> (L.) Roxb.
Shinguti	<i>Leptadenia reticulata</i> (Retz.) Wt. & Arn.
Shirish	<i>Albizzia lebeck</i> (L.) Willd.
Shirka	<i>Tripogon</i>
Shivali	<i>Nyctanthus arbortristis</i> L.
Shivalingi	<i>Diplocyclos palmatus</i> (L.) Jeffrey.
Shivan	<i>Gmelina arborea</i> Roxb.
Shivra	<i>Alysicarpus longifolius</i> (Rott.ex Spr.) Wt. & Arn.
Shiwde	<i>Cucumis melo</i> L. sub-sp- <i>agrestis</i> (Naud.) Panglo
Shoe-flower	<i>Hibiscus rosa-sinensis</i> L.
Sigam kati	<i>Dichrostachys cinerea</i> (L.) W. & A.
Sij	<i>Euphorbia ligulari</i> Roxb.

Local names	Scientific names
Sisal fibre plant	<i>Agave sisalana</i> Perrine. ex Engleman.
Sisal plant	<i>Agave sisalana</i> Perrine. ex Engleman.
Sisam	<i>Dalbergia latifolia</i> Roxb.
Sisori	<i>Persicaria glabra</i> (Willd.) Gomes.
Sisvi	<i>Dalbergia sissoo</i> Roxb. ex DC.
Sita ashok	<i>Saraca asoka</i> (Roxb.) de Willde.
Sitaphal	<i>Annona squamosa</i> L.
Snow bush	<i>Breynia nivosa</i> (Bull.) Small.
Somalata	<i>Sarcostemma viminalis</i> (L.) R. Br
Sonchampa	<i>Michelia champaka</i> L.
Sondhara	<i>Dalbergia paniculata</i> Roxb.
Sonki	<i>Senecio bombaiensis</i> Balakrishnan.
Sonmohor	<i>Peltophorum pterocarpum</i> (DC.) Baker.
Sontarwad	<i>Caesalpinia pulcherrima</i> (L.) Sw.
Sowa	<i>Anethum graveolens</i> L.
Soyabean?	<i>Vicia faba</i> L.
Spearmint	<i>Mentha spicata</i> L.
Speed-well	<i>Veronica anagallis-aquatica</i> L.
Spider Grass	<i>Chlorophytum capense</i> (L.) Voss.
Staki	<i>Ensete glaucum</i> (Roxb.) Cheesm.
Stylo-gavat	<i>Stylosanthes hamata</i> (L.) Taub.
Subabhul	<i>Leucaena leucocephala</i> (Lamk.) de Wit.
Sugar cane	<i>Saccharum officinarum</i> L.
Sukhchain	<i>Pongamia pinnata</i> (L.) Pierre.
Sunthi	<i>Zingiber officinale</i> Roscoe.
Supli	<i>Firmiana colorata</i> (Roxb.) R. Br.
Supli	<i>Mundulea sericea</i> (Willd.) A. Chev.
Surajmukhi	<i>Helianthus annuus</i> L.
Suraka	<i>Atriplex hortensis</i> L.
Suru	<i>Casuarina litoralis</i> L.
Suryakadi	<i>Dicanthium</i> sps.
Suryaphul	<i>Helianthus annuus</i> L.
Suryavarti	<i>Chrozophora rottleri</i> (Geis.) Juss. ex spr.
Sweet basil	<i>Ocimum basilicum</i> L.
Tag	<i>Crotalaria juncea</i> L.
Takla	<i>Cassia tora</i> L.
Takmak	<i>Cucumis melo</i> L. sub-sp-agrestis (Naud.) Panglo
Talakia	<i>Striga asiatica</i> (L.) O. K
Talap	<i>Striga angustifolia</i> (D. Don.) Saldanha
Tali-pullu	<i>Murdania nudiflora</i> (L.) Brenan
Taman	<i>Lagerstroemia speciosa</i> (L.) Pers.
Tambat	<i>Flacourtia indica</i> (Burm.f.) Merrill.
Tambuti	<i>Acacia horrida</i> (L.) Willd.
Tamilkhana	<i>Hygrophila schulli</i> (Buch-Ham.) Almeida & Almeida
Taniki	<i>Homonoia riparia</i> Lour.
Tantani	<i>Lantana camara</i> var. <i>aculeata</i> (L.) Mold
Tapioca	<i>Manihot esculanta</i> . Cranz.
Tarangi	<i>Wendlandia thyrsoides</i> (Roth) Steud.
Tarat	<i>Capparis stylosa</i> DC.
Tarb	<i>Sopubia delphinifolia</i> (L.) G. Don
Tarota	<i>Cassia tora</i> L.
Tarvad	<i>Cassia auriculata</i> L.
Tarvata	<i>Cassia tora</i> L.
Tasmanian blue gum	<i>Eucalyptus globulus</i> Labil.
Tausa	<i>Wendlandia thyrsoides</i> (Roth) Steud.
Teewas	<i>Ougenia oojinensis</i> (Roxb.) Hochrest.
Tejovati	<i>Cardiospermum halicacabum</i> L.
Telas	<i>Ougenia oojinensis</i> (Roxb.) Hochrest.
Temburni	<i>Diospyros melanoxylon</i> Roxb.

List of local names

Local names	Scientific names
Terda	<i>Impatiens balsamina</i> L.
Tere	<i>Alocacia esculenta</i>
Tetu	<i>Oroxylum indicum</i> Vent.
Thor	<i>Euphorbia antiquorum</i> L.
Thor	<i>Euphorbia neriifolia</i> L.
Til	<i>Sesamum orientale</i> L.
Timru	<i>Diospyros melanoxylon</i> Roxb.
Tisal	<i>Zanthoxylum rhetsa</i> (Roxb.) DC.
Toddy palm	<i>Caryota urens</i> L.
Toltimya	<i>Grewia</i>
Tondval	<i>Coccinea grandis</i> (L.) Voight.
Topia	<i>Dalbergia paniculata</i> Roxb.
Toran	<i>Zizyphus rugosa</i> Lamk.
Tugli	<i>Albizzia amara</i> (Roxb.) Boivin.
Tulasi	<i>Ocimum tenuiflorum</i> L.
Tumba	<i>Leucas aspera</i> (Willd.) Link.
Tumba	<i>Leucas stelligera</i> Wall.
Tupa	<i>Psydrax umbellatum</i> (Wight) Brisden
Tur	<i>Cajanus cajan</i> (L.) Mill sp.
Turda	<i>Arthraxon villosus</i> C. E. C. Fisher
Turki	<i>Indigofera linifolia</i> (L.f.) Retz.
Turti	<i>Limnophila dubia</i> (L.) Almeida
Ukshi	<i>Calycopteris floribunda</i> Lamk.
Uksiamen	<i>Cassia roxburghii</i> DC.
Umbar	<i>Ficus racemosa</i> L.
Umbari	<i>Ficus ampelos</i> Burm.
Undir-mar	<i>Glyricidia sepium</i> (Jacq.) Kunth.
Undri Pachnai	<i>Linum mysorensis</i> Heyne. ex Roth.
Unhali	<i>Tephrosia purpurea</i> (L.) Pers
Uns	<i>Saccharum officinarum</i> L.
Urmedi	<i>Cassia roxburghii</i> DC.
Ursal	<i>Psydrax umbellatum</i> (Wight) Brisden
Utarandiche gavat	<i>Lavandula multifida</i> Burm. f.
Utarani	<i>Pergularia diamea</i> (Forsk.) Chiv.
Utati	<i>Tephrosia purpurea</i> (L.) Pers
Utkatyar	<i>Echinops echinata</i> Roxb.
Vad	<i>Ficus benghalensis</i> L.
Vagti	<i>Nilgiranthus heyneanus</i> (Nees) Brem.
Vajradanti	<i>Barleria prionitis</i> Linn.
Vali	<i>Vigna unguiculata</i> (L.) Walp.
Van-Bhendi	<i>Urena lobata</i> ssp. <i>sinuata</i> (L.) Borssum.
Vangi	<i>Solanum melongena</i> L.
Varang	<i>Kydia calycina</i> Roxb.
Varas	<i>Heterophragma quadrilocularis</i> (Roth.) K. Schum.
Vasalvel	<i>Cocculus hirsutus</i> (L.) Diels.
Vasu	<i>Boerhavia repens</i> L.
Vatoli	<i>Diploclisia glaucescens</i> (Bl.) Diels.
Vauding	<i>Embelia basaal</i> (R. & S.) DC.
Vaula, Papda	<i>Holoptelea integrifolia</i> (Roxb.) Planch.
Vaushi	<i>Tripogon</i>
Vedi-babhal	<i>Acacia nilotica</i> var. <i>Andersonii</i>
Veetla caita	<i>Cyanotis cristata</i> (L.) D. Don
Vekhand	<i>Acorus calamus</i> L.
Veli-gulab	<i>Rosa multiflora</i> Thunb.
Vidari	<i>Pueraria tuberosa</i> (Roxb.) DC.
Vilayati chinch	<i>Pithecolobium dulce</i> (Roxb.) Benth.
Vilayati kihar	<i>Parkinsonia aculeata</i> L.
Vilayati vakhundi	<i>Cryptostegia grandiflora</i> R. Br
Vilavati erand	<i>Jatropha gossypifolia</i> L.

List of local names

Local names	Scientific names
Waghathi	Capparis zeylanica L.
Wara-pullu	Cyperus exaltatus Retz.
Wara-pullu	Juncellus alopecuroides (Rottb.) Clare.
Water hyacinth	Eichornia crassipes (Mart.) Solms.
Water-lettuce	Pistia stratiotis L.
Whaiti	Nilgiranthus heyneanus (Nees) Brem.
Wild date-palm	Phoenix sylvestris (L.) Roxb.
Winter cherry	Nicandra physaloides (L.) Gaertn.
Wood apple	Feronia limonia (L.) Swingle
Yelati	Dichrostachys cinerea (L.) W. & A.
Yellangi	Embelia basaal (R. & S.) DC.
Yeltur	Dichrostachys cinerea (L.) W. & A.
Yenkal	Maytenus senegalensis (Lamk.) Excell.
Yeralm	Calotropis gigantea (L.) R. Br.
Zellusi	Combretum albidum D. Don
Zendu	Tagetes erecta L.
Zinnia	Zinnia elegans Jacq.
Zinzurdi	Triumfetta rotundifolia Lamk.

**LIST OF WILD ANIMALS, BIRDS AND SNAKES
FOUND IN AHMEDNAGAR DISTRICT**

WILD ANIMALS

Sr. No.	Local Name	English Name	Zoological Name
1.	Biblya or Bibtya	Panther	Panthera pardus
2.	Taras	Hyena	Hyaena hyeana
3.	Kolha	Jackal	Canis aureus
4.	Khokad	Grey fox	Vulpus bengalensis
5.	Ran dukkar	Indian wild boar	Sus scrofa
6.	Neelgai	Blue Bull	Boselaphus tragocamelus
7.	Chowsingha	Four horned Antelope	Tetracerus quadricornis
8.	Kavit	Black Buck	Antilope cervicapra
9.	Chinkara	Indian gazelle	Gazella gazelle
10.	Bhekar	Barking deer	Muntiacus muntjak
11.	Mungoos	Common Mongoose	Herrpestes edwardsi
12.	Ran manjar	Wild Cat	Fellis chaus
13.	Salu or Sayal	Porcupine	Hystrix indica
14.	Sase	Indian hare	Lepus nigricollis
15.	Khadi khar	Fivestriped Palm squirrel	Funambulus pennanti
16.	Shekru	Large brown Flying squirrel	Petaurista philippensis

BIRDS

1.	Baya	Baya weaver Bird	Ploceus philippinus
2.	Bharadwaj	Crow Pheasant or coucal	Centropus sinensis
3.	Chota Basantha	Crimsonbreasted Barbet or Coppersmith	Megalaima haemacephala
4.	Chimni	House sparrow	Passer domesticus
5.	Deshi myna	Common myna	Acridotheres tristis
6.	Ghar	Black Winged Kite	Elanus caeruleus
7.	Ghar	Pariah Kite	Milvus migrans govinda
8.	Ghubad	Brown Wood Owl	Strix leptogrammica

9.	Ghubad	Indian Screech Owl	Strix Javanica
10.	Choubad or Pingla	Spotted Owlet	Athene brama
11.	Harial	Common green Pigeon	Teron Phoenicoptera
12.	Holga	Red Turtle Dove	Streptopelia Tranquebarica
13.	Holga	Spotted Dove	Streptopelia chinensis
14.	Kabutar	Blue Rock Pigeon	Columba livia
15.	Kala Baza	Black Ibis	Pseudibis papillosa
16.	Kala Teetar	Grey partridge	Francolinus pondicerianus
17.	Khandya	Common or small Blue Kingfisher	Alcedo atthis
18.	Khandya	Pied kingfisher	Ceryle rudis
19.	Kokila	Koel	Eudynamys scolopacea
20.	Kotwal	Black Drongo Or King Crow	Dicrurus adsimilis
21.	Kotwal	Racket tailed Drongo	Dicrurus paradiseus
22.	Lahuri	Jungle Bush Qual	Perdica asiatica
23.	Lal Munia	Red Munia	Estrilda amandava
24.	Maldhok	Great Indian Bustard	Choriotis nigriepps
25.	Mor	Common peafowl	Pavo cristatus
26.	Nikanth	Indian Roller Or Blue Jay	Coracias bengalensis
27.	Patringa	Small Green Bee Eater	Merops Orientalis
28.	Peelak	Blackheaded Oriole	Oriolus xanthornus
29.	Peelak	Golden Oriole	Oriolus Oriolus
30.	Popat	Roseringed Parakeet	Psittacula Krameri
31.	Rankombdi	Grey Jungle fowl	Gallus sonneratti
32.	Satbhai	Common Babbler	Turdoides caudatus
33.	Satbhai	Jungle Babbler	Turdoides straitus
34.	Shikra	Shikra	Accipiter Badius
35.	Shimpi	Tailor Bird	Orthotomus sutorius

36.	Sutar	Mahratta	Dendrocopos, Mahrattensis
37.	Tembat	Hoopoe	Upupa epops
38.	Gai Bagala	Cattle Egret	Bubulcus ibis
39.	Bagala	Grey Heron	Ardea cinerea
40.	Gagala	Pond Heron Or paddy Bird	Ardeola grayii
41.	Pan Kawla	Little cormorant	Phalacrocorax niger
42.	Pankombadi	Water Hen	Gallinula Chloropus
43.	Titavi	Red wattled Lapwing	Vanellus indicus
44.	Kala Pidda	Pied Bushchat	Saxicola caprata
45.	Swargiy nartak	Paradise Flycatcher	Terpsiphone paradise
46.	Nachan Chakdik	White spotted Flycatcher	Rhipidura albogularis
47.	Dhanesh	Common Grey Hornbill	Tockus birostris
48.	Chandul	Crested lark	Galerida Cristata
49.	Duri. Deoli	Ashycrowned or Black bellied Finch Lark	Eremopterix grisea
50.	Telia munia (Sinewaz)	Spotted Munia	Lonchura Punctulata
51.	Myna	Indian Night Jay	Caprimulgus asiaticus
52.	Barsiri	Stone Curlew or Goggle Eyed Plover	Burhinus Odicnemus
53.	Chuvak	Indian Robin	Saxicoloides fulicata
54.	Dyal	Magpie Robin	Copsychus saularis
55.	Bulbul	Bay Backed Shrike	Lanius Vittatus
56.	Jambhla Surya Parkashi	Purple Sunbird	Nectarinia asiatica
57.	Ababed Leishra	Swallow	Hirundo rustica
58.	Leishra	Wiretailed Swallow	Hirundo Smithii
59.	Myna	Tree Pie	Dendrocitta vagabunda
60.	Bulbul (Khanjan)	Large Pied Wagtail	Motacilla caspica

SNAKES			
a) POISONOUS :			
1)	Nag	Cobra	Naja naja
2)	Manyar	Common Krait	Bangarus caeruleus
3)	Phurse	Saw Scaled Vipur	Echis carinatus
4)	Ghonus	Russell`s Vipur	Vipera russelli
b) NON- POISONOUS			
5)	Ajagar	Indian Python	Python molurus
6)	Dhaman	Rat Snake	Ptys mucosus
7)	Harantol	Common Green Whip Snake	Dryphis nasutus

DEFINITIONS OF THE TERMS USED IN THE WORKING PLAN

Afforest	To establish a forest by artificial means on an area from which forest vegetation has always or long been absent.
Afforestation Series.	A forest area forming the whole or part of working circle and delineated so as to distribution afforestation activity and regeneration to suit local conditions.
Artificial Regeneration	The process of renewal of a forest by sowing, plantings or other artificial means
Aspect	The direction towards which a slope faces.
Base Line	A line which is used as a base for further work.
Beat	A territorial charge, primarily protective in scope, sub-division of a range; usually the charge of a forest guard or a forester.
Biotic	Pertaining to living organism in their ecological rather than physiological relations.
Biotic factor	Any influence of living organisms.
Blank	An unstocked forest area where, for any reason few or no trees are growing, A gap in a plantation.
Catchment area	The total area draining into a given waterway, lake or reservoir.
Census	A complete enumeration and classification of a population.
Cattle	Under the Indian Forest Act the term includes elephants, camels buffaloes, horses, mares, geldings ponies, colts fillies, mules, asses, pigs, rams, ewes, sheep, lambs, goats and kids.
Cleaning	A tending operation done in a sapling crop, involving the removal or topping of inferior growth including individuals or the favoured species, climbers etc., when they are interfering with the better grown individuals of the favoured species.
Climatic Factors	Light, atmospheric temperature, pressure and humidity, winds and other features of climate that influence vegetation.

Climber	A herbaceous or woody plant that climbs up trees or other support.
Climber cutting	A cultural operation or tending in which climbers are cut back
Close, to	To prohibit entry into a forest for exercising any right or privilege
Compartment History Coupe	A record of all events affecting the forestry Of an individual compartment. A felling area usually one of an annual series.
Cut back, to	To cut flush with the ground
Demarcate, to	The setting out and marking the limits of a forest.
Density, Crop	The relative completeness of the tree stocking expressed as a decimal coefficient, taking normal number of trees, basal area or volume as unity.
Deviation	A departure from the prescription of a working plan.
Enumeration	The counting, singly or together, of individuals of one or more species in a forest crop and their classification by species. Size condition etc.
Felling series	A forest area forming the whole or part of working circle and delimited so as (1) to distribute felling and regeneration to suit local conditions and (2) to maintain or create a normal distribution of age classes. The yield is calculated separately for each felling series which should have an independent representation of age classes.
Fire break	An existing barrier, natural or otherwise or one prepared before a fire occurs, from which all or most of the inflammable materials have been removed, designed to stop light ground or surface fires and to serve as a line from which to work and counterfire if necessary; also to facilitate the movement of men and equipment in the fighting.
Fire watcher	A person employed to aid in fire protection.
Fire season	a) The period of year during which forest fires are likely to occur and become dangerous b) The period or periods of the year during which the use of fire in a forest is subject to legal restriction

Forest Protection	An area wholly or partly covered with woody growth, managed primarily to regulate stream flow, prevent erosion, hold shifting sand, or to exert any other beneficial influence.
Forest, Thorn	A forest in which the dominantsare chiefly small thorny trees and shrubs.
Forest, Unclassed	Forest land owned by Government but not constituted into a reserved, village or protected. Forest
Game	Forms of wildlife hunted for sport, food, fur etc
Grazing, Controlled	Conservative grazing through controlling the period and incidence by the movement of livestock in different parts of the area in prescribed sequence.
Grazing	The use of different parts of the grazing area of pasture in orderly sequence. The use of the this term is sometimesrestricted to grazing involving short rotational closures of a week or a month or more at different seasons in the year, grazing involving longer closures of a year or more at a time, being called periodice grazing.
Grazing capacity	The amount of grazing that an area can support under controlled grazing expressed as number of animals or equivalent cow units per acre.
Habitat	a) The sum of effective environmental conditions under which an organism lives. b) Often used for the natural range of distribution of a species. c) The kind of place in which a plant or animal lives, such as forest habitat, grass-land habitat.
Map, Stock	A map showing the distributions of the different forest or stand types which have a bearing on management, with information about their composition, age class, etc.

Map, Management	A map prepared, normally as part of a working plan, to show the division of the forest area into management units, the layout of roads, etc.
Nursery	An area where plants are raised for eventual planting out; has ordinarily both seeding and transplant beds. Nurseries are either permanent or temporary.
Predator	An animal that preys externally on other. A predator usually

	destroys several hosts; an animal parasite usually lives in or on a single host.
Quality, Site	A measure of the relative productive capacity of a site for a particular species. The top height as it varies with age is generally the basis of classification.
Rotation	The planned number of years between formation or regeneration of a crop and its final felling. In the case of a selection forest the average age at which a tree is considered mature for felling.
Royalty	A prescribed fee forest produce payable to the owner of the forest
Sample, stratified Random	A sample from a stratified population consisting of a random selection of sampling units from each stratum.
Sampling unit	The ultimate unit of assessment or measurement in a sample. In a sample. It may be the individual, any given number of individuals, a given area of ground
Sanctuary	An area constituted by competent authority in which killing and capturing of any form of wild life is prohibited except with permission and the boundaries and character of which area sacrosanct.
Silviculture	The art and science of cultivating forest crops
Silvicultural System	A method of silvicultural procedure worked out in accordance with accepted sets of silvicultural principles, by which crops constituting forest area tended, harvested and replaced by new crops of distinctive forms.
Silvicultural Operations, Subsidiary	A general term for all operations carried out immediately after the main felling; besides cultural operations proper, this might include other specific operations.
Slope	The gradient of the surface of the ground, given either as the angle the surface makes with the horizontal or as the ratio expressed as a fraction or percentage, between the vertical rise or fall and the horizontal distance in which the rise or fall has occurred.
Tending	Generally, an operation carried out for the benefit of a forest crop, at any stage of its life; essentially covers operations on the

	crop itself and an competing vegetation e.g. weeding cleaning, thinning and even improvement fellings; also pruning, climber cutting and girding of unwanted growth, but not regeneration fellings nor ground operations like soil working drainage, irrigation and controlled burning.
Watershed	Strictly a water Parting, the dividing line between catchment areas, The use of this term as a synonym for catchment or drainage area is deprecated.
Watershed	Strictly a water Parting, the dividing line between catchment area, the use of the term as a synonym for catchment or drainage area is deprecated.
Working circle	A forest area organized with a particular object, and under one silvicultural system and one set of working plan prescriptions. In certain circumstances working circles may over lap.
Working Plan	A Written scheme of management aiming at continuity of policy and action and controlling the treatment of a forest .

PART – I

SUMMARY OF FACTS ON WHICH THE PROPOSALS ARE BASED

CHAPTER I

THE TRACT DEALT WITH

SECTION: 1

NAME AND SITUATION:

SECTION 1.1: LOCATION

1. The area dealt with under this plan comprises of the Forest areas in the revenue district of Ahmednagar, nestled between the Rivers Godavari and Bhima, located centrally in the state of Maharashtra . The district spreads between 73 °38` and 75° 36` East longitudes and 18°19' and 19°59` North latitudes. Ahmednagar district is the largest district of Maharashtra State, with a length of about 1992 Kilometers and width of about 200 kilometres, encompassing an area of 17,413 Square Kilometers, which is 5.66% of the State Geographical area. The district is bounded by districts Nashik in the North, by Aurangabad in the North-East, by Beed and Osmanabad in the East, by Pune and Thane in the West and by Solapur in the South, making it the only district in the state of Maharashtra being bounded by 7 districts.

SECTION 1.2: CONFIGURATION OF THE GROUND.

2. The district encompasses 14 Tahsils with 1581 villages and is home to 4040642 population as per the 2001 census, with 80.11% being rural and has a population density of 232 per square kilometer (against 315 of state). The Scheduled Castes population number 4,84,655 (12%) with those of the Scheduled Tribe being 3,03,255 (7.51%). The district houses 14 Panchayat samitis, 1308 grampanchayats, 1 Mahanagarpalika, 8 nagarpalika, 1 nagar panchayat (Shirdi-holy town) and 1 cantonment board (Ahmednagar cantonment). The population in the 1581 villages is represented as under:

s.no	Population category	Total villages	Percentage
1	0 to 1499	943	59.65
2	1500 to 2999	408	25.81
3	3000 to 4999	153	9.68
4	5000 to 9999	55	3.48
5	10000 to 19999	18	1.14
6	20000 and above	2	0.13
	Total district	1581	100.00

3. The forest area is quite scattered and administered under a Deputy Conservator of forests stationed at Ahmednagar and a recently created Independent Sub-divisional

- forest officer/Assistant Conservator of forests stationed at Sangamner within seventeen territorial units.
4. The Government of Maharashtra had resolved on 3rd December 2008, on administrative grounds, and created a new independent forest sub-division Sangamner with headquarters at Sangamner, under the administrative control of an Assistant Conservator of forests, Sangamner with 6 territorial ranges namely Sangamner I, Sangamner II, Sangamner III, Akole (territorial), Akole (EGS) and Rajur. The Sub-division has become operational since 1st of April 2009. This would leave the rest of the district under the administrative control of the Deputy Conservator of forests, Ahmednagar division, with headquarters at Ahmednagar, with 11 territorial ranges namely Kopargaon, Rahuri (territorial), Ahmednagar, Parner, Takli Dhokeshwar, Pathardi, Tisgaon, Shrigonda I, Shrigonda II, Karjat and Jamkhed.
 5. The SAHYADRI MOUNTAINS form, for a distance of about forty kilometers, a continuous natural boundary between the Ahmadnagar and Thane districts. When viewed from the west or low level of the Konkan the appearance of this range is that of a mighty wall of rock, 2000 to 3000 feet high, of dark hue relieved by narrow horizontal belts of grass and evergreen forest, surmounted by isolated peaks and rocky bluffs rising in many places to a further height of 1000 to 1500 feet. The three hill-forts of Kulang, Ratangad and Harishchandragad are among the most striking of these masses of rock within Ahmadnagar limits. These mark the points of divergence from the main line of the Sahyadris of three great spurs, Kalsubai, Baleshwar, and Harishchandragad, which stretch far across the district, gradually decreasing in height as they pass eastwards.
 6. The KALSUBAI range, branching off at Kulang, is the northernmost of the three spurs and for some thirty kilometers forms the boundary between the Ahmednagar and Nasik districts. Viewed from the Nasik side it presents the appearance of a continuous and in many places a precipitous wall of rock. Almost every hill in this range has been a fort and many still have water cisterns and granaries. Alang, Pandara, Palan, Bitangad and Mahakali are the prominent ones in this range. Kalsubai, the highest peak of Sahyadri (1654 Metres) is situated in the North-Western border of the district. The tract of country which lies between the central portion of this range and the Pravara river is extremely rugged. The range extends to Sangamner town and further ends sharply with the hill of Dudheshwar. The flat-topped hills Tava and Raula, which lie a few kilometers off the Akola town are conspicuous objects from all parts of the Pravara valley. As far as Kalsubai, the mountains are averagely wooded with mango, jamun, and other semi-evergreen

- trees; teak abounded on the slopes of the spurs jutting towards the south; the part of the range which lies in Sangamner is covered with scrub and at places is bare.
7. The BALESHWAR Range, the second great spur of the Sahyadris, which branches off at Ratangad 12 kilometers south-east of Kulang, completely traverses the Akola and Sangamner sub-divisions forming on the north the valley of the Pravara and on the south the valley of Mula. East of Ratangad is a series of lofty mountains, Katrabai, Mura, Shirpunj, and Sindola, followed by Asvalya, Ghatsari, and Dhagya. The range culminates with Baleshwar as a central mass crowned with a ruined Hemadpanti temple, surrounded by spurs radiating from the centre in all directions. East of Dhumya the hills decrease in height and finally subside in the open plain near Rahuri. The range which extends to about 95 kilometers has similar vegetation to that of Kalsubai range.
 8. The HARISHCHANDRAGAD range is the longest in the district and forms the watershed between the Godavari and Bhima rivers. For an initial twenty five kilometers the direction is easterly, shutting in the valley of the Mula river which flows between it and Baleshwar range, and forming the boundary line between the Ahmadnagar and Pune districts. The range decreased in height from Bhramanvada, takes a south-east turn, crosses the corner of Junnar division of Pune, and enters Parner which it completely traverses. The summits of the hills here widen into the plateau of Kanher; near the village of Jamgaon on the Nagar side of the plateau from which two spurs branch off. One turning to the east forms the watershed between the Godavari and the Bhima, while the other travels southwards, crosses the north-east corner of the Srigonda tahsil and enters Karjat tahsil. The former flat ridge shoots to the north-east, which distinguishes forming the watershed line between the tributaries of Godavari and those of the Bhima. The ridge enters the Nagar revenue sub-division and as the ground on the north gradually acquires a slope towards the Mula river, it becomes the crest of a tableland having a gentle slope towards the south-east. North of the town of Ahmednagar the crest rises again to the dignity of a mountain range, wherein the hills of Gorakhnath, Manjarsumba and Gunjala are prominent. The spurs in Karjat tehsil after crossing Shrigonda extend all the way eastward, gradually losing height. The distinguishing feature of this branch is the succession of pathars or flat-topped hills which are so uniformly horizontal as to bear an almost artificial appearance. The valleys of innumerable streams flowing generally towards east feed the major rivers of the district. The hill ranges have given rise to many terraces along the foot-hills, which fall along steep sides marked by cliffs. Besides these ranges there are many hills which are either isolated or forming the backbone of ridges between streams.

9. The physiography of the districts has given rise to four major characteristic land forms viz. (i) the hills and ghat, (ii) the foothills, (iii) the plateaus and (iv) the plains.

The tahsil wise extent of such features (in sq.kms) depicting different physiographic features in Ahmednagar district is as under: Rahata a new tahsil has been carved out from tehsils Shrirampur and Kopargaon, and has not been shown separately.

Sr. No.	Tahsil	Hills & Ghats	Foot Hills	Plateau	Plains	Total
1	Kopargaon	-	-	-	1044.80	1044.80
2	Akola	548.72	425.98	-	603.50	1488.26
3	Sangamner	229.37	425.98	196.60	828.15	1680.10
4	Shrirampur	-	-	-	1092.10	1092.10
5	Rahuri	-	262.14	49.15	730.41	1041.70
6	Newasa	32.76	-	-	1210.94	1243.70
7	Shevgaon	65.53	-	-	1184.17	1229.70
8	Parner	-	688.12	163.84	935.64	1787.60
9	Ahmednagar	-	294.91	114.68	1106.11	1515.70
10	Pathardi	393.21	262.14	-	446.45	1101.80
11	Shrigonda	-	262.14	32.76	1304.70	1599.60
12	Karjat	32.76	360.44	65.53	991.97	1450.70
13	Jamkhed	65.53	278.52	-	528.25	872.30
Total		1277.88	3260.37	622.56	11888.19	17048.00
% age of Total		7.5%	19.1%	3.7%	69.7%	100%

10. The different land forms in a region constitute its physical setup. If we consider the physical setup of Ahmednagar district, there are three physical divisions
- Western Hilly region: comprising of Akole taluka and Sangamner taluka, with the hilly ranges of Adula, Baleshwar and Harishchandragad. Kalsubai with height of 5427 feet, is the highest peak in the Sahyadris, and lies in this region.
 - Central Plateau region: comprising of Parner and Ahmednagar talukas and parts of Sangamner, Shrigonde and Karjat talukas.
 - The region of Northern and Southern Plains: comprising of Northern Kopargaon, Rahata, Shrirampur, Rahuri, Newasa, Shevgaon and Pathardi talukas. This is the region of Godavari and Pravara river basins. Parts of the Southern talukas of Shrigonda, Karjat, Jamkhed are also included in this physical division, the region of which covers basins of the Ghod, Bhima and the Sina rivers.

11. The district is drained by two chief rivers, the Godavari and the Bhima a tributary of the Krishna. The watershed line is the great spur of the Sahyadris which branches off at Harishchandragad and stretches completely across the district from West to East. The important rivers flowing through the district are Pravara, Mula, Sina and Dhora. Pravara is the tributary of the river Godavari. Waters of the river Pravara fall from a great height, creating the Randha falls.
12. The Godavari, Bhima and Sina are the major rivers forming three important basins in the district. The River Godavari enters the district at village Chas in Kopargaon tahsil and flows about 138 Kilometers along the North eastern boundary of the district through tahsils of Rahata, Shrirampur, Newasa and Shevgaon, leaving the district at village Mungi.
13. The River Pravara, a tributary of Godavari, originates in Akole tahsil between Kulang and Ratangad, and joins Godavari in Newasa tahsil, the dam Bhandardara is constructed across the river at Bhandardara, near by are the Randha falls. The Rivers Mula, Adhula and Mahalungi are important tributaries draining into Pravara. The Adhula rises in the north of Akole on the slopes of Patta and Mahakali, flows for fifteen miles in an easterly direction between two ranges of hills which encloses the Samsherpur valley; joins Pravara three miles west of the town of Sangamner. The Mahalungi rises on the southern and eastern slopes of Patta and Aundha, passes into Nashik district and reenters Ahmednagar district.
14. The Mula rises on the eastern slopes of the Sahyadris between Ratangad and Harishchandragad crosses through Sangamner, Parner. The Mula Dam is constructed across the river at Baragaon Nandur in Rahuri. The Dhora rises on the slopes of the hills east of the town of Ahmednagar, drains Shevgaon and part of Newasa.
15. The southern portion of the district, comprising of Parner, Ahmednagar, Pathardi, Shrigonda and Karjat tahsils comprise the Bhima basin with River Kukadi and Ghod forming the tributaries of the Bhima. The River Bhima enters the district at village sangwi of Shrigonda Tahsil, flows about 56 kilometers along the boundaries of Pune and Ahmednagar districts and leaves the district at village Babulgaon.
16. The River Sina, a major tributary of Bhima forms the Sina sub-basin. It originates in village Pimpalgaon Ujjani of Ahmednagar tahsil and leaves the district at village Khadaki of Jamkhed Taluka, after flowing along a course of about 120 kilometers through Ahmednagar, Karjat and Jamkhed tahsils.

The following table indicates the details of various rivers of the district.

Sr. No.	Name of the river	Perennial or Seasonal	Length in the district in Kms.	Tahsils through which flows
1.	Pravara	Perennial	200	Akola, Sangamner, Rahata, Rahuri, Newasa and Shrirampur
2.	Adhala	Seasonal	48	Sangamner & Akola
3.	Mahalungi	Seasonal	13	Sangamner
4.	Kahu	Seasonal	35	Parner
5.	Kopri	Seasonal	35	Parner And Ahmednagar
6.	Sina	Seasonal	120	Ahmednagar, Karjat Jamkhed
7.	Hanga	Seasonal	65	Parner & Shrigonda
8.	Mehekar	Seasonal	32	Ahmednagar
9.	Ghod	Seasonal	70	Shrigonda
10.	Kukadi	Seasonal	28	Parner
11.	Khanapuri	Seasonal	22	Karjat
12.	Dhor	Seasonal	70	Shevgaon
13.	Simphana	Seasonal	23	Shevgaon
14.	Deo	Seasonal	46	Shrigonda and Rahuri
15.	Rodi	Seasonal	17	Shevgaon
16.	Kas	Seasonal	23	Sangamner
17.	Bhima	Perennial	36	Shrigonda & Karjat
18.	Godavari	Perennial	156	Rahata, Kopargaon, Newasa, Shrirampur, and Shevgaon (Border)
19.	Mula	Perennial	150	Akola, Sangamner, Parner & Rahuri

Dams have been constructed on Pravara, Sina, Kukadi, Godavari, Mula Adhala, Ghod and Mahalungi rivers. Majority of these rivers are not perennial The physiographic features and drainage courses have given rise to slightly undulating terrain and plains.

The projects classified as Major and Minor existing in the district are tabulated as under:

s.no	Type	Name of reservoir	Valley	Project gross storage (Mcft)
1	Major	Mula	Godavari	26000
2		Bhandardara	Godavari	11039
3		Nilwande II	Godavari	8320
4		Ghod	Krishna	7639
1	Medium	Adhala	Godavari	1060
2		Mandohol	Godavari	399
3		Ghatshil Pargaon	Godavari	440
4		Sina	Krishna	2400
5		Khairy	Krishna	533
6		Visapur	Krishna	922

SECTION : 1. 3 – GEOLOGY, ROCK AND SOIL

GEOLOGY AND ROCK:

17. The entire Ahmednagar district forms the Deccan plateau basalt province, which covers about 82 percent of the total area of state. Because of their tendency to form flat topped plateau like features and their dominantly basaltic composition, such lavas are called “Plateau Basalt” The flows are called “ Traps”, on account of the step like or terraced appearance of their outcrops. The Deccan trap basalt, being volcanic rocks, contains cavities formed due to escape of gases from the lava. On the basis of these gas cavities, the basalt can be divided into three types
 - a) The vesicular basalt with empty gas cavities.
 - b) The amygdaloidal basalt with gas cavities filled up by secondary minerals.
 - c) The compact basalt without gas cavities.
18. Prismatic disposition is observed more markedly and perfectly in the basalt strata than in the amygdaloids. Perfect columns are generally small, of four, five, or six sides, but the prismatic structure sometimes manifests itself in basaltic and amygdaloidal columns many feet in diameter, in the face of the hill at Kothul, a small village in Shrigonda twenty four miles south of Ahmednagar, there is thick stratum of close grained gray homogenous basalt which is crowned by temple of Khandoba. In the watercourses near Kadus in Parner are columns of basalt of bluish gray colour, compact texture, vitreous hue, and sharp fracture. At Harishchandra there is sheet of rock which has the appearance of a pavement of pentangular slabs which are doubtless the terminal planes of basaltic columns. Round or oval masses of compact basalt, with concentric layers like the coats of an onion, known as nodular basalt are widely diffused and form another characteristic of Deccan trap formation. The basaltic dykes are all vertical and do not occasion any disturbance or dislocation in the strata through which they pass. The most remarkable example is the dyke which runs vertically from east to west through the hill fort of Harischandragad. Another distinctive feature is the occurrence of strata of red ochreous rock underlining thick strata of basalt or amygdaloid. At Baragaon-Nandur in the Rahuri taluka it is found thick as a porphyritic stratum with embedded crystals of lime and is used as a building stone. Another distinctive feature of the Deccan trap formation is the occurrence of immense quantities of loose basalt stones of all sizes which look as if

they had been showered on the land; also of rock piled into heaps as if by labour of the man.

19. The traps weather with characteristic spheroid exfoliation, which given rise to large rounded boulders on the outcrops. The rocks give rise to either deep brown to rich red soil or to regur (black cotton soil). Close to the ground surface the basalt displays a greater degree of shattering. At places the lava flows are overlain by older alluvial deposits, consisting of gravel, conglomerate, sand and hard silt. Overlying the older alluvium is the recent alluvium, consisting of unconsolidated strata of sand, silts and soil deposited on the banks of many streams and rivulets. Alluvial deposits of varying thickness are also recorded; they are located along major river courses like Godavari, Pravara and Mula in Sangamner, Kopergaon, Shirampur Newasa and Rahuri Tahsils, while the alluviums are also observed along the Sina and Bhima rivers in Ahmednagar, Karjat, Jamkhed and Shrigonda tahsil. The alluvial deposits of Pravara basin are more clayey in nature as compared to those of Mula basin.
20. Pot holes in the Rocky River beds are of frequent occurrence. Those above the falls of the Pravara, at village of Rauda in the Akole tahsil, and at Kund-Mahuli in the Kukadi River a short distance from the village Nighoj in the Parner tehsil, are specially noteworthy on account of their number and size.

SOIL :

Soil constitutes the physical basis of all forestry works involving afforestation practices. The capacity of soil to retain and transmit moisture depends upon its structure and texture. Three major nutrients namely Nitrogen, Phosphorus and Potassium account for soil fertility. Based on the Physical characteristics of the soil, the soils, of Ahmednagar district can be divided into the following five major categories viz. (i) Black cotton soil, (ii) Red soil, (iii) Lateritic soil, (iv) coarse shallow soil or Barad and (v) White soil, locally known as Pandhari.

21. In Rahuri tahsil, the soil is mostly deep, black and rich coupled with perennial water system in the hilly areas of Akola tahsil, red lateritic soil is deeper on slopes than on the levels. In the plain lands of Akola and Sangamner tahsils, the soil along the banks of Pravara is extremely rich and gradually becomes poor, as one approach the hills. Kopergaon and Shirampur plains have in general, a good depth of soil near the Godavari and Pravara rivers. The Southern portion of the district, comprising the tahsils of Ahmednagar, Parner, Shrigaonda and Karjat with cross ranges of hills has

deep table lands. Most of the plain land in this region, however, is covered by poor and shallow soil. In the South-east the soil in Jamkhed tahsil is generally light. Low levels of reddish land mixed with patches of poor soils are common in Jamkhed areas. Soils of Newasa and Shevgaon tahsils are rich and very fertile.

22. Table given below indicates the distribution of different types of soil in Ahmednagar district (Rahata tehsil is included in Rahuri and Shrirampur tehsils).

Sr. No.	Tahsil	Type of soil (In Sq.Kms.)				Total Sq.Kms)
		Reddish brown soil along hill slopes	Coarse shallow soil	Medium soil	Deep black soil	
1	2	3	4	5	6	7
1.	Kopergaon	-	-	847.43	197.37	1044.80
2.	Akola	1457.48	15.36	-	15.36	1488.20
3.	Sangamner	-	1090.29	393.21	196.60	1680.10
4.	Shrirampur	-	-	795.50	296.60	1092.10
5.	Rahuri	-	163.84	550.16	327.68	1041.70
6.	Newasa	-	-	1013.94	229.76	1243.70
7.	Shevgaon	-	294.91	572.65	365.14	1129.70
8.	Parner	-	1672.92	-	114.68	1784.60
9.	Ahmednagar	-	1417.41	65.33	32.76	1515.70
10.	Pathardi	-	229.37	872.43	-	1101.80
11.	Shrigonda	-	491.52	845.94	262.14	1599.60
12.	Karjat	-	229.37	991.96	229.37	1450.70
13.	Jamkhed	-	445.29	360.48	65.53	872.30
Total		1457.48	6051.28	7309.25	2229.99	17048.00

23. The rainfall is the main source of soil moisture. The same quantity of rainfall will effect soil moisture differently under different conditions of soil depths, slopes, location of sites in watersheds etc. which ultimately results in opportune time for intake of rain water. The soil can also be put into the following four categories on the basis of soil depth.

Sr.No.	Type of Soil	Depth in Cms.	Available Soil moisture in mm. At saturation
i)	Very shallow soils	Upto 10	16
ii)	Shallow soil	Above 10 & Upto 22.5	37
iii)	Medium deep soils	Above 22.5 & Upto 60	65 to 67
iv)	Deep Soils	Above 60	140

24. The above classification of soil types is broad based and there are bound to be intricate local variations in the physical and chemical characteristics depending upon number of variable factors. It is, therefore, extremely necessary to get the soils tested well in advance while taking up afforestation and plantation works and to decide the doses of manures and the base elements needed for proper growth of seedlings.
25. The National Bureau of Soil survey and Land Use Planning in co-operation with the Department of Agriculture, Maharashtra evolved soil resource maps for the state of Maharashtra and has also published soil-maps at 1:500,000 scale. Ahmednagar Forest Division, has the following soil categories as per NBSS&LUP classification, the polygon numbers and description of which is given below. The soil map of Ahmednagar division is prepared on this basis. The polygon numbers of Ahmednagar division are-
- 75,83,89,95,106,107,110,111,113,115,122,125,126,136,138,141,143,150,
163,164,165,175,176,178,187,193,209,211,212,231,241,243,244,254,258, 259 and 283.

The distinct features as per this classification are tabulated as under:

75	Soils of dissected hills with escarpments with narrow valleys-very shallow, excessively drained, loamy soils on moderately steeply sloping highly dissected escarpments of the Northern Sahyadri with severe erosion ; associated with shallow, well-drained loamy soils with moderate erosion.
83	Soils of dissected hills with escarpments with narrow valleys-shallow,, well drained, clayey soils on moderately sloping highly dissected hill ranges on Northern Sahyadri with moderate erosion; associated with slightly deep, moderately well drained, clayey soils with moderate erosion.
89	Soils of Upper Maharashtra (Deccan) Plateau-very shallow, somewhat excessively drained, loamy soils on moderately sloping summits/spurs with severe erosion and strong stoniness; associated with rock outcrops.
95	Soils of Upper Maharashtra (Deccan) Plateau-very shallow, well drained, loamy soils, on very gently sloping summits/spurs of upper plateau with moderate erosion; associated with shallow, moderately well drained, loamy soils with moderate erosion.
106	Soils of Upper Maharashtra (Deccan) Plateau- Shallow, well drained, clayey soils on gently sloping summits/spurs with moderate erosion associated with extremely shallow well drained, clayey soils with moderate erosion and moderate stoniness.
107	Soils of Upper Maharashtra (Deccan) Plateau-Shallow, well drained, clayey calcareous soils on gently sloping summits/spurs with moderate erosion; associated with slightly deep, well drained, fine, calcareous soils with moderate erosion.
110	Soils of undulating lands-very shallow, somewhat excessively drained, loamy, calcareous soils on gently sloping undulating lands with severe erosion; associated with very shallow, somewhat excessively drained, loamy, calcareous soils with severe erosion.
111	Soils of undulating lands-very shallow, somewhat excessively drained, loamy, calcareous soils on gently sloping undulating lands with severe erosion and moderate stoniness; associated with shallow, well drained, clayey soils with moderate erosion.
113	Soils of undulating lands-extremely shallow, well drained, loamy soils on gently sloping lands with severe erosion; associated with slightly deep, moderately well drained, fine, calcareous soils with moderate erosion.
115	Soils of undulating lands-very shallow, well drained, loamy calcareous, soils on gently sloping undulating lands with moderate erosion; associated with very shallow well drained,

	loamy, calcareous soils with severe erosion and moderate stoniness.
122	Soils of undulating lands-shallow, well drained, loamy soils on gently sloping undulating lands with moderate erosion; associated with moderately deep, moderately well drained, loamy soils with moderate erosion.
125	Soils of undulating lands-very shallow, well drained, clayey soils on moderately sloping undulating lands with moderate erosion and moderate stoniness; associated with very shallow, well drained, clayey soils with moderate erosion.
126	Soils of undulating lands-slightly deep, somewhat excessively drained, loamy soils on gently sloping and undulating lands with severe erosion; associated with slightly deep, well drained, fine, calcareous soils with moderate erosion.
136	Soils of undulating lands-deep, well drained, fine soils on gently sloping lands with moderate erosion; associated with moderately deep, well drained, fine, soils on gently sloping lands with moderate erosion.
138	Soils of plains-deep, well drained, loamy, calcareous soils on very gently sloping plain with moderate erosion; associated with moderately deep, well drained, fine, calcareous soils with moderate erosion.
141	Soils of plains-shallow, well drained, loamy soils on moderately sloping lands with very severe erosion and slight stoniness; moderately deep, well drained, clayey soils with moderate erosion and slight stoniness.
143	Soils of plains-shallow, well drained, loamy, calcareous soils on very gently sloping plain with moderate erosion; associated with very shallow, well drained, loamy, calcareous soils with moderate erosion.
150	Soils of plains-deep, well drained, loamy, calcareous soils on very gently sloping plain with slight erosion; associated with slightly deep, loamy, well drained, calcareous soils with moderate erosion.
163	Soils of undulating lands with Mesas and Buttes-very shallow, excessively drained, loamy soils on moderately sloping undulating lands, with mesas and buttes with severe erosion and strong stoniness; associated with very shallow, excessively drained, clayey soils with severe erosion.
164	Soils of undulating lands with Mesas and Buttes-extremely shallow, somewhat excessively drained, clayey soils on moderately sloping undulating lands with mesas and buttes with severe erosion and strong stoniness; associated with rock outcrops.
165	Soils of undulating lands with Mesas and Buttes-very shallow, well drained, clayey soils on moderately sloping undulating lands with mesas and buttes with severe erosion; associated with very shallow, well drained, clayey soils with severe erosion.
175	Soils of undulating lands with Mesas and Buttes-very shallow, somewhat excessively drained, loamy, calcareous soils on gently sloping undulating lands with mesas and buttes with severe erosion; associated with very shallow excessively drained, loamy soils with very severe erosion and moderate stoniness.
176	Soils of undulating lands with Mesas and Buttes-slightly deep, well drained, fine, calcareous soils on very gently sloping lands with mesas and buttes with moderate erosion; associated with slightly deep, well drained, fine, calcareous soils with moderate erosion.
178	Soils of undulating lands with Mesas and Buttes-very shallow, well drained clayey soils on gently sloping lands with mesas and buttes with moderate erosion; associated moderately deep, moderately well drained, fine soils with moderate erosion.
187	Soils of Lower Maharashtra (Deccan) Plateau-soils of summits and spurs-very shallow, well drained, loamy calcareous soils on gently sloping summits/spurs with severe erosion; associated with very shallow well drained loamy soils with severe erosion.
193	Soils of Lower Maharashtra (Deccan) Plateau-soils of summits and spurs-shallow, well drained, clayey, calcareous soils on gently sloping summits and spurs with moderate erosion; associated with very shallow, well drained, clayey soils with moderate erosion.
209	Soils of undulating lands-slightly deep, moderately well drained, moderately calcareous, fine soils, on very gently sloping lands with moderate erosion; associated with very shallow, well drained clayey, moderately calcareous, soils with moderate erosion.
211	Soils of undulating lands-slightly deep, well drained, fine, moderately calcareous soils, on very gently sloping lands with moderate erosion; associated with slightly deep, well drained,

	fine soils with moderate erosions.
212	Soils of undulating lands-Slightly deep, well drained, fine, moderately calcareous soils on gently sloping lands with moderate erosion; associated with slightly deep, well drained clayey moderately calcareous soils with moderate erosion.
231	Soils of plains and valleys-very shallow, well drained, loamy soils on gently sloping lands with severe erosion and moderate stoniness; associated with very shallow, well drained, clayey soils with moderate erosion.
241	Soils of plains and valleys-Deep, well drained, fine soils on gently sloping plains and valleys with slight erosion; associated with shallow, somewhat excessively drained, clayey soils with moderate erosion.
243	Soils of plains and valleys-Moderately deep, moderately well drained, clayey soils on very gently sloping plains and valleys with moderate erosion and slight salinity; associated with deep, moderately well drained, clayey soils with moderate erosion.
244	Soils of plains and valleys-Slightly deep, moderately well drained, fine soils on very gently sloping plains and valleys with moderate salinity; associated with moderately deep, well drained clayey calcareous soils with moderate erosion.
254	Soils of plains and valleys-Deep, Moderately well drained, fine, calcareous soils on very gently sloping plains and valleys with moderate erosion; associated with shallow, well drained, clayey soils with moderate erosion.
258	Soils of plains and valleys-Very deep, moderately well drained fined, calcareous soils on very gently sloping plains and valleys with moderate erosion; associated with shallow, well drained, clayey soils with moderate erosion.
259	Soils of plains and valleys-Deep, moderately well drained, fine, calcareous soils on very gently sloping plains with moderate erosion; associated with moderately deep, moderately well drained, fine, calcareous soils with moderate erosion.
283	Soils of rolling lands with mesas and buttes-Very shallow, well drained, loamy soils on gently sloping rolling lands with mesas and buttes with severe erosion and moderate stoniness; associated with very shallow, well drained, clayey soils with moderate erosion.

26. The different types of soils-polygons found in each of the tehsils are depicted as under:

s.no	Tehsil	Polygon numbers of soil types as per NBSS & LUP classification.
1	Akole	75,163,258,176,175,83.
2	Sangamner	126,176,138,107,143,150,211.
3	Shrirampur	211,258,243.
4	Rahata	211,258,243.
5	Kopargaon	212,211,258,126.
6	Rahuri	111,187,258,126,150,283,176,110.
7	Newasa	258,283,263.
8	Shevgaon	283,258,259,209.

9	Pathardi	283,259,89,209,164.
10	Parner	176,150,110,107,216,126,241,115,165.
11	Shrigonda	165,216,241,115,244,236.
12	Karjat	236,115,165,113,217,241,193,259,216,106.
13	Jamkhed	231,259,217,164,29,193,128,108.
14	Nagar	76,110,176,211,258,216,259,165,236.

SECTION :1. 4- RAINFALL AND CLIMATE :

27. The district receives rainfall mainly from the South – West monsoon, which normally sets in during middle of June and ends by October. The distribution of the rainfall is uneven and erratic in all the areas excepting Akola tahsil. The normal rainfall of the area ranges between 5000 and 700 mm. Based on mean average annual rainfall the district can be broadly divided into following three major zones.

- a. ZONE I : This is the zone of heavy rainfall. Rainfall in this area is quite heavy and ranges from 2000-4000 mm. Such area is confined to the western most part in Akola tahsil
- b. Zone II: This is the zone of medium rainfall. This is confined to Akola tahsil in the west. The rainfall varies from 1000-2000 mm.
- c. Zone III: this is the zone of low rainfall, spread over majority of the district area. Areas in tehsils of Parner, Ahmednagar, Shrigonda parts of Sangamner etc., predominantly have such areas.

28. The rainfall is most erratic and uncertainty prevails over normalcy. Moisture deficiency during the major period of the year prevails all over the area. It is apparent that a suitable choice of species would have to be made while carrying out plantation programs, based upon the rainfall variation pattern. The fact finding committee of Government of Maharashtra has reported that the rainfall is not dependable in the following areas and those area likely to be affected by scarcity conditions:

Area	Grade	Estimated frequency of scarcity
Shrigonda tahsil and Rashin circle of Karjat tahsil	A	Once in 3 Years
Parner, Ahmednagar & Karjat (excluding Rashin Circle)	B	Once in 6 Years
Sangamner, Pathardi and Jamkhed tahsils	C	Once in 10 Years

29. Thus only 6 tahsils out of 14 are free from scarcity conditions. They are Akola in the west, and Kopargaon, Rahata, Shrirampur, Newasa, Rahuri and Shevgaon in the northern part of the district. Out of these only Akola and Sangamner tahsils area having substantial areas to be managed by the Forest Department

Figures compiled by the District Collectorate of the rainfall received in each of the talukas between 1991 to 2003 during the months of June to October in each year, depict the situation (Appendix no:II of Volume II).

30. The abstract of figures for rainfall for ease of appreciation of the situation are as under:

s.no	Taluka	Average rainfall (cms)
1	Akole	50.89
2	Sangamner	41.70
3	Shrirampur	46.40
4	Kopargaon	44.00
5	Rahuri	45.50
6	Newasa	53.10
7	Shevgaon	58.50
8	Pathardi	58.00
9	Parner	48.70
10	Srigonda	44.90
11	Karjat	49.30
12	Jamkhed	58.30
13	Nagar	53.10
14	Rahata	44.10

31. The incidence of total rainfall received in the district over the years is represented as under:

Year	Rainfall (cms)	Year	Rainfall (cms)	Year	Rainfall (cms)
1990	906.8	1995	611.7	2000	686.8
1991	609.5	1996	862.8	2001	521.9
1992	566.6	1997	484.6	2002	576.6
1993	759.1	1998	1009.4	2003	424.2
1994	651.6	1999	532.7	2004	824.9

CLIMATE :

32. The climate of the district is extremely congenial. In winter season, which lasts from November of February, the air is dry, cool and invigorating; a hot dry wind from North-East gradually sets in blowing with varying force till middle of May. This is usually succeeded by oppressive sultry weather, lasting, unless tempered by the showers, which frequently precede the regular burst of south west monsoons, till middle of June, when rains set in. The climate at once becomes temperate and pleasant. The South-West monsoon lasts till the early part of October. During January-February, light showers are not unusual, but thereafter till May the sky is always cloudless

33. There are very little variations as regards temperature in different parts of the district.

The following table gives the variations in temperatures in Centigrade in Ahmednagar district.

	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Mean Min temp	12.5	38.9	40.6	43.1	43.7	43.3	37.2	36.7	36.7	37.6	35.6	33.3
Mean Max temp	29.5	32	35.6	38	39.1	33.7	29.5	29.4	29.9	31.2	29.7	28.9

Relevant climatological data compiled for each of the talukas/tehsils is represented in the Annexure I of Volume II.

SECTION : 5- WATER SUPPLY :

34. The water table is generally low and its depth varies from 5-15 m. from the ground level. Rivers Godavari and Bhima are the principal rivers of the district. Pravara is the main tributary of Godavari and it drains the water of Mula, Adhala and Mahalaungi into Godavari. Sina, Kukadi and Ghod flow through the southern part a Perennial flow of the district and join Bhima. Godavari, Bhima, Pravara, Mula, and Ghod have a perennial flow of water, while Adhala, Mahalungi, Kukadi and Sina are seasonal in nature. Amongst all these rivers, the Pravara, Mula Ghod and Godavari have proved to be a boon to the district. The irrigation network from these rivers, has transformed the economy of Shrirampur, Rahata, Kopargaon, Newasa, Rahuri and Shrigonda tahsils from one of subsistence to that of prosperity and plenty. Since the last scarcity, large numbers of percolation tanks have been constructed in other tahsils of the district.

SECTION : 6- DISTRIBUTION OF AREA :

35. The forest area is very much unevenly distributed in this district. Major portion of the forest area lies in Akola, Sangamner, Parner and Shrigonda tahsils. Newasa, Kopargaon, Shevgaon and Shrirampur tahsils have negligible forest areas, while Ahmednagar, Jamkhed, Pathardi, Karjat and Rahuri tahsils are having small scattered areas under forest. The total area in- Charge of the territorial forest department is 1375.94 Sq. km, which forms about 8.04% of the total geographical area of the district. The distribution of the forest area in-charge of the Territorial forest Department based on information furnished by the division is as under:

Sr No	Name of Taluka	Name of Range	Forest Area in ha.					Geographical Area in ha.	% of Forest Area	No of Forest Villages
			R.F.	P.F.	C.Aff.	Unclass	Total			
1	2	3	4	5		6	7	8	9	10
1	Akole	Akole (T)	6689.352	0.000	0.000	62.000	6751.352	151574	15%	142
		Akole(E.G.S.)	7252.760	0.000	0.000	0.000	7252.760			
		Rajur	8715.233	80.000	0.000	80.000	8875.233			
		Total	22657.345	80.000	0.000	142.000	22879.345			
2	Sangamner	Sangamner - 1	14839.511	0.000	0.000	529.940	15369.451	163086	20%	97%
		Sangamner - 2	10089.800	92.880	0.000		10182.680			
		Sangamner - 3	6398.75	0.000	0.000		6398.750			
		Total	31328.061	92.880	0.000		31950.881			
3	Kopergaon	Kopergaon	743.110	0.000	0.000	0.000	743.110	75583	1%	42
4	Shrirampur		12.760	0.000	0.000	0.000	12.760	61476	0.02 %	
5	Rahata		47.900	0.000	0.000	0.000	47.900	54100	0.09 %	
			803.770	0.000	0.000	0.000	803.770			
6	Rahuri	Rahuri (T.)	6480.080	20.020	0.000	42.000	6542.100	95108	13%	44
		Rahuri (M.)	5989.980	0.000	0.000	0.000	5989.980			
		Total	12470.060	20.020	0.000	42.000	12532.080			
7	Ahmednagar	Ahmednagar	7840.680	114.000	0.000	361.740	8316.420	143748	6%	69
8	Newasa		1132.160	0.000	0.000	0.000	1132.160	115582	0.90 %	52
		Total	8972.840	114.000	0.000	361.740	9448.580	0		
9	Parner	Parner	5389.594	53.820	0.000	452.350	5895.764	199909	11.50%	100
		Takli Dhokleshwar	16288.980	512.170	0.000	263.647	17064.797			
		Total	21678.574	565.990	0.000	715.997	22960.561			
10	Shevgaon	Pathardi	1307.920	48.000	0.000	1151.640	1355.920	103127	1.31 %	41
11	Pathardi		5711.840	0.000	0.000		6863.480		9.14 %	63
			3798.760	0.000	0.000		3798.760			
		Total	10818.520	48.000	0.000	1151.640	12018.160			
12	Jamkhed	Jamkhed (E.G.S.)	1880.1	0.000	0.000	0.000	1880.100	106870	3.50 %	27
		Jamkhed (M.)	1540.71	157.82	0.000	164.000	1862.530			
13		Total	3420.810	157.82	0	164.000	3742.630			
		Grand Total	112149.980	1078.710	197.4	3107.317	116336.007			

Note: Total Geographical area of the district is 1704800 ha, of which an area of 8% is forests. The break-up of area received for Compensatory Afforestation/in lieu of areas diverted for Non-forest use under provisions of Forest Conservation Act, 1980 could not be provided by the division, and in view of the situation explained above, the minor discrepancy in area are expected to be smoothened out after due enquiry as suggested in the plan. Details of the areas provided in the form of Beat-wise, Village wise areas by the Division

totalled up to 116483.14 hectares, which have been taken as the basis for further computations.

36. The position of the Ahmednagar district vis-à-vis the reorganization orders issued for creation of separate Independent Sub-division of Sangamner with 2 tehsils, would then place the situation of area as Forest for revision of the working plan (as per information given by the Division) as under :

Sr.no	Division/ Sub-division	Forest Area
1	Ahmednagar division	61532.32 hectares
2	Sangamner Independent sub-division	54950.82 hectares
	Total Ahmednagar district (territorial)	116483.14 hectares

37. The administrative set up for management of the forest areas with territorial divisions in Ahmednagar division is as under:

s.no	Division	Range	Number of rounds	Number of beats
1	Sangamner sub-div	Akole (T)	2	6
2	Sangamner sub-div	Akole (EGS)	2	6
3	Sangamner sub-div	Rajur	2	6
4	Sangamner sub-div	Sangamner-I	3	7
5	Sangamner sub-div	Sangamner-II	2	5
6	Sangamner sub-div	Sangamner-III	2	5
	SANGAMNER	6	13	35
7	Ahmednagar div	Kopargaon	1	3
8	Ahmednagar div	Rahuri	3	8
9	Ahmednagar div	Ahmednagar	4	9
10	Ahmednagar div	Parner	2	8
11	Ahmednagar div	Takli-Dhokeshwar	2	6
12	Ahmednagar div	Pathardi	2	5
13	Ahmednagar div	Tisgaon	1	3
14	Ahmednagar div	Jamkhed	1	3
	AHMEDNAGAR	8	16	45
	Total Ahmednagar district (exl wildlife)	14	29	80

38. Area of the earlier plan was to the tune of 104753.640 hectares, for the plan period 1994-95 to 2003-04. With the acquisition of forest land from the Revenue department over the years, other than the fresh lands acquired under the Compensatory Afforestation, and areas which are part of the Wildlife sanctuaries handed over or in the process of being handing over to the Wildlife Wing, there are changes in the area, which are addressed to in this plan.
39. In order to appreciate the exact area under possession of the territorial division units, a reconciliation exercise was jointly carried out by the Working plan division office with the Division office, which led to identification of areas which were forests, but were not shown as forests partly/completely, due to either non-possession as they were under non-forest use, apparently, as distributed status by the Revenue Department. Such areas which were partly distributed were taken into account, and in order to facilitate due enquiry followed by proper assignment of status, and the areas accounted for. Further the district maps obtained from MRSAC, Nagpur, examined using GIS interface-GEOMEDIA, supplemented by identification of forest lands with help of data so compiled and in the presence of the Survey staff of both the offices, led to identification of such areas as forests, and data so generated is further utilised to draw coupes under various working circles as prescribed. Care has been taken to take up afforestation works in such areas at a later stage of the plan period, by which it is expected that the land status is settled after following the due process of law. The details of the area so arrived at are reproduced below: (in hectares)

Range	Area (div figures)	Increase area	Decrease area	Total difference	Area after reconciliation	Area with Geomedia
Sangamner 1	13688.99	1798.56	0.34	1798.12	15487.81	15466.20
Sangamner 2	7435.15	950.15	0.23	949.92	8385.07	8281.30
Sangamner 3	10852.03	2117.23	0.00	2117.23	12969.26	13107.45
Rajur	6516.63	319.26	0.00	319.26	6835.89	6841.60
Akole 1	9809.14	141.66	0.00	141.66	10012.1	9959.40
Akole 2	6648.88	55.26	0.00	55.26	6704.14	6503.70
SANGAMNER SUB-DIV	54950.82	5382.12	0.57	5381.45	60394.27	60235.45

Range	Area (div figures)	Increase area	Decrease area	Total difference	Area after reconciliation	Area with Geomedia
Ahmednagar	9646.36	602.58	0.00	602.58	10248.94	10212.41
Jamkhed	3753.04	407.90	0.00	407.90	4160.94	4162.25
Pathardi	7179.56	1513.31	0.00	1513.31	8692.87	8881.14
Tisgaon	4898.20	93.57	0.00	93.57	4991.77	4739.20
Kopargaon	753.75	525.90	0.00	525.90	1279.65	1256.18
Rahuri	12481.80	1924.40	0.00	1924.4	14406.20	14601.75
Takli-dokeswar	16342.06	6.29	0.00	6.29	16348.35	15309.25
Parner	6485.02	42.90	0.00	42.90	6527.92	6506.29
AHMEDNAGAR DIV	61539.79	5116.85	0.00	5116.85	66656.64	65668.47
AHMEDNAGAR DISTRICT	116551.91	40498.97	0.57	10498.30	127050.91	125903.92

40. The Volume II of the plan shows in detail the information pertaining to the forest land of the district along with the administrative units, under Annexures III, and V; the details of Identified Forest Area under Annexure VI and those forest areas still under Revenue under Annexure VII.

41. The information pertaining to the land of the District can be summarised as under

- a) Total Forest Area in the District : 212959.32 hectares
 - i. Area notified as Protected area in district : 98207.31 ha
 - ii. Area of the PA which is forest area : 41576.82 ha
 - iii. Forest Area in PA with forest dept : **39679.63 ha**
 - iv. Forest Area in PA still with Revenue : 1897.19 ha.
 - v. Forest Area with Revenue Dept : **34024.00 ha**
 - vi. Forest Area with Defence : 1661.690 ha.
 - vii. Forest Area with Territorial Forest Dept : 137594.55
- b) Area with territorial division (after reconciliation) : **127050.91 ha**
- c) Area for which working plan is not being prepared (hectares)

- i. Areas of Shrigonda I, Shrigonda II, Karjat and Mirajgaon (PA): 20655.52
 - ii. Areas of Forest with Revenue Department : 34024.00
 - d) Area planimetered using Geo-Media GIS software : **125903.92 hectares**
42. With the presence of diversion of forest area for various purposes not exactly depicted in the record books with needful details such as nature and purpose of non-forest use, orders permitting such use etc., and further not demarcated on the ground the exact area with the Forest department is to be ascertained precisely.
43. Though some Forest Areas with the Revenue Department had been handed over back to the Forest Department over the years, yet sizeable area lies still in custody of the Revenue Department. The Forest Department is in the process of corresponding with the Collector to take custody of such lands, and this needs to be completed at an early stage. With the information during stock-mapping that some lands with the Revenue had been distributed amongst persons for different purposes it is all the more important to regularize this distribution and update the land records of the Forest Department. Incidentally, rough records available with the Forest Department Survey section speak of exact area in custody on paper, for a survey number, but fail to pinpoint the exact location of the area distributed or not in our custody, and the authority of such distribution not present in many cases. Hence it is all the more important to treat all such areas as Forests, till their status is finalized and decide the extent of Forest area actually in custody after settling and regularizing the Land Records of the division. This work shall obviously be of the topmost priority for the Territorial Division Staff.
44. There is a dire need to update the Form Number 1 of the Division in the proforma prescribed by the Office of the Principal Chief Conservator of Forests, Maharashtra state, Nagpur. Perusal revealed that the register had not been updated in the last two decades. However the Division has computerized most of the land records information, barring details of diversion wherever made, which needs to be updated and entered into a register format, with details of diversion/disforestation suitably recorded and endorsed, and the true statistics of area in custody of the territorial department finalized.
45. Reconciliation exercise conducted by the staff of the division and the working plan staff led to identification of additional areas of forest which hitherto were not intimated to the working plans, but were stockmapped by the staff, leading to an increase in the

area with the forest department. The details of the reconciliation exercise duly ascertained find mention in the Vol II of the current plan and in the maps supplied to the division and the details of such lands which merit immediate investigation and due process as laid down by law are listed at Annexure LII of the Volume II of the plan.

SECTION : 7 STATE OF BOUNDARIES :

46. The state of boundaries is unsatisfactory Actual demarcation has not been carried out in many block and the boundaries which have undergone changes are not shown on the maps. Consequently, there is considerable confusion about their position in the past and were badly neglected as regards protection, they suffered extensively at the hands of the growing population, which was interested in extending cultivation. This was done at cost of forest which was further supplemented by the allotment of extensive areas of reserved forest, for cultivation by the Revenue Department. Excepting for the areas of Akola and part of Sangamner tahsils, survey sheets of any scale area not available. Village maps of 8:1 mile scales are misleading to a greater extent so far as the forest areas are concerned. This is due to the fact that each of these villages was surveyed by triangulation method, which has given rise to cases wherein the areas of adjoining villages either overlap or leave a gap. Consequently their position in the field cannot be fixed.
47. The working plan of Nimbalkar and Mishra seized of this peculiar situation outlined a special plan to undertake demarcation of forest lands in the district, the demarcation programme which was to be completed in 10 years period. However progress in implementation is far from satisfactory.
48. During the Nimbalkar & Mishra's plan period and subsequently some progress has been made in terms of erection of cement cairns/pillars as per the guidelines laid down by the Government, however much is left to be desired. This coupled with areas which have been apparently handed over apparently due to Revenue Department orders in the intervening period, are yet to be demarcated on the ground as well leading to a situation of confusion. Further in the absence of the process of regularization of the eligible encroachments, or other orders pertaining to allotment/diversion of forest lands for non-forest purposes, land statistics necessitate reassessment and demarcation on ground as well on maps. The total number of cement pillars erected along forest boundary is as under-

Year	Large pillar	Small pillar
2002-03	0	0
2003-04	370	529
2004-05	600	611
2005-06	280	90
2006-07	2060	2230
2007-08	1871	1988
	5181	5448

49. In most cases, the physical definition of boundary is very difficult as lines are often not clear and cairns are either missing, or are in a bad shape. The work of delineating and fixing forest boundaries was to be taken up immediately even by appointing special survey staff with a definite program as per earlier prescriptions, which however could not pick up for reasons not clear. In fact, this work should have been carried out immediately after creation of the division and taking over the area from the Revenue Department. For want of these details on the ground, the working plan regarding areas with certain unavoidable limitation as to the accuracy. The offices of the Collector has been requested to furnish the details of the area diverted for different purposes over the years, and such patches wherein discrepancy was observed in the course of conducting stock mapping operation specifically identified for further due course of action.
50. The forest areas have been identified to be subject to pressures of already distributed land classified as 'vatap lands', use for non-forest purposes, under occupation yet to be noted in the Divisional Forest Area Registers viz., the Form 1, thereby presented a confusing picture on to the correctness of the area in custody with the Forest Department. Stock-mapping by the Working Plan staff enabled in identifying such problematic areas. Tripartite study involving Survey teams of the Working plan and the Territorial division along with the Range Forest Officers who had done the stockmapping, helped in identifying the forest areas using Geo-Media system and maps generated using data obtained from MRSAC. Further detailed prescriptions regarding such protective issues involving Land, in the plan period would definitely assist in identifying, regularising and demarcating the forest lands.

51. Survey and demarcation programme of 10 years was prepared and shown in Appendix in the earlier plan whose implementation too leaves much to be desired. Receipt of insufficient grants in the initial periods coupled with receipt of grants in the later phase after the plan period resulted in unsatisfactory implementation of the said programme. With the acquisition and taking over of forest areas from Revenue Department in the intervening period, there is a need for preparation of a new 5-year demarcation programme for the entire district.

SECTION : 8 – LEGAL POSTION :

52. Fairly large areas were acquired by the British Government for forest conservancy, before the Forest Act 1978. These areas were subsequently declared as Reserved Forests under section 34 of the act. From time to time various settlements were carried out and more areas brought under Forest Department for management. However, a persistent demand for more land for cultivation and for extended grazing facilities continued. This demand further urged that the Forest Department was not managing these lands to the best advantage. As result, in 1903 and in subsequent years, all the forest areas of the district excepting those of Akola and Sangamner tahsils were transferred to the Revenue Department. Since the reconstitution of Ahmednagar Sub- Division in 1955 and Ahmednagar Forest Division in 1962, Portions of such areas are being transferred back to the Forest Department for implementing various developmental schemes.
53. Reserved Forest area of 34024.300 hectares is still with the Revenue Department, correspondence for handing over the area back to the Forest Department is still in progress. Similarly an area of 1661.690 hectares, is with the Defence department, Government of India. The details of the forest area with the Revenue Department are appended separately in Annexure of the Vol II of the plan, the range-wise data represented hereunder:

s.no	Range	Area with revenue dept 'ha'
1	Akole (T)	160.00
2	Akole (EGS)	140.00
3	Rajur	16.87
4	Sangamner I	1680.05
5	Sangamner II	1570.00
6	Sangamner III	475.36

7	Kopargaon	3172.25
8	Rahuri T	2200.00
9	Rahuri EGS	734.86
10	Ahmednagar	7504.92
11	Parner	108.00
12	Takli-Dhokeswar	100.38
13	Pathardi	4074.00
14	Tisgaon	1345.61
15	Shrigonda I	2320.18
16	Shrigonda II	1235.00
17	Karjat	3739.00
18	Mirajgaon	2208.14
19	Jamkhed (EGS)	601.08
20	Jamkhed (M)	638.30
	TOTAL	34024.000 hectares

SECTION :-9- RIGHT AND PRIVILEGES :

54. The only general rights with which these forests are burdened with are rights of way and of access to and use of temples, wells, tanks and watering places. There area rights of way and access to all temples situated within the forest area and holding of worship and annual fairs at them is also admitted. The general privileges granted as per article 132 of Bombay Forest Manual Vol. III are applicable to this area. Special privileges sanctioned for Ahmednagar district area as per article 145 of Bombay forest Manual Volume III
55. The protected forest are heavily burdened with concession as per revised rules 52 and 63 mentioned in part II- A of the Bombay Forest Manual Vol. II These concessions are enjoyed by the Villagers of Kumshet, Shirpunj Khurd Ambit, Pachnai, Panjara, Udadaune, Ghatghar, Samrad and Laawali- Kotul Enjoyment of few concessions viz. Cultivation, burning of lime or charcoal collection of forest produce etc. granted to the above mentioned villages have been prohibited as indicated in statutory order No. 8 above mentioned villages have been prohibited as indicated in statutory order No. 8

(a) and 9 (a) under Indian Forest Act, 1927 and the Bombay Forest Rules, 1942(Part II- A of Bombay Forest Manual Vol.II) However, under these statutory orders, the villagers, who are permanently residing in the above villages are permitted to :

- a. gather and remove edible fruits and roots.
- b. gather and remove dead wood for fuel
- c. quarry or gather and remove stone for their own use for agriculture or domestic purpose. All mango, Jamun, Hirda trees and Bamboos have been declared to be reserved in protected forests.

56. NISTAR : In addition to the concessions above, the villagers enjoy 'Nistar' facilities similar to those in vogue in vidarbha region. These have been extended to this area as per order passed by the Government Resolution in Revenue and Forest department No. FZT/ 1564/2239 dated 15 the January, 1968. Under these facilities small timber below 60 cms. In girth, firewood and khod timber are sold to the villagers in limited quantities at the concessional rates. This material can be used for their bonafide agricultural and domestic purposes and not for sale or barter

CHAPTER – II

FLORA AND FAUNA

Ila - FLORA

SECTION 2.1 – GENERAL DESCRIPTION, COMPOSITION AND CONDITION OF CROP:

1. The forests in Ahmednagar district are almost entirely limited in area to those lands, which are found to be unsuitable for cultivation owing to their physical nature and this remnant amounts to only about 8 to 9 percent of the total area of the district. The land is scattered in strips and patches throughout the district. The pressure on the forest too has played a role in limiting the area and has affected the composition and condition of the vegetation to such an extent that no where it has remained in its natural form, except those in extreme west which incidentally have received protection by constitution of protected area ,almost barren and without any tree cover. This interference occurred in the west mainly through repeated clear felling and burning for cultivation and in the remaining area through excessive grazing by cattle and removal of tree growth either for fuel or timber such actions have continued with varying intensity for a long period prior to the handing over of these areas to the Forest Department for adopting conservancy measures and systematic management.
2. The following three main types of forests are represented in this Division
 - a) The Southern Tropical Semi–Evergreen West Coast Forest (2A/C2)
 - b) The Southern Tropical Dry Mixed Deciduous Forests. (5A/C3)
 - c) The Southern Tropical Thorn Forests. (6A/C1)

These three types correspond to western, eastern part of western portion and the remaining areas respectively. They also correspond to the high, medium and low rainfall areas. Altitude and rainfall area the limiting factors in the occurrence of species. For example, Teak is noticed in the eastern part of the western portion, where the rainfall is about 800 mm, only below an altitude of 800 M. Thus the eastern spurs of Sahyadri, which maintain their heights above the limit, present interesting changes in vegetation. Beginning in the East, at a general altitude of about 300 M with an average rainfall of less than 500 mm, only very open thorn forest is noticed with Bor, Babul, Prosopis, Capparis and Euphorbia as the typical species scattered in the area whose growth is

usually stunted. Neem is the only timber yielding species seen in the locality. As a notable exception, Babhul is seen growing well where the soil is deep and black and along water sources where additional soil moisture is available.

3. With the increase in rainfall towards the West, the growth becomes somewhat better than that in the Eastern part of the district. The deciduous species being more useful to the Man have been constantly removed and this removal coupled with excessive grazing has resulted in reduction of humus, heavy erosion and general impoverishment of the soil. This has led to increased xerophytic conditions with preponderance of thorny species in areas of the central zone, where originally Mixed Deciduous Forests should have existed. The areas are mostly supporting shrub species with varied presence of species like Salai (*Boswellia serrata*), Dhavada (*Anogeissus latifolia*), Moin (*Lannea coromandelica*), Aola (*Embllica officinalis*), Ain (*Terminalia tomentosa*), Beheda (*Terminalia bellerica*), Neem (*Azadirachta indica*), Maharukh (*Ailanthus excelsa*), Bondara (*Lagerstroemia parviflora*) and teak (*Tectona grandis*). Good growth in teak is noticed in well protected privately owned areas with Karvand (*Carissa congesta*), Dhayaty (*Woodfordia fruticosa*), Tambat (*Flacourtia latifolia*), Sabar (*Euphorbia* spp), Nirgudi (*Vitex negundo*) and Lantana (*Lantana camara*) etc., are noticed as an undergrowth. Due to excessive grazing, growth of palatable grasses is scanty, growth of Kusali, phuli and rosha grasses are noticed.
4. Towards the west as the rainfall increases, evergreen species are seen inter-mixed with the deciduous species with patches of purely evergreen patches. Excessive grazing coupled with increased anthropogenic activity in the past has resulted in a considerable extension of the deciduous belt towards the west and hence it is difficult to say whether the rainfall has become a limiting factor for the evergreen forests. For having better growth and comparatively higher yield of grass, ruthless cutting of tree species has destroyed the vegetative cover leaving majority of hill slopes barren. In the areas covered with tree growth, Mango, Jamun, Hida and Aola occur in the top storey. Anjani (*Memcylon edule*), pisa (*Actinodaphne hookeri*), Pangara (*Erythrina variegata*), Lokhandi (*Ixora parviflora*), Bhoma (*Glochidion lanceolarium*) and Gel (*Catunargeum spinosa*) are noticed in the undrestorey. Very few bamboo clumps are noticed along water courses. Karvand (*Carissa congesta*), pandhari (*Murraya paniculata*) rameta (*Laxiosiphon eriocephalus*), Karva (*Strobilanthes ixiocephalus*), Karvi (*Strobilanthes callosus*), occur as under growth. Lantana is invading the transition belt between the deciduous and semi-evergreen forest. Chilar (*Caesalpinia sepiaria*), Ukasi (*Calycopteris floribunda*), Gunj (*Abrus Precatorius*), and Kuhila – (*Mucuna pruriens*) are main

climbers. Phuli, Pawanya and Kusli are the main grasses. Karvand and Karvi appear invading the open patches having more than 2500 mm. Rainfall, in almost gregarious proportions. The natural regeneration of Anjani, Pisa, Mango, Jamun, Pangara and Lokhandi is noticed in sheltered protected patches. Coppice growth of Aola. Jamun and Pisa is noticed in areas prone to illicit cuttings. Due to excessive grazing prevailing in the area, bamboo regeneration is not noticed anywhere through it is reported by the local people that gregarious flowing had taken place in the forest areas around Bhandardara, the details of which are not available.

SECTION : 2.2 INJURIES TO WHICH THE CROP IS LIABLE :

5. The important agencies causing damage to the forest growth are Anthropogenic in nature-Illicit cutting, Fires and Grazing being the principal ones. Other injuries due to agencies like Wild Animals, Climbers and weeds, Pests and Diseases, Parasites etc., play a minor role.
6. Forest growth in this region has already suffered an irreparable damage by human agency mainly through encroachments, illicit cuttings and setting of fires. This has led to destruction of forest leaving majority of the areas without any tree cover, thereby exposing them to further deterioration through atmospheric agencies. In the heavy rainfall zone, where large forest areas were left unorganized, the role of protection was neglected to its utmost, the subordinates at times reluctant to reside at their headquarters located within the area. Naturally, the local villagers took advantage of the situation and have encroached over extensive forest areas clearing the growth on moderate slopes and sometimes even on steep slopes resulting in loss of forest cover, leading to heavy soil erosion. Honey combing of the forest area as a result of orders of the Collector, Ahmednagar district to people coupled with poor demarcation on ground exacerbated the situation. The single factor that all the areas were with Revenue Department earlier in the early 1900, and that were handed over to the Forest Department gradually, with still some area remaining with the Revenue Department, played a major role in ensuring that the forest areas were bereft of ideal tree growth since inception over a major area in the District.
7. **ILLICIT CUTTING :** The forest vegetation in the medium rainfall areas have been described as mixed deciduous forest with teak as the principal species in Garland's plan. However, the present position of teak is far from satisfactory. Not a single timber yielding teak tree is noticed in this tract. Even the coppice of the teak, as soon as it attains sapling stage, is illicitly cut and removed. Due to demand for fuel wood even the

standing miscellaneous growth has been removed illicitly. In the low rainfall area, even shrubs and weeds are not allowed to grow and are removed the nearby population for use as fuel. Lopping of trees for 'Tahal' is a common agricultural practice in high rainfall zone areas. Tahal is used for burning rabs in paddy fields, before the monsoon sets in. In addition to Tahal cuttings, the villagers collect all fallen leaves too and thus impoverish the soil by denying incorporation of hums material.

8. The loss to the forests of Ahmednagar through various types of offences booked over the past in the form of number of cases drawn from the division Annual Adminstration Reports is documented in the table as under:

Year	Fire	Illicit felling	Grazing	encroachment	others	Total including previous years	Number at closer
1994-95	40	155	564	43	319	22344	20058
1995-96	27	135	399	59	363	21048	18398
1996-97	113	175	452	33	362	19493	18053
1997-98	73	211	653	37	388	19427	16457
1998-99	80	138	585	13	24	17297	15335
1999-00	153	109	479	10	322	16398	13549
2000-01	140	104	395	14	367	14569	5991
2001-02	65	107	452	14	692	8808	5808
2002-03	64	99	318	13	441	6743	5595
2003-04	24	131	296	4	240	5497	3478
2004-05	44	180	467	8	321	4498	3391
2005-06	79	121	344	5	349	4289	3451
2006-07	89	130	330	8	347	4355	2260
2007-08	93	155	317	10	39	3016	2032

9. **FIRE** : Considerable damage has been caused to the forest growth, even in the high rainfall areas by fires. Fires are mostly intentional and set in the forest by human agency for various reasons such as illegal hunting, collection of gum, honey, fruits of hirda, fruits and flowers of mohwa. Apart from this, to obtain better and luxuriant growth of grass during early stage of monsoon the forest are set on fire by innumerable

graziers grazing their cattle, sheep and goats in this area. Such repeated annual fires kill all the regeneration and shrubs and bushes by direct physical effect. They alter the nature of soil by burning humus and other ingredients. This ultimately results in reduction in the moisture absorption and retention capacity of the soil. Reduction of soil cover exposes the soil to the adverse influences of the atmospheric agencies like heat, wind, rainfall etc. and results in initiation of soil erosion. The cumulative effect is seen in the form of extensive denuded and barren areas incapable of producing even inferior grasses. The facts and figures do not reflect the exact nature of damage, and many a times the incidences of fire find no mention in the forest records.

10. **DOMESTIC ANIMALS:** The forests are subjected to heavy pressure of grazing by large herds of economic and uneconomic cattle population from the surrounding villages. The following table represents that Cows & Bulls in association with Goats are the major constituents posing pressure on the lands in the district. The tehsil wise breakup of the cattle/livestock population drawn from the District Socio-Economic Survey report for the year 2006-07, based on figures recorded in 2003 reflects the situation as under:

Tehsil	Cows & bullocks	Buffaloes	Sheep	Goats	Other livestock	Total	Forest area 'ha'	% to geo area
Akole	95271	14529	1609	50199	9356	170964	22879.34	15 %
Sangamner	142421	5507	66017	83264	24060	321269	31950.88	20 %
Kopergaon	65943	11148	6701	49597	14423	147812	743.11	1 %
Rahata	64149	5009	14480	49690	17309	150637	47.90	0.09 %
Shrirampur	49509	7196	5665	35657	15535	113562	12.76	0.02 %
Newasa	116871	24259	19954	93396	28464	282944	1132.16	0.90 %
Shevgaon	72850	15263	11836	67017	21152	188118	1355.92	1.31 %
Pathardi	99746	25331	20200	90461	21242	256980	10662.24	9.14 %
Nagar	79613	23158	22848	74674	19198	219491	8316.42	6 %
Rahuri	112802	8243	27073	86232	25574	259924	12532.08	13 %
Parner	116778	14020	91271	96178	29880	348127	22960.56	11.5 %
Shrigonda	119559	21459	33123	95639	28236	298016	10307.73	6.42 %
Karjat	65500	6840	39088	52409	15210	179047	10282.56	6.52 %
Jamkhed	56208	10234	4134	36322	9912	116810	3742.63	3.5 %
TOTAL	1257220	192196	363999	960735	279551	3053701	137123.70	8.04 %
% to total	41.17	6.29	11.93	31.46	9.15	100	8.04%	

11. The figures as against sheep and Goats are alarming. Compared to the huge cattle population the forest area is meagre. Serious damage has already been caused to the forest due to uncontrolled and excessive grazing by cattle, sheep and goats. This has totally upset the regeneration, totally destroyed the young seedlings and hardened the soil to such an extent as to prohibit germination and root penetration of young seedlings. Severe soil erosion has set in as a result of upsetting of physiological and biological balance.

12. Grazing Settlement:

13. WILDLIFE :

Wildlife in the tract is localized and consequently the damage on this account too localized. However, damage to plantations by rats, monkeys, porcupines, rabbits and pigs is noticed. Black bucks, wherever they exist, have damaged Subabool seedlings in the plantations. Crop raiding in the private farm lands in the area adjoining the forests, incidences of loss of human life and attack on human beings is confined to pockets and is on the rise.

14. PLANTS :

Damage due to plants such as climbers, shrubs and weeds is not noticed in medium and low rainfall areas. However, in the western part of high rainfall zone, damage by climbers is noticed in some wooded patches. Where formerly shifting cultivation or ruthless exploitation have removed the tree canopy, Karva and Karvi show a strong tendency to become so dominant as to resist regeneration of tree species.

15. ATMOSPHERIC AGENCIES :

a) HEAVY RAINFALL:

The western most portion of this division is occupied by the hill ranges of Sahaydri. The hills are having steep and precipitous slopes with exposed rock surfaces. Rainfall in this tract is quite heavy and exceeds 3000 mm. It comes in the form of torrential downpour in the monsoon i.e. from June to September. The slopes being very steep and of exposed rock surfaces, absorption of rainwater is minimal. Water rushes to the gullies, nalas and rivers with high velocity, causing heavy damage to the surface soil, washing down boulders as well as uprooting tree growth on the upper banks of nalas and rivers.

b) WIND : Slight damage due to high velocity winds is noticed in western fringes. In rest of the areas it is negligible. Pockets of reasonable wind velocity do exist in the district

which are being tapped by concerned agencies to generate Electricity from Wind energy by way of installing Wind Mills.

c) FROST: Occurrences of frost is not recorded.

d) DROUGHT: Drought is of common occurrence throughout the area especially in the eastern and the central regions. A long spell of dry weather from the beginning of November till the advent of monsoon has a considerable effect on plantation. Droughts are experienced every alternate year or two years especially in low rainfall zone. Due to such dry condition in the hilly areas, there is constant danger of the soils of the upper slopes to be drifted downwards. This ultimately results in exposed and bare rocks or a thin desiccated covering of soil insufficient for sufficient for supporting any vegetation.

II – b) Fauna

SECTION 1: DESCRIPTION OF HABITAT.

1. The tract dealt with was fairly rich in the number and variety of Wild life. Ahmednagar district by virtue of having a large geographical area spreading from the Western Ghats to the drier drought affected areas, by virtue of the diversity in climate and vegetation supports varied wildlife. Areas supporting wildlife have been identified over the years, notified as 'Protected Areas', management plans prepared for conservation of the wildlife therein, placed under administration of Wildlife Wing for the purpose. Ecological changes coupled with greater protection to the fauna with the implementation of the Wildlife Protection (Conservation) Act 1992, has led to an increase in Man-Animal conflict in specific areas of the division, necessitating measures to manage Wildlife.
2. The Protected Areas though have legally defined boundaries, have no clearly established Ecological boundaries, with the faunal populations including reptiles, mammals, avifauna venturing outside the legal limits into adjoining areas for foraging and breeding, thereby establishing the importance and need to evolve a proper approach in their management. The Protected Area network in the Ahmednagar district is represented as under:

Name of Protected Area	Notified Area	Talukas	Forest Area	Managed By
Jaikwadi bird sanctuary	34105 ha	Newasa, Shevgaon	Nil	DCF wl Aurangabad
Kalsubai-Harishchandragad wildlife sanctuary.	29909 ha	Akole, Rajura	18249	CF wl Nashik
Rehekuri Blackbuck wildlife sanctuary	217.31 ha	Karjat	217.31	CF wl Pune
Great Indian Bustard Wildlife sanctuary (over both Ahmednagar & Solapur districts)	337976 ha	Newasa Karjat Shrigonda	23110.51 (1897.19 ha with revenue	DCF Ahmednagar (for area in nagar)

3. **Jaikwadi Bird Sanctuary** which is a vast gigantic man-made water body constructed principally for Irrigation and Drinking water purposes, spans Paithan, Gangapur tehsils in Aurangabad and Shevgaon, Newasa tehsils of Ahmednagar districts. The waters of the Jaikwadi dam serve as nesting grounds for migratory birds from Central Asia, Europe and Siberia. The area in addition to having Economic, Recreational, and Religious significance also has ample Biological, Ecological and Scientific Value to the Wildlife Enthusiasts. In addition to attracting flocks of migratory birds and supporting resident birds, the area supports diverse aqua fauna and animals too in the precincts.

- a. More than 200 different types of birds have been recorded in the area over the years with the principal bird species being the Tufted Pochard, Coot and Demoiselle Crane. Others include Flamingo, Common crane, White necked stork, black necked stork, open bill stork, grey heron, purple heron, Indian reef heron, Indian pond heron, night heron, little cormorant, curlew, avocet, gulls, godwit, dabchick, bramhiny duck, tufted duck, spot bill duck, pintail duck, nakta, red crested pochard, common pochard, mallard, gadwall, wigeon, shoveller, spoonbills, egrets, snipes, sand piper, black whie and glossy ibis, jacanas, moorhens, plover, stilt, kingfisher, barheaded goose, brown fish owl, water hens, common kite.
- b. Wild animals such as Fox, Wolf, Hyena, and Black Buck, Mongoose are noticed in the agriculture fields outside the boundary of the sanctuary; Reptiles like Cobra, Rat snake or dhaman, viper and Monitor Lizard are common.
- c. The reservoir has a high diversity of aqua fauna supporting about 50 indigenous fish species, details of which are recorded in the approved Management Plan for the sanctuary.

4. **The Kalsubai-Harishchandragad Wildlife Sanctuary**, nestled in the Western Ghats, over a notified area of 299.09 square kilometers has forest area of 182.49 sq.kms and 116.62 sq.kms of other areas. The area is very rich in Biodiversity hosting varied flora and fauna and receives very high rainfall. The Highest peak in Western Ghats in Maharashtra 'Kalsubai' at 1654 MSL is part of the sanctuary; numerous hills named Harishchandragad, Ratangad, Alangad, Kulangad, Kombada fort, Bahiroba hill etc., form the 34 hills in the area attracting trekkers and rock-climbers. The place holds archaeological interest too with temples, forts, water storage tanks. The forests in the area are Evergreen and Semi-evergreen forests, principal species include-Hirada, Beheda, Awala, Dhaman, Karap, Karanj, Mango, Jamun, Ain, Pisa, Karwand, toran, Karvi etc., Many medicinal plants like Sarpagandha, Shatawari, Adulsa, Hirda, Beheda, Awala etc., are found in abundance. Mango, Jamun, Awala, Hirda occupy the top storey, with Anjani, Pisa, Pangara, Lokhandi in the understorey. Bamboo is found sparsely along the river banks; Karvand, Karvi, ramhita occur as undergrowth. Chillar, ukshi, Gunj, Khajvel are the principal climbers, with Kusali and Phuli the main grasses. The natural regeneration of Anjani, Pisa, Mango, Jamun, Pangara, and Lokhandi is noticed. The forest cover is good, and a habitat for animal fauna including Panther, Barking deer, Hyena, Wild cat, Wild boar, peafowl and Indian Giant Squirrel. Indian Giant

squirrel is the key species of the Kalsubai Harishchandragad sanctuary. Finer aspects in detail are found in the Management Plans specially prepared for the wildlife protected area.

5. **The Great Indian Bustard Wildlife Sanctuary**, notified over 8496 sq.kms of the districts of Solapur and Ahmednagar, on 27th September 1979, is found in the tehsils of Shrigonda, Karjat and Newasa of Ahmednagar district. Grassland fauna are found in abundance in the area, with the Great Indian Bustard the key species of the area. The Management plan of the protected area is prepared by the Wildlife wing at Pune, yet the areas in Ahmednagar are with the territorial offices of Ahmednagar for conservation and management. Final process of notification of the area is in progress.
6. **Rehekuri Black Buck wildlife sanctuary**, notified over 217.31 ha of forest in Rehekuri village of Karjat tehsil of Ahmednagar district on 29th February 1980, is an area rich in Black Buck. The area is yet under the administrative control of the Territorial offices of Ahmednagar forest division.

SECTION 2: DISTRIBUTION OF WILD LIFE.

7. Ahmednagar district blessed with variable climatic conditions supports varied fauna which have settled in the area. Accordingly it has been observed that the Panthers are confined more in the Western part of the district, the Black Buck to the Eastern part and a few localized in pockets of the district, thereby necessitating special strategy in their management. The division had reported presence of wild animals including panther (80), Jackal (227), wolf (235), hare (491), common fox (147, peacock (379), hyena (50), black buck (1718), common langur (128), porcupine (66), chinkara (378), mongoose (178), wild boar (12), wild cat (34), rhesus macaque (125), common palm civet (17) in the year 2005 after conducting a detailed census of wildlife in the division. The census extracts of the district excluding the Protected Areas as has been vetted by the Chief Wildlife Warden of Maharashtra as "The Wildlife Population Estimation-2005" wherein barring the Panther population, the other animals being that of Waterhole count, is reproduced as under:

S.No	Wild Animal	No of Animals				
		Male	Female	Cubs	undecided	Total
1	Panther	34	35	11	0	80
2	Fox (kokhad)	147				
3	Jackal (Kolha)	227				
4	Indian Wolf (landga)	235				
5	Wild Boar (randukkar)	12				
6	Rhesus Macaque	125				
7	Common Langur	128				
8	Chinkara	0				
9	Black Buck (kalvit)	1718				

8. The increasing trends of wildlife especially Leopards in the Sangamner sub-division area resulting in deprivation of livestock and human life, crop raiding by Black buck and chinkara, frequent outbreak of attack by Jackals and Wolves is posing a challenge to the Forest department. Trends of the number of leopards alone which is localized in pockets of the district indicate that against the numbers of 7, 8,8,19 recorded earlier in years 1989,1993,1997,2001 respectively, there were 80 recorded in 2005 census exercise which merits a fresh look towards organizing the conservation strategy.

SECTION 3: INJURIES TO THE WILD LIFE.

9. Forest fires, which occur often, not recorded truthfully, destroy the natural habitat of the Forest Fauna, coupled with the scarcity of water forces the animals to migrate. Poaching is also a threat to the very existence of the animals. The number of wildlife offences registered in recent years is given in the following table:

Year	Offences registered	Year	Offences registered
1998-99	4	2004-05	1
1999-00	5	2005-06	2
2000-01	1	2006-07	2
2001-02	1	2007-08	2
2002-03	2	2008-09	3
2003-04	2		

SECTION 4: INCIDENCES OF ATTACK BY WILD ANIMALS.

10. The incidences of attack by wild animals on the human beings and their livestock are confined to specific areas of the district.
- The figures reflect the damage caused in terms of loss of human life and the injury caused to human life by attack of wild animals on human beings, and the compensation amounts paid as per the provisions of the Government.

s.no	Year	Cases number	Deaths	Compensation paid(Rs)	Injured persons	Compensation paid
1	1997-98	13	2	40,000	11	41,018
2	1998-99	4	0	0	4	15,547
3	1999-00	5	1	20,000	4	18,966
4	2000-01	0	0	0	0	0
5	2001-02	45	6	1,80,000	39	3,38,116
6	2002-03	17	4	2,80,000	13	22,632
7	2003-04	13	1	2,00,000	12	48,834
8	2004-05	9	0	0	9	60,345
9	2005-06	8	0	0	10	63,021
10	2006-07	15	3	6,00,000	12	63,112
11	2007-08	6	2	4,00,000	4	68,688
12	2008-09(Oct)	9	0	0	2	99,505

- b. The amount of compensation paid to the owners of cattle and livestock predated upon by the wildlife in the recent past are as under: cattle loss compensation figures

s.no	Year	Cases number	Dead cattle	Compensation paid (Rs)
1	1997-98	91	123	1,33,840
2	1998-99	163	228	2,43,625
3	1999-00	337	441	4,93,176
4	2000-01	327	383	4,23,176
5	2001-02	257	312	3,82,103
6	2002-03	369	453	5,12,610
7	2003-04	306	386	5,85,431
8	2004-05	210	248	3,31,425
9	2005-06	420	608	9,32,250
10	2006-07	470	725	2,52,587
11	2007-08	510	n.a	1312
12	2008-09(Oct)	821	951	7,07,300

- c. Figures of compensation paid to the farmers as a result of crop raiding wild animals in the recent years for which compensation has been paid are as under :

S.NO	YEAR	CASES NUMBER	CROP DAMAGE DUE TO WILDLIFE	COMPENSATION PAID (RS)
1	2007-08	17	17	67,000
2	2008-09 (OCT)	92	39	84,880

Compensations have been given as per the norms provided in the Govt. Resolution.

SECTION 4: LEGAL POSITION.

The Wild Life Protection Act 1972 is applicable and being implemented for protection and preservation of the Wild Life.

CHAPTER – III

UTILIZATION OF THE PRODUCE

SECTION : 1 – AGRICULTURAL CUSTOMS AND WANTS OF THE POPULATION

1. Ahmednagar district, the largest district in the state of Maharashtra spreads over an area 17048 sq.kms, and the population is primarily dependant on Agriculture. The vital statistics of the district are as under: (source District Socio-Economic Survey, 2006-07)

S. No	Particulars	Urban	Rural	Total	Maharashtra
1.	Area in Sq. Kms.	177.2	16870.8	17048	308000
2.	Density per Sq.Km.	1682	191	232	315
3.	Villages	-	1581	1581	43711
4.	Cities	18		18	378
5.	Total population	20 %	80%	4041000	96879000
6.	Literacy %	73.57 %	62.01%	64.31 %	76.9 %
7.	Females per 1000 males	908	948	941	922
8.	Schedule caste population	13.12 %	11.72 %	485000 (12%)	9882000 (10.2%)
9.	Schedule tribe population	1.82 %	8.92 %	303000 (7.5%)	8577000 (8.9%)
10.	Total district production	--	--	12095 crores	386241 crores
11.	Share in State's production			3.13 %	
12.	Net Per capita production (current price)	--	--	28297 rupees	37081 rupees
13.	Total road length (kms)	--	--	12408	231430
14.	Total livestock (all types)	--	--	3054000 (8.36%of state)	36504000
15.	Families below poverty line (1999-2000)	--	--	1.99 lakh	38.19 lakh

2. the taluka wise population as per the 2001 census reflects as under:

s.no	Taluka	Number of villages	Area in sq.km	Population	Density per sq.km
1	Akole	191	1505.08	131576	177
2	Sangamner	169	1705.06	441439	259
3	Kopergaon	79	725.16	277170	382
4	Rahata	58	759.19	288279	380
5	Shrirampur	54	569.87	256458	450
6	Newasa	129	1343.43	326698	243
7	Shevgaon	112	1031.85	203676	197
8	Pathardi	134	1214.10	214872	177
9	Nagar	104	1605.74	606690	378
10	Rahuri	96	1035.11	294924	285
11	Parner	131	1930.28	246552	128
12	Shrigonda	114	1603.81	277356	173
13	Karjat	121	1503.61	205674	137
14	Jamkhed	86	878.62	134216	153

3. the distribution of the land amongst the holders is represented as under :

s.no	Category	Number of landholders	Area in hectares
1	Less than 1 hectare	239151	127900
2	1 to 1.99 hectare	213899	312445
3	2 to 3.99 hectare	157906	423553
4	4 to 9.99 hectare	61517	352165
5	10 hectares and above	8136	131259
6	Total	680609	1356322

4. LAND USE PATTERN : the district Socio-economic survey published in 2006-07, for the year 2004-05 places the data on land use pattern as under:

- i) Geographical Area : 1668 thousand hectares.
- ii) Area under forests : 132 thousand hectares.
- iii) Area not available for Agriculture-
 - a) under Non-Agricultural use : 11 thousand hectares.
 - b) waste land and land unfit for cultivation : 186 thousand hectares.
 - c) Total : 197 thousand hectares.
- iv) Lands other than Wasteland not brought under cultivation-
 - a) land under grazinglands etc., : 45.21 thousand hectares.
 - b) land under trees and shrubs : 10 thousand hectares.
 - c) cultivable fallow land : 48 thousand hectares.
- v) Waste land-
 - a) current fallow : 56 thousand hectares.
 - b) other fallow : 69 thousand hectares.
- vi) area under cultivation-
 - a) net area under cultivation : 1186 thousand hectares.
 - b) area re-sown : 140 thousand hectares.
 - c) area total under cultivation : 1326 thousand hectares.
- v) area under irrigation-
 - a) net area under irrigation : 432 thousand hectares.
 - b) total irrigated area : 597 thousand hectares.
- vi) area under major crops-
 - a) Pulses : 84 thousand hectare (6.32%)
 - b) cereals : 1001 thousand hectares(75.47%)
 - c) oilseeds : 42 thousand hectares
 - d) Sugarcane : 81 thousand hectares (6.12%)
 - e) Cotton : 6 thousand hectares.

5. CROP PATTERN : Kharif, Rabi and Summer are the three seasons during which different crops are taken in the district. During Kharif season the crops usually taken include-Paddy, Bajra, Jowar, Rai, Nachani, amongst cereals; with pulses amongst Redgram, Mung, math, Ground nut; and Sunflower (oil seeds). During the Rabi season the crops seen are Jowar, Wheat, Gram, Jawas; with Summer seeing few crops where irrigation potential is there amongst Ground nut, Maize, Sunflower crops and vegetables.

6. MAJOR, MEDIUM AND MINOR IRRIGATION PROJECTS :There are two major irrigation projects, seven medium irrigation projects and 107 minor irrigation projects in the district. Mula and Bhandardara are the two major irrigation projects in the district. Irrigation is also available from Gangapur, Ghod and Kukadi major irrigation projects which are in the adjoining district. The irrigation potential of the above projects is 92 thousand hectares. Visapur, Adnala, Pargaonghatsheel, Mandohol, Takilban and Mahesangvi are the medium Irrigation Projects with 66 thousand hectares potential. There area 107 minor irrigation projects with the irrigation potential of 53 thousand hectares. Well irrigation covers about 253,000 Hectares.
7. In order to arrive at the approximate demand arrived at of the forest produce in the Ahmednagar district based on assumptions of the average need of a family in the district an estimate was computed based on daily consumption. The earlier plan has placed the demand of timber as 17,835 cubic metres (average @ 0.03 cumt per family per year) and firewood as 12,84,141 metric tones (average @ 2.16 MT per family per year). With 10% of the Livestock located in Ahmednagar district, as against the condition at the time of preparation of earlier plan in the late 1980's when it was 6.52% of the state population of livestock, the demand for fodder is very high and on the rise. Much of the need is met from the agricultural waste; and in practice it is common to find cattle loitering around grazing with gay abandon in the forests of the district, and is one of the principal causes for failure in afforestation exercise of the department. However of late with increase proportion of rearing Hybrid Milch cattle stall feeding has picked up. Nevertheless there is a shortage for fodder in the district.
8. With the total number of families placed at 7.76 lakhs, with 6.20 lakhs located in rural areas (as per 2006-07 socio-economic survey), with the total number of wooden ploughs placed at 20,000 and bullock carts at 53,000, an attempt to arrive at a nominal demand based on the yardsticks used in earlier plan arrive at a demand of timber at 23,280 cubic metres and firewood for rural persons at 13,39,200 metric tones.
9. There were 15 bidi manufactures with 184 branches, employing about 20,000 labourers earlier, with their requirement of tendu leaf being drawn from the neighbouring areas bearing tendu. However of late there has been a decline in the industry especially in Nagar district, with many of them closing down, and of the registered tobacco based 7 firms only 5 are in operation with just 1040 labour on their rolls, the few present import their requirement from other productive areas.

10. Of the 168 registered wood based industry (other than plywood) the socio-economic survey mentions that 153 are in operation 762 labourers; and the 3 plywood based industry employ 31 labour on their rolls.

SECTION : 2 : MARKET AND MARKETABLE PRODUCE.

11. Except for a small area in the extreme west, the rest of the forest area of this division is almost barren and devoid of any tree growth. Timber and firewood is imported from other districts such as Thana, Nashik, Chandrapur, Amrawati etc. Ahmednagar, Kopergaon, Shirampur, Jamkhed and Karjat are main marketing centres.

12. Practically no forest produce, excepting small quantities of 'Hirda' fruits, tendu leaves and Apta leaves can be extracted from the forest. The availability of important forest produce in the division is as under : -

1. Timber: Teak, which is the principal timber species, is not available in most parts of the division. Secondary species like Dhawada, Ain, Salai, Bija etc. are also not available. Because of paucity of any timber, the local population has turned to 'Neem' and 'Babhul' as their principal substitute for teak. This explains the large scale illicit cutting of these two species from road sides and an almost total absence of them from private lands, whereas formerly people specially preserved these trees for leaf fodder. Though the area in charge of the forest department in this division amounts to about 8 to 9 percent of the total geographical area of the district, majority of the entire area is unproductive and barren. Due to excessive maltreatment, overgrazing and annual fires in the past, the forest area of the district, almost lost their productive capacity Major portion of the area is beyond repairs and no tree species can easily be raised in it. However with special efforts by adopting soil and moisture conservation measures, some areas have been brought under the tree cover in the recent past, yet it is too early to predict scientific basis of systematic exploitation of the forests to meet partial demands of the population.
2. Fuel: As stated above almost the entire forest area is unproductive and barren. The availability of fuel from other than forest area had been computed in the earlier plan, whose figures have been after due examination revised with an increase ranging from 5 to 10 % accounting for the changes in the district in the last decade; and depicted as under:

(a) Cowdung	3,88,830 M. Tonnes.
(b) Agricultural waste	1,78,200 M. Tonnes.
(c) Saw Mills	15,000 M. Tonnes.
(d) Private lands	1,25,400 M. Tonnes.
(e) Cooking gas	<u>47,851 M. Tonnes.</u>
Total	<u>7,55,281 M. Tonnes.</u>

This leaves a gap of about 5.90 lakh Metric Tonnes. It is on this count that it is a common sight to see people indulging in illicit cutting of roadside trees or resorting to cutting plantations, removing even bushy growth from forest areas. Virtually any thing which can burn is used as fuel. The forest area is so degraded that it is very difficult to meet shortage of fuel.

A review of the Traditional Biomass Consumption in India made by faculty of IIM Ahmedabad reveals that The Biomass consumption (as in 2004) and the Fuel Wood consumption by Sectors represented as under :

s.no	Fuel	Million tones
1	Fuelwood	205
2	Crop residue	116
3	Dry dung	35

Fuel wood consumption by sectors (2004)

s.no	Sector/end-use		Million tones
1	Household	Forested rural	83
2		Nonforested rural	65
3		Urban areas	17
4	Household	Sub-total	165
5	Cottage industry		22
6	Rituals		4
7	Restaurants etc		14
		TOTAL	205

3. The study by IIM Ahmedabad reveals the picture regarding consumption of Biomass used for different purposes in India represented as :

Energy forms	RURAL			URBAN		
	Purchased	Collected	Home grown	purchased	Collected	Home grown
Firewood	18.4%	54.1%	27.5%	78.2%	11.2%	10.6%
Dry Dung	12.6%	22.2%	65.2%	58.6%	8.1%	33.3%
Crop-residue	12.9%	52.3%	34.8%	77.4%	22.6%	0.00 %

4. FODDER:-Forage resources, requirement and Shortage of forage in the district had been computed in the earlier plan which has been taken as a basis and the figures accordingly projected taking into the account the socio-economic survey of the district project that against the need only 60% is met with known available resources. In the years of scarcity, not even 50% of agricultural waste is available as Cattle feed and serious situation develops. In the years of scarcity the cattle is allowed to starve and distress sale of cattle is very common. The forest areas yield fodder which is usually auctioned under the rules laid down by the State Government, with the preference being given to the Gram Panchayat, the Village Dairy Co-operatives.
5. Tendu Leaves : There is little availability of Tendu leaf in the division, the single Tendu Unit with the capacity of 500 standard bags, is often unsold in the auction conducted by the State Forest Department.
6. Hirda Fruits: It is one of the important Non-Timber Forest Produce. It is available in hilly areas of Akola Tahsil. The Hirda fruits are collected by Tribal Development Corporation through local Villagers.
7. Agave Leaves: Many old plantations are having agave fencing. Agave leaves used to be collected and used for manufacture of fibres and ropes. However over the years with increase in mechanization and change in life styles, there has been a visual decline in the practice of preparation of ropes from Agave fibres.
8. Other miscellany forest produce like Sitaphal fruits too are obtained from the forests, the yields of the produce over the last decade are represented below for perusal.

Year	Tendu (standard bags)	Grass (tonnes)	Hirda (quintals)	Sitaphal (kilograms)
1994-95	523.995	965.050	500	6700 (Rs24100)
1995-96	194.202	132.14	2838	5480 (rs16400)
1996-97	468.375	504	98.80	9100 (rs45500)
1997-98	-	40	1330	1200(rs30000)
1998-99	-	185	1598	3500(rs89000)
1999-00	354.532	302.50	1630.85	7000(rs78000)
2000-01	499.700	779.00	911.41	Rs.42200
2001-02	-	-	446.17	-
2002-03	-	170.25	406.12	Rs 5500
2003-04	-	-	406.12	-
2004-05	-	-	406.12	-
2005-06	-	-	177.93	-
2006-07	-	-	151.37	-
2007-08	425.957	-	260.70	-

SECTION : 3 LINES OF EXPORT AND IMPORT

13. The broad-gauge single line Manmad –Daund Railway enters the district at Isgaon in the North and emerges out in South at Daund thus, traversing the distance of 197 K.Ms.

14. The National Highway connecting Pune and Nashik passes through the District, and is the lifeline connecting to the major highway from Mumbai to Agra. Other important roads traversing across the district include Pune-Nagpur, Daund-Nagar-Rahuri-Nashik, Ahmednagar-Jamkhed-Beed roads.

The information regarding roads is as under. The figures in parenthesis are those mentioned in the earlier plan.

Sr.No.	Category	Incharge of P.W.D K.Ms.	Incharge of Z.P. K.Ms.	Total K.Ms.
1	National Highway	202 (61)	0 (0)	202 (61)
2	Major state Highways	19.37 (78)	0 (18)	19.37 (96)
3	State Highways	1641 (1635)	0	1641 (1635)
4	Major District Roads	2693 (1015)	0 (1555)	2693 (2570)
5	Other District Roads	0 (21)	3345 (3221)	3345 (3242)
6	Village Roads	0 (0)	4527 (4311)	4527 (4311)
	Total	4555.37 (2810)	7872 (9105)	12427.37 (11915)

In all 1476 villages of the total 1579 inhabited villages (93.50%) are connected by all weather roads. It is an observation that there is a visual increase in the road network of the district, and with the poorly demarcated forest lands which at many places are barren lands; with exposed stony outcrops, are creating hassles.

SECTION 4: METHODS OF EXPLOITATION AND THEIR COST:

15. No harvesting of timber or firewood was done during the last plan period. The Forest Labour Co-operative societies are absent in the district.

SECTION 5 : PAST AND CURRENT PRICES:

16. In the absence of regular exploitation of forests, no such information on the past and current prices is furnished separately. Ahmednagar is mainly having forests on degraded land, and is under the process of undergoing greening, over the years, and is yet to yield commercially.

Chapter IV

ACTIVITIES OF FOREST DEVELOPMENT CORPORATION IN HARVESTING AND MARKETING OF FOREST PRODUCE

1. The Forest Development Corporation of Maharashtra Ltd (FDCM Ltd) with headquarters at Nagpur was established in 1974. the main aim was to cover and develop the understocked and poor quality forest areas into productive forests by introducing valuable and production enhancing species. Forest Development Corporation is totally a Maharashtra State Government undertaking, which is independent of the Forest Department, draws on deputation officers of the Indian Forest Service from the Forest department, and is accountable to the State Government directly.
2. Ahmednagar division currently doesn't have the presence of the FDCM. In the early years prior to 1995 FDCM activities were confined to undertaking massive afforestation in areas allotted to the corporation, principally under the Employee Guarantee Scheme and other allied schemes in the Sangamner sub-division areas. With the cessation of the activity of FDCM, the areas were once again taken over by the Forest division at Ahmednagar.
3. the works undertaken by FDCM in Ahmednagar division can be tabulated as under-

Year	Agency	Scheme	Area covered in hectares
1988-89	FDCM	Mass affor scheme	1275
1989-90	FDCM	EGS and MAS	648.40
1990-91	FDCM	EGS and Comp Affores	1000
1992-93	FDCM	EGS	1126.31
1993-94	FDCM	EGS	1282

CHAPTER V

IMPACT OF FIVE-YEAR PLANS ON ATTAINMENT OF MANAGEMENT OBJECTIVES

1. As the total forest area in the tract dealt with is to the tune of 22% of total geographical area and with the best natural forests given higher degree of protection-conservation by constitution into Protected Areas as Wildlife Sanctuary, leaving roughly 18% of the Geographical area with the Territorial division, which is borne on poor soil strata and supports poor quality of growth despite repeated afforestation, leaves plenty of scope for allied wings of the Forest Sector viz., the Social Forestry department to make its presence felt. As a matter of fact the activity of the Social Forestry Department and the extension activities of the Forest department could positively foster the cause of Environment consciousness, leading to emergence of personalities like Sh.Annasaheb Hazare of Ralegaon Shindi, Sh.Popatrao Powar of Hivre Bazar amongst individuals and organizations such as WOTR, who have pioneered in the field of Water Conservation and Forestry.
2. First working plans were introduced between 1894 and 1908 and they were written for different regions. Prior to these plans fellings were carried out in unsystematic manner and fellings were done by government agencies, privilege holders and felling for firewood by non-privilege population on a permit system. In general the fellings were confined to teak and blackwood. The exploitation was confined to large and sound trees leaving crooked and diseased trees. The permit system also led to malpractices and had deleterious effect on the forests, thereby affecting regeneration.
3. The Working plans for the Ahmednagar district, were principally for the areas in tehsils Akola and Sangamner, till they were part of Nashik division, along with the working plan for Nashik, and later upon annexation with Pune division, along with areas of Shrigonda continued to be treated with plans for Pune division. Earlier plans by R.S.F.Fagan in 1900, Dodgson in 1905, and Thomson.D.A later which continued till 1932-33 were the plans under which forest areas in Nagar district were worked. Later working plan prepared by Garland in 1932-33 was in operation for greater period of time.
4. Post Independence saw transfer of areas admeasuring about 3200hectares in Rahuri and Shrigonda talukas for afforestation, which gave good results, encouraged by which Ahmednagar forest division was independently created in the year 1962.

FIRST FIVE-YEAR PLAN (1951 to 1956):

5. The first Indian Prime Minister, Pt. Jawaharlal Nehru presented the first five-year plan to the Parliament of India on December 8, 1951. The total plan budget was allocated to seven broad areas: irrigation and energy (27.2 percent), agriculture and community development (17.4 percent), transport and communications (24 percent), industry (8.4 percent), social services (16.64 percent), land rehabilitation (4.1 percent), and other (2.5 percent). The plan promoting the idea of a self-reliant closed economy was developed by Prof. P. C. Mahalanobis of Indian Statistical Institute and borrowed the ideas from USSR's five-year plans developed by Dorn. The plan is often referred to as the Dorn-Mahalanobis Model. The target growth rate was 2.1 percent annual gross domestic product (GDP) growth; the achieved growth rate was 3.6 percent. During the first five-year plan the net domestic product went up by 15 percent. The monsoons were good and there were relatively high crop yields, boosting exchange reserves and per capita income, which went up 8 percent. Lower increase of per capita income as compared to national income was due to rapid population growth. Many irrigation projects were initiated during this period, including the Bhakra Dam and Hirakud Dam. The World Health Organization, with the Indian government, addressed children's health and reduced infant mortality, contributing to population growth.
6. Working plans of Garland were in implementation during this period in Ahmednagar district. Ahmednagar district forest areas principally of Akole and Sangamner along with parts of Shrigonda were treated along with Pune district plans and the emphasis was on afforestation activity only. The species tried out included Neem on a large scale. Large scale transfers of forest area from Revenue to Forest department took initiative with more than 3200 hectares in Rahuri and Shrigonda transferred to Forest for afforestation. Emphasis was on felling of trees in forested patches, coupled with Pasture development measures.

SECOND FIVE-YEAR PLAN (1956-1961):

7. The second five-year plan focused on industry, especially heavy industry. Domestic production of industrial products was encouraged, particularly in the development of the public sector. The plan followed the Mahalanobis model, an economic development model developed by the Indian statistician Prasanta Chandra Mahalanobis in 1953. The plan attempted to determine the optimal allocation of investment between productive sectors in order to maximise long-run economic growth. It used the prevalent state of art

techniques of operations research and optimization as well as the novel applications of statistical models developed at the Indian Statistical Institute.

8. The working plan prescriptions of Garland continued to be implemented, and the good forests of Western Ghats continued to be exploited.

THIRD FIVE-YEAR PLAN (1961-1966):

9. The third plan stressed on agriculture and improving production of rice, but the brief Sino-Indian War in 1962 exposed weaknesses in the economy and shifted the focus towards defense. In 1965-1966, the Green Revolution in India advanced agriculture. The war led to inflation and the priority was shifted to price stabilization. The construction of dams continued. Many cement and fertilizer plants were also built. Punjab began producing an abundance of wheat. Many primary schools were started in rural areas. In an effort to bring democracy to the grassroot level, Panchayat elections were started and the states were given more development responsibilities.
10. Ahmednagar forest division was independently created in 1962, with greater areas handed over from Revenue to Forests. Emphasis in this plan period was on Afforestation, and involved raising of plantations involving mixture of species over 2500 hectares in the period, planting of Bamboo over 1100 hectares in Akole tehsil alone, and massive plantations of Agave all over the district starting from 1965. There was no special plan prepared as such, with Garland's plan being the guideline.

POST THIRD FIVE-YEAR PLAN (1966-1969):

11. The period saw large emphasis on raising plantations involving Mixture of species including Nilgiris, Neem, Babul along with pure plantations of Agave species on hardy rocky areas. This period also saw efforts to improve the fodder situation and special efforts to raise plantations involving fodder species aimed at fodder and pasture development initiated.

FOURTH FIVE-YEAR PLAN (1969-1974):

12. At this time Indira Gandhi was the Prime Minister. The Indira Gandhi government nationalized 19 major Indian banks. In addition, the situation in East Pakistan (now independent Bangladesh) was becoming dire as the Indo-Pakistani War of 1971 and Bangladesh Liberation War took place.

13. Funds earmarked for the industrial development had to be used for the war effort. India also performed the Smiling Buddha underground nuclear test in 1974, partially in response to the United States deployment of the Seventh Fleet in the Bay of Bengal to warn India against attacking West Pakistan and widening the war.
14. The prescriptions of the Garland plan continued to be a guidestone; in the year 1972-73 a special plan for development of Mutha Catchment development was developed which envisaged catchment treatment in tehsils of Rahuri, Akole, Sangamner till 1973-74, however could never see the light of the day. Areas in Nagar forest division continued to be afforested with emphasis on Soil & Moisture Conservation under different schemes. Drought Prone Area Development Programmes took off on a great way, with forest department actively covering afforestation programmes coupled with Soil and Moisture conservation measures in the area.

FIFTH FIVE-YEAR PLAN (1974 - 1979):

15. Stress was laid on employment, poverty alleviation, and justice. The plan also focused on self-reliance in agricultural production and defense. In 1978 the newly elected Morarji Desai government rejected the plan. Electricity Supply Act was enacted in 1975, which enabled the Central Government to enter into power generation and transmission
16. Maharashtra pioneered in the Country, by bringing an Employment Guarantee Scheme (EGS scheme), and promulgated an Act in the direction, ensuring guarantee of employment, within 8 kilometres of radius of radius for any able bodies and willing workperson, at nominal rates decided by the Government. This programme was a rural oriented programme.
17. Progress in DPAP led to formation of a separate division under IDA fund, which continued work till 1981-82, after which it merged with the division. The period saw intensive afforestation programme in tehsils of Pathardi, Jamkhed, Parner, Shrigonda, Karjat, and Ahmednagar under different schemes and the Employment Guarantee Scheme made a big impact on the forest sector in Ahmednagar.

ANNUAL PLAN (1979 – 1980) AND SIXTH FIVE-YEAR PLAN (1980 – 85):

18. Called the Janata government plan, the sixth plan marked a reversal of the Nehruvian model. When Rajiv Gandhi was elected as the prime minister, the young prime minister aimed for rapid industrial development, especially in the area of information technology. Progress was slow, however, partly because of caution on the part of labor and communist leaders. The Indian national highway system was introduced for the first

time and many roads were widened to accommodate the increasing traffic. Tourism also expanded.

19. The sixth plan also marked the beginning of economic liberalization. Price controls were eliminated and ration shops were closed. This led to an increase in food prices and an increased cost of living.
20. During this period, the decision was taken to regularize the encroachments upon forestland for the encroachers of the period from 1/9/1972 to 31/3/1978, close on the heels of the decision on forests of the Ahmednagar district leased on Eksali basis to be handed over to the cultivators in 1969 by the State Government.
21. The period saw increased activity of Afforestation activity, with Forest Development Corporation of Maharashtra Ltd., also entering the fray in areas of Sangamner tehsil.

SEVENTH FIVE-YEAR PLAN (1985-90):

22. The Seventh Plan marked the comeback of the Congress Party to power. The plan lay stress on improving the productivity level of industries by up-gradation of technology.
23. Ahmednagar division continued to be afforested over large areas. Biotic pressures coupled with poor soil conditions prevented establishment and conversion of the crop. This period saw afforestation under EGS and Massive afforestation schemes at the rate of 1000 hectares a year by FDCM alone and by the department on 2500 hectares on an average.
24. this period also saw some experiments grounded in refractory areas of the division, and involved steps like blasting rocky gravelly soils, to plant saplings, taking deeper WATs along contour, and sow Prosopis seed in the bottom of the trench, which established as a bio-mass and absorption trench for surface run-off over select areas in Sangamner tehsil.
25. Steps to prepare revised working plan for the areas in Ahmednagar got underway, with the SOFR unit conducting systematic floristic studies in Akole tehsil, the working plans preparation work was given to the Working plans division Nashik.
26. 1989-91 was a period of political instability in India and hence no five year plan was implemented. Between 1990 and 1992, there were only Annual Plans. In 1991, India faced a crisis in Foreign Exchange (Forex) reserves, left with reserves of only about \$1 billion (US). Thus, under pressure, the country took the risk of reforming the socialist economy. P.V. Narasimha Rao (28 June 1921 – 23 December 2004) also called Father of Indian Economic Reforms was the twelfth Prime Minister of the Republic of India and head of Congress Party, and led one of the most important administrations in India's modern history overseeing a major economic transformation and several incidents

affecting national security. At that time Dr. Manmohan Singh (currently, Prime Minister of India) launched India's free market reforms that brought the nearly bankrupt nation back from the edge. It was the beginning of privatization and liberalization in India.

27. the period saw inspired leadership in the form of Sh. Annasaheb Hazare, from Ralegaon Shinde, which revolutionised the approach to Rural Development. All the departments involved in rural development integrated their schemes for development of a village, and preparation of micro-plans for the purpose aimed at soil and water conservation became the pioneering efforts not only in the district but also in the State and Country as well.

EIGHTH FIVE-YEAR PLAN (1992--1997):

28. Modernization of industries was a major highlight of the Eighth Plan. Under this plan, the gradual opening of the Indian economy was undertaken to correct the burgeoning deficit and foreign debt. Meanwhile India became a member of the World Trade Organization on 1 January 1995. This plan can be termed as Rao and Manmohan model of Economic development. The major objectives included, containing population growth, poverty reduction, employment generation, strengthening the infrastructure, Institutional building, Human Resource development, Involvement of Panchayat raj, Nagarapalikas, N.G.Os and Decentralisation and peoples participation. Energy was given priority with 26.6% of the outlay. An average annual growth rate of 6.7% against the target 5.6% was achieved.

29. Various developmental agencies involved themselves in Rural development works. In addition to Ralegaon Shinde's success under the able leadership of Sh. Annasaheb Hazare, other agencies like WOTR under the Indo-German Watershed Programme took initiative and led the involvement of people in soil and water conservation works. A land mark decision in forestry was taken by Government of Maharashtra on 16th of March to involve the people by Joint Forest Management(JFM) for degraded forests.

30. the period saw increased afforestation activity under different schemes and Ahmednagar division on an average each year afforested about 4000 hectares of land. Intensive soil and water conservation practices in the form of CCTs, and Refilled contour CCTs started taking shape, which became the focus of all forest officers in the State.

31. Maharashtra Forestry Project under the aegis of the World Bank, took shape, leading to implementation of scientific development of the areas, special focus on wildlife areas, leading to creation of new posts and handing over of the wildlife areas to personnel created for the purpose, and increased emphasis on Nursery Technology and people's participation.

32. The First Working Plan in Independent India for Ahmednagar division took shape in the hands of Nimbalkar and Mishra for the period from 1994-95 to 2003-04, which broadly recommended treatment of the major area in the division as Afforestation Working circle, with emphasis on other working circles like Silvi-pasture management working circle, and an overlapping NTFP working circle. The plan gave compartment numbers for the first time to the fragmented areas of the division, which was a Herculean task by any means.

NINTH FIVE-YEAR PLAN (1997 - 2002):

33. During the Ninth Plan period, the growth rate was 5.35 per cent, a percentage point lower than the target GDP growth of 6.5 per cent.
34. Prescription of existing plan continued. State government had started various schemes in consonance with central government schemes. Forest Department was one of the implementing agencies. World Bank aided Forestry Project was implemented and the main focus of this project was on Joint Forest Management. This project succeeded in certain areas where the staff took special personal interest; Villages Dolasne, Darewadi, Ralegaon Shinde were the pioneers, with people of Hivre Bazaar actively involved in participatory management of the forests in the vicinity
35. Refilled Continuous Contour Trenching (CCT), became the instrument for achieving soil and moisture conservation objectives coupled with afforestation initiatives in almost all the forest areas of the district. The impact led to taking up of CCTs on areas outside the forests too by the District Administration, and this initiative has greatly given an impetus in improving the ground water table of the area it is felt. It is no exaggeration to realize that a length of more than 25,000kilometres was excavated in the progress by the forest division in this endeavour. Areas ranging from 4000 to 4500 hectares continued to be afforested in the division in these periods each year.
36. Advent of new scheme from the Government of India entitled Samanvit Gram Vikas advocating formation of a Forest Development Agency (FDA) on the lines of DRDA, with the Zilla Parishad, to effectively monitor the participatory processes in Forest development in the village, brought fresh initiatives in formulation of the project, and seeking funds from the GOI.

TENTH FIVE YEAR PLAN (2002-2006):

37. The main objectives of the 10th Five-Year Plan were:
- Reduction of poverty ratio by 5 percentage points by 2007;

- Increase in forest and tree cover to 25 per cent by 2007 and 33 per cent by 2012;
38. The period saw continued afforestation measures with 2500 to 3000 hectares tackled on an average every year, with emphasis on participatory management, with new initiatives in the field of medicinal plants, tree borne Oil seed initiatives, efforts to popularise humus building and organic farming, Deep CCTs, vantis and vanbandharas in the division.
 39. Steps to improve Tourism facility, create Nature Interpretation centres were in progress. Emphasis on adoption of forest based villages, developing concepts for increased emphasis on focussed approach became the back-bone of the working of the division.
 40. The PWPR I presented by the territorial Chief Conservator of Forests, Nashik, under the guidelines of the new Working Plan Code 2004, gave a new direction for increased emphasis on planting and utility of NTFP, soil and water conservation, efforts to develop specific plants like Sandal, which aim to approach the management of the division in a different angle.
 41. The work of PWPR II was handed over to the Conservator of forests, Working Plans division, Aurangabad, stationed at Aurangabad, the work of which has been started since December 2006.

Eleventh Five Year Plan (2007-2012):

42. The eleventh plan has the following objectives:
 1. Income & Poverty
 - o Accelerate GDP growth from 8% to 10% and then maintain at 10% in the 12th Plan in order to double per capita income by 2016-17
 - o Increase agricultural GDP growth rate to 4% per year to ensure a broader spread of benefits
 - o Create 70 million new work opportunities.
 - o Reduce educated unemployment to below 5%.
 - o Raise real wage rate of unskilled workers by 20 percent.
 - o Reduce the headcount ratio of consumption poverty by 10 percentage points.
 2. Education
 - o Reduce dropout rates of children from elementary school from 52.2% in 2003-04 to 20% by 2011-12
 - o Develop minimum standards of educational attainment in elementary school, and by regular testing monitor effectiveness of education to ensure quality

- o Increase literacy rate for persons of age 7 years or more to 85%
- o Lower gender gap in literacy to 10 percentage points
- o Increase the percentage of each cohort going to higher education from the present 10% to 15% by the end of the plan

3. Health

- o Reduce infant mortality rate to 28 and maternal mortality ratio to 1 per 1000 live births
- o Reduce Total Fertility Rate to 2.1
- o Provide clean drinking water for all by 2009 and ensure that there are no slip-backs
- o Reduce malnutrition among children of age group 0-3 to half its present level
- o Reduce anaemia among women and girls by 50% by the end of the plan

4. Women and Children

- o Raise the sex ratio for age group 0-6 to 935 by 2011-12 and to 950 by 2016-17
- o Ensure that at least 33 percent of the direct and indirect beneficiaries of all government schemes are women and girl children
- o Ensure that all children enjoy a safe childhood, without any compulsion to work

5. Infrastructure

- o Ensure electricity connection to all villages and BPL households by 2009 and round-the-clock power.
- o Ensure all-weather road connection to all habitation with population 1000 and above (500 in hilly and tribal areas) by 2009, and ensure coverage of all significant habitation by 2015
- o Connect every village by telephone by November 2007 and provide broadband connectivity to all villages by 2012
- o Provide homestead sites to all by 2012 and step up the pace of house construction for rural poor to cover all the poor by 2016-17

6. Environment

- o Increase forest and tree cover by 5 percentage points.
- o Attain WHO standards of air quality in all major cities by 2011-12.
- o Treat all urban waste water by 2011-12 to clean river waters.
- o Increase energy efficiency by 20 percentage points by 2016-17.

43. The new Working plan for Ahmednagar division has incorporated all the directions of the Committee and has in addition to enrichment of the areas, afforestation over suitable

ares laid specific emphasis on land regularisation, demarcation of the forest boundary, and advocates special methods to handle specific areas in addition to regular works.

CHAPTER VI

STAFF AND LABOUR SUPPLY

SECTION 1 :- STAFF :

- Staff position of Ahmednagar division (including Sangamner sub-division) as on 1st April 2007 is as under:

s.no	Category	Payscale (VI pay com)	Grade pay	Number of posts		
				permanent	temporary	total
	Class I					
1	Deputy Conservator	15600-39100	5400-7600	1	-	1
2	Assistant conservator	9300-34800	5000	-	4	4
	Class II					
3	Range forest officer	9300-34800	4400	14	7	21
	Class III					
4	Round Forest officer	5200-20200	2400	41	20	61
5	Beat Guard	5200-20200	1800	120	51	171
6	Surveyor	5200-20200	2400	3	-	3
7	Head Accountant	9300-34800	4300	1	-	1
8	Steno-typist	5200-20200	2400	1	-	1
9	Accountant	5200-20200	2800	8	5	13
10	Clerk	5200-20200	1900	11	4	15
11	Jeep driver	5200-20200	1900	2	-	2
12	Armed constable	5200-20200	1900	1	-	1
	Class IV					
13	Naik	4440-7440	1600	1	-	1
14	Peon	4440-7440	1300	2	-	2
15	Mali	4440-7440	1300	2	-	2
16	Watchman	4440-7440	1300	2	-	2
17	Cook	4440-7440	1600	1	-	1
18	Van major	4440-7440	1300		452	452
	TOTAL			211	543	754

- Notification from the Government of Maharashtra dated 3rd December 2008, creating a separate Independent Sub-division Sangamner with Headquarters at Sangamner, would entail in re-organisation within the existing staff of Ahmednagar division by the Chief Conservator of forests, Nashik (territorial), without incurring any additional costs on the establishment.
- With computerization having entered in a large way, this would give an opportunity to reorganize after due appraisal of the work-load in the different sections of the office, and streamline the working of the Department, setting an example for other divisions as well.

SECTION : 2 LABOUR SUPPLY

4. Labour is available in plenty. There is separate additional Collector for Employment Guarantee Scheme for this district. In addition to Employment Guarantee Scheme various Works under National Rural Employment Programme and Rural Landless employment Guarantee Programme and the newly launched Maharashtra Rural Employment Guarantee Scheme (MREGS) modeled on the Central Government directives exist in the district. The employment generated on various works of different departments under following schemes during the years 2005-06 and 2006-07 as extracted from the District Socio-Economic Survey is as under :-

Item	2005-06		2006-07	
	district	forest	District	Forest
Total number of works planned	11133	978	10004	187
Total expenditure (lakhs)	1251.19	161.47	350.95	87.05
Employment generated (lakh mandays)	17.88	2.30	5.40	1.34

5. Analysis of the data of the generation of employment in terms of man-days generated due to implementation of various programmes by the Forest division, Ahmednagar, which centered principally on afforestation activities, indicate the contribution of employment generation to the rural populace in the district (in lakh mandays).

Year 19	94-95	95-96	96-97	97-98	98-99	99-00	2000-01	1-2	2-3	3-4	4-5	5-6	6-7	7-8
Man days	19.4	19.2	16.9	17.1	12.4	1.7	1.0	11.8	9.6	10.8	7.8	0.8	2.3	1.8

6. The raise in cost of living has led to concurrent hike in the rate of the daily wages meted out to the daily labourers on work in the forestry operations. The trend of the rise in the daily wage rates inclusive of the Dearness Allowance based on the Pricing Indices as sanctioned by the competent authority is represented as under:

Item\year	1996	2000	2006	2008
Unskilled	Rs.35.10	Rs.51.90	Rs.71.73	Rs 83.62

CHAPTER – VII

PAST SYSTEM OF MANAGEMENT

SECTION 1 - GENERAL HISTORY OF THE FORESTS

1. From the old records, it appears that the erstwhile rulers in this area always asserted their feudal right over teak and blackwood. These were considered royal trees, the property of the Government, in whatever land they grew except in case of areas specially granted as ' sanads' to various temples. They had also set apart and preserved areas as 'kurans' which were excluded from the areas available for cultivation and reserved for production of timber, fuel and grass.
2. During the period of consolidation of their new acquisition by the British, the above facts appear to have been entirely overlooked. As a result, much of the land formerly reserved by the ex-rulers was surreptitiously acquired by private individuals and harvesting of tree growth was carried out with the only consideration of profits. This ruined the forests almost to an irreparable stage. In 1840, the British Government appointed Dr. Gibson, the superintendent of Botanical Gardens to inspect the forest areas of the Deccan region to assess the quantity and quality of timber that could be made available from these forests to supplement the depleted teak supplies to the dock-yards of Kanara and Malbar. His report indicated that teak in this part of the Deccan region was of little account for external commercial purpose.
3. The military department appointed Dr. Gibson as Conservator of Forests on 22nd March, 1847 and an extensive area was placed under his control. He endeavored to bring the forest growth into a better state by arranging for protection and improvement felling wherever this was possible. He also tried to protect the forest by making agreements with leading villagers, promising them share from the harvesting in exchange of protection from teak within their village limits. Conservancy of grass kurans and Babhul started in 1850. The first survey settlements were completed by 1860. It was entirely left to the revenue officials to decide which lands in each village were more suitable for cultivation and for forests. No forest preserves were selected long the Ghats. It was not until 1852 that with the advent of Railway and the increased demand for fuel brought about such a diminution in non royal species all over tract that the desirability of affording some protection to such species by the Government began to take effect. Regulations were finally issued by the Government in 1855, conservancy measures for 40 villages of Akola tahsil were adopted in 1851 by appointing a keeper. These regulations were largely

directed towards putting stop to the shifting cultivation which had been found to be causing immense destruction of the fuel species and the evergreen parts in the hills. In 1856 when the authorities were convinced about the role played by the hereditary keepers in conniving at the shifting cultivation, they were replaced by paid keepers removable at pleasure. By 1867 a revision survey was started. The allocation of the forest areas was still carried out by the Revenue Officials quite independently of the Forest Department. The harvesting was carried out in haphazard manner. Only teak was harvested departmentally for revenue purpose. Other species were sold by auction.

4. Matters continued as such till 1878, when the Forest Act was passed and definite areas declared as 'Forests' in March 1879. Scientific management was then introduced. As forest settlements were still in progress, years were spent in preparation of various registers for records. Even after the settlements, persistent demands for more land and for extended grazing facilities continued. As a result, in 1903 and in subsequent years, large areas which have been gazetted as reserved forest were taken over by the Revenue Department of management. The whole for the forest areas in Ahmednagar district except those of Akola and Sangamner talukas were transferred to the Revenue Department.
5. Consequently, Ahmednagar division completely disappeared and the two talukas of Akole and Sangamner were added to the Nashik division for administrative purpose. Later In 1914, when Poona division was created, they were jointed to the Poona Forest Division. This transfer of control from the Forest department to Revenue Department was in fact a decision of the Government to abandon the attempts to improve these lands and leave their future development to individual initiative. The result has been that the better lands have been taken up in small holding for cultivation, increasing immensely the pressure of grazing on poorer lands. The abandoning of any period of closure resulted in absolute uncontrolled utilization of such lands.

SECTION : 2 PAST SYSTEM OF MANAGEMENT AND THEIR RESULTS :

6. As far back as 1864, felling was made in the forest of Akola tahsil and from then, annual fellings were made up to 1880. In 1879-80, Height prepared the first working plan for the teak forest of Akola and Sangamner tahsils. The harvesting was based on yield. All teak trees considered fit for harvesting were counted and measured. The total volume thus arrived at was then divided by the volume which it was considered possible to harvest annually and thus the rotation was fixed. This plan is unavailable and apparently has not worked well, as from 1884 on wards it was modified to a system of harvesting by

area on a 40 year rotation under Coppice with Standard system. A working Plan for fuel and fodder resources of Ahmednagar division was prepared by R.S.F. Fagan in 1900. According to this plan the thorn and babhul forest were to be worked by clear felling on 40 years rotation, with artificial regeneration by ploughing and sowing.

7. The first working plan for the mixed deciduous forest for Ahmednagar was drawn by J.Dodgson in 1905. Under this plan the teak forest were to be worked under coppice with standard system with a rotation of 40 years. The coppice regeneration was to be supplemented by artificial regeneration by pit planting of teak seed and by transplants. Ten standards of sound and well grown teak trees were to be retained in coupe due for felling. As almost all areas in charge of the Forest Department excepting those of Akola and Sangamner talukas stood transferred to the Revenue Department in 1903 and later, the plan prescriptions prescribed by Dodgson could not be brought under implementation.
8. Later on, the general revision of the working of all types of forest of Pune Division (including areas of Akola and Sangamner talukas) was undertaken by D.A.Thomson. Due to certain difficulties and transfer of Thomson, this working plan could not be approved, though the field work and mapping etc. were completed. Five working circles viz. Teak, Babhul, Raival, Grass and Unworkable were indicated on maps. Coupes and felling series were laid out. Work according to this distribution was actually introduced in anticipation of the sanction of the plan and continued till 1932-33. The teak was worked under coppice with standards system as in the previous plan and babhul under clear felling system. The working was probably intended to be a light improvement felling on a 30 years cycle, but the harvesting was probably carried out on the same lines as 'Coppice with standards' which caused serious damage to the existing forest growth. Most of these forests are located on steep slopes with shallow soils, like all evergreens, they appear to live largely alone on products of their down decay. Their existence alone ensures adequate conditions of soil moisture; while their dense canopy creates sufficient depth of humus to enable them to flourish. Their artificial removal immediately results in conditions hostile to replacement by any, but the less desirable species. Marked retrogression occurs which results permanent blanks. Such extensive blanks are noticed distributed all over the area, wherever harvesting of these forests has taken place.
9. The prescription of the unapproved plan of Thomson continued to be applied till 1932-33. Garland, who undertook the revision of working plan for Poona division, provided a comprehensive plan for the forest of Akola and Rajur ranges of Ahmednagar district too, as they then formed part of Poona Forest Division. Part of Srigonda range was also covered under the plan.

10. Four working circles were created by Garland, the working and results of which are briefly summarised below :

- a. Main Working Circle- This mainly covered the deciduous forest areas and was directed to be worked under clear felling system in patches where coppice regeneration supplemented by artificial regeneration could be established. The felling cycle prescribed was 40 years. The system was later changed to 'coppice with reserve' with prescription to reserve 25 teak and valuable injali trees. This reservation was to be supplemented by 'rab' regeneration of teak and valuable injali species. A reservation of 25 trees could not be done in most of the places owing to scanty growth. The working as a whole had an appearance of simple coppice. The artificial 'rab' regeneration in patches and in strips has on the whole a very patchy appearance. Many of the coupes could not be worked at all due to poor and scattered growth. Moreover, the incidence of illicit cutting and hacking of shoots due to extreme paucity of fuel was so heavy in this region that plantation raised or coppice growth that had come up as a result of clear felling the standing growth did not put on any desired growth and subsequently vanished.
- b. Pasture working Circle. This primarily included mainly grass producing areas which were constituted into blocks with prescriptions for harvesting stunted tree growth and shrubbery under a ten year cycle through ten sub-block in each block. No definite improvement measures were suggested, nor was any extent of closure applied at any time except that of subjective prescription aiming at general improvement of land and pasturage inviting goodwill of the people. The results were disastrous and have resulted in drop in the soil fertility and denudation resulting from loss of soil cover and rapid erosion coming in its wake. As the cattle population in this area far exceeded the carrying capacity of the forest, the areas were heavily grazed. While drafting the prescriptions, public cooperation was envisaged for successful implementation of the scheme. The local people never extended such co-operation. Moreover, the special staff required for the effective implementation of the prescription was not provided. As a result, these pastures were continuously subjected to uncontrolled and excessive grazing.
- c. Fuel Working Circle. This working circle included the riverside babhul areas of shrigonda tahsil. Garland prescribed clear felling system with artificial

generation of babhul with suggestions to try out species like *Prosopis juliflora*, on soils which naturally evade good babhul growth on a 30 years rotation. The system of regeneration had for long been one on the lines of taungya plantation, the open land after removal of the crop being auctioned out for cultivation, the cultivation raising field crops simultaneously with babhul in lines 20' apart. The working system neglected or at least overlooked the necessity of preserving the soil complex in its original state. Reduction in soil depth and fall in the quality growth have become too evident due to the sheet and the gully erosion, the flood water taking away the best soils every year from the floors of these forest following clear fellings.

- d. Protection working circle. This was formed out of the 'semi-evergreens' situated on the hill slopes on the eastern spurs on Sahyadri. To begin with, the working aimed at a conservative removal of mature tree growth without exposing much soil cover, under a 30 year felling cycle. The felling operations were to be of the nature of improvement fellings and thinnings. But in practice, this was transformed into almost clear fellings with destructive results. As a result large parts of the area have turned into open grass lands bearing occasional growth of thorny species. The thin soil layer has been washed off exposing the underlying rocky crust. The prescriptions of raising plantations in the worked areas do not seem to have been attended properly. A large extent of area was left over by Garland as unorganised. No prescriptions were laid down nor did any attempts make for their protection and rehabilitation. Naturally the villagers from the surrounding villages cleared the forest growth illegally over extensive areas for raising food grains. Subsequently the encroachments have been vacated, but the areas have suffered severely and area now devoid of any tree growth and are subjected to severe erosion, as also unrestricted and excessive grazing with serious repercussions.

11. In 1955, areas of about 3200 hectares from the reserved forest of the remaining parts of Ahmednagar district were retransferred to the Forest Department, which were then included in the Poona Division for management. Two afforestation ranges, one at Rahuri and the other at Shrigonda were formed with an annual target of 400 hectares for raising plantations and afforestation. Some of the plantations viz. At Rahuri, Baragaon-nandur, deulgaon, Rehekuri, Nandgaon Kuldharan has come up well. Though the growth of the trees appears to be poor a definite progress in building up suitable conditions for further

development by natural regeneration of the planted species is noticed. Encouraged by the success of the afforestation works and plantations in the first years, full fledged Ahmednagar Forest Division was created in 1962 and Akola and Rajur ranges, which previously formed part of Nashik (West) division, were transferred to this division.

12. A watershed management plan for catchment of Mula river was prepared by shri V.N. Deshmane in 1973-74, the plan period of which was upto 1982-83. It covers areas from Rajur, Akola, Parner and Rahuri ranges, lying in the catchment of Mula River. Four working circles were formed and massive afforestation perscribed. However, the prescriptions of this scheme do not seem to have been completely enforced. Only a few afforestation areas have been tackled.

SECTION 3 - AFFORESTATION MEASURES UNDERTAKEN IN THE PAST : Ahmednagar district has about 40% forest area concentrated in Akola and Sangamner talukas. 80% forest area is located on hilly terrain and 20% is on the plains and most of the area devoid of any appreciable tree growth. Earlier efforts too strived with the main objective of afforestation and soil and moisture conservation after initial attempts to systematize by organized felling failed. In the process, the realization of the futility of keeping the areas with Revenue Department, led to creation of separate Ahmednagar forest division with headquarters at Ahmednagar in the year 1962.

Years	Scheme	Area of implementation		Area 'hectares'	species	Remarks
		Tehsil	Village			
1962-63 to 65-66	Afforestation in reserved forests of selected talukas	Ahmednagar, Parner, Srigonda, Rahuri	Jeur,manjarsumba ghatsiras,wadgaon-saotal, wankute, bhangaon, kolgaon bhose,taklilonar, khambe,mhaisgaon.	927	mix	
	Afforestation of fast growing species	Ahmednagar, Parner, srigonda, rahuri, Karjat	Jeur, ghatsiras, karnajia,wadgaon saotal, dhotre K &b, wankute, kuldharan, rehekuri, taklilonar, baragaon, khambe, mhaisgaon, chiklatan,warawandi.	1571	Nilgiri, siras, prosopis etc	
1963 to 1978	General Utility Timber-bamboo	Akola,	Chichondi, pangri, uddavane, pimprkane,ghatghar, penshet,shenit, ambit,shirpunja, kumshet, koltembha.	1019	bamboo	Clearning operations not done, some areas now in WL sanctuary.

Years	Scheme	Area of implementation		Area 'hectares'	species	Remarks
		Tehsil	Village			
1965-66 to 78-79	MFP plantation Agave	Ahmednagar, parner, karjat, shrigonda, jamkhed, sangamner, akola,rahuri.	Dongargad,ghospuri, wadgaon sautal, gazdipur, malkup, wankute, chincholi, wadzire, kuldharan, ghalwadi, chanda, shinda, nandgaon belwandi, deulgaon, hiradgaon,ghodgaon, khar, rajur,mogras, gardani,pangri,brahmni	1900	agave	Help cottage industry and soil and moisture conservation.
1966 onwards	Affor for Soil conservation	All over the district				No record.
1966-67	Aff. Ind.& com. Imp fuelwood	Ahmednagar, sangamner, rahuri, parner	Karanji, warwandi, chikalthan, ghosepuri, palaspur, wankute.	321	Nilgiri,siris, neem,acacia, prosopis	Only one year
1966-67 to 1968-69	Grass& kuran dev scheme	Rahuri,sng'ner parner, srigond a ahmednagar	Baragaon nandur, mhaishaon, sherry kuran,wadgaon sautal, chikhli, takli lonar,ghosepuri	332		

13. Afforestation schemes included planting of different species including Eucalyptus, Shiras, Prosopis, Bamboo, Agave, Sissoo, Neem, Acacia, Sandal etc.,

14. AFFORESTATION AND KURAN DEVELOPMENT SCHEMES UNDER DROUGHT PRONE AREA PROGRAMME: Under this programme started in 1971-72 drought prone talukas of the Ahmednagar district were selected for Afforestation. Objectives of this programme were to conserve soil and moisture and to provide the green cover to exposed soil surface. Till 1973-74 this scheme was implemented by the Ahmednagar division and about 450 Hectares covered in Pathardi, Ahmednagar, Jamkhed, Parner, Srigonda and Karjat talukas. Considering the magnitude of the work involved, a separate division was created in 1974-75 for implementing this programme, funding of which was through I.D.A (International Development Agency). This division worked mainly on non-forest lands. The division was closed in 1981-1982 and merged with the territorial division

15. Since 1974-75, various afforestations were carried out under the Employment Guarantee Scheme. Under this scheme, which had the main objective and assurance to provide employment to those willing and unemployed labour, work was offered within 8 kilometres vicinity of their village to provide them employment. Under this scheme, works such as afforestation for soil conservation, Teak plantation(Akola Taluka – Village

Mehenduri and Terungan), Chandan plantation (Ahmednagar – Shendi, Sangamner-Warwandi, Srigonda-Kamathi), Bamboo plantation (Akola-Pachnai, Lavhili Kotul), Nallah Bandhs (Akola-Ratanwadi, Samrad, Uddavne, Ghatghar, Chinchondi, Koltembha, Pangire) Trench Cum Mound fencing around forest areas etc. were taken up. Works under E.G.S. and allied schemes are still in vogue.

16. Afforestation works undertaken in the late 70s and prior to 1990s involved activity of the Forest Development Corporation too, which confined its work to the Sangamner sub-division area only. A concise statement of the afforestation undertaken in Ahmednagar district in this period is as under:

Year	Agency	Scheme	Area covered
1986-87	Forest department	RDF, I&C bamboo, W.Ghat Affores for soil conservation	455
1987-88	Forest department	As above	733
1988-89	Forest department	As above	706
1989-90	Forest department	As above	902
1990-91	Forest department	As above	579.50
1988-89	FDCM	Mass affor scheme	1275
1989-90	FDCM	EGS and MAS	648.40
1990-91	FDCM	EGS and Comp Affores	1000
1992-93	FDCM	EGS	1126.31
1993-94	FDCM	EGS	1282

17. PLANTATION TECHNIQUES IN OLD PLANTATIONS Prior to 1994 : Apart from the Bamboo and Agave plantations, the planting techniques are similar for all the schemes in old plantations discussed in foregoing para graphs. The planting has been done invariably on Trenches of size 4m. x 0.30m. x 0.60m, trenches being 150 per hectare. 5 plants were planted per trench and the seeds were also sown in between the planted seedling. In some patches, planting on pits is also noticed. In such cases the pits were of size 30x30x30 cms. 'Uralis' were taken up throughout the site, lines being 5 feet apart. Three weedings were carried out in the first year, 2 in second year and one in third year. Whole area was enclosed by digging T.C.M. Plantations were fire protected and watchman engaged for five years. In case of Agave plantations, the pits of size 30x30x15 cms were dug up 5 feet apart throughout the site. Uralies were taken up throughout the site only one weeding was carried out every year for first three years. These agave plantations were auctioned to Societies of rope weaving labourers, from second year

onwards. It seems that with the advent of synthetic ropes, this Cottage Industry became commercially unviable and subsequently these plantations were replaced by other afforestation species. At present no pure Agave plantations are noticeable. But agave is found on T.C.M.s in other afforestation areas.

18. RESULTS OF PAST AFFORESTATION WORKS prior to 1994: The old plantations were inspected and evaluated during the preparation of the earlier Working Plan. Given the situation wherein the records, such as, plantation Registers, Plantation models etc. of the Old plantations were not available either in Division office or old range Offices; moreover, the year of plantations also could not be ascertained accurately in most of the old plantations as these had been replanted 2-3 times over in the last 20 years or so. So it was very difficult to say authoritatively whether a particular tree had been planted in the first Afforestation operation or in the subsequent reafforestations. For the same reasons, the net planted area of the Division is also not clear. Owing to this constraint, the Working Plan staff then had to base the findings on their field visits and observations only and not on the official records. Following observations were made during the course of such observations.

- a. Afforestations are in general, partially successful. More than 20-30 % trenches have no surviving plant and about another 20-25% have a congestion of plants. This is because of the fact the seed sowing done at the time of Afforestation has resulted in a number of seedlings. These have not been thinned subsequently. Planting is invariably on trenches of size 4m.x0.3m. x 0.6m in old plantations, the number of trenches was 150/Ha, which had later increased to 600 and 533 per Ha with pits of size 30x30x30 cms taken up in patches along with the trenches in old plantations.
- b. The density of the plantation in successful patches varies from 0.1 to 0.5 and reaches a maximum of 0.5. Congestion on some trenches because of survival of both seed sowing and planted seedlings, has not been reduced and this has contributed along with other factors, to the stunted growth, the other main factor being very low soil depth.
- c. Species tried over the years in the division included-Neem, Subabul, Anjan, Acacia tortillis, Chandan, Siras, Kshid, Eucalyptus, Babhul, Ramkathi babhul, Prosopis, bor, chinch, Glyricidia, Khair Bamboo, Karanj, Lallai (A.amara) Maharaukh, Ritha, Teak, Siwan, Vilayati Cinch, Australian Babhul etc.

- d. In general it was observed that Neem, Sissoo, Subabul and Acacia tortilis have given satisfactory growth and survival. However, other species mentioned above have done well, in specialized locations in patches, Examples are – Bamboo in Panshet Uddavne, Samsheerpur, and Sawargaon areas of Akola Taluka. Chandan in Rahuri and Ahmednagar Talukas, Anjan in Rahuri, Khair in Rahuri encalyptus in Akola Rahuri and Sangamner, acacia auriculiformis in Akola Taluka. Fruit species are not easily visible, exception is Bor
- e. All the plantations have been fenced by T.C.M. At places, Chillar, agave and prosopis have been planted on T.C.M. Grass beds do not appear to have been prepared in Old plantations, but on recent plantations i.e. 1980 onwards, these are noticed. Original planted grass was mainly Anjan grass.
- f. Fire damage is not high in the division.
- g. Soil and moisture conservation works noticed in old plantations appear inadequate. In general, the soil and moisture conservation measures have improved the site which has improved the subsequent reafforestation.
- h. the enumeration of old plantations was carried out in Sangamner, Akola, Rahuri and Ahmednagar talukas. The plantations selected for enumeration were successful plantation in comparison to the general plantations of that period in the adjoining areas. Data collected indicated there were maximum trees in the 21 to 40 cms girth class. The analysis of data of old plantations showed that Neem and Sissoo are the most successful species for this division and mostly the plants have reached girths not more than 50 cms. In the growth period of 30-40 years, very few plants have reached higher girths and this is attributed to local factors like good soil depth or more moisture and these are rather exceptions.
- i. In the case of recent year plantations the growth data was collected from 4th year (1988-89 Sixth year (86-87) 8th year (84-85) and 10 year (82-83) plantations of different talukas. Samples were selected in such a way, that the good plantation patches are enumerated and the general trend in their growth can be observed. The blank, failure areas of the plantations were not considered. Sample plots were laid down over one hectare spread over 4

such smaller sample plots in 4 sites, data analysed which led to the inference that-

- i. Neem, subabul, sisoo, acacia tortilis, siras, glyricidia and eucalyptus have shown better survival and growth
 - ii. In successful plantations after X year about 56% plants remain under 20 cms girth and about 19% reach over 30cms girth.
 - iii. After the 8th year, in successful plantations, % of plants below 20 cms girth is 77%, only 6% reach about 30cms girth.
 - iv. Commercial exploitation of the plantations was ruled out in the plantations at the time of preparation of Nimbalkar and Mishra's plan for Nagar division.
- j. The results of the enumeration carried out by the Working plan division team then prior to the preparation of plan between 1992-93 is represented as:

Location	Sample area	% of total Number of trees in girth classes								Species with % of total .
		<10	10-20	20-30	30-40	40-50	50-60	60-70	Total	
Akola, Shevgaon, Rahuri	3 ha from 90 ha of 1992-93 plantation	27.22	28.66	25.44	12.92	4.70	0.91	0.15	2083	Neem (38.8), subabul(28.5), Australian Acacia (2.69), Siras(2.76), A.tortilis(4.1), kashid(2.67), khair, bor, babul, chinch, maharukh, eucalyptus(8.44), glyricidia(0.77)
Sangamner, shevgaon, rahuri	3 ha from 70 ha of 1984-85 plantation	34.28	42.29	15.98	4.72	1.49	0.52	0.12	1546	
Akola, newasa, rahuri	3 ha from 95 ha of 1986-87 plantation	46.76	37.89	14.38	0.82	0.15	0	0	1961	
Sangamner, newasa, rahuri	3 ha from 90 ha of 1988-89 plantation	60.40	33.83	1.77	-	-	-	-	2152	

19. ANALYSIS OF PAST SYSTEM MANAGEMENT IN THE NIMBALKAR & MISHRAS plan: The Working plan for Ahmednagar forest division in the independently created Ahmednagar division was in operation from 1994-95 to 2003-04. The plan envisaged treatment of a total of 1,04,753 hectares under two working circles, with 1,02,023.938 hectares to be treated under Afforestation Working circle, and the rest 2,729.702 hectares

to be treated under the Silvi-pasture Management working circle and prescribed operations including demarcation of forest lands, and for the first time attempted to give compartment numbers to the forest areas of the division.

20. **The Afforestation Working Circle**, included most of the area of the forest division, and divided the total area of 102023.938ha into 100 afforestation series, which were further divided into 20 annual coupes for afforestation. It was envisaged that the demarcation of the coupes would be done on ground and on the maps by the Territorial staff as per the prescriptions of the area of the coupe in the plan; a year in advance, followed by preparation of a detailed treatment map. The categories stipulated were-

- i. A-protection areas-a) area with slope greater than 45°
b) area eroded and erodible areas.
- ii. B-Rocky and refractory areas unsuitable for raising any plantation including grasses.
- iii. C-Patches of forests with more than 0.4 density and successful patches of old plantations.
- iv. Understocked areas on sloped below 45.°

21. the treatments prescribed for each of such areas demarcated on the treatment map are summarized as under-

Areas	Treatment prescribed
A (i)	Seed sowing-Neem, Albizzias, sissoo, Gliricidia, Maharukh by the 1 st week of June; at 1.5 x 1.5 mtr spacing. No subsidiary operations.
A (ii)	Need extensive Soil & Moisture Conservation works, nalla bunding, gully plugging. Seed of grasses to be sown.
B	Left as unworkable areas, no soil/rock disturbances.
C	In small occurring Natural patches-removal of damaged trees, climber cutting, destroy lantana bushes, In old plantation areas-where stocking less, enrichment should be done with suitable species like Neem, Sissoo, Subabul, Acacia tortilis Extensive Soil & Moisture works all over the area. Where crowding observed, thinning recommended, failure areas to be replanted with inspection/report to the DCF.
D	Areas further classified into 3 zones and treatment accordingly specified. Zone I areas-areas with soil depth <10cms, where Water Absorption Trenches (WATs) @

	200 per hectare are to be taken up coupled with seed sowing amongst Neem, Subabul, Prosopis, Glyricidia on WATS, TCM, contour trenches. Zone II areas-areas with soil depth 10 to 30 cms, where afforestation in staggered Trenches @ 500 per hectare is recommended such that 1000 plants are there per hectare. Zone III areas-areas with soil depth >30cms , where afforestation in staggered Trenches @ 600 per hectare is recommended such that 1200 plants are there per hectare. Plant population to be fixed at 750 plants per hectare after III year of operation based on the concept of 'ecological index' computed for the district. Afforestation coupled with Grass beds comprising of 2 weedings and a soil working in First year, 1 weeding and 1 soil working in II year, and 1 soil working in III year operations, followed by limiting the number of plants to 750 per hectare giving preference to retaining Neem, Anjan, Sissoo, Karanj, A.tortilis over Glyricidia, Subabul. Area to be fire protected and closed to grazing for 5 years, permitting cutting of grass within the area.

22. The prescriptions of the working plan rested solely on the concept of "ECOLOGICAL INDEX" computed for the district of Ahmednagar. The concept was based on a research article published by M.H.A.Sheikh (1992). Ecological Approach to wasteland development. My Forest. March 1992 pages 123-128, copy of which is placed at Annexure LXIII of the Volume II of the plan.

23. The principle that Afforestation techniques and choice of species should relate to the Ecological conditions of the planting site, based on utility of the Ecological Index, which was computed (modified formula of Gindel) computed for the state of Karnataka by D.K.Deshmukh (1986) as :

Ecological index is the mathematical expression of the ecological conditions of a site. It takes into account various factors like annual rainfall, no. of rainy days in a year, temp. range rate of evaporation etc.

$$\text{Ecological index} = \frac{P \times D}{Tr \times EPT} \quad (\text{Gindel's Formula})$$

P = Annual precipitation in mm.

D = No. of rainy days in a year.

Tr. = Range of maximum temp. Averages.

EPT = $0.459 \times R \times Ct \times CW \times Ch \times Cs \times Ce$

R = Extra terrestrial radiation.

Ct = Temperature.

Cw = Wind Velocity.

Ch = Humidity

Cr = Sunshine.

Ce = Elevation.

Shri. Deshmukh (1986) has carried out studies in the field of E.I. in Karnataka and has suggested that the E.I. of last limits of wet zones in 13.45. Similarly, areas, having E.I. less than 3 indicate xerophytic condition.

24. Ecological index serves in two ways. It indicates potential of the region and given an idea of what vegetation type the region can support. It also suggests that afforestation techniques and other land management practices in areas having low values cannot be the same as that of localities having higher values.

25. The annual E.P.T. for Ahmednagar is 1604 mm. The E.I. For Ahmednagar comes out to 3.38 (or say 3.4) which indicates arid and adverse ecological conditions for afforestation, Calculation is as follows :

$$\frac{559 \times 31.5}{39 \times 1.33.7} = 3.38$$

26. So E.I. of Ahmednagar suggests that afforestation in these areas should be for soil and moisture conservation, and for maintaining environmental balance and not for practicing production forestry. This ecological index of 3.4 suggests that the no. of seedlings planted should be about 750/Ha.

27. One of the main objectives of dry zone afforestation is soil and moisture conservation. Therefore the amount of earth work should be so designed that it holds maximum runoff.

Av. Rainfall of Ahmednagar – 559 mm.

Total rainfall per hectare = $559 \times 10000 / 1000 = 5590 \text{ m}^3$

No. of rainy days = 31

Average Rainfall / day / Ha. = $5590 / 31 = 180$

So the amount of earth work should not be less than 180 Cum. Per ha. to hold maximum runoff. The foregoing discussion indicates to propose the no. of plants around 750 and earth work not less than 180 cum.

28. Higher values indicate better site conditions, better plant growth and better vegetation, converse to lower values which indicate poor site conditions, poor growth and xerophitic vegetation. In Karnataka the highest was at Mercare at 123, and Bellary had 1.43, which

is a drought prone area. The areas with less values of E.I should be planted with less number of seedlings.

29. THE SILVI-PASTURE MANAGEMENT WORKING CIRCLE- principally centred around areas identified which were subject to unrestricted grazing in the past over an area of 2729.702 hectares. Natural grassland of the area is Sehima/Dicanthium. The working circle is spread over 6 compartments, divided into 5 afforestation series, and each series divided into 10 coupes.

30. prior to treatment the areas are demarcated into 3 category of areas as:

- a. A- protection areas (areas with slopes greater than 45 and eroded and erodible areas)
- b. B-areas not covered under (b) and (c) areas.
- c. C-patches of old plantations in the coupe.

31. the treatment prescribed in each of the category is tabulated as under:

A areas	Need extensive Soil & Moisture Conservation works, nalla bunding, gully plugging. Seed of grasses to be sown. Need extensive Soil and moisture conservation works, nalla bunding, gully plugging, seed of grasses to be sown.
B areas	Area closure, soil and moisture conservation work, increasing fodder productivity, establishment of seed plots for raising planting stock of grasses, sowing fodder tree species at 8 x 5 mtrs, @ 250 trees per hectare

32. The choice of species for Grasses, Legumes and Fodder Tree species with location of seed plots establishment has been prescribed and detailed procedure to tackle the areas based on their configuration described

33. In addition to the NTFP overlapping working circle, the plan envisaged under miscellaneous regulations operations of Survey and Demarcation with a specially designed demarcation programme, fire protection programme,.

34. Implementation of the Nimbalkar and Mishra's plan:

- a. the implementation of the plan prescriptions was not followed to the final word it has been observed. Excepting for taking up afforestation programmes on a large scale no systematic approach was observed in conduct of the

operations on the field. Year-wise afforestation taken up under different schemes reflects the situation as under:

Year	Under all schemes	Scheme wise breakup in each year					
		EGS	Plan	DPAP, Assur.e mploy.s chem Jalsand haran	W.ghat	Non-plan others	Indo german watershed.
1994-95	5436	1245	2382	1404	405	-	-
1995-96	4088	1748	2114		115	111 (NP)	-
1996-97	4584	2271	1011	966	150	186 (NP)	-
1997-98	4900	1309	2027	900	300	-	364
1998-99	4199	795	1420	1127	400	-	457
1999-00	4231	1415	1875	73	85	-	413
2000-01	3197	630	2185		100	40 (NP)	242
2001-02	3090	2645	299		65		81
2002-03	2619	1516	406		80	491 (NP)	126
2003-04	2776	1809	432		50	462	23
2004-05	5598	2889	494			414 (FDA)	10
2005-06	1459	85.13				1070.5 (NFFW) 304 other	
2006-07	1789	-	504.45	570		665(FDA)	50
2007-08	1207	-	751.57	100 Oth		283(FDA)	73
2008-09	2469	-	1429			1040(FDA)	
	51642	18357.13	17330.02	5140	1750	5066.5	1839

- b. there was no adherence to the coupe numbers, and many a place though one finds mention of a coupe number, there is utter confusion, since the coupes were never laid down on the field and correspondingly on the map which was a prescription of the earlier plan.
- c. Chaotic situation under situations wherein numerous plantations had been taken on sites which already had been afforested earlier too.

- d. A perusal of the sites reveals that there has been repeated afforestation on the sites at earlier places, however, many sites reveal that hard strata, with scant growth, especially on exposed surfaces had not been afforested to that greater extent, thereby giving a picture of young to pole congested crop in crevices, niches, valleys, and at places with satisfactory soil depth, and barrenness on exposed areas, no attempts to afforest on the disputed so called 'distributed areas'; which is somewhat justified from the FSI imagery interpreted using the Geo-Media software, which surprisingly throws up information that more than 1 lakh hectares of the total forest area in the land is under blank classification, which calls for a serious introspection of the efforts of the staff of the division.
- e. Scant respect to the prescription of the working plan regarding conduct of thinning of afforested areas so that plant population is maintained at 750 plants per hectare after the III yr of operation, led to a situation wherein there is absolute congestion of crop, coupled with the established seed sown glyricidia competing with the crop, thereby ensuring that none of the crop grows to the expected pattern. This had led to recommendation of thinning exercises by the touring senior officers too.
- f. Submission of Control Forms after the year of operation was neglected completely, therefore there is no adherence to getting the Deviation proposals sanctioned if any from the competent authority.
- g. There was no implementation of the prescriptions of the Silvi-Pasture management working circle, leading to massive intensive afforestation in such areas designated in the Working circle. Moreover, afforestation exercises have apparently been conducted in the Wildlife Protected Areas in custody of the territorial division, much against the prescriptions of the Wildlife Management Plan sanctioned for the Great Indian Bustard Sanctuary.
- h. Non-submission of Control Forms as per the prescriptions of the earlier sanctioned Working Plan, prevented the Working plan division office at Nashik and the WPO to interpret the progress of implementation of the working plan prescriptions.
- i. The efficacy of the extent of implementation of the specially recommended survey and Demarcation exercise over the period of 10 years is difficult to

appreciate in the absence of control forms for the purpose. The progress of the scheme revealed that against the target every year for each range to survey and demarcate on an average 10 villages and 4000 hectares of forest area each year, the total length covered was a meager 1634 kilometre, leading to erection of 14961 large cairns and 23722 small cairns, involving an expenditure of Rs 8.61 lakhs. The years of operation were 1999-2000 in the first place, and later in years 2004-05, 2005-06, 2006-07, and 2007-08. the details of work done are presented under separate Annexure in Vol II of the plan.

- j. The enumeration of the tree population conducted by the Working plan staff during the course of stock mapping revealed that most of the crop is still <45 cms girth; with a preponderance of Glyricidia and Subabul amongst those present.
- k. Experiments at Hivre Bazaar and Dorje coupled with innovative practices in the form of Van Vigyan Kendras at different centres in the district, have kept the District foremost in Forest Extension activity, propounding the positive effect of public participation in Water Conservation excercises, and humus building excercises. Further the Forest Eco-centres for dissemination of Information are truly innovative and showcase an example of the co-operation of the Forest department with the District Administration.

35. During the plan period in 1994-95 to the present significant strides made by the Division have been paraphrased as under-

36. progress in Water conservation structures including Van talis, bandharas is-

2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
20	27	72	67	53	4	90

37. In the years 2005-06 to 2007-08, under the provision of the National Equi-development scheme for which funds were drawn through the District Rural Development Agency, for overall development of the selected districts in the country of which Ahmednagar was one, Forest department had against the proposals of Rs.201.1 lakhs made, could spend actually Rs.307.58 lakhs, on activities including-

Activity	Number of works	Amount spent Rs (lakhs)
Vantali /vanbandharas	43	259.58
Nature Interpretation centres	3	39.20
Repair to steps to Kalsubai	1	18.80

38. Participative management activity of the forest department, led to laudatory achievements at State Level.

- a. Village Hivre Bazaar, stood First in the state in 2006-07, under the Sant Tukaram Vangram Yojana, and won a prize of Rs.5 lakhs and a citation from the State Government.
- b. Village Dorje, stood First in the state in 2007-08, under the Sant Tukaram Vangram Yojana, and won a prize of Rs.5lakhs and a citation from the State Government.

40. The Ahmednagar forest division years 2002 and 2005, won encomiums and prize at the District level, in the Rajiv Gandhi Administrative Reform Programme.

SECTION : 4 – PAST YIELD :

41. The yield of timber and firewood from Ahmednagar division is negligible.

SECTION : 5 – PAST REVENUE AND EXPENDITURE :

42. Statement showing the figures of Revenue and Expenditure for the period 1994-95 and thereafter is separately appended in Annexure XI of the Volume II of the plan.

CHAPTER – VIII

STATISTICS OF GROWTH AND YIELD

SECTION : 1 – GROWTH :

1. There is almost total absence of Teak and commercially important species of harvestable size. Scanty, sparse and stunted tree growths in restricted areas which have been taken back from revenue department from all the tahsils is the picture one sees in Ahmednagar. However in few patches repeated afforestation coupled with absence of thinning operation prescribed in the earlier plan leads to a picture of congestion with thickets of Glyricidia and Subabul, the former preventing establishment of other species. This plan too doesn't envisage harvest on a commercial basis.

SECTION: 2- STOCKING

2. The survey of forest resources has been carried out by the Ahmednagar territorial division staff that has been trained in the process by the staff of Survey of Forest Resource Unit, Nashik; on the sample plots as per the design given by the Chief Forest Statistician wing of the Forest Department. The results are in the process of analysis and shall be appended separately in the Vol II of the plan. The earlier plan had completed the Plant Resources Survey for the district only in Akola tahsil on the reason that rest of the forest areas from the district were mostly blank and degraded. The then team had however conducted sample analysis amongst the Older plantations, the middle aged plantations to observe the composition of the species in the afforested areas. The results find mention in the chapter entitled past history of management of this plan. The enumeration had been done, by taking village as a unit. Method adopted was random Topo unit sample method and intensity of enumeration was approximately 15%.

3. Ahmednagar division had been afforested on an average @ 3,000 to 4,000 hectares in each year from 1985 to 2005 under different schemes. Keeping in tune with the guidelines issued in the National Working Plan Code 2004, the Range Forest Officers of the Working Plan division, Aurangabad in co-operation with the field staff of the Ahmednagar division, in the process of stock mapping and updating the compartment history of the compartments, laid down plots admeasuring 20 x 20mtr and/or 40 x 40 mtrs in each of the compartment of the division, and enumeration of the tree growth species girth-wise in the plots laid down was tabulated and summarized for each of the Tehsils, which are tabulated below. The

details of each of the plots are appended with the compartment histories, and abstracts for each tehsil appended in the Annexure in Vol II.

4. The salient features of the growth statistics observed in the earlier plan could be summarized as under-Nimbalkar and Mishra's plan presented SOFR unit observations limited to Akole tehsil only, and conducted sample observations on old and middle aged plantations which have been presented in the chapter Past systems of Management. The SOFR data for Akole Tehsil makes interesting study, which was done in the year 1991, which involved enumeration over area of 2615 ha with a sampling intensity of 18.51%, is represented as under:

	Species	Girth-wise classification in centimeters									
		15-30	30-45	45-60	60-75	75-90	90-105	105-120	120-135	135 & >	Total
1	Ain	50686	58301	54142	50695	42474	34550	27442	19742	14506	352538
2	Awali	2935	2832	1975	1752	1018	807	940	528	379	13166
3	Asana	2717	2949	2777	2005	1594	1288	975	319	229	14853
4	Bondara	4447	15739	14319	12343	10171	8818	6181	3721	1728	87467
5	Behada	6601	8049	6611	5643	5144	4507	3756	3242	2885	46439
6	Dhawada	512	492	412	173	332	237	213	54	-	2425
7	Dhaman	2298	2549	2057	1743	1139	880	200	136	17	11019
8	Hed	55	42	34	55	29	46	50	21	21	353
9	Kalam	162	114	152	66	70	140	67	39	28	838
10	Kakad	789	927	674	753	954	616	566	526	419	6224
11	Khair	41	11	1	-	-	-	-	-	-	53
12	Khirmira	415	195	44	22	22	6	61	-	-	765
13	Sawar	2648	3037	2129	2248	1906	2846	2088	1914	261	21435
14	Tiwas	491	1216	317	209	268	110	84	14	19	2728
15	Hirda	30467	36936	31021	27888	23461	19456	17586	12027	9205	208047
16	Shiras	1324	1642	1216	942	598	398	294	149	265	6828
17	Total	116586	135031	117881	106537	89180	74705	60503	42433	32320	775178
18	Other sps	346716	315540	229903	186137	145202	112433	79741	53981	39606	1509259
19	Grand total	463304	450571	347784	292674	234382	187138	140244	96414	91926	2284437

Observations were made in the year 1991 when the wildlife sanctuary areas were with the Territorial divisions. It is quite likely that the above data is a result of sampling done in the protected area too, hence doesn't give a true picture of the Akole tehsil outside the protected area network.

5. Observations made during the current stock-mapping in plots 20 x 20 mtr over the number of plots laid are as under-

Tehsil (plots)	Number of trees in each girth class									Maximum Species
	<15	15-30	30-45	45-60	60-75	75-90	90-120	>120 cms	total	
Nagar (21)	3	28	41	28	18	-	-	-	118	Subabul, neem, gliricidia, A.tortilis
Newasa(11)	-	11	14	18	-	-	-	-	43	Neem, Prosopis, Nilgiri.
Parner (71)	52	135	125	72	8	4	-	-	396	Subabul, gliricidia, neem, nilgiri, khair
Kopargaon(8)	5	14	1	14	-	-	-	-	34	Prosopis, Subabul, Neem, Awala, babul
Rahata (2)	-	5	1	3	-	-	-	-	9	Neem, A.tortilis, babul
Shrirampur(1)	-	-	-	1	-	-	-	-	1	Babul
Rahuri(32)	-	29	61	42	-	-	-	-	132	Neem, babul, A.tortilis, subabul, nilgiri, anjan, gliricidia
Sangamner(88)	399	1207	222	68	27	3	3	-	1929	Subabul, neem, A.tortilis, Gliricidia, Babul, sissoo.
Akola (65)	87	408	312	99	38	8	5	4	962	Gliricidia, subabul, babul, nilgiri, neem, A.tortilis, jambul, ain.

6. the salient features of the current sampling exercise during the stock-mapping could be inferred as-

- there is a domination of glyricidia and subabul in most of the plantations taken up and seen by the teams.
- There is a decline in afforestation and subsequent establishment of the traditional plant species.
- It leads to surmise that seed sowing of seed like subabul and glyricidia in particular done along with the planting of principal plants; coupled with no

thinning operations prescribed in the working plan after III year of operations, have led to a situation of crowding of areas with subabul and glyricidia; which necessitates thinning during subsequent operations.

- d. There have been many cycles of plantations done in a compartment per se; however barring few areas in Akole tehsil where there has been Bamboo congestion; there is little scope for exploitation of the plant species.
- e. *Acacia tortilis* at many places appeared lodged, apparently due to drying up.

7. The details of observations made in each of the tehsils by the RFOs of the Working plan division are appended as Annexure LXII of the Volume II of the plan, the data on analysis by SOFR unit, Nashik shall be appended after receipt as a separate annexure.

8. Studies using Forest Survey of India vegetation data of 2004, data on the district prepared by the Maharashtra Remote Sensing Centre-Nagpur MRSAC, on the Geo-Media GIS software in the office of the Working plans divisions Dhule and Aurangabad led to inference that despite repeated afforestations carried out in the district forests, the areas classified as Blanks are significantly higher, re-iterating the hypothesis confirmed on the ground that repeated afforestations were made on the same piece of ground, the spacements spreading over the entire area rather than tackling or covering the entire area of the compartment and the works were not as per prescriptions of the earlier plan.

9. The interpretation of FSI vegetation data as derived from the records indicates that much of the forest in Ahmednagar had been of the open cateory i.e., between 10 to 40% canopy density. The data over the years is presented here under:

Year	Geographical area sq.km	Very dense	Moder.d ense	open	Total forest	% of GA	change	Scrub
2005	17048	0	72	173	245	1.44	1	350
2003	17048	0	70	148	218	1.28	-94	
2001	17048	193		193	312	1.83		379
1999	17048	20		147	167			608
1997	17048	46		123	169			398
1995	17048	8		123	131			338
1993	17048	8		124	132			

10. The results of the observations using FSI vegetational imagery overlay on the forest lands of Ahmednagar district on a GeoMedia GIS platform were made as per the revised GR of the Government enabling Administration of Ahmednagar forest division in 8 ranges and those of Sangamner sub-division into 6 units; the work of reclassifying the data into 14 units separately for Sangamner sub-division and Ahmednagar division is represented as under. Detailed statement depicting compartment wise status is appended as an Annexure LXIV in Volume II of the Plan.

Range	Area under compartments	Classification of forest area under different categories				
		Scrub <10%den	Open 10-40%	Dense 40-70% & >70%	Submerged	Blank
Akole 1	9959.40	2900.50	227.80	30.90	3.50	6796.70
Akole 2	6579.50	298.30	375.90	151.40	6.70	5747.20
Rajur	6841.60	1378.04	406.70	351.00	9.50	4696.36
Sangamner 1	15466.20	2843.90	403.00	80.30	8.30	12130.70
Sangamner 2	8281.30	1305.50	0.00	0.00	0.00	6975.80
Sangamner 3	13107.40	1093.40	0.00	0.00	2.90	12011.10
TOTAL Sangamner sub-division	60235.45	9819.64	1413.40	613.60	30.9	48357.86
Parner	6506.29	909.80	129.60	22.30	6.10	5438.49
Takli-Dhokeswar	15309.25	408.10	214.70	2.60	102.20	14581.65
Ahmednagar	10212.41	1876.00	433.80	83.60	0.40	7818.61
Rahuri	14601.75	1060.20	131.90	41.30	1287.90	12080.45
Kopargaon	1256.18	1.20	0.00	0.00	6.20	1248.78
Pathardi	8881.14	2498.30	0.00	0.00	3.10	6379.74
Tisgaon	4739.20	1359.20	156.90	3.50	0.00	3219.60
Jamkhed	4162.25	1916.50	172.80	17.50	9.90	2045.55
TOTAL Ahmednagar division	65668.47	10029.30	1239.70	170.80	1415.80	52812.87
Total Ahmednagar district	125903.92	19848.94	2653.10	784.40	1446.70	101170.73

Floristic studies in Ahmednagar district :

11. Observations made in the Planted Areas do not give a true idea of the floristics of the area. Ahmednagar district is host to a varied floral biodiversity, which has been studied under the collaborative efforts of the Territorial division, and eminent taxonomist Dr.M.R.Almeida and the Chief Conservator of forests, Nashik circle on established lines of plant taxonomy.

12. For the first time, Ahmednagar district came out with a check list of plants in the district, published in the form of a booklet, the extracts of which are appended separately in the Annexures IV and LIII of the Volume II of the plan.

13. The salient features observed during this study are-

- a. A total of 1324 plant species were recorded, in comparison with the 1040 recorded by the Botanical Survey of India.
- b. The plant species list has been arranged alphabetically with their scientific names, Family, IUCN category, with Medicinal and other uses, with locations of occurrence.
- c. The common names of the species have been given in greater detail.
- d. During the study it has been noted and recorded that of the endemic species in Maharashtra, 23 species could be located in Ahmednagar district itself and 3 species, namely, *Ceropegia lawii*, *Lepidocoma rollae*, *Neanotis sahyadrica* are apparently endemic to Ahmednagar.

SECTION :3: EVALUATION STUDIES BY EVALUATION WING:

14. Ahmednagar forest division is under the jurisdiction of the DFO Evaluation, Nashik, and DFO Evaluation Pune did evaluation studies only in one year 2000-01. The officers had been taken into confidence, and opinion sought on the future strategy which needed to be adapted in their opinion based on the observations made by their office over the years. The reports are appended under Annexure in the Volume II.

15. The gist of observations/recommendations of the DFO Evaluation, include:

- a. Areas of Akole tehsil are categorized under grade 3 and 5 of the Agri Zones of Maharashtra with rest of the district under grade 6.
- b. Areas of Akole tehsil could be afforested with species including Jackfruit, Anjan, Jambul, Babul, Subabul, Neem, Nilgiri, Glyricidia, Mango, Karanj, Bamboo, Shiras, Australian Acacia, bhendi, Shevaga etc., and other areas may be planted by Subabul, Neem, Babul, Prosopis, sissoo, awla, Bor, Karvand, Sitafal, Mango, Dashid, Siras, anjan, Maharukh, tamarind, Shevga etc.,
- c. In the plantations observed in Akole tehsil, species subabul, awla, neem, bamboo, khair, babul, sissoo, shivan, hirda, behda to a major extent and to medium extent Apta, karanj, glyricidia, nilgiri, Australian babul, bor, jatropha, and to some extent tortilis, tamarind, kavat, jambul, awla, acacia mangium, bahawa, rita, mango, maharukh have been planted. The growth was not upto the expectations, and amongst the planted species, subabul, nilgiri, shivan, Australian babul, glyricidia, tA.tortilis, neem, apta, awla, sissoo, have come up well in the difficult circumstances. Of the 8 plantations inspected 1 plantation was affected by fire, 3 had grazing problems, and 2 had rocky patches and poor soil characters, bringing to note the difficult circumstances of the ground situation.
- d. Likewise in the other areas of the district, species Neem, khair, A.tortilis, babul, awla, subabul, sissoo, bor, shivan, hiwar, apta, tamarind, jatropha, nilgiri, to a major extent, and species to medium extent in karanj, ramkati babul, anjan, gliricidia, sitaphal, kashid, kavat, lalai, maharukh, shiras and to small extent prosopis, behda, ain, Australian babul, umbar, bamboo, dhavda, gulmohar, pimpal, bahawa have been planted with growth not as per expectations with species subabul, bor, shivan, shiras, maharukh, kashid, gliricidia, Australian babul, prosopis, babul, khair, neem, nilgiri, doing well in such difficult circumstances wherever the land was plain and well protected. Of the total 19 sites inspected, 7 were affected by grazing, 2 were affected by fire, 7 were with rocky patches and shallow soils, slopes were seen.
- e. Evaluation opined that afforestation works on Contour Trenches had come well as compared to those taken on pits, and opined that the quantum of soil and water conservation work proposed for the area, should be site specific and should not have any slabs.

- f. The DFO Evaluation at Pune, based on his earlier studies in Ahmednagar, and current observations in the DPAP areas of Solapur, Sangli, Pune and Ahmednagar, is of the opinion that CCTs serve a good purpose, however these areas being subject to sudden torrential rainfall, wherein large scale runoff making even the normal CCTs ineffective is common, Deep CCTs should be taken, to handle the sudden and rather heavy rainfall these areas receive, so that all the surface incidence is allowed to percolate in the ground; further he has observed that species Neem, Anjan, Sissoo, Maharukh, Acacias, Albizzias, Ber, Ficus, Sitaphal have been doing better in such areas.
- g. A total of 4 sites taken under the aegis of the Maharashtra Forest Project were examined by the evaluation wing at Pune.

SECTION :- 4- YIELD :

16. As the tree growth left is very scanty and restricted to very small portion of the district, no felling is envisaged and hence it is opined that there is no propriety in collecting yield data as regards timber and firewood.

SECTION :- 5 VOLUME TABLES. :

17. There is no need of preparing local volume table as the plan is not harvest oriented and there are no important timber species found naturally in the district. However the behavior of various species in old successful plantations as has been observed in the earlier plan with Average height and mean girth of important species had been plotted against the age is continued with.

PART II

FUTURE MANAGEMENT

DISCUSSED AND PRESCRIBED

CHAPTER - IX

BASIS OF PROPOSALS.

SECTION 1: NATIONAL FOREST POLICY.

1. As per the resolution No.3 .1 / 86-FP dated 7th December 1988 of the Ministry of Environment and Forests, the National Forest Policy, 1988 has come into force, prescribing a new strategy for forest conservation. The basic objectives governing the new policy are given below:

SECTION 2: BASIC OBJECTIVE OF THE NATIONAL FOREST POLICY-1988.

- a. Maintenance of environmental stability through conservation and, where ever necessary, restoration of the ecological balance that has been adversely disturbed by serious depletion of the forest of the country.
- b. Conserving the natural heritage of the country by conserving the remaining natural forests with the vast variety of flora and fauna, which represents the remarkable biological diversity and genetic resources of the country.
- c. Checking soil erosion and denudation in the catchment areas of rivers, lakes, reservoirs in the interest of soil and water conservation, for mitigating floods and drought and for the retardation of siltation of reservoirs.
- d. Checking the extension of sand-dunes in the desert areas of Rajasthan and along the coastal tracks.
- e. Increasing substantially the forest/tree cover in the country through massive afforestation and social forestry programme, especially on all denuded, degraded and unproductive lands.
- f. Meeting the requirements of fuelwood, fodder, minor forest produce and small timber of the rural and tribal population.
- g. Increasing the productivity of forests to meet essential national needs.

- h. Encouraging efficient utilization of forest produce and maximizing substitution of wood.
- i. Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests. The derivation of direct economic benefit must be subordinated to environmental stability and maintenance of ecological balance.

SECTION 3: Salient features of the National Forest Policy 1988.

2. The salient features and the strategy as regards management of State Forests are as under--

- a. The national goal should be to have a minimum of one third of the total land area under forest or tree cover.
- b. Severe restrictions on schemes and projects which interfere with forests that clothe steep slopes, catchment of rivers, lakes and reservoirs.
- c. No working of forests without the Government having approved the Management plan.
- d. No programme should entail clear-felling of adequately stocked natural forests. Exotic plant species should not be introduced unless long-term scientific trials are taken.
- e. The rights and concessions, including grazing, should always remain related to carrying capacity and should be achieved by increased investment and silvicultural research. Stall feeding of cattle should be encouraged.
- f. The rights and concessions from forests should primarily be for the bonafide use of the communities living within and around forest areas, specially the tribals.
- g. The right and concessions enjoyed by tribals and people living around forests should be fully protected. Their domestic requirement of fuelwood, fodder, minor forest produce and construction timber should be the first charge on forest produce.

- h. On the front of domestic energy, fuelwood needs to be substituted as far as practicable with alternate sources like bio-gas, L.P.G. and solar energy. "Fuel efficient Chulhas" as a measure of conservation of fuelwood needs to be popularized in rural areas.
- i. Diversion of forest lands for non-forest purpose should be subjected to careful scrutiny. Projects, which involve such diversion, should provide funds for compensatory afforestation.
- j. Forest management plans to take special care of the needs of wildlife conservation.
- k. The tendency of doing encroachments should be checked and there should be no regularization of existing encroachment.
- l. Forest based industries should raise the raw material needed by themselves in arrangement with the private cultivators.
- m. People should be made forest conscious through extension activities.
- n. Survey of forest resources to be completed on scientific line for updating information.

SECTION 4: Transfer of Ownership of MFP to Panchayats.

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

4. Govt. of Maharashtra has enacted a law "Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas Act, 1997" and has also amended "Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 (Act No.45 of 1997)", vide which

ownership of 33 MFP specified in the Schedule, found in the Govt. land has been transferred to the Panchayats.

SECTION 5: Salient Features of Forest (Conservation) Act 1980

5. The Forest (Conservation) Act 1980 i.e. No. 69 of 1980 came into force on the 25th October 1980 and extends to whole of India except the State of Jammu and Kashmir. It places restrictions on the de-reservation of forest or use of forest land for non – forestry purpose. It mainly stipulates that :

- a. No State Government or other authority shall make, except with the prior approval of the central Government, any order directing that any reserved forest or any portion thereof shall cease to be reserved. That any Forest land or any portion thereof may be used for nay non-forest purpose.
- b. The central Government may constitute a Committee to advise the Government with regard to this Act and any other matter connected with the conservation of forests.
- c. Central Government may by notification in the official Gazette make rules for carrying out the provision of this Act.

6. THE FOREST (CONSERVATION) AMENDMENT ACT 1988, NO. 69 OF 1988: The parliament enacted the Forest (Conservation) Amendment act to amend the Forest (conservation) Act. 1980. To the stipulations of the Act of 1980, it adds the following :

- a. That any forest land or any portion thereof may be assigned by way of lease or to any authority, Corporation, Agency or any other organisation not owned, managed or controlled by the Government.
- b. That any forest land or part thereof may be cleared of trees for the purpose of using it for afforestation.
- c. Whoever contravenes or abets the contravention of Forest Conservation Act, shall be punishable with simple imprisonment for a period upto 15 days.
- d. Where any offence under this Act has been committed by any Department of Government, the head of the Department or by any authority, every person who at the time the offence was committed was directly in charge of and was responsible to, the authority for the conduct of the business of the authority as

well as the authority, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly. This amendment act also explain the term “Non-forest purpose” “Non-forest purpose” under this Act means the breaking up or clearing of any forest land or portion thereof for

- a) The Cultivation of tea, coffee, spices, rubber, palms, oil plants, horticultural crops or medicinal plants.
- b) Any purpose other than re-afforestation but does not include any work relating to conservation, development and management of forest and wildlife, namely, the establishment of check post, fire lines, wireless communications and construction of fencing, bridges, dams, waterholes, trench marks, boundary marks, pipe lines or other like purposes.

SECTION: 7 – GRAZING POLICY

7. The Government of Maharashtra by its R.& F.D. Resolution No. MFP – 1365/ 132 – 11 Y dated 6/12/1968 formulated the grazing policy for the entire state, with an objective to have a uniform grazing policy throughout the state The policy aims at providing ideal pasturage within the available resources in the state forests without letting the resources impair or deteriorate. In view of above the Government of Maharashtra vide Revenue and Forest Department Resolution No. MFP-1371/237035-z dated Novemeber 3, 1973, promulgated the grazing rules to illustrate the regulatory character of the forest grazing. The important features of the grazing rules are as below :

- All grazing in the forest (where free or otherwise) would be on permit only.
- Each forest division will be divided into grazing units and the issue of license in subject to such definite allotment of villages to a particular grazing unit, to such limitation on the number of cattle grazed in any such units, as may have been ordered by the Government after special enquiry and also to such closure to grazing as may be enforced in accordance with the prescriptions of sanctioned working plans.
- For excess cattle, license at prescribed rates may be taken out for any grazing unit, provided, there is room in that grazing unit.

- For Free grazing of cattle of cultivator family and others, issue of licenses are limited to the period of July 15 to July 31 only.

- A grazing license can be refused over a period of only year to any individual, who has been guilty of persistent illicit grazing on the order of the Conservator of Forest. Government otherwise may refuse grazing license for a community whose members have been guilty of persistent illicit grazing.

- Computation of cattle units are made as per the following :

Category	Equivalent Cattle Unit	Grazing fees (Rs)
Adult Buffalo	2	2.00
Adult Cow Bull or Bullock	1	1.00
Buffalo calf (less than a year but more than 6 months old)	1	1.00
Cow calf (less than 3 years, but more than 6 months old)	$\frac{1}{2}$	0.50

- Essential cattle, subject to a maximum of two plough units per cultivator family, should be allowed free grazing in forests. A plough unit shall mean 4 cattle units.

- The patwari / Talathi / Gram sevak shall issue a certificate on demand to all cultivator families entitled to graze cattle free.

- Each grazing unit and the villages served by it shall constitute a grazing circle. There will be a license vendor to issue passes.

8. The following is the maximum permissible grazing incidence permitted in each category of forest as stated in the functional classification.

a. Protection Forests : Because of steep and precipitous nature of Forest, grazing should altogether be prohibited here, except in exceptional cases, where too the incidence should not exceed one cattle unit for 4 hectare (10 acre)

b. Tree forests: The grazing incidence of these forests should be one cattle unit for 1.2 Ha.

c. Minor Forests: The grazing incidence for these forests should be one cattle unit for 0.6 to 0.8 Ha.

- d. Pasture land: The grazing incidence for these lands should be one cattle unit for 0.4 Ha.
- e. Grass Reserves: The grazing is completely eliminated from these areas but cutting of grass is permitted.

9. Grazing settlement report submitted by the Assistant Conservator of forests, Ahmednagar appointed as Grazing Settlement Officer, was accorded sanction by the Government of Maharashtra vide resolution MFP-2103/file no.135/F-1, Revenue & Forest department, Mantralaya, Mumbai dated 6th May 2008, and a copy of the same along with the copy of Grazing settlement report has been placed under Annexure LXV of Volume II.

10. The forests which are being covered under this plan are as follows :

- a) Protection Forests
- b) Minor Forests
- c) Pasture lands

SECTION 5: REASONS FOR REVISION OF THE PLAN.

11. Expiry of earlier Plan

The working plan for Ahmednagar Division by Shri Nimbalkar and A.K.Mishra (1994-95 to 2004-05) has expired. Since then it was neither extended nor revised. The prescriptions of Nimbalkar & Mishra's Plan were not implemented in the true spirit, barring carrying out afforestations as per will; scant attention was given to the plan prescriptions of the Silvi-pasture management working circle, and the prescription of Forest Survey and Demarcation programme. Anthropogenic pressures like unrestricted grazing coupled with lopping and cutting and fires resulted in further degradation of the forests. The plantations did not give expected results and at many sites resulted in severe congestion of Glyricidia and Subabul.

12. Changes in forest area

There had been quite a few changes in the area of the Ahmednagar Division since last plan.

- a) There have been area changes in the forest area in custody of the forest department, administrative changes involving creation of an Independent Sub-division with headquarters at Sangamner.
- b) The previous plan was prescribed for an area of 104753.64 hectares, and current plan shall be for an area of 126184.59 hectares.
- c) Of the total area of 116483.14 hectares with the Forest department, as per their say, areas have been reconciled after joint exercise and additional areas identified; further some areas have been identified to have been diverted for non-forest use. In the absence of the relevant orders directing such use it is imperative to examine each case. Land acquired under Forest Conservation Act provisions as Compensatory Lands, and land have also been acquired from Revenue department which were in their custody, and the process is in progress.
- d) The forest area of the district barring Akole tehsil, is highly fragmented, scattered all over the district. It is common to come across 4 to 5 patches to 20 to 25 segments in a compartment, necessitating detailed listing of all the areas with the forest department and lay down measures to survey and demarcate them.
- e) Increased importance of regularization of land issues, merits systematic classification and demarcation of the forest lands.
- f) Need to involve participatory approach, improve the productive capacity of the forests.

SECTION 6: FACTORS INFLUENCING THE GENERAL OBJECTS OF MANAGEMENT AND FUTURE MANAGEMENT DISCUSSED.

13. Due to failure in achieving the objectives set in the earlier Plan a change in approach is suggested. The approach is required to focus on coming over the gaps observed whilst implementing the earlier plan prescriptions, and prescribe specific line of treatment for specific areas; further emphasis on survey and demarcation of the forest land is spelt out.

14. Biotic pressure and non-involvement of local people are the main reasons for failure of the plantations and also degradation of the forests. Hence local community will be involved in forest management both in planning and implementation taking inspiration from the successful initiatives in the division.

SECTION 7: GENERAL OBJECTS OF MANAGEMENT.

1. Maintenance of environmental stability through conservation and wherever necessary, restoration of the ecological balance.
2. Checking soil erosion and denudation in the catchment areas of rivers, reservoirs in the interest of soil and water conservation for mitigating droughts and for retardation of siltation of reservoir.
3. Increasing forest cover by assisting the natural regeneration by protecting the forests from fire, grazing etc and tending the root stock. Enriching the existing stock by raising economically viable plant species.
4. Identification, survey and demarcation of the forest lands in custody, regularization of anomalies of land use wherever noticed.
5. Meeting the requirements of fuelwood, fodder, Non-Timber forest produce and small timber of the rural and tribal population.
6. Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests.

SECTION 8: FUNCTIONAL CLASSIFICATION OF FORESTS.

1. The State Government, vide Revenue and Forest Dept. Resolution No. MFP-1365/132211-Y dated 6.12.1968 has recognized the following classes of forests on functional basis:

- a] Protection Forests.
- b] Tree Forests.

- c] Minor Forests.
- d] Pasture lands.
- e] Miscellaneous Forests.

2. **PROTECTION FORESTS**

These are forests which occur on very steep slopes (25 ° and above) or along river banks and forests that have become depleted through maltreatment and further exploitation of which will eventuate soil erosion and adversely affect the productivity of agricultural land in the lower regions. The very steep precipitous slopes along the ridges and spurs of the Sahyadris fall in this category. The management will aim at conserving the soil, the water regime and the physical and climatic factors of the locality by conserving the forests of the areas. The forests are included in the A category of lands in the lands outlined in the Afforestation Working circle.

3. **TREE FORESTS**

These forests are situated in remote tracts, in small gaps, which are prominently suited for commercial value. The forests of Ahmednagar do not have much in this category of forests, with most of the crop yet in the pole stage.

4. **MINOR FORESTS**

These are the forests capable of producing small timber and firewood and providing grazing, which are the indispensable needs of the adjoining agricultural population. This category of forests is spread all over the Division.

5. **PASTURE LANDS**

Pasture lands are those identified in the earlier plan, and accorded treatment in this plan.

SECTION 9: METHOD OF TREATMENT.

1. The forests having been classified on functional basis under the different categories necessitate suitable treatment for each class. The methods of treatment will therefore differ in respect of each category of forests. It may also be necessary to adopt different methods of treatment for the different areas of forest falling in the same functional category with the main object of achieving their development to the maximum possible extent. It is with this aim that the methods of treatment are proposed.

2. **PROTECTION FORESTS:** These forests are confined to the precipitous slopes along the ridges of Sahyadris and its spurs. The object of management in these forests is to improve vegetation, soil conservation and sub-soil water regime. No felling is prescribed.

Gap planting with seedlings using special intensive techniques involving blasting of rocky soil strata, irrigated plantation where irrigation facility is available based on successful experimentation on smaller patches, shall find space on larger areas coupled with seed sowing and intensive soil and moisture conservation works wherever feasible.

3. **TREE FORESTS:** These are the forests, capable of yielding timber, in the long run. Enrichment of the area with practices such as gap planting, tending operations of the existing root stock and soil and moisture conservation works will be carried out. Congested Bamboo clumps in the Sangamner Sub-division, especially in the Akole tehsil shall be worked, with a view to ease congestion, attain yields and tend the crop for subsequent systematic management.

4. **MINOR FORESTS:** These forests capable of yielding small timber and fuelwood, cover all the ranges. Most of the areas are either under-stocked or open. So the main object is to re-clothe the area with vegetal cover and to prevent soil erosion. The method of treatment will involve assisting the natural regeneration by providing adequate protection from fire and grazing combined with soil and moisture conservation works.

5. **PASTURE LANDS:** The pasture lands identified during the earlier plan, and additional lands identified shall be treated to raise grass species and tree species yielding fodder.

SECTION 10: FORMATION OF WORKING CIRCLES.

In accordance with the general objects of management and keeping in tune with the Working Plan Code, the following Working Circles are proposed to be constituted:

- 1) Enrichment Working Circle.
- 2) Afforestation Working Circle.
- 3) Silvi-Pasture Management Working Circle.
- 4) Bamboo Management Working circle
- 5) Plantation (Overlapping) Working Circle
- 6) Non Timber Forest Produce (Overlapping) Working Circle.
- 7) Joint Forest Management (Overlapping) Working circle.
- 8) Wildlife Management (Overlapping) Working circle.
- 9) Forest Protection (Overlapping) Working circle
- 10) Eco Tourism (Overlapping) Working circle.

1. **ENRICHMENT WORKING CIRCLE:** Ahmednagar district has undertaken afforestation under different schemes all over the areas of the division, over the years and on an average each year 3000 to 4000 hectares afforested. Statistics with the department indicate that roughly 50% of the afforested areas are partially successful to successful ones, and with the improved humus conditions coupled with innovations by the department in the

propagation of NTFP species, which is also a requisite to improve the overall productivity of the site, needful prescriptions for such identified areas with underplanting or enrichment of the areas with suitable species including Bamboo, valuable medicinal plants, Gum, lac yielding NTFP species are suggested coupled with soil moisture conservation works, which are requisite in these less rainfall areas. Planting on CCTs based on the refilled continuous contour trenches and other methods is suggested.

2. AFFORESTATION WORKING CIRCLE: The forest areas of Ahmednagar district which despite plantation show results as poor, and the available blanks which were not prescribed in the earlier plan, are to be afforested under this plan, coupled with soil moisture conservation works. Planting on CCTs based on the refilled continuous contour trenches and other methods is suggested. The whole area is to be studied treatment map prepared as per the established criteria, followed by zonation and species economically useful and suitable to the site are recommended. Areas which are subject to demarcation issues are proposed to be taken up for Afforestation after completion of the demarcation on ground. Further areas meriting special treatment in the form of drilling, or sites near to sources of irrigation, are proposed to be tackled by special procedures after due sanction from the competent authority.

3. SILVI-PASTURE MANAGEMENT WORKING CIRCLE: in addition to the areas earlier recommended for management under this working circle, additional areas with potential have been identified, for specific treatment for silvi-pasture management in the division. It is expected that increasing emphasis of dairy in the district, and the increasing demand for fodder and fodder resources, is met to some extent by scientific management of the areas, and extension activity to encourage recent advances in fodder technology are effectively mobilized amongst the villagers in the course of participatory management exercises in the division.

4. BAMBOO MANAGEMENT WORKING CIRCLE: The forest areas in Akole tehsil of the Sangamner sub-division of the current Ahmednagar division support good bamboo crop, raised in the last 15 to 20 years; however lack of systematic management and aftercare led to congestion in the clumps and stagnation in growth. It is expected that by prescriptions of the working circle would enable to work such bamboo areas already identified to be 850 hectares, and other areas which are to be afforested by bamboo in the plan period.

5. PLANTATION MANAGEMENT (OVERLAPPING) WORKING CIRCLE: In Ahmednagar forest division every year plantation works have been taken to cover the forest

blanks with tree cover. This working circle is prescribed to assess the reasons for failure and success of the plantations in the division and after thorough analysis drafting a successful plantation model for different climatic situation in the division. There are some successful plantations in the division, and these plantations are covered in this working circle. All old and plantations in the Division are proposed to be included in this working circle. This is an overlapping working circle. During previous working plan period many special schemes were implemented and close to sixty thousand hectares of plantations were done in the division. Not all plantations achieved uniform results; it is envisaged that this working circle would lay down the modality for assessment of the reasons for success/failure, suggest suitable remedy, and lead to expected co-ordination between the Evaluation, Research and Territorial wings of the Forest Department

6. NON TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE: This working circle overlaps the other working circles and covers the entire forest area under this plan. Non- timber forest produce (NTFP) has great potential for sustainable economic improvement of local Communities with conservation of forest resources. Sustainable NTFP production will be given high priority in the forest management. Assessing the existing NTFP collection, estimating real NTFP potential like enumeration of girth wise/ beat wise NTFP species namely gum yielding trees (kadai, salai, dhawada etc), Lac host trees(bor, kusum, khair, palas etc), bio fuel trees (mahua, neem, karanj etc,) Medicinal plants propagation, Humus-Organic farming concepts, Implementation of the 73rd amendment by making villagers aware of potential and value of NTFP by active involvement of forest department is envisaged.

7. JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE: Involving local people in managing forests and awareness in rural and tribal areas is considered indispensable for the forest conservation. Management of forests close to village will give priority to meeting demands of local people for small timber, firewood, pasture, non-wood forest produce, etc. Local people will be actively involved in forest management, forest protection, plantations and development of natural resources in the village. Experiences of pioneering villages Ralegaon shinde, Hivre Bazaar, Dorje, are to be shared with other villages, and efforts to replicate Dorje, Hivre Bazaar in all the villages with Forests is envisaged.

8. WILD LIFE MANAGEMENT (OVERLAPPING) WORKING CIRCLE: Wildlife requirements shall be the most important consideration for conserving bio diversity of the

area and improvement of habitat of wild life. Special habitat management for wildlife conservation will receive high priority. Ahmednagar district is faced with the dilemma of dealing with increasing incidences of wildlife in Akole tehsil from Leopards, and from Herbivores population of Black Bucks in the tehsils neighbouring the protected area network of Great Indian Bustard WLS and Rehekuri WLS; for which management strategy is to be developed. Measures to prepare the forest staff to a degree of preparedness in handling wildlife emergencies, utilize the Bio-diversity of the area to showcase in the form of Wildlife Tourism and Eco-Tourism under the guidelines issued by the Government are thought of. The concept of Habitat Animal relationships is emphasised. Steps to provide conservation whilst working under other working circles without affecting the wildlife of the area is proposed.

9. FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE: The forests suffer heavy biotic pressure, especially illicit felling, fire, uncontrolled grazing, resulting in trampled regeneration and compact soils, devoid of humus. Excessive grazing and uncontrolled fires are the main adverse factors causing degradation of forests in the division. Demarcation preceded by regularisation measures after ascertaining the veracity of the lands is emphasised. The situation in terms of management with existing staff, measures in vogue to create additional units for administration and the future needs are discussed.

10. ECO TOURISM (OVERLAPPING) WORKING CIRCLE : Eco tourism is the new buzzword in the realm of tourism throughout the world. Eco tourism generates more employment and provides enormous opportunities for entrepreneurship. Measures to foster the potential of the Ahmednagar district through Eco Tourism have been discussed.

SECTION 11: PERIOD OF THE PLAN.

1. The Plan is proposed for 10 years, from the year 2010-11 to 2020-21.

CHAPTER X

THE ENRICHMENT WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION.

1. The areas with substantial vegetation and which require improvement through Silvicultural operations and artificial regeneration have been included in this working circle. The main aim is to improve the status of the crop and land. Therefore obtaining produce of any kind is neither expected nor regulated. The Working circle principally aims to enrich the existing created forests, which are principally dominant with Subabul and Glyricidia. This Working circle also includes the areas belonging to the upper precipitous and very steep slopes. As far as possible a continuous blocks of such forests have been included.
2. This working circle is constituted from the areas allotted to the Earlier Afforestation Working Circle and areas afforested on lands acquired for compensatory afforestation. Total area of this working circle is 40647.63 ha, spread over all the ranges of Ahmednagar forest and Sangamner forest sub-division.

SECTION 2: GENERAL CHARACTERS OF THE VEGETATION.

3. The forests are also well stocked in general and with certain open and blank patches. They are a result of successful and partially successful plantations taken up in the earlier years, and need to be further enriched with suitable species. The crop is generally young and middle aged. Nearly 90% of the crop is less than 45 cms girth size.

SECTION 3: BLOCKS AND COMPARTMENTS.

4. Total Area allotted to this working circle is 40647.63 ha. A total of 260 compartments comprising of 690 units are proposed for working in this working circle. The list of compartments allotted to this working circle is given in the Annexures XXVII & XXX of the Volume II of the plan. The range wise situation is reflected as under :

s.no	range	Area of range	# compts		Area allot to WC	% to area of range	% to area of division
			Compt	Units			
1	Akole I	9959.40	43	97	4890.70	49.10	
2	Akole II	6579.50	18	31	2334.40	35.48	
3	Rajur	6841.60	29	124	4537.50	66.32	
4	Sangamner I	15466.20	36	65	5452.80	35.26	
5	Sangamner II	8281.30	18	33	3441.48	41.56	
6	Sangamner III	13107.45	18	34	4312.20	32.90	
7	Sangamner sub.division	60235.45	162	384	24969.08		41.45
8	Kopergaon	1256.18	3	64	935.76	74.49	
9	Rahuri	14601.75	15	19	1689.75	11.57	
10	Ahmednagar	10212.41	21	58	2965.26	29.03	
11	Parner	6506.29	22	72	2719.59	41.80	
12	Takli Dokeshwar	15309.25	7	10	802.53	5.24	
13	Pathardi	8881.14	11	42	1940.24	21.85	
14	Teesgaon	4739.20	12	27	3351.00	70.71	
15	Jamkhed	4162.25	7	14	1274.42	30.62	
16	Ahmednagar div total	65668.47	98	306	15678.55		23.88
	Grand total Ahmednagar dn	125903.92	260	690	40647.63		32.23

SECTION 4: SPECIAL OBJECTS OF MANAGEMENT.

- To improve the condition of the growing stock by tending existing rootstock.
- There is a need to improve blank areas in to well stocked areas through artificial regeneration.
- To safeguard the areas against soil erosion and thereby preserve and improve the site quality.

- The upper reaches and steep slopes will be protected so that grasses can come up in these areas.
- To increase the proportion of valuable species in the growing stock.

SECTION 5: ANALYSIS AND VALUATION OF THE CROP.

5. Subabul and Glyricidia form the major species of the growing stock. The growing stock predominantly contains young and middle-aged crop. The stock mapping of the compartments is done by procuring Forest Density Classified Satellite Images from Forest Survey of India, Dehradun, The Images procured belong to the year 2004. Compartment boundaries are overlaid on these images and density maps are prepared. The results of stock mapping are indicated in Annexure LXIV of the Volume II of the plan.
6. Stock mapping exercise reveals the area allotted to this working circle as successful and partially successful plantation area, which is indirectly a measure of the extent of success of the afforestation work in the Ahmednagar division.
7. Soil depth is sufficient in most of the areas, however due to faulty practice of not laying down coupes in the areas of working, large areas have repeatedly been afforested, leaving plenty of gaps in between wherever soil depth is apparently less; further problematic areas too have been given the slip thereby occupying more gross area than allotted, as a result the vegetation appears sparse, offering scope for under planting, and enrichment with beneficial plant species.

SECTION 6: SILVICULTURAL SYSTEM.

8. All advance growth will be nurtured along with Enrichment by artificial regeneration. Fellings will be purely on Silvicultural considerations aiming at improvement of the growing stock.

SECTION 7: FORMATION OF WORKING SERIES AND COUPES:

9. A working cycle of 20 years is kept to tackle the whole area. The working circle has been divided into 15 felling/working series in case of Ahmednagar division and each working series is divided into 20 coupes. The detailed information about working series and coupes is given in Annexure XXX in volume II. Likewise the working circle has been divided into 18 felling series/working series in case of Sangamner sub-division, and each working series further divided into 20 coupes. The detailed information about working series and coupes is given in Annexure XXXIV of Volume II of the plan. To be consistent with watershed approach sequencing of coupes have been done from ridge to valley wherever possible.

SECTION 8: DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP, TREATMENT PROPOSED AND MARKING RULES

10. Demarcation of Coupes: The main coupe shall be demarcated one year in advance of working.

11. Preparation of Treatment Map: It will be prepared by RFO and verified by ACF. The trace of the coupe map will show the contours along with important features like *nala*, streams, old plantation, etc. While preparing the treatment map clear note as to the extent of the work done for Soil/Moisture conservation works earlier shall be noted, and future scope if any identified, and shown to an officer not less than the rank of ACF who shall certify the need for the same.

12. The area will be classified as follows: -

- a. **Type 'A'- PROTECTION AREAS:** The areas consisting of patches over 25° slope or more and 20 meter strip on both sides of the rivers or *nalas*.
- b. **Type 'B'- UNDERSTOCKED AREAS/BLANKS:** Blanks and under stocked patches (crown density below 0.4), with slopes below 25° , and minimum area exceeding 2 hectare in extent.
- c. **Type 'C'- OLD PLANTATIONS AND GROUPS OF YOUNG POLES:** This will include patches of well-grown poles for retention as future crop in addition to old plantations. The patches should not be less than one hectare in extent.
- d. **Type-'D': WELL STOCKED AREAS:** This will include natural forest areas with crop density more than 0.4. The area will be further divided into two classes:
 1. Type D1: Areas having adequate regeneration(750 seedlings or more per hectare)
 2. Type D2: Areas having inadequate regeneration.

13. TREATMENTS PROPOSED: The various treatments proposed are as under:

a. Area 'A':

- (i) The soil and moisture conservation treatment shall be as given in Miscellaneous Regulation.
- (ii) Planting *Bamboo, Khair, Jamun, Arjun*, Agave and grasses along the *nala* and river bank.

b. Area 'B':

- (i) Under stocked and blank forest areas where slopes are $<25^{\circ}$, conservation structures at regular intervals on the nalas, with loose boulder structures on the upstream of these dams should be constructed to prevent early siltation. Preference to be given to vegetative measures and avoid use of Cement. After siltation of loose boulder structures agave/aloe suckers or khus/vetivera grass slips should be planted on the silted soil. On gentler slopes ($<15^{\circ}$) CCT works should be done and fresh seed of *Jatropha curcus*, *Semmarubia glauca* should be sown at 0.5m intervals. The seed being oil yielding seed its germination viability is very low. Seed of previous season does not germinate. Hence it is mandatory to purchase or collect seed from fruits of that very season. DCF should ensure that the seed is fresh by conducting germination tests before they are sown on CCT's. Continuous Contour Trenches should be taken with proper alignment. Models promulgated by the Government of Maharashtra in this regard based on the slope of the ground shall be used in finalizing the estimates. Fresh seed of Karanj/Neem/Moha/*Jatropha* etc or locally available species, as per the DCF's choice should be sown at 50 centimeter interval. The earlier technique of CCT by refilling of Contour may be adapted. Works shall be completed before the onset of Monsoon. Quantum of work will depend upon the site requirement.

- (ii) Plantation of healthy seedlings from amongst species Khair, salai, Maharukh, kusum, bor, khair, palas, pimpal, kadai, dhawada, Kandol, Sitaphal, Anjan, Hirda, Babul, Chandan, Siras, Sissoo, Hiwar, Karanj, Ain, Shiwan, Teak, Neem, *Holoptelia integrifolia*, *Acacia senegalensis*, *Acacia tortilis*, Bakain, Amaltas, Raintree, Sawar, Bamboo, Guggul, Ashwagandha, Shatavari, Bael, Padal, Awla, Agnimanth and any other species as directed by the Chief Conservator of forests or the Deputy Conservator of forests, in tune with the current prescriptions and preferably yielding Non-timber Forest Produce are recommended. The choice of species is to be governed by the local edaphic factors. These miscellaneous species should be raised in polypots or root trainer containers. Pits or trenches as per suitability of site should be adopted, giving

preference to the Refilled Continuous Contour Trenching Technology popularized in Ahmednagar division earlier. The DCF should choose the model with technical approval from CCF(T).

- (iii) The plant population shall be limited to at 750 plants per hectare, keeping in tune with the principle of Ecological Index worked out for the district.

c. Area 'C':

- (i) These areas are to be underplanted with suitable species including Bamboo, Chandan and other economically important species such that the planted population doesn't exceed 400 plants per hectare.
- (ii) At places where severe congestion of Subabul and Glyricidia exist, needful thinning operations including removal may be resorted to encourage growth of superior planted species.

d. Area 'D':

- (i) **D1 areas-** areas support 750 plants per hectare, however silvicultural thinning to favour enrichment by bamboo, sandal, ashwagandha, samudrashosh, shatavari, bedki pala/Gymnema and other economically important species are recommended to improve the floristics of the area.
- (ii) **D2:** The natural regeneration of this area need to be supplemented by artificial regeneration to the extent by which natural regeneration fall short of 750 plants per hectare with suitable species including Bamboo, Chandan etc., based on the local edaphic factors.

14. MARKING RULES FOR Enrichment and Soil –Water Conservation Working Circle:

a. Marking For Type 'A' Area: No marking will be carried out.

b. Marking For Type 'B' Area:

- (i) All dead, dying and diseased trees after retaining 2 dead trees per hectare shall be marked for felling.
- (ii) All live high stumps shall be cut as close to the ground as possible and dressed.
- (iii) All malformed advance growth of Teak (Sangamner sub-division) up to 30 cm. shall be cut back
- (iv) The established multiple coppice shoots will be reduced to one per stool retaining the vigorous one, which is closer to the ground.

- (v) The undesirable under growth, which is preventing growth of natural regeneration of desired species will be removed.

c. Marking For Type 'C' Area:

- (i) The patches of not less than one hectare shall be identified having advance growth of any species and it shall be spaced out to one third of the top height, while retaining the vigorous and straight poles. Silvicultural thinning shall be done. as per yield table. The thinning shall be done in such a manner that epicormic branches do not come up.

d. Marking for Type 'D' Area:

- (i) All dead, dying, diseased and malformed trees, all live high stumps and all except one vigorously growing coppice shoot per stool will be marked for felling.
- (ii) In Akole tehsil, in areas where Teak is noticed, In patches not less than 0.5 ha. In extent and having Teak reproduction in seedling stage, heavy openings in middle canopy by cutting miscellaneous growth will be carried out.
- (iii) In teak bearing areas of Akole tehsils, the existing established teak reproduction upto 20c.m. in girth at breast height will be freed by marking overwood for removal
- (iv) Malformed advance growth of Teak in Akole tehsil upto 30c.m. in girth will be cutback. The overwood and inferior species likely to interfere with the coppice growth will be marked for felling.
- (v) Thinning, marking will be carried out in favour of Teak and other valuable species
- (vi) No fruit bearing tree shall be marked for felling.

SECTION 9: REGENERATION.

15. Natural Regeneration: The NR will be protected against fire and animals. TCM/Vegetative live hedge fencing or other kind of fencing may be established.

16. ARTIFICIAL REGENERATION AND CHOICE OF SPECIES:

- a. **PPO+PYO operations:** As approved by the competent authority.
- b. **Choice of species:** The areas under this working circle are to be enriched by suitable species which not only enrich the floristics of the area but also would provide sufficient economical gain in future and should comprise of bio fuel trees like karanj, neem, mahua, jatropa on CCT etc, or lac insect host trees like kusum, bor, khair, palas, pimpal, acacia auriculiformis etc, or gum exudating trees like kadai, salai, khair, dhawada, etc., Further species like Bamboo, Sandal, and Guggul, Shatavari, Ashwagandha with medicinal value have tremendous NTFP value, are native to such tracts.
- c. **METHOD OF PLANTING:** - **The planting model approved by the competent authority will be implemented and C.C.F. (Territorial) will provide guidance from time to time.**

SECTION 10: SUBSIDIARY SILVICULTURAL OPERATIONS.

The Subsidiary Silvicultural operations includes

(1) Cleaning and (2) Thinnings.

- a. **Cleaning:** A cleaning operation will be carried out in the 5th year commencing from the year of planting.
 - (i) All climbers will be cut over entire area of the coupe, if necessary i.e., when it is ensured beyond doubt that the species doesn't have NTFP value superior to the plant/tree it is endangering.
 - (ii) Damaged, malformed saplings, and coppice shoots will be cutback. Multiple coppice shoots will be reduced to one promising shoot per stool provided no other seed origin sapling is available at that place.
 - (iii) Fast growing inferior species and bamboo interfering or likely to interfere with reproduction of teak & other valuable species will be cut.
 - (iv) In thick patches of teak advance growth & established regeneration of other valuable species spacing between saplings to be retained, should vary from 2 meter to 2.59 meter depending on the height of the sapling. Cleaning in plantation areas should be carried out as & when required depending upon the crop condition.

- b. **Thinning:** Thinning in plantation areas will be carried out when the III year of operations are completed. The thinning will be silvicultural as prescribed in the Chapter on Miscellaneous Regulations and would aim to restrict the plant population to 750 per hectare in tune with the Ecological Index of the region, retaining healthy economical crop.

SECTION 11: OTHER REGULATIONS.

17. **Protection from Fire:** All the Plantations will be fire traced and rigidly fire protected for a period of **Five years** from the year of planting. In the month of October / November after the demarcation is over all the undergrowth in the proposed external and internal fire line is removed. The cut material will be spread along the fire-line length and burnt taking care that the cut material remains sufficiently away from the stems of the trees and burning does not harm the trees. The dry and cut bushes of unwanted species shall be burnt before the end of February to avoid fire hazards to the forests. All the plantations shall be part of the Fire Protection Plan to be prepared for the divisions. The regeneration is the future growing stock. Hence the main thrust should be on protection of regeneration. The techniques of fire protection should be as per the paragraphs given in Miscellaneous Regulations
18. To ensure effective protection from fire the workable schemes of fire protection should be carried out in which the due share to people's participation shall be given. For meaningful participation modalities shall be worked out to impart benefit to the people so that they come forward. The village forest protection committees will be formed & fire protection will be done through the village protection committee.
19. Sandal Plantations wherever taken should be ensured of proper protection. Preference to be given to such areas where protection can be ensured.
20. **Grazing Control:** The areas in the working circle shall remain closed to grazing for a **period of 5 years**. The grazing will be regulated as per Govt. policy of the Govt. of Maharashtra dt.6th Dec.1968 Further, in the area of adjoining but with sufficient lag for working of coupe, seeds of palatable grasses be sown and villagers be motivated to harvest the fodder. The method of rotational grazing is followed. As per functional classification this working circle can mainly be classified as minor forests and the maximum grazing incidence prescribed for it is 1.2 ha per cattle unit. This will facilitate opening of area on rotational basis. The closed areas should be specifically mentioned in the grazing licenses and villagers be communicated of such closures by suitable means such as drum-beating, notices on prominent places, village Panchayat officers etc. and by binding grass pullies or stacks along the boundaries of closed coupes. However the grazing settlement report prepared and submitted to the Government for

Ahmednagar division, doesn't prescribe issue of any grazing permits, which is yet to receive official sanction from the Government.

21. **Soil and moisture Conservation Works:** One of the main objectives of dry zone afforestation is soil and moisture conservation. Therefore the amount of earth work should be so designed that it holds maximum runoff.

Average Rainfall of Ahmednagar = 559 mm.

Total rainfall per hectare = $\frac{559 \times 10000}{1000} = 5590 \text{ m}^3$

No. of rainy days = 31

Avg. Rainfall / day / Ha. = $5590 / 31 = 180 \text{ Cum}$

So the amount of earth work should not be less than 180 Cum. Per ha. to hold maximum runoff. The foregoing discussion indicates to propose the number of plants around 750 and earth work not less than 180 cum would be ideal for Ahmednagar district in general. As Ahmednagar division areas had undergone Soil & Moisture Conservation works earlier, it is recommended that any additional measures proposed are duly certified to the extent of essentiality by an officer not less than the Assistant Conservator of Forests, and preference be given to vegetative modes of conservation, avoiding large scale construction of cement structures in the forest. It has been observed that by and large the area holds potential to have further 5-6 cumtr of SMC works per hectare.

22. A judicious combination from the available techniques of Soil & Water Conservation techniques is to be arrived at. Deep CCT though is being advocated by many needs to be taken up with great degree of caution. NABARD through discussion have expressed that they too have placed an upper cap of limiting to 150 RMT per hectare of 1mt x 1mt dimension large WATs; and that great caution needs to be exercised in alignment and location of the deep CCT.

23. Guidelines for planning and execution of soil moisture conservation works are appended in Miscellaneous Regulations chapter.

24. Soil and Moisture Conservation works are based on the principle that says,

"ONE WHICH IS RUNNING, MAKE IT TO WALK;

ONE, WHICH IS WALKING, MAKE IT TO STOP;

And, ONE, WHICH IS STOPPED, LET IT BE ABSORBED."

25. Gully plugging and *na/a* bunding works will be taken up. Appropriate structures will be taken up to preserve moisture for a longer period; Simultaneously, the catchments areas of the earlier done cement plugs/ earthen *bandhara* be treated with loose boulder structures so as to prevent siltation in the dams. On gentler slopes ($<15^{\circ}$) CCT works should be done and fresh seed of *Jatropha curcus* or suitable site specific local species should be sown at 0.5m intervals. Species like Aloe, Agave, Charoli etc., with very good NTFP value should be collected during season and sown on trenches. *Jatropha* seed being oil yielding seed its germination viability is very low. Seed of previous season does not germinate. Hence it is mandatory to purchase or collect seed from *Jatropha* fruits of that very season. DCF should ensure that the seed is fresh by conducting germination tests before they are sown on CCT's. Works shall be completed before the onset of Monsoon. Quantum of work will depend upon the site requirement.
26. **People's Participation:** Ahmednagar district has a tradition of producing pioneers in the field of Soil and Water Conservation. The people's participation is the need of the hour, to protect the forest from fire, grazing, illicit cutting etc. Unless the villagers living nearby are made aware of the material benefit from the forest, they would not feel associated with the well being of the forest and may not visualize the distinct valuable utility of forests for their material benefit they get or likely to get. Therefore it should be expedited through viable measures. Motivation efforts for making them aware about natural benefits of the forests for providing them pure drinking water, bringing rain conserving top soil for boosting their agricultural production and providing fodder for their milch cattle are to be emphasised.
27. By ensuring regular employment to the FPC members on preference basis as they associate themselves in protection, development and regeneration of forests. Incentives to FPC/Village(Sant Tukaram best JFM village Scheme of the government should get wide publicity in JFM villages) committees in terms of cash awards/ free grants on annual basis would be formalized. These measures would help actively involve people in the forest management and should benefit them in the longer run. The people should be made aware of their responsibilities so that long lasting relations get strengthened and well being and sustenance of forests along with people is ensured.
28. **CONTROL FORMS:** The division office will prepare the control forms of the coupes worked every year from the start of the working plan religiously and submit the same to working plan office in the control form as given in Annexure XLIII in volume II by April month end. The division will also submit location maps of the area treated along with latitude and longitudes (northings & eastings) to working plan office. The treated area

maps are registered in GIS system and the monitoring of vegetational changes should be done using remote sensing images year after year by working plan office. The False colour composites for the entire division area required for image processing are procured by division office from National Remote Sensing Center (NRSA) and given to working plan office regularly. The images should be of September to October period. The working plan office will verify 10 percent of the field work done by division office to check whether the prescriptions are properly implemented or not.

29. DEVIATION PROPOSALS: Due to lack of funds or due to any other reasons the division fails to treat the coupe as per working plan proposals, the division should submit deviation proposal at the end of every year of coupe treatment for further necessary action. Minor deviations can be sanctioned at the level of the CCF working plan or the PCCF as the case may be: but the PCCF, before sanctioning the major deviations of the following nature, will necessarily take prior approval of the Regional CCF of the Ministry of Environment and Forests:

- (i) Change in Silvicultural System.
- (ii) Clear Felling of Natural Forest.
- (iii) Formation of new Felling Series: and
- (iv) Large scale felling due to natural calamities, which can not be adjusted against future yield.

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CHAPTER XI

THE AFFORESTATION WORKING CIRCLE

SECTION 1: GENERAL CONSTITUTION.

13. The areas with substantial vegetation and which require improvement through Silvicultural operations and artificial regeneration have been included in this working circle. The main aim is to improve the status of the crop and land. Therefore obtaining produce of any kind is neither expected nor regulated. The Working circle principally aims to re-afforest the gaps in the forests, which had been earlier afforested earlier and could not show the desired results. This Working circle also includes the areas belonging to the upper precipitous and very steep slopes, and prescribes treatment for all such areas. As far as possible a continuous blocks of such forests have been included.
14. This working circle is constituted from the areas allotted to the Earlier Afforestation Working Circle, areas afforested on lands acquired for compensatory afforestation and areas acquired in the recent past. Total area of this working circle is 71271.24 hectares, spread over all the ranges of Ahmednagar forest and Sangamner forest sub-division.

SECTION 2: GENERAL CHARACTERS OF THE VEGETATION.

15. The forests are with open and blank patches and a result of failure plantations taken up in the earlier years, and blanks left untreated during the earlier plan period either by virtue of having been treated as Zone-I areas or otherwise and need to be further planted with suitable species.

SECTION 3: BLOCKS AND COMPARTMENTS.

16. Total Area allotted to this working circle is 71271.24 ha. A total of 431 compartments spread over 1414 units are proposed for working in this working circle. The list of compartments allotted to this working circle in Ahmednagar forest division and Sangamner forest sub-division is given in the Annexures XXVIII and XXXV respectively in the Volume II of the plan. The range wise situation is reflected as under :

s.no	Range	Area of range	# compts		Area allot to WC	% to area of range	% to area of division
			Compt	Units			
1	Akole I	9959.40	38	114	4218.70	42.35	
2	Akole II	6579.50	30	58	3831.20	58.23	
3	Rajur	6841.60	24	74	1790.60	26.17	
4	Sangamner I	15466.20	14	128	10013.40	64.74	
5	Sangamner II	8281.30	19	52	4075.82	49.22	
6	Sangamner III	13107.45	18	68	8562.65	65.32	
7	Sangamner sub.division	60235.45	143	494	32492.37		53.94
8	Kopergaon	1256.18	3	17	320.42	25.51	
9	Rahuri	14601.75	26	123	12683.10	79.44	
10	Ahmednagar	10212.41	25	111	6787.85	66.47	
11	Parner	6506.29	26	161	3453.32	53.07	
12	Takli Dokeshwar	15309.25	21	96	12105.18	79.07	
13	Pathardi	8881.14	13	70	2404.12	27.07	
14	Teesgaon	4739.20	7	16	789.50	16.66	
15	Jamkhed	4162.25	3	9	235.38	5.66	
16	Ahmednagar div total	65668.47	124	603	38778.87		59.05
	Grand total Ahmednagar dn	125903.92	267	1097	71271.24		56.60

SECTION 4: SPECIAL OBJECTS OF MANAGEMENT.

- To conserve soil and moisture in the areas by taking appropriate measures of afforestation and reforestation.
- To improve the condition of the growing stock by tending existing rootstock.
- To improve blank areas in to well stocked areas through artificial regeneration.

- To safeguard the areas against soil erosion and thereby preserve and improve the site quality.
- To ensure protection of the upper reaches and steep slopes so that grasses can come up in these areas.
- To increase the proportion of valuable species in the growing stock and to increase the vegetal cover of the area thereby increasing the productivity of forest land.
- To maintain and preserve the biodiversity of the area.

SECTION 5: ANALYSIS AND VALUATION OF THE CROP.

17. The area is deprived of satisfactory tree growth, present in blanks. These blanks could be failed earlier attempts or natural blanks left alone for reasons that the area is unworkeable or under zone I in the earlier plan period, or for assumption that the soil strata is not supportive for plant growth. However such areas are also envisaged to be tackled in the current plan period under this working circle. The stock mapping of the compartments is done by procuring Forest Density Classified Satellite Images from Forest Survey of India, Dehradun, The Images procured belong to the year 2004. Compartment boundaries are overlaid on these images and density maps are prepared. The results of stock mapping are indicated in Annexure LXIV of Volume II of the Plan.

18. Soil depth is sufficient in most of the areas, however due to faulty practice of not laying down coupes in the areas of working, large areas have repeatedly been afforested, leaving plenty of gaps in between wherever soil depth is apparently less; further problematic areas too have been given the slip thereby occupying more gross area than allotted, as a result the vegetation appears sparse, offering scope for under planting, and enrichment with beneficial plant species. Area classified under Zone I as per the earlier Afforestation Working Circle was not prescribed any afforestation treatment, which shall be tackled now in this plan period. Areas suitable for afforestation after drilling holes and raising irrigated plantations have been identified for special treatment after obtaining due permission from the competent authority.

SECTION 6: SILVICULTURAL SYSTEM.

19. All advance growth will be nurtured along with Enrichment by artificial regeneration. Fellings will be purely on Silvicultural considerations aiming at improvement of the growing stock.

SECTION 7: FORMATION OF WORKING SERIES AND COUPES:

20. A working cycle of 20 years is kept to tackle the whole area. The working circle has been divided into 19 working series in Ahmednagar forest division and 17 working series in Sangamner forest sub-division, and each working series is divided into 20 coupes. The detailed information about working series and coupes is given in Annexures XXVIII and XXXIX for Ahmednagar and Sangamner respectively in volume II of the plan. To be consistent with watershed approach sequencing of coupes have been done from ridge to valley wherever possible.

SECTION 8: DEMARCATION OF COUPES, PREPARATION OF TREATMENT MAP, TREATMENT PROPOSED AND MARKING RULES

21. Demarcation of Coupes: The main coupe shall be demarcated one year in advance of working.

22. Preparation of Treatment Map: It will be prepared by RFO and verified by ACF. The trace of the coupe map will show the contours along with important features like *nala*, streams, old plantation, etc. While preparing the treatment map clear note as to the extent of the work done for Soil/Moisture conservation works earlier shall be noted, and future scope if any identified, and shown to an officer not less than the rank of ACF who shall certify the need for the same.

23. The area will be classified as follows: -

e. Type 'A'- PROTECTION AREAS: The areas consisting of patches over 25⁰ slope or more and 20 meter strip on both sides of the rivers or *nalas*.

f. Type 'B'- UNDERSTOCKED AREAS/BLANKS: Blanks and under stocked patches (crown density below 0.4), with slopes below 25⁰, and minimum area exceeding 2 hectare in extent.

1. the understocked areas shall be further classified into different zones based on soil depth as under-

(i) Zone I – soil depth below 10 cms.

(ii) Zone II – soil depth above 10cms upto 30cms.

(iii) Zone III – soil depth above 30 cms.

2. the soil depth shall be determined on the basis of trial pits taken for the purpose of cross section 45x45cm upto 30 cms deep, at 100 x50mtr spacement, and shall be shown on the treatment map.

- g. **Type 'C'- OLD PLANTATIONS AND GROUPS OF YOUNG POLES:** This will include patches of well-grown poles for retention as future crop in addition to old plantations. The patches should not be less than one hectare in extent.
- h. **Type-'D': WELL STOCKED AREAS:** This will include areas with crop density more than 0.4. The area will be further divided into two classes:
 - 1. Type D1: Areas having adequate regeneration(750 seedlings or more per hectare)
 - 2. Type D2: Areas having inadequate regeneration.

30. TREATMENTS PROPOSED: The various treatments proposed are as under:

a. Area 'A':

- (i) The soil and moisture conservation treatment shall be as given in Miscellaneous Regulation.
- (ii) Planting *Bamboo, Khair, Jamun, Arjun, Agave* and grasses along the nala and river bank.

b. Area 'B':

- (i) Under stocked and blank forest areas where slopes are $<25^{\circ}$, Appropriate structures at regular intervals on the nalas, with loose boulder structures on the upstream of these dams should be constructed to prevent early siltation. After siltation of loose boulder structures agave/aloe suckers or khus/vetivera grass slips should be planted on the silted soil. On gentler slopes ($<15^{\circ}$) CCT works should be done and fresh seed of *Jatropha curcus*, *Semaruba glauca* should be sown at 0.5m intervals. The seed being oil yielding seed its germination viability is very low. Seed of previous season does not germinate. Hence it is mandatory to purchase or collect seed from fruits of that very season. DCF should ensure that the seed is fresh by conducting germination tests before they are sown on CCT's. Continuous Contour Trenches should be taken with proper alignment. Models promulgated by the Government of Maharashtra in this regard based on the slope of the ground shall be used in finalizing the estimates. Fresh seed of *Karanj/Neem/ Moha/Jatropha* etc or locally available species, as per the DCF's choice should be sown at 50 centimeter interval. The earlier technique of CCT by refilling of Contour may be adapted. Works

shall be completed before the onset of Monsoon. Quantum of work will depend upon the site requirement. Specific treatment for the areas as Zone I, Zone II and Zone III is as under:

(ii) Zone I areas:

1. Digging of Water Absorption Trenches (WATs), at the rate of 200 per hectare, each of WAT to be 60cms wide, 30cms deep, 1mtr long, aligned along the contours in a staggered manner.
2. Seed sowing of species like Neem, Sitafal, planting of hardy species like Agave, Aloe, Vad, Pimpal to be made.
3. Dibbling of grass seed dipped in balls of moist earth in urea pellets shall be done on the WATS and in holes made in the adjoining bushes with the help of a stake in the monsoon.

(iii) Zone II areas:

1. Digging of Trenches of size 2mtr x .60 x.30mtrs , at the rate of 250 trenches per hectare in a staggered manner.
2. Planting 3 plants suitable for the area in each trench, @ 750 plants per hectare, followed by 2 weedings and 1 soil working in FYO, 1 weeding and 1 soil working in SYO and 1 soil working in TYO.
3. Dibbling of grass seed dipped in balls of moist earth in urea pellets shall be done on the WATS and in holes made in the adjoining bushes with the help of a stake in the monsoon.
4. Dibbling of pre-germinated Chandan seed in bushes, after monsoon, by using a stake, @ 2 to 3 per bush at a nominal rate of say 200 to 250 places in a hectare.

(iv) Zone III areas:

1. Digging of trenches of size 2mtrx0.60 x0.30mtrs, at the rate of 350 trenches per hectare OR continuous trenches of dimension 0.60x0.30mtr @ 1200 RMT per hectare at spacement of 15 mt. so as to raise 750 plants per hectare on the trenches or on the Refilled Continuous trenches.
2. Dibbling of grass seed dipped in balls of moist earth in urea pellets shall be done on the WATS and in holes made in the adjoining bushes with the help of a stake in the monsoon.

3. Dibbling of pre-germinated Chandan seed in bushes, after monsoon, by using a stake, @ 2 to 3 per bush at a nominal rate of say 200 to 250 places in a hectare.
 4. Planting followed by 2 weedings and 1 soil working in FYO, 1 weeding and 1 soil working in SYO and 1 soil working in TYO.
- (v) Plantation of healthy seedlings from amongst species Khair, salai, Maharukh, kusum, bor, palas, pimpal, kadai, dhawada, Kandol, Sitaphal, Anjan, Hirda, Babul, Chandan, Siras, Sissoo, Hiwar, Karanj, Ain, Shiwan, Teak, Neem, *Holoptelia integrifolia*, *Acacia senegalensis*, Amaltas, Raintree, Sawar, Bamboo, Guggul, Ashwagandha, Shatavari, Bael, Padal, Awla, Agnimanth, Simarouba, Khaya and any other species as directed by the Chief Conservator of forests or the Deputy Conservator of forests, in tune with the current prescriptions and preferably yielding Non-timber Forest Produce are recommended. The choice of species is to be governed by the local edaphic factors. These miscellaneous species should be raised in polypots or root trainer containers. Pits or trenches as per suitability of site should be adopted, giving preference to the Refilled Continuous Contour Trenching Technology popularized in Ahmednagar division earlier. The DCF should choose the model with technical approval from CCF(T).
- (vi) The plant population shall be limited at 750 plants per hectare, by retaining the well established and economically important species only, keeping in tune with the principle of Ecological Index worked out for the district.

c. Area 'C':

- (i) These areas are to be underplanted with suitable species including Bamboo, Chandan and other economically important species such that the planted population doesn't exceed 400 plants per hectare.
- (ii) At places where severe congestion of Subabul and *Glyricidia* exist, needful thinning operations including removal may be resorted to encourage growth of superior planted species.

d. Area 'D':

- (i) **D1 areas-** areas support 750 plants per hectare, however silvicultural thinning to favour enrichment by bamboo, sandal, ashwagandha, samudrashosh, shatavari, bedki pala/Gymnema and other economically important species are recommended to improve the floristics of the area.
- (ii) **D2:** The natural regeneration of this area need to be supplemented by artificial regeneration to the extent by which natural regeneration fall short of 750 plants per hectare with suitable species including Bamboo, Chandan etc., based on the local edaphic factors

31. The following table shows the compilation of suitable species which can be planted in different types of soil.

Sr. No.	Soil Type	Suitable species
1	Sandy loam soil	Ber, Kala siris, Albizzia odoratisima, Tamarindus indica, Dalbergia sissoo, neem, Pongamia pinnata, Anthocephalus kadamba, Ain, Shiwan, Teak, Babul, all ficus spp.
2	Clayey Loam soil	Kala Siris, Dalbergia latifolia, Pterocarpus marsupium, Adina cordifolia, Babul, Mitrygyna parviflora, all ficus spp.
3	Black cotton soils	Neem, Soymida febrifuga(rohan), Buchanania lanzan, Acacia auriculiformis, Khair, Hiwar, (Acacia leucophloea), Acacia nilotica, Acacia arabica, Kala siris, Albizzia procera, Dalbergia latifolia, Ougenia oogenensis, Lagerstroemia parviflora, all ficus spp.
4	Stiff clay soils	Aegle marmelos, Semicarpus anacardium, Cassia fistula, Cassia siamea, Adina cordifolia, Mahua. Anjan, all ficus spp.
5	Riverain soil	Xylia xylocarpa, Dalbergia sissoo, Bombax ceiba, all ficus spp.
6	Sandy soil	Khair, Terminalia arjuna, casuarina spp, all ficus spp.
7	Hilly tract with good soil	Anjan, Khair, Movai, Chandan, Sterculia urens, Acacia nilotica, Prosopis juliflora, all ficus spp.
8	Moist patches	Terminalia arjuna, jamun, all ficus spp.
9	Hilly tract with poor soil	Ailanthus excelsa, Melia azadirachta, Buchanania lanzan. Anjan, Salai, Sterculia urens, all ficus spp.
10	Gravelly soil	Rohan, Acacia auriculiformis, Khair, Mahua, Annona

		squamosa, Dhawada, Bauhinia variegata, Cassia siamea, Terminalia chebula, all ficus spp.
11	Shallow soil	Ailanthus excelsa, Sterculia urens, Boswellia serrata, Melia azadirach, Khair, Hiwar, Xylia xylocarpa, Bauhinia variegata, Hardwickia binata, cassia fistula, Cassia siamea, Dhawada, Terminalia chebula, all ficus spp.
12	Lateritic soil	Acacia auriculiformis, Xylia xylocarpa, Terminalia belerica, Terminalia chebula, Neem, Karanj, Mahua, all ficus spp.
13	Swampy soil	Acacia nilotica, Albizzia procera, Samania saman, Mitragnya parviflora, Terminalia arjuna, all ficus spp.
14	Grassy blank soils	Samania Saman, Bombax ceiba, all ficus spp.

32. MARKING RULES FOR Afforestation and Soil –Water Conservation Working

Circle:

- a. **Marking For Type 'A' Area:** No marking will be carried out.
- b. **Marking For Type 'B' Area:**
 - (i) All dead, dying and diseased trees after retaining 2 dead trees per hectare shall be marked for felling.
 - (ii) All live high stumps shall be cut as close to the ground as possible and dressed.
 - (iii) All malformed advance growth of Teak (Sangamner sub-division) up to 30 cm. shall be cut back
 - (iv) The established multiple coppice shoots will be reduced to one per stool retaining the vigorous one, which is closer to the ground.
 - (v) The undesirable under growth, which is preventing growth of natural regeneration of desired species will be removed.
- c. **Marking For Type 'C' Area:**
 - (i) The patches of not less than one hectare shall be identified having advance growth of any species and it shall be spaced out to one third of the top height, while retaining the vigorous and straight poles. Silvicultural thinning shall be done. as per yield table. The thinning shall be done in such a manner that epicormic branches do not come up.
- d. **Marking for Type 'D' Area:**

- (i) All dead, dying, diseased and malformed trees, all live high stumps and all except one vigorously growing coppice shoot per stool will be marked for felling.
- (ii) In Akole tehsil, in areas where Teak is noticed, In patches not less than 0.5 ha. In extent and having Teak reproduction in seedling stage, heavy openings in middle canopy by cutting miscellaneous growth will be carried out.
- (iii) In teak bearing areas of Akole tehsils, the existing established teak reproduction upto 20c.m. in girth at breast height will be freed by marking overwood for removal
- (iv) Malformed advance growth of Teak in Akole tehsil upto 30c.m. in girth will be cutback. The overwood and inferior species likely to interfere with the coppice growth will be marked for felling.
- (v) Thinning, marking will be carried out in favour of Teak and other valuable species
- (vi) No fruit bearing tree shall be marked for felling.

SECTION 9: REGENERATION.

33. Natural Regeneration: The NR will be protected against fire and animals. TCM/Vegetative live hedge fencing or other kind of fencing may be established.

34. ARTIFICIAL REGENERATION AND CHOICE OF SPECIES:

- d. **PPO+PYO operations:** As approved by the competent authority.
- e. **Choice of species:** The areas under this working circle are to be enriched by suitable species which not only enrich the floristics of the area but also would provide sufficient economical gain in future and should comprise of bio fuel trees like karanj, neem, mahua, jatropha on CCT etc, or lac insect host trees like kusum, bor, khair, palas, pimpal, acacia auriculiformis etc, or gum exudating trees like kadai, salai, khair, dhawada, etc., Further species like Bamboo, Sandal, and Guggul, Shatavari, Ashwagandha with medicinal value have tremendous NTFP value, are native to such tracts.
- f. **METHOD OF PLANTING:** - **The planting model approved by the competent authority will be implemented and C.C.F. (Territorial) will provide guidance from time to time.**

SECTION 10: SUBSIDIARY SILVICULTURAL OPERATIONS.

The Subsidiary Silvicultural operations includes

(1) Cleaning and (2) Thinnings.

- b. **Cleaning:** A cleaning operation will be carried out in the 5th year commencing from the year of planting.
- (i) All climbers will be cut over entire area of the coupe, if necessary i.e., when it is ensured beyond doubt that the species doesn't have NTFP value superior to the plant/tree it is endangering.
 - (ii) Damaged, malformed saplings, and coppice shoots will be cutback. Multiple coppice shoots will be reduced to one promising shoot per stool provided no other seed origin sapling is available at that place.
 - (iii) Fast growing inferior species and bamboo interfering or likely to interfere with reproduction of teak & other valuable species will be cut.
 - (iv) In thick patches of teak advance growth & established regeneration of other valuable species spacing between saplings to be retained, should vary from 2 meter to 2.59 meter depending on the height of the sapling. Cleaning in plantation areas should be carried out as & when required depending upon the crop condition.
- b. **Thinning:** Thinning in plantation areas will be carried out when the III year of operations are completed. The thinning will be silvicultural as prescribed in the Chapter on Miscellaneous Regulations and would aim to restrict the plant population to 750 per hectare in tune with the Ecological Index of the region, retaining healthy economical crop.

SECTION 11: OTHER REGULATIONS.

35. Models for afforestation are enclosed under Annexures XLVI and XLVII of the Volume II of the plan, for ease of reference and planning.
36. Sandal Plantations wherever taken should be ensured of proper protection. Preference to be given to such areas where protection can be ensured.
37. An area of 454.08 ha (108.33ha in Nagar division and 345.75ha in Sangamner sub-division) is found to be suitable for afforestation after drilling holes/blasting the surface; details of which are appended in the Annexure XLVIII of Vol II., the works modelled on

raising plantations of vad and pimpal on such blasted soils shall be undertaken only after sanction is obtained from the competent authority.

38. Likewise an area of 805.5ha (618ha in Nagar division and 187.5 ha in Sangamner sub-division) the details of which are appended at Annexure XLIX of the Volume II of the plan found suitable to raise irrigated plantation by virtue of their nearness to irrigation facility, may be taken up only after obtaining sanction from the competent authority.

39. **Protection from Fire:** All the Plantations will be fire traced and rigidly fire protected for a period of **Five years** from the year of planting. In the month of October / November after the demarcation is over all the undergrowth in the proposed external and internal fire line is removed. The cut material will be spread along the fire-line length and burnt taking care that the cut material remains sufficiently away from the stems of the trees and burning does not harm the trees. The dry and cut bushes of unwanted species shall be burnt before the end of February to avoid fire hazards to the forests. All the plantations shall be part of the Fire Protection Plan to be prepared for the divisions. The regeneration is the future growing stock. Hence the main thrust should be on protection of regeneration. The techniques of fire protection should be as per the paragraphs given in Miscellaneous Regulations

40. To ensure effective protection from fire the workable schemes of fire protection should be carried out in which the due share to people's participation shall be given. For meaningful participation modalities shall be worked out to impart benefit to the people so that they come forward. The village forest protection committees will be formed & fire protection will be done through the village protection committee.

41. **Grazing Control:** The areas in the working circle shall remain closed to grazing for a **period of 5 years**. The grazing will be regulated as per Govt. policy of the Govt. of Maharashtra dt.6th Dec.1968 Further, in the area of adjoining but with sufficient lag for working of coupe, seeds of palatable grasses be sown and villagers be motivated to harvest the fodder. The method of rotational grazing is followed. As per functional classification this working circle can mainly be classified as minor forests and the maximum grazing incidence prescribed for it is 1.2 ha per cattle unit. This will facilitate opening of area on rotational basis. The closed areas should be specifically mentioned in the grazing licenses and villagers be communicated of such closures by suitable means such as drum-beating, notices on prominent places, village Panchayat officers etc. and by binding grass pullies or stacks along the boundaries of closed coupes. However the grazing settlement report prepared and submitted to the Government for

Ahmednagar division, doesn't prescribe issue of any grazing permits, which is yet to receive official sanction from the Government.

42. **Soil and moisture Conservation Works:** One of the main objectives of dry zone afforestation is soil and moisture conservation. Therefore the amount of earth work should be so designed that it holds maximum runoff.

Average Rainfall of Ahmednagar = 559 mm.

$$\text{Total rainfall per hectare} = \frac{559 \times 10000}{1000} = 5590 \text{ m}^3$$

No. of rainy days = 31

$$\text{Av. Rainfall / day / Ha.} = 5590 / 31 = 180 \text{ Cum}$$

So the amount of earth work should not be less than 180 Cum. Per ha. to hold maximum runoff. The foregoing discussion indicates to propose the no. of plants around 750 and earth work not less than 180 cum would be ideal for Ahmednagar district in general. Preference should be given to utilization of Vegetative structures in devising such methodology, and cement bandharas should be to the minimum. Keeping in view of the ample work of Soil and Moisture works already done in the areas, any additional work proposed should be duly verified as necessary by an officer of rank not below the Assistant Conservator of forests.

43. A judicious combination from the available techniques of Soil & Water Conservation techniques is to be arrived at. Deep CCT though is being advocated by many needs to be taken up with great degree of caution. NABARD through discussion have expressed that they too have placed an upper cap of limiting to 150 RMT per hectare of 1mt x 1mt dimension large WATs; and that great caution needs to be exercised in alignment and location of the deep CCT. Observations made suggest SMC works potential of about 6-7 cumtr per hectare.

44. Guidelines on choice of soil moisture conservation methods are represented in the chapter miscellaneous regulations.

45. Soil and Moisture Conservation works are based on the principle that says,

“ONE WHICH IS RUNNING, MAKE IT TO WALK;

ONE, WHICH IS WALKING, MAKE IT TO STOP;

And, ONE, WHICH IS STOPPED, LET IT BE ABSORBED.”

46. Gully plugging and *nala* bunding works will be taken up. The catchments areas of the earlier *bandhara/structures* be treated with loose boulder structures/ vegetative structures so as to prevent siltation, avoiding cement structures. On gentler slopes (<15°) CCT works should be done and fresh seed of *Jatropha curcus* or suitable site specific local species should be sown at 0.5m intervals. Species like Aloe, Agave, Charoli etc., with very good NTFP value should be collected during season and sown on trenches. *Jatropha* seed being oil yielding seed its germination viability is very low. Seed of previous season does not germinate. Hence it is mandatory to purchase or collect seed from *Jatropha* fruits of that very season. DCF should ensure that the seed is fresh by conducting germination tests before they are sown on CCT's. Works shall be completed before the onset of Monsoon. Quantum of work will depend upon the site requirement.

47. **People's Participation:** Ahmednagar district has a tradition of producing pioneers in the field of Soil and Water Conservation. The people's participation is the need of the hour, to protect the forest from fire, grazing, illicit cutting etc. Unless the villagers living nearby are made aware of the material benefit from the forest, they would not feel associated with the well being of the forest and may not visualize the distinct valuable utility of forests for their material benefit they get or likely to get. Therefore it should be expedited through viable measures. Motivation efforts for making them aware about natural benefits of the forests for providing them pure drinking water, bringing rain conserving top soil for boosting their agricultural production and providing fodder for their milch cattle are to be emphasised.

48. By ensuring regular employment to the FPC members on preference basis as they associate themselves in protection, development and regeneration of forests. Incentives to FPC/Village(Sant Tukaram best JFM village Scheme of the government should get wide publicity in JFM villages) committees in terms of cash awards/ free grants on annual basis would be formalized. These measures would help actively involve people in the forest management and should benefit them in the longer run. The people should be made aware of their responsibilities so that long lasting relations get strengthened and well being and sustenance of forests along with people is ensured.

49. **CONTROL FORMS:** The division office will prepare the control forms of the coupes worked every year from the start of the working plan religiously and submit the same to working plan office in the control form as given in Annexure XLIII of Volume II by April month end. The division will also submit location maps of the area treated along with latitude and longitudes(northings & eastings) to working plan office. The treated area maps are registered in GIS system and the monitoring of vegetational changes should be done using remote sensing images year after year by working plan office. The False colour composites for the entire division area required for image processing are procured by division office from National Remote Sensing Center(NRSA) and given to working plan office regularly. The images should be of September to October period. The working plan office will verify 10 percent of the field work done by division office to check whether the prescriptions are properly implemented or not.

50. **DEVIATION PROPOSALS:** Due to lack of funds or due to any other reasons the division fails to treat the coupe as per working plan proposals, the division should submit deviation proposal at the end of every year of coupe treatment for further necessary action. Minor deviations can be sanctioned at the level of the CCF working plan or the PCCF as the case may be: but the PCCF, before sanctioning the major deviations of the following nature, will necessarily take prior approval of the Regional CCF of the Ministry of Environment and Forests:

- (i) Change in Silvicultural System.
- (ii) Clear Felling of Natural Forest.
- (iii) Formation of new Felling Series: and
- (iv) Large scale felling due to natural calamities, which can not be adjusted against future yield.

CHAPTER XII

WORKING PLAN FOR THE SILVI-PASTURE MANAGEMENT WORKING CIRCLE

SECTION - 1: GENERAL CONSTITUTION

1. The working circle comprises of areas which are subjected to heavy grazing & have very poor soil. This working circle comprises of all the forests with limited soil depth. This working circle includes those areas which were subjected to unrestricted grazing in the past. These are depleted areas, with poor soil cover, less trees or shrubs. Old plantations are present. The grass growing on these areas is of the inferior quality. Natural grassland type of the forests is Sehima/ Dichanthium (Grassland survey of India – 1954, ICAR) These areas belonged to Silvi-Pasture Management Working Circle of Nimbalkar and Mishra's Working Plan. The total area under this working circle is 13130.55 hectare spread over whole division.

SECTION - 2: GENERAL CHARACTERS OF THE VEGETATION

2. The vegetation is of low quality and the forests belongs to southern Thorn Forests type and the Dry Deciduous forests i.e. 6 A C-I and 5A/C3 forests. All areas are open & understocked. Artificial regeneration has shown good results at places. Soil erosion is common. These are poor, open low forests having generally shallow soil and have a pronounced xerophytic ecological association in which the growing stock is stunted and malformed. Tree growth is less consisting of local species and trees of old plantations.
3. The grasses commonly seen and which have fodder value are pavanya (*Schima nervosum*), Sheda (*Schima sulcatum*), tambadgota (*Andropogon pumilus*) and Kusali (*Heteropogon contortus*). The other grasses having comparatively less fodder value are kunda (*Ischaemum pilogum*), phulora (*Themeda quadrivalvis*), rosha (*Cymbopogon martini*), phuli(*Aristida funiculata*) etc..
4. The Sehima-Dichanthium type is represented by dominant perennial grasses viz., *Dichanthium annulatum*, *Sehima nervosum*, *Bothriochloa pertusa*, *Chrysopogon fulvus*, *Heteropogon contortus*, *Iseilema laxum*, *Themeda triandra*, *Cynodon dactylon*, *Aristida setacea*, and *Cymbopogon* spp. Important associated species are *Apluda mutica*, *Bothriochloa intermedia*, *Arundinella nepalensis*, *Desmostachya bipinnata*, *Eragrostis* and *Eragrostiella* spp.
5. A *Dichanthium* community, with *D.annulatum*, *D.caricosum* or *D.aristatum* as principal species, represents the highest development of grassland. The plant cover of a developed *Dichanthium* community may exceed 80% and hay production may be about

6.3t/ha. On level soils with increasing moisture availability, the Dichanthium community is replaced partially or wholly by an Iseilema, with I.laxum as a chief species. When Sehima-Dichanthium cover is subject to grazing these communities are replaced by Chrysopogon and Bothriochloa communities and with further grazing at this stage, these communities are replaced by Heteropogon and Eremopogon communities, with Heteropogon contortus and E.foveolatus the chief species.

SECTION - 3: BLOCKS AND COMPARTMENTS

6. Total Area allotted to this working circle is 13130.55 ha. A total of 47 compartments comprising of 114 units are proposed for working in this working circle. The list of compartments allotted to this working circle is given in the Annexures XXXII and XXXVI respectively for Ahmednagar and Sangamner in the Volume II of the plan. The range wise situation is reflected as under :

s.no	Range	Area of range	# compts		Area allot to WC	% to area of range	% to area of division
			compt	Units			
1	Akole I	9959.40	4	8	557.40	5.60	
2	Akole II	6579.50	1	1	111.60	1.69	
3	Rajur	6841.60	4	9	253.90	3.71	
4	Sangamner I	15466.20	0	0	0.00	0	
5	Sangamner II	8281.30	1	3	764.00	9.22	
6	Sangamner III	13107.45	1	1	232.60	1.77	
7	Sangamner sub.division	60235.45	11	22	1919.50		3.19
8	Kopergaon	1256.18	0	0	0.00	0	
9	Rahuri	14601.75	1	1	228.90	1.57	
10	Ahmednagar	10212.41	4	5	459.30	4.49	
11	Parner	6506.29	3	7	333.38	5.12	
12	Takli Dokeshwar	15309.25	3	3	2401.54	15.68	
13	Pathardi	8881.14	18	37	4536.78	51.08	
14	Teesgaon	4739.20	1	2	598.70	12.63	
15	Jamkhed	4162.25	6	37	2652.45	63.72	
16	Ahmednagar div total	65668.47	36	92	11211.05		17.07
	Grand total Ahmednagar dn	125903.92	47	114	13130.55		10.42

SECTION - 4: SPECIAL OBJECTS OF MANAGEMENT

- To conserve soil & moisture effectively.
- To improve the quality of fodder Grasses & vegetal cover of the area.
- To meet the Local demand of fodder & fuel wood.
- To develop strategies that include measures to establish fodder banks, conversion of fodder into feed blocks, extension activity geared to enrich straw/stover with urea, hay/silage, chaff cutters use, emphasis on fodder seed production and watershed development programmes through people's participation programmes.

SECTION - 5: ANALYSIS AND VALUATION OF THE CROP

7. Most of the areas are open, the natural tree growth is sparse, stunted & malformed. The plantations done over the years have shown mixed results. The crop over bulk of the areas is quality IV-b. The stock mapping of the compartments is done by procuring Forest Density Classified Satellite Images from Forest Survey of India, Dehradun. The Images procured belong to the year 2004. Compartment boundaries are overlaid on these images and density maps are prepared. The results of stock mapping are indicated in Annexure LXIV of the Volume II of the plan.

Soil depth is sufficient in most of the areas but in areas close to revenue areas soil compaction due to biotic interference is observed.

SECTION - 6: SILVICULTURAL SYSTEM

8. The area will be tackled by artificial regeneration of grasses & legumes with fodder tree species which also provides small timber/firewood.

SECTION-7: FORMATION OF WORKING SERIES AND COUPES:

9. The working circle area is divided in to 12 working series in Ahmednagar forest division and 5 working series in Sangamner forest sub-division, the details of which are appended in annexures XXIX for Ahmednagar and in Annexure XXXVI for Sangamner sub-division. Area of each afforestation series has been divided into 15 coupes so that area is covered in 15 years. The sequence of working coupe is given in Annexures XXXII for Ahmednagar division and in Annexure XL for Sangamner sub-division in the Volume II of the plan.

SECTION –8: IMPLEMENTING AGENCY

10. The annual coupes will be worked on departmental basis. In the working of annual coupes, works like demarcation, preparation of treatment map, preparation of estimates will be carried out by the forest staff under technical supervision of concerned A.C.F. Involvement of local JFM communities may be solicited to facilitate smooth operation.

SECTION - 9: METHOD OF TREATMENT

11. TREATMENTS PROPOSED: The various treatments proposed are as under:

- a. **Demarcation of Coupes:** The main coupe shall be demarcated one year in advance of working.
- b. **Preparation of Treatment Map:** It will be prepared by RFO and verified by ACF. The trace of the coupe map will show the contours along with important features like *nalas*, old plantations etc.
- c. The area will be classified as follows: -

Type 'A'- PROTECTION AREAS: The areas consisting of patches over 25⁰ slope or more and 20 meter strip on both sides of the rivers or *nalas*.

Type 'B'- UNDERSTOCKED AREAS/BLANKS: Blanks and under stocked patches (crown density below 0.4), with slopes below 25⁰, and minimum area exceeding 2 hectare in extent.

Type 'C'- OLD PLANTATIONS AND GROUPS OF YOUNG POLES: This will include patches of well-grown poles for retention as future crop in addition to old plantations. The patches should not be less than one hectare in extent.

Type-'D': WELL STOCKED AREAS: This will include areas with crop density more than 0.4. The area will be further divided into two classes:

*- Type D1: Areas having adequate regeneration(750 seedlings or more per hectare)

*-Type D2: Areas having inadequate regeneration.

The emphasis shall be on tackling areas classified as Type 'A', 'B' areas in this working circle, notwithstanding the fact that while allotting the compartments to this working circle suitability factors have been given sufficient weightage.

12. TYPE A areas: -

- a. These areas will be covered with soil & moisture conservation works like gulley plugging & Nala bunding. Seed sowing with the seeds of Anjan, Babul, Subabul, neem, Bamboo, Siras etc. will be done at suitable places.

13. Type B areas: -

- a. These areas are unworkable areas the existing Euphorbias & other bushes in this areas will be protected properly seed of Neem, etc. will be sown in these bushes before onset of monsoon through forest guards & watchman.
- b. Proposed treatment will consist of closure, undertaking soil and moisture conservation work, increasing fodder productivity by adopting silvi-pastoral approach, increasing water absorption and retention capacity of soil, establishment of seed plots for raising the planting stock of grasses etc., Grass and legumes suitable for drought prone areas will be sown mixed together. Fodder tree species shall be planted at 8 x 5 mtrs, throughout the area, giving a total of 250 trees per hectare.

14. Type C areas: -

- a. All these areas will be covered with soil & moisture conservation works. All old successful plantations with crowded pole crop will be given light silvicultural thinning favouring the growth of Neem, Anjan, Sissoo Siras, Babul and other NTFP yielding species etc.

15. Type D areas:-

- a. Soil and moisture conservation works to be taken in these areas.

16. The choice of species shall be from amongst:

- a. Grasses-
 - i. Dongari grass 2-4-11 Chrysopogon fulvas
 - ii. Motha Pawana 100-5 (Sheda) Sehima nervosum
 - iii. Anjan grass Cenchrus ciliaris
 - iv. Marvel-8 Dicanthium annulatum
 - v. Dinanath grass Pennisetum pedicilatum

- b. Legumes-
 - i. Stylosanthus species viz. Hamata, scabra
 - ii. Subabul Leucaena leucocephala
 - iii. Wild tur Atylosia scaraboides
 - iv. Siratro Macroptilum atropurpureum
- c. Fodder Tree Species-
 - i. Anjan, Acacai arabica, Sissoo, Subabul, Prosopis cineraria, Ficus, Tamarind.

17. PLANTING OPERATIONS IN THE FIELD:

All the sites are undulating and drought prone. However the steepness of the slopes in different sites and also within a site varies. As the rainfall and soil factors generally remain unchanged, the gradient becomes a determining factor for the treatment proposed. Therefore, following tree types of area will be demarcated on the treatment map.

Category 1: - Flat areas or areas with a gentle slope (Up to 5°)

Category 2: - Areas with gentle to moderate slopes (From 5° to 15°)

Category 3: - Areas with moderate to steep slopes (Over 15° slopes)

18. Following operations will be common for all the above mentioned areas:

Eradication of bushes and weeds by uprooting and manual cutting. After cutting their stumps will be treated with weedicides viz. 2,4,5-T (0.4% solution) to prevent their resurgence. However, fodder trees of old plantations should be retained.

19. SOIL TREATMENT AND SEED SOWING:

- a. **Category 1 areas:** Water absorption trenches of 60cms width and 30cm Depth will be dug up throughout the workable area at a spacing of 8m. Trench should be aligned along the contours. A tractor or a country plough will be used to rip area between the trenches. These works shall be completed by 15th of May of the planting year. In the last week of May or first week of June, the grass seeds and legume seeds will be sown in alternate rows at spacing of 50cms apart, Seeds must be sown at not more than 0.8cm. depth otherwise the germination will be affected. 6kg. Grass seed will be sufficient for one Ha. Similarly following quantities of legume seeds will be required.

1. Stylo hamata	4kg/ha.
2. Siratro	10 kg/ha.
3. Wild Tur	10 kg/ha.

In case of grasses, pelleting of seeds is found beneficial for better establishment. Seed is processed in small pellets which are easy to handle and less vulnerable to be blown by wind or washed off by water. A homogenous thick paste is prepared by incorporating seeds in the mixture of sand, clay, cow dung manure and water in the proportion of 3:1:1:1. The pellets are prepared in such a size that each pellet consists of up to 5 seeds. The pellets are dried and can be stored for 4-6 months before sowing. On the onset of monsoon these may be sown in the field. Pellets can be made manually or by using a machine.

b. Category 2 areas:

WATs of 60 cm. Width and 30cm. Depth will be dug up throughout the workable area at a spacing of 8m. Trench should be aligned along the contours. 50 grass seed beds of size 8m. x 1.75cm x 15cm shall be prepared in between these trenches. The grass and legume seeds will be sown in alternate lines on grass seed beds and trenches about 4.5 kg. Seed of grass will be required. Requirement of legume seeds is similar to that for category 1 areas. Timing and method of sowing is as given for category 1 area.

c. Category 3 areas:

WATs of 60 cm. Width and 30cm. Depth will be dug up throughout the workable area at a spacing of 8m. along the contours. Small pits of size 10cm. X 10cm. X 10cm shall be dug up through out the site at 1m. x 1m spacing. These pits will provide better conditions for germination than ordinary dibbing. Grass and legume seeds will be sown in alternate lines on these pits and also on trenches. The depth of seeds sown will not be more than 0.8 cm. The timing of sowing will be as per category 1 areas.

20. **Planting of fodder tree species on Trenches:** Throughout the site 250 seedlings of fodder species mentioned above will be planted at 8 x 5m spacing.

21. **Weeding:** In the first year, it is proposed to carry out two weeding to remove undesirable grass species, interfering with growth of grasses and legumes sown in the plantation.

The first weeding will be done in the second/third week of July and the second weeding the middle of September. During the weeding where line sowing is done all undesirable grasses will be removed. In case of G.S.B. the grasses other than sown will be removed. In case of pit method, weeding around the pit up to a distance of 30cm on either side will be carried out.

Weedings of seedling: Two weeding with soil working of 250 seedling planted on trenches during first year. Soil working with one weeding during 2nd year and one soil working during 3rd year should be carried out.

22. Fertilizer application:

In the formation year, it is proposed to give fertilizer dose to get better results. For plain areas where ripping and line sowing of grass legume seed is done basal dose of phosphate at 20 kg/ha and Nitrogen 20 kg/ha, will be administered by broadcasting the said fertilizers before sowing of seeds. Top dressing does of 20 kg Nitrogen/ha will be given after one month of establishment of grasses. In undulating areas 40 kg Nitrogen/ha will be given by spraying urea. This does has to be given after one month of establishment of grasses.

23. Protection: The plantation of grasses needs to be protected effectively from grazing and fire. It is proposed to provide one watchman for 25 ha area. In the first year watchman for 9months and from S.Y.O. to fifth year all round the year is to be provided. Fire line of 5mtrs width will be taken around the plantation from F.Y.O. to fifth year.

24. Harvesting: In the first year, the grass will be ready for harvest by November. Its seed should be collected from November onwards, till January and afterwards the grass will be allowed to be cut or it may be disposed off by any other method in force in the division, such as by auction etc. Only the cutting to be done in first year and two cuttings in subsequent years may be taken.

Similarly the fodder tree species may be allowed to be lopped for green fodder from 4th year onwards.

In subsequent years the grass will come up again from existing rhizomes and will need casualty replacement only in a few failure patches.

25. Re-establishment of the Coupes:

Grasses establish in a short time and start giving produce within a year. This production increases up to fourth year but after that period a plateau is reached and productivity gradually falls. It therefore, becomes desirable to undertake operation necessary for re-establishing the grass. It is proposed to carry out these operations after 10th year. The operations will be as mentioned in the preceding paragraphs.

SECTION 10: OTHER REGULATIONS:

26. The strategies should include measures to establish fodder banks, conversion of fodder into feed blocks, extension activity geared to enrich Straw/Stover with urea, hay/silage, chaff cutters use, emphasis on fodder seed production and watershed development programmes.

27. The JFM Village level forest protection committees should be imbued to appreciate the benefits of efficient use of technology to further their animal husbandry enterprises, and the silvi-cultural management working circle can not be truly effective without due emphasis on people participation.

28. Ahmednagar district has developed a strong foothold in the Dairy Industry, hence the forest department could play a major role in developing the lands with active co-operation of the people of the district.

29. **Establishment of Seed Plots:** To make available good quality grass seeds, seed plots of 2-3 Ha. each will be established in the Division in following Talukas, where the work of raising the silvi-pasture plantations are proposed –

- a. Sangamner
- b. Akola
- c. Ahmednagar
- d. Shevgaon

30. For establishing the seed plots, site with good soil depth (more than 30 cms) should be selected in the month of October. It should be ploughed and cross ploughed thoroughly. A light burn of available grasses will be helpful. Farmyard manure should be applied to the site. Area should be levelled as far as possible to avoid water logging afterwards, small undulations can also be left. This work should be completed by March end. This site will be left to weather in the sun till last week of May. In the last week of May, the clods of soil should be broken and seeds of grass should be sown in a line. In this way about 10 kg. Seed will suffice for a hectare. Care should be taken to sow different species of grass in separate plots in a Nursery. 200 kg Super phoshate basal dose should be applied before sowing (Fertilizer should be applied as per requirement after soil testing).

31. After the seed germination is over, fertilizer at the rate of 100 kg. Of Urea per Ha should be applied. Urea should be applied during the down pour. After one month , the site should be cleared of all the unwanted grasses and brushwood during weeding (2 weedings)

32. The grass will be ready for harvesting from November onwards. Before harvesting, the seed should be collected and stored properly for use in the next monsoon season. In this way, by conservative estimates, 150kg. Seed will be produced per hectare. Usual production of the proposed grass seed is 250 kg/ Ha.

33. **Fire Protection:** Main-working coupes will be fire traced and rigidly fire protected for a period of **Five years** from the year of working. In the month of October / November after the demarcation is over all the unwanted undergrowth will be uprooted. The cut material will be spread over the fire line area to be in such a way that the cut material remains sufficiently away from the stems of the trees and burning does not harm the trees. The dry and cut bushes of unwanted species shall be burnt before the end of February to avoid fire hazards to the forests.

34. To ensure effective protection from fire the workable schemes of fire protection should be carried out in which the due share to people's participation shall be given. For meaningful participation modalities shall be worked out to impart benefit to the people so that they come forward. The village forest protection committees will be formed & fire protection will be done through the village protection committee. The comprehensive Fire Fighting Scheme should be chalked out so that effective Fire Fighting force is created for, for the period 15th February to 15th June on 24 hour duty on suitable area basis.

35. The techniques of fire protection should be as per the paragraphs given in Miscellaneous Regulations.

36. **Grazing Control:** - The areas of main working shall remain closed to grazing for **a period of 5 years**. The grazing will be regulated as per Govt. policy of the Govt. of Maharashtra dt.6th Dec.1968. Further, in the area of adjoining but with sufficient lag for working of coupe, seeds of palatable grasses be sown and villagers be motivated to harvest the fodder. The method of rotational grazing be followed. As per functional classification this working circle can mainly be classified as minor forests and pasture lands and the maximum grazing incidence prescribed for it is 0.4 ha per cattle unit. The closed areas should be specifically mentioned in the grazing licenses and villagers be communicated of such closures by suitable means such as drum-beating, notices on prominent places, village Panchayat officers etc. and by binding grass pullies or stacks along the boundaries of closed coupes. Recent report of the Settlement Officer, Ahmednagar division recommended no grazing in the forest areas of the division, which is yet to be accorded sanction by the Government.

Till then no further decision shall be taken, and measures to encourage staff feeding shall be in force.

37. CONTROL FORMS: The division office will prepare the control forms of the coupes worked every year from the start of the working plan religiously and submit the same to working plan office in the control form as given in volume II by April month end. The division will also submit location maps of the area treated along with latitude and longitudes(northings & eastings) to working plan office. The treated area maps are registered in GIS system and the monitoring of vegetational changes should be done using remote sensing images year after year by working plan office. The False colour composites for the entire division area required for image processing are procured by division office from National Remote Sensing Center(NRSA) and given to working plan office regularly. The images should be of September to October period. The working plan office will verify 10 percent of the field work done by division office to check whether the prescriptions are properly implemented or not.

38. DEVIATION PROPOSALS: Due to lack of funds or due to any other reasons the division fails to treat the coupe as per working plan proposals, the division should submit deviation proposal at the end of every year of coupe treatment for further necessary action. Minor deviations can be sanctioned at the level of the CCF working plan or the PCCF as the case may be: but the PCCF, before sanctioning the major deviations of the following nature, will necessarily take prior approval of the Regional CCF of the Ministry of Environment and Forests:

- i) Change in Silvicultural System.
- ii) Clear Felling of Natural Forest.
- iii) Formation of new Felling Series: and
- iv) Large scale felling due to natural calamities, which can not be adjusted against future yield.

CHAPTER XIII
BAMBOO (OVERLAPPING) WORKING CIRCLE

**SECTION 1: - GENERAL CONSTITUTION OF THE OVERLAPPING
WORKING CIRCLE**

1. This overlapping working circle includes the forest areas having vegetation density more than 0.6 areas having bamboo clumps and the areas suitable for bamboo planting but density less than 0.6

SECTION 2: GENERAL CHARACTER OF VEGETATION

2. The common variety of bamboo occurring in this tract is *Dendrocalamus strictus*. Quality of bamboo varies with the drainage, soil, density of the tree cover. Bamboo clumps are found in scattered patches in old plantations. The clumps are congested and the growth of individual bamboo got effected due to congestion in clumps. The bamboo was raised by the department in the mid 1980s and during later afforestation schemes, and due to lack of maintenance and subsequent silvicultural operation appears congested, meriting proper steps of management. In the recent years ranges in the Sangamner sub-division in Akole tehsil have increased the area under afforestation with Bamboo as a component.

SECTION 3 : SPECIAL OBJECTS OF MANAGEMENT

3. Following are the special objects of bamboo management
 - a. Management of bamboo areas on scientific lines to obtain maximum sustained yield
 - b. To regenerate the bamboo clump naturally
 - c. To develop the bamboo as commercial crop and to meet the demands of local population
 - d. To promote mechanisms of popularizing the Bamboo cultivation and its utility as a source of livelihood amongst the residents of the area.

SECTION 4 :- ANALYSIS AND VALUATION OF THE CROP

4. The bamboo crop in the tract has not been enumerated during the course of enumeration and therefore results are not available. However the areas having good Bamboo growth is principally found in the Sangamner sub-division, in Akole tehsil , the details of which are given below

Forest range	Village	Survey No:	Approx Area (ha)
Akole EGS	Keli-rumhanvadi	8,22	90
	Tahakari	19,8	50
	Muthalne	38,40	50
	Tirade	3	50
	Kombhalne	32	40
	Samsherpur	18,10	50
	Sangvi	23	30
Rajur MAP	Vita	80	60
	Savargaon pat	17	50
	Chinchodi	56	50
	Wanjulsheth	96pt	20
	Pangari	15	50
Akole T	Pisewadi	80,81,82 (compt 147)	50
	Bholewadi		50
	Lahit		50
	Chas		50
	Dhamangaon		50
Total			850 hectares

5. The areas which are being afforested with Bamboo, in the recent years, too shall be worked under the prescriptions of the working circle, as and when they become eligible

for working, necessitating separate estimates to be prepared by the RFO, which shall be given needful sanction by the Division/Sub-divisional officer in-charge of the division.

6. Total Area allotted to this working circle is 854.50 ha only in Sangamner sub-division. A total of 23 compartments comprising of 25 units are proposed for working in this working circle. The list of compartments allotted to this working circle is given in the Annexure XXXVII of the Volume II of the plan. The range wise situation is reflected as under :

s.no	Range	Area of range	# compts		Area allot to WC	% to area of range	% to area of division
			compt	Units			
1	Akole I	9959.40	6	7	292.60	2.93	
2	Akole II	6503.70	10	10	302.30	4.65	
3	Rajur	6841.60	7	8	259.60	3.79	
4	Sangamner I	15466.20	0	0	0		
5	Sangamner II	8281.30	0	0	0		
6	Sangamner III	13107.45	0	0	0		
7	Sangamner sub.division	54808.31	23	25	854.50		1.56
8	Ahmednagar div total	65949.13	0	0	0.00		0
9	Grand total Ahmednagar dn	125903.92	23	25	854.50		0.68

SECTION 5 :- METHOD OF TREATMENT

7. The bamboo clumps require periodic thinning. A cutting cycle of 3 years has been fixed as it has been found that the yield reduces considerably at a short rotation of 2 years. 1st and 2nd year bamboo culms provide food and nourishment to the rhizomes under soil and should not be cut. Only 3rd year culms are fit for harvesting. The sequence of working is represented in Annexure XLI of the Volume II of the plan.

SECTION 6 :- METHOD OF WORKING

8. The following method will be adopted
- (i) Exploitation of existing clumps
 - (ii) Treatment of existing clumps
 - (iii) Enrichment planting of bamboo

EXPLOITATION OF EXISTING CLUMPS:

9. In a clump the following types of culms (green and living) will be retained
- (i) All culms less than year old (Current season)
 - (ii) From the rest culms equal in number to the current seasons (Less than one year old) culms or eight whichever is more.
10. Following culms will be removed from all clumps
- (i) All dead, decayed and dry bamboos
 - (ii) Culms whose half or more top part is broken or damaged
 - (iii) Twisted or malformed culms

- (iv) The remaining culms will be considered available for harvesting. The cutting height of culms will be 15 cm to 45 cm above the ground level i.e. above the first inter node above the ground. The cut shall be slant with a sharp instrument.
- (v) No clump should be considered fit for harvesting unless it contains more than 12 mature culms (One year as well as two year old included)
- (vi) Harvesting of bamboo shall be done in a manner so as to ensure that the retained culms are evenly spaced and that some mature culms i.e. more than two year old are retained on periphery for the purpose of support to the new culms. The culms on the periphery of the clump will not be removed except where absolutely necessary to facilitate working in the interior portion of the clump.
- (vii) The leading exterior culms may not be cut under any circumstance even if they are malformed as their retention is in the interest of outward growth of rhizome and clump and to support new culms.
- (viii) Upon noticing gregarious flowering, measures to harvest such clumps after due approval from the Chief Conservator of forests are to be initiated.

Treatment of Existing Clumps

11. The clump formation at the sites is not proper due to heavy competition and suppression by fast growing hardy species like *Gliricidia*. The following treatment is to be given to the under matured clumps.
 - (i) The inferior species like *Gliricidia* will be cut from the ground within 1 meter from the clump
 - (ii) soil working of clump shaving majority of culms of size below 10 cm girth. this soil working each in first and second year will be done after working the clumps as mentioned in the para above at 8.

ENRICHMENT PLANTING OF BAMBOO

12. The forest areas having vegetative cover density more than 0.4 and the areas of moisture will be taken up for enrichment planting at 6 m x 6 m spacing in 45 cm x 45 cm x 45 cm pits. Bamboos prefer well drained soils though they also occur along nalas, low

level depressions, beds of streams and other moist sites. The 6m x 6m spacing will be maintained even with the existing clumps.

13. Deep planting of plant material prepared from at least 1 year old rhizome is recommended.

SECTION 7 :- NURSERY TECHNIQUE

14. The necessary operation will start two years in advance of the planting operations

(i) Preparation of mother beds :- After thorough cross ploughing the area upto a depth of 30 cm raised beds of size 12.20 m x 1.20 m will be prepared in the month of March – April after allowing the ploughed soil to weather for about a month all clods on beds should be broken properly before sowing.

(ii) Sowing :- As soon as the seed is available in May-June , it should be sown in lines in the bed, lines being 10 cm apart. About 1 kg seed will be required for a bed.

(iii) Germination :- After the rains set in the germination starts within 6 to 7 days and is completed within 3 weeks.

(iv) Transplantation :- As soon as the seedlings are 3 to 5 cm tall, they should be pricked out from the mother beds and transplanted in polythene bags filled with mixture of soil sand and cow dung manure in the ratio of 1:2:1 At least two to three seedlings should be transplanted together in a bag as it helps the early formation of clumps. The mixture in the poly pots should invariably from soil adjacent to bamboo clumps, which contain VAM i.e. Vesicular Arbuscular Mycorrhiza which helps in the healthy growth of rhizome

SECTION 8 : Pre – Monsoon Works

15. The following works will be executed

(i) Digging pits : The pits of size 45 cm x 45 cm x 45 cm should be dug at a spacing of 6m x 6m

(ii) **Refilling of pits**: - After the soil gets sufficient weathering the pits should be refilled with the excavated soil in the month of April. 10% BHC powder (about 5 gram) should be mixed thoroughly in the soil before refilling the pits.

16. **Planting operations**: - After the good monsoon showers are received and the soil gets properly soaked upto a depth of 30 cm the nursery raised bamboo seedlings in polythene bags should be planted. Care should be taken to see that the buds or rhizome do not get hurt while transporting and planting the seedlings. The rhizome portion should only go completely below the ground level. The soil should be packed thoroughly round the plant.
17. **Weeding operations**: - In the first year 3 weeding should be carried out after one month of planting. The second weeding should be carried out after two month of first weeding should be carried out after two month of first weeding i.e. in the month of August –September and the third weeding should be done in the month of November – December. The plant should be clean weeded to a distance of 45 cm all round. Along with third weeding it is necessary to do mulching. The soil should be heaped around the plant at the center.
18. In the second year two weeding should be carried out. The first weeding in the month of July and along with this weeding casualty replacement should also be done. The second weeding should be carried out in the month of October.
19. In the third year only one weeding should be carried out in the month of August.

SECTION 9: OTHER REGULATIONS

20. **FIRE PROTECTION** : Fire cause extensive damage to the new shoots of bamboos and therefore these areas will be completely protected from fire.
21. **Gregarious flowering**: in instances of gregarious flowering immediate verification of the facts, are to be followed up by seeking permission to harvest such gregariously flowered bamboo from the Chief Conservator of forests.
22. **GRAZING CONTROL** :- These areas should be protected from grazing specially in the rainy season in which the recruitment of new culms will take place.

23. NATIONAL BAMBOO MISSION: The Government India is encouraging large scale production of Bamboo all over the country, under the Bamboo national mission. Advantage of the said scheme should be taken, and all the training material, literature pertaining to Bamboo cultivation, rearing, harvest, grading, marketing and utilization should be utilized and disseminated at the village level, so that the district is benefited.

CHAPTER XIV

THE PLANTATION MANAGEMENT (OVERLAPPING) WORKING CIRCLE

SECTION - 1: GENERAL CONSTITUTION

1. This is an overlapping working circle. There are many successful plantations in the division, and plantations done in the division since its inception are covered in this working circle. During previous working plan period many special schemes were implemented and close to 52,000 hectares of plantations were done in the division in the last decade. Normally the plantations are ignored once the period of the scheme is over. Also same planted areas are being taken again for plantation with out objectively judging the reasons for failure of previous plantation. The D.C.F. should verify all old plantation areas, since the first plantation done in the division and ascertain the status of the plantation. The successful plantation should be first be verified by the RFO, cross checked by ACF and reported to the DCF. DCF on verification should ask the RFO and ACF to prepare estimate for further cultural operations in the plantation. The failure of plantations needs critical analysis by the department.
2. The list of old plantations should be prepared by division office. The division office also prepares a list of plantation to be verified every year of the plan period i.e. each year should have Total number of plantations done thus far divided by Plan period (10years). This list should be sent to CCF, Working Plan, and Evaluation offices. These lists should be prepared range wise and sent to respective range officer. The RFO of the range will prepare a status report of each and every plantation in his jurisdiction along with the control form number-3 and submit the report to ACF (critical analysis of success/failure of plantation). The ACF should make field visit and thoroughly investigate the field situation and submit a report to the DCF with reasons for success/failure every year as per allotment. Some of the plantations are already evaluated by Evaluation division, Nashik; these reports should be considered while preparing the critical analysis of the report.
3. The copies of the report should be given to Research & Evaluation division, Working plan division. All these three units i.e. evaluation & research, working plan and field officers should analyze the reasons for success/failure objectively and future remedies

should be suggested from these experiences (learning experience) so that the future efforts will not go waste.

SECTION2: USE OF Geographic Information Systems(GIS) AND SATELLITE TECHNOLOGIES TO MONITOR PLANTATION AREAS:

4. Working plan office is equipped with GIS soft ware. Using satellite images the vegetation maps can be prepared. The vegetation maps indicate the dense, open and blank forest areas. Only the blank areas of the division should be taken for plantation purpose. All divisions are equipped with Global Positioning Systems (GPS) instruments, using GPS, the location of the plantation along with Latitude / Longitudes (northings / eastings) of the corners of the plantation area should be supplied to CF, working plan office every year. To start with last five year locations and as the working plan starts, all areas treated every year should be submitted with map and Lat/Long points of the plantation.
5. The division will order and procure the satellite images of the division for September/October month every year from National Remote Sensing Agency (NRSA), and supply to working plan office for image analysis. The working plan office after image analysis (forest density classification) will superimpose the compartment boundaries and the areas which have been planted (areas as supplied by division office) and give the vegetational change status to CCF(T) and the DCF Ahmednagar with his comments. This exercise can be a very good check on plantation program of the department.
6. Forest department should use Geographic Information Systems (GIS) extensively. The GIS system should find application at Range Office level. It is extremely difficult to physically monitor vegetational changes year after year. Here the GIS can be very handy software to monitor and control ground situations. The GIS and GPS till RFO level will help to do ground truth activity easily. To use GIS system uniformly it is necessary to develop a standard and uniform procedure for whole of the state.

SECTION - 3: GENERAL CHARACTERS OF THE VEGETATION

7. The general characteristics are same as that of the compartments in which the plantations were carried out.

SECTION - 3: SPECIAL OBJECTS OF MANAGEMENT

- i. To improve the growing stock by tending of the existing plantations.
- ii. To meet the local demand of fire wood and small timber to the extent possible.

- iii. To develop a database of all the afforestation works in the division.
- iv. To analyse the reasons for success/failure of the plantations.
- v. To co-ordinate with the Research, Evaluation wing in developing suitable plantation schemes for the district.

SECTION - 4: SILVICULTURAL SYSTEM

- 8. As the object of management is improvement, only climber cutting, tending etc. are proposed to be carried out in successful plantations in this working circle.

SECTION - 5: METHOD OF TREATMENT

- 9. From the list of plantations carried out in the division since division inception, DCF should prepare list of 2000 to 2500 hectares of old plantations and assess first its success or failure. The reasons for their present condition should be analyzed. The verification and assessment will be done by RFO and ACF and reported to DCF. DCF should verify 10% of failure plantations and hundred percent successful plantations, before preparing estimations for cultural operations. The list of all plantations should be circulated to CF working plan and DCF evaluation of the circle. These offices should verify failure plantations at random and hundred percent verification of successful plantations.
- 10. All three wings i.e. field, evaluation and working plan officer shall independently assess these plantations and come together at CF working plan office in the month of December for object analysis of these plantations and make a report to CCF (Territorial) by January 15th every year.
- 11. The quantum of plantations undertaken between 1986 to 94 is indicated below-

Year	Agency	Scheme	Area covered
1986-87	Forest department	RDF, I&C bamboo, W.Ghat Affores for soil conservation	455
1987-88	Forest department	As above	733
1988-89	Forest department	As above	706
1989-90	Forest department	As above	902

1990-91	Forest department	As above	579.50
1988-89	FDCM	Mass affor scheme	1275
1989-90	FDCM	EGS and MAS	648.40
1990-91	FDCM	EGS and Comp Affores	1000
1992-93	FDCM	EGS	1126.31
1993-94	FDCM	EGS	1282

12. The quantum of plantations under different schemes done in the last decade (1992 to 2005) is represented as:

Total area planted	Successful	Partially successful	Failure
50834.23 ha	25336 ha	2245 ha	27581

The data base needs to be perfectly developed in terms of location of compartment number and survey number, keeping in view the large tracts of land repeatedly afforested over the years. The list of plantations done in the district is appended at Annexure XVII of the Volume II of the plan.

13. **Cut Back Operation:** The stumps of illicitly cut tree will be felled in slanting manner by saw. Dressing of the stool will be carried out. The area will be protected from fire.

14. **First Year Operation:** Two vigorous and straight coppices coming from the lower most side will be retained. Other coppices will be cut. Seed sowing will be carried out in the blank areas. Soil and moisture conservation works will also be taken up. Area will be protected from fire.

15. **Second Year Operation:** Singling operation will be carried out and only one vigorous and straight coppice coming from the ground level will be retained and other coppices will be cut. Area will be protected from fire.

16. **Subsidiary Cultural Operation:** All climbers will be cut. If some miscellaneous plants are having multiple leaders only the most vigorous shoots will be retained and others will be cut.

17. Thinning Methods: General considerations: When a plantation is made, silvicultural requirements, particularly, the restoration or creations of a tree cover to the soil. Dictate spacing plan would be adopted if economy is not the immediate cause and number of plants required had alone to be considered. Many of the original number of planted have to be cut out when they are of little of no sale value to permit satisfactory development of those retained. Even so, the number of stems still standing after the first thinning of two, will be far greater than the final number at maturity, and somewhat irregular spacing is relatively unimportant as it can be adjusted in later thinning. The thinning operations should be carried out as prescribed in miscellaneous regulations.

CHAPTER XV

NON TIMBER FOREST PRODUCE(OVERLAPPING)WORKING CIRCLE.

SECTION-1:- GENERAL CONSTITUTION OF WORKING CIRCLE.

1. This overlapping working circle extends over the entire plan area. Currently activity on the NTFP front is low, however the potential and the steps to be initiated have been dwelt in brief, in order to give an impetus to this important sector of forest produce.

SECTION –2 :- NON TIMBER FOREST PRODUCE OF THIS AREA.

2. Timber in general is defined as wood, whose value is mainly on account of its mechanical properties and fuel wood, whose value is only on account of its calorific value. Minor forest produce comprises of all forest products other than timber and fuelwood and include medicinal plants, gums, resins oleoresins, essential oils, fatty oils, edible and wild plants, tanning acids, fodder and forage plants, colouring material, katha, oxalic acids, saponins, insecticides, green manures, beads, rubber plants, plants useful for paper baskets, wicker work including canes, beedi leaf, thatching material, broom material etc. Besides these plant products, animal products such as lac, honey and wild animal extracts like horns, Hoover, ivory, hides, which are now banned from trade, are included amongst minor forest produce or non timber forest produce. These products seem to yield minor income to the department in comparison with timber and fuelwood. Above non timber forest produce with millions of rupees are extracted annually collected / utilized free or at concession rates by local forest dwellers. These products derive meagre revenue to the Forest Department or Government hence is being termed as 'MINOR FOREST PRODUCE'. But these products are procured by local traders from forest dwellers at throw away prices, but in reality crores worth of products are being prepared and marketed every year.

The revenue of state for the year 1996 to 1999 is given below

Year	1996-97	1997-98	1998-99	Average	Percentages
Timber	6646	7802	6714	7054	50.28
Firewood	550	583	472	535	3.81
Bamboo	1556	1651	2001	1736	12.37
Bidi Leaves	4186	3501	3001	3563	25.40
Grass & grazing	62	63	56	60	0.43
Other MFP	228	126	63	139	0.99
Other Receipts	1050	849	935	942	6.71
	14278	14575	13242	14029	100.00

3. The above table shows the contribution of minor forest produce (tendu excluded) to the forest department revenue as 1.43% only. This minor contribution to the state revenue, perhaps forced our predecessors call these forest produce “MINOR FOREST PRODUCE”. Over a period of time a new realization has set in about its immense value and is now appropriately addressed as “NON TIMBER FOREST PRODUCE (NTFP)”.
4. During the survey of non timber forest produce in Ahmednagar district it is observed that Tribal Development Corporation is operating in the Akole Tehsil. Data prior to 1994-95 indicates that the forests of the district yielded NTFP.
5. The NTFP of the area included prior to 1994- Hirda, Tendu Leaves, Apta leaves, Vavding, Kaldol Gum (Sterculia urens), Kadu limb, supli leaves, Karvi, Grass, Bamboo, Agave, Sitaphal fruits, Karanj, which now over the decade has declined. The details of NTFP marketed in recent years is represented as-

Year	Tendu (standard bags)	Grass (tonnes)	Hirda (quintals)	Sitaphal (kilograms)
1994-95	523.995	965.050	500 (Rs700)	6700 (Rs24100)
1995-96	194.202	132.14	2838 (Rs 1.32lak)	5480 (rs16400)
1996-97	468.375	504	98.80 (Rs 1.75 lakh)	9100 (rs45500)
1997-98	-	40	1330 (Rs 8572)	1200(rs30000)
1998-99	-	185	1598 (Rs 10303)	3500(rs89000)
1999-00	354.532	302.50	1630.85 (Rs 25613)	7000(rs78000)
2000-01	499.700	779.00	911.41 ((Rs 4670)	Rs.42200
2001-02	-	-	446.17 (Rs 3009)	-
2002-03	-	170.25	406.12 (Rs 2031)	Rs 5500
2003-04	-	-	406.12 (Rs 2031)	-
2004-05	-	-	406.12 (Rs857)	-
2005-06	-	-	177.93 (Rs890)	-
2006-07	-	-	151.37 (Rs 757)	-
2007-08	425.957	-	260.70	-

Of the above, Hirda fruits are handled exclusively by the Tribal Development Corporation. The purchase value of Hirda is a fluctuating figure.

SECTION - 3:- SPECIAL OBJECTS OF MANAGEMENT

6. The special objects of management of this working circle are as below:
 - a. To generate employment for the Forest Protection Committee members and improve the economic situation of the local rural people.
 - b. To identify and assess different NTFP resources in the division. i.e., girth class wise, beat wise, enumeration of commercially important NTFP species with Medicinal and Gum yielding species like *Anogeissus latifolia*, *Sterculia*

urens, Boswellia serrata, Schleicheria oleosa, Butea monosperma, Commiphora sps etc.

- c. To develop mechanisms to popularize NTFP spread in terms of afforestation, care, non-destructive method of harvest, sustainable use, marketing of the produce in the forests of the division.
 - d. The local people should be taught about the collection/tapping technologies and storing of the collected produce.
7. The department after assessing the NTFP potential of the division, should do market survey and assesses the market and find most competitive price for the produce collected by the local people.

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

8. **The** Parliament has enacted a law “The Provisions of the Panchayat (Extension to the Scheduled Areas) Act, 1996 (Act No.40 of 1996)”. The said Act, provides for endowing by the States, the Panchayats in the Scheduled areas, with such powers and authority as may be necessary to enable them to function as institution of self Govt. It further provided that a State Legislature should ensure inter-alia, that the Panchayats at the appropriate level and the Gram sabhas are endowed specifically with the ownership of minor forest produce.
9. Govt. of Maharashtra has enacted a law “Maharashtra Transfer of Ownership of Minor Forest Produce in the Scheduled Areas Act, 1997 and has amended Maharashtra Minor Forest Produce (Regulation of Trade) Act, 1969 (Act No.45 of 1997)”, vide which ownership of 33 MFP specified in the Schedule, found in the Govt. land has been transferred to the Panchayats. The MFPS included in the Schedule are [1] Mahuwa flower, [2] Mahuwa fruits, [3] Gum, [4] Hirda , [5] Charoli, [6] Awala, [7] Baheda, [8] Neem seeds, [9] Karanj seeds, [10] Amaltas seeds, [11] *Tamarindus indica* , [12] Tamarind seeds, [13] Lac of *Butea monosperma*, [14] Lac of *Schleicheria oleosa* , [15] Seeds of *Jatropha carcus*, [16] Takda/ Pauda *Clerodendron phburidis* , [17] Nirmali/ Kapi, [18] Guggul, [19] Bapchi bee(seed), [20] Kunchala kari, [21] Shikakai, [22] Reetha, [23] Biba, [24] Gunj seed, [25] Broom grass , [26] Mango seed , [27] Wawding, [28] Baphali, [29] Cut Grass and fodder, [30] Honey , [31] Palas leaves, [32] Sitaphal , [33] Cashew nuts .

10. Panchayats are to strictly adhere to the prescriptions contained in the Working Plan with regards to the harvest of minor forest produce. In the areas not covered under the Working Plan the Panchayats are to adhere to the rules made, with regard to the harvesting of minor forest produce, by the conservation of forests of the concerned circle.

11. The Tribal Population in Ahmednagar district is confined mostly to the Akole taluka of the district and the census figures over the years for the district are as under:

	Population in Thousands						
	1981 census		1991 census		2001 census		%
	Total	Tribal	Total	Tribal	Total	Tribal	2001
Maharashtra	62784	5772	78937	7318	96879	8577	8.85
Ahmednagar	2708	188	3373	240	4041	303	7.50

12. The areas which are classified as Tribal Areas are in the Akole tehsil of the Sangamner sub-division. They are a total of 117 villages in the Tribal Sub-Plan the details of which are appended in the Vol II of the plan.

SECTION - 5: - AGENCIES FOR COLLECTION:

13. The *Maharashtra* Tribals' Economic Condition (Improvement) Act, 1976 empowers the state government to enforce monopoly procurement of certain goods including the NTFP in the Tribal Sub-plan Areas. The Maharashtra Tribal Development Corporation (TDC) serves as the Chief Procurement Agent. List of items covered under the monopoly procurement vary. This procurement provision is binding and therefore to be carried out accordingly.

14. The Deputy Conservator of Forests/the Sub-Divisional Forest Officer should take initiative to implement the Amendment 73 in Scheduled areas. During the field study it is observed that awareness levels about the amendment and its benefits are low. Women Self Help Groups (SHGs) should be promoted to collect the NTFP produce

and marketing facility should be provided by the forest department. Bamboo exploitation could be one of the primary activities which could be taken up with sizeable returns. This would avoid exploitation of poor tribal by middle men.

SECTION - 6: METHOD OF TREATMENT

15. The trade of minor forest produce is governed by Minor Forest Produce (Regulation of trade) Act 1969.
16. The trade of *tendu* leaves in particular is governed by Maharashtra Forest Produce (Regulation of *tendu* leaves) Rules 1969. In this regard Ordinance R&D.D. 10 Dec 1997 published in part IV of Maharashtra State Gazette 18 Dec 1997 (pp 682) should be considered by the Forest Officers.
17. Since legal provisions are not very explicit, it is recommended that treatments prescribed in the following paragraphs be modified according to the legal directives issued by the state government from time to time.
18. **Fire Protection measures:** Collection of NTFP is often associated with forest fire, because the villagers set fire around the NTFP-yielding trees for clearance of leaf litter and undergrowth. Fires are also caused by agents of *tendu* contractors to get better flush of *tendu* leaves. If left unattended such fires spread into forests as forest fires.
 - a. The village *panchayats* and JFMCs shall be involved in awareness generation program to control forest fires. Villagers should be encouraged to ensure that such cleaning do not end up as forest fire. In case of forest fire, legal action should be taken against the defaulters. Strict vigilance is necessary during the months of March-April to check the spread of fires in time during *tendu* season.
19. **Documentation of NTFP collection:** The Beat Guards shall send monthly reports to the Range Forest Officer on the quantity of NTFP collected in their beats. The Range Forest Officer shall compile and send the details to the division office. The division office shall compile the figures for each species for the division with a view to monitor their collection and harvest, to sustainable limit.

20. Non-destructive collection of NTFP: Unless detrimental to the wildlife conservation and site conditions, sustainable harvesting of herbs non-destructive removal of flower, fruit and other medicinal parts can be permitted.
21. Compartments having promising regeneration areas of NTFP species shall be identified and tended to remove congestion in the crop. Considering site suitability and local needs; NTFP species like GUM, LAC, BIO FUELS shall be given due importance in various plantation schemes. Except dead, no NTFP tree shall be marked for felling during the coupe working under various working circles.

MANAGEMENT OF *TENDU*:

22. *Tendu* leaves collection is monopoly of the state government under the Maharashtra Forest Produce (Regulation of Trade) Act, 1969. The *tendu* leaf collection shall be carried out in the manner prescribed by the Principal Chief Conservator of Forests from time to time. *Tendu* is not the prominent revenue generating NTFP of this tract.
23. *Tendu* leaves collection is an income generating activity for most local and tribal villages in the region. Measures to increase the proportion of *Tendu* in the Afforestation drives, measures to tend the few trees present in the forests, and outside, should be initiated. The local village communities shall be gainfully engaged in *tendu* collection in the division to support their livelihood. It is proposed to ensure inclusion of *tendu* in significant proportion in mixed plantations prescribed under various area specific working circles.

MYROBALANS:

24. **USE:** These NTFP are used in many ways. *Hirda*, *Beheda* and *Aonla* are most common amongst Myrobalans. These are of high medicinal value and are used in many Ayurvedic medicines. *Hirda* and *Beheda* are given to children in villages invariably for cold, cough and stomach disorder.
25. **YIELD:** So far no study has been conducted to know the yield of fruits for trees of such species.

26. **FORMATION OF UNITS AND COUPES:** The range shall be the unit. Since working is annual and covers the entire area and so unit will also be the coupe.
27. **AGENCY FOR HARVESTING:** As per latest amendment to Panchayati Raj Act, the ownership of the minor forest produces in schedule areas is with gram panchayat. The collection and disposal of that is to be carried out by the gram panchayat as decided by the concerned gram sabha. Hence the collection and disposal of these minor forest produces will be governed by the panchayat concerned. In the non-scheduled areas, for large-scale operation, the units shall be given on lease. The lessee will collect the same as per the direction of the DCF/inde Sub DFO concerned. The lease period should be from 1st July to 30th June. Lease shall be given for one year by calling tender at division or circle level. On failure of tender, departmental harvesting can be thought of, provided marketing tie up is made with user industries.
28. **Market:** All probable industrial consumers shall be identified and quality grades be fixed and department shall act as a facilitator between JFMC and consumer.

GUM

29. The forests of Ahmednagar forest division have sporadic gum yielding trees like *Anogeissus latifolia*(Dhawada), *Boswellia serrata*(Salai), *Sterculia urens*(kadai), *Acacia senegal*(Babul), *Acacia Arabica* (gum arabica) etc. concentrated in patches, details of which find mention in the compartment histories. These are used in medicines, chemicals, cosmetics and food industries. *Salai* gum is mostly used as incense and is said to be used in the Indian medicines for rheumatism and nervous diseases. It has the possibility of becoming an important substitute for imported Canada balsam, used as mounting media in the preparation of microscopic slides. This gum is very similar to turpentine oil. Varnish and paints prepared from it have been found to be suitable. It may also be suitable in the manufacture of elastic adhesive, lacquers, oilcloth compositions, ink and perfumery. *Kulu* gum is the costliest gum and is having export potential. *Dhawada* gum is very good for the preparation of many food items. It is mostly used in the preparation of sweets. So it is in great demand before *Diwali*. *Jaipur*, *Udaipur* and *Jodhpur* are the big markets for consumption.

30. **Regeneration of Gum Yielding Trees:** NR of **gum yielding trees** such as *kulu*, *dhawra* and *salai* shall be provided soil working along with other planted seedlings during coupe operations of area specific working circles.

31. Soil Working of Gum Yielding Trees :

- a. Digging of 30cm deep trench encircling *kulu*, *dhawda* and *salai* trees of diameter matching the tree crown has been found to be useful to regenerate the species from roots; By doing so roots are injured and from which profuse shoots come out. Singling and tending will increase the population of this species. The practice is proposed to regenerate areas deficient of *kulu*, *dhawra* and *salai* in stocking.
- b. *kulu*, *dhawra* and *salai* is prescribed to be included in the list of species prescribed in various area specific working circles.

Yield:

- a. The study of yield of gums has not been done in this tract. The production is low. No scientific method for tapping has been used so far in this area. This is a very potential field of employment generation and revenue earning. Besides, the regulations of the collection are very important from protection of forest from the fire point of view.
- b. The survey done by the Working Plan staff by laying down 400 square metre plots in the compartments gives a general picture of NTFP resource. The DCF should exactly assess the total resource in his division. The resource survey should be girth class wise and beat wise. Each NTFP tree should be numbered and recorded properly by the beat guard. A study should be conducted by the DCF regarding the gum exudation from trees girth class wise and exactly assess the gum potential of the division. The methodology to carryout these activities should be devised by DCF with the approval of the CCF of the circle.
- c. Despite the fact that there is currently less potential to exploit NTFP for gums literature which could have a bearing and of use in the years to come is mentioned in the foregoing paragraphs-

Use Of Ethephone To Increase Exudate Gum Yield:

32. Experimental tapping of gum from *Acacia Senegal* was carried out at Central Arid Zone Research Institute (CAZRI), ICAR India and study of the properties of the gum was made. An important finding of the CAZRI Scientists has been the observation, that gum exudation from most of the trees can be increased (nearly doubled), by injecting two drops or 2ml of the plant hormone ethephone (2- Chloroethyl Phosphonic acid) into the tree.
33. Ethephone, a plant growth regulator has been known to be a precursor of ethylene, which accelerates the ripening of the fruits and increases boll opening in cotton plants. It was for the first time that the CAZRI Scientists have shown its effect on increasing gum yield from trees.
34. While using ethephone injection, it is not necessary to scar the tree trunk and exudation starts due to abscission of cellulose tissues of various sites of the tree. Increase in exudation of gum when ethephone is injected, suggests that the gum is a normal metabolic product in certain plants, which is already present as sap in gum ducts. When cellulose cells are broken due to ethephone, creating abscission of gum ducts at several points, gum ooze out at such points.
35. It has been observed that this method causes minimum injury to the tree and exudation is not confined to a particular site (e.g. place of blazing of the stem) as in the case of conventional method of gum tapping.

Tapping Rules: The rules for tapping, derived by the FRI, *Dehradun*, are as follows:

- a. The tapping season will commence from November to end of May each year. No tree below 90 cm in girth will be tapped.
- b. Tapping will be confined to the main bole of trees between 15 cm from ground level to the point from which first branch is given off.
- c. Only trees above 90 cm in girth at breast height will be tapped.
- d. Each tree will be tapped continuously for 3 years and will be given a rest for 3 years thereafter. The second tapping cycle will begin in the 7th year after the commencement of tapping season and will continue for another period of 3 years.
- e. The initial blaze of 20 cm wide and 30 cm in length or height may be made in the month of November on trees at 15 cm above ground level with a sharp edge having 7.5 cm wide blade. The blaze is made 0.6 cm deep in the bark. **Blaze may be made horizontally leaving approximately equal space**

between the blazes. The blazes should not have any loose fiber. The number of blazes on each tree is represented as under:

S.no	Girth at breast height	Max no of blazes per tree
1	0.9 mt to 1.3mtr	2
2	1.3 mt to 2.0mtr	3
3	2.0 mt to 3.0 mtr	4
4	Over 3 mtr	1 blaze for every 45cms girth in addition to category 3 above.

- f. No fresh blaze will be made on the partially healed up surface or old wounds.
- g. Each blaze will be in a shape of parabola with a 2.5 cm wide base. The curved side of the parabola will be upwards and of height not more than 7.50 cm and the depth of the blaze will not exceed 0.6 cm in the wood.
- h. At the end of the session, the height of the blaze shall not be greater than 12.50 cm. Maximum permissible dimension of each blaze shall be 10 cm x 12.5 cm x 0.6 cm in width, height and depth respectively.
- i. Since the tapping is to be done continuously for three years the total height of the blaze at the end of three years of tapping will be 37.5 cm, the width and depth remaining the same.
- j. In the second cycle i.e. in the 7th year (after three years rest) new blazes will be made in the same way in the unblazed portion, in between the blazed portions of the first cycle. This blazing will continue for another three years in the manner described above and the operation will be repeated till unblazed portion is fully covered.

Grading: The collected gum is graded into three classes:

- i) **White**
- ii) **Yellowish**
- iii) **Black coloured.**

36. White coloured gum fetches higher price in the market compared to yellowish and black gum. Yellowish gum fetches less price as compared to white one. Black gum

fetches the lowest price. When gum is collected it is a mixture of all the three grades. By grading the gum the trader is able to assess correctly and offers correct price. So skill for grading be provided to the people by organizing training to the gum collectors.

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

Formation Of Units And Coupes: Range is the unit. Each unit is generally divided into three annual coupes. The working cycle will be of three years.

38. **Agency:** As per latest amendment to *Panchayat Raj* Act, the ownership of the minor forest produces in schedule areas is with gram *panchayat*. The collection and disposal of that is to be carried out by the gram *panchayat* as decided by the concerned gram sabha. Hence the collection and disposal of these minor forest produces will be governed by the *panchayat* concerned. In the non-scheduled areas, for large-scale operation, collection may be done either by FLCS or other agency under terms and conditions as decided by the Government.

39. **Market:** There is monopoly purchase by TDC under the provisions of Monopoly Act. Besides, the export of raw or finished goods shall be explored. The dhawada gum has been accorded GRAS(Generally Regarded As Safe) status by Food and Drug Administration of USA. The status for this gum has provided immense market in western world. These markets should be explored by the forest department for obtaining better price to the gum. Dhawada gum is an exclusive product of India and Sri Lanka.

Other Regulations:

- i) The compartment wise list of such trees shall be prepared and maintained at beat, round and range levels.
- ii) Cleaning around the trees to facilitate gum collection and to avoid fire, shall be done.
- iii) Gum producing trees shall be reserved from felling.
- iv) A strict watch is necessary to enforce tapping rules and check unauthorized collection of gum and tapping during the period of rest. the blaze should be slightly slopping outwards to avoid lodging of guggul in the blazed pocket in case initial blazing is done by edge.

- vii) The *guggul* starts oozing out soon after blazes are made and may be collected initially after a month i.e. by about December when the blazes may also be freshened. Subsequent collections and freshening may be done at fortnightly up to May. Thus 12 freshenings may be required to be made during the year.
- viii) In each freshening, the lower surface is not to be freshened. The edges may be scraped so that only 3.8 cm is increased on either side in width at the end of 12th freshening. This means that about 0.3 cm should be scraped off either side in width in each freshening.
- ix) The lowest row of blazes will be at one metre above the ground level. The next row of blazes will be made at the height of 60 cm from the lower i.e. at a total height of 1.6 metre from the ground level. The vertical portion of the blaze of upper row will alternate with similar portion of the row and no two blazes of the two rows will be directly one above the other.
- x) The number of blazes to be made on each tree will depend on its girth at breast height as given below:

LAC:

- 40. The Local populace comprising of tribals/ villagers collect lac from palas, bor, pimpal, khair trees and also from Kusum trees which are found in small patches. Rangeeni lac and kusum lac is collected by the local villagers and is sold to middlemen. Lac insect is present in the division and the cultivation of lac scientifically as taught by Indian Lac Research Institute, Ranchi, should be practiced in the division.
- 41. Lac insect *Kerria lacca* produces three products of great commercial importance. These are resin, dye and wax. Lac resin due to its adhesive, surface coating and insulating properties has the potential of widespread applications in different types of industries. Lac dye has brilliance and fastness for dyeing of wool, silk and cotton. Lac wax is a substitute for imported carnauba wax.
- 42. The exact number of Kusum, bor, pimpal, khair, and palas girth class wise and beat wise should be done to know the exact potential of the division for lac cultivation. Lac is mostly cultivated by economically weak section of people, mostly tribals, on lac host trees scattered over wide areas. The Lac insect is a soft bodied tiny insect belonging to Coccid group of order Homoptera. Two genera and 19 species of lac

insects have been observed in India and most common Indian lac insect of commercial importance is *Kerria lacca* Kerr. Rangeeni and Kusmi are two strains of this insect. Each of these, produce two crops in a year (bi-voltine). Kusmi insect grows well mainly on Kusum (*Schleichera oleosa*) and also on a few other trees but not on Palas (*Butea monosperma*), whereas Rangeeni strain grows well mainly on palas and also on few other trees but not on Kusum. The rangeeni insect matures once in Oct-Nov and there after in June-July, Whereas Kusmi matures in Jan-Feb and then in June-July. Kusum lac is having beautiful light colour, good life and better flow, superior any other lac, hence kusum commands higher market price compared to Rangeeni lac. But palas trees are widely prevalent in this country and Kusum is scarcely populated in the jungles hence out of total lac produced in this country Rangeeni lac comprises of 80 to 85% and Kusum lac contribution is about 15 to 20%.

43. LAC ECONOMICS: *The Assistant Project Officer (APO) of Utnoor Tribal Project, Adilabad, from the neighbouring state of Andhra Pradesh states economics of lac cultivation which is interesting,*

- FROM 10 LAKH PALAS TREES.
- EACH PALAS TREE YIELDS 2KGS OF RANGEENI LAC.
- FROM 10 LAKH TREES 20 LAKH KILOS OF RANGEENI LAC IS OBTAINED.
- PRICE OF 1KG LAC (min) IS RS 40/-
- HENCE 10 LAKH TREES YIELD EIGHT CRORE RUPEES.
- **TWO CROPS CAN BE TAKEN IN A YEAR THAT IS 16 CRORES.**

44. The above economics are very interesting figures, Utnoor Tribal Project of Adilabad district started lac cultivation only four years ago and today is a big lac cultivating center, attracting lac purchasers from all over the country. Same is also seen in Seoni district of Madhya Pradesh, at Purulia of West Bengal. Though it is a difficult task, a concerted effort from forest department can make this a reality. Ahmednagar would present at the outset an image that this could not be possible, but it is sincerely opined after gaining first hand knowledge of the interest of the villagers and their initiatives in the field of dairy, water conservation and management, that such eco-friendly and remunerative rural based industry coupled with the proximity to Pune and Mumbai, offer an opportunity of making forest-people initiatives through participatory management.

45. Training of local villagers about lac cultivation: The villagers should be trained about lac cultivation by inviting experts from Indian Lac Research Institute(ILRI), Ranchi. The people should also be taught about the storage and processing of lac, which will increase the market value substantially. The forest department should also conduct market survey of lac, both domestic and international so that the product can fetch better price to the villagers.

MOHA:

46. **Moha collection:** *Moha* trees present more towards the Western borders of the district are in low numbers. Natural Regeneration of *moha* shall be encouraged by dibbling of *moha* seeds in the plantations and by carrying out weeding and soil working along with other planted seedlings during coupe operations of area specific working circles.
47. **Soil working of Moha trees:** Digging of 30cm deep trench encircling *moha* trees of diameter matching the tree crown has been found useful to regenerate the species from root suckers; By doing so roots are injured and from which profuse shoots come out. Singling and tending will increase the population of this species. The practice is proposed to regenerate areas deficient of *moha* in stocking.
48. *Moha* is prescribed to be included in the list of species prescribed in various area specific working circles.
49. **Moha Flower:** *Moha* flower is a rich source of sugar, vitamins and calcium. The flower, in its ripe form, has almost 73% sugar and is, therefore, even a better medium for fermentation than grapes. *Moha* flower is eaten raw or cooked. This is eaten also after frying or baking into cakes. More usually, the corolla tubes, after removing the stamens, are boiled for about 6 hours and left to simmer until water evaporates completely. The odour disappears as a result of cooking and the material becomes soft and jelly like. It is eaten with rice, tamarind, grains or other food or as sweetmeat. Dried *moha* flower is also boiled with rice and mixed with wheat flour and this provides a wholesome food. After drying, it becomes valuable food additive to diet. *Moha* flower is largely used in the preparation of distilled liquor also. This

liquor is actually the beer of India having strong smoky fetid odour, which disappears on aging. It is reported to excite gastric irritation and produce other adverse effects. Redistilled and carefully prepared liquor is good quality without having adverse effects and closely resembles to Irish Whisky. The corollas were in the past, exported, to France for distillation of cheap brandy.

50. *Moha* spirit prepared by distillation of liquid containing fermented *moha* flowers is the most important alcoholic drink in many of the areas. It makes a potent drink and efforts are required to be made to refine it in modern distilleries. The flower is also used for the preparation of certain kinds of non-alcoholic food drink by some tribes. The flower is also used for the preparation of vinegar. *Moha* having appreciable proteins and vitamins has valuable nutrition content.
51. Syrup of good quality is prepared from the corollas by extraction with hot water clarification with activated charcoal and evaporation under vacuum. The syrup with very high sugar content (61%) has a golden yellow colour with the odour of fresh flower. It is a substitute for honey. Apart from human consumption, *moha* flower offers an excellent food to the livestock and wild animals as well.
52. Nutrition analysis of flower showed digestible crude protein 3.08 %, total digestible nutrients 73.7% and starch equivalent to 53.1 %. The flesh of animals particularly of pigs, fed on *moha* flowers, acquires a delicate flavour.
53. *Moha* Fruit:
54. **Use And Nutritive Value:** A ripe fruit has cream coloured epicarp, which is edible. *Moha* berries were eaten raw or cooked. Cattle, sheep, goats, monkey and parrots also eat them. They have medicinal value as well. Fruit fallen on the ground are easily attacked by insects and ants thus becomes unfit for human consumption.
55. The *moha* seed oil. A thick oil light yellow in colour and extracted from the seeds, is used by forest tribes for cooking purpose, as an illuminance and hair oil. It is also used in the manufacture of soaps, particularly, laundry chips. In many areas it is also used as an adulterant for 'Ghee' for which it is clarified with butter mark to mask the disagreeable colour. The oil finds use in medicines also.
56. Crude oil has a deep colour, high acidity, unpleasant odour and bitter test. Refining and hydrogenation yield product similar to mutton tallow or cocoa butters. Oil having acid value below 13 may be refined by treatment with caustic soda and that with higher acid value is extracted with alcohol and further treatment with alkali. Refined oil finds use in the manufacture of lubricating grease and fatty alcohol. The oil is also used for candles, as batching oil in Jute Industry and as a raw material for the production of stearic acid.

57. The yield of oil from the seeds depends on the efficiency of the equipment employed for crushing them. It is 20-30% of the weight of the kernels when crushed in 'ghanis', 34-37% in expellers and 40-48% when extracted by solvents.

58. *Moha* oil shall have a set of characteristics. For this purpose ISI standards have been prescribed which are as below:

Moha Oil Properties

Sr. No.	Characteristics	Grade		
		I	II	III
1.	Moisture and insoluble impurities% by mass max.	0.10	0.25	0.50
2.	Color in a ¼ in a cell on the Loviband scale expressed are Y + 5R not deeper than.	0.20	30	50
3.	Refractive index at 40°C	1.459	to	1.460
4.	Sp.gravity at 90°F /30°C	0.862	to	0.875
3.	Saponification value	187	to	196
6.	Iodine value	58	to	70
7.	Unsaponification matter % by mass	2.0	3	3.0
8.	Acid value max	0.5	20.0	>20

59. **Yield:** *Moha* trees starts bearing flowers and fruits between 10th to 15th years of planting. A study with reference to the yield of *moha* flowers and fruits has been conducted by the MVSS, Chandrapur in comptt.No.195 in Tadgaon Range of Bhamragarh Forest Division in the year 1992. The trees of different shapes and girths were selected for the purpose of this study Results obtained are as below:

Yield Of Moha Flower And Fruits

Weight in Kg.			
Sr. No.	G. B. H. in Cm	Flower	Seed
1.	076 – 090	06.00	1.20
2.	091 - 105	10.00	1.00
3.	106 - 120	11.25	2.00
4.	136 - 150	13.30	2.75
3.	151 - 175	13.00	3.80
6.	176 - 190	13.00	4.00
7.	206 – 220	20.00	4.30
	Average	12.94	2.72

(Note: As year 1992 was not a good seed year, the average obtained above is on lower side.)

60. The rates of royalty in Rs/Qtl. Of Moha flower and seed as decided by the T.D.C in Jalgaon district for the years, 95-96 to 1999-2000 is Rs.3/quintal which is indicative of the extent of scope available.

61. Formation Of Units And Coupes:

62. The range shall be the unit of working for the purpose of this working circle. Since operation is to be carried annually throughout the area and so the unit will be the coupe in this case.

63. The collection of *moha* flowers and seeds is presently being done by individuals. Normally they confine themselves around their village only to collect *moha* flower and seeds. As per latest Amendment to *Panchayati Raj* Act, the ownership of the minor forest produce in schedule areas is vested with of gram *panchayat*. The collection and disposal of produce is to be carried out by the gram *panchayat* as decided by the concerned *gram sabha*. Most of the tract is under schedule areas. Hence the collection and disposal of these minor forest produces will be governed by the *panchayat* concerned. In the non-scheduled areas, for large-scale operation, collection may be done either by FLCS or any other agency under terms and conditions as decided by the Government.

64. **Market:** Moha flower and seed come under Monopoly Act and so the collection of *moha* flower and seed is carried out by people and purchased by the TDC. If TDC is not operating in the division the forest department should take initiative to search the market all over the country and the trader who offers maximum price should be given the Transit Pass. This exercise is necessary by forest department because the price given to the produce should be uniform all over the division.

65. Other Regulations:

- a. Compartment wise list of Moha trees shall be prepared and maintained at beat, round and range levels.
- b. One of the important reasons of forest fire is the burning of leaf litter on ground under Moha trees by the people to collect *moha* flower. Therefore, before the start of flower falling, the ground under the *moha* tree crown shall be cleaned with the cooperation of villagers and *chaukidars*. This may be treated, as one of the most important duties of the Beat Guard, failure in it and occurrence of fire shall be viewed seriously.
- c. The measures for enhancing the production and productivity by local means shall be explored and taken up.

BIOFUEL PLANTS:

66. **Jatropha seeds (Jatropha curcas)** :- This seed is in demand for its oil. The oil can also be used as biofuel and can supplement our depleting petroleum resources. The plant can be raised from cuttings or by dibbling seeds and forms a very good live hedge. It should be planted on CCTs, to stabilize nallah bunds, T.C.M.s and also other boundaries, fencings etc.
67. **Karanj(Pongamia pinnata):** - This seed oil can also be used as biofuel and the oil can also be used for arthritis cure. The seed is also used for Brochoitis cure, The seed of this plant should be sown on CCTs, TCM and seedlings should also be raised to plant in plantations. Plus trees of Karanj should be identified, trees which yield 10 to 15 kgs of seed per square meter of crown area should be identified as plus trees, and cleft grafting should be done for faster and better yield of karanj seed.
68. Also Neem, Moha seed also has oil content which can be used as biofuel. For lower end machines like diesel pump and diesel generator, expel the oil in a regular oil expeller, fine filter the oil and can be used directly in these diesel machines. It can also be blended with diesel to an extent of 10 to 15% and run the diesel vehicles.
69. The bio fuels have more viscosity compared to diesel. Hence a process called 'Trans-esterification' a simple chemical process would reduce the viscosity of biofuels. These technologies are available with Punjabrao Krishi Vidya peeth, Akola and Vishveshwarayya National Institute of Technology (formerly Regional Engineering College,REC), Nagpur(VIT). Forest Department should take initiative to first asses the resource i.e. number of Karanj, moha, neem trees in each and every beat (both forest and non forest land) and start collecting the seed for making biofuels.
70. During agricultural exhibitions diesel pumps running on biofuels should be demonstrated to the farmers to make common man aware of biofuel and popularize the biofuel.

OTHER NON TIMBER FOREST PRODUCE WITH POTENTIAL IN THE DIVISION

71. **Apta leaves (Bauhinia racemosa)** :- These leaves are also used for making beedis .The trade is by and large confined to Gujarat state. The divisions in the Western Ghat region have auctions on lines of Tendu each year, but the trade is on the decline, with reduction in the number of Apta trees in the natural habitat, and less emphasis on planting the same in the afforestation drives.The Apta seedlings should be planted in plantation areas to increase their relative proportion.

72. Awla fruits (*Emblica officinalis*): - These fruits are eaten raw and in pickled form.

Being one of the richest sources of vitamin 'C' it also forms part of the ayurvedic system of medicine. It is one of the three ingredients of "Triphala", an important ayurvedic preparation. This species does well in afforestation areas, even in dry zones and should be made part of the plantation programme all over the area.

73. Agave leaves (*Agave sisilana*, *Agave americana*) :- Agave leaves have demand

because of its fibres. It is a good live-hedge and should be planted on the TCM and nallah bunds. However decline in trade and migration of the local community handling this trade earlier to greener pastures has left the earlier plantations raised ineffective.

74. Tarwad bark (*Cassia auriculata*) :- This shrub grows all over in open exposed forests especially in dry areas. It has demand in tanning industry. Production can be increased by broadcasting seed on T.C.M. nallah bunds, and spaces between the trenches in afforestation works.

75. Khair wood (*katha*) (*Acacia catechu*) :- Khair has great demand in Katha industry. However there is a marked depletion of the stock of these trees and it needs to be built up by taking up plantations of this species in suitable areas and making this species a must in regular afforestation programmes. Besides katha this tree also exudates gum and is also a good lac insect host plant.

76. Rosha grass (*Cymbopogon martinii*) :- This grass has demand due to its essential oil, which is of medicinal importance. It can be introduced in the afforestation areas between the trenches by dibbling of seed wherever there is demand.

77. Tarota seed (*Cassia tora*) :- The seed has demand as it is used in some beverages and cattle feed. The plant comes up naturally in blank areas. However its proportion can be increased by dibbling seed in blanks with shallow soil.

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

midst of forests. The processing and marketing can be managed by forming co-operatives.

79. **Safed Musali (*Chlorophytum tuberosum*)** :- It is a herb with tuberous roots. The tubers are used as tonic and is of great medicinal importance. It is collected and sold by the tribals at the rate of 400-500 Rs. Per kg. to the traders. Its indiscriminate removal needs to be controlled and regularized.

80. **Ghat bor fruits (*Zizyphus xylopyra*)** :-The fruits are in demand for tanning industry. The plants can be raised by dibbling seeds on the plantation T.C.M.s and also in 'Protection Working Circle' areas, where the slopes are steep. This tree is also a good host for lac insect and can be developed for lac cultivation.

81. **Lakshmi Taru/ Paradise tree (*Simarouba glauca*)**: the trees having multipurpose, capable of coming up in rainfall ranges of 250-4000mm, with temperature endurance upto 50 degree C, has spread to greater tracts in Peninsular India. Economic exploitation starts from 6 to 10 years of plantation, the seeds Oil is a source of vanaspati, vegetable oil, Biofuel, Soaps etc., and the Oil cake has use as organic manure. The Shells find use in Particle boards, Activated charcoal, fuel, the Fruit pulp has use as an excellent beverage; the bark and leaf purportedly have medicinal properties against dysentery etc., the wood finds use in manufacture of toys, match industry, quality furniture, paper making and fuel. Well maintained plantations are capable of yielding 7.5 tonnes seed per hectare. A 10 year old plantation with productivity period of 60 years is projected to yield Oil (1000-2000kg/ha), Oil cake (1000-2000 kg/ha), fruit pulp (6000-8000kg/ha) and leaf litter (6000-8000kg/ha).

SECTION 7: CONSERVATION OF MEDICINAL PLANTS .

82. Many valuable species of medicinal plants grow and can be grown through afforestation in this tract. The following measures should be adopted for the conservation of medicinal plants in the tract :

- Forest Protection Committees/ JFM committees should be entrusted with the responsibility of protecting patches rich in medicinal plants from biotic interference.
- Training programmes should be organized at regular intervals to familiarize members of FPCs /JFMCs with the medicinal plants, their sustainable management, non-destructive harvest and utility in treating various diseases.

- The FPCs/JFMCs should be encouraged to prepare an exhaustive inventory of medicinal plants in their territory.
- Efforts should be made to artificially propagate those species of rare medicinal plants categorized as “endangered”, “vulnerable” or “near-threatened”.
- Conservation of Medicinal plants could be popularized by concepts of Charak Van, Dasha Moola van, etc.,

SECTION 8: RESEARCH WORKS:

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

SECTION :9. OTHER IMPORTANT PRINCIPLES AND PROCEDURES:

84. The following are important principles and procedures:
- a. The annual estimates for collection of Non Timber Forest Produce and Medicinal Plants shall be made based upon the experience.
 - b. The annual estimates for collection of NTFP shall be approved by the Chief Conservator of Forests.
 - c. The Range Forest Officer for the respective range shall issue the passes for collection of NTFP to the lessees and keep record of the collection etc.
 - d. The Non Timber Forest Produce and Medicinal Plants lease units shall have distinct boundaries.
 - e. NTFP collection estimates shall be based upon the inventories of forest resources.
 - f. Scheme shall be formulated for improving yield of Non Timber Forest Produce and Medicinal Plants e.g. plantations, protection against disease etc.
 - g. Measures shall be taken to maintain and improve the present output of the Non Timber Forest Produce and Medicinal Plants.

CHAPTER XVI
JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

SECTION: 1: INTRODUCTION:

1. National Forest Policy 1988 envisages the importance of involvement of local people in the protection of forests. It also emphasizes the importance of traditional rights of forest dwellers. Priority for the use of forest produce is given to forest dwellers and the use of forests for industrial purpose is discouraged.
2. As a follow up action on this new forest policy, and the encouraging experiences from West Bengal in J.F.M., the Government of India issued a set of J.F.M., guidelines in 1990 encouraging forest departments to involve local people in the management of the forests. Over the past 9 years, most of the states have issued their own guidelines. Maharashtra Government has also issued the guidelines and passed Government Resolution no SLF-1091/CASE NO 119/91/F-11 to the effect on 16th March 1992, the JFM activity was adopted for degraded forest area of the state and new guidelines have been issued vide GR No. MSC/2000/C.No. 143/F-2, dated 25.4.03.
3. Villagers themselves are required to voluntarily participate in the programme. Forest protection committee (FPC) is to be formed in each village. The members of the committee will help in protection and development of forests and they will receive in turn a share in the usufructs and output from the forest areas assigned to such committee. The JFM area will be managed according to the micro-plans prepared jointly by the Deputy Conservator of Forests and members of the FPC. These micro-plans shall contain the details of forest and village development. This has to be sustainable, should cater to aspirations of local communities and at the same time the silvicultural requirements of the forests are to be met properly.
4. Later, the government of India advised the state governments to take up the Joint Forest Management in well stocked forest areas on experimental basis and accordingly guidelines dated 25.4.03 cited above have authorized the forest department in the state in this respect. Summary of guidelines is as follows
5. Good forests within 2 km from a village are to be covered under the programme on experimental basis and stage by stage other villages containing good forests are to be brought under it.

6. JFM is to be implemented with the help of gram *panchayat* and forest produce available is to be provided on priority to meet bonafide local needs.
7. The village having non-forest land, which has agreed to participate in the programme, may be brought under the scheme.
8. Help of the institutions of local self-govt., NGO, environmental The scheme though does not intend to facilitate agriculture based professions but non-irrigated horticulture schemes in (private) wastelands may be encouraged if approved in the micro-plan. expert, if any available locally, may be solicited.
9. The scheme though does not intend to facilitate agriculture based professions but non-irrigated horticulture schemes in (private) wastelands may be encouraged if approved in the micro-plan.
10. The program underlines conservation of forests and wildlife and therefore any activity/agreements etc. that is not consistent with Forest Conservation Act, 1980 should not be incorporated in the micro-plan.

SECTION: 2: GENERAL CONSTITUTION:

11. It shall be an overlapping working circle. Joint Forest Management may be taken up in any village if the forests belong to the category as defined in the Government of Maharashtra Resolution dated 16th March 1992.
12. However with a view to afforest the degraded and denuded forests of Ahmednagar Division and to improve some of the understocked areas closer the villages efforts shall be made to motivate the villagers to take up JFM in these villages.
13. Ahmednagar district has always been in the forefront in the domain of participatory management and has given the country illustrious persona who by their dynamic leadership and vision gave the country further insights in formulating strategies for rural development.
14. The district boasts of being host to illustrious persona including Sh. Annasaheb Hazare of Ralegaon-Shinde, Sh. Popatrao Pawar of Hivre-Bazaar, and the villagers of Dorje(Shrigonda) , Gardani (Akole), Dolasne(Sangamner), Daraewadi(Sangamner), who have participated for the overall development of the villages. Institutions such as

the WOTR(Watershed Organisation Trust) , set up under Indo-German Watershed Development project, NABARD, and the Indian Military (Chichonde-Patil village) provided the needed support.

15. The progress of formation of VFC/FPC in the district is shown below: the details of area under JFM is represented under Annexure XLV of the Volume II of the plan.

Total villages in district	Villages with forests	Villages with FPCs formed and registered	Remarks
1581	593	378	In Villages with forest less than 20ha FPC not formed

16. A micro plan of a village where the degraded forest area is falling shall be considered. The ACF and RFO shall prepare a detailed micro plan of the village after conducting a PRA exercise as per G.R. Dated 16-3-1992.
17. In tune with the directives all the villages of the district having forest area shall form Forest Protection Committees, which shall be gradually enveloped under the broad umbrella of JFM programme and the FDA and related schemes of the Government. The micro-plans prepared for the villages, shall incorporate the broad guidelines of the Working plan prepared for the district.

SECTION: 3: SPECIAL OBJECTS OF MANAGEMENT:

18. The special objects of management are as follows

- Reforestation of degraded forests with the participation of villages.
- Plantation and its protection with the help of forest protection committee.
- To let avail usufructs derived from such afforestation to the villagers.
- To create awareness about importance of forest amongst the people.
- To increase vegetal cover and check soil erosion.

- f) To bring about soil and moisture conservation and utilize the land for the productive purpose according to its capability.
- g) To bring about the integrated development of the adjoining villages with help of all other development agencies.
- h) Provide incentive and appreciation to villagers by consideration in the awards and rewards announced by the Government..

SECTION: 4: IMPLEMENTATION:

19. Implementation of the prescriptions under this working circle are totally dependent on the willingness of the villagers, neither the compartments are allotted nor the felling series are formed. But if some villagers do not show interest, the areas of those villages shall be tackled under the concerned working circle. Any other village may be tackled under J.F.M., from any range and any working circles if the DCF deems them fit. The micro plan prepared under the overall frame work of the respective working circle of the working plan for that village shall supersede the working plan so far as that village is concerned. This shall not be considered as a deviation from the working plan prescription.

SECTION: 5: THE PRINCIPLES:

20. Following principles should be adhered to during the implementation of J.F.M. in any village.

1. Eco system Protection
2. Participatory, Democratic structure.
3. Open Communication.
4. Management of Responsibility and Benefit sharing in Relation to Traditional usage.
5. Gender Equity.
6. Community Responsibility.
7. Effective Conflict Resolution.
8. Traditional Rights and use.
9. Discrete Jurisdiction and Explicit Agreements and last but not the least.
10. Effective Monitoring and Advocacy

SECTION: 6: METHOD OF TREATMENT:

21. The areas shall be treated according to the J.F.M. Plan for the village to be prepared in consultation with the villagers as per the guidelines issued by the government vide G.R. No SLP/1091/C.N. 119/F-11, Mantralaya, Bombay dated 16th March 1992. Similarly, the guide lines issued by the central government in this connection vide its letter No 6-21/89, F.P. dated 01-06-1990 shall be considered. The Forest Development Agency (FDA) project sponsored by, Ministry of Environment and Forests, Government of India, is a wonderful opportunity for forest department for J.F.M implementation. This project gives lot of flexibility to plan as per local demands. The entry point activity provision helps in developing relationships with the villagers.
22. The entry point activity should enable the villagers to gain self sufficiency and earn profit for the FPC which could be invested for the development of the village. Traditional activities rest on provision of Tents, Cooking Utensils, construction of halls etc., new impetus to activity such as investment with savings/contribution of the Village members in the Village Revolving fund towards installation of Gasifiers (electric generating), processing units for dairy, agriculture can be thought of.
23. Micro plans to be prepared should be broadly based on the prescriptions given for the areas under consideration. Micro plan duly sanctioned by competent authority will not be considered as deviation to this plan prescriptions. The following activities should be tried out in villages as per local situation
 - a. Conducting Medical Camps with local Medical Authorities/ NGO's like Rotary/Lions clubs or Indian Medical Associations of the district. Medicines may be supplied free to the villagers from entry point activities.
 - b. Focus on Economic improvement activities like implementation of Amendment 73. The earmarked NTFP products in JFM/ scheduled areas should be implemented. The awareness to this amendment is not seen in the villages. The local authorities should take initiative, conduct meetings in the villages and self help groups should be formed. The collection of NTFP like gums, lac moha flowers, honey, Natural dyes (palas flowers, bixa, dhawada sal etc) should be done by SHG's and the marketing should be done by forest department by contacting traders all over the country. Who ever offers best price to the NTFP the Transit Pass should be issued. The departmental intervention is essential in the beginning, so that the villager is not cheated by the middle men. Once the awareness has set in the villages the department can become a silent regulator.

- c. Electrify to villages with generators running on biofuels like Karanj seed oil, Jatropha oil, Moha, Neem oil. The oil expelling facilities should be provided at a prominent place in the division. Even esterification facilities should also be made available near the oil expeller for effective use of bio fuels.
- d. Regular training programs to the villagers regarding scientific lac cultivation(Indian Lac Research Institute ILRI, Ranchi), GUM grading techniques/ spray drying techniques for removing impurities in gum so that the villager can get better price for the NTFP collected.
- e. NTFP theme plantations, like GUM yielding species plantations (Dhawada, Salai, Khair, Hiwar, Movai Babul etc), Lac insect host plant plantations(Kusum, Palas, khair, bor, rain tree, acacia auriculiformis, Pimpal etc), Bio fuel plant plantations(Karanj, Neem, Moha, jatropha, palas etc) should be taken around the JFM villages in consultation with the villagers. The program underlines conservation of forests and wildlife and therefore any activity/agreements etc. that is not consistent with Forest Conservation Act, 1980 should not be incorporated in the micro-plan.

SECTION 7: HUMAN RESOURCE DEVELOPMENT:

- 24. The concept of Joint Forest Management (JFM) requires proper training, both among forest personnel and among villagers. The concept should be thoroughly appreciated first among forest staff, particularly among forest guards, Range officers and Range Forest Officers, who are the real implementing officers in the field. Hence there should be regular training sessions to these staff members. Senior officers and sincere NGO's should be called to train the staff. Developing such strong commitment among field officers is important for proper implementation and success of Joint Forest Management.
- 25. Conducting meetings regular and repeatedly among villagers to impress among them the concept of joint forest management is very important. There are lot of success stories within the circle and state. People from such villages should be called to address these villagers to realise the importance of Joint Forest Management. Getting close to the villagers by conducting programs like medical camps, creating women self help groups, training village youth for generating income and making self sufficient is an important activity of JFM. The non timber forest produce like grasses, gums, biofuels, lac cultivation, natural dyes, honey etc from forest should be sustainably exploited for creating income generation among village youth and women. Such income benefits to the villagers from forests will create a sense of belonging towards the forest resource

and will result in forest protection and subsequent development of forest. Making villagers aware that they are stake holders in forest resource by generating income from forest resource i.e 33 NTFP items earmarked for gram panchayats by JFM GR. Forest department should provide technologies to utilize the forest resource by use of non-destructive methods, and and facilitate marketing the produce so that the poor villagers are not exploited by middle men. Once such income benefits starts flowing to the villagers and realization of the value of NTFP from forest among villagers will make them protect the forest around their village on their own, is key to success of joint forest management.

CHAPTER XVII

WILD LIFE MANAGEMENT (OVER LAPPING) WORKING CIRCLE

SECTION: 1: GENERAL CONSTITUTION:

1. This is an overlapping working circle and it extends over entire geographical area of Ahmednagar forest and Sangamner forest sub-division in the district of Ahmednagar comprising of fourteen tehsils, namely, Akole, Sangamner, Shrirampur, Rahata, Kopargaon, Rahuri, Newasa, Shevgaon, Pathardi, Parner, Shrigonda, Karjat, Jamkhed and Nagar. The Deputy Conservator of Forests, Ahmednagar Forest Division stationed at Ahmednagar is the ex-officio Deputy Chief Wild life Warden who is responsible for protection, conservation and development of wildlife in the division. The Assistant Conservator of forests, Sangamner, shall upon functioning of the Sangamner sub-division, from the date to be decided after creation of facility, continue to function as the Deputy Chief Wildlife Warden for Sangamner sub-division, comprising of Akole and Sangamner tehsils of Ahmednagar district. Till such date, the Assistant Chief Wild life warden and other staff assist the DCF Ahmednagar for the areas under his administration.

2. The tract dealt with was fairly rich in the number and variety of Wild life. Ahmednagar district by virtue of having a large geographical area spreading from the Western Ghats to the drier drought affected areas, by virtue of the diversity in climate and vegetation supports varied wildlife. Areas supporting wildlife have been identified over the years, notified as 'Protected Areas', management plans prepared for conservation of the wildlife therein, placed under administration of Wildlife Wing for the purpose. Ecological changes coupled with greater protection to the fauna with the implementation of the Wildlife Protection (Conservation) Act 1992, has led to an increase in Man-Animal conflict in specific areas of the division, necessitating measures to manage Wildlife.

3. The Protected Areas though have legally defined boundaries, have no clearly established Ecological boundaries, with the faunal populations including reptiles, mammals, avifauna venturing outside the legal limits into adjoining areas for foraging and breeding, thereby establishing the importance and need to evolve a proper approach in their management. The Protected Area network in the Ahmednagar district is represented as under:

Name of Protected Area	Notified Area	Talukas	Forest Area	Managed By
Jaikwadi bird sanctuary	34105 ha	Newasa, Shevgaon	Nil	DCF wl Aurangabad
Kalsubai-Harishchandragad wildlife sanctuary.	29909 ha	Akole, Rajura	18249	CF wl Nashik
Rehekuri Blackbuck wildlife sanctuary	217.31 ha	Karjat	217.31	CF wl Pune
Great Indian Bustard Wildlife sanctuary (over both Ahmednagar & Solapur districts)	337976 ha	Newasa Karjat Shrigonda	23110.51 (1897.19 ha with revenue	DCF Ahmednagar (for area in nagar)

4. Forest Management should take special care of the needs of wild life conservation and for the corridor linking the protected areas the forest management plans should include prescriptions for this purpose. It is essential to provide and maintain genetic continuity between artificially separated sub sections of migrant wild life. These areas are the repositories of Bio-diversity and merit protection of the highest order.

5. With inspiration from the Constitutional provisions The National Forest Policy 1988 aims at conservation of natural heritage of the country preserving the remaining natural forests with the vast variety of flora and fauna, which represents the remarkable biological diversity and genetic resources of the country. The wild life (protection) Act 1972 in consonance with other Acts add teeth to these measures in protecting wildlife.

SECTION:2: SPECIAL OBJECTS OF MANAGEMENT:

6. This overlapping working circle has been constituted to achieve the following objectives,

- a) To conserve the existing wild life population.
- b) To create ideal conditions for betterment of wild life.
- c) To take steps to mitigate the man-animal conflict situations.
- d) To train the forest personnel adequately to handle wildlife emergencies

SECTION 3: LEGAL POSITION

7. There were no written regulations for control over hunting when these areas were under the erstwhile Sansthan and Jahagiris except that hunting by people other than the Rulers was generally not permitted. The Wild Birds and Animal Protection Act of 1912 was the first legislation which was implemented in the areas which were under British regime. However the provisions of this Act were not enough to control the hunting of wild animals. The Indian Forest Act of 1927 had provisions under section 26 (1) (i) and 32 (j) for protection of wild animals in notified Reserved and Protected Forests but these provisions were not applicable outside notified Reserved and Protected forests.

8. The Bombay Wild Animals and Wild Birds Protection Act 1951 was a more comprehensive piece of legislation affording much wider protection to wild animals and wild birds and also included constitution of a State Wildlife Advisory Board, Procedures for issuing licences for hunting certain wild animals and birds, Constitution and control of game sanctuaries, Regulations for dealing in trophies and Prevention and detection of offences and penalties for contravention of the provisions of the Act.

9. Accordingly the Indian Board for Wildlife was first constituted in 1952 to advise the Government on policies related to Wildlife Conservation and Protection. In 1972 the Wildlife (Protection) Act was passed and the title of the Act was as follows. "An Act to provide for the protection of Wild animals, birds and plants and for the matters connected therewith or ancillary or incidental thereto".

10. The Wildlife (Protection) Act 1972 has undergone major amendments in 1982 (Amendment Act. 23 of 1982), 1986 (Amendment Act. 28 of 1986), 1991 (Amendment Act 44 of 1991), 1993 (Amendment Act 26 of 1993) and 2003 (Amendment Act 16 of 2003). The preamble of the recently amended Act 2003 reads as follows.

"An Act to provide for the Protection of Wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto with a view to ensuring the ecological and environmental security of the country".

It is thus evident that the scope of the recently amended Wildlife Protection Act has been broadened to correlate the ecological and environmental security of the country with the protection of Wild animals, birds and plants.

11. The first National Wildlife Action plan was adopted in 1983 and recently i.e. in 2002 this has been modified by the second National Wildlife Action Plan (2002 – 2016). The Preamble of this new National Wildlife Action Plan is as follows:

12. “The first National Wildlife Action plan was adopted in 1983 based on the decisions taken in the XVth meeting of the Indian Board for Wildlife held in 1982. The plan had outlined the strategies and action points for Wildlife Conservation, which is still relevant. In the mean while, however, some problems have become more acute and new concerns have become apparent, requiring a change of priorities. Increased commercial use of natural resources, continued growth of human and live stock populations and changes in consumption patterns are causing greater demographic impacts. Biodiversity conservation has thus become a focus of interest. The National Forest policy was also formulated in 1988, giving primacy to conservation. Hence this new National Wildlife Action Plan (2002 – 2016)”.

13. Thus the present policies and legislation concerning Wildlife conservation / protection are as follows:

1. National Wildlife Action Plan (2002-2016)
2. Wildlife (Protection) Act 1972 as Amended in 2003
3. National Zoo Policy 1998
4. The Biological Diversity Act 2002

SECTION:4: DISTRIBUTION OF WILDLIFE:

14. The current working circle, being overlapping in nature, no demarcation of separate habitat improvement areas have been prescribed here. The prescription mentioned in the succeeding section will be followed for habitat improvement during their working. The forest areas provide good habitat for various wild animals.

15. Proximity to human settlements, the agricultural fields especially sugarcane which offers excellent habitat for stay and increased connectivity through road networks have led to increase in man-animal conflict situations not to speak of the Anthropogenic pressure on the forests of the area.

16. Ahmednagar district blessed with variable climatic conditions supports varied fauna which have settled in the area. Accordingly it has been observed that the Panthers are confined more in the Western part of the district, the Black Buck to the Eastern part and a few localized in pockets of the district, thereby necessitating special strategy in their management.

17. The division had reported presence of wild animals including panther (80), Jackal (227), wolf (235), hare (491), common fox (147), peacock (379), hyena (50), black buck (1718), common langur (128), porcupine (66), chinkara (378), mongoose (178), wild boar (12), wild cat (34), rhesus macaque (125), common palm civet (17) in the year 2005 after conducting a detailed census of wildlife in the division. The census extracts of the district excluding the Protected Areas as has been vetted by the Chief Wildlife Warden of Maharashtra as "The Wildlife Population Estimation-2005" wherein barring the Panther population, the other animals being that of Waterhole count, is reproduced as under:

S.No	Wild Animal	No of Animals				
		Male	femal e	Cubs	undecided	Total
1	Panther	34	35	11	0	80
2	Fox (kokhad)	147				
3	Jackal (Kolha)	227				
4	Indian Wolf (landga)	235				
5	Wild Boar (randukkar)	12				
6	Rhesus Macaque	125				
7	Common Langur	128				
8	Chinkara	0 (?)				
9	Black Buck (kalvit)	1718				

18. The increasing trends of wildlife especially Leopards in the Sangamner sub-division area resulting in deprivation of livestock and human life, crop raiding by Black buck and chinkara, frequent outbreak of attack by Jackals and Wolves is posing a challenge to the Forest department.

Year	1989	1993	1997	2001	2005
Number of panthers	7	8	8	19	80

SECTION 5: INJURIES TO THE WILD LIFE.

19. Forest fires, which occur often, not recorded truthfully, destroy the natural habitat of the Forest Fauna, coupled with the scarcity of water forcing the animals to migrate. Poaching is also a threat to the very existence of the animals. The increase in the number of wildlife population particularly Leopards, coupled with increased cases of capture, more at

the instance of local pressures coupled with release in the vicinity after prolonged period of captivity has created more problems, affecting the wild nature of the animal. Budgetary constraints hamper proper care of the animal in captivity and ensuring proper training to the workforce to keep them fighting fit to handle wildlife emergencies.

20. The number of wildlife offences registered in recent years is given in the following table:

Year	Offences registered
1998-99	4
1999-00	5
2000-01	1
2001-02	1
2002-03	2
2003-04	2
2004-05	1
2005-06	2
2006-07	2
2007-08	2
2008-09	3

SECTION 6: INCIDENCES OF ATTACK BY WILD ANIMALS.

21. The incidences of attack by wild animals on the human beings and their livestock are confined to specific areas of the district.

- a. The figures reflect the damage caused in terms of loss of human life and the injury caused to human life by attack of wild animals on human beings, and the compensation amounts paid as per the provisions of the Government.

s.no	Year	Cases number	Deaths	Compensation paid(Rs)	Injured persons	Compensation paid
1	1997-98	13	2	40,000	11	41,018
2	1998-99	4	0	0	4	15,547
3	1999-00	5	1	20,000	4	18,966
4	2000-01	0	0	0	0	0
5	2001-02	45	6	1,80,000	39	3,38,116
6	2002-03	17	4	2,80,000	13	22,632
7	2003-04	13	1	2,00,000	12	48,834
8	2004-05	9	0	0	9	60,345
9	2005-06	8	0	0	10	63,021
10	2006-07	15	3	6,00,000	12	63,112
11	2007-08	6	2	4,00,000	4	68,688
12	2008-09(Oct)	9	0	0	2	99,505

b. The amount of compensation paid to the owners of cattle and livestock predated upon by the wildlife in the recent past are as under: cattle loss compensation figures

s.no	Year	Cases number	Dead cattle	Compensation paid (Rs)
1	1997-98	91	123	1,33,840
2	1998-99	163	228	2,43,625
3	1999-00	337	441	4,93,176
4	2000-01	327	383	4,23,176
5	2001-02	257	312	3,82,103
6	2002-03	369	453	5,12,610
7	2003-04	306	386	5,85,431
8	2004-05	210	248	3,31,425
9	2005-06	420	608	9,32,250
10	2006-07	470	725	2,52,587
11	2007-08	510	n.a	1312
12	2008-09(Oct)	821	951	7,07,300

- c. Figures of compensation paid to the farmers as a result of crop raiding wild animals in the recent years for which compensation has been paid are as under :

s.no	Year	cases number	crop damage due to wildlife	compensation paid (rs)
1	2007-08	17	17	67,000
2	2008-09 (OCT)	92	39	84,880

22. Compensations have been given as per the norms provided in the Govt. Resolution. Interactions with wildlife enthusiasts, the Forest Department Officials, the local people indicate that improvements to the existing provisions/situations could improve the management status of wildlife in the area.

SECTION: 7: AREAS UNDER WORKING CIRLCE:

23. This is an overlapping working circle and encompasses whole areas under present day Ahmednagar Forest Division.

SECTION: 8: PRESCRIPTIONS:

24. These prescriptions are applicable to all forest areas and also to the whole civil district, where ever possible.

- Soil and moisture conservation works will be taken up, wherever possible, in all forest areas, additional measures to be taken to form water holes particularly in Akole and Sangamner tehsils to favour the Leopard population.
- Creation of additional waterholes in DPAP areas of the district should not be a criterion to benefit wildlife, since the wild animals of the area are biologically capable of withstanding water scarcity which in a way regulates their population. Assured water supply may at times bring in a sense of security triggering off spurts in population outbreaks which later on become a cause for man-animal conflict.
- Reorientation of people's awareness about wildlife through inciting people's participation in programs like wild life week celebrations in educational institutions, general populace and rural areas.

- d. Involving local students, NGOs, Wildlife enthusiasts, and general public for wild life census operations and counting of avifauna at water bodies every winter.
- e. Provision of salt licks at suitable places.
- f. Erection of Wild life watchtowers at suitable spots, which would also serve as Fire Watch-Towers during the summer months.
- g. Make provision of Shelter and hiding places, if not existing naturally.
- h. Inoculation of cattle in the vicinity of forests to be compulsorily enforced, in co-ordination with the Animal Husbandry department and District Administration to protect the wild life from contagious diseases of cattle.
- i. Develop management strategies to handle crop raiding herbivore, by resorting to preventive and curative measures.
- j. Develop mechanisms to ensure that the genuinely affected persons due to wildlife damage are compensated within the shortest period of time.
- k. Van Vigyan Kendras associated with Wildlife Interpretation Centres to perform the function of educating the public in managing wildlife.

SECTION: 9: GENERAL MEASURES FOR PROTECTION:

- 25.** The general measures to ensure wildlife protection should include-
- a. Areas should be strictly and effectively protected from fire.
 - b. A vigilant watch should be kept on poachers by creating checking gates at strategic points vis-à-vis check post for checking the forest produce in transit.
 - c. During summer, the scarcity of water leads to drive the animals to a few water pools exposing themselves as prey to poachers including local inhabitants. Such areas should be kept under constant vigilance.
 - d. Compensation for cattle and human killings by wildlife should be made immediately as per law to create sympathy towards wildlife and to check any sorts of revenge to be taken by villagers.
 - e. If there exists any cattle lifter or man-eater that should be translocated safely to safe areas.
 - f. To have awareness for the wild life in the areas drive regarding wild animals should be taken from time to time.
 - g. To have an orphanage to rear the ailing animals to recoup and then to set free in their natural home. Belwandi in Ahmednagar division is in the process of being developed as a Relief Center by the Maharashtra Forest Department.

SECTION: 10: MANAGING THE MAN-ANIMAL CONFLICT SITUATION:

26. Ahmednagar district is beset with the twin problem of having had to deal with both Carnivore and Herbivore wild animal populations and accordingly, the strategy developed should be in tune with the situation on the ground. Discussion and Inputs from wildlife workers in the area Ms. Vidya Athreya and the Veterinary Doctor-wildlife enthusiast, helped fine tune the concept of developing management strategies, rather than adapting a fire fighting approach. Extracts are represented in Annexure XX of the Volume II of the plan.

Man-Animal conflict LEOPARD issues:

27. Human-leopard conflict is a multi-faceted issue influenced by political and social attitudes, the biology of the species and the management action. Effective management of conflict will have to balance minimizing serious conflict with the long-term conservation of the leopard species. The presence of a species like the leopard in a human dominated landscape will invariably lead to some levels of predation on domestic animals. The lack of systematic population control of feral animal populations in India is likely to play an important factor in helping the leopard to colonise and sustain itself in human dominated areas (eg. sugarcane fields and villages). Various studies across India have confirmed the important role of domestic dogs in leopard diet. Leopards are a very adaptable species capable of living close to human settlements and doing so with low levels of serious conflict.

28. The strategy should be a rationalized response-based more on preventive strategies involved in conducting studies of the area in greater detail with association of subject matter specialists, and to monitor the animals movement, the presence-absence, the numbers trend etc., based on the scats, the livestock affected with special reference to dog population being subject to lifting, pugmarks, reported sightings, attacks on human beings etc., on a routine basis at the range level. Trapping each and every animal is not the permanent solution for the problem.

29. Wildlife emergencies should be taken into account on the lines of human medical emergencies, and the department should be fully equipped with vehicles and trained manpower in this regard, trained in handling emergency involving sighting, trapping, immobilizing, safe transport, procedural compliance, elimination if need arises, public management, etc., and the training should be on a regular basis.

30. Recourse to imparting training to the local staff at all levels of the department through trained individuals and specialists, with greater interaction between veterinary doctors, police personnel, and forest staff is the need of the day.

Man-Animal Conflict Black Buck and related animal issues:

31. The conflict involving Human and herbivore crop raiding animals is more a result of infringement of the habitat of the animal population by anthropogenic pressures, changing cropping pattern in the area over the years, as a result of the increased facility of irrigation potential created in the area.
32. approaches to the problem should be centred out to create artificial barriers between the cropped area and the animal, by way of scaring devices, change in cropping pattern to raise crops not preferred by the animals, by way of breaking the line of sight of the animal by raising vegetative barriers in the rolling dry grassland areas which encourage the animal to migrate over larger distances.
33. Measures to arrive at optimal populations for the area need to be worked out, and safe relocation procedures as developed in the neighbouring state of Andhra Pradesh, which as a matter of fact is to be implemented in similar affected areas of Aurangabad district adjoining the Ahmednagar district, may as well find replication in Ahmednagar district in the affected areas.
34. Study of animal behaviour by involving scientific community is the crux of the problem, which would enable to arrive at scientifically thought out solutions which could be debated and implemented as per Government policy.

SECTION: 11: WILD LIFE TOURISM:

35. In consonance with the Wildlife Wing operative in the district, the territorial wing too should strive to identify suitable areas for developing Wildlife Tourism. Further impetus to the cause of Wildlife conservation and appreciation of the importance of Wildlife can be achieved by devoting sections in the Nature Interpretation Centres in the district, for showcasing the Wildlife of the area, the state and the country.
36. Such Nature Interpretation Centres are identified and could come up with the co-operation of the District Administration at Chandanapur Ghat, Chand Bibi Mahal, Newasa, Siddatek, Vruddeshwar and Sansar.
37. Wildlife Tourism doesn't necessarily mean 'commercial tourism'. The objectives broadly include devising strategy to-
 - a. Maximize people's enjoyment of their stay through education and recreation,
 - b. Minimize the impact on habitat and wildlife.
 - c. Increase the visitor's concern for nature conservation.
38. While devising strategy to encourage wildlife tourism in the district, it is pertinent to observe that all the provisions of the Forest Conservation Act, 1980 and the observations of the Honourable Supreme Court of India, the law of the land are borne in spirit and action.

SECTION 12: WILD LIFE HABITAT RELATIONSHIPS (WHR):

39. With the facilities of GIS and GPS instruments in place an effort should be made by field staff to develop Wild life habitat relationship data base of the division (WHR). Wildlife Institute of India, Dehradun, has made a study on Wild life Habitat Relationships (WHR) under Mssrs Pant.A, V.B. Sawarkar, S.G.Chavan, S.B. Banubakode, Mathur, P.K. and J.F. Lehmkuhl.

40. Wildlife Habitat Relationships Database is a set of facts depicting vegetation, habitat elements and environmental conditions used by specific wildlife species. These depictions can be provided in the form of simple narratives, tables of habitat types and components, prediction models, or by other formats. Mathur et al (2002).

41. A WHR database can be characterised by the following components:

- A habitat classification
- Listing of Wildlife Species of management interest.
- Species information on life history and ecological attributes. The distribution of each species in narrative or map form.
- Information on the legal and administrative status, and ecological status (degree of rarity) of each species.

42. WHR databases and models are expected to aid:

- Assessment of present and prediction of future, habitat conditions, showing distribution and abundance of habitats by habitat class and by habitats described specifically for individual species or species group.
- Assessment of current potential, and prediction of future, distributions of wildlife populations by species or species group
- Prediction of wildlife community patterns, specifically number of species and their ecological roles, by species groups within specified habitats or circumscribed areas
- Assessment of environmental impacts from various forest management and disturbance activities as affecting specific habitat components.

43. Overall there may be three stages to developing a WHR information base and prediction system. (This Working Plan has achieved Stage 1 based on the earlier published work)

44. Stage 1 Develop the species and habitat information base. The first stage consists of developing the basic information on habitats and wildlife species. This includes habitat and wildlife classification systems, basic wildlife species lists by habitat type and management

unit, maps of vegetation and habitat distribution, and annotated summaries of species' life histories and population status. This information can be used to produce lists of species that occur in various habitat conditions and changes in those conditions, as a first simple step in developing models that predict wildlife response.

Developing the information base for the first stage typically entails tapping into experts' knowledge of species and habitat conditions, reviewing the ecological literature, and beginning field inventories and monitoring studies to fill in critical knowledge gaps.

45. Stage 2 Develop and test species and habitat response models

The second stage entails building and testing more sophisticated procedures, which can include models to evaluate how individual species respond to habitat and environmental conditions. These wildlife models address how population rates of change, population structure, spatial patterns of habits, and landuse activities affect population distribution, abundance, and trends. Species chosen for these more detailed models can be based on their rarity, social value, key ecological roles in the forest ecosystem, or vulnerability to human activities or habitat changes.

Also developed during this stage are more advanced models of how the habitat itself responds to natural and human- caused disturbances. Habitat responses include effects on vegetation composition and structure from systematic and catastrophic, and both natural and anthropogenic, disturbances. Such disturbances include secondary succession, fire, insects, and various kinds of human use such as grazing, burning, and collection of various forest products.

46. Stage 3 Integrate the wildlife information base and habitat response models with spatial models

Third stage consists of more advanced models designed to project future habitat conditions and to integrate assessments of spatial and temporal cumulative effects of human activities (Rapheal and Holthausen, 2002). Tools such as geographic information systems and use of remote sensing imagery information on habitat conditions and changes can be integrated with models of wildlife species-habitat relationships to display current and potential future effects on population distribution and abundance.

47. Building the Information Base

The first step in building the information base for the first stage is to describe the categories of information desired. In brief, a wildlife-habitat relationships database can include the following kinds of information for each wildlife species:

- Common (vernacular) name, scientific name, and other taxonomic information

- Legal status for management significance
- Distribution (occurrence by geographic location, and possibly range maps)
- General habitat requirements (vegetation communities)
- Special habitat requirements (specific habitat elements and substrates)
- Breeding information
- Territory and home range information
- Movement within the area of interest (e.g., residency and migration)
- Key literature references

48. WHR information is most useful in

(1) Providing a systematic means of synthesizing and presenting information on vertebrate species. If all or a representative cross-section of species within the plan area are used to evaluate general habitat allocation decisions, there is no bias in emphasizing one taxonomic group over another or in ignoring some groups.

(2) It is useful for helping make general habitat allocation decisions at a broad scale of land resource planning.

49. An integrated program of inventory, management, monitoring, and research entails establishing a set of research priorities. Priorities can be based on key species and habitats for which management is needed but for which, after the initial WHR information base is developed and evaluated. Research priorities can also be set based on the key assumptions and other major weaknesses in the WHR information base to test or develop. Monitoring provides information on how habitats or wildlife species respond to conditions affected by management; research helps disclose the mechanism behind those responses. By closely integrating monitoring and research studies, a wealth of information on species occurrence and responses can be developed.

CHAPTER XVIII

FOREST PROTECTION (OVERLAPPING) WORKING CIRCLE

(FIRE, ILLICIT FELLING, ENCROACHMENT, ILLEGAL MINING, POACHING, SURVEY AND DEMARCATION ETC.)

SECTION.1.GENERAL CONSTITUTION OF FOREST PORTECTION (OVERLAPPING) WORKING CIRCLE:

1. This is an overlapping Working Circle covering the entire forest area of the tract dealt with. Thus the total forest area included in this working Circle is 137594 ha and includes the Notified Protected Area still with the Territorial division for managment. The activity by virtue of the space factor spreads over the entire geographical area of the District, demanding co-ordination and action between like minded departments of the Government.
2. The National Working Plan Code prescribed this Working Circle as a mandatory Working Circle in the Working Plan. The forests are burdened with heavy biotic interferences, hence addressing of these problems in a systematic manner necessitated the constitution of this Working Circle. Illicit felling, grazing, encroachments, poaching and fires are the major causes for the damage of the forests.
3. The forest areas of Ahmednagar district were with Revenue Department in the earlier years, and since 1903 orders to return them back to Forest Department were issued, and led to handing of major areas, with still some areas with the Revenue department, and few under occupation by the Ministry of Defence. Land resources have become invaluable, and instances of diversion of forest land for non-forest use within the gambit of the Forest Conservation Act,1980, happen for different purposes. Further land has become the subject of contention for encroachment to enable agricultural and related livelihood, and at times for other activities and with multitude of authority presents a confusing picture.

SECTION 2. STATUS OF FOREST OFFENCE CASES:

4. The Range Forest Officer, the Assistant Conservator of Forests and the Deputy Conservator of Forests shall take review of forest offence cases at least once, every month. Shifting of boundary marks along the forest boundary shall be viewed seriously, and the encroachers shall be prosecuted in the court for omission of commission causing obliteration of the forest boundary. Charge sheets regarding all cases of forest

encroachments shall be submitted before the Judicial Magistrates within stipulated time. Similar time-bound action is recommended in all cases of timber theft. Failure of submitting charge sheets within the statutory time limit shall be considered willful negligence of duty. All cases of violation of the Forest Conservation Act, 1980 shall be referred to the regional CCF, Bhopal through Nodal Officer for prosecution purposes with respect to the government officers involved in the cases.

SECTION 3. SPECIAL OBJECTS OF MANAGEMENT:

5. The special objectives of management are
 - a. To enforce the Indian Forest Act 1927, Wildlife Protection Act 1972 as amended till 2003 for the effective control of Illicit felling, grazing, encroachments poaching and fires.
 - b. To develop the database to monitor various offence cases in a systematic manner.

SECTION 4. ILLICIT FELLING:

6. Illicit felling in the forest area of the Ahmednagar division could be termed as minimum as perused from the records of the office. However the nature of crop being Glyricidia, Subabul, in most of the plantation areas, signs of hacking are common place, indicating that the vigilance net work is not performing to the expectations.
7. Reports of Evaluation wing indicate presence of immense biotic pressure whether in terms of stunted growth, due to hacking or grazing or fire incidences which do not find reflection in the data, thereby indicating that the records do not give a true picture of the anthropogenic pressure on the forests, and this needs to be duly rectified. It is quite likely that the forests contribution to match the needs of the populace in terms of small wood and firewood are not properly documented by the field staff.
8. In addition to addressing supply-side management by augmenting wood production on forest and other community land, the demand-side management should take up efficient wood utilization and energy efficient alternatives like Community Kitchens of Hindustan Petroleum, Biogas, solar cookers, etc. utilizing the effective and established principles and examples of participative management in Nagar district. The following general principles are prescribed for the effective protection of the forest.
9. measures which could fine tune the Forest Offence management could be-
 - a. Review the offence cases beat wise, every month.
 - b. Place emphasis on speedy disposal of the Offender and Offender not known category. The offender unknown category should be rightly addressed, and

efforts to trace the offenders linked to overall performance appraisal of the field staff.

- c. Handling of forest offence cases to be done as per the existing standard orders and instructions of the Department.
- d. Delay in the submission of charge sheets in the courts be viewed seriously.
- e. Offence cases information should be computerized facilitating analysis.
- f. Ahmednagar is in the transit route, hence measures to check the vehicles by squads surprisingly should be a practice.
- g. Use the provisions of rewards for gathering of information.
- h. Provide regular training to the staff in submitting the charge sheets, preparation of *panchanamas* etc.
- i. After obtaining needful confirmatory orders method. Every year from January 1, onwards start the new series of notation of stump numbers and POR numbers such that all illicit fellings noted are recorded and those unrecorded are dealt with accordingly.
- j. All forest offices Range Offices and above to keep separate file of important instructions, judgements regarding forest offences.
- k. Beat khairyat reports to be dutifully and timely collected, and acted upon.

SECTION 5. FIRE PROTECTION:

10. Fire adversely affects natural regeneration, forest growth, ground Flora, soil organisms and site productivity. Effective fire control as prescribed in the plan is essential for the forest development. The division officials and local people shall be sensitized about the need of effective fire control. All fire incidences must be meticulously recorded and investigated to assess the damage caused.

11. Fires are of common occurrence. Due to highly combustible undergrowth consisting of dense grasses and dry lantana, a tiny spark can trigger off a conflagration in a short time. Lantana, when dry, is extremely combustible. It throws up a huge flame, which scorches the leaves and bole of trees completely. The high speed of hot winds during summer, combined with the hilly configuration accelerates the spread of fire easily when it occurs and engulfs vast areas before it can be brought under control only by counter firing. With a long standing fire protection measures and vigilance of the staff, the forests, in general, have been protected against fires in spite of the handicaps.

12. Classification of fire control:

- a. **Class-I (Complete Fire Protection):** The Class-I fire control areas include all coupes (six years) of plantations (five year), the A-type areas (permanent), forest depots (permanent), forest nurseries (permanent), Special habitat

areas (permanent) and any other areas of special importance decided as such by the CCF (T).

- b. **Class-II (General Fire Protection):** The Class-II fire control areas include the remaining areas as well as any other areas, which deserve the protection in the opinion of the CCF (T).
- c. **Class-III (General vigilance):** The remaining forest areas (that is, areas not included in the above two classes) are identified as the Class-III fire control areas. Special measures for the fire protection are not undertaken, but deliberate setting of fire and burning the forest is prohibited.

13. Fire control measures:

- a. A fire protection scheme for the entire division shall be prepared before November each year, identifying the watch points (including watch towers), strategic locations, and strength of fire watchers at each location, deployment of vehicles, use of wireless sets, supervisory forest staff and the co-ordination protocol.
- b. Each location is proposed to have 5 to 10 persons including regular staff and fire watchers. The staff shall be trained in the application of modern fire-fighting tools. The fire prevention shall be trained as a high priority item. The scheme shall be implemented sincerely during the fire season.
- c. Areas deliberately burnt for silvicultural reasons under the sanction of the Chief Conservator of Forests (T) shall be excluded from the fire protection scheme. Fire in such areas need not be reported unless spreads beyond such area.
- d. All the Class-I and Class-II areas will have external fire lines and internal fire lines dividing the forest area into convenient blocks.
- e. Fire Watchers and local forest staff shall constantly patrol the Class-I and Class-II fire control areas. The directives require that fire in the Class-I areas be reported to the Deputy Conservator of Forests immediately along with details of the area burnt and the damage inflicted to the forest crop.
- f. The group of fire watchers shall immediately rush to the site and extinguish fire as soon the fire spot is located by upcoming smoke in their area of operation. Modern fire fighting tools shall be used for extinguishing the fire. The supervising officials should mobilize reinforcement in case of large fire. Utmost care will be taken to quench the smouldering material. Providing a thick layer of soil over such material is generally effective.

- g. The fire lines shall be kept clear of all growth and combustible material during the season. Leaf litter and other dry material on the fire lines shall be collected periodically along the edge and burnt before the fire season starts.
- h. The cutting of fire lines shall be completed by December. Fire tracing (burning) shall be completed by February 15, and thereafter burning should require permission of the Chief Conservator of Forests and physical presence of a gazetted officer.
- i. The division office shall maintain a "Register of fire lines" showing the length and width of fire lines, and enter the period of cutting and burning of fire lines. The register will be kept up to date and checked every year, in March.
- j. Negligence in the fire protection shall be taken as dereliction of duty. The supervisory officers shall extensively verify fire control measures.
- k. Motivate the villagers to protect and control the fire by giving rewards to the community. The grant available for fire protection shall be given to the JFM/village committee for protection of forest from fire at the end of the fire season after making due verification by the officer in charge.

14. Standard widths of fire lines are prescribed in the Table

Standard widths of various types of fire lines

Sr. No.	Characteristics of the area	Width of fire line in meters
1	External boundaries of the forest	12
2	Naturally or artificially regenerated areas (For 5 years) (coupes)	6
3	Remaining coupe boundary	3
4	Both sides of road and cart tracks through the forests	6
5	Timber, bamboo and firewood depots	40

SECTION 6. GRAZING REGULATIONS

15. The entire forests are liable to damage from grazing except the interior areas, which are away from the villages. In fact, there is hardly any grass left in this block and they only serve as exercise grounds for the cattle. These areas are very undulating and the soil is very poor and are, therefore, even unfit for cultivation. The forests adjoining the Sahyadris are very hilly, and the upper slopes are steep. The grazing is, therefore, confined to the

lower hills and the calculated incidence does not give the true picture of the grazing pressure here, while a large inaccessible area of the units remains un-grazed. A realistic calculation of grazing incidence is required.

16. The grazing incidence figures are misleading as the erstwhile forest village cattle are grazed in the immediate vicinity of the villages. The true grazing incidence in the areas adjoining the villages is therefore, heavier than estimated.

17. The lopping and hacking of trees has led to degeneration of the forests. The seedlings are grazed and saplings of these fodder tree species have been hacked to provide fodder to the cattle. Continuous and heavy grazing not only prevents regeneration of tree species but also the young regeneration obtained during the period of closure, is lost soon after the area is opened for grazing. In areas with clayey soil, the trampling by cattle results in hardening of soil and reduction in the soil aeration. In sandy soils, heavy grazing results in accelerated erosion and denudation. The grazing on undulating lands loosens the soil, which results in the soil erosion. The problem of migrated cattle in addition to the resident ones is severe in Ahmednagar division which needs utmost attention to control the grazing.

18. It is not uncommon to see goats grazing in forests. The goat grazing is prohibited because of their close level grazing in which the seedling or grass rhizome is uprooted.

19. The grazing shall be regulated as per guidelines of Grazing Policy 1968 of Maharashtra State issued vide Resolution No. MFP-1365/132211-Y dated December 6, 1968 and Grazing Rules issued vide No. MFP-1371/237035-Z dated November 3, 1973.

20. Heavy cattle pressure adversely affects the forest regeneration and soil condition. The statutory provisions regulated grazing are difficult to apply in the entirety. The present political economy of domestic animals in the area throws up strong challenge, and implementation of the grazing regulations in its current form.

21. The situation may be substantially improved by establishing effective communication with the local people, awareness generation and efficient animal husbandry program. The forest officers should take up these preventive measures in co-ordination with the Animal Husbandry Officers.

22. Maximum admissible grazing incidence according to the current policy has been shown for various working circles in a table as under. A systematic survey of fodder availability is recommended during the plan period in each round.

23. The carrying capacity and period of closure should be calculated for the forest area adjoining each village. The grazing passes, free or otherwise to individual families are proposed to be distributed on the calculated carrying capacity basis. Village bodies should also be actively be engaged in the implementation of grazing regulations.

24. The surplus cattle should be kept under regular watch, and villagers should be encouraged to adopt stall-feeding or other means to address mismatch between cattle-heads and fodder availability.

Working Circle	Functional classification	Maximum grazing incidence (ha per cattle unit)	Period
Special areas(overlapping)			
Protection areas (A1 & A2) & Special habitat areas	Protection forest	Nil	Permanent
Annual coupes	Protection forest	Nil	Till six years
Plantations	Protection forest	Nil	Till fifth year
Other area (under Working Circles)			
Enrichment working circle	Tree forest	1.2	
Bamboo working circle	Tree forest	1.2	
Silvipasture working circle	Pasture lands	0.4	
Irrigated plt wc	Tree forest	1.2	
Afforestation	Open forest	0.8	After plantations

Admissible grazing incidence in various working circles

Note: Area required for wildlife population should be calculated accordingly, and deducted from the available area for the domestic cattle. If relevant data is not available 20% area should be marked for the wildlife.

25. Fodder development on the community lands and translocation of surplus cattle may be encouraged. Animal husbandry and Dairy Development Agencies should be motivated and influenced to take up breed improvement program. Fodder in the plantation areas should be made available free of cost on cut-and-carry basis.

26. The DCF shall get carried cattle census of each village during the winter season at the beginning of the plan period to find out the local cattle once for all and maintain record

and passes shall be issued limited to those cattle subject to the availability of carrying capacity.

27. The Grazing Settlement Report for Ahmednagar areas recommending no grazing needs to be obtained approval from the Government.

SECTION .7. FOREST ENCROACHMENT:

28. In recent past tendency for encroaching forestland for cultivation has increased. The actual encroached area is higher than the recorded one. The eligible encroachment is yet to be finalized at the time of the preparation of the plan. The area under dispute is not clearly demarcated.
29. The causes of forest encroachment shall be examined thoroughly and addressed in a comprehensive manner. All the necessary support should be provided. And encroachment should be evicted as early as feasible. The boundary management and standard administrative guidelines will help to control encroachment.
30. The state government should be urged to finalize and complete the land grant in all identified cases of encroachments to be regularized in accordance with the government resolutions issued before 1980. Renewed and concentrated efforts on the part of division staff for eviction of the encroachment is proposed on priority basis.
31. Small isolated patches of the forestland are often neglected and become vulnerable to encroachment. Special care shall be taken to ensure protection of such patches from encroachment.
32. The civil powers of eviction are entrusted with ACF and DCF by Govt. Resolution and should act as per GR. The procedures laid out in the Land Revenue Code shall be followed before the execution of eviction.
33. All external boundaries shall be demarcated with concrete pillars. All sensitive and important boundaries and wherever disputes are there be surveyed with DILR and concrete pillars be laid immediately. Orders of the State Government empowering Range Forest Officers and Surveyors issued in 2001 for conducting survey over forest lands to be effectively used.
34. All encroachments be listed with their names, age, residence, profession whether belongs to SC, ST, OBC/NT, extent of encroachment, S.No. and location of encroachment village/block. A Detailed report of the case be prepared for each encroacher and be submitted to ACF to obtain summary eviction orders, in a time bound program.
35. After the completion of due procedure of Land Revenue code and after giving a reasonable opportunity of being heard to the encroacher, the ACF shall pass a summary

eviction order if he satisfies so, quoting the findings. The concerned RFO shall execute the eviction order.

36. If the encroachments in a village are more in number police protection be obtained for the operation.

37. Use of Cr. P. C. provisions like section 106 and 110 be used to obtain good character of offenders before *Tahsildar* and SDO respectively to smoothen the eviction operations as well as to prevent the tendency of future encroachments. For the encroachments on the un-classed forests (though 7/12 shows clear possession of the departments) FIR shall be lodged in the concerned police station for the prosecution. To prevent the tendency of encroachments, improved crop techniques be propagated in the problem villages to enhance the crop productivity with the help of Agricultural Department. Regularization of the encroachments made earlier to 1980 be settled as early as possible and proposals to that extent be submitted to the Central Govt.

38. In the month of May a drive for encroachment prevention be taken up in all the sensitive areas by taking meetings in the villages by *Dawandi* and distribution of leaflets and posters.

SECTION 8. POACHING:

39. The issues related with poaching has been dealt in detail under Chapter on Wildlife (overlapping) Working Circle.

SECTION 9. SURVEY AND DEMARCATION

40. The forests lands are spread all over the district, and subject to various non-forest uses including construction of Irrigation projects, reservoirs, schools, houses-dwellings, agriculture, industry, canals etc., The lands apparently have been subject to issue of orders prior to 1980 in many instances, however lack of evidence corroborating the same, sanctifying the diversion for non-forest use from the competent authority, and total absence of demarcation of boundary on the ground in such areas of dispute are to be tackled under this working circle. Indicative details of Eksali cultivation, Eligible/non-eligible encroachers, observations during the Stock-mapping exercise etc., are appended separately, which should serve as a pointer; however the division staff is expected to thoroughly make a survey of the area under its control to smoothen out and regularise such instances wherever noticed, under the provisions of the law of the land.

41. Total Area identified as needing demarcation urgently is 6777.49ha. A total of 203 Compartments comprising of 363 units the list of which is given in the Annexure LII of the Volume II of the plan. The range wise situation is reflected as under :

s.no	Range	Area of range	# compts		Area	% to area of range	% to area of division
			compt	Units			
1	Akole I	9959.40	11	11	158.00	1.58	
2	Akole II	6579.50	22	40	223.22	3.39	
3	Rajur	6841.60	33	51	268.33	3.92	
4	Sangamner I	15466.20	28	42	586.05	3.79	
5	Sangamner II	8281.30	19	33	1041.48	12.58	
6	Sangamner III	13107.45	11	20	436.14	3.33	
7	Sangamner sub.division	60235.45	124	197	2713.22		4.50
8	Kopergaon	1256.18	2	4	10.64	0.8	
9	Rahuri	14601.75	20	49	1616.64	11.07	
10	Ahmednagar	10212.41	13	24	760.08	7.44	
11	Parner	6506.29	11	28	219.58	3.37	
12	Takli Dokeshwar	15309.25	16	30	743.60	4.86	
13	Pathardi	8881.14	13	27	617.71	6.95	
14	Teesgaon	4739.20	2	2	85.02	1.79	
15	Jamkhed	4162.25	2	2	11.00	0.26	
16	Ahmednagar div total	65668.47	79	166	4064.27		6.19
	Grand total Ahmednagar dn	125903.92	203	363	6777.49		5.38

42. Further areas which have been identified to have been distributed and the division office is not in possession of the same are indicated separately in the Annexure III the area statement appended in Volume II of the plan, which also needs to be addressed to.

43. The objectives while undertaking such demarcation exercise would be:

- To regularise the land records of the division.
- To enable demarcation of the boundary of the forest land, after proper survey.
- To enable reclamation of forest land if found to be illegally encroached upon.

44. Analysis of the data obtained from the Ahmednagar division, places the known figures for forest lands under degrees of occupancy for various purposes represented hereunder. The stock-mapping exercise by the staff of the Working plans division with the co-operation of the local staff of the territorial Ahmednagar division, enabled in identifying several such areas which are apparently titled as 'vatap' which means 'distributed', as a result of Revenue department orders.
45. Further during the process of reconciliation of the Forest records of the division in consultation with the Division Survey section attempts to streamline the land situation had been made, and all such areas which are forests identified and located on the maps of the division. As a result areas hitherto which were distributed for non-forest use which are yet to be regularised figured which also need to be regularised. The compartment history and the maps reflect all such lands along with the detailed statement of land appended in the Vol II of the plan.
46. The process of handing over of forest lands from Revenue to Forest department has been going on in the past, and this has led to taking over of disputed lands too and at many places with such 'vatap' status, which needs to be regularised, demarcated and proper entries registered in the relevant Land Records.
47. The situation is reflected as under:

NATURE	Extent of land (approx)hectares
Eksali lands	2160.64
Encroachment (1972-78) total area	1561.91
Vatap lands and lands needing regularisation-(stock mapping exercise)	6777.49
Lands with Defence	1661.690
Area with Revenue department	34024.300
TOTAL AREA	46185.79

48. The process of regularisation of the land records and subsequently demarcation doesn't involve any silvicultural system. Reclaimed lands after the regularisation process shall be treated as if under the regular Afforestation Working circle.
49. To facilitate ease in identification, and to ensure that such disputed lands are not given any afforestation treatment till they have been regularised, they have been given separate notation under a,b,c,d etc., for a compartment, it is expected that a 3 year period should be enough to ensure compliance of prescription of the working circle, subsequent to

which forestry operations could be taken up under the Afforestation Working circle, after completion of the Demarcation process.

50. The Procedure should involve-

- A. Collect the relevant papers pertaining to the nature of occupation of the land, viz., 7/12 extracts of the land, the form no: 8 extracts from Revenue, orders of the Government or Authority, and the copy of the orders of diversion from the relevant authority Pre-1980 or Post-1980.
- B. Survey of the disputed area, and assess the actual extent of involvement of the area. Orders of the Government of Maharashtra issued in year 2001 enabling Range Forest Officers and Surveyors of the Forest department competent to conduct survey of the forest lands need to be taken note of rather than resorting to services of offices of TILR and DILR which are already under immense pressure and time constraints.
- C. Reconciliation of the Mutation entries, reconciliation of Forest land records and Revenue records.
- D. Ascertain the nature of diversion as to whether it is legal or illegal.
- E. If the nature of disputed land is determined to be Legal, under orders of the competent authority and in tune with the law of the land, needful entry to be made in the Division Forest land records form no:1, and other records, and ensure that the complete area is demarcated on ground with Cement Concrete Pillars or any other method as determined by the CCF (territorial).
- F. If the nature of disputed land is determined to be Illegal, needful steps to determine the nature of dispute shall be started immediately.
 - a. Determine the nature and extent of the land under occupation for the purpose.
 - b. Initiate proceedings as listed under the Forest Acts.
 - c. In cases wherein there is clear-cut diversion of forest land for non-forest use by any other user agency, the agency would be directed to submit the needful proposal under the guidelines of Forest Conservation Act, 1980, to get the diversion regularized from the Government of India.
 - d. In cases wherein ineligible encroachments/occupation is detected the Range Forest Officer, should submit to the Assistant Conservator of forests, in charge of the range, under the provision of sections 53,54, and 54 (a) of the Maharashtra Land Revenue Code 1966.
 - e. In cases wherein it is proved that the entire occupation is illegal, with the ulterior motive of grabbing forest land, then needful steps as outlined under Maharashtra Land Revenue Code 1966, under sections 53,54 and

54 (a), wherein Assistant Conservators of forests have been authorized, shall be immediately initiated and measures to free land of the encumbrances shall be taken.

- f. The boundary of the land so released back to the Forests shall be demarcated on ground, and depending upon the suitability and the situation needful afforestation and allied activity taken up in subsequent years.

50. In order to ensure that the forest lands shown in the working circle, and other forest lands detected in the process are identified, surveyed, regularised and demarcated, settled systematically, the Assistant Conservators of the forests, currently overseeing the ranges in the division shall be given the principal responsibility of carrying out the important task.

51. The Assistant Conservators of forests in the division, currently stationed at Akole(1) later to be shifted to Rahuri, Sangamner(1), Ahmednagar (2), shall be assisted by the territorial Range Forest Officers in their jurisdiction, towards settling the issues arising in this regard.

52. The Deputy Conservator of forests Ahmednagar, and the Sub-divisional Forest Officer Sangamner (ACF Sangamner) after functioning as the independent sub-division, shall make it a point to oversee and report the progress every month to the CCF (T) Nashik, who shall make it an issue to regularly review the progress of the work for the division.

53. To ensure meaningful participation from the villagers modalities shall be worked out to involve forest protection committees in the process..

54. The work of survey and demarcation shall be completed within five years. A detailed scheme of survey and demarcation by permanent pillars will be prepared by DCF and submitted to C.C.F(T). for approval. The 5 year demarcation programme is separately appended under annexures L and LI of the Volume II of the plan for Ahmednagar and Sangamner forest divisions/sub-division respectively.

55. Precast reinforced cement concrete pillars of specification given by PCCF,MS, will be erected to have permanent boundary marks. The method for demarcation shall be as per the direction given by Office of Principal Chief Conservator of Forests, Maharashtra State vide his Letter No.68 dated 29.5.2001 (Marathi) and appended as Appendix in Volume II of this plan. The RCC pillars will be as per the proposed expenditure for Class I and Class II pillars for which model expenditure have been provided by the office of the PCCF,MS. The details of model wise estimate of expenditure and specification of RCC pillars with their diagrams have been given in Volume II of this working plan. Provide a Class I pillar at every 200 meter distance and at every change of direction and Class II pillar at every 50 meter distance between Class I pillars. In an undulating terrain the line of sight should be the criteria to fix the pillar, if the sighting of the pillar is becoming difficult, then at less than 50

meters the class II pillar may be fixed. After five years of operation of this plan all the forest areas will be brought under 1/5 th boundaries work for which mainly maintenance of boundary and boundary pillars will be carried out. A model estimate of the demarcation work erected using stone masonry in Aurangabad circle, wherein RCC pillars were subject to breaking, has been appended at Annexure LX in the Volume II which may be thought of in such vulnerable areas with the consent and sanction of the Territorial Chief Conservator of forests.

56. Boundary between Revenue and Forests:-It is mandatory that *the boundary between Revenue and forests should be demarcated with the help of DILR* and financial provision should be made for the demarcation by paying DILR fee. The width of the clear area of the outer boundary of the government forest will be 12 meters. Nothing will be cut growing outside the true forest boundary line. The clearing will consist of cutting down only all the undergrowth that impedes the view, preventing one forest boundary mark being seen from its neighbouring one. Trees on the boundary lines will not be cut so long as they do not obscure the view of the boundary marks one from the other.

57. Compartment Boundaries: The internal forest boundaries to demarcate compartment boundaries, except where the natural features form the boundary demarcation will be by cairns. The forest boundary marks will be of the following specifications.

- 1) Shape:** A truncated cone.
- 2) Description:** The cairns will be built of loose stones upon an excavated foundation of 30 cms deep, so the lowest tier of stones will be held in position and not pushed out by the weight of the super structure especially when the ground becomes wet and slippery. The inter spaces between the large stones composing the cairn will be filled in with small stones and the outer stones will be weighed with stone chips. A slab stone or a central stake of teak or khair projecting 50 cms above will be fixed firmly on top of the cairn in the centre.
- 3) Dimensions:** A cairn will have a base of 1.8 metres diameter, 1.2 metres high and the top diameter will be 1.2 metres.
- 4) Colour Wash:** The slab stone will be colour washed red in case of the closed forests and white in the case of open forests and line of same colour should be drawn to show the direction of the boundary lines.
- 5) Position:** The cairns will be placed at visible distance one from each other. Where there is no change in direction over a large distance the boundary marks will be erected at an interval not greater than 200 meters. Each cairn will have a serial number and a register should be maintained.
- 6)** The width of the clear area of the boundary of the forest will be 3 meters. Nothing will be cut growing outside the true forest boundary line. The clearing will consist of cutting

down only all the undergrowth that impedes the view, preventing one forest boundary mark being seen from its neighbouring one. No tree should be cut within this 3 meter width.

7) In addition to the boundary marks tin plates will be fixed on the boundary trees at a height of 3 meters, preferably at boundary of the two compartments. These plates will indicate the compartment numbers, with arrow and below them will be pillar numbers closer to the either side of the tree. The metal plates will be of the size 45cm X 45cm and will be written in red.

SECTION: 14: OTHER IMPORTANT REGULATIONS.

58. Area register shall be updated every year according to the changes brought about during detailed survey and demarcation of the areas as described above.

59. The pillars should be given serial number in progressive manner and its location should also be given on the map of 1 : 15000. The forest guard of the beat will be responsible for the maintenance and protection of the boundary marks in the forests of his beat. He will himself will colour wash them annually after rains and will make a special report of having performed this work. The Beat Guard should visit 100 percent pillars and give a report about its condition to Forester.

60. The Round Officer will be responsible for the maintenance and protection of the boundary marks in the forests of his round and he will see that they are maintained properly repaired and colour washed by the beat guard, as provided in this chapter. The round officer will check all the boundary marks in a year. He will make a mention of this in his diaries. The round officer will annually submit a certificate to the RFO. And the RFO submits a demarcation certificate to DCF after inspection annually.

61. **Damage to Pillars:** - In case of damage to the pillars the concerned Forest Guard should verify whether it is natural or damaged by some offender. In case of an offence the offence should be registered under section 63 of the IFA 1927, altering, moving, destroying or defacing any boundary mark of any forest to which the provisions of the act apply, is punishable with imprisonment for a term which may extend to two years, or with fine, or with both. This offence is non-compoundable under section 68.

62. To repair the damaged pillars the RFO should prepare the estimate, with proper material evidence like photographs and submit it to ACF, ACF after due verification should submit to DCF with proper recommendations. DCF should provide funds for the repair of these damaged pillars.

63. Territorial D.C.F. shall also supply the copy of the corrected maps and area register to C.F. Working Plans every year in the month of June.

CHAPTER XIX
ECO TOURISM (OVERLAPPING) WORKING CIRCLE

SECTION: 1: INTRODUCTION:

1. Eco tourism is the new buzzword in the realm of tourism throughout the world. Mr Hector Ceballos Lascurain is the father of Eco tourism who coined the word ECO TOURISM in 1983. He said "Eco Tourism respects the environment, encourages and promotes the well being of local people. Nature tourism may or may not do this".
2. Eco-Tourism is an Industry which is supposed to make low impact on the environment and local culture, but help in creating more jobs in tune with the policies of Bio-Diversity Conservation.
3. A mechanical implementation with an over emphasis on physical and financial targets with out making an attempt to understand the spirit of the program would end up in causing irreparable damage to the environment. It is more difficult to establish and run a successful eco tourism enterprise. A main difference is the need to take into account the environmental factors and successfully integrate them with business and social concerns in a carefully thought out and implemented plan.
4. Eco tourism generates more employment and provides enormous opportunities for entrepreneurship. Once hassles are removed and tourism sector becomes dynamic, the entrepreneurs will sprout to capitalize on opportunities to create wealth and new jobs.
5. Eco tourism management seeks to integrate and balance several potentially conflicting objectives, protection of natural and cultural resources, provision of recreation opportunities and generation of economic benefits. In the absence of effective planning and management, ecotourism can lead to significant negative impacts on vegetation, soil, water, wildlife and historic resources, cultural and even visitor experiences such as visitor crowding had conflicts. Such impacts can be both ecologically and culturally significant and may negatively affect visitor satisfaction. Visitation may diminish along with the economic benefits and resource protection incentives.
6. Eco tourism has been the fastest growing sector in tourism with an estimated annual growth rate of 10 to 15% over the last few years and it is expected to grow even more in future. The present government emphasis is on eco tourism, with proper planning it is a one- time investment activity, which triggers enormous employment opportunities in various fields like transportation, restaurant, hotel, tourist guide, shopping, other entertainments like cinema halls etc.
7. The Government of Maharashtra has resolved vide its order dated 20th February 2008, and outlined the Eco-Tourism Policy of the State Government, which shall be the guide-stone in formulation and implementation.

SECTION: 2: WHAT IS ECOTOURISM ?

8. Ecotourism is responsible travel to natural areas, which conserves the environment and improves the welfare of local people. (The ecotourism society 1993).

9. Tourism that involves travelling to relatively undisputed natural areas with the specified object of studying, admiring and enjoying the nature and its world of plants and animals as well as any existing cultural aspects found in these areas is defined as ecotourism.(World Tourism Organization).

10. Ecotourism is about satiating a hunger for nature, about exploiting tourism's potential for conservation and development and about averting its negative impact on ecology, culture and aesthetics.

11. Wildlife Tourism/ Ecotourism doesn't necessarily mean 'commercial tourism'. The objectives broadly include devising strategy to-

- a. Maximize people's enjoyment of their stay through education and recreation,
- b. Minimize the impact on habitat and wildlife.
- c. Increase the visitor's concern for nature conservation.

12. The general list of activities which merit attention with varying intensities, to be in tune with the ground reality, include:

- a. Wildlife viewing-
 - i. On foot
 - ii. On bicycle/ horse-cart/ rickshaw etc.,
 - iii. On elephant/camel/horse
 - iv. From car/mini bus/jeep
- b. Walking and trekking-
 - i. Short trail
 - ii. Long trail
 - iii. Trek
- c. Education/Information/Entertainment-
 - i. Guided tours
 - ii. Interpretive walk
 - iii. Meet the park director/range officer
 - iv. Films or Audio-Visual presentations
 - v. Library
 - vi. Exhibition or Visitor centres.
- d. Cultural Activities/Sight seeing-
 - i. Visits to historic buildings
 - ii. Visits to religious shrines/temples
 - iii. Observing village craftsmen at work

- iv. Tribal dance
- v. Visit local fairs and festivals
- vi. Interesting development works (dams)
- e. Social Gathering-
 - i. Picnic
 - ii. Campfire/camping
- f. sporting activities-
 - i. mountaineering
 - ii. rafting/boating
 - iii. swimming/diving
 - iv. fishing (sport)
- g. games & play-
 - i. playground
 - ii. joy rides.

13. While devising strategy to encourage wildlife tourism in the district, it is pertinent to observe that all the provisions of the Forest Conservation Act, 1980 and the observations of the Honourable Supreme Court of India, the law of the land are borne in spirit and action.

SECTION: 3: BASIC PRINCIPLES OF ECO TOURISM:

- a. Avoids negative impacts that can damage or destroy the integrity or character of the natural or cultural environment being visited.
- b. Educates the traveler on the importance of conservation
- c. Directs revenues to the conservation of natural areas and the management of protected areas.
- d. Brings economic benefits to local communities and directs revenues to local people living adjacent to protected areas.
- e. Emphasizes the need for planning and sustainable growth of tourism industry, and seeks to ensure that tourism development does not exceed the social and environmental "carrying capacity".
- f. Retains a high percentage of revenues in the host country by stressing the use of locally owned facilities and services.
- g. Increasingly relies on infrastructure that has been developed sensitively in harmony with the environment.

SECTION: 4: SUSTAINABLE FOREST MANAGEMENT ECO-TOURISM AS A TOOL:

14. Forestry has traversed through various phases over the past century. During British rule the main focus was on production forestry and after independence the focus slowly shifted

from production forestry to protection forestry. However with rapidly increasing human and livestock population there is immense biotic pressure on our forests. In order to solve the predominant human-forest conflicts, the concepts of people's participation and Joint Forest Management have been evolved.

15. To maintain the forests sustainably over an indefinite period and its dependence on both government and foreign grants is to be reduced there is an immediate need to evolve a revenue-generating aspect of forestry that does not result in the extraction of any forest produce i.e. timber, firewood etc. The only way to bring this sort of revenue generation is through Ecotourism. It is in this sector that the future of forestry lies. In the new millennium, the time has come to move from merely conservation forestry to towards "Intellectual Forestry", the basis of which is **Ecotourism**.

16. Greater awareness generation among the public:

It is observed that whenever on talk of stake holders in forestry, the focus is always on forest dwelling communities, forest dependant communities, local NGO's and the forest department. The city and town dwelling urban forest independent communities are not at all considered as having any stake in the forestry. It is a matter of irony, however that almost all the decision makers and opinion-leaders of the country, be they top bureaucrats, judges, industrialists, famous personalities and even politicians, etc are all members of this community. Even though this segment comprises only a small percentage of country's population, its ability to influence decision making is much more significant. The new GR on FDA has given a new direction in involving the towns and cities in Joint Forest Management.

17. Ecotourism is the best possible manner in which these forest independent communities can be made aware of forestry in India. Ecotourism could also expose school children – the future generation of policy makers to the relevance and importance of our forests. As people today are becoming increasingly aware about environmental issues, this is the right time to promote ecotourism.

18. Benefits for the local communities: Ecotourism can play a very significant role in reducing the dependence of local communities (both forest dwelling and forest dependent) on the forests. Setting up of an ecotourism unit would not only provide them with a means of employment at the unit itself, but would also make them stakeholders in the financial progress of such an enterprise. The Eco-tourists would also constitute a ready made markets for NTFPs such as honey, charoli, dhawada gum and other items such as embroidery products, local handicrafts etc, at their door steps. High quality micro enterprises such as poultry farming, vegetable supply units could also be set up and centered on the ecotourism unit. Such a Participatory Ecotourism Strategy (PES) would not

only cut operational costs for the ecotourism unit but would at the same time reduce the traditional dependence of the local communities on the adjoining forests by providing an alternative source of livelihood. In addition to the above, ecotourism could be used as an effective communication and extension tool to convince the local communities and especially the children there in about the benefits of conserving the forests and natural ecosystems.

19. Local youth will be selected and training will be given to them on ecotourism and related topics like identification of birds, animals, flora and other important features that are seen during the tour. The traditional knowledge of the tribal youth will also be utilized during the tour.

Benefits for the Forests and the Forest Department:

20. By providing the local people with alternative sources of income, ecotourism would drastically reduce the biotic pressure in the region which would automatically lead to greater habitat improvement. Other habitat improvement work such as clearing weeds for making view lines, creating salt pits for the wild life etc. would be mutually beneficial for both the forest and the eco-tourists. The unit operates and the visiting ecotourists would also back up as eyes and ears of the forest department in curbing all illegal activities such as felling, poaching etc. The forest department would also get an opportunity to educate the city dwellers, villagers.

21. The forest department has hitherto largely been perceived as far removed from the general public. Ecotourism is the best way in which the public can be made aware of the pivotal and difficult role that is played by the forest department in conserving India's forests. This would in turn lead to much greater appreciation of Forest department and increase the importance that is attached to it.

SECTION: 5: MAJOR PLAYERS IN ECOTOURISM:

Major players in the formation of eco tourism triangle are:

1. Local people and NGOs.
2. Government Agencies.
3. Tour Operators.

The purpose of this conceptual frame work with in which the ecotourism should take shape in field is to ensure that protected areas are in a position of authority with ecotourism growth. Ecotourism will be a successful industry only if natural resources are protected. And natural resources will be best protected of there is a strategy frame work in place and park staff and local communities understand the concept and take a lead role in the process. One important measure of both the success and sustainability of ecotourism is the management

of visitor impacts to ensure the long term protection of natural and cultural resources, as well as continued visitor enjoyment and use.

SECTION: 6: ECOTOURISM POTENTIAL OF AHMEDNAGAR FOREST DIVISION:

22. Ahmednagar district offers good scope to develop ecotourism circuits. The district offers exciting opportunities to develop Religious circuits, Wildlife circuits, and Highway Tourism.

23. Ahmednagar is renowned as the land of Saints. It boasts having had given shelter to the great saints and temples including- Sai Baba of Shirdi (Rahata), Shani Shingnapur temple (Newasa), Sant Gyaneswar mandir (Newasa) where the religious scripture 'Gyaneswari' was written, Datta Mandir at Devgad (Newasa), Miravli Dargha (Nagar), Kanifnath Mandir at Madhi (Pathardi), Vriddeshwar temple at Tisgaon (Pathardi) Mohota devi mandir at Mohota (Pathardi), Takli Dokeswar Temple, Baleswar temple, Kakatai temple (Rahuri), Pimpalgaon malwi (nagar), Jawle-Baleswar temple (Sangamner) which are frequented not only by religious tourists from within the district and state of Maharashtra, but also from other states in the country and foreigners too.

24. Other places which hold scope for development of Tourism facility include Chand Bibi Mahal, Ahmednagar fort, Kharda fort, Bhandardara Dam, Mula Dam waters.

25. In addition to these places Ralegaon Shindi, Hivre Bazaar, Dolasne, Daraewadi, and of late Dorje need to be showcased for participatory excellence in Rural Development. Each of these spots should be examined afresh from the Forestry and Ecological point of view and Eco-tourism potential needs to be developed.

26. Highway Tourism could be developed in the form of developing Eco Tourism Natural Interpretation Centres, Van Vigyan Kendras at Chand Bibi Mahal, Newasa Phata, Chandnapuri ghat, Akole-sugaon nursery, Samvatsar-Shirdi, Pandripul ghat, Supa ghat, Karanje ghat, Rahuri Agricultural College campus, Vriddeshwar, Siddhtek need to be developed, wherein in addition to information, sale of forest saplings medicinal plants and forest products could be encouraged.

27. Though the district holds promise on various counts priority is to be given to those sites identified by the Office of the Principal Chief Conservator of forests, Maharashtra, in this regard while implementing the Eco-tourism projects. The sites identified in this regard in the district are as under:

s.no	Place with tourism potential
1	Pimpalgaon-malvi
2	Chandbibhi mahal
3	Sautada (Bhandardara-Rajur)
4	Mohata devi (Akole, Rajur)
5	Madhi (Rajur)
6	Rehekuri WLS (Karjat)
7	Takli Dhokeshwar, Dhokeshwar mandir (Takli Dokeshwar)
8	Harishchandragad (Rajur)
9	Kalsubai Dongar & WLS (Rajur)
10	Ghatghar, Udanchal Jal vidyut prakalp (Rajur)
11	Malganga kund & Nidhoj Waterfall (Takli Dokeshwar)
12	Ratanwadi (Rajur)
13	Vrideshwar mandir (Tisgaon)
14	Javabaleshwar (Sangamner)
15	Bhandardara dam (Rajur)

ECOTOURISM COMPLEX – Objectives / purpose / functions.

28. The complex which may go by name as Eco-Tourism complex or Nature Interpretation Centre, or Van Vigyan Kendra should be such a structure, which should not only showcase the importance of nature, educate the viewer the rich heritage he has inherited for safe-handling and handing over to posterity, have place to reside for a day or two with basic facilities at nominal rates, serve as a place wherein method demonstrations of successful experiments are in practice to enable

“learning by doing and seeing is believing”,

and have facility for boarding. The purpose is-

1. To provide eco friendly infrastructure preferably on the fringes of wild life protected area which takes care of minimum lodging and boarding facilities in pucca houses, huts, machans and tents as per requirements of the tourists.
2. To provide mini- libraries to enable visitors to spend their time usefully and elicit support for protection of wild life.
3. To provide indoor games like carrom and chess for the entertainment of visitors.
4. To earn revenue for the state government.
5. To provide income to local people by employing them as guides, watchers etc.
6. To facilitate sale of locally made crafts to tourists.
7. To impart education on nature conservation.
8. Lastly, to facilitate all round development.

29. **The** activities which could be implemented in these Van Vigyan Kendras could be from-

- a. Nature Interpretation centre
- b. Audio-Visual theatres/conference facility
- c. Medicinal plants demonstration plots
- d. Humus-Organic farming demonstration plots
- e. Forest produce stalls.
- f. Boarding/lodging facility
- g. Nakshatra van etc.,

The relevant extracts-guidelines for establishing of the same are separately appended in the Volume II of the plan as a separate annexure.

SECTION :7: RESOURCES REQUIRED FOR DEVELOPMENT OF ECOTOURISM/FUTURE COURSE OF ACTION:

30. The Deputy Conservator of Forest should take initiative to prepare plans and estimates for the developmental activities at these places of interest and submit the estimates to Forest Department, District Authorities or Maharashtra Tourism Development Corporation for resources. In eco tourism it is a one time capital investment provides platform or triggers multi dimensional activities like transportation, food industry, shops for locally made articles in these places of interest.

31. Recent directives as laid down in the Eco-Tourism Policy of the Government of Maharashtra resolved vide its order dated 20th February 2008, shall act as guide-stones.

CHAPTER XX
MISCELLANEOUS REGULATIONS

SECTION 1. PETTY FELLINGS (IRREGULAR HARVESTING):

1. Restriction on Petty Fellings (Irregular Harvesting): Irregular harvesting of timber, firewood and other NTFPs is prohibited, except in the following cases:

- a. **Harvesting for the fire lines and the transmission line:** The Deputy Conservator of Forests shall permit felling of trees within the prescribed width of the established fire lines and the approved power transmission line. The prescribed width in the guidelines for the Forest (Conservation) Act, 1980 and rules, there under, shall be applicable to the transmission lines. Creation of new fire lines shall require prior permission of the Conservator of Forests.
- b. **Felling for the haulage roads:** The Deputy Conservator of Forests shall permit felling of trees for the purpose of haulage roads, which shall be aligned properly to ensure minimum possible felling of trees.
- c. **Harvesting in forest areas diverted for non-forestry purposes:** Felling of trees on forest land required by the other departments such as Irrigation, PWD, etc., shall be undertaken after the proposals for the use of forest land for non-forest purposes are approved by the Government of India under the provisions of the Forest Conservation Act, 1980. The Deputy Conservator of Forests shall permit felling of trees of forestland diverted for the non-forestry purpose as approved under the provisions of the Forest (Conservation) Act, 1980. The material obtained from such harvesting shall be brought to the depots and shall be disposed off as regular coupe material.
- d. **Harvesting of dead fallen and uprooted trees in the storm:** Removal of dead, fallen firewood and trees uprooted by wind of storm from all parts of the forest, except the coupes due for working, shall be carried out in the following manner. Every year in the month of October each beat guard shall report the availability of dead, fallen firewood and trees uprooted by wind or storm to the concerned Range office. The Range Forest Officer shall estimate the availability of such material in each compartment and ACF concerned shall verify the same. If more than 2 (two) such trees per hectare is estimated,

proper marking shall be carried out. Two dead and fallen trees are required for retention for wildlife conservation. Wood removal shall be carried out from the compartment after the approval of the Deputy Conservator of Forests. The details of material obtained from each compartment and revenue realized from it shall be entered in the respective Compartment History Form. Harvesting of dead and fallen firewood is governed by the *Nistar* privileges as admitted in the *Nistar Patrak* or directed by the government from time to time. The *Nistar* holders are allowed to collect such material directly from the forests on rated passes or in the manner prescribed in the relevant directives.

2. No irregular harvesting, for the purpose of undertaking plantations/ afforestation works under scheme outside the scope of this working plan shall be taken up in any of the forest areas under the working plan.

SECTION 2. DEVIATIONS:

3. Following is the format Deviation Statement:

Statement Showing Deviations Form Working Plan Prescriptions

YEAR -----

DIVISION-----

Serial No. of deviation	Control book name, form no. Page	Reference to working plan		Nature of deviation requiring PCCF's sanction
		Paragraph	Nature of Prescription	

4. The DCF shall forward through the Territorial Conservator typed copies of this form in triplicate, yearly, with his coupe control forms. No explanatory remarks are required on this form, but these should be given in the forwarding letter. One copy of the statement will be returned to the DCF and another to the Territorial Conservator after the deviations have been sanctioned by the PCCF. If the PCCF or the Working Plan Conservator's sanction has been obtained in advance, the sanction number and date should be quoted in the last column.

5. All deviations, which permanently alter the basis of management laid down in a working plan, will require prior sanction of the PCCF. All deviations, which do not permanently alter the basis of management and with the necessity of which he agrees, may be approved and sanctioned by the Working Plan Conservator on behalf of the PCCF. In

case where there is difference of opinion between the Working Plan Conservator and the Territorial Conservator, the former will refer them to the PCCF for instructions. The PCCF/CFWP, as the case may be will countersign the deviation statement.

6. Minor deviations can be sanctioned at the level of the CF Working Plan or the PCCF as the case may be; but the PCCF, before sanctioning the major deviations of following nature, will necessarily take prior approval of the Regional CCF of the Ministry of Environment and Forests

- (i). Change in Silvicultural Systems;
- (ii). Clear Felling of Natural forest;
- (iii). Formation of new Felling Series; and
- (iv). Large scale felling due to natural calamities, which cannot be adjusted against future yield.

Criteria and Indicators of Sustainable Forest Management:

7. The government of India, the State Government, and IIFM-Bhopal are in the process of finalizing the criteria and indicators for monitoring and evaluation of Sustainable Forest Management. As and when these are finalized, the monitoring and evaluation of implementation of the working plan will be done accordingly.

SECTION 3. RIGHTS AND CONCESSIONS:

8. As per Forest policy of 1988, the first charge on the forest produce is that of tribal and other villagers living in and around the forest. Accordingly the forest produce obtained from the forest will first be supplied to the people living in the villages notified for nistar purposes at the rate fixed by the Deputy Conservator of Forests in consultation with the District Collector. Only the surplus forest produce of the forest produce, which is not required by the local people, will be sold in open auction. The following forest produce to be given to the local inhabitants as nistar as per due process.

- a. **Bamboo:** There are large number of Burads families in the district who prepare bamboo mats and other articles to earn their livelihood. Bamboo is required for agriculture purposes as well. Taking into consideration their long pending demand for supply of bamboo at nistar rates, Government of Maharashtra has issued resolution no. ABS-1095/C/no. 128/f-9 dated 3-th May 1997 for the supply of bamboo to the above mentioned people at *Nistar*

rates. As per this resolution 1500 bamboo per family per year are to be given at *Nistar* rates, to be sanctioned by the **Conservator of Forest** in consultation with the District Collector, to the registered *Burads* families who depend on bamboo for their livelihood as well as to the institutes which give training for preparing articles out of bamboo. The bamboo depots will be increased as per the availability of bamboo to meet the requirement of the people.

- b. **Small Timber, Poles And Fire Wood:** Small timber and poles required for agricultural purpose and repairs to houses as well as firewood for domestic use will be supplied from the depots at concessional rates to the villagers living near the forests, depending upon the availability of these produce. Depots will be opened at suitable places, throughout the division, so that people have to traverse minimum possible distance to procure these products. Range, round or beat head quarters are proposed for this purpose, so that supervision and maintenance of these depots become convenient.

SECTION 4. RESEARCH PLOTS:

- 9. It is necessary to emphasize the fact that experimental and sample plots and their demarcated surrounds are under the complete control of the Silviculturist and are thus excluded from all operations prescribed in the Working Plan. No Research Plots, Experimental, Seed plots are laid out in the Ahmednagar forest division.

SECTION 5. ROADS, PATHS, BRIDGES AND BUILDINGS:

- 10. The Public Works Department of the state government of the *Zilla Parishad* maintains large number of roads passing through the forest area. Some stretch has been permanently transferred to the department. Proper records of these roads must be maintained on priority basis.
- 11. Forestry operations and forest protection should determine the priority for maintenance of the forest roads.
- 12. Unwarranted up-gradation of the forest roads shall be discouraged, but necessary culverts shall be constructed for forest protection. The list of buildings in charge of the division is given in the Appendix

13. Action for construction of accommodation for the staff for the newly created Sangamner sub-division commensurate with the staff posted is required to be taken by the D.C.F. on priority.

SECTION 6. DEMARCATION AND PROTECTION:

14. In order to keep the integrity of forest areas intact, strict vigilance over the forest boundary and periodic verification of the demarcation on the ground for the entire forest area has been prescribed. However, in view of the position of demarcation and boundary pillars on the ground **concrete boundary pillars**, as prescribed by the PCCF, shall be erected on the external boundary of the entire Reserved Forests and unclassified forests as per 1/5th boundary demarcation scheme. The 1/5th boundary demarcation scheme is given in Annexure L and LI of Volume II of the plan.
15. **Routine boundary maintenance:** The Beat Guard after his inspection of the entire compartment must submit the Compartment Inspection Certificates every month to the RFO, before disbursement of the monthly salary. The certificate must record forest encroachments, illicit cutting and condition of forest boundaries including pillar numbers and inter-pillar visibility conditions. Separate certificate should be submitted for each compartment.
16. The Round Officer should submit certificates for his inspections. Half of his certification should involve checking of the work done during the previous month by the Beat Guards in his jurisdictions, and the other half should involve checking of the compartments not reported by the Beat Guards during the months. He should also submit monthly report regarding the action taken on the forest offences recorded and the progress of the forest enquiries entrusted to him. The pillar inspection certificate of round officer should be in the following proforma,
17. I Shri _____ Round officer of _____ round in _____ range certify that annual length of the boundary lines as prescribed under the scheme given in Appendix No: _____ of the working plan for the forests of _____ Forest Division has been verified by me personally and that boundary lines and marks are found to be correct as per the maps. I further certify that the next cairn on other side is visible and they are in proper condition and bear correct serial no. There are no encroachments

18. The Range Forest Officer can allow the delay not exceeding 15 days for reasons recorded in writing. Default on this account for 2 months should be viewed as dereliction of duty and should attract disciplinary action.
19. The Range Forest Officer shall check the accuracy of the Compartment Inspection Certificate according to the prescribed norms covering each round. He shall personally check at least 1 (one) vulnerable compartment other than those covered by the Beat Guards and the Foresters during the previous month. The certificate of RFO should be in the given format,
20. The Range Forest Officer will submit a certificate to DCF annually in the following form.
21. I -----certify that ----- percent of boundary line of 1/5th boundary demarcation as shown in Appendix ... of the working plan of _____ and _____ on Forest Divisions and that the boundary line and pillars are found to be correct as per Demarcation Register and maps. I further certify that the next pillar on either side of a pillar is visible.
22. There are no encroachments.
 - a. The Range Forest Officer, Mobile Squad will co-ordinate cross-checking of compartment inspection certificates.
 - b. These guidelines shall be applied along with other directives issued for the forest protection from time to time. Other field officers shall carry out their field inspections according to these guidelines as modified from time to time.
 - c. **Specification of boundary pillars:** The May 2001 instruction referred above directs placing 1.40-meter long cement concrete pillars (Class I) at roughly 200 meters interval or whenever there is a change of direction. and Class II pillar at every 50 meter distance between Class I pillars. In an undulating terrain the line of sight should be the criteria to fix the pillar, if the sighting of the pillar is becoming difficult, then at less than 50 meters the class II pillar may be fixed. Both types of pillars should be embedded to 0.40 meter depth in the pillar is 0.10x0.15 meter at the top and 0.15x0.23 meter at the base. The 0.90-meter pillars are parallel pipes with 0.15-meter width and thickness.

The prescribed design must be followed to carry out the task of fixing the boundary pillars as prescribed.

- d. **Specification of a boundary cairn:** Artificial boundaries should be marked with a series of boundary Cairns. A cairn should be made of loose stones upon excavated foundation to a depth of 30 (thirty) centimeters and shaped like a truncated cone. Interspace between the large stones should be filled in with small stones, and the outer stones will be wedged with stone chips. A cairn will be 1.20 meter high, and have 1.20-meter top diameter and 1.80-meter base diameter, as described in the Central Province and Berar Forest Manual. A slab (0.20x0.20x0.90 meter) of a timber stake projecting $\frac{1}{2}$ (half) meter in the center will be fixed firmly on the top of the cairn, and marked with cairn serial number. Each boundary marks (cairns) must be visible from its neighbouring once on both sides. Distance between two consecutive boundary marks should not exceed 250 meters. The cairn stone or post should be colour washed white for the open forests and red for the closed forest. The cairn tops should have direction of boundary lines shown by the same colour lines radiating from the center. Such cairns can be made of earthen mass, where stone boulders are not available.
- e. **Recording locations of the boundary pillars or Cairns:** The location of the boundary pillars and Cairns along with their numbers should be shown on the maps. The numbering will follow the convention communicated by the Chief Conservator of Forests in charge of the land matters. The numbers shown on the topo-sheets will be maintained unless warranted by the compelling reasons. Such reasons must be reduced in writing and entered as a note on the master set of the maps. This master set will be made available to the Working Plan Division for updating the working maps and the digital database.
- f. **Clearance boundary line:** Boundary line clearance on the artificial boundaries will follow the standard width as described in the directives on the subject. Trees should not be felled for the boundary line, but shrubby undergrowth should be cleared. Norm for the external boundary line is 12 meters. The internal compartment boundary lines should be 3 meter wide.
- g. **Compartment plates:** Metal plates on the boundary trees at a height of 2.5 to 3.0 meters will be fixed on the corners and roughly at half-kilometer interval on the side way from the compartment. The colour of the plate and lettering should agree with the state-level general guidelines. Till such guidelines are available, red letters on white plates will be used. Size of the plate and letters

should not be less than 55 cm and 10 cm, respectively. Strokes should be at least 2cm wide.

- h. **Colour wash on the boundary marks:** The Beat Guard will be responsible for annual freshening of the pillar numbers, the compartment plates and the colour-wash of the boundary pillars carried out in September-October. He must submit details for work done in each compartment in his Annual Colour-Wash Report. The Round Forest Officer will carry out sample checking of the report in the manner directed by R.F.O. Only material cost should be admissible for this purpose.

SECTION 7. DEMARCATION, PREPARATION OF TREATMENT MAP AND MARKING OF COUPES.

23. **Demarcation OF Coupe:** The annual coupes for the afforestation and tending operations shall be demarcated in year in advance, and each coupe shall be subdivided into four sections for effective management and control. The Range Forest Officer shall inspect the coupe after demarcation and issue Coupe Demarcation Certificate in the prescribed format, given in the following paragraph, which shall be verified by concerned Assistant Conservator of Forest.

24. Format for the Coupe Demarcation Certificate is, as follows,

I-----R.F.O. -----
----- certify that I have personally inspected the demarcation of the coupe No. ----
----- in Compartment No. ----- of W.C.----- on dated -
----- and found that the coupe has been demarcated as
prescribed in the working plan. The area of the coupe is -----hectares.

Date: **Signature of the RFO** **C/s of the ACF Date:**

25. **Demarcation Of Coupes:**

26. Annual coupe shall be demarcated by cutting and clearing bushy undergrowth on 3 (three) meter wide line and by erecting pillars of posts up to 2 meter height in the middle part of the cut line at suitable intervals, so that one pillar shall be visible from the other one, except where the coupe boundary runs along streams, fire line or road. The pillars

shall bear the coupe number, name of the felling series and the working circle on the side away from the coupe.

27. Selected trees above 45 cm gbh, at suitable intervals standing on the periphery of the coupe shall be given two coal tar bands and a geru band in between after scrapping the loose dead bark. The lower coal tar band shall be at B.H and the other coal tar band shall be 15 cm above it. Just below the lower coal tar band Tree serial number in Arabic shall be given on the side away from the area of the coupe. The band and serial numbers of such trees shall be maintained in the marking register, in the following form.

List of trees on the coupe boundary

Sr. No.	Name of species	GBH (OB)	Remarks
1			
2			
3			

28. No tree bearing coupe demarcation bands shall be marked for felling.

29. Demarcation Of Protection Areas:

30. Selected trees, on the periphery of the Protection areas shall be given two-geru bands 15-cm apart, lower band being at B.H. In addition, a cross in geru colour between the bands will also be given on the side away from the protection areas. All those trees will be serially numbered. The serial number will be given on the side away from the protection area just below the lower geru band, on the side bearing the cross. All the protection areas shall be numbered in Roman numerals and the trees standing on the periphery of each protection area shall be numbered in Arabic, adopting separate series for each areas, so that the trees on periphery of Protection Area No. I will be the Sr. no. I/1, I/2, I/3, etc. and the similar trees on periphery of Protection Area No. II will bear the Sr. no. II/1, II/2, II/3, Etc.

31. **Demarcation Of Other Areas Given In The Treatment Map:** The other categories of areas shown in the treatment map shall be marked by giving one geru band at B.H and one coal tar band 5 cm above it.

Treatment Map:

32. Immediately, after completion of demarcation of the coupe, RFO shall prepare the Treatment map of the coupe as prescribed in earlier, clearly showing the various Treatment-type areas in the coupe. The concerned ACF will verify the treatment map and make corrections, if necessary, before the submission to the DCF for approval.
33. The compartment maps prepared in the Forest GIS Cell, Aurangabad, shall serve as the base maps, which would be used for making areas suitable for different treatment types. Corrections in the base maps, if any, and observations on crop conditions in the coupe shall be recorded and sent to the Working Plan Officer Nashik henceforth who has jurisdiction over Ahmednagar division for verification and updating the digital database.
34. Preparation of treatment map shall be preferably be done one year in advance of the coupe working. Timely preparation would facilitate necessary checking and corrections, if any, in time.
35. Immediately, after seeking the approval of the treatment map site specific Work Plan for the entire coupe shall be prepared by RFO, incorporating all the prescribed activities under various treatment-type areas marked on the map, entailing quantum of work involved, estimated amount required and period of operation for each activity. The Work Plan shall be verified by the ACF concerned and submitted to the DCF for approval by the DCF. The work plan shall be approved sufficiently, in advance, i.e. the before starting of coupe working in the respective coupes.

Marking Of Trees For Harvesting- not exactly applicable here in Ahmednagar division, however rules are mentioned for ease of availability in near future.

36. After the approval of treatment map, marking of trees for harvesting shall be carried out as per prescriptions given in respective working circles. Marking of trees for harvesting shall be done one year in advance of the coupe working. Timely marking would facilitate necessary checking and corrections, if any, in time.
37. Marking shall be done under the close supervision of RFO and inspected by the ACF concerned. The DCF shall himself inspect majority of coupes to ascertain proper marking as per prescriptions of working plan as well as to guard against the excessive marking, if any.

38. Trees marked for felling shall be given geru bands at breast height and will bear marking hammer impression at the B.H (breast height) and at the base on the blazes of sizes 10 cm x 10 cm.
39. Following trees, in addition, will bear digit serial numbers both at BH (breast height) and at the base.
- All trees of Teak, *bija*, *shisham*, *ain*, *tiwas*, *haldu*, *kalam*, *dhaora* and *siwan*, of 45 cm and above girth at b.h (ob).
 - Trees of all other species, of and above, 60 cm girth at b.h.
40. The remaining trees marked will bear serial numbers, which will be given by coal tar. The digit and coal tar serial numbers will form separate series. The number of the tree marked shall be written vertically on the blaze, shown as under.

For Tree no. 210

XX (Hammer mark) 210

41. All trees bearing serial numbers shall be recorded in marking (recording) book, in, the following, Form Serial number given in coal tar must be recorded in the marking book.

Format for marking of trees for harvesting.

Tree Digit No.	Serial No. Coal tar	Name of species	GBH (OB)	Remarks

42. Abstract of trees marked for felling will be made species wise in 15-cm girth classes. Timber, poles and firewood trees shall be shown, separately.
43. Malformed trees alone shall be recorded as fuel trees, except that of teak. A tree shall be classified as fuel tree only when it is incapable of yielding any useful sawn timber.

Soil And Moisture Conservation:

44. The areas adjoining the human habitation have become devoid of vegetation by way of illicit cutting, heavy grazing and repeated fires. The compaction of soil reduces percolation and water holding capacity of the soil. Due to these factors NR of teak and its associates die back before being established.
45. The soil and moisture conservation is crucial to maintain and improve the site conditions as well as water regime of a given tract. Moreover, extensive silvicultural works have been prescribed in this working plan to regenerate the forests primarily assisting and tending the existing NR and available rootstock. To ensure the success of these operations in improving the forests, soil and moisture conservation works are of utmost importance.
46. The soil and moisture conservation works would start along the marking of coupe and be completed before the onset of monsoon. Wherever feasible, the material obtained from climber cutting, bamboo cleaning and shrub clearance shall be used for brushwood check dams to arrest the soil loss.
47. It is prescribed to follow watershed management approach viz. The ridge-to-valley approach for carrying out soil and moisture conservation works. The contour trenching and gully plugging/check dams, as given under, have been prescribed to constitute the major component of these works. Preference is for vegetative and other methods, rather than erecting concrete structures in the forest.

48. Continuous Contour Trenching:

- a. The continuous contour trenching is prescribed in areas having density less than 0.4 and slope below 25. The size of the trench is 30 cm deep and 60 cm wide. Dug up soil from the trenches will form a ridge on the downhill side, and pebbly material from the trench will be neatly pitched on the lower side. Agave bulbils, and other suitable soil binding species will be planted on the mound at one-meter interval in two staggered rows set 20 centimeters apart on the downhill side. The mound will also have sowing of seeds of *khair*, *babhul* and *neem*, etc. *Chilati* seeds may be preferred on refractory sites.
- b. Trenches near the nala are prescribed to be discontinued and curved upward at both sides of the nala at 45° to prevent the run off of water stored. Contour

trenches will normally be not more than 10 meter in length, and two contour trenches will be spaced based on the slope.

49. **Nala Bunding and Check Dams:**

- a. The primary objective of nala bunding and check dams is to reduce the run off water and to arrest the silt. They are prescribed to be made from the loose boulders found in and around the nala bed or from the dug up soil. No blasting shall be done for this purpose. Where sufficient boulders are not available brushwood may be used. In this plan check dams of both the loose rubble for arresting silt and soil loss and earthen gully plugging (nala bunds) for moisture conservation and water harvesting are prescribed.
- b. The structure and quantum of work will depend upon various factors such as the erosion status, ground conditions, local availability of suitable materials. The streambeds more than 8 meters in width shall not be covered under the nala bunding. Nalas more than 8 meter wide at the top should normally require elaborate engineering structures for bunding, and therefore, such bunds should not be considered as part of the quantity prescribed here. Each of such nala bunds, if required, should be treated as an independent project,
- c. The forest tanks are proposed to be taken up in exceptional circumstances without causing damage to the tree crop either during construction or due to submergence, strictly under the provisions of the Forest Conservation Act. Construction of Cement bandharas on a large extent is to be avoided, with more emphasis to be placed on utilization of vegetative and eco-friendly technology.
- d. Keeping in view the immense work already carried out in the district, any additional works proposed are to be duly verified and ascertained by the Assistant Conservator of forests prior to obtaining sanction.
- e. To prevent the soil erosion on the slopes contour stone bunding having the size of 60 cm x 30 cm shall be taken up at an interval of every 50 m. Where loose boulders are not available agave suckers shall be planted in two rows along the contours.

50. General guidelines for execution of Soil Moisture Conservation works:

NABARD after detailed study in the area has come out with prescriptions for the areas which come under Ahmednagar division for choice from methods mentioned below:

LAND USE	TREATMENT	Cross section	Max unit/ha
crop cultivation	Contour bund/ farmbund, vegetative bunds	0.45-1 sq.mt	250-400 rmt
	Stone outlets		
	Earthen gully plugs	1.5-2.5 sq.mt	As per site
	Grass seeding on bund		
Afforestation	WAT	1	300 rmt
	CCT	0.18	1200 rmt
	Refilling of CCT	0.24	600 rmt
	Plantation		
	Stone bund	0.45-0.60	300 rmt
	Gully plug	1	
Drainage line	Loose blder struct		
	Earthen gully plug		
	Nala bund		
	Check dam		

51. Plantation Guidelines:

52. From the beginning of scientific forestry, the plantations has been recognized as prominent activity to afforest and enrich denuded and under stocked forest tracts. It is prescribed to supplement the activity at places where natural regeneration is inadequate or is not likely to succeed. The following guidelines are, hereby, prescribed for adherence for undertaking plantations under this plan.

53. **Consistency in plantations schemes:** Since plantation schemes providing the funds may not exactly match with the prescriptions of this plan, all efforts will be made to bring the discrepancies to the notice of the concerned authorities so as to bring the scheme in consonance with the plan prescriptions.

54. **Tending of natural regeneration:** All seedling and saplings of valuable species more than 60 cm in height will be treated at par with planted seedling; and tended as a part of future crop. Spacing operations, if required, will be carried out to leave nearly 400 saplings per hectare at an average of 5-meter spacing. The natural regeneration present shall be assisted and encouraged by soil working and mulching around them, as prescribed in guidelines for rootstock management.
55. **Plantation in working circles:** Plantations in the working circles will be taken up as under. The PPO/PYO (pre-planting operations) shall be taken up in the year of coupe working, while the seedling planting and other FYO (first year operations) activities shall be carried out in the following year. Other plantation works will follow in the sequence. The cleaning and thinning operations in plantations will be done in the fifth and eleventh year of plantations. The extent of plantation should not exceed the prescribed staff norms.
56. **Choice of species:** Valuable local species suitable for the site and favored by the local village communities will be preferred in plantations. Seedlings of edible fruit yielding forest species may constitute up to 20 percent and seedling of medicinal plants up to 5 percent of the planting stock. Stakes or tall planting of suitable species, such as, *ficus*, *umbar*, etc. useful to wildlife are also proposed in plantations, up to 5 percent of planting stock. An officer not below the rank of namely Assistant Conservator of Forests should approve the final choice of species and source nurseries.
57. **Spacing in plantations:** Teak stumps from root-shoot cuttings should be planted on well-drained sites (2m x 2m spacing). Teak seedlings raised in poly-pots or root trainer containers can be used in special cases only duly recorded the reasons in the prescribed register. Mixed species plantations should be carried out at (2m x 2m), and bamboo seedlings should be planted at six-meter interval (6m x 6m). Care should be taken to avoid planting of seedlings directly under the canopy of existing trees or established saplings.
58. **Fencing of Plantations:** The plantation areas or the rootstock management areas shall be fenced by TCM (Trench-cum-mound) fencing, live-hedge fencing or suitable mechanical fencing for effective protection. TCM of the standard cross-section, one-meter deep and 1.90 and 0.60 meter wide at top and bottom, respectively is prescribed. Across the slope, however, rubble wall is proposed in place of TCM. Two rows of Agave will be planted at the outer edged along with seed sowing of *chilati*, *babul*, *jatropha*, and other local thorny species immediately before the onset of monsoon. The mechanical fencing, if

found financially viable, may be used in areas prone to heavy biotic pressure, if the situation so demands. Justification for use of mechanical fencing should be recorded in the prescribed plantation register.

59. **Pit digging:** Pits of size, preferably, 30 cm³ for planting seedling of non-teak species and 45 cm³ sides for bamboo planting is prescribed. The dug up soil will be kept on the upper side of the slope, and allowed to weather from March to the first week of May. Pit refilling must be completed before the onset of monsoon. Pits for bamboo planting shall be half filled during the refilling using topsoil from the heap.

60. **Planting:**

61. **Planting of teak stumps:** Crowbar planting of teak stumps shall be carried out within one week after the first monsoon shower.

62. **Poly-pot or root-trainer planting:** Seedling planting shall be completed within a fortnight after the first monsoon shower.

63. **Bamboo planting:**

a. Bamboo planting shall be completed within a fortnight after the first monsoon shower. Preferably, two-year-old bamboo seedlings with well-developed rhizomes of thumb thickness shall be planted. If stone mulching is feasible in the area, the pits should be refilled up to the ground. Otherwise, the ball of the earth and rhizome of the seedling shall be covered with soil and almost half of the pits should be left unfilled for reducing wild boar damage.

b. Clonal rhizome multiplication method is proposed for bamboo propagation the bamboo plants shall be undertaken under various circles.

c. Deep planting of rhizomes of bamboo have given effective results in Raigad and Kolhapur districts, hence advocated while planting Bamboo is taken up.

64. **Subsequent planting operations:**

65. **First year operations:** All weeding and soil working should be carried out in a circle of one-meter diameter around the seedlings or saplings. The first scrape weeding shall be

started immediately after completion of planting. Casualty replacement should be done in the first weeding. The second scrape weeding shall be carried out in the last week of August. The soil working and mulching shall be done in the first week of October. In case of prolonged hot and dry season, it is desirable to carry out one soil working in the month of January.

66. **First year operations in bamboo plantations:** The first weeding, casualty replacement and the second weeding should be carried out as described in the preceding paragraph. Stone mulching should also be carried out with the second weeding in bamboo plantations as a safeguard against the wild boar damage. The third weeding and soil working operations are not required in the bamboo plantation.

67. **Second year operations:** In the second year of plantation, casualty replacement should be done in the planting season. The first scrape weeding should be carried out in the first week of August, and the soil working and mulching should be done in early October. The first and second weeding should also be carried out around the seedling coppice in the plantation area.

68. **Second year operations in bamboo plantations:** The first weeding should be done in the first week of August, and it should include maintenance of the stone mulching in the bamboo plantations.

69. **Third year operations:** One weeding in the third year should be done along with the soil mulching in September. Singling of coppice shoots, management of damaged and malformed saplings, climber cutting and shrub clearance should be repeated as third year operations.

70. **Thinning Guidelines:**

71. **Definition:** Thinning is defined as a felling made in an immature stand for the purpose of improving the growth and form of the trees that remain, without permanently braking the canopy. Thinning is chiefly concerned with promoting good growth in the stems that are retained.

72. **Special objectives in thinning:** Plantations are made with various objects in view; and thinning methods have to be varied accordingly. The maximum volume production (in a given form) is generally an objective. Plantation work is expensive and it may be

desired to get some return as soon as possible; however, in this case, thinning will aim at giving some of the trees the adequate room they can utilize, thus ensuring rapid diameter growth. Plantations are all too often made in an attempt to minimize a foreseeable shortage of timber consequent on the too rapid exploitation of the mature stock of natural forests.

73. Observable Factors as the basis for thinning procedure

- i. **Tree classification:** To describe the nature and intensity of a thinning, there is a choice between qualitative and quantitative methods, the former being almost inevitably mainly subjective. The older procedures were all of former category, as would be excepted from the fact that the latter calls for standards of reference, which is still only available for a few species. The individual trees in a crop were classified by height and size of crown, whilst the thinning prescription laid down which classes were to be removed. The standard adopted is as follows:

74. (I). **Dominant Trees (D):** All trees which form the uppermost leaf canopy and have their free. These are usually subdivided as follows:

1. Pre-dominant trees comprising all the tallest trees which determine the general top level of the canopy, and
2. Co-dominant trees which fall short of this, averaging about 5/6 of the height of predominant.

Trees with normal crown development and good stem form.

Trees with defective stems or crowns, e.g.:

- b. Trees with crown space cramped by neighboring trees,
- c. Badly shaped old advance growth,
- d. Trees with forked leader and similar defects

Trees with very defective stems/crowns, i.e. with the same defects as (b) to such an extent that they are of little or no present value or promise.

Whips-Trees with very thin bole and very constricted crown incapable of existence without the support of the neighboring tree

75. **(II). Dominated Trees (d):** These trees do not form part of the upper most leaf canopy, but the leading shoots of which are not definitely overtopped by the neighboring trees. Their height is about $\frac{3}{4}$ that of the tallest trees

- i. Trees with normal crown development and good stem form.
- ii. Trees with defective crowns or stems.

76. **(III). Suppressed Trees (s):** which reach only about $\frac{1}{2}$ to $\frac{5}{8}$ of the height trees, with their leading shoots definitely over-topped by their neighbors or at least shaded on all sides by them.

77. **(IV). Dead And Moribund Trees (m):** This class also includes bent over and badly leaning trees usually of the whip type.

78. **(V). Diseased Trees (k):** This class includes those trees which are infected with parasites to such an extent the their growth is seriously affected or that they are a danger to their neighbors.

Dominant.

Dominated and suppressed.

79. **Thinning Methods:**

80. **General considerations:** When a plantation is made, silvicultural requirements, particularly, the restoration or creations of a tree cover to the soil. Dictate spacing plan would be adopted if economy is not the immediate cause and number of plants required had alone to be considered. Many of the original number of planted have to be cut out when they are of little of no sale value to permit satisfactory development of those retained. Even so, the number of stems still standing after the first thinning of two, will be far greater than the final number at maturity, and somewhat irregular spacing is relatively unimportant as it can be adjusted in later thinning.

Mechanical Thinning: There may accordingly be little objection to provide extra growing space by the mechanical removal of complete lines of plants, of every alternate plant subject to provision to cover cases of local gaps. Where spacing is irregular, the "stick" method used in natural regeneration is a possibility whereby one tree of every pair of adjoining trees is removing if the distance between them is less than a prescribed length.

- a. This method is followed in teak plantations for the first and less commonly for the second thinning. Each operations removing 50% of the original planting lines reducing the number of plants to $\frac{1}{2}$ in each operation. For instance, in case of 2 x 2 spacing, number of plants will reduce from 2500 to 1250 and then 625 per hectare and increasing the spacing from 2 m x 2m to 4 m x 4 m. In case of 3 m x 3 m spacing, as proposed in this plan, number of plants will reduce from 1111 to 556 and then 278 per hectare and increasing the spacing from 3 m x 3 m to 6 m x 6 m.
- b. It is usually provided that where there is a gap in the retained line, an adjoining plant in the cleared line should be retained.
- c. This method is only practicable where casualties are very few and growth is both good and even under such conditions but it is out of question in poor or uneven plantations.
- d. It is not suitable for mixed plantations. However, in rare cases, similar operation may be done in mixed plantations where one species has been introducing essentially to help cover the ground quickly and its removal or cutting back is necessary in the interest of the major species.

Silvicultural Thinning: Alternatively, thinning may be selective, the case for removal or retention being considered for each tree in turn according to a set of rules drawn up for the purpose. This is the most usual procedure even where additional checks are applied, being often described as a “silvicultural” thinning.

- a. **Thinning Schedule:** The other possibility is to be guided by thinning schedule which lay down the number of stems that should remain standing after thinning according to various criteria of dimensions, site quality and/or age viz. Stand Tables and Yield Tables of that locality. Such criteria should ideally be based on a wide range of growth studies to reveal the development to be expected to take place under the conditions concerned.

81. Types Of Thinning:

82. Ordinary Thinning:

83. The mechanical thinning meet the initial requirements of plantations. It soon ceases to be practical proposition owing to the unequal development of the trees and their smaller numbers, and hence call for other methods for thinning operations.

84. The most usual method has been to view each tree in relation to its neighbors, and to remove those which appears already to have shown their inferiority by dropping behind,

taking first the suppressed trees, then the dominated ones, and finally some of the dominants with restricted of, otherwise, inferior crowns. As the method begins with the removal of the lowest canopy class and then works upwards, it has been called Low thinning, but it is now known, on account of its widespread application, as Ordinary Thinning.

85. The smaller dominated and suppressed trees are usually removed, they may be retained as soil cover and as insurance against casualties among the larger trees standing over them.

86. Most foresters tend, at first, to thin very lightly corresponding to something between B and C grades, after experience however they mark heavily up to a full C-grade and D-grade. The term 'heavy thinning' implies the C-grade thinning.

87. The standard grade of ordinary thinning:

Light thinning (A-grade): This is limited to the removal of dead, dying, diseased and suppressed tree i.e. classes V, IV and III. Grade A is of no practical use, it serves as the initial stage, especially, in comparative research on the effect of thinning on increment.

Moderate thinning (B-grade): This consists in the further removal of defective dominated stems and whips. Branchy advance growth which it is impracticable or not desirable to prune may also be taken, i.e. classes V, IV, III, II (b) and I (d) and an occasional I(c). B-grade is also of little use in practice, due to its having little influence on the increment of the remaining stems.

Heavy thinning (C-grade): This consists in the further removal of the remaining dominated stems and some defective dominants without making lasting gaps in the canopy, i.e. classes V, IV, III, II and I (b), (c) and (d).

Very heavy thinning (D-grade): It consists further removal of some of the good dominants, subject to the condition of not making any lasting gap in the canopy. The trees for removal are selected in such a way that the remaining crop consists of trees, with good boles and crowns, well and evenly distributed over the area, and with space for further development, i.e. classes V, IV, III, II and I (b), (C), (d) and some I (a). If their removal is of no economic or hygienic value, class V, IV and III trees are not removed, in heavier grades.

Very heavy thinning (E-grade): For research purposes it has been found desirable to make ordinary thinning even heavier than the standard D-grade. It prescribes removal of more of

the dominant stems even in class I (a), so that all retained have ample room for further development. It goes as far as possible within the rule for avoiding permanent gaps in the canopy.

It is often inadvisable to make a full C-grade or D-grade thinning in a dense crop in which thinning has been unduly delayed. The first thinning in such cases should be lighter than is ultimately intended.

88. **Crown Thinning:** This method of thinning looks first of all to the dominants, and removes such of them, beginning with the least promising individuals, as are hindering the development of the best individuals. Due regards are paid to obtaining as even a distribution of good dominants over the area as possible. It requires special skill and acumen in carrying it out.

89. **Grades of Crown Thinning:** Only two grades of crown thinning have been standardized; they are defined as follows:

Light Crown Thinning (L C-grade): This consists in the removal of dead, dying and diseased trees, with such of the defective, after them the better dominants, as are necessary to leave room for the further development of the best available trees evenly distributed over the area, i.e. classes V, IV, I (d),(c), many of I (b) and few of I (a) but not III and II. This is similar to D-grade ordinary thinning, but retains all III and II, and is not quite so heavy on I.

Heavy Crown Thinning (H C-grade): This grade pays even more attention to favoring the selected best stems by removing all the remaining I (b) which can be taken without creating permanent gaps, and more of I (a), i.e. classes V, IV, I (d),(c), most of I (b), some of I (a); but not III and II.

Crown thinning is well adapted to moderately shade-tolerant species in which the retention of the lower canopy presents no difficulty.

Site quality wise number of trees for various maximum girths in cms allowed to be attained in the crop are usually available which may be referred to.

90. **Thinning Procedure:** For this, the figures from the Yield Table and from the Stand Table in respect of relevant site quality and age shall be reproduced as provided in the form 3 given in appendix no. --- of volume II, and girth class wise comparison of number of stems actually present with that required as per Stand Table shall be done. Following principle should be followed for taking decision as to how many stems in different girth classes would be retained after thinning in the crop.

91. When in any girth class, actual population of stems is found to be equal or less than that given in Stand Table, no removal in that girth class shall be affected and all existing trees shall be retained irrespective of the fact whether they are of coppice origin or of inferior miscellaneous species. However dead and top broken trees shall be removed as they have special reasons.
92. If actual population of stems in a girth class is found to be more than that given in the Stand Table, the excess number of stems in that girth class are liable to be removed keeping the number of stems to be retained in that girth class equal to the population given in the Stand Table. However, if shortage of stems in next higher girth classes were found and as a result, less number of stems are being retained in those girth classes, the number of stems to be retained in this girth class shall be increased by the number it is falling short in the higher girth class. Thus, in short, total number of stems per hectare to be retained shall be equal to that given in the Stand Table (of course, provided that the actual total), but increasing equal number of stems in the lower girth classes where excess population was found shall compensate the shortage in higher girth classes. There may be instances where although actual total population per hectare is more than that desired, shortage of stems is occurring in lower girth classes as well. In that case, the shortage of lower girth classes shall be compensated by increasing the number in the next higher girth classes to that extent.
93. After it is decided, as to how many number of trees per hectare are to be retained and those to be removed in different girth classes, the marking for removal in that girth class shall be effected in the following order.
- a. First, non-teak coppice shall be marked irrespective of species till all are marked.
 - b. Then teak coppice shall be marked till all are marked.
 - c. Thereafter non-teak trees of seed origin shall be marked for felling. However, trees of *Shisam*, *Bija*, *Semal* (of seed origin) shall not be marked for felling besides fruit bearing trees like *Aonola*, *Mahua*, and *Charoli* etc. for any reason whatsoever. They shall be retained in excess of the desired population of the growing stock.
 - d. Then teak trees of seed origin would be taken up for marking.

- i. Keeping the principles as prescribed above in clauses, (i), (ii) and (iii), detailed instructions as to how many trees of teak, non-teak including coppice, if any, and teak coppice shall be marked for felling and how many trees would constitute the residual crop after thinning shall be respectively recorded in items 10 and 11 of Form 3, and communicated to the marking officer by the Deputy Conservator of Forests in writing.

94. Harvesting and Disposal:

95. **Agency for harvesting:** The coupes shall be worked departmentally. However bamboo coupes shall be worked as per the government decision. Estimation of bamboo yield should be based on actual enumeration carried out a year prior to the beginning bamboo harvesting.
96. **Disposal at timber depots:** Harvesting timber and firewood shall be transported to the established forest depots for sale by auction. The National Forest Policy, 1988 acknowledges the first charge on the forest produce in the local tribal and village community living in and around the forest areas. Disposal of the forest produce should meet the requirements of the first rights of the local village communities over the forest produce, as enunciated in the policy. In view to facilitate *nistar* distribution temporary bamboo depots shall be created at the Range Headquarters.
97. **Stacking for the nistar supply:** Each established or temporary depots is prescribed to have designated areas for stacking small timber, poles, firewood and *bamboo* for the nistar supply at the special low sanctioned rates to local people including agriculturists and artisans. The Deputy Conservator of Forests can approve additional *nistar* depots at suitable places in the division, preferably the round or beat headquarters, so that villagers may not be required to traverse large distance to procure the *nistar* materials. The Deputy Conservator of Forests in consultation with the District Collector fixes the nistar rate. Burads, the bamboo artisans, prefer green bamboo, and hence, necessary arrangement shall be made to reduce the period between bamboo cutting and delivery to the Burad communities. Each registered Burad family is entitled up to 1,500 bamboos per year at the nistar rate fixed by the Dy.Conservator of Forests in consultation with the District Collector. Availability of the nistar material shall be informed to the *Taluka Panchayats*, and the material left unused for three months will be sold through open auction.

98. **FIRE PROTECTION:** Uncontrolled fires cause immense harm to the forest in the form of damages to flora and fauna, young crop, regeneration and the soil fertility. For effective protection of the forest various forest areas are classified as follows.

Class 1: Forest completely protected

It includes the following.

All Plantations.

All regenerated coupes of all the Working Circle in the young crop attend an age of 10 years.

All government timber depots.

Any other areas of special importance as ordered by the Conservator of Forests.

99. All the above specified areas will be fire protected by isolating these areas by means of fire-lines and cut guidelines and will be patrolled by the fire watchers. Any fire in these areas must be reported to the Dy.Conservator of Forests in writing giving the details of the area burnt and various types of losses.

Class II: Forest generally protected:

100. This class includes:

(i) The remaining areas of Afforestation Working Circle ' , 'Fodder Reserve Working Circle.'

Any other areas of special importance as ordered by the Conservator of Forests.

101. All these areas will be isolated by means of external fire lines and will be divided into convenient blocks of interior fire lines. No guidelines will be cut. Fire watchers may be engaged for patrolling if sanctioned by the C.F.

Class III: Forest Protected by law only :

102. All other forests not included in the above two classes are included in this class. Deliberate burning in these forests is prohibited by law, but no special measures for protection will be undertaken.

103. The following lines will be maintained as fire lines and will be kept clear of all growth and combustible material during the fire season i.e. from February till May.

104. All external reserved forest boundary lines upto 12 metres width.

- a. 6 metre wide lines around all plantations upto 10 years from the year of planting.
- b. 6 metre wide lines on both sides of all roads and cart tracks passing through the forests.
- c. 40 metre wide line on all sides of the timber and fire wood depots.

105. The following rules will be followed to reduce the incidence of forests fires:

106. The cutting and cleaning of fire lines will be completed by the end of December and burning should be completed before the end of February.

Dry leaves on fire lines will be burnt after the end of February except with the express order of the Chief Conservator of Forest. In case such permission is granted, the burning should be done in the presence of the R.F.O.

In Reserved Forests following are the provisions.

Section 26 (l) B: To set fire to reserved forests.

Section 26 (l) c: kindling, keeping and carrying any fire except at such seasons as the forest officer may notify in this behalf.

Section 26 (l) f: Burning of any tree.

Section 26 (l) g: burning of charcoal

Section 26 (iii) the state Government may suspend the exercise of all rights of pasture or to forest produce in the reserved forest/protected forests or a portion thereof whenever the fire is caused willfully or by gross negligence for such period as it thinks fit.

107. In protected forest the following are the provisions:

108. Any person who commits any of the following offences under section 33 (l) (a), (b), (d) and (e) namely, burns any tree reserved under section 30, burns any lime ore charcoal contrary to prohibition under section 30, sets fires to such forests or kindles a fire without taking all reasonable precautions to prevent its spreading on any tree reserved under section 30 and leaves burning any fire kindled by him in the vicinity of any such tree or closed portion under section 30 shall be punishable with imprisonment which may extend to 6 months or fine which may extend to two thousand rupees or both.

109. Provision contained in the Maharashtra Forests (Protection of forests from fire) Rules.

110. The Government of Maharashtra vide notification No.1074.252 359/F6, dated 14-10-1982 under section 32 (6) and 76 (l) (d) of the IFA 1927, made the rules for the

protection of protected forests from fire called, " The Maharashtra Forests (Protection of forests from fire) Rules.

111. 1982." The various provisions made under rules 3 to 7 are given as under....
112. **Rule 3:** A ban is placed on kindling fire within a distance of 1 km from the boundary of the forest.
113. **Rule 4:** Under this rule any person desirous of clearing by fire in standing forest or grassland beyond a distance of 1 km from the boundary of the forest shall observe the following rules.
114. He shall clear a fire belt at least 10 m. wide on the side of the area which he proposes to burn which is nearest to the boundary of the forest in such a manner that no fire can spread across such belt.
115. He should keep a watcher to see that a fire does not spread in the forest area.
116. **Rule 5:** Under this rule any person desirous of burning Rab or clearing land by burning the growth on it near the forest boundary should inform the nearest Forest officer at least one week in advance of his intention to do so. A clean belt of at least 10 mtr.width should be left in between the boundary of the forest and the place where the Rab is to be burnt so that the fire does not spread in the forest and while burning the Rab he should make such arrangement so that the fire does not spread in the forest and while burning the Rab he should make such arrangement so that the fire does not spread in the forest area.
117. **Rule 6:** Under this rule all camping places along the boundary of an within the limits of the forest area will be cleared and will be set apart by the Dy.Conservator of Forests for the use of visitors. A list of all such camping places will be published annually and except on such camping grounds no fire shall be lighted within or along the boundary of the forest. All persons using these camping grounds shall light any fire they make for cooking or other purposes in such a way so as not to endanger the forest or any building, sheds or other property on the camping grounds and before leaving they shall collect in the Centre of the camping ground all inflammable material which is ot be left behind and shall carefully extinguish all fire.

118. **Rule 8:** Rules 3 to 7 will be relaxed during the rainy season from 15th of June to 31st of October.

119. Provisions contained in the Bombay Forest Manual Vol.II part IV

- a. **Rule 152:** As per this rule the Forest fire cases should not be compounded.
- b. **Rule 153:** It deals with the duties of the Magistrates dealing with forest fire offence cases.
- c. **Rule 157:** It provides for the continuous protection of the valuable forests from fires.
- d. **Rule 158:** Under the provisions contained in this rule if the forest fire is serious and due to repeated neglect by the villagers then as an exception a communal punishment can be given with the sanction of the Government.
- e. **Rule 159:** It deals with the duties of the villager.
- f. **Rule 160:** It deals with powers of the Forest officers to sanction rewards in cases of effective fire protection.
- g. **Rule 162:** It deals with the powers of the Commissioner to sanction rewards to the villagers for effective fire protection.

120. Provisions contained in the Maharashtra felling of trees (regulation) act 1964.

121. As per section 2 (e) of the above act burning, trees on private lands is included in the definition of felling of trees and such act on the part of any person without obtaining felling permission from tree officer under section 3, is punishable under section 4 of the above act. The punishment to be imposed by the competent tree office may extend upto Rs.1000/- besides the tree so felled is also liable to be forfeited to the Government.

122. The firewatchers will prevent the carrying and kindling of any kind of fires in the forests and will keep the fire line completely free of all kind of combustible material. On noticing a forest fire he should at once inform the beat guard and will assist him in extinguishing the same with the help of the local people. The R.F.O. must inform about the outbreak of fire in his range to the DCF at once. After the fire is extinguished the RFO must inform about the outbreak of fire in his range to the DCF at once. After the fire is extinguished the RFO should submit a final report along with a sketch to the D.C.F. within 15 day after thorough inspection of the burnt area.

123. The D.C.F. will submit a monthly return to the C.C.F. mainly covering the cause of the fire, the area and the extent of the damage and measures taken to extinguish the fire. A separate fire record must be maintained in the division office.

124. Areas deliberately burnt for silvicultural reasons eg; to destroy felling debris or to stimulate regeneration etc. will be excluded from the scheme of fire protection provided it is prescribed in the Working Plan or sanctioned by the C.F. the steps to cut-back the badly damaged young regeneration in the naturally and artificially regenerated areas due to fires, will be undertaken by the R.F.O in consultation with D.C.F.

125. WATERSHED MANAGEMENT.

126. Proper management of Watershed leads towards sustainability of resource utilization. Land is the major resource in Rural Indian Economy. Forest Land forms mostly the upper ridges of the topography. So the management of watershed cannot be effected in isolation by the Agriculture Department or Water Conservation Department. Integrated and coordinated watershed development project implementation has become the need of time. Hence our planning too needs to be consistent with the overall approach of watershed management. Attempt has, therefore, been made to sequence the coupes from ridge to valley and micro watershed boundaries have been shown as additional layers using the G.I.S. techniques to facilitate effective co-ordination and communications with other related departments.

CHAPTER XXI

GENERAL FINANCIAL FORECAST AND FINANCIAL PLAN OF OPERATIONS.

SECTION 15.1: FINANCIAL FORECAST

15:1.1: REVENUE: There is no felling of coupes prescribed in the plan and as such the revenue from major forest produce will depend on the timber seized in offence cases and removal of dead and fallen trees from the forest area. However the regular removal of non timber forest produce (NTFP) will fetch revenue to the division. Since the present system of exploiting NTFP is not properly quantified and recorded and the NTFP unit are sold in auction on the basis of approximation and hence there is huge under estimation of the quantity. The field staff will make systematic efforts to quantify NTFP as prescribed in NTFP working circle. During the plan period the NTFP will be managed (Except Tendu) by JFM committees or gram panchayats. The details of the revenue received in the division are given in the Annexure XI of the Volume II of the plan.

The details of Revenue expected principally from Bamboo is estimated at Rs 12.75 lakhs annually on a lower side of estimation initially due to congestion per year which comes to Rs.127.50 lakhs for the plan period; this is expected from only forests of Sangamner sub-division. Expenditure principally in terms of raising plantations every year over 2833.21 hectares in Ahmednagar division and 2748.66 hectares in Sangamner sub-division is projected at current rates as under. The benefits are expected to be realised after a period of time.

s.no	Division/ Sub-division	Working circle	Cost per hectare	Expected target /year	Total cost (in lakhs)	Plan period (in lakhs)
1	Ahmednagar	Enrichment	30,000	784	235.20	
2		Afforestation	40,000	1302	520.80	
3		Pasture	50,000	747	373.50	
4	TOTAL			2833	1129.50	11295.0
5	Sangamner	Enrichment	30,000	1252	375.60	
6		Afforestation	40,000	1084	433.60	
7		Pasture	50,000	128	640.00	
8		Bamboo	25,000	285	71.25	
9	TOTAL			2749	1520.45	15204.5

The cost of incurred in preparation of this plan is placed at Rs.91 per hectare

CHAPTER XXII
CONTROL FORMS AND RECORDS

SECTION 1. CONTROL AND RECORDS:

1. The following records shall be maintained in the division office:

- i) Control Form
- ii) Compartment History
- iii) Plantation and Nursery Registers.
- iv) Divisional Note Book.

The ideal formats are appended in the Volume II of the plan which may be referred to and adhered with minor modifications in tune with the locality in consultation and guidance with the local Chief Conservator of forests.

2. CONTROL FORMS:

1. Three permanent sets of these control forms will be prepared in the Working Plan Conservator's office and distributed one set each to working plan circle itself, the Territorial Conservator, and the Divisional forest Officer.

FORMATS OF CONTROL FORMS

Following are two formats of control forms:

1.Coupe Control Form- For the Control of all silvicultural operations such as felling, subsidiary cultural operations, cleanings, thinning, burning, etc., prescribed to be carried out in a given coupe for the duration of the working plan.

2.Felling Control form- For controlling and maintaining a record of all trees marked for felling and trees retained as seed bearers or to safe guard future yield.

3. The prescribed proforma of the control forms mentioned above are given in Annexure XLIII in the Volume II of this plan

ND LABOUR

SECTION 1. THE ESTABLISHMENT:

The Establishment with Ahmednagar division is given below:

s.no	category	Payscale	Number of posts		
			Permanent	temporary	total
	Class I				
1	Deputy Conservator	10000-15200	1	-	1
2	Assistant conservator	7450-11000	-	4	4
	Class II				
3	Range forest officer	6500-10500	14	7	21
	Class III				
4	Round Forest officer	4000-6000	41	20	61
5	Beat Guard	2750-4400	120	51	171
6	Surveyor	4000-6000	3	-	3
7	Head Accountant	5000-8000	1	-	1
8	Steno-typist	4000-6000	1	-	1
9	Accountant	4500-7000	8	5	13
10	Clerk	3050-4590	11	4	15
11	Jeep driver	3050-4590	2	-	2
12	Armed constable	3050-4590	1	-	1
	Class IV				
13	Naik	2610-4000	1	-	1
14	Peon	2550-4000	2	-	2
15	Mali	2610-4000	2	-	2
16	Watchman	2550-3200	2	-	2
17	Cook	2610-4000	1	-	1
18	Van major			452	452
	TOTAL		211	543	754

7. As a result of the Notification from the Government of Maharashtra dated 3rd December 2008, creating a separate Independent Sub-division Sangamner with Headquarters at Sangamner, would entail in re-organisation within the existing staff of Ahmednagar division by the Chief Conservator of forests, Nashik (territorial), without incurring any additional costs on the establishment.
8. With computerization having entered in a large way, this would give an opportunity to reorganize after due appraisal of the work-load in the different sections of the office, and streamline the working of the Department, setting an example for other divisions as well.
9. The administrative set up in Ahmednagar forest division at present is as under. The Government had earlier sanctioned functioning in 10 ranges, however with the actual creation of Sangamner sub-division with 6 ranges, and the functional classification of the division is taken into account while preparing the plan.

s.no	Range	Number of rounds	Number of beats
1	Akole (T)	2	6
2	Akole (EGS)	2	6
3	Rajur	2	6
4	Sangamner-I	3	7
5	Sangamner-II	2	5
6	Sangamner-III	2	5
7	Kopargaon	1	3
8	Rahuri	3	8
9	Ahmednagar	4	9
10	Parner	2	8
11	Takli-Dhokeshwar	2	6
12	Pathardi	2	5
13	Tisgaon	1	3
14	Jamkhed	1	3
Total	Ahmednagar district	29	80

SECTION.2.LABOUR AVAILABILITY:

10. Most of the schemes have some amount on labour welfare. These amounts should be pooled, and utilized for the community welfare program in concerned villages by involving local communities. Labour skills shall be upgraded by organising training camps in gum collection and grading and bamboo, harvesting etc.
11. Some scheduled adjustment should be sufficient for execution of the forestry operations. Temporary manpower shortage is experienced during the crop showing period.

3.BUILDINGS

12. The problem of accommodation is not satisfactory, as the existing buildings are not maintained properly, especially the field staff. Many residential quarters for the Forest Guards do not have residential facilities. Although a number of buildings were constructed under the Maharashtra Forestry Project, more residential buildings are required in the field, especially, in the interior locations. Sufficient funds should be made available for the maintenance and construction of buildings in the field. Funds will also be required for developing eco-centers and camping facilities for eco-tourists as prescribed in the chapter of Wildlife Management (Overlapping) Working Circle and Ecotourism chapter.

CHAPTER XXIV

SUMMARY OF PRESCRIPTIONS

THE TRACT:

1. The area dealt with under this plan comprises of the Forest areas in the revenue district of Ahmednagar, nestled between the Rivers Godavari and Bhima, located centrally in the state of Maharashtra . The district spreads between 73 °38` and 75°36` East longitudes and 18°19' and 19°59` North latitudes. Ahmednaga r district is the largest district of Maharashtra State, with a length of about 1992 Kilometers and width of about 200 kilometres, encompassing an area of 17,413 Square Kilometers, which is 5.66% of the State Geographical area. The district is bounded by districts Nashik in the North, by Aurangabad in the North-East, by Beed and Osmanabad in the East, by Pune and Thane in the West and by Solapur in the South, making it the only district in the state of Maharashtra being bounded by 7 districts.

2. The district encompasses 14 Tahsils with 1581 villages and is home to 4040642 population as per the 2001 census, with 80.11% being rural and has a population density of 232 per square kilometer (against 315 of state). The Scheduled Castes population number 4,84,655 (12%) with those of the Scheduled Tribe being 3,03,255 (7.51%). The district houses 14 Panchayat samitis, 1308 grampanchayats, 1Mahanagarpalika, 8 nagarpalika, 1 nagar panchayat (Shirdi-holy town) and 1 cantonment board (Ahmednagar cantonment).

The population in the 1581 villages is represented as under:

s.no	Population category	Total villages	Percentage
1	0 to 1499	943	59.65
2	1500 to 2999	408	25.81
3	3000 to 4999	153	9.68
4	5000 to 9999	55	3.48
5	10000 to 19999	18	1.14
6	20000 and above	2	0.13
	Total district	1581	100.00

3. The forest area is quite scattered and administered under a Deputy Conservator of forests stationed at Ahmednagar and a recently created Independent Sub-divisional forest

officer/Assistant Conservator of forests stationed at Sangamner within seventeen territorial units.

4. The Government of Maharashtra had resolved on 3rd December 2008, on administrative grounds, and created a new independent forest sub-division Sangamner with headquarters at Sangamner, under the administrative control of an Assistant Conservator of forests, Sangamner with 6 territorial ranges namely Sangamner I, Sangamner II, Sangamner III, Akole (territorial), Akole (EGS) and Rajur. This would leave the rest of the district under the administrative control of the Deputy Conservator of forests, Ahmednagar division, with headquarters at Ahmednagar, with 11 territorial ranges namely Kopargaon, Rahuri (territorial), Ahmednagar, Parner, Takli Dhokeshwar, Pathardi, Tisgaon, Shrigonda I, Shrigonda II, Karjat and Jamkhed.

5. The different land forms in a region constitute its physical setup. If we consider the physical setup of Ahmednagar district, there are three physical divisions Western Hilly region: comprising of Akole taluka and Sangamner taluka, with the hilly ranges of Adula, Baleshwar and Harishchandragad. Kalsubai with height of 5427 feet, is the highest peak in the Sahyadris, and lies in this region. Central Plateau region: comprising of Parner and Ahmednagar talukas and parts of Sangamner, Shrigonda and Karjat talukas.
6. The region of Northern and Southern Plains: comprising of Northern Kopargaon, Rahata, Shirampur, Rahuri, Newasa, Shevgaon and Pathardi talukas. This is the region of Godavari and Pravara river basins. Parts of the Southern talukas of Shrigonda, Karjat, Jamkhed are also included in this physical division, the region of which covers basins of the Ghod, Bhima and the Sina rivers.
7. The district is drained by two chief rivers, the Godavari and the Bhima a tributary of the Krishna. The watershed line is the great spur of the Sahyadris which branches off at Harishchandragad and stretches completely across the district from West to East. The important rivers flowing through the district are Pravara, Mula, Sina and Dhora. Pravara is the tributary of the river Godavari. Waters of the river Pravara fall from a great height, creating the Randha falls.
8. The district receives rainfall mainly from the South – West monsoon, which normally sets in during middle of June and ends by October. The distribution of the rainfall is uneven and erratic in all the areas excepting Akola tahsil. The normal rainfall of the area ranges between 5000 and 700 mm. Based on mean average annual rainfall the district can be broadly divided into following three major zones.

ZONE I : This is the zone of heavy rainfall. Rainfall in this area is quite heavy and ranges from 2000-4000 mm. Such area is confined to the western most part in Akola tahsil

Zone II: This is the zone of medium rainfall. This is confined to Akola tahsil in the west. The rainfall varies from 1000-2000 mm.

Zone III: this is the zone of low rainfall, spread over majority of the district area. Areas in tehsils of Parner, Ahmednagar, Shrigonda parts of Sangamner etc., predominantly have such areas.

9. Area of the earlier plan was to the tune of 104753.640 hectares, for the plan period 1994-95 to 2003-04.

10. With the acquisition of forest land from the Revenue department over the years, fresh lands acquired under the Compensatory Afforestation, and areas which are part of the Wildlife sanctuaries handed over or in the process of being handing over to the Wildlife Wing, there are changes in the area, which are to be addressed to in this plan.

11. a) Total Forest Area in the District : 212959.32 hectares

- Area notified as Protected area in district : 98207.31 ha
- Area of the PA which is forest area : 41576.82 ha
- Forest Area in PA with forest dept : **39679.63 ha**
- Forest Area in PA still with Revenue : 1897.19 ha.
- Forest Area with Revenue Dept : **34024.00 ha**
- Forest Area with Defence : 1661.690 ha.
- Forest Area with Territorial Forest Dept : 127050.91 ha

c) Area for which working plan is not being prepared (hectares)

i. Areas of Shrigonda I, Shrigonda II, Karjat and Mirajgaon (PA): 20655.52

ii. Areas of Forest with Revenue Department : 34024.00

FLORA & FAUNA :

12. The following three main types of forests are represented in this Division

- a) The Southern Tropical Semi–Evergreen West Coast Forest (2A/C2)
- b) The Southern Tropical Dry Mixed Deciduous Forests. (5A/C3)
- c) The Southern Tropical Thorn Forests. (6A/C1)

These three types correspond to western, eastern part of western portion and the remaining areas respectively. They also correspond to the high, medium and low rainfall areas. Altitude and rainfall are the limiting factors in the occurrence of species. For example, Teak is noticed in the eastern part of the western portion, where the rainfall is about 800 mm, only below an altitude of 800 M. Thus the eastern spurs of Sahyadri, which maintain their heights above the limit, present interesting changes in vegetation. Beginning in the East, at a general altitude of about 300 M with an average rainfall of less than 500 mm, only very open thorn forest is noticed with Bor, Babul, Prosopis, Capparis and Euphorbia as the typical species scattered in the area whose growth is usually stunted. Neem is the only timber yielding species seen in the locality. As a notable exception, Babul is seen growing well where the soil is deep and black and along water sources where additional soil moisture is available.

13. With the increase in rainfall towards the West, the growth becomes somewhat better than that in the Eastern part of the district. The deciduous species being more useful to the Man have been constantly removed and this removal coupled with excessive grazing has resulted in reduction of humus, heavy erosion and general impoverishment of the soil. This has led to increased xerophytic conditions with preponderance of thorny species in areas of the central zone, where originally Mixed Deciduous Forests should have existed. The areas are mostly supporting shrub species with varied presence of species like Salai (*Boswellia serrata*), Dhavada (*Anogeissus latifolia*), Moin (*Lannea coromandelica*), Aola (*Embllica officinalis*), Ain (*Terminalia tomentosa*), Beheda (*Terminalia bellerica*), Neem (*Azadirachta indica*), Maharukh (*Ailanthus excelsa*), Bondara (*Lagerstroemia parviflora*) and teak (*Tectona grandis*). Good growth in teak is noticed in well protected privately owned areas with Karvand (*Carissa congesta*), Dhayaty (*Woodfordia fruticosa*), Tambat (*Flacourtia latifolia*), Sabar (*Euphorbia* spp), Nirgudi (*Vitex negundo*) and Lantana (*Lantana camara*) etc., are noticed as an undergrowth. Due to excessive grazing, growth of palatable grasses is scanty, growth of Kusali, phuli and rosha grasses are noticed.

14. The Protected Areas though have legally defined boundaries, have no clearly established Ecological boundaries, with the faunal populations including reptiles,

mammals, avifauna venturing outside the legal limits into adjoining areas for foraging and breeding, thereby establishing the importance and need to evolve a proper approach in their management. The Protected Area network in the Ahmednagar district is represented as under:

Name of Protected Area	Notified Area	Talukas	Forest Area	Managed By
Jaikwadi bird sanctuary	34105 ha	Newasa, Shevgaon	Nil	DCF wl Aurangabad
Kalsubai-Harishchandragad wildlife sanctuary.	29909 ha	Akole, Rajura	18249	CF wl Nashik
Rehekuri Blackbuck wildlife sanctuary	217.31 ha	Karjat	217.31	CF wl Pune
Great Indian Bustard Wildlife sanctuary (over both Ahmednagar & Solapur districts)	337976 ha	Newasa Karjat Shrigonda	23110.51 (1897.19 ha with revenue	DCF Ahmednagar (for area in nagar)

15. The increasing trends of wildlife especially Leopards in the Sangamner sub-division area resulting in deprivation of livestock and human life, crop raiding by Black buck and chinkara, frequent outbreak of attack by Jackals and Wolves is posing a challenge to the Forest department. Trends of the number of leopards alone which is localized in pockets of the district indicate that against the numbers of 7, 8,8,19 recorded earlier in years 1989,1993,1997,2001 respectively, there were 80 recorded in 2005 census exercise which merits a fresh look towards organizing the conservation strategy.

GROWTH :

16. The salient features of the current sampling exercise during the stock-mapping could be inferred as-

- a. there is a domination of glyricidia and subabul in most of the plantations taken up and seen by the teams.

- b. There is a decline in afforestation and subsequent establishment of the traditional plant species.
- c. It leads to surmise that seed sowing of seed like subabul and glyricidia in particular done along with the planting of principal plants; coupled with no thinning operations prescribed in the working plan after III year of operations, have led to a situation of crowding of areas with subabul and glyricidia; which necessitates thinning during subsequent operations.
- d. There have been many cycles of plantations done in a compartment per se; however barring few areas in Akole tehsil where there has been Bamboo congestion; there is little scope for exploitation of the plant species.
- e. Acacia tortilis at many places appeared lodged, apparently due to drying up.

GENERAL OBJECTS OF MANAGEMENT AND FUTURE MANAGEMENT

- 17. Due to failure in achieving the objectives set in the earlier Plan a change in approach is necessitated. The approach is required to focus on coming over the gaps observed whilst implementing the earlier plan prescriptions, and prescribe specific line of treatment for specific areas; further emphasis on survey and demarcation of the forest land is spelt out.
- 18. Biotic pressure and afforestation not followed up with thinning as recommended after the III year of operations, coupled with established seed sowing results are the main reasons for sight of seeing dense plantations in pockets and also degradation of the forests. Local community will be involved in forest management both in planning and implementation taking inspiration from the successful initiatives in the division.

GENERAL OBJECTS OF MANAGEMENT.

- 19. Maintenance of environmental stability through conservation and wherever necessary, restoration of the ecological balance.
- 20. Checking soil erosion and denudation in the catchment areas of rivers, reservoirs in the interest of soil and water conservation for mitigating droughts and for retardation of siltation of reservoir.

21. Increasing forest cover by assisting the natural regeneration by protecting the forests from fire, grazing etc and tending the root stock. Enriching the existing stock by raising economically viable plant species.
22. Identification, survey and demarcation of the forest lands in custody, regularization of anomalies of land use wherever noticed.
23. Meeting the requirements of fuelwood, fodder, Non-Timber forest produce and small timber of the rural and tribal population.
24. Creating a massive people's movement with the involvement of women, for achieving these objectives and to minimize pressure on existing forests.

FORMATION OF WORKING CIRCLES.

In accordance with the general objects of management and keeping in tune with the Working Plan Code, the following Working Circles are proposed to be constituted:

- 1) Enrichment Working Circle.
- 2) Afforestation Working Circle.
- 3) Silvi-Pasture Management Working Circle.
- 4) Bamboo Management Working circle
- 5) Plantation (Overlapping) Working Circle
- 6) Non Timber Forest Produce (Overlapping) Working Circle.
- 7) Joint Forest Management (Overlapping) Working circle
- 8) Wildlife Management (overlapping) Working circle
- 9) Forest Protection(overlapping) working circle
- 10) Eco Tourism (overlapping) Working circle.

26. ALLOCATION OF FOREST AREAS TO WORKING CIRCLES:

The allocation of forest areas of the Ahmednagar forest division and Sangamner forest sub-division to different working circles is represented as below-

s.no	Working Circle	Ahmednagar	Sangamner	Total
2	Enrichment	15678.55	24969.08	40647.63
3	Afforestation	38778.87	32492.37	71271.24
4	Silvi-Pasture Management	11211.05	1919.50	13130.55
5	Bamboo management	0	854.50	854.50

THE FOREST ENRICHMENT WORKING CIRCLE

27. The area will be classified as follows: -

- a. **Type 'A'- PROTECTION AREAS:** The areas consisting of patches over 25⁰ slope or more and 20 meter strip on both sides of the rivers or *nalas*.
- b. **Type 'B'- UNDERSTOCKED AREAS/BLANKS:** Blanks and under stocked patches (crown density below 0.4), with slopes below 25⁰, and minimum area exceeding 2 hectare in extent.
- c. **Type 'C'- OLD PLANTATIONS AND GROUPS OF YOUNG POLES:** This will include patches of well-grown poles for retention as future crop in addition to old plantations. The patches should not be less than one hectare in extent.
- d. **Type-'D': WELL STOCKED AREAS:** This will include natural forest areas with crop density more than 0.4. The area will be further divided into two classes:
 - a) Type D1: Areas having adequate regeneration(750 seedlings or more per hectare)
 - b) Type D2: Areas having inadequate regeneration.

TREATMENTS PROPOSED:

28. The various treatments proposed are as under:

b. Area 'A':

- (i) The soil and moisture conservation treatment shall be as given in Miscellaneous Regulation.
- (ii) Planting *Bamboo, Khair, Jamun, Arjun*, Agave and grasses along the nala and river bank.

c. Area 'B':

- (i) Under stocked and blank forest areas where slopes are <25⁰, appropriate structures at regular intervals on the *nalas*, with loose boulder structures on the upstream of these dams should be constructed to prevent early siltation. After siltation of loose boulder structures agave/aloe suckers or khus/vetivera grass slips should be planted on the silted soil. On gentler slopes (<15⁰) CCT works should be done and fresh seed of *Jatropha curcus*, *Semaruba glauca* should be sown at 0.5m intervals. The seed being oil yielding seed its germination viability is very low. Seed of previous season does not germinate. Hence it is mandatory to purchase or collect seed from fruits of that very season. DCF should ensure that

the seed is fresh by conducting germination tests before they are sown on CCT's. Continuous Contour Trenches should be taken with proper alignment. Models promulgated by the Government of Maharashtra in this regard based on the slope of the ground shall be used in finalizing the estimates. Fresh seed of Karanj/Neem/Moha/Jatropha etc or locally available species, as per the DCF's choice should be sown at 50 centimeter interval. The earlier technique of CCT by refilling of Contour may be adapted. Works shall be completed before the onset of Monsoon. Quantum of work will depend upon the site requirement.

- (ii) Plantation of healthy seedlings from amongst species Khair, salai, Maharukh, kusum, bor, khair, palas, pimpal, kadai, dhawada, Kandol, Sitaphal, Anjan, Hirda, Babul, Chandan, Siras, Sissoo, Hiwar, Karanj, Ain, Shiwan, Teak, Neem, Holoptelia integrifolia, Acacia senegalensis, Acacia tortilis, Bakain, Amaltas, Raintree, Sawar, Bamboo, Guggul, Ashwagandha, Shatavari, Bael, Padal, Awla, Agnimanth and any other species as directed by the Chief Conservator of forests or the Deputy Conservator of forests, in tune with the current prescriptions and preferably yielding Non-timber Forest Produce are recommended. The choice of species is to be governed by the local edaphic factors. These miscellaneous species should be raised in polypots or root trainer containers. Pits or trenches as per suitability of site should be adopted, giving preference to the Refilled Continuous Contour Trenching Technology popularized in Ahmednagar division earlier. The DCF should choose the model with technical approval from CCF(T).
- (iii) The plant population shall be limited to 750 plants per hectare, keeping in tune with the principle of Ecological Index worked out for the district.

d. Area 'C':

- (i) These areas are to be underplanted with suitable species including Bamboo, Chandan and other economically important species such that the planted population doesn't exceed 400 plants per hectare.

- (ii) At places where severe congestion of Subabul and Glyricidia exist, needful thinning operations including removal may be resorted to encourage growth of superior planted species.

e. Area 'D':

- (i) **D1 areas-** areas support 750 plants per hectare, however silvicultural thinning to favour enrichment by bamboo, sandal, ashwagandha, samudrashosh, shatavari, bedki pala/Gymnema and other economically important species are recommended to improve the floristics of the area.
- (ii) **D2:** The natural regeneration of this area need to be supplemented by artificial regeneration to the extent by which natural regeneration fall short of 750 plants per hectare with suitable species including Bamboo, Chandan etc., based on the local edaphic factors.

THE AFFORESTATION WORKING CIRCLE

29. Soil depth is sufficient in most of the areas, however due to faulty practice of not laying down coupes in the areas of working, large areas have repeatedly been afforested, leaving plenty of gaps in between wherever soil depth is apparently less; further problematic areas too have been given the slip thereby occupying more gross area than allotted, as a result the vegetation appears sparse, offering scope for under planting, and enrichment with beneficial plant species. Area classified under Zone I as per the earlier Afforestation Working Circle was not prescribed any afforestation treatment, which shall be tackled now in this plan period.

30. The area will be classified as follows: -

- a. **Type 'A'- PROTECTION AREAS:** The areas consisting of patches over 25⁰ slope or more and 20 meter strip on both sides of the rivers or *nalas*.
- b. **Type 'B'- UNDERSTOCKED AREAS/BLANKS:** Blanks and under stocked patches (crown density below 0.4), with slopes below 25⁰, and minimum area exceeding 2 hectare in extent.
 - a) the understocked areas shall be further classified into different zones based on soil depth as under-
 - 1. Zone I – soil depth below 10 cms.
 - 2. Zone II – soil depth above 10cms upto 30cms.
 - 3. Zone III – soil depth above 30 cms.

2. the soil depth shall be determined on the basis of trial pits taken for the purpose of cross section 45x45cm upto 30 cms deep, at 100 x50mtr spacement, and shall be shown on the treatment map.

- c. **Type 'C'- OLD PLANTATIONS AND GROUPS OF YOUNG POLES:** This will include patches of well-grown poles for retention as future crop in addition to old plantations. The patches should not be less than one hectare in extent.
- d. **Type-'D': WELL STOCKED AREAS:** This will include natural forest areas with crop density more than 0.4. The area will be further divided into two classes:
 - a) Type D1: Areas having adequate regeneration(750 seedlings or more per hectare)
 - b) Type D2: Areas having inadequate regeneration.

TREATMENTS PROPOSED:

31. The various treatments proposed are as under:

f. Area 'A':

- (i) The soil and moisture conservation treatment shall be as given in Miscellaneous Regulation.
- (ii) Planting *Bamboo, Khair, Jamun, Arjun, Agave* and grasses along the nala and river bank.

g. Area 'B':

- (i) Under stocked and blank forest areas where slopes are $<25^{\circ}$, Appropriate structures at regular intervals on the nalas, with loose boulder structures on the upstream of these dams should be constructed to prevent early siltation avoiding cement. After siltation of loose boulder structures agave/aloe suckers or khus/vetivera grass slips should be planted on the silted soil. On gentler slopes ($<15^{\circ}$) CCT works should be done and fresh seed of *Jatropha curcus*, *Samaruba glauca* should be sown at 0.5m intervals. The seed being oil yielding seed its germination viability is very low. Seed of previous season does not germinate. Hence it is mandatory to purchase or collect seed from fruits of that very season. DCF should ensure that the seed is fresh by conducting germination tests before they are sown on CCT's. Continuous Contour Trenches should be taken with proper alignment. Models promulgated by the Government of Maharashtra in this regard based on the slope of the

ground shall be used in finalizing the estimates. Fresh seed of Karanj/Neem/Moha/Jatropha etc or locally available species, as per the DCF's choice should be sown at 50 centimeter interval. The earlier technique of CCT by refilling of Contour may be adapted. Works shall be completed before the onset of Monsoon. Quantum of work will depend upon the site requirement. Specific treatment for the areas as Zone I, Zone II and Zone III is as under:

(ii) Zone I areas:

1. Digging of Water Absorption Trenches (WATs), at the rate of 200 per hectare, each of WAT to be 60cms wide, 30cms deep, 1mtr long, aligned along the contours in a staggered manner.
2. Seed sowing of species like Neem, Sitafal, planting of hardy species like Agave, Aloe, Vad, Pimpal to be made.

(iii) Zone II areas:

1. Digging of Trenches of size 2mtr x .60 x.30mtrs , at the rate of 250 trenches per hectare in a staggered manner.
2. Planting 3 plants in each trench, @ 750 plants per hectare, followed by 2 weedings and 1 soil working in FYO, 1 weeding and 1 soil working in SYO and 1 soil working in TYO.
3. Raising Grass beds either in form of beds 8mtx1.75mtx0.15mt dimensions @ 50 beds per hectare, or digging V-shaped furrows of dimensions 45cms wide and 10cms deep @ 750 RMT per hectare on which grass seed/tussocks could be sown.
4. Dibbling of grass seed dipped in balls of moist earth in urea pellets shall be done on the WATS and in holes made in the adjoining bushes with the help of a stake in the monsoon.
5. Dibbling of pre-germinated Chandan seed in bushes, after monsoon, by using a stake, @ 2 to 3 per bush at a nominal rate of say 200 to 250 places in a hectare.

(iv) Zone III areas:

1. Digging of trenches of size 2mtrx0.60 x0.30mtrs, at the rate of 350 trenches per hectare OR continuous trenches of dimension 0.60x0.30mtr @ 1200 RMT per hectare at spacement of 15 mt. so as to raise 750 plants per hectare on the trenches or on the Refilled Continuous trenches.

2. Dibbling of grass seed dipped in balls of moist earth in urea pellets shall be done on the WATS and in holes made in the adjoining bushes with the help of a stake in the monsoon.
 3. Dibbling of pre-germinated Chandan seed in bushes, after monsoon, by using a stake, @ 2 to 3 per bush at a nominal rate of say 200 to 250 places in a hectare.
 4. Planting followed by 2 weedings and 1 soil working in FYO, 1 weeding and 1 soil working in SYO and 1 soil working in TYO.
- (v) Plantation of healthy seedlings from amongst species Khair, salai, Maharukh, kusum, bor, palas, pimpal, kadai, dhawada, Kandol, Sitaphal, Anjan, Hirda, Babul, Chandan, Siras, Sissoo, Hiwar, Karanj, Ain, Shiwan, Teak, Neem, Holoptelia integrifolia, Acacia senegalensis, Amaltas, Raintree, Sawar, Bamboo, Guggul, Ashwagandha, Shatavari, Bael, Padal, Awla, Agnimanth, Simarouba, Khaya and any other species as directed by the Chief Conservator of forests or the Deputy Conservator of forests, in tune with the current prescriptions and preferably yielding Non-timber Forest Produce are recommended. The choice of species is to be governed by the local edaphic factors. These miscellaneous species should be raised in polypots or root trainer containers. Pits or trenches as per suitability of site should be adopted, giving preference to the Refilled Continuous Contour Trenching Technology popularized in Ahmednagar division earlier. The DCF should choose the model with technical approval from CCF(T).
- (vi) The plant population shall be limited as per the zonation, and at 750 plants per hectare, in tune with the principle of Ecological Index worked out for the district.

h. Area 'C':

- (i) These areas are to be underplanted with suitable species including Bamboo, Chandan and other economically important species such that the planted population doesn't exceed 400 plants per hectare.
- (ii) At places where severe congestion of Subabul and Glyricidia exist, needful thinning operations including removal may be resorted to encourage growth of superior planted species.

i. Area 'D':

- (i) **D1 areas-** areas support 750 plants per hectare, however silvicultural thinning to favour enrichment by bamboo, sandal, ashwagandha, samudrashosh, shatavari, bedki pala/Gymnema and other economically important species are recommended to improve the floristics of the area.
- (ii) **D2:** The natural regeneration of this area need to be supplemented by artificial regeneration to the extent by which natural regeneration fall short of 750 plants per hectare with suitable species including Bamboo, Chandan etc., based on the local edaphic factors

THE SILVI-PASTURE MANAGEMENT WORKING

- 32. The grasses of this area belong to the Sehima-Dichanthium group and those commonly seen and which have fodder value are pavanya (*Schima nervosum*), Sheda (*Schima sulcatum*), tambadgota (*Andropogon pumilus*) and Kusali (*Heteropogon contortus*). The other grasses having comparatively less fodder value are kunda (*Ischaemum pilogum*), phulora (*Themeda quadrivalvis*), rosha (*cymbopogon martini*), phuli(*Aristida funiculate*) etc..
- 33. The Sehima-Dichanthium type is represented by dominant perennial grasses viz., *Dichanthium annulatum*, *Sehima nervosum*, *Bothriochloa pertusa*, *Chrysopogon fulvus*, *Heteropogon contortus*, *Iseilema laxum*, *Themeda triandra*, *Cynodon dactylon*, *Aristida setacea*, and *Cymbopogon* spp. Important associated species are *Apluda mutica*, *Bothriochloa intermedia*, *Arundinella nepalensis*, *Desmostachya bipinnata*, *Eragrostis* and *Eragrostiella* spp.
- 34. A *Dichanthium* community, with *D.annulatum*, *D.caricosum* or *D.aristatum* as principal species, represents the highest development of grassland. The plant cover of a developed *Dichanthium* community may exceed 80% and hay production may be about 6.3t/ha. On level soils with increasing moisture availability, the *Dichanthium* community is replaced partially or wholly by an *Iseilema*, with *I.laxum* as a chief species. When Sehima-Dichanthium cover is subject to grazing these communities are replaced by *Chrysopogon* and *Bothriochloa* communities and with further grazing at this stage, these communities are replaced by *Heteropogon* and *Eremopogon* communities, with *Heteropogon contortus* and *E.foveolatus* the chief species.

TREATMENTS PROPOSED: **The various treatments proposed are as under:**

- a. **Demarcation of Coupes:** The main coupe shall be demarcated one year in advance of working.
- b. **Preparation of Treatment Map:** It will be prepared by RFO and verified by ACF. The trace of the coupe map will show the contours along with important features like nalas, old plantations etc.
- c. The area will be classified as follows: -
 - a) **Type 'A'- PROTECTION AREAS:** The areas consisting of patches over 25° slope or more and 20 meter strip on both sides of the rivers or *nalas*.
 - b) **Type 'B'- UNDERSTOCKED AREAS/BLANKS:** Blanks and under stocked patches (crown density below 0.4), with slopes below 25°, and minimum area exceeding 2 hectare in extent.
 - c) **Type 'C'- OLD PLANTATIONS AND GROUPS OF YOUNG POLES:** This will include patches of well-grown poles for retention as future crop in addition to old plantations. The patches should not be less than one hectare in extent.
 - d) **Type-'D': WELL STOCKED AREAS:** This will include areas with crop density more than 0.4. The area will be further divided into two classes:
 - e) Type D1: Areas having adequate regeneration(750 seedlings or more per hectare)
 - f) Type D2: Areas having inadequate regeneration.

The emphasis shall be on tackling areas classified as Type 'A', 'B' areas in this working circle, notwithstanding the fact that while allotting the compartments to this working circle suitability factors have been given sufficient weightage.

35. TYPE A areas: -

These areas will be covered with soil & moisture conservation works like gulley plugging & Nala bunding. Seed sowing with the seeds of Anjan, Babul, Subabul, neem, Bamboo, Siras etc. will be done at suitable places.

36. Type B areas: -

- a. These areas are unworkable areas the existing Euphorbias & other bushes in this areas will be protected properly seed of Neem, etc. will be sown in these bushes before onset of monsoon through forest guards & watchman.
- b. Proposed treatment will consist of closure, undertaking soil and moisture conservation work, increasing fodder productivity by adopting silvi-pastoral approach, increasing water absorption and retention capacity of soil,

establishment of seed plots for raising the planting stock of grasses etc., Grass and legumes suitable for drought prone areas will be sown mixed together. Fodder tree species shall be planted at 8 x 5 mtrs, throughout the area, giving a total of 250 trees per hectare.

37. Type C areas: -

- a. All these areas will be covered with soil & moisture conservation works. All old successful plantations with crowded pole crop will be given light silvicultural thinning favouring the growth of Neem, Anjan, Sissoo Siras, Babul and other NTFP yielding species etc.

38. Type D areas:-

- a. Soil and moisture conservation works to be taken in these areas.

39. The choice of species shall be from amongst:

a. Grasses-

a) Dongari grass 2-4-11	Chrysopogon fulvas
b) Motha Pawana 100-5 (Sheda)	Sehima nervosum
c) Anjan grass	Cenchrus ciliaris
d) Marvel-8	Dicanthium annulatum
e) Dinanath grass	Pennisetum pedicilatum

b. Legumes-

a) Stylosanthus species viz.	Hamata, scabra
b) Subabul	Leucaena leucocephala
c) Wild tur	Atylosia scaraboides
d) Siratro	Macroptilum atropurpureum

c. Fodder Tree Species-

- a) Anjan, Acacai arabica, Sissoo, Subabul, Prosopis cineraria, Ficus, Tamarind.

40. PLANTING OPERATIONS IN THE FIELD:

All the sites are undulating and drought prone. However the steepness of the slopes in different sites and also within a site varies. As the rainfall and soil factors generally remain unchanged, the gradient becomes a determining factor for the treatment proposed. Therefore, following tree types of area will be demarcated on the treatment map.

Category 1: - Flat areas or areas with a gentle slope (Up to 5°)

Category 2: - Areas with gentle to moderate slopes (From 5° to 15°)

Category 3: - Areas with moderate to steep slopes (Over 15° slopes)

41. Following operations will be common for all the above mentioned areas:

Eradication of bushes and weeds by uprooting and manual cutting. After cutting their stumps will be treated with weedicides viz. 2,4,5-T (0.4% solution) to prevent their resurgence. However, fodder trees of old plantations should be retained.

42. SOIL TREATMENT AND SEED SOWING:

- a. **Category 1 areas:** Water absorption trenches of 60cms width and 30cm Depth will be dug up throughout the workable area at a spacing of 8m. Trench should be aligned along the contours. A tractor or a country plough will be used to rip area between the trenches. These works shall be completed by 15th of May of the planting year. In the last week of May or first week of June, the grass seeds and legume seeds will be sown in alternate rows at spacing of 50cms apart, Seeds must be sown at not more than 0.8cm. depth otherwise the germination will be affected. 6kg. Grass seed will be sufficient for one Ha. Similarly following quantities of legume seeds will be required.

4. Stylo hamata	4kg/ha.
5. Siratro	10 kg/ha.
6. Wild Tur	10 kg/ha.

In case of grasses, pelleting of seeds is found beneficial for better establishment. Seed is processed in small pellets which are easy to handle and less vulnerable to be blown by wind or washed off by water. A homogenous thick paste is prepared by incorporating seeds in the mixture of sand, clay, cow dung manure and water in the proportion of 3:1:1:1. The pellets are prepared in such a size that each pellet consists of up to 5 seeds. The pellets are dried and can be stored for 4-6 months before sowing. On the onset of monsoon these may be sown in the field. Pellets can be made manually or by using a machine.

- b. **Category 2 areas:**

WATs of 60 cm. Width and 30cm. Depth will be dug up throughout the workable area at a spacing of 8m. Trench should be aligned along the contours. 50 grass seed beds of size 8m. x 1.75cm x 15cm shall be prepared in between these trenches. The grass and legume seeds will be sown in

alternate lines on grass seed beds and trenches about 4.5 kg. Seed of grass will be required. Requirement of legume seeds is similar to that for category 1 areas. Timing and method of sowing is as given for category 1 area.

c. Category 3 areas:

WATs of 60 cm. Width and 30cm. Depth will be dug up throughout the workable area at a spacing of 8m. along the contours. Small pits of size 10cm. X 10cm. X 10cm shall be dug up through out the site at 1m. x 1m spacing. These pits will provide better conditions for germination than ordinary dibbing. Grass and legume seeds will be sown in alternate lines on these pits and also on trenches. The depth of seeds sown will not be more than 0.8 cm. The timing of sowing will be as per category 1 areas.

43. **Planting of fodder tree species on Trenches:** Throughout the site 250 seedlings of fodder species mentioned above will be planted at 8 x 5m spacing.

BAMBOO management CIRCLE

44. The common variety of bamboo occurring in this tract is *Dendrocalamus strictus*. Quality of bamboo varies with the drainage, soil, density of the tree cover. Bamboo clumps are found in scattered patches in old plantations. The clumps are congested and the growth of individual bamboo got effected due to congestion in clumps. The bamboo was raised by the department in the mid 1980s and during later afforestation schemes, and due to lack of maintenance and subsequent silvicultural operation appears congested, meriting proper steps of management. A total of 850 hectares is proposed to be managed immediately, and future plans to manage the future crop outlined. In the recent years ranges in the Sangamner sub-division in Akole tehsil have increased the area under afforestation with Bamboo as a component. The areas which are being afforested with Bamboo, in the recent years, too shall be worked under the prescriptions of the working circle, as and when they become eligible for working, necessitating separate estimates to be prepared by the RFO, which shall be given needful sanction by the Division/Sub-divisional officer in-charge of the division

45. The following method will be adopted

- (i) Exploitation of existing clumps
- (ii) Treatment of existing clumps
- (iii) Enrichment planting of bamboo

46. EXPLOITATION OF EXISTING CLUMPS:

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

- (i) All culms less than year old (Current season)
- (ii) From the rest culms equal in number to the current seasons (Less than one year old) culms or eight whichever is more.

25. Following culms will be removed from all clumps

- (i) All dead, decayed and dry bamboos
- (ii) Culms whose half or more top part is broken or damaged
- (iii) Twisted or malformed culms
- (iv) The remaining culms will be considered available for harvesting. The cutting height of culms will be 15 cm to 45 cm above the ground level i.e. above the first internode above the ground. The cut shall be slant with a sharp instrument.
- (v) No clump should be considered fit for harvesting unless it contains more than 12 mature culms (One year as well as two year old included)
- (vi) Harvesting of bamboo shall be done in a manner so as to ensure that the retained culms are evenly spaced and that some mature culms i.e. more than two year old are retained on periphery for the purpose of support to the new culms. The culms on the periphery of the clump will not be removed except where absolutely necessary to facilitate working in the interior portion of the clump.
- (vii) The leading exterior culms may not be cut under any circumstance even if they are malformed as their retention is in the interest of outward growth of rhizome and clump and to support new culms.

47. Treatment of Existing Clumps

26. The clump formation at the sites is not proper due to heavy competition and suppression by fast growing hardy species like *Gliricidia*. The following treatment is to be given to the under matured clumps.
- (i) The inferior species like *Gliricidia* will be cut from the ground within 1 meter from the clump

58. **ENRICHMENT PLANTING OF BAMBOO**

27. The forest areas having vegetative cover density more than 0.4 and the areas of moisture will be taken up for enrichment planting at 6 m x 6 m spacing in 45 cm x 45 cm x 45 cm pits. Bamboos prefer well drained soils though they also occur along nalas, low level depressions, beds of streams and other moist sites. The 6m x 6m spacing will be maintained even with the existing clumps.
28. Deep planting of plant material prepared from at least 1 year old rhizome is recommended.

59. The Government India is encouraging large scale production of Bamboo all over the country, under the National Bamboo Mission. Advantage of the said scheme should be taken, and all the training material, literature pertaining to Bamboo cultivation, rearing, harvest, grading, marketing and utilization should be utilized and disseminated at the village level, so that the district is benefited.

THE PLANTATION MANAGEMENT (OVERLAPPING) WORKING CIRCLE

48. There are many successful plantations in the division, and plantations done in the division since its inception are covered in this working circle. During previous working plan period many special schemes were implemented and close to 52,000 hectares of plantations were done in the division in the last decade. Normally the plantations are ignored once the period of the scheme is over. Also same planted areas are being taken again for plantation with out objectively judging the reasons for failure of previous plantation
49. Working plan office is equipped with GIS soft ware. Using satellite images the vegetation maps can be prepared. The vegetation maps indicate the dense, open and blank forest areas. Only the blank areas of the division should be taken for plantation purpose. All divisions are equipped with Global Positioning Systems (GPS) instruments, using GPS, the location of the plantation along with Latitude / Longitudes (northings / eastings) of the corners of the plantation area should be supplied to CF, working plan office every year. To start with last five year locations and as the working plan starts, all areas treated every year should be submitted with map and Lat/Long points of the plantation.
50. The division will order and procure the satellite images of the division for September/October month every year from National Remote Sensing Agency (NRSA), and supply to working plan office for image analysis. The working plan office after image analysis (forest density classification) will superimpose the compartment boundaries and the areas which have been planted (areas as supplied by division office) and give the vegetational change status to CCF(T) and the DCF Ahmednagar with his comments. This exercise can be a very good check on plantation program of the department.
51. Forest department should use Geographic Information Systems (GIS) extensively. The GIS system should find application at Range Office level. It is extremely difficult to physically monitor vegetational changes year after year. Here the GIS can be very handy software to monitor and control ground situations. The GIS and GPS till RFO level will help to do ground truth activity easily. To use GIS system uniformly it is necessary to develop a standard and uniform procedure for whole of the state.

NON TIMBER FOREST PRODUCE(OVERLAPPING)WORKING CIRCLE.

52. Currently activity on the NTFP front is low, however the potential and the steps to be initiated have been dwelt in brief, in order to give an impetus to this important sector of forest produce.
53. The special objects of management of this working circle are as below:
- h. To generate employment for the Forest Protection Committee members and improve the economic situation of the local rural people.
 - i. To identify and assess different NTFP resources in the division. i.e.,girth class wise, beat wise, enumeration of commercially important NTFP species with Medicinal and Gum yielding species like *Anogeissus latifolia*, *Sterculia urens*,*Boswellia serrata*, *Schleichera oleosa*, *Butea monosperma*, *Commiphora* sps etc.
 - j. To develop mechanisms to popularize NTFP spread in terms of afforestation, care, non-destructive method of harvest, sustainable use, marketing of the produce in the forests of the division.
 - k. The local people should be taught about the collection/tapping technologies and storing of the collected produce.
54. The department after assessing the NTFP potential of the division, should do market survey and assesses the market and find most competitive price for the produce collected by the local people.

JOINT FOREST MANAGEMENT

55. National Forest Policy 1988 envisages the importance of involvement of local people in the protection of forests. It also emphasizes the importance of traditional rights of forest dwellers. Priority for the use of forest produce is given to forest dwellers and the use of forests for industrial purpose is discouraged.
56. Ahmednagar district has always been in the forefront in the domain of participatory management and has given the country illustrious persona who by their dynamic leadership and vision gave the country further insights in formulating strategies for rural development.
57. The district boasts of being host to illustrious persona including Sh.Annasaheb Hazare of Ralegaon-Shinde, Sh. Popatrao Pawar of Hivre-Bazaar, and the villagers of Dorje(Shrigonda) , Gardani (Akole), Dolasne(Sangamner), Daraewadi(Sangamner), who have participated for the overall development of the villages. Institutions such as the WOTR(Watershed Organisation Trust) , set up under Indo-German Watershed

Development project, NABARD, and the Indian Military (Chichonde-Patil village) provided the needed support. The Micro-plans should involve activity that could really influence the Rural development in a long way by way of measures like-

- a. Electrify to villages with generators running on biofuels like Karanj seed oil, Jatropha oil, Moha, Neem oil. The oil expelling facilities should be provided at a prominent place in the division. Even esterification facilities should also be made available near the oil expeller for effective use of bio fuels.
- b. Regular training programs to the villagers regarding scientific lac cultivation(Indian Lac Research Institute ILRI, Ranchi), GUM grading techniques/ spray drying techniques for removing impurities in gum so that the villager can get better price for the NTFP collected.
- c. NTFP theme plantations, like GUM yielding species plantations (Dhawada, Salai, Khair, Hiwar, Movai Babul etc), Lac insect host plant plantations(Kusum, Palas, khair, bor, rain tree, acacia auriculiformis, Pimpal etc), Bio fuel plant plantations(Karanj, Neem, Moha, jatropha, palas etc) should be taken around the JFM villages in consultaton with the villagers. The program underlines conservation of forests and wildlife and therefore any activity/agreements etc. that is not consistent with Forest Conservation Act, 1980 should not be incorporated in the micro-plan.

WILD LIFE MANAGEMENT (OVER LAPPING) WORKING CIRCLE

58. Ahmednagar district by virtue of having a large geographical area spreading from the Western Ghats to the drier drought affected areas, by virtue of the diversity in climate and vegetation supports varied wildlife. Areas supporting wildlife have been identified over the years, notified as 'Protected Areas', management plans prepared for conservation of the wildlife therein, placed under administration of Wildlife Wing for the purpose. Ecological changes coupled with greater protection to the fauna with the implementation of the Wildlife Protection (Conservation) Act 1992, has led to an increase in Man-Animal conflict in specific areas of the division, necessitating measures to manage Wildlife.
59. The Protected Areas though have legally defined boundaries, have no clearly established Ecological boundaries, with the faunal populations including reptiles, mammals, avifauna venturing outside the legal limits into adjoining areas for foraging and breeding, thereby establishing the importance and need to evolve a proper approach in their management. The Protected Area network in the Ahmednagar district is represented as under:

Name of Protected Area	Notified Area	Talukas	Forest Area	Managed By
Jaikwadi bird sanctuary	34105 ha	Newasa, Shevgaon	Nil	DCF wl Aurangabad
Kalsubai-Harishchandragad wildlife sanctuary.	29909 ha	Akole, Rajura	18249	CF wl Nashik
Rehekuri Blackbuck wildlife sanctuary	217.31 ha	Karjat	217.31	CF wl Pune
Great Indian Bustard Wildlife sanctuary (over both Ahmednagar & Solapur districts)	337976 ha	Newasa Karjat Shrigonda	23110.51 (1897.19 ha with revenue	DCF Ahmednagar (for area in nagar)

60. Forest Management should take special care of the needs of wild life conservation and for the corridor linking the protected areas the forest management plans should include prescriptions for this purpose. It is essential to provide and maintain genetic continuity between artificially separated sub sections of migrant wild life. These areas are the repositories of Bio-diversity and merit protection of the highest order.
61. With inspiration from the Constitutional provisions The National Forest Policy 1988 aims at conservation of natural heritage of the country preserving the remaining natural forests with the vast variety of flora and fauna, which represents the remarkable biological diversity and genetic resources of the country. The wild life (protection) Act 1972 in consonance with other Acts add teeth to these measures in protecting wildlife.
62. This overlapping working circle has been constituted to achieve the following objectives,
1. To conserve the existing wild life population.
 2. To create ideal conditions for betterment of wild life.
 3. To take steps to mitigate the man-animal conflict situations.
 4. To train the forest personnel adequately to handle wildlife emergencies
63. Proximity to human settlements, the agricultural fields especially sugarcane which offers excellent habitat for stay and increased connectivity through road networks have led to

increase in man-animal conflict situations not to speak of the Anthropogenic pressure on the forests of the area.

64. Ahmednagar district blessed with variable climatic conditions supports varied fauna which have settled in the area. Accordingly it has been observed that the Panthers are confined more in the Western part of the district, the Black Buck to the Eastern part and a few localized in pockets of the district, thereby necessitating special strategy in their management.
65. The division had reported presence of wild animals including panther (80), Jackal (227), wolf (235), hare (491), common fox (147), peacock (379), hyena (50), black buck (1718), common langur (128), porcupine (66), chinkara (378), mongoose (178), wild boar (12), wild cat (34), rhesus macaque (125), common palm civet (17) in the year 2005 after conducting a detailed census of wildlife in the division. The census extracts of the district excluding the Protected Areas as has been vetted by the Chief Wildlife Warden of Maharashtra as "The Wildlife Population Estimation-2005" wherein barring the Panther population, the other animals being that of Waterhole count, is reproduced as under:

S.No	Wild Animal	No of Animals				
		Male	femal e	Cubs	undecided	Total
1	Panther	34	35	11	0	80
2	Fox (kokhad)	147				
3	Jackal (Kolha)	227				
4	Indian Wolf (landga)	235				
5	Wild Boar (randukkar)	12				
6	Rhesus Macaque	125				
7	Common Langur	128				
8	Chinkara	0 (?)				
9	Black Buck (kalvit)	1718				

66. The increasing trends of wildlife especially Leopards in the Sangamner sub-division area resulting in deprivation of livestock and human life, crop raiding by Black buck and chinkara, frequent outbreak of attack by Jackals and Wolves is posing a challenge to the Forest department.

Year	1989	1993	1997	2001	2005
Number of panthers	7	8	8	19	80

67. The prescriptions are applicable to all forest areas and also to the whole civil district, where ever possible.

- a. Soil and moisture conservation works will be taken up, wherever possible, in all forest areas, additional measures to be taken to form water holes particularly in Akole and Sangamner tehsils to favour the Leopard population.
- b. Creation of additional waterholes in DPAP areas of the district should not be a criterion to benefit wildlife, since the wild animals of the area are biologically capable of withstanding water scarcity which in a way regulates their population. Assured water supply may at times bring in a sense of security triggering off spurts in population outbreaks which later on become a cause for man-animal conflict.
- c. Reorientation of people's awareness about wildlife through inciting people's participation in programs like wild life week celebrations in educational institutions, general populace and rural areas.
- d. Involving local students, NGOs, Wildlife enthusiasts, and general public for wild life census operations and counting of avifauna at water bodies every winter.
- e. Provision of salt licks at suitable places.
- f. Erection of Wild life watchtowers at suitable spots, which would also serve as Fire Watch-Towers during the summer months.
- g. Make provision of Shelter and hiding places, if not existing naturally.
- h. Inoculation of cattle in the vicinity of forests to be compulsorily enforced, in co-ordination with the Animal Husbandry department and District Adminstration to protect the wild life from contagious diseases of cattle.
- i. Develop management strategies to handle crop raiding herbivore, by resorting to preventive and curative measures.
- j. Develop mechanisms to ensure that the genuinely affected persons due to wildlife damage are compensated within the shortest period of time.
- k. Van Vigyan Kendras associated with Wildlife Interpretation Centres to perform the function of educating the public in managing wildlife.

GENERAL MEASURES FOR PROTECTION:

68. The general measures to ensure wildlife protection should include-

- a. Areas should be strictly and effectively protected from fire.

- b. A vigilant watch should be kept on poachers by creating checking gates at strategic points vis-à-vis check post for checking the forest produces in transit.
- c. During summer, the scarcity of water leads to drive the animals to a few water pools exposing themselves as prey to poachers including local inhabitants. Such areas should be kept under constant vigilance.
- d. Compensation for cattle and human killings by wildlife should be made immediately as per law to create sympathy towards wildlife and to check any sorts of revenge to be taken by villagers.
- e. If there exists any cattle lifter or man-eater that should be translocated safely to safe areas.
- f. To have awareness for the wild life in the areas drive regarding wild animals should be taken from time to time.
- g. To have an orphanage to rear the ailing animals to recoup and then to set free in their natural home. Belwandi in Ahmednagar division is in the process of being developed as a Relief Center by the Maharashtra Forest Department.

MANAGING THE MAN-ANIMAL CONFLICT SITUATION:

69. Ahmednagar district is beset with the twin problem of having had to deal with both Carnivore and Herbivore wild animal populations and accordingly, the strategy developed should be in tune with the situation on the ground. Discussion and Inputs from wildlife workers in the area Ms. Vidya Athreya and the Veterinary Doctor-wildlife enthusiast, should orient in developing management strategies, rather than adapting a fire fighting approach.
70. Wildlife Tourism doesn't necessarily mean 'commercial tourism'. The objectives broadly include devising strategy to-
 - a. Maximize people's enjoyment of their stay through education and recreation,
 - b. Minimize the impact on habitat and wildlife.
 - c. Increase the visitor's concern for nature conservation
71. Wildlife Habitat Relationships Database is a set of facts depicting vegetation, habitat elements and environmental conditions used by specific wildlife species. These depictions can be provided in the form of simple narratives, tables of habitat types and components, prediction models, or by other formats. Mathur et al (2002).
72. A WHR database can be characterised by the following components:
 - A habitat classification
 - Listing of Wildlife Species of management interest.

- Species information on life history and ecological attributes. The distribution of each species in narrative or map form.
- Information on the legal and administrative status, and ecological status (degree of rarity) of each species

73. WHR information is most useful in

(1) Providing a systematic means of synthesizing and presenting information on vertebrate species. If all or a representative cross-section of species within the plan area are used to evaluate general habitat allocation decisions, there is no bias in emphasizing one taxonomic group over another or in ignoring some groups.

(2) helping to make general habitat allocation decisions at a broad scale of land resource planning.

74. An integrated program of inventory, management, monitoring, and research entails establishing a set of research priorities. Priorities can be based on key species and habitats for which management is needed but for which, after the initial WHR information base is developed and evaluated. Research priorities can also be set based on the key assumptions and other major weaknesses in the WHR information base to test or develop. Monitoring provides information on how habitats or wildlife species respond to conditions affected by management; research helps disclose the mechanism behind those responses. By closely integrating monitoring and research studies, a wealth of information on species occurrence and responses can be developed.

FOREST PROTECTION

75. The forests are burdened with heavy biotic interferences, hence addressing of these problems in a systematic manner necessitated the constitution of this Working Circle. Illicit felling, grazing, encroachments, poaching and fires are the major causes for the damage of the forests.

76. Reports of Evaluation wing indicate presence of immense biotic pressure whether in terms of stunted growth, due to hacking or grazing or fire incidences which do not find reflection in the data, thereby indicating that the records do not give a true picture of the anthropogenic pressure on the forests, and this needs to be duly rectified. It is quite likely that the forests contribution to match the needs of the populace in terms of small wood and firewood are not properly documented by the field staff.

77. Fires are of common occurrence. Due to highly combustible undergrowth consisting of dense grasses and dry lantana, a tiny spark can trigger off a conflagration in a short time. When dry, they are extremely combustible. They throw up a huge flame, which scorches the leaves and bole of trees completely. The high speed of hot winds during

summer, combined with the hilly configuration accelerates the spread of fire easily when it occurs and engulfs vast areas before it can be brought under control only by counter firing. With a long standing fire protection measures and vigilance of the staff, the forests, in general, have been protected against fires in spite of the handicaps.

ECOTOURISM

78. Eco-Tourism is an Industry which is supposed to make low impact on the environment and local culture, but help in creating more jobs in tune with the policies of Bio-Diversity Conservation.
79. A mechanical implementation with an over emphasis on physical and financial targets with out making an attempt to understand the spirit of the program would end up in causing irreparable damage to the environment. It is more difficult to establish and run a successful eco tourism enterprise. A main difference is the need to take into account the environmental factors and successfully integrate them with business and social concerns in a carefully thought out and implemented plan.
80. Eco tourism management seeks to integrate and balance several potentially conflicting objectives, protection of natural and cultural resources, provision of recreation opportunities and generation of economic benefits. In the absence of effective planning and management, ecotourism can lead to significant negative impacts on vegetation, soil, water, wildlife and historic resources, cultural and even visitor experiences such as visitor crowding had conflicts. Such impacts can be both ecologically and culturally significant and may negatively affect visitor satisfaction. Visitation may diminish along with the economic benefits and resource protection incentives.
81. Ahmednagar district offers good scope to develop ecotourism circuits. The district offers exciting opportunities to develop Religious circuits, Wildlife circuits, and Highway Tourism.
82. Ahmednagar is renowned as the land of Saints. It boasts having had given shelter to the great saints and temples including- Sai Baba of Shirdi (Rahata), Shani Shingnapur temple (Newasa), Sant Gyaneswar mandir (Newasa) where the religious scripture 'Gyaneswari' was written, Datta Mandir at Devgad (Newasa), Miravli Dargha (Nagar), Kanifnath Mandir at Madhi (Pathardi), Vruddeshwar temple at Tisgaon (Pathardi) Mohota devi mandir at Mohota (Pathardi), Takli Dokeshwar Temple, Baleswar temple, Kakatai temple (Rahuri), Pimpalgaon malwi (nagar), Jawle-Baleshwar temple (Sangamner) which are frequented not only by religious tourists from within the district and state of Maharashtra, but also from other states in the country and foreigners too.
83. Other places which hold scope for development of Tourism facility include Chand Bibi Mahal, Ahmednagar fort, Kharda fort, Bhandardara Dam, Mula Dam waters.

84. In addition to these places Ralegaon Shindi, Hivre Bazaar, Dolasne, Daraewadi, and of late Dorje need to be showcased for participatory excellence in Rural Development. Each of these spots should be examined afresh from the Forestry and Ecological point of view and Eco-tourism potential needs to be developed.
85. Highway Tourism could be developed in the form of developing Eco Tourism Natural Interpretation Centres, Van Vigyan Kendras at Chand Bibi Mahal, Newasa Phata, Chandnapuri ghat, Akole-sugaon nursery, Samvatsar-Shirdi, Pandripul ghat, Supa ghat, Karanje ghat, Rahuri Agricultural College campus, Vriddeshwar, Siddhtek need to be developed, wherein in addition to information, sale of forest saplings medicinal plants and forest products could be encouraged.
86. The complex which may go by name as Eco-Tourism complex or Nature Interpretation Centre, or Van Vigyan Kendra should be such a structure, which should not only showcase the importance of nature, educate the viewer the rich heritage he has inherited for safe-handling and handing over to posterity, have place to reside for a day or two with basic facilities at nominal rates, serve as a place wherein method demonstrations of successful experiments are in practice to enable

“learning by doing and seeing is believing”,

87. Van Vigyan Kendras/ Nature Interpretation centres serve a great purpose by-
1. To provide eco friendly infrastructure preferably on the fringes of wild life protected area which takes care of minimum lodging and boarding facilities in pucca houses, huts, machans and tents as per requirements of the tourists.
 2. To provide mini- libraries to enable visitors to spend their time usefully and elicit support for protection of wild life.
 3. To provide indoor games like carrom and chess for the entertainment of visitors.
 4. To earn revenue for the state government.
 5. To provide income to local people by employing them as guides, watchers etc.
 6. To facilitate sale of locally made crafts to tourists.
 7. To impart education on nature conservation.
 8. Lastly, to facilitate all round development.

88. The directives as laid down in the Eco-Tourism Policy of the Government of Maharashtra resolved vide its order dated 20th February 2008, shall act as guide-stones.

MISCELLANEOUS REGULATIONS

89. Miscellaneous instructions issued by the 'Forest department from time to time, covering various issues are presented in brief.

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**VOLUME II OF THE WORKING PLAN FOR AHMEDNAGAR FOREST DIVISION & SANGAMNER
FOREST SUB-DIVISION**

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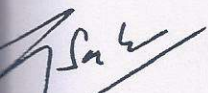
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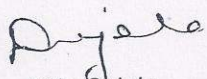
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Plan in accordance to instructions of the State Level Committee recommendations of 27th
for Ahmednagar forest division and Sangamner forest sub-division



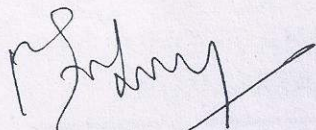
G. Sai Prakash
Conservator of forests, Working plans
Aurangabad



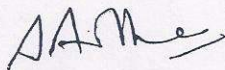
Dilip Gujela
Deputy Conservator of forests
Ahmednagar division



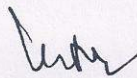
S.V. Matsagar
Assistant Conservator of forests
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