



**GOVERNMENT OF ODISHA
FOREST DEPARTMENT**

**REVISED WORKING PLAN
OF
SUNDARGARH FOREST DIVISION**

(2014-15 to 2023-24)

VOLUME – I

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INTRODUCTION

The Working Plan writing is the most important job for any W.P.O. where he has to put all his effort, knowledge and ideas regarding future management of the Forest & environment. At present Forest & environment management is a fast expanding field, encompassing several disciplines and covering vital areas like conservation of biodiversity, protection of species diversity, systematic management of forest and solving socioeconomic problems. The constant shrinkage of wilderness, increasing community pressures on forest areas, problems of public support for conservation and forestry operations in vogue throughout the Division have further aggravated the situation in state.

While writing Working Plan of Sundargarh Forest Division, I took help from the Working Plan of Sundargarh Division written by Sri D.S. Pattnaik. I made several tours to different parts of the Sundargarh District and gathered a lot of information from the field Staff and local people regarding forest, wildlife and environment. This working plan aims at planned compatible package of development measures, which while achieving the strategies necessary for better forest management, also needs of the local people and provides alternative. Many mistakes, immature and arbitrary conclusions might have crept and during preparation of working plan at many places. This is attributed to the time constraint and lack of inadequate database. Therefore, suggestion and criticism, which aim at improving this working plan, are most welcome.

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Dated the

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GLOSSARY OF TERMS

**Vernacular and Botanical Names of Trees, Shrubs, Climbers etc.
found in Sundargarh Forest Division.**

Vernacular Name	Botanical Name	Vernacular Name	Botanical Name
Achhu	Morinda tinctoria	Amba	Mangifera Indica
Ambada	Spondius	Ankula	Alangium lamarckii

	mangifera		
Anla	Emblica officinalis	Arjuna	Terminalia arjuna
Asan	Terminalia tomentosa	Ashoka	Saraca asoca
Aswatha	Ficus religiosa	Acacia	Acacia auriculoformis
Agasti	Sesbania grandiflora	Agnisikha	Gloriosa superba
Ambta	Bauhinia racemosa	Babul	Acacia nilotica
Bahada	Terminalia belerica	Bandhana	Desmodium oojeinensis
Bara	Ficus bengalensis	Barkoli	Zizyphus jujuba
Barada	Bauhinia retusa	Barbakulia / Dhobi	Delbergia paniculata
Baruna	Crataeva religiosa	Bastura	Litsaea polyantha
Batra	Melia composita	Behenta	Limonia acidissima
Bela	Aegle marmelos	Bhalia	Semicarpus anacardium
Bhendiamardan / Genduli / Girdhini	Sterculia urens	Bheru	Chloroxylon swietenia
Bija/Piasal	Pterocarpus marsupium	Bura / Simuli	Bombax ceiba
Bhaincha	Flacourtia indica	Chadaigodi	Vitex peduncularis
Champa	Michelia champaca	Chandan	Santalum album
Chakundi	Cassia siamea	Chara	Buchanania lanzan
Chhatian	Alstonia scholaris	Chauli	Elaeodendron glaucum
Chhuinpatuli	Sterospermum aungustifolium	Cashew	Anacardium occidentale
Dalasingha/ Kumbharchikini	Canthium didymum	Dhala Sirisa	Albizzia procera
Damkurudu / Katarang	Gardenia latifolia	Debadaru	Polyalthia longifolia
Dhaman	Grewia tilaefolia	Dhaura	Anogeissus latifolia
Dhaurang	Holoptelia integrifolia	Dimiri	Ficus glomerata
Gambhari	Gmelina arborea	Gandhapalas	Milliusa velutina
Gangasiuli	Nyctanthes arbortristis	Genduli	Sterculia urens
Ghodalanjia	Albizzia stipulata	Giringa	Pterospermum heyneanum
Gohira	Acacia leucophloea	Gotha	Croton oblongifolius
i			
Gundi	Mallotus philippinensis	Haldu/Kurum/Mundi	Adina cordifolia
Halanda	Diospyros montana	Harida	Terminalia chebula
Hinjala	Barringtonia acutangula	Hentala	Licuala peltata
Jaisanda	Litsea sebifera	Jamu	Syzigium cuminii
Jari	Ficus infectoria	Jeotha	Artocarpus lakoocha

Kadamba	Anthocephalus cadamba	Karamanga	Averrhoa carambola
Katha Champa	Plumeria rubra	Kaitha	Feronia limonia
Kalucha	Diospyros sylvatica	Kala Sirisa	Albizzia lebeck
Kanchan	Bauhinia purpurea	Kansa	Hymenictyon excellsum
Kangada	Xylia xylocarpa	Kapasias	Kydia calycina
Karada	Cleistanthus collinus	Karanja	Pongamia glabra
Kasi	Bridelia retusa	Kendu	Diospyros melanoxylon
Katakala	Strychnos potatorum	Keruan	Sonneratia apetala
Kurein	Holarrhena antidysenterica	Khair	Acacia catechu
Khakada	Casearia elliptica	Kharsan	Ficus glaberrima
Kochila	Strychnos nuxvomica	Kodala	Sterculia villosa
Kaiyan / Tentuli	Tamarindus indica	Kangada / Tangana	Xylia xylocarpa
Kumbhi	Careya arborea	Kusuma	Schleichera oleosa
Kuruma	Adina cordifolia	Lembura Moi	Bursera serrata
Mahalimba	Gmelina azadirachata	Mahula	Madhuca indica
Mankadakendu	Diospyros embryopteris	Manjari / Paldhua	Brythrina indica
Mitikinia	Mitragyna parvifolia	Moi	Lanea grandis
Mundi	Mitragyna parvifolia	Mukha	Schrebera swietenoides
Nima	Azadirachta indica	Nageswar	Mesua ferrea
Oau	Dillenia indica	Ostha	Ficus religiosa
Paladhua	Brythrina indica	Palasa	Butea monosperma
Panasa	Artocarpus heterophyllus	Panigambhari	Trewia nudiflora
Patuli	Stereospermum suaveolens	Phasi	Anogeissus acuminata
Pitamoi	Garuga pinnata	Piasala	Pterocarpus marsupium
Rai	Dillenia pentagyna	Rohini	Soymida febrifuga
Rakta Chandan	Pterocarpus santalinus	Rithaphala	Sapindus laurifolia
Saguan	Tectona grandis	Sahada	Streblus asper
ii			
Sal	Shorea robusta	Salai	Boswellia serrata
Salapa	Caryota urens	Sidha	Lagerstomia parviflora
Simili	Bombax ceiba	Sweta Simili	Ceiba pentandra
Sirisa (Dhala)	Albizzia procera	Sirisa (Kala)	Albizzia lebeck
Sisoo	Dalbergia latifolia	Suam	Soymida fabrifuga
Sunari	Cassia fistula	Sugandhi	

Tala	Borassus flabellifer	Tinia	Albizzia odoratissima
Tela kuruan	Ixora parviflora	Tentuli / Tamarind	Tamarindus indica
B.BAMBOO			
Daba baunsa	Bambusa arundinacea	Balangi baunsa	Oxytenanthera nigrociliata
Salia baunsa	Dendrocalamus strictus	Pani baunsa	Bambusa pallida
C. SHRUBS			
Agnijal	Vernonia roxburghii	Guakoli	Maba boxifolia
Anka-Koli	Carissa spinarum	Jhumpuri	Phyllochlamys spinosa
Arakha	Calotropis gigentia	Kantaikoli	Zyzyphus oenoplia
Arguna	Cycas Circinalis	Khirkoli	Mymuspos hexendra
Baincha koli	Flacourtia jangomos	Lajakoli	Mimosa pudica
Baula	Mimusops elengi	Lantana (Naga airi)	Lantana camara
Basanga	Adhatoda vasica	Lodha	Symplocos racemosa
Begunia	Vitex negundo	Mamari	Antidesma diandrum
Beta (Gouri)	Calamus latifolius	Mura	Helectris isora
Beta (Kanta)	Calamus guruba	Mersunga	Murra koenigii
Beta (Pani)	Calamus viminalis	Nagairy	Lantana camara
Bhuin nima	Andrographis paniculata	Nalbeli	Sipadesa fruticosa
Bhalia	Semecarpus anacardium	Narguni	Atlantia monophylla
Bhersunga	Murraya koenigii	Panijamu	Wedlandia excreta
Bhuin Anala	Phyllanthus niruri	Phanaphana	Oroxylum indicum
Bichhuati	Tragia involacrata	Patalagaruda	Rauwolfia serpentina
Chakundi	Casia tora	Pokasungha	Eupatorium odoratum
Dhatki	Woodfordia fruticosa	Ranidanturi	Desmodium cephalotes
Dudura	Datura stramonium	Ranidantakathi	Flemingi-a-chappar
Durikoli	Opilia amantacea	Siju	Euphorbia royalenna
Giliri	Indigofera pulchella	Soyam nai	Ichnocarpus frutiscens
Ghurudu	Gardenia gummiifera	Tilei	Wedlandia tinctoria
Gangasiuli	Nyctanthes arbortristis		

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D.CLIMBERS			
Anantamula	Hemidesmus indicus	Guluchi	Tinospora cordifolia
Asadua	Capparis horrida	Gila	Entada acandens
Atundi	Combretum decandrum	Kaincha	Abrus precatorius
Baidanka	Mucuna pruriens	Malati	Aganosma dichotoma

Banamali	Jasminum arborescens	Marda	Milletia racemosa
Buduli	Butea Superba	Muturi	Smilax macrophylla
Dantari	Acacia Pinata	Raktapituli	Gouaria leptostachya
Durkoli	Erycibe peniculata	Siali	Bauhinia vahillii
Gaja	Milletia auriculata	Satabari	Asparagus racemosus
Gudamari	Gymneva sylvestris	Uturudi	Pergularia daemia

<u>E.GRASS</u>			
Baguli	Eulaliopsis binata	Duba grass	Cynodon dactylon
Bena	Vetiveria zizaniodes	Phulchanchhuni	Thysanolaena maxima
Chhana	Imperata arundinacea	Sinkula	Heteropogon contrortus
Dhanwantary	Symbopogon martini		

GLOSSARY OF LOCAL NAMES OF ANIMALS AND BIRDS FOUND IN SUNDARGARH DIVISION

<u>A. ANIMALS</u>		
Local Name	English Name	Latin Name
Bajra kapta	Pangolin	Manis crassicaudata
Bagha	Tiger	Panthera tigris
Badodi	Shortnosed fruitbat	Cynopterus spinax

Banabiradi	Jungle cat	Felis chaus affinis
Barha	Wild boar	Sus scrofa cristatus
Balia kukur	Wild dog	Cuon alpinus dukhunensis
Bhalu	Black bear	Melursus ursinus
Bilua	Jackal	Canis sureus indicus Hodgson
Chittal	Spotted deer	Axis axis
Gayal	Bison	Bibos gaurus
Gundichimusa	Squirrel	Funumbulus pennanti
Gurandi	Mouse deer	Tragulus minna
Hati	Indian elephant	Elephas maximua
Heta	Haeyna	Hyaena hyaena
Jhinka	Porcupine	Hystrix indica
Kalarapatria bagh	Leopard	Panthera pardus fusca
Kokisiali	Fox	Vulpes bengalensis
Kutura	Barking deer	Muntiacus mintijack
Mankad (Hanu)	Monkey	Presbytis entellus
Mankada (Pati)	Rhesus macacue	Macaca mulatta
Musa	Rat	Rattus rattus
Musa (nepali)	Flying squirrels	Petauristaphili philippinensis
Neula	Common mongoose	Herpestes edwardsii
Odha	Common otter	Lutra lutra
Sambar	Sambar	Carvus unicolour
Saliapatani	Small Indian civet	Viverricula indica

B. BIRDS

Bani	Indian myna	Acridotheres tristis
Banakukuda	Jungle fowl (Red)	Gallus gallus
Bhadabhadalia	Roller / Blue jay	Coracas bengalensis

Bhaliakhai	Common grey born bill	Tikos birostris
Chatak	Pied crested cuckoo	Clammator jacobinus
Dahuka		Amanronis phoenicury
Deulia para	Pigeon	Anastomus oseitans
Gendalia	Open billed stork	Anastomus oseitans
Ghar chatia	House scarriw	Passer domesticus
Gobara chadhei		Molpates cafer
Haladi Basanta	Black headed oriole	Oriolus xanthornus

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Harada Chadhei		Crecapus phoenicopterus
Kajalapati	Black drongo	Dicrurus maerocerus
Kau (ati)	King crow	Corvus splendens
Kau (Damara)	Jungle crow	Corvus macrohyreos
Kochilakhai	Malabr pied Horn Bill	Anthrococeros coronatus
Koili	Indian cuckoo	Eudynamis scolopaclus
Kumbhatua	Crow pheasant	Cantropus sinensis
Kapta	Dove	Streptopellchin oensis
Mayura	Peacock	Pavo cristatus
Machharanka	Pied King fisher	Ceryle rudis
Panikua	Little cormorant	Phalacrocorax niger

Pecha	Owl	Athena brama
Sari	Hyna	Gracula religiosa
Sua	Parrot	Psittacula eupilia
Sarguna	King vulture	Sacrongyas calvus
Sankhachila	Kite brahminy	Heliastur Indus

<u>C. REPTILES AND AMPHIBIANS</u>		
Ahiraj	King Cobra	Naja Hannah
Ajarah	Indian python	Pythonmolurus
Chanda Boda	Russels viper	Viper russelli
Chiti	Common Indian Krait	Bungarus cacruleus
Dhamana	Rat snake	Ptyas mucosus
Gokhar	Indian cobra	Naja naja naja
Laudonkia	Common green whip snake	Dryophis nasutrus
Pani dhanda	Checkeered keel back	Natrix piscator
Rana	Banded krait	Bungarus fasiatus
Tampa	Monocellata cobra	Naja Naja kuothia

<u>LIZARDS</u>		
Bahurupi	Indian chameleon	Chammaeleon zeylanicus
Champainali	Mabuya	Mabuya bibro
Endua	Common garden lizard	Calotesversicolor
Godhi	Cargelandmonitor	Vernus monitor
Jhitipiti	House lizard	Homidactylus flaviriridis

<u>TORTIES AND TORTOISES</u>		
Kainchha	Land tortoise	Testudo elonguta
Pani Kainchha	Water tortle	Lissemys punctan granose

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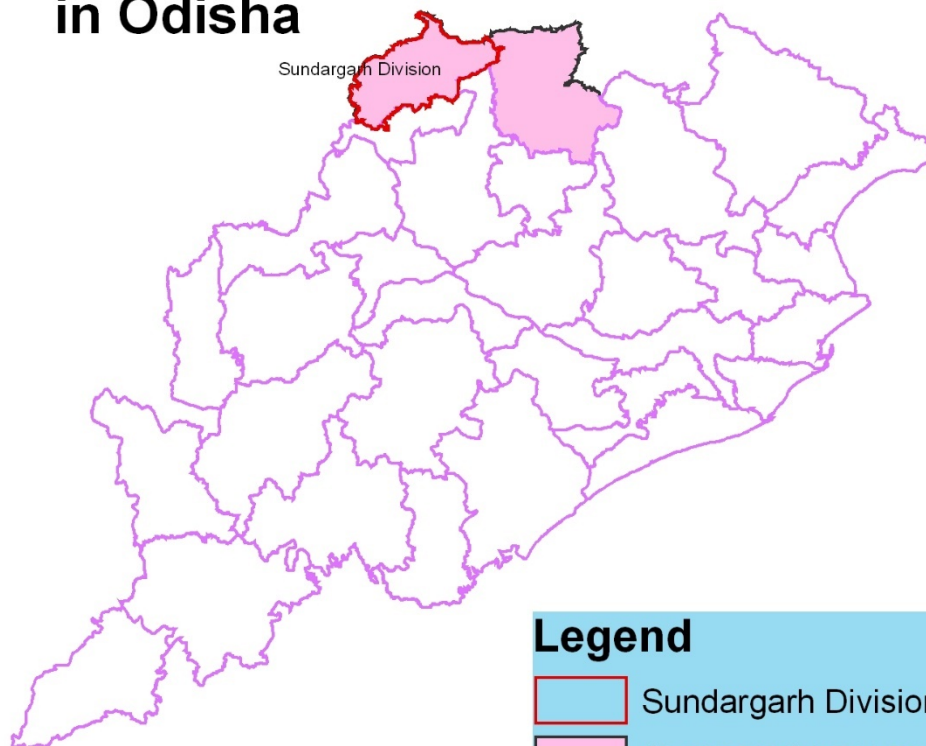
<u>D. FISHES</u>		
Balia		Wallagonia attu
Baligarada		Glossogobius giuris
Bhakura		Catle catla
Chenga		Ophiocaphalus gachua
Chitala		Notopterus chitala
Dand-khiri		Esomus dandrica
Illishi		Hilsa ilisa
Jalanga		Pangasisus
Jallah		Chela argentea
Kantia		Myotus cavaus
Kerandi		Barbus ambassis
Magura		Clarias batrachus

Mirkali		Cirrhinia mrigala
Mahurali		Amblypharyngodon mola
Phali		Notopterus notopterus
Rohi		Labeo rohita
Serana		Barbus serana
Seula		Ophiocephalus striatus
Singi		Heterophneustes fossil
Todi		Mastacembelus armatus

Xxxxxxxxxxxxxxxxxxxxx



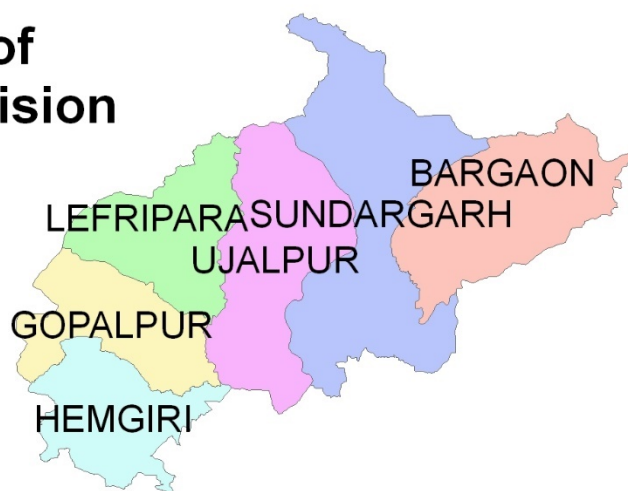
Sundargarh Division in Odisha



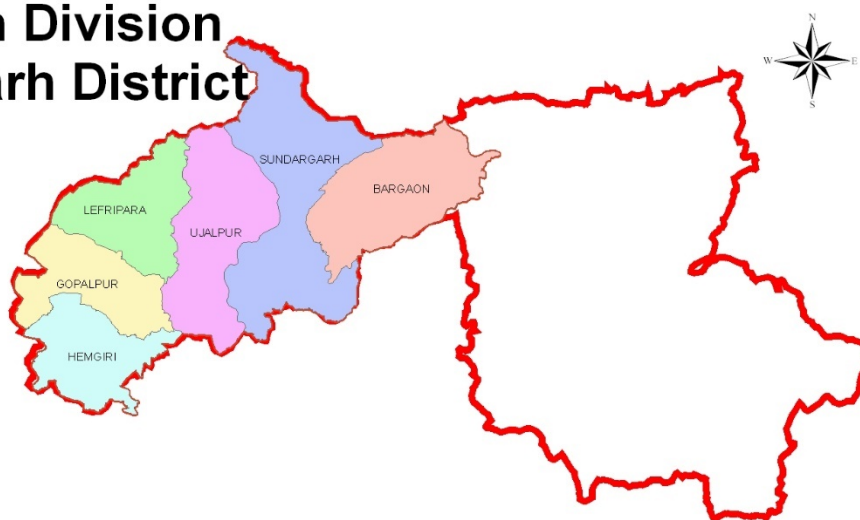
Legend

-  Sundargarh Division
-  SUNDERGARH DISTRICT

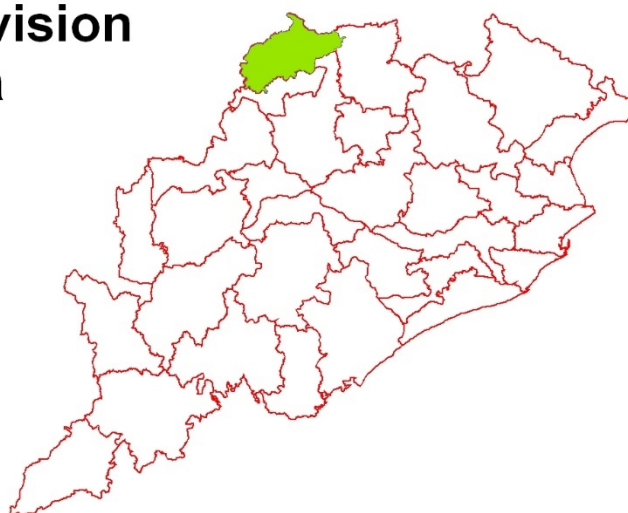
Range Map of Sundargarh Division

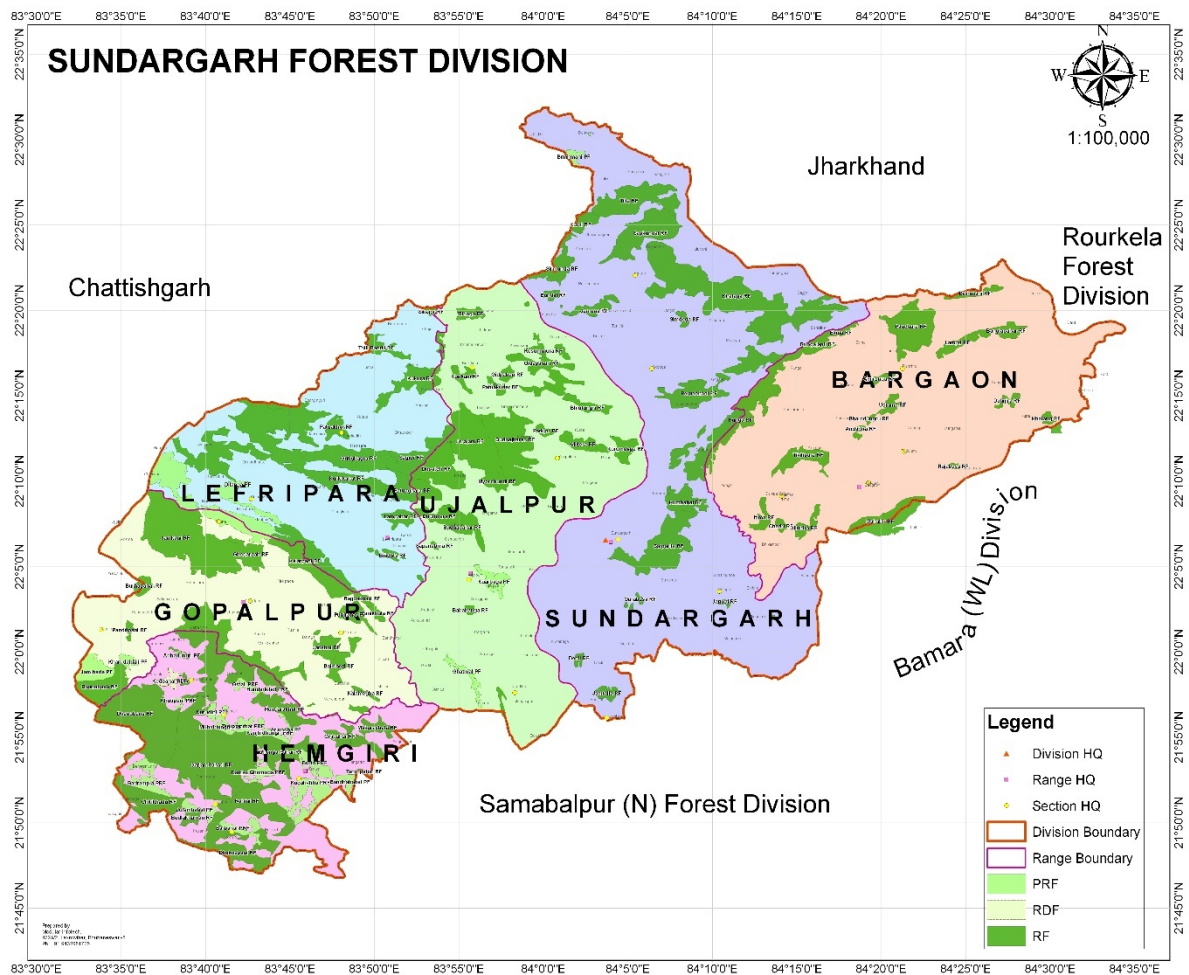


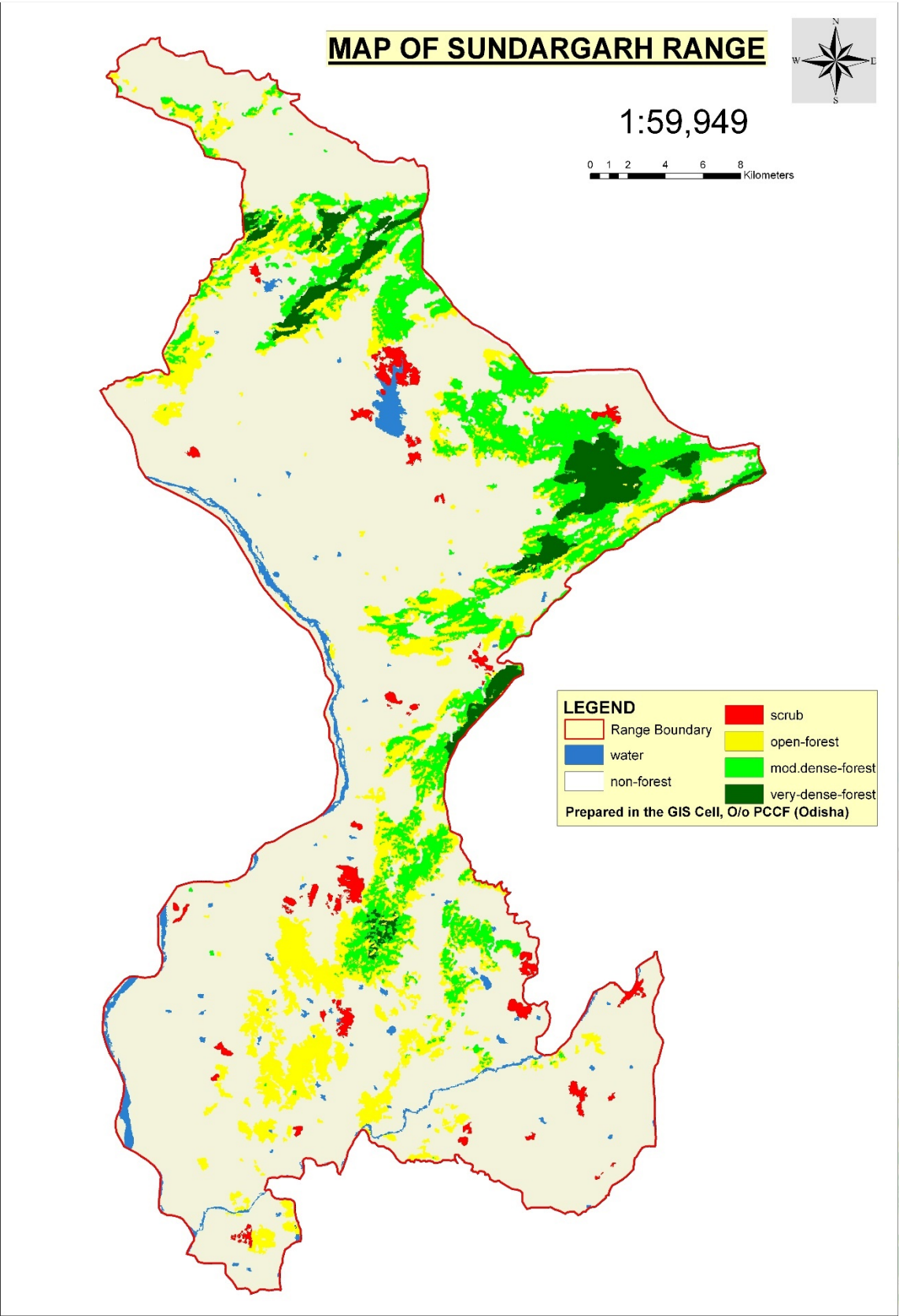
Sundargarh Division in Sundargarh District

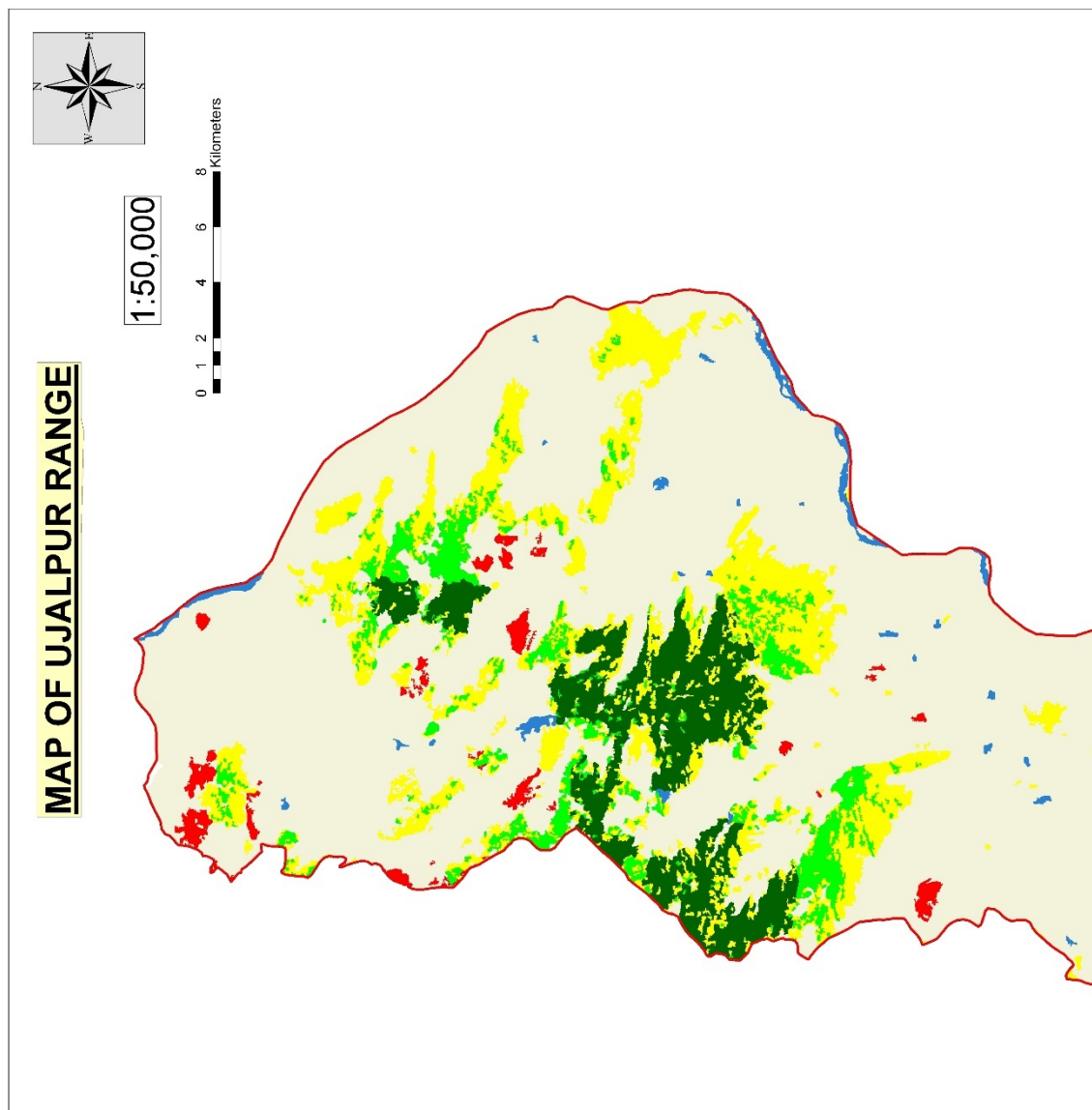


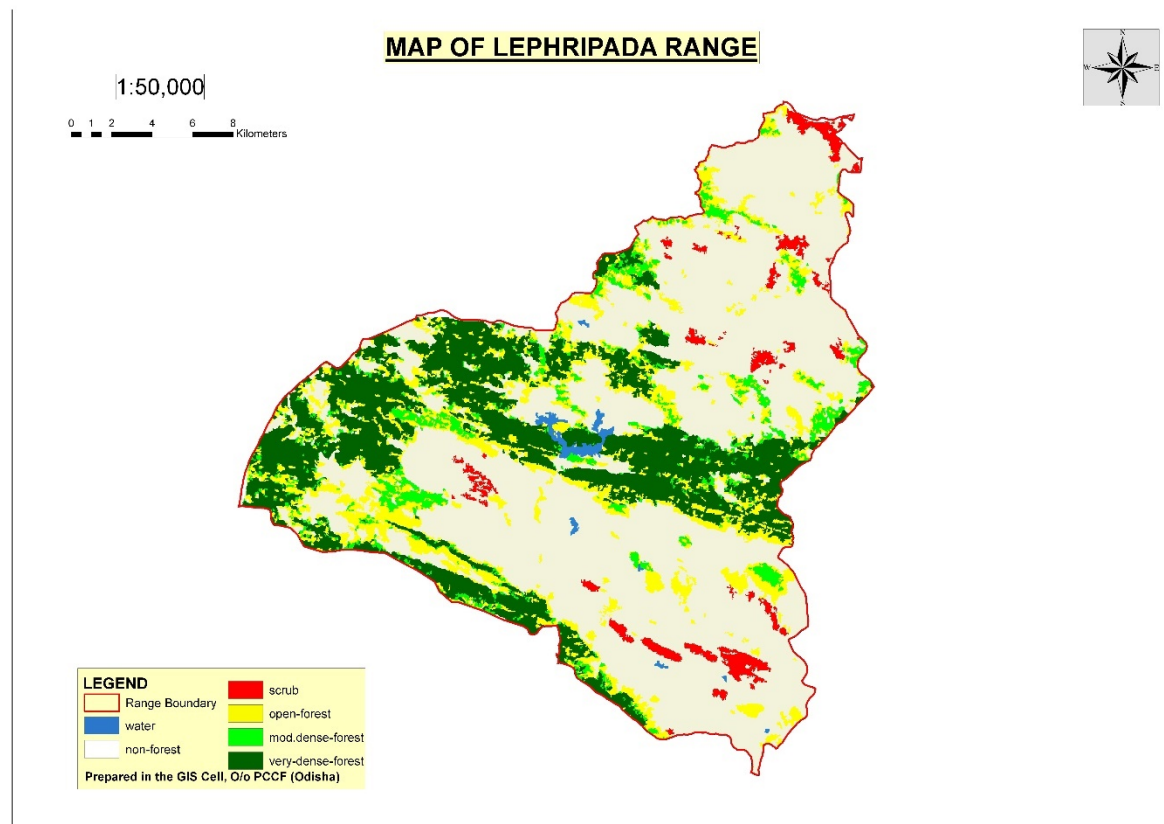
Sundargarh Division in Odisha

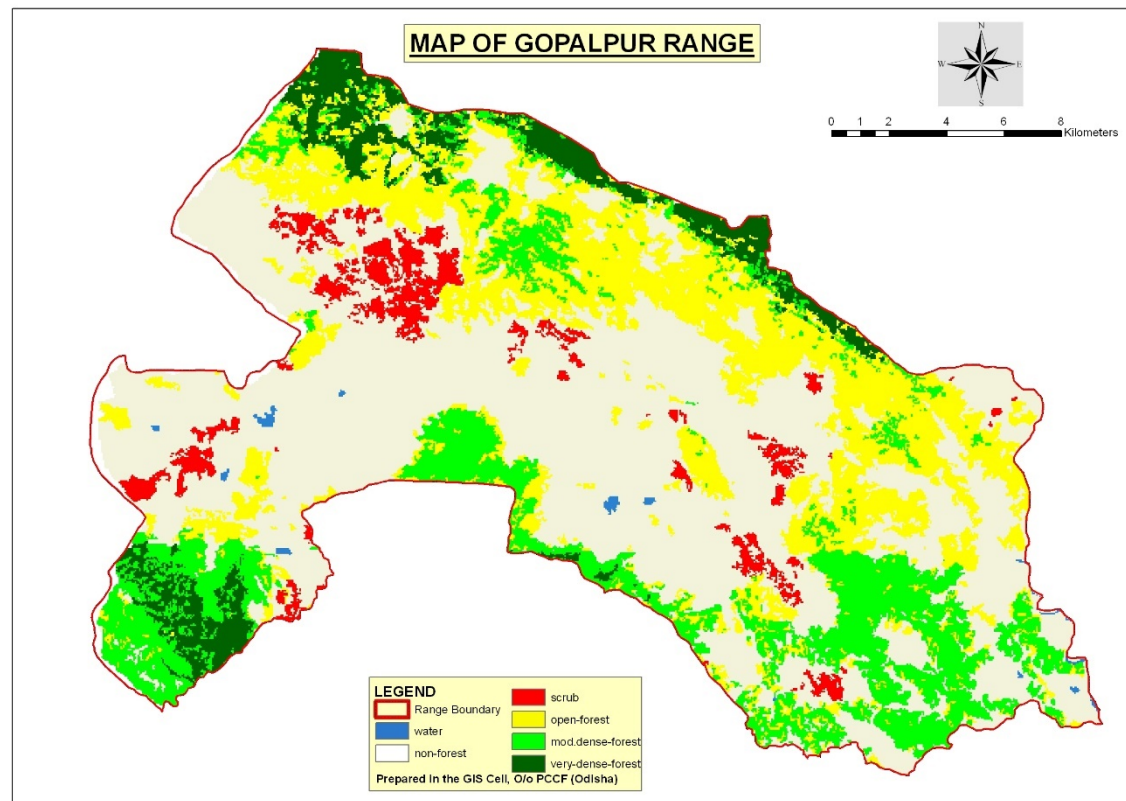


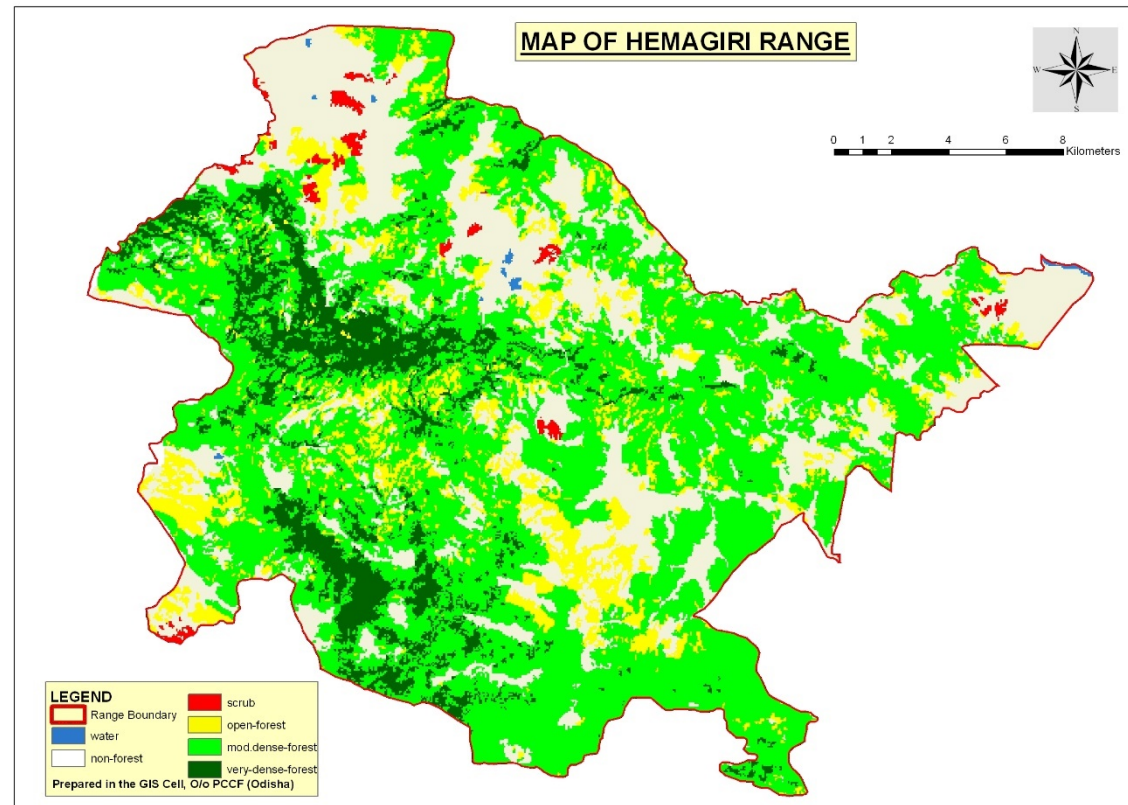


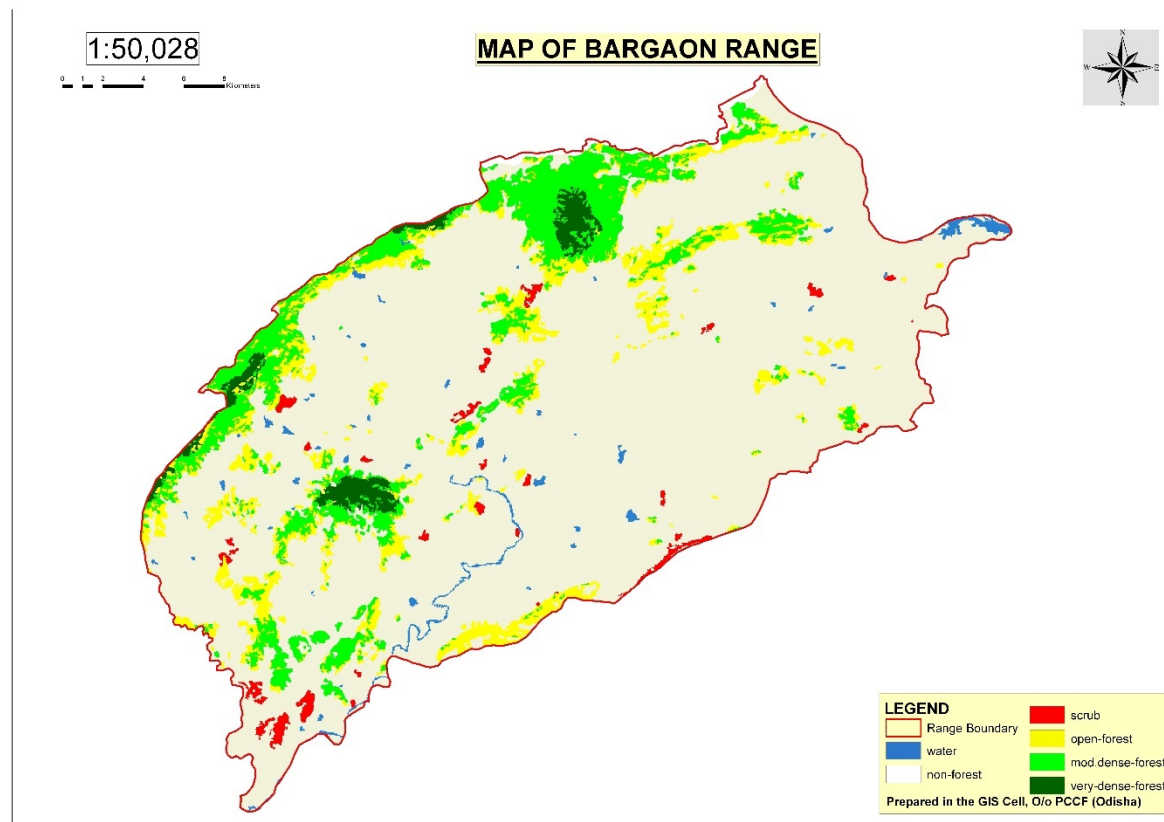












PART- I

Revised Working Plan of Sundargarh Forest Division

[2014-15 to 2023-24]

PART-I

Chapter-I

THE TRACT DEALT WITH

1.1 NAME AND SITUATION

1.1.1 The area dealt with in this Working Plan covers all the Reserved Forest Blocks notified under Section 21 of the Orissa Forest Act, Proposed Reserved Forests notified under section 4(1) of the Orissa Forest Act, DPFs in the process of notification under section 4(1) of the Orissa Forest Act and Village Forests of Sundargarh Forest Division including Ex-Gangpur Khalsa, and Hemgir areas under Sundargarh Division of Sundargarh District. This division has boundary with Ranchi District of Jharkhand state in the north, Bamra and Sambalpur Forest Divisions in the south and Rourkela Division in the east.

1.1.2 The total geographical area of this division is 3576.39 square kilometers as per the available records and it contains 94 Reserved Forests (RFs), 26 Proposed Reserved Forests (PRFs), 92 Demarcated Protected Forests (DPFs), 146 Village Forests (VFs) and Unclassed Forests (80.43 ha) having total forest area, including revenue DLC forests land of 172054.42 ha. The headquarters of this forest division is at Sundargarh which is 391 km away from the State headquarter Bhubaneswar. The nearest air ports are located at Jharsuguda and at Rourkela. The nearest sea port is Paradeep which is 445 km away. The distance from Divisional Headquarters, Sundargarh to the adjoining and nearby important places are given in the following table.

From	To	Routes followed	Distance in Kms.
Sundargarh	Jharsuguda	-	35 Kms
-do-	Rourkela	-	107 Kms
-do-	Bisra	Rourkela	125 Kms
-do-	Kuarmunda	Panposh	121 Kms
-do-	Hemgir (Kanika)	-	60 Kms
-do-	Gopalpur	-	40 Kms
-do-	Ujalpur	-	15 Kms
-do-	Vedvyas	-	95 Kms
-do-	Basundhara MCL	-	40 Kms
-do-	Hemgirgarh	-	62 Kms
-do-	Rajgangapur	-	69 Kms
-do-	Tangerpali (Ujalpur)	-	13 Kms.
-do-	Subdega	-	29 Kms.
-do-	Balisankara	-	46 Kms.
-do-	Banga	-	29 Kms.
-do-	Kutra	-	53 Kms.
Sundargarh	Nuagaon	-	156 Kms.
-do-	Lithikata	-	119 Kms.
-do-	Pitamahul Dam	-	91 Kms.
-do-	Mandira Dam	-	75 Kms.
-do-	Ghogra Temple	-	43 Kms.
-do-	Ushakothi	-	47 Kms.

The Railway line connecting Kolkota with Mumbai passes through the Division. The detailed list of CD Blocks, Tahsils and NAC within the jurisdiction of Sundargarh Division is given in the following table.

C.D Blocks within the Division		Tahsils within the Division		Municipality in the Division
Sl. No	Name	Sl. No	Name	Name
1	Sundargarh	1	Sundargarh	Sundargarh
2	Bargaon	2	Bargaon	
3	Kutra	3	Kutra	
4	Subdega	4	Subdega	
5	Tangarpali	5	Tangarpali	
6	Lephripada	6	Lephripada	
7	Balisankara	7	Balisankara	
8	Hemgir	8	Hemgir	

1.2 CONFIGURATION OF THE GROUND

The division comprises of an elongated patch of land running in East-West direction whereas the central part contains a vast plain area with isolated hillocks along with small chain of mountains. The plain land gradually ascends in western and southern direction. On the western border, R.Fs. like Ushakothi, Jamkani and Garjanpahad are situated. The highest peak on the western border is seen in Garjanpahad R.F. having an altitude of 598m. The other peak of Division is Katang (604m) in the south-eastern side having good forest. The North-Eastern portion is almost plain area dominated by cultivated land. Adjoining northern border Tillia, Kiralaga and Sagjore forest blocks are located. The highest peak in this region is Barha hill (652 m.) in Tilia R.F.

1.3 GEOLOGY, ROCK AND SOIL

1.3.1 GEOMORPHOLOGY

The oldest rock formations found in Sundargarh Division are those belonging to Gangpur series, which are prevalent in the former Gangpur state. The major rock types of the Gangpur series are phyllites, mica schist, carbon phyllites, calcitic and dolomitic marbles which are followed by the rock formations belonging to the iron-ore series, viz. mica-schist, phyllites and quartzitic rocks. A few thin beds of laterite gonditic rocks carrying manganese ore occur amidst these along a narrow zone between Kinjirma and Bargaon at the western part and through Pandrisila in the central part of the Division. Gneiss and granites, pegmatite occupy the area around Sundargarh and to its north and north-east and quartz veins traverse The low mounds and hills occurring here and there amidst the plains are covered with laterite derived from weathering of the underlying rocks.

The Division occupies a prominent position on the mineral map of the state. The important minerals available in the division are coal, limestone, dolomite and fire-clay. Beside, a few other minerals like mica, bauxite, lead, copper and zinc are also found. The economic minerals of lesser importance found in this Division are kyanite and silimanite, pyrite, building materials and kaolin etc.

1.3.2 ROCKS

A large part of the Division is occupied by the para-metamorphic rocks of Gangpur series occurring under the soil and alluvium occupying mainly the plain land and low lying hill slopes between Jareikela-Birmitrapur, Sundargarh and Lephripada. A narrow land of detached gangetic rocks occurs within the phyllite and mica schist between Kinjirima in the west, Gobira in the east through Ghoriajor, Kumtimunda and Panchara. The lower

carbonaceous phyllites zone called Kuarmunda stage is most conspicuously developed in this area. The mica schist, phyllites of iron ore series are found extensively in the area from north of Biramitrapur, Hatibari around Jareikela up to Bamra, in a small area of Hemgir particularly Punjipahad block, Kalatpani block and a portion of Jamkani block. In this Division in Khalsa area graphite and granite-gneiss cover a vast area near and around Sundargarh and in the north and north-east. Athkosia tract of this Division is mainly of schistose type of rock. Abundance of Quartz veins intersects the rock making the surface soil rocky.

The lower Gondwana formations which rest over the older Archean gneiss are met within Hemgir area. The coal bearing Barkar occurs in this area which rests over the denuded surface of older metamorphic rocks. These formations consist of conglomerates, sand stone and carbonaceous shell. It occurs on a narrow belt roughly in NW-SW direction. The coal bearing beds do not possess high quality of coal. The detailed list of rock types of Sundargarh District is given in **Annexure-1 (Page 01 of volume II)**. Dharwars carry the principal ore deposits of the country, i.e., those of gold, manganese, iron, chromium, copper, tungsten and lead etc. These with their associated rocks are also rich in industrially useful products such as mica etc. The percentage of minerals in the ores appears to be quite high.

The lower Gondwana formations of the Division contain pink colored sand stones. It is seen at Ramlata and Surulata village near Dhanubans blocks along forest roads to Taporja. Large deposits of carbonaceous clay are used in manufacture of fire resistant bricks. The peat coal deposits are not of much use even as cooking coal. But these are used in brick burning by mixing with good variety coal of about 20 to 25 %. The detailed list of mineral deposits of Sundargarh District is given in **Annexure -2 (Page 02 of volume II)**.

1.3.3 SOIL TYPES

Soil derived from mica-schist and gneiss cover the major portion of the forest area and forests on alluvium is on a limited area. The forest located on the alluvial soil shows good density and quality where as those located in the former are of poor quality and open type. The lowest density of forest on the hill slopes are seen mainly on quartzite, the major portion of which are grassy blanks.

The soil derived from mica-schist phyllites is red in color. They are immature in nature and there is still scope for further disintegration of mineral constituents. It does not show any clear profile. It is poor in water containing capacity but supports good forests cover both Sal and non-Sal depending upon the aspect. Quartzite and quartzite schist are tough in nature and more weather resistant. These rocks are usually found in association with granite or schist which forms soil and its fertility depends upon the percentage of argillaceous matter present in the rock. The detailed list of soil type and soil related constraints of Sundargarh Division (Block wise) are given in **Annexure-3 & 4 (Page 3&4 of volume II)**.

SOIL CHARACTERISTICS OF UPPER DHARWAR ROCKS

Mica schist and Gneiss are the best soil formers but soils derived from those are red in color. The soils on hilly and sloping grounds are washed down to the plain grounds where there is no forest. The forest blocks located on the hill slopes have very shallow and infertile soil, often sterile with quartz crystals. In the valleys good depth of soil is met with and it supports good vegetation. Calcareous soils are generally not met widely within the forest blocks, where tree crop has almost vanished and shows remnants of valuable tree with miscellaneous species like Asan, Bheru, Kendu etc. Soil types of Ragadakhhol, Panikhulia, Balijore, Jhantikhol are calcareous in nature. This type of soil has limited fertility. It supports poor miscellaneous crop consisting of Bheru, Asan, Senha. Bamboos are almost absent. Soil type and soil related informations of Sundargarh Division (Revenue block wise) are furnished here with in the next page.

Sl. No.	Revenue Block	Type of soil	Acidity (%)	Nutrient status Kg/ha.		
				N	P	K
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Hemgir	Black soil, Yellow soil, Brown forest soil	54%	1.24	1.58	2.32
2	Lephripara	Black soil, Brown forest soil, Red yellow soil.	63%	1.30	1.79	2.08
3	Tangarpali	Red soil, Yellow soil, Brown forest soil.	65%	1.37	1.78	2.17
4	Sundargarh	Black soil, Yellow soil, Red Brown Forest soil.	64%	1.30	1.82	2.18
5	Subdega	Yellow soil, Black soil, Mixed	64%	1.35	1.61	2.30
6	Balisankra	Black, Yellow, Brown Forest soil	63%	1.28	1.56	2.23
7	Bargaon	Red, Yellow soil, Brown Forest soil	61%	1.32	1.75	2.22
8	Kutra	Black soil, Red soil, Mixed soil, Brown Forest soil	61%	1.30	1.54	2.24

1.4 CLIMATE, RAINFALL AND HUMIDITY

The summer starts from March and continues up to June. The rainy season continues from July to October where as winter season continues from November to February. The maximum temperature recorded is 45.5° C during the month of May where as minimum temperature recorded is 6°C in the month of January. Prolonged summer with severe forest fires results in high percentage of mortality of natural regeneration in the forests. Thus dry deciduous types of forests are noticed in this Division. However, in exception Hemgir area gets rainfall during winter from retreating monsoon which is helpful in improving vegetation. Storms and cyclones are very rare in this Division. However, desiccating wind during summer causes some damages to young seedlings. The Tabular statement of rainfall from 1981 to 2000 is given in **Annexure -5 (Page 11 to19 of volume II)**.

1.5 HEALTH

The general health condition in the plain area is better than the interior forest tracts especially those of Dumabahal, Rouldega etc. which are malaria prone. Over the years much development has taken place in the health sector and threat of epidemics has been reduced. The following table shows block- wise position of hospital, dispensary, PHC, CHC etc. in the Division as on 31.03.1997.

Sl. No.	Name of Block/NAC	Hospital	Dispnr.	PHC	CHC
1	Sundergarh	-	1	4	-
2	Balisankara	-	3	3	-
3	Bargaon	-	2	5	1
4	Hemgir	1	1	5	-
5	Kutra	-	1	4	-
6	Lephripara	1	1	6	-
7	Subdega	-	1	3	-
8	Tangarpali	-	1	4	-
9	Sundergarh NAC	1	-	2	-

1.6 WATER SUPPLY

Besides the rivers, there are very few perennial streams inside the forest blocks. Most of the nallas go dry during the summer. Water supply in hot seasons is usually scanty and restricted to some shallow pools in river beds. As a result of which the villagers mostly depend upon the tank which are not hygienic. Only the big villages have the wells but the remote hamlets depend upon scoop holes dug in dry nallas. The general water table falls by 25 feet to 30 feet during May. The detailed list of water level of Sundargarh Division is given in **Annexure – 6 (Page 20 to 21 of volume II).**

The Division drains towards South-west directions by river Ib. The lowest point of this Division is 223 m near the union point of Saphai nadi with river Ib. The Ib River starts from Joshpur of Chhattishgarh State and traverses through Sundargarh and Sambalpur North Divisions to join Mahanadi River near Hirakud Dam. The river Ib is perennial and hold water during summer season also. The detailed report on drinking water and ground water in Sundargarh Forest Division is furnished below:

Range	Tube Well/ Place		Condition	Range	Well / Place	Condition
Hemgir	Daghora	Fr. Qrs.	Good	Hemgir	Fr. Qrs	Damaged
	Kodbahal	Fr. Qrs.	Good	Kanika	FRH	Good
	Ratakhandi		Good			
Lephripara	Lephri para		Good	Dumabahal		Damaged
	Duma bahal		Good	Gundiadihi		Good
Sundargarh	Mahesdihi	Range Office Campus	Good		Range Office Campus	Not working
	Baladmal		Good			
	Jormal		Good	Karamdihi Check gate		Not working
Bargaon	-			Bargain (Latagaon)		Good
				Tudalaga	Fr. Qrs	Good
				Itma	-do-	Good
				Panchra	-do-	Good
Ujalpur	-			Ujalpur	Range Office Campus	Good
				Kinjirkela	Fr. Qrs	Good
				Nuadihi	Fr. Qrs	Good
Gopalpur	Duduka	FG Qtrs.	Good		Range Office Campus	Good
	Jamjharia		Good		F.R.H. Campus	Good
				Taporia	Fr. Qtrs.	Damaged

1.7 SURVEY

This area was topographically surveyed by Survey of India during the year 1981-82 to 1985-86. Topo maps used in this Division are available in 1: 2,50,000 and 1:50,000 & 1:25,000 Scale. The total forest area tackled in this plan is covered by 5 topo sheets of 1:250,000 scale and 14 numbers in 1:50,000 scales. The entire forest Division is covered by the following topo sheets of scale 1: 50,000 and 1:25,000.

Details of Topo sheets of Sundargarh Forest Division

1:50,000 Scale	1:25,000 Scale
64 N/12	64 N/ 12 NE, NW, SE, SW
64 N/14	64 N/ 14 - - SE -
64 N/15 (F 44/L15)	64 N/ 15 NE, - SE -
64 N/16(F 44/L16)	64 N/ 16 NE, NW, SE, SW
64 O/ 9	64 O/ 9 NE, NW, SE, SW
64 O/13 (F 44/R13)	64 O/ 13 NE, NW - SW
73 B/ 2	73 B/ 2 - - - SW
73 B/ 3	73 B/ 3 NE, NW, SE, SW
73 B/ 4	73 B/ 4 NE, NW, SE, SW
73 B/ 7	73 B/ 7 NE, NW, SE, SW
73 B/ 8	73B/ 8 NE, NW - SW
73 B/11	73 B/ 11 NE, NW, SE, SW
73 B/12	73B/ 12 NE, NW, SE, SW
73 C/ 1	73C/ 1 NE, NW,

1.8. DISTRIBUTION OF AREA

1.8.1 This plan covers 94 numbers of Reserve Forest Blocks, 26 Proposed Reserve Forests duly notified U/s-4 of O.F.A. 1972, 92 numbers of Demarcated Protected Forests and 146 numbers of duly notified Village Forests extending over part of Sundargarh Sub-Division of Sundargarh District. The total forest area under the administrative control of this Division is as follows:

<u>Legal Status</u>	<u>Nos.</u>	<u>Area (in ha.)</u>
1. Reserved Forest	94	101186.87 Ha.
2. Proposed Reserved Forest	26	5580.80Ha
3. Demarcated Protected Forest	92	14876.84 Ha.
<u>Sub-Total</u>		<u>121644.51 Ha.</u>
4. UDPF		45342.23 Ha.
5. Village Forest	146	1048.10 Ha.
6. Un-classed Forest		80.43 Ha.
7. Land having forest growth		3939.15 Ha
Grand Total Forest Area		172 054.42 Ha.
-		

Geographical area of the Division - 3576.39 Sq. Km.

Range-wise Forest Area of Sundargarh Forest Division.

I. LIST OF RESERVED FORESTS.

Name of the Range	Name of R.F.		Area in Ha.	R F Boundary in km.
1	2		3	4
1. Bargaon	1	Bangala-pahad	346.82	10.86
	2	Lamtipahad	310.80	18.6
	3	Brahmani	829.64	28.12
	4	Panchara (North)	1153.39	13.14
	5	Panchara (South)	607.05	10.46

Bargaon	6	Bhursalia	76.89	7.24
	7	Udarama	273.17	8.26
	8	Mahabir	633.35	21.04
	9	Jharbeda (Katang)	162.08	10.5
	10	Dahigira	190.20	11.02
	11	Latalaga	82.96	7.26
	12	Rajabasa	47.34	2.16
	13	Mukundpur (Andiabira)	99.15	6.16
	14	Pamradunguri	101.17	7.28
	15	Tikilipara	627.29	25.2
	16	Itma	252.94	11.2
	17	Raidihi	238.77	5.6
	18	Kharika-munda	80.94	8
	19	Jharmunda	87.42	11.2
	20	Rungaon (part)	2942.94	80
Range Total			9144.31	303.30
2. Sundargarh	1	Rungaon-P	1960.00	55
	2	Kurai	3334.73	13.75
	3	Kirelaga	8103.31	115.25
	4	Gurabasa	56.66	4.72
	5	Bijlikhaman	30.35	2.44
	6	Gopikudar	14.16	1.72
	7	Deoli	72.85	3.62
	8	Jamtalia	242.82	10.4
	9	Satparlia (Alanpani)	2076.11	67.4
	10	Brahmani- pahar	121.41	6.8
	11	Ghumuda	56.25	4.3
	12	Jarmal	40.47	2.5
	13	Khariakani	105.63	4.26
	14	Rasraipur	57.06	5.15
	15	Peruabhadi	1375.98	14.8
	16	Jugigugian	344.00	13.24
	17	Tiljura	76.89	4.2
	18	Satparlia (Kumbahal)	485.64	7.4
	19	Mahulgaon	627.29	18.8
	20	Kurai (Banrai)	194.26	6.95
	21	Simdega	77.70	5.6
	22	Ghoghar	604.62	43.6
Range Total			20058.18	411.90

Name of the Range	Name of R.F.	Area in Ha.	R F Boundary in km.	Name of the Range
1	2		3	4
3. Ujalpur	1	Bankidihi	24.28	1.8
	2	Rajpur	1643.08	28.5
	3	Athakosia-A(Part)	9915.55	95
	4	Sapanbira	121.41	2.8
	5	Bhursipatra	84.98	6.5
	6	Kurladungri	121.41	8.4
	7	Athkosia-B (Part)	2027.95	43.5
	8	Kusumura	2116.58	102.4
	9	Tildegga	414.41	10
Range Total			16469.65	298.90

4. Lephri-para	1	Dhanger-gudi	8271.66	86.9
	2	Sikajore -A	1578.33	26.5
	3	Chirelkhaman	40.47	2.8
	4	Sikajore-B	725.22	5.2
	5	Bindhya-Pahar	103.60	11
	6	Kurumkel	641.44	34.7
	7	Dalkijharan	32.31	3.6
	8	Athkosia-A (Part)	5597.41	59
	9	Athkosia-B (Part)	441.12	8
	10	Bichutungri	20.31	1.92
	11	Jamkani (Part)	1080.55	7.5
Range Total			18532.42	247.12
5. Gopalpur	1	Jamkani (Part)	7924.83	60
	2	Garjan-pahad- Part	4090.65	20.5
	3	Dhanubans(p)	2023.57	17.5
	4	Punjipahad	611.09	16.06
	5	Panikhalia	165.92	6.38
	6	Regedakhhol	95.91	4.38
	7	Jhantikhol	590.45	10.24
	8	Balijori	537.84	16.34
	9	Pandripani	205.18	6.9
	10	Runjisarua	30.35	2.7
	11	Sidarmunda	65.56	4.7

Name of the Range	Name of R.F.		Area in Ha.	R F Boundary in km.
1	2		3	4
Gopalpur	12	Dhokar- pahad	74.46	5.02
	13	Kanhupahad	12.54	2.2
	14	Kalamegha pahad	108.05	7.15
	15	Budhapahad	252.53	2.56
	16	Pankipahad	105.62	5.32
	17	Lalma	80.94	4.46
	18	Kalatpani	792.80	4.46
	19	Dhanuardihi	12.95	1.98
	20	Sarangi-jharia-A	55.27	8.471
Range Total			17836.51	207.32
6. Hemgir	1	Chenga-pahad	1017.41	29.36
	2	Hundarkhol	775.00	20.94
	3	Sissopahad	485.23	20.92
	4	Makarchata	368.27	11.96
	5	Giripahad	392.96	10.33
	6	Budla-khaman	252.53	8.09
	7	Makri-dungiri	68.39	4.7
	8	Budhadugri	64.34	3.8
	9	Behera-munda	48.15	4.25
	10	Ghantia-chhapal	27.11	2.55
	11	Satparlia	114.12	5.9
	12	Tangopahad	72.44	5.35
	13	Chitkikhadu	1455.70	16.28
	14	Rohini	1298.27	32.75
	15	Singaribahal	1279.66	32.05
	16	Dheknapani	1270.75	31.04
	17	Garjanpahad (Part)	5947.47	27.5
	18	Dhanubans (part)	4208	36.5
Range Total			19145.80	304.27
Grand Total (RF Area)			101186.87	1772.81

List of PRFs (Range wise)		
Name of Range	Name of Forest Block	Area in Ha.
1	2	3
1. Bargaon	1. Dahijira	18.31
	2. Tudalaga	66.67
	3. Khatkurbahal	110.48
Total		195.46
2. Sundargarh	1. Sublaya	27.72
Total		
3. Ujalpur	1. Chakramal	16.59
	2. Megdega	26.3
Total:-		42.89
4. Lephripara	1. Bahala	1095.11
	2. Tamkina	1274.8
	3. Baladbandha	47.75
	4. Bendojharia	49.77
	5. suruguda	47.75
	6. Badkhalia	60.7
	7. Pithabhuin	56.65
	8. Sikajore	82.96
	9. Chhatenpali	22.25
Total		2737.74
5. Gopalpur	1. Karelkachhar	60.7
	2. Sareikela	89.03
	3. Kaletpani	225.82
Total		375.55
5. Gopalpur	1. Karelkachhar	60.7
	2. Sareikela	89.03
Total		375.55
6. Hemgir	1. Kaudaraha-Tilia	991.51
	2. Barbahali	400.65
	3. Kanthidungri	259
	4. Beheramunda	56.65
	5. Garjanpahad-Ext.	29.94
	6. Mitheitungri	261.03
	7. Ostali	172.88
	8. Hundarkhol	29.78
Total		2201.44
Grand Total:- (PRF Area)		5580.80

List of DPFs (Range wise)

Name of Range	Name of Forest Block.	Area in Ha.
1. Bargaon	1. Kustuna	121
	2. Salbira Nakti	111.49
	3. Tilaimal(Mundajore	68.79
	4. Baibai	59.08
	5. Salepali	60.78
	6. Panchara (Nuagaon)	80.94
	7. Kalijapathar	146.49
	8. Pamra	151.94
	9. Rangiadhipa	19.85
	Total	820.36
2. Sundargarh	1. Kadopani	14.71
	2. Amasranga	66.53
	3. Amasdegi	48.16
	4. Badalpada	55.18
	5. Bihabar	136.78
	6. Bhedabahal	80.93
	7. Gadiajore	62.12
	8. Gadiajore-II	36.12
	9. Bhawanipur	94.69
	10. Jamtalia-I.	31.88
	11. Jamtalia-II	29.95
	12. Kisanikhol	103.2
	13. Mangarkunda	55.64
	14. Madhapur	7.48
	15. Mahuljore	29.14
	16. Thithitangar	55.84
	17. Tilia	954.26
	18. Sagjori	46.14
	19. Talsara	321.76
	Total	2230.57
3. Ujalpur	1. Badbahal,Kanakjora -Part-I & II	47.75
	2. Bharatpur- Badbanga	42.89
	3. Bharatpur- Nialipali	143.26
	4. Chhotbanga	97.13
	5. Bhaludungri	39.34
	6. Raidihi	224.61
	7. Mahikani	93.07
	8. Tangarpali A & B	426.55
	9. Darlipali-Ghantamal	105.22
	10. Sribhubanpur	104
	11. Dwarikhol A & B	29.14

Name of Range	Name of Forest Block.(DPF)	Area in Ha.
1	2	3
Ujalpur	12. Beheradihi	32.37
	13. Sanpatrapali	32.37
	14. Budabahal	275.19
	Total	1692.89
. Lephripara	1. Lephripara	91.46
	2. Kulabira	58.28
	3. Kadomal	398.62
	4. Baadgamal	74.46
	5. Karadega	107.65
	6. Suarijore	101.17
	7. Banujore	37.64
	8. Lampahad	110.08
	9. Dhatkipahad	356.29
	10. Koilaga	612.1
	11. Gadaghat	396.6
	12. Ushakothi	503.16
	13. Banrai	181.1
	14. Sialikhaman	511.94
	15. Litiapani	612.1
	16. Banjikachhar	401.21
	Total	4553.86
5. Gopalpur	1. Jamjharia	63.43
	2. Tapria	70.82
	3. K.Daldali(Kucheidega)	344.02
	4. K.daldali	57.46
	5. Balinga	19.74
	6. Duduka	289.11
	7. Satparlia	22.26
	8. Saraikela B	19.96
	9. Jhupruna	10.63
	10. Sarangijharia B	41.86
	Total	939.29

Name of Range	Name of Forest Block.(DPF)	Area in Ha.
1	2	3
6. Hemgir	1. Khutipani	104.57
	2. Tangardihi	52.77
	3. Julumbahal	279.64
	4. Jaraikela	21.36
	5. Kutrajore-Bendrichuan	161.47
	6. Bandhabahal-B	54.96
	7. Badranpia	592.88
	8. Kurludihi	103.76
	9. Kanaktura	90.73
	10. Raichuan	32.78
	11. Bheluatikra	115.26
	12. Kodbahal	275.19
	13. Arjunda-Biswanathpur	254.95
	14. Dhanubans-Extn.	22.25
	15. Arjunda	224.68
	16. Burta	505.86
	17. Kanika-Ghumunda	283.28
	18. Sukhabandh	131.53
	19. Tilia-Singaribahal	192.63
	20. Hemgir-Budhadungri	121.4
	21. Bandhabahal A	180.44
	22. Dheknapani	64.75
	23. Surulata	505.86
	24. Tangoparbat	266.94
	Total	4639.94
Grand Total		14876.84

**List of Village Forests of Sundargarh Forest Division declared under Odisha
Village Forests Rule**

Sl. No	Name of the District/Division	Name of the Tahasil	Name of the Range	Name of village forest	Area in Ha.
1	2	3	4	5	6
1	Sundargarh	Subdega	Sundargarh	Baragad	6.49
2	Sundargarh	Subdega	Sundargarh	Barangakachhar	5.40
3	Sundargarh	Subdega	Sundargarh	Mahuljore	8.16
4	Sundargarh	Sundargarh	Sundargarh	Simna	0.928
5	Sundargarh	Sundargarh	Sundargarh	Budabahal	8.58
6	Sundargarh	Sundargarh	Sundargarh	Sapdagar (Pradhanpada)	11.00
7	Sundargarh	Sundargarh	Sundargarh	Barpali	4.00
8	Sundargarh	Sundargarh	Sundargarh	Kurumkel (Babudihi)	14.00
9	Sundargarh	Sundargarh	Sundargarh	Chitabanga	12.80
10	Sundargarh	Rajgangpur	Sundargarh	Semna	13.28
11	Sundargarh	Rajgangpur	Sundargarh	Kainsara	8.40
12	Sundargarh	Balisankara	Sundargarh	Raidihi	1.50
13	Sundargarh	Balisankara	Sundargarh	Rengali	3.52
14	Sundargarh	Balisankara	Sundargarh	Ranpur	0.73
15	Sundargarh	Balisankara	Sundargarh	Katngidihi- Rasrajpur	3.77
16	Sundargarh	Rajgangpur	Sundargarh	Simdega	0.70
17	Sundargarh	Rajgangpur	Sundargarh	Balisankara	8.30
18	Sundargarh	Rajgangpur	Sundargarh	Katngidihi-	3.48
19	Sundargarh	Rajgangpur	Sundargarh	Sapdagar	8.50
20	Sundargarh	Sundargarh	Sundargarh	Bhasma	5.00
21	Sundargarh	Sundargarh	Sundargarh	Jarmal	8.00
22	Sundargarh	Subdega	Sundargarh	Bansikar	5.00
23	Sundargarh	Subdega	Sundargarh	Bamdera	6.00
24	Sundargarh	Sundargarh	Sundargarh	Bhoipali	4.54
25	Sundargarh	Sundargarh	Sundargarh	Latagaon	22.0
26	Sundargarh	Subdega	Sundargarh	Chitabanga	12.14
27	Sundargarh	Sundargarh	Sundargarh	Jamtalia	4.80
28	Sundargarh	Sundargarh	Sundargarh	Gadiajore	5.06
29	Sundargarh	Sundargarh	Sundargarh	Gadiajore	5.06
30	Sundargarh	Sundargarh	Sundargarh	Ghantibud	5.06
31	Sundargarh	Sundargarh	Sundargarh	Kinjirma	9.79
32	Sundargarh	Sundargarh	Sundargarh	Bhedabahal	10.12
33	Sundargarh	Sundargarh	Sundargarh	Pandermal	3.04
34	Sundargarh	Sundargarh	Sundargarh	Podbahal Kundukela GP	10.08
35	Sundargarh	Balisankara	Sundargarh	Balisankara	10.12
36	Sundargarh	Sundargarh	Sundargarh	Bhasma	0.40
37	Sundargarh	Sundargarh	Sundargarh	Podbahal	6.27
38	Sundargarh	Sundargarh	Sundargarh	Kundukela	3.84
39	Sundargarh	Balisankara	Sundargarh	Talsara	10.12
40	Sundargarh	Lephripa	Sundargarh	Bijadihi	7.32
41	Sundargarh	Lephripa	Ujalpur	Surguda	6.04
42	Sundargarh	Lephripa	Ujalpur	Chhatenpali	12.8

43	Sundargarh	Tangarpali	Ujalpur	Dambahal (Nialipalai)GP	8.79
44	Sundargarh	Lephipara	Ujalpur	Rupabahal	1.96
45	Sundargarh	Lephipara	Ujalpur	Rangiamunda	3.98
46	Sundargarh	Lephipara	Ujalpur	Chakramal	9.80
47	Sundargarh	Lephipara	Ujalpur	Tangarpali	2.00
48	Sundargarh	Lephipara	Ujalpur	Nuadihi (Sargidhipa)	7.60
49	Sundargarh	Balisankara	Ujalpur	Kulabira	11.00
50	Sundargarh	Balisankara	Ujalpur	Nialipali (Karladhipa)	13.308
51	Sundargarh	Balisankara	Ujalpur	Tasladihi	3.128
52	Sundargarh	Lephipara	Ujalpur	Bandhpali	11.22
53	Sundargarh	Lephipara	Ujalpur	Remda	8.60
54	Sundargarh	Balisankara	Ujalpur	Kepse	2.00
55	Sundargarh	Balisankara	Ujalpur	Kepse	8.61
56	Sundargarh	Lephipara	Ujalpur	Mundagaon	4.38
57	Sundargarh	Lephipara	Ujalpur	Mahulpali	11.79
58	Sundargarh	Subdega	Ujalpur	Karlaghati	13.75
59	Sundargarh	Subdega	Ujalpur	Gangpurgad (Kainsjore)	12.5
60	Sundargarh	Subdega	Ujalpur	Kukridihi Adhapada P-I	6.52
61	Sundargarh	Subdega	Ujalpur	Kukridihi - II	5.75
62	Sundargarh	Lephipara	Ujalpur	Kaputikra (Pithampur)	10.5
63	Sundargarh	Lephipara	Ujalpur	Kuanrbaga (P)	16.00
64	Sundargarh	Lephipara	Ujalpur	Kuanrbaga (P)	9.00
65	Sundargarh	Lephipara	Ujalpur	Nialipali (Singarmunda)	17.5
66	Sundargarh	Lephipara	Ujalpur	Rupabahal	5.00
67	Sundargarh	Lephipara	Ujalpur	Dumbahal	5.00
68	Sundargarh	Lephipara	Ujalpur	Bandhpali	6.00
69	Sundargarh	Lephipara	Ujalpur	Sianbahal	4.00
70	Sundargarh	Lephipara	Ujalpur	Kurladhipa	7.00
71	Sundargarh	Lephipara	Ujalpur	Tangarpali	5.00
72	Sundargarh	Lephipara	Ujalpur	Nialipali	5.00
73	Sundargarh	Lephipara	Ujalpur	Bandhpali	15.00
74	Sundargarh	Subdega	Ujalpur	Rajpur	1.46
75	Sundargarh	Subdega	Ujalpur	Raidihi	6.00
76	Sundargarh	Balisankara	Ujalpur	Kinkibandh	12.00
77	Sundargarh	Balisankara	Ujalpur	Kinjirkela	1.10
78	Sundargarh	Lephipara	Ujalpur	Ergapita	3.00
79	Sundargarh	Sundargarh	Ujalpur	Lemlema	5.636
80	Sundargarh	Lephipara	Ujalpur	Mangaspur (Sargipali)	5.40
81	Sundargarh	Lephipara	Ujalpur	Remenda	6.00
82	Sundargarh	Lephipara	Ujalpur	Dambahal	5.20
83	Sundargarh	Sundargarh	Ujalpur	Tangarbhadhi	5.60
84	Sundargarh	Lephipara	Ujalpur	Surguda	5.00
85	Sundargarh	Lephipara	Ujalpur	Suanjore	5.00
86	Sundargarh	Lephipara	Ujalpur	Darlipali	13.00
87	Sundargarh	Lephipara	Ujalpur	Darlipali	6.964

88	Sundargarh	Lephipara	Ujalpur	Lephipara (Manbholapara)	5.00
89	Sundargarh	Lephipara	Ujalpur	Sunajore	5.00
90	Sundargarh	Lephipara	Ujalpur	Sagarpali	7.00
91	Sundargarh	Lephipara	Ujalpur	Lephipara (Manbholapara)	4.00
92	Sundargarh	Lephipara	Ujalpur	Kepse	1.44
93	Sundargarh	Lephipara	Ujalpur	Balijori	5.71
94	Sundargarh	Lephipara	Ujalpur	Kurga	10.00
95	Sundargarh	Lephipara	Ujalpur	Kenapali	5.20
96	Sundargarh	Lephipara	Ujalpur	Chotbanga	1.60
97	Sundargarh	Subdega	Ujalpur	Khutgaon	1.00
98	Sundargarh	Lephipara	Ujalpur	Duaruadihi	10.32
99	Sundargarh	Balisankara	Ujalpur	Kinkibandh	10.10
100	Sundargarh	Lephipara	Ujalpur	Chhatenpali	12.14
101	Sundargarh	Lephipara	Ujalpur	Mundagaon	1.38
102	Sundargarh	Lephipara	Ujalpur	Surguda	8.00
103	Sundargarh	Hemgir	Gopalpur	Pithampur P-I	5.00
104	Sundargarh	Hemgir	Gopalpur	Pithampur P-II	6.60
105	Sundargarh	Lephipara	Lephipara	Chakradharpur	10.12
106	Sundargarh	Hemgir	Lephipara	Biringibahal	2.49
107	Sundargarh	Hemgir	Lephipara	Ratansara (Ratanpur)	4.00
108	Sundargarh	Hemgir	Lephipara	Satjoria	11.4
109	Sundargarh	Rajgangpur	Bargaon	Dahurada	4.80
110	Sundargarh	Rajgangpur	Bargaon	Khatkurbahal	6.00
111	Sundargarh	Rajgangpur	Bargaon	Dandjamra	10.50
112	Sundargarh	Rajgangpur	Bargaon	Jajpur	12.00
113	Sundargarh	Rajgangpur	Bargaon	Jajpur	4.25
114	Sundargarh	Rajgangpur	Bargaon	Purkapali	8.00
115	Sundargarh	Rajgangpur	Bargaon	Purkapali	4.00
116	Sundargarh	Rajgangpur	Bargaon	Panchra (Raidihi)	15.00
117	Sundargarh	Rajgangpur	Bargaon	Lanjiberna	15.00
118	Sundargarh	Rajgangpur	Bargaon	Timna (Gentubahal)	5.00
119	Sundargarh	Rajgangpur	Bargaon	Purkapali	10.00
120	Sundargarh	Rajgangpur	Bargaon	Karmabahal	7.00
121	Sundargarh	Rajgangpur	Bargaon	Kutra (Chunipada)	6.00
122	Sundargarh	Rajgangpur	Bargaon	Birtula	7.00
123	Sundargarh	Rajgangpur	Bargaon	Kadopara	6.00
124	Sundargarh	Rajgangpur	Bargaon	Udarama	4.00
125	Sundargarh	Rajgangpur	Bargaon	Phulbari	0.93
126	Sundargarh	Rajgangpur	Bargaon	Jangli	6.05
127	Sundargarh	Rajgangpur	Bargaon	Kantiamura	12.00
128	Sundargarh	Rajgangpur	Bargaon	Gentubahal- Timna	6.664
129	Sundargarh	Rajgangpur	Bargaon	Kantiamura	4.64
130	Sundargarh	Rajgangpur	Bargaon	Chhamunda	3.50
131	Sundargarh	Rajgangpur	Bargaon	Laxmiposh	12.00
132	Sundargarh	Kuarmunda	Bargaon	Purnapani	9.00

133	Sundargarh	Rajgangpur	Bargaon	Mangalpara	5.00
134	Sundargarh	Rajgangpur	Bargaon	Chinimahul	2.40
135	Sundargarh	Rajgangpur	Bargaon	Gargadbahal	3.88
136	Sundargarh	Rajgangpur	Bargaon	Tudalaga	6.00
137	Sundargarh	Rajgangpur	Bargaon	Jajpur	4.50
138	Sundargarh	Rajgangpur	Bargaon	Salepali	12.06
139	Sundargarh	Kuarmunda	Bargaon	Lanjiberna	5.00
140	Sundargarh	Sundargarh	Sundargarh	Kirei	3.24
141	Sundargarh	Tangarpali	Ujalpur	Surda (NialipaliGP)	5.00
142	Sundargarh	Sundargarh	Sundargarh	Timadihi	15.00
143	Sundargarh	Bargaon	Bargaon	Samleimunda	12.00
144	Sundargarh	Bargaon	Bargaon	Samleimunda	5.00
145	Sundargarh	Bargaon	Bargaon	Nuagaon	15.00
146	Sundargarh	Bargaon	Bargaon	Rangniabahal	18.00
	Total VF Area			146 nos	1048.10

1.8.2 Besides the above forest area, un-classed forest area over 80.43 hectares is available in revenue records which carries the buildings and forest roads of this Division. More over 45 342.23 hectares of revenue land with record of rights as 'Forests' are mentioned in the revenue records. The DLC list of Non-forest Land of Sundargarh Forest Division with good forest growth is given at **Annexure -7(a) (Page 22 to 90 of volume II).**, **List of un-classed forest is given at Annexure- 7(b) (Page 91 to103 of volume II).** and **List of RF , PRF & Village Forest blocks with notification nos is annexed at Annexure-7(c) (Page 104 to 107 of volume II).**

1.8.3 Recorded Forest Area of Sundargarh District:

Sl. No.	Legal Status	Recorded Forest Area (in sq. km)
1	Reserved Forest	2651.88
2	Demarcated Protected Forest	836.85
3	Undemarcated Protected Forest	-
4	Unclassed Forest	1.72
5	Other Forest	1466.32
	Total	4957.32

1.9 DIVERSION OF LAND FOR NON-FORESTRY PURPOSES

During the last plan period some forest land have been diverted for non-forestry purposes, a list of which is given below with details of compensatory plantations raised in this Division.

Sl. No.	Name of Project	Name of Range	Name and status of forest area diverted	Area
(1)	(2)	(3)	(4)	(5)
2	Basundhara (E) Open cast	Gopalpur	Pandripani RF Tikilipara KF Bankibahal KF	0.56 Ac 52.17 Ac 53.34 Ac
3	Orissa Cement Rajgangpur	Bargaon	-	62.29 Ha
4	Katang nalla MIP	Sundergarh	Kurei RF	
7	Construction of 400 K.V. DC line from Jamshedpur Rourkela	Kuarmunda Kuarmunda	Kundelpost Santirjhar KF	3.6504 Ha 4.1496 Ha 7.8 Ha
10	Renewal of under ground Mining lease Hindustan Zinc Ltd.Sargipali	Ujalpur	Badbanga RF	25.520 Ha
11	Construction of 33 KV DC line Garjanbahal to Basundhara	Gopalpur	VF	6.727 Ac
12	Construction of transmission line from Budhipadar to Garjanbahal Construction of 132 KV	Ujalpur Gopalpur	Raidihi KF Darlipali KF Bandhapali KF Duduka KF Barpali KF	11.34 Ac 2.36 Ac 6.16 Ac 8.20 Ac 14.10 Ac 17.062 Ha
13	D.C. Transmission line Budhipadar to Sundergarh	Ujalpur	Revenue Forest	10.040 Ha
14	Badgamal MIP	Lephripa	Athakosia Lapahar compt Revenue Forest	6.000 Ha. 13.100 Ha.
17	Construction 400 KV Dc line RKL to Raipur	Sundargarh Kuarmunda	Revenue Forest	23.308 Ha.
18	Basundhara west open cast project	Gopalpur	Pandaripani RF Revenue Forest	0.390 Ha. 123.440Ha.
19	Construction of Masina nalla MIP	Lephripa	Badhajhara RF Revenue Forest	19.740 Ha. 1.300 Ha.

The detailed list of compensatory afforestation of Sundargarh Forest Division is given in **Annexure 8(Page 108 to 110 of volume II).**

1.10 STATE OF BOUNDARIES

The boundaries are of two types, one is of natural origin and the rest are artificially maintained with stone cairns around wooden posts/ RCC pillars. The inter-state boundaries are 60 feet in width whereas other boundaries are 20 feet to 40 feet wide. Most of the Reserved Forests boundaries have not been maintained properly in spite of detailed prescriptions for regular maintenance. This may be due to paucity of funds. Hence specific attention should be given for this important work which forms the baseline of forest management. The details of block wise “state of boundary” report are given below.

Status of Boundaries of Sundergarh Division					
Range – Bargaon					
Sl. No.	Forest Block	Length of boundry in K.M.s	No. of Boundary Pillars	No. of damaged Pillars	Encroachment along the boundary line
1	2	3	4	5	6
1	Panchara (N)RF	13.21	89	89	4patches
2	Panchara(s)RF	10.52	81	81	2patches
3	Bhurusulia RF	7.28	57	57	Nil
4	Udarama RF	9	55	55	Nil
5	Mahabir	21.16	104	104	1 Patch
6	Jharbeda RF	12.89	74	74	Nil
7	Jaidega RF	21.92	172	172	Nil
8	Jharbeda RF (Katang)	12.89	78	56	1patch
9	Dahijira RF	10.4	79	79	Nil
10	Latalaga RF	11.53	55	55	Nil
11	Rajabasa RF	3.38	20	20	1 patch
12	Makundapur (Andiabira)RF	6.19	38	38	Nil
13	Kurai RF	13.75	239	193	20.00 ha
14	Kiralaga RF	115.25	852	240	Nil
15	Runga RF	131.72	848	776	Nil
16	Gurabasa RF	4.72	32	32	Nil
17	Bijilikhaman RF	2.44	18	18	Nil
18	Gopikudar RF	1.72	15	Nil	Nil
19	Deoli RF	3.62	30	4	02.80ha
20	Jamtalia RF	10.4	132	128	Nil
21	Tikilipara RF	25.2	145	80	Nil
22	Itma RF	11.2	51	51	Nil
23	Mahulgaon RF	18.8	142	20	08.00ha
24	Kurai(Banrai) RF	6.95	49	9	Nil
25	Simdega RF	5.628	34	34	Nil
26	Peruabhadi RF	14.8	130	70	Nil
27	Jogijogain RF	13.24	111	91	00.25 ha.
28	Tiljora RF	4.2	27	27	Nil
29	S.parlia(K. bahal) RF	12.4	93	21	05.20 ha.
30	Satparlia RF				
	Basalbhadi Compt.	19.2	83	52	02.00 ha.
	Baladmal+Dungajore Comptment	23.2	165	50	20.50 Ha.
31	Brahamanipahar RF	6.8	50	50	Nil
32	Ghumda RF	4.2	27	2	Nil
33	Jarmal RF	2.5	26	Nil	Nil
34	Kheriakani RF	4.26	30	30	Nil
35	Raidihi RF	5.6	34	34	Nil
36	Kharikamunda RF	8	58	58	Nil
37	Jharmunda RF	11.2	30	30	Nil
38	Ghogar RF	43.7	378	228	Nil
39	Rasaraipur RF	5.9	55	33	Nil
40	Athkosia (A) RF				
	Kulrlukapat Compt.	21.06	186	186	4 Patches
	Patuaghara Compt.	32.08	258	258	16 Patches
	Dhabadoli Compt.	11.12	100	70	12 Patches
	Jorajar Compt	33.35	252	252	8 Patches
	Budhajharan Compt	32.28	390	290	5 Patches
	Gireldungri Compt	13.20	-	-	4 Patches
	Kukuda Compt	57.40	425	355	15 Patches

	Bhalubahal Compt	13.6	119	99	4 Patches
	Kumbhkani Compt	11.90	-	-	3 Patches
	Patuakudar Compt	12.00	100	52	5 Patches
41	Dhangergudi RF				
	Dhangergudi Compt	36.72	349	331	3 Patches
	Gutighara Compt	39.10	428	385	2 Patches
	Patuakudar Compt	11.20	109	109	Nil
42	Sikajore RF	19.40	-	-	8 Patches
43	Sapanbira RF	2.80	23	13	Nil
44	Chirelkhaman RF	1.60	68	40	Nil
45	Bhursitatra RF	6.36	43	43	3 Patches
46	Kurladungri RF	8.40	69	29	Nil
47	Bankidihi RF	1.80	18	13	Nil
48	Rajpur RF				
	Kusumdegi Compt	14.20	105	57	5 Patches
	Aleikera Compt	14.10	87	87	3 Patches
49	Kusumpur(Kusumura)				
	Gidpahadi Compt	45.20	353	253	6 Patches
	Kusumura Compt	22.20	196	136	2 Patches
	Bhaludungiri Compt	14.60	-	-	12 Patches
50	Athkosia (B) RF				
	Dhabakhhol Compt	11.00	65	50	6 Patches
	Budapahad Compt	11.50	96	49	4 Patches
	Dhumasara Compt	11.56	106	115	3 Patches
	Lampahad Compt	10.20	69	69	1 Patch
51	Shikajore (B) RF	5.30	29	29	Nil
52	Tildeg RF	10.4	70	-	3 Patches
53	Bindhapahar RF	11.20	76	76	Nil
54	Kurumkel RF	20.00	108	83	1 Patch
55	Dalkijharan RF	3.60	32	-	Nil
56	Jamkani RF	73.34	529	370	5 Patches
57	Garjanpahar RF	144.80	1054	1035	4 Patches
58	Dhanubans RF	50.04	373	373	Nil
59	Punjipahar RF	15.894	158	158	Nil
60	Panikhulia RF	5.388	62	62	Nil
61	Ragdakhhol RF	4.592	51	51	Nil
62	Jhantikhhol RF	10.25	85	85	Nil
63	Balijori RF	6.344	140	100	3 Patches
64	Kalatpani RF	15.03	104	58	5 Patches
65	Pandripani RF	6.114	51	46	Nil
66	Ranjisarwa RF	2.70	26	26	Nil
67	Sirdarmunda RF	4.70	44	44	Nil
68	Dhokarpahar RF	5.00	44	Nil	Nil
69	Kanhupahar RF	2.2	26	Nil	Nil
70	Dhanuardihi RF	1.892	19	Nil	Nil
71	Kalamegha RF	10.0	75	44	Nil
72	Budhapahar RF	8.236	98	98	Nil
73	Pandkipahar RF	5.235	55	25	Nil
74	Lalma RF	5.034	34	34	Nil
75	Bichhudungri RF	1.941	18	Nil	Nil
76	Sarangijharia(A)	8.471	76	Nil	Nil
77	Chhengapahad RF	29.37	271	201	2 Patches
78	Hundarkhol RF	20.95	247	209	3 Patches
79	Sisopahar RF	20.82	177	169	6 Patches
80	Makarchata RF	11.97	106	102	Nil
81	Giripahar RF	12.34	121	95	Nil
82	Budlakhman RF	8.8	42	42	Nil

83	Makridunguri RF	4.6	43	43	Nil
84	Budhadunguri RF	3.76	35	35	Nil
85	Beheramunda RF	4.2	29	29	Nil
86	Ghantiachhapal RF	2.8	31	31	Nil
87	Satparlia RF	5.5	55	55	Nil
88	Tangopahar RF	5.17	49	49	Nil
89	Chitikikhadu RF	28.4	212	212	4 Patches
90	Rohini RF	32.76	248	248	1 Patch
91	Singaribahal RF	32.08	271	230	2 Patches
92	Dheknapani RF	31.4	275	202	1 Patch
93	Bangla-pahad	10.92	47	47	0
94	Lamtipahad	18.7	118	118	0
	Total	1913.138	14614	11496	

1.11 ENCROACHMENT

1.11.1 This Division is highly affected by encroachments. A good portion of forest land including R.Fs, P.R.Fs and D.P.F s with gentle slope adjoining to village areas in remote corners of this Division are under control of encroachers. Attempt has been made to regularize pre-1980 encroachments.

1.11.2 PRE-1980 ENCROACHMENT CASES AND THEIR REGULARISATION

As per instruction of Government of Orissa, Revenue Department Letter No. GE (GL)-S-17/2000/21060/F dt. 04.05.2000, 50 numbers of encroached forest settlement/habitation were identified in different Reserved Forests of this Forest Division. The joint verification of Revenue and Forest officials were done for 30 habitations and the proposal for 10 habitation containing 264 encroachers over 2926.177 ha. for declaring Revenue Villages have been submitted to the Principal Chief Conservator of Forests, Orissa, Bhubaneswar. The joint verification for rest of the 20 habitations/ settlement is under progress. The details of encroachers, eligible encroachers, area encroached upon for 10 villages are as follows:

Number of total encroachers	702
Area in hectares	873.62
Eligible encroachers in surveyed village	449
Area in hectares	479.485
Area with ineligible encroachers in hectares	222.515
S.C.	06
S.T.	422
O.B.C.	-
Others	21
Legal Status	
R.F.	434.415 ha
P.F.	-
Others	15.070 ha

1.12 FOREST VILLAGE

There is no forest village in this Division.

1.13 LEGAL POSITION

The process of reservation of forest land started prior to 1911 when the Khalsa areas were first converted into Reserved Forest. Subsequently during 1963, 1967 most of the Forests were notified as reserved. In the past during 1984, 1985, 1999, 2000 seven P.R.F. have been converted into Reserved Forests. During 1991, 1992, 1993 147 numbers of Village Forests raised under SIDA program were notified as Village Forests. The Notification numbers have been mentioned in the tabular statement of R.Fs and P.R.Fs.

1.14 RIGHTS AND CONCESSIONS

No Rights are admitted in the Reserve Forest blocks of this Division. However tribals are allowed to collect edible fruits, roots, leaves and grasses for their own consumption free of charge. Presently at the times of natural calamity like flood and fire, forest materials are supplied at schedule of rates to the effected people from the 'B' class R.Fs. The tenants are allowed to take bamboos from annual coupes at schedule of rates. They are also allowed to collect dry fire wood from Khesra Forests at half the current schedule of rate subject to their payment of Nistar cess. Free grazing has been abolished since 1954. Schedule of rates as given in "Forest Produce, Orissa – 1977" is in force in this Division since its inception, i.e., 24th November 1977, a list of which has been given below.

Schedule of Rates			
Rate for Timber & Poles.			
Quality Class	Size	Girth Class. In. cm.	Rate
(1)	(2)	(3)	(4)
		90 to under 120 cm	Rs. 94.60 per cum.
	Round	120 to under 150 cm	Rs. 139.751 - do -
	Timber	150 to under 180 cm	Rs. 199.40 - do -
		180 to under 210 cm	Rs. 199.40 - do -
		210 cm and above	Rs. 199.40 - do -
Class - I			
		Under 30 cm	Rs. 00.55 per Piece
		30 to under 45 cm	Rs. 01.10 - do -
	Poles	45 to under 60 cm	Rs. 02.15 - do -
		60 to under 75 cm	Rs. 05.40 - do -
		75 to under 120 cm	Rs. 10.75 - do -
		90 to Under 120 cm	Rs. 69.60 per cum
	Round	102 to under 150 cm	Rs. 112.85 - do -
	Timber	150 to under 180 cm	Rs. 127.95 - do -
		180 to under 210 cm	Rs. 127.95 - do -
		210 and above	Rs. 127.95 - do -
Class - II			
		Under 30 cm	Rs. 00.45 per piece
		30 to under 45 cm	Rs. 00.85 - do -
	Poles	45 to under 60 cm	Rs. 01.60 - do -

		60 to under 75 cm	Rs. 03.25 - do -
		75 to under 90 cm	Rs. 07.55 - do -
		90 to Under 120 cm	Rs. 47.00 per cum
	Round	102 to under 150 cm	Rs. 67.65 - do -
	Timber	150 to under 180 cm	Rs. 97.85 -do -
		180 to under 210 cm	Rs. 97.85 -do -
		210 and above	Rs. 97.85 -do -
Class - III			
		Under 30 cm	Rs. 0.20 per piece
		30 to under 45 cm	Rs. 0.55 - do -
	Poles	45 to under 60 cm	Rs. 0.85 - do -
		60 to under 75 cm	Rs. 1.60 - do -
		75 to under 90 cm	Rs. 4.30 - do -

Schedule of rate for Bamboo			
	Salia per 100 pieces	-	Rs. 04.30
	Daba per 100 pieces	-	Rs. 06.45
Rate for Fire Wood			
	Head load	-	Rs. 00.20
	Bahar load	-	Rs. 00.40
	Bullack Cart load	-	Rs. 02.00
	Buffalo Cart load	-	Rs. 03.00
	Per quintal	-	Rs. 01.00
Rate for Charcoal			
	Head load	-	Rs. 00.55
	Bahar load	-	Rs. 01.10
	Bullack Cart load	-	Rs. 10.80
	Buffalo Cart load	-	Rs. 16.20
	Per quintal	-	Rs. 02.70

Schedule of rate for Minor Forest Produce.

Sl. No.	Particulars	Per head load	Per bhar load	Per cart load	Per buffalo load	Per bullock load	Per 100 nos.	Per quintal	Per KG
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Thorn & leaves	0.10	0.20	1.10	1.60	-	-	-	-
2	Brush wood	0.10	0.20	1.10	1.60	-	-	-	-
3	Fodder grass	0.10	0.20	0.85	1.10	-	-	-	-
4	Thatching grass	0.20	0.55	-	3.25	2.70	-	-	-
5	Sabai & Panasi								
	grass	0.20	0.55	-	3.25	2.70	-	-	-
6	Creepers	0.10	0.20	-	2.15	1.60	-	-	-
7	Palm leaves	0.85	1.60	-	21.50	1.60	-	-	-
8	Ashes (Khar)	0.20	0.45	-	-	15.05	-	5.75	-
9	Siali bark	0.20	-	-	2.15	-	-	-	-
10	Rual	-	-	-	-	1.10	-	-	-
11	Bhalia fruit	-	-	-	-	-	-	2.90	-
12	Tamarind	-	-	-	-	-	-	1.70	-
13	Honey	-	-	-	-	-	-	-	0.90
14	Wax	-	-	-	-	-	-	-	1.70
15	Myrabolans	-	-	-	-	-	-	2.90	-
16	Simul cotton	-	-	-	-	-	-	-	0.25
17	Sunari bark	-	-	-	-	-	-	5.75	-
18	Asan bark	-	-	-	-	-	-	2.90	-

19	Other tanning								

	bark	-	-	-	-	-	-	1.70	-
20	Sal resin	-	-	-	-	-	-	-	0.55
21	Natural gum	-	-	-	-	-	-	-	0.55
22	Lac	-	-	-	-	-	-	17.30	-
23	Tassar cocoons	-	-	-	-	-	0.15	-	-
24	Other fruits	-	-	-	-	-	-	2.30	-
25	Kuchila	-	-	-	-	-	-	2.90	-
26	Bones	-	-	-	-	-	-	11.50	-

(Source: D.F.O. Sundergarh Division)

1.15 JOINT FOREST MANAGEMENT (J.F.M.)

Joint Forest management is not a new concept for this Division, In the forests of Ex-Zamindary areas of Hemgir, Hatibari and Nagra along with Khalsa portion, the nearby villagers were permitted with concession to remove edible roots, fruits, leaves and dry fallen fire wood. Grazing by their cattle was allowed with the condition that they will assist in extinguishing forest fire and clear boundary lines as and when required by the forest department. In course of time these rules turned obsolete and are no more in vogue.

The State Govt. in their resolution No. 10F (prone)-47/88/17240/FFAH dt.01.08.1988 introduced the concept of J.F.M. in the State for protection of Reserved Forests by community. Again another resolution No.10F (prone)-4/90/29825/FFAH dt.11.12.1990 was promulgated for protection of Reserved Forest and Protected Forests by community and enjoyment of certain usufructs by them. The next Resolution No.16700 dt.03.07.1993 provided a broad base for J.F.M. including constitution of Vana Samrakshan Samiti (V.S.S.) for protection of Reserved Forest and Protected Forests and enjoyment of usufructs. A supplementary to this resolution has been passed vide resolution No.23180 dt.30.09.1996. Basing on these resolutions as much as 331 number of V.S.S. have been formed in this Division which covers 30977 hectares of forest area throughout the Division. Details of these Samities are given in **Annexure 9 and 10 (Page 111 to 119 & 120 of volume II)**.. The range wise abstract of V.S.S. is furnished below in tabular form.

RANGE-WISE ABSTRACT OF V.S.S. FORMATION

Sl. No.	Name of the Range	No. of VSS formed	Total Forest Area allotted (in ha.)
1	Bargaon	48	4662.5
2	Ujalpur	60	6406.5
3	Lephripara	45	3651.95
4	Gopalpur	44	4201.0
5	Hemgir	48	5309.95
6	Sundergarh	86	6747.0
	Total	331	30977.95

1.16 FOREST DEVELOPMENT AGENCY OF SUNDARGARH DIVISION

(2002-03 TO 2006-07)

As per the National Afforestation Programme (NAP) guidelines FDA, Sundargarh was registered as society under the Society Registration Act, 1860 on 07.09.2002, with 30 VSS in the erstwhile Sundargarh Division. After reorganization of the Forest Department on 01.10.2003, 22 VSS are controlled by Sundargarh Forest Division. In the year 2003-04, 2400 ha of degraded forest was taken up for treatment through FDA, out of which 2000 ha was taken for Aided Natural Regeneration (ANR), 250 ha for Artificial Regeneration (AR), 50 ha bamboo plantation and 100 ha silvipasture.

As per the Govt. of India, F & E Department letter no.NAEB-16.01, 16/2002-B-III, dt. 21.11.2002 Forest Development Agency, Sundargarh was formed taking 30 V.S.S. of the Division under National Afforestation Programme Scheme of Govt. of India for treating 2400 Ha. of land at a total cost of Rs.311.64 lakh during the period 2002-03 to 2006-07. Out of 30 sanctioned V.S.S. the Sahajbahal V.S.S. was disputed V.S.S. It was discussed in the Executive Body meeting and a resolution was approved by the Conservator of Forests, Rourkela Circle. The area allotted to Sahajbahal V.S.S. was distributed to Khairkhaman and Padampur V.S.S. which has been approved by the Conservator of Forests, Rourkela circle. The detailed list of Forest Development Agency of Sundargarh Division is given in **Annexure 11 (Page 121 of volume II)**.. The Components are:

A.N.R.	-	2000 Ha.	-	200 Plants per Ha.
A.R.	-	250 Ha.	-	1100 -do-
P.D.	-	100 Ha.	-	400 -do-
B.P.	-	50 Ha.	-	625 -do-
Total -		2400 Ha.		

**Release of funds to the VSS during 2003-04, 2004-05, 2005-06
from the allotment of 2002-03 and 2003-04.**

Sl. No.	Name of the Range	Name of VSS	Type of plantation (in ha.)						Funds Released
			ANR	AR	PD	BP	MP	TOTAL	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Sundargarh	Sublaya (Septibahal)	-	20	-	-	-	20	149910/-
2	-do-	Khairkhaman	70	-	-	-	-	70	351250/-
3	-do-	Samardihi (Bhedabahal)	30	20	-	10	-	60	374261/-
4	-do-	Bamdera (Kisanpara)	-	30	-	-	-	30	224825/-
5	-do-	Gaikanpali	70	-	20	-	-	90	482584/-
6	-do-	Tilaimalti	-	20	-	-	-	20	149850/-
7	Bargaon	Padampur	25	-	-	-	-	25	125362/-
8	-do-	Udarma	100	-	10	-	-	110	519780/-
9	-do-	Tudalaga	20	20	-	-	-	40	250252/-
10	Hemgir	Kutrajore	100	-	-	-	-	100	501815/-
11	-do-	Bendrichuan	90	-	-	-	-	90	451580/-
12	-do-	Barbahali	100	-	-	-	-	100	501774/-
13	-do-	Budajharia	100	-	-	-	-	100	501784/-

14	-do-	Budelkani	100	-	10	-	-	110	567484/-
15	-do-	Kodbahal	90	15	-	-	-	105	564044/-
16	-do-	Katphali	100	-	10	-	-	110	567480/-
17	Gopalpur	Pithampur	60	-	-	-	-	60	301008/-
18	-do-	Kutabaga	70	-	10	-	-	80	416938/-
19	-do-	Sumura	50	-	-	-	-	50	250856/-
20	Lephripara	Baladbandha	100	-	20	-	-	120	637884/-
21	-do-	Kulabira(Talipara)	40	-	-	-	-	40	200692/-
22	Rajgangpur	Ranipia	100	-	-	-	-	100	501780/-
23	-do-	Alanda	100	-	10	-	-	110	567432/-
24	-do-	Malidihi (Bhogotola)	100	-	-	-	-	100	501780/-

PART-I

Chapter-II

T H E F O R E S T S

2.1 COMPOSITION AND CONDITION OF THE CROP

The forests of this Division are dry in nature except some damp plant communities which occur in the moist and shady aspects along perennial nallah and streams. The forests are located on all the three main geographical formations, i.e., igneous, sedimentary and metamorphic rocks. The geological formations, which are resistant to weathering, mostly contain dry type of forests. The Kiralaga block is ideal examples where igneous rocks are very resistant to weathering. The sedimentary rocks are represented only in Hemgir areas where the chief rock types are sand stone and clay stone. The sand stones are often found covered with hard limonitic layer making the rocks fairly resistant to weathering. The soil so derived is not very fertile. The valley portion, where sandy loam type of soil is found, supports some fine stand of Sal crop of quality II/III.

The metamorphic rocks are represented by a wide variety of rock types i.e. phyllites, gneiss and schist which are found in Sundergarh, Bargaon and Ujalpur Ranges. The forests of Panchora Forest blocks represent transition between the tropophyllous vegetation of Bonai and dry type of forests of Chhotanagpur plateau of Jharkhand state. Besides the climatic influence, the xerophytic character of this transition belt is mainly due to edaphic influence. To add to it, the aridity has been added by heavy encroachments in the Reserved Forests. The Baghdega block (now in Rourkela division) has almost pure sal patch with pole crop, which has resulted due to coppicing in the past. It shows that area is capable to produce fine stand of sal in natural sites by natural regeneration. Similar is the case in Rohini block. Due to uncontrolled grazing and illicit felling most of the forest blocks have been reduced to scrub jungles now.

The Sundargarh and Bargaon portion occurs entirely on metamorphic formations except a few patches located on granites like Kiralaga and Itma forest blocks. Blocks like Rajabasa, Dahijira, Jharbeda (katang) located on laterite rocks contain almost pure crop of Sal but due to heavy grazing the tree crop is gradually being reduced to bushes and weeds. If proper protection is given to these blocks fine stand of sal crop may come up. Small blocks located on the plains with fairly deep loam soil like Gurabasa, Gopikudar, Bijlikhaman, Deoli, Jamtalia support good forests. Compartments like Jorajam, Budhajharan

and Patuaghara of Athkosia Block are located on granite gneiss rock with horn-blend schists. This rock type is capable of forming good fertile soil, but the areas having fertile soil have been heavily encroached upon. The hill slopes do not contain good soil and are less fertile with less water-containing capacity. To add this there are extensive quartz veins mostly seen on the ridges as a result quartz pebbles are found over the surface making the soil poorer. Besides these tracts are continuously under dry cultivation since last eighty years or more. Sound sal trees of 4 feet girth and above can hardly be seen in this tract due to unrestricted sleeper supply in the past. The forests are subjected to regular and repeated annual fires thus preventing the forest to re-establish in natural conditions.

2.2. FLORA AND FAUNA

2.2.1 As per Champion and Seth classification, this Division comes under peninsular Sal and dry deciduous mixed forest types. Sal, the dominant species fully established and abundant in these forests varying from a fairly pure to a mixed crop and occurs throughout the area. The main associates of Sal are Asan, Kurum, Bija or Piasal etc. The other note worthy tree species are *Buchanania*, *Semecarpus*, *Terminalia*, *Cassia* and *Adina* etc. Mixed with these species *Cochlospermum*, *Boswellia*, *Hardwickia* and *Bassia* etc are seen. *Dendrocalamus strictus* is the prominent bamboo species available.

2.2.2 FOREST TYPES AND SUB -TYPES

According to Champion and Seth classification of Forest Types, the forests of this Division can be divided into following forest types and sub- types basing on regeneration status and composition of young available crops.

I. Dry Tropical Forests	
Group – 5-	Tropical Dry Deciduous Forests
Sub-Group 5 B	Northern Tropical Dry Deciduous Forests
C1 / 1c-	Dry Peninsular Sal Forests
C2 -	Northern Dry Mixed Deciduous Forests
Degradation stages of tropical dry deciduous forests are	
	Ds. 1 – Dry Deciduous Scrubs.
	E9 - Dry Bamboo Brakes

The above main forest types are easily recognised and are more or less well defined. Besides these broad classifications there are minor classifications and local variations of both dry and moist types.

5 B-C1 / 1c - Dry Peninsular Sal

These types are represented by almost all Sal forests of the Division except the moist type mentioned above. The occurrence of Sal is minimum 30% and maximum up to 60% in certain small blocks like Dahijira, Rajabasa, Jharabeda (Katang,) Jamtalia and Deoli.

Besides, there are number of other blocks where Sal occurs up to 60% of crop even on northern aspects of the hills and in valleys. The crop is mainly in pole stage except in the blocks worked under long rotation/ selection. The blocks worked under short rotation coppice system have depleted cover due to repeated working and illicit/unauthorized cutting. The crop in general is in pole stage with few bigger trees left as standards. Regeneration is mostly of coppice origin. Due to lack of adequate protection, the fate of many well stocked blocks has been reduced to scrub forests. In Hemgir areas bamboo is decreasing at an alarming rate due to ecological retrogression and a stage will come when probably bamboo will vanish.

The common associates of Sal in this area are *Terminalia tomentosa*, *Terminalia bellerica*, *Terminalia chebula*, *Pterocarpus marsupium*, *Eugenia operculata*, *Madhuca latifolia*, *Diospyros melanoxylon*, *Buchnanan latifolia*, *Dalbergia latifolia* (rare), *Cleistanthus collinus*, and in drier areas *Embllica officinalis*, *Eugenia caryophyllifolia*, *Anogeissus latifolia*, *Ougenia dalbergoides*, *Boswellia serrata* etc. In the moist locality Mango and *Adina cordifolia* are seen. Common shrubs are *Gardenia gummifera*, *Nyctanthes arboristis*, *Woodfordia fruticosa*, *Indigofera pulchella*, *Flemingia chhapar*, *Zizyphus xylopyra*, *Zandia uliginosa*, *Helectres ixora*, *Strobilanthes auriculata*, *Strebylus asper*. Common climbers are *Bauhinia vahlii* and *Butea superba*. Common grasses are *Eulaliopsis binata*, *Sehima nervosum* and *Heteropogon contortus*.

5-B.C 2 NORTHREN DRY MIXED DECIDUOUS FORESTS

This type is the characteristic of more dry areas having infertile shallow soil. The blocks that represent this type are Kiralaga (particularly the Kadopani compartment), Kukuda RF, Chhelgudri compartment of Dhangergudi RF, some compartments of Jamkani, Jhantikhoh etc. The crop is of semi xerophyte type and it is composed of very little percentage of sal of very poor quality which is stunted. Most conspicuous among the trees species are *Cleistanthus collinus*, *Terminlia tomentosa*, *Anogeissus latifolia*, *Diospyros melanoxylon*, *Embllica officinalis*, *Madhuca latifolia*, *Boswellia serrata*, *Swietenia* and *Cochlospermum gossipium*. Amongst the shrubs the most common are *Gardenia gummifera*, *Nyctanthus arboretis*, *Zizyphus xylopyra*, *Woodfordia fruticosa*. Only few woody thorny climbers like *Zizyphus cenoplia*, *Celastrus paniculata* are seen. The common grasses are *Aristida setacea* and *Andropogon* species etc.

5. B-C2 Ds 1-Dry Deciduous Scrub

This type occurs in many compartments of Kiralaga, Athkosia, Pundripani, Dhumasara, Budapahar, Lalma, Jarmal, etc. The crop is open and mostly in bushy form. The tree species are struggling for their existence and show stunted growth due to biotic interference. The species mainly found are *Chloroxylon swietenia*, *Cleistanthus collinus*, *Terminlia tomentosa*, *Diospyros melanoxylon*, *Shorea robusta*, *Zizyphus xylopyra*, *Gardenia gummifera*, *Boswellia serrata*, *Nyctanthes arboretis*. Some blocks with bamboo are seen but they are mostly in bushy form due to repeated cutting. The clumps have turned to look like

umbrella with its rhizomes raised above the ground forming a small mound. Mostly unpalatable dry grasses are found. Regeneration is very poor.

5. B C2 / E 9- DRY BAMBOO BRAKES

Dendrocalamus strictus is more commonly found in this Division. *Cephalostachium purgracile* bamboo occurs along a few perennial nalla in Jamkani forest blocks. The forest where this species occurs is a woody tract and are put under type 1 and 2. The presence of bamboo is found as pure crop and about 60 percent of the crop is met within Hemgir areas. Salia bamboo occurs sporadically in certain compartments of Bhainsamunda RF, Athkosia (Jorajam, Budhajharan, Kukuda, Dhobadoli, Kurlukapat, Chelgudri compartment of Dhangerigudi RF, Kumbhkani Compartment of Athokosia 'B' RF, Mahabir RF, Kurei RF etc. The presence of bamboo in Hemgir areas is due to edaphic reasons. The bamboo forms poor crop in certain compartments of Jamkani, Dhanubans and Garjanpahar Blocks.

The regeneration of indigenous species is hindered due to repeated fire and grazing. Due to this phenomenon the soil layer which is being washed down further make it difficult for the tree species to establish on ground. But for a bamboo the little soil is enough to establish itself. The common associates of bamboo in this type are *Cleistanthus collinus*, *Madhuca latifolia*, *Pterocarpus marsupium*, *Sterculia urens*, *Solmalia malabarica*, *Diospyros melanoxylon* and *Shorea robusta*. It is worthwhile to mention here that during 1939-40 there was semi-gregarious flowering and since then no such phenomenon have been recorded in the divisional records.

2.2.3 CONDITION OF THE CROP

The blocks of Sundergarh Forest division can be divided into four types basing on the extent of degradation. The four types of forests found are as follows.

2.2.4 GOOD FORESTS

The degradation has started, although the forest is prone to illicit felling. The factors like uncontrolled grazing, forest fire and encroachment are not rampant. Still there are many reports of illicit felling. The blocks which belong to this category are Dhanubans, Garjanpahad. Density is about 0.6-0.8.

2.2.5 PARTIALLY DEGRADED FORESTS

These forest blocks are degraded and the crown is open at many places. The two main factors are illicit felling and grazing. The other factors are encroachment; old extraction paths and soil erosion contribute to the degradation. Few blank patches are present in these blocks and some areas may be termed as completely degraded forest. The forest blocks that belong to these categories are Pachora North & Pachora South. Density varies from 0.5 to 0.6.

2.2.6 HIGHLY DEGRADED FORESTS

These forest blocks are in advanced stage of degradation. Forest canopy is open at large number of places. Blank patches are common. The undergrowth is dense and mostly covered with weeds. All types of erosion are present. The factors responsible are heavy illicit felling, uncontrolled grazing and encroachment besides quarrying and soil erosion. The blocks belonging to this category are Chitikikhadu, Athakosia”A”, Rajpur, Peruabhadi, Jamuna, Ghoghar & Mahabir etc. The density varies from 0.3 to 0.5.

2.2.7 FULLY DEGRADED/SCRUB FORESTS

The canopy is generally open. Most of the areas have no forest but blank patches. Even the under growing stills and rocks are exposed. The flora consists of scrubs of hardy and thorny species. Heavy soil erosion and grazing takes place. Some patches have become unfit for grazing. Even the root stocks are not available at some places. The blocks of this category are Bhursipatra, , Lamti, Bhursulia, Simdega, Jharmunda and Lalma etc. The density varies from 0.01 to 0.3.

2.3. REGENERATION STATUS

Regeneration survey was carried out in 239 Forest blocks as mentioned below along randomly selected grid lines of 100 mts length. 50 Nos. of quadrants of 4 sq. meters each was laid on either side of the grid line and enumeration of established, woody, whippy and recruit regenerations were completed. The established, woody, whippy and recruit seedlings were given each a numeric value of 5, 4, 2 & 0.5 respectively and the value of all the 50 quadrants were added to determine the status of regeneration which is shown in the following table. Presence of either established or woody is considered sufficient for scoring a quadrant. Regeneration Survey has been done in 314 blocks of the Division and Range wise regeneration status of different blocks is presented in Table below:

Regeneration Survey					Regeneration Status			
Name of Range	RF	PRF	DPF	Total	Sl. No.	Score	Status	Symbol
Sundergarh	27	1	22	50	1	0-50	Deficient	D
Ujalpur	16	8	21	45	2	51-100	Fair	F
Gopalpur	21	6	19	46	3	101-150	Moderate	M
Hemgir	16	8	24	48	4	151-200	Good	G
Badgan	31	6	13	50	5	201-250	Established	E

The regeneration survey shows that excellent regeneration is coming up in Gopalpur, Ujalpur and Hemgir Ranges. It is moderate in Sundergarh Range. Details of Regeneration Survey are given in **Annexure 12 (Page 122-127 of volume II)..**

2.4 FOREST HEALTH

The health of Forest blocks according to density i.e. dense, open, scrub is given in the following table.

Sl. No.	Range	Name of the Forest Block	Density	Type of the forests dense/open/ scrub	Remarks
1	Sundargarh	All blocks	0.1 to 0.3	Scrub	Deficient
2	Ujalpur, Gopalpur	-do-	0.3 to 0.5	Open	Fair and moderate
3	Hemgir, Badgan	-do-	0.5 to 0.7	Dense	Good and established

The regeneration survey indicates the presence of good root stocks of various species which can be taken into consideration before taking up plantations. This also indicates soil fertility status and potentiality of each forest block. Details of regeneration status are given in **Annexure 13 (Page 128 to 200 of volume II)..**

2.5 FLORISTIC DIVERSITY SURVEY

The biodiversity survey has been taken up in all forest blocks to develop the quantitative base line. Biodiversity indices of forests of the division have been calculated. The index is “Modified Simsona Florostic Diversity Index”. The survey aims at calculation of maximum diversity in the area.

Methodology

The biodiversity survey was conducted in all Forest blocks of the division. These forest blocks represent all the four types of forests mentioned earlier. (a) Good forest (b) Partially Degraded Forests (c) Highly Degraded Forests and (d) Scrub Forests. Random sampling techniques have been adopted for the biodiversity survey. Three samples in most of the forest blocks were laid out. The size of each sample was 20 mt x 20 mt, for the enumeration of all the trees above 30 cm girth and 10 mt x10 mt. sample size for species below 30 cm. girth including all shrubs, herbs, climbers and grasses. The help of local villagers was taken for identification of species for total enumeration. The calculation was done on the basis of modified Simpson’s Floristic Index Diversity Formula. $D = 1 - \sum (n/N)^2$. The floristic diversity index comes to 0.98282591. The abstract of Floristic Index of forest blocks is furnished in **Annexure 14(Page 201 to 203 of volume II)..**

2.6 PLANTATIONS RAISED IN THE DIVISION

Plantation target during the last plan period was 21,910 Ha but achievement was to the tune of 14,980 Ha only and it was not done in the prescribed blocks as per the plan. Exotic species like Teak, Acacia were raised in the Division along with species like Asan, Arjun, Sisoo, Cassia, Bija, Gambhar etc. M.F.P. species like Bamboo, Sisal, Neem, Karanja, Anla etc. have also been planted but to a limited extent. Other wings like O.F.D.C. Ltd. (Plantation wing), Social Forestry Project Division have taken up plantations in this Division. They have resorted to planting of Acacia and Cassia mainly. List of plantation raised in different R.Fs of this Division since 1981-82 to 2000-2001 is given in **Annexure-15 (Page 204 to 212 of volume II)**. Most of the plantations raised by other wings are not in proper condition and are surviving only as coppice shoots with stunted growth. Subsequent silvicultural operations have not been carried out probably due to resource crunch. Plantations taken up under protection of J.F.M.C have shown better results. Natural regeneration of indigenous species is noticed in many sites of the plantation areas. However, existing plantations need improvement through proper protection and post-planting silvicultural operations. Detailed list of old plantation of Sundargarh Division is given in **Annexure 16 and 17 (Page 213 to 221 & 222 to 225 of volume II)**.

2.7 INJURIES TO WHICH THE CROP IS LIABLE

The main injuries to which the crop is liable are as follows:

2.7.1 Human Agency

Human being are directly as well as indirectly responsible to a great extent for depletion and degradation of valuable forest of this Division through illicit felling, uncontrolled grazing, girdling, lopping, fires and encroachment of forest land etc. A good number of forest blocks of Sundargarh, Ujalpur and Badgan Range are surrounded by thickly populated villages where poverty and unemployment is common feature. The poor people of these villages are fully dependent upon the forests for meeting their requirements of firewood, fuel, timber and NTFP.

Increasing population of these villages coupled with wide spread poverty and unemployment is exerting more and more pressure on the adjoining forests and as a result causing the gradual depletion and degradation of the forest. Gradually more and more local people are resorting to illicit felling and removal of forest produce for domestic and trading purposes. They are viewing the forest as a source of earning easy and quick money. Entry of some intermediaries having vested interest, which are involved in illegal commercial trade of timber, has further accelerated the illicit felling and removal of forest produce.

Though, the incidence of illicit felling and removal is prevalent in almost all the forest blocks of this Division, its intensity is less in some area of Sundargarh division. In Bamboo growing areas of this Division, there is heavy illicit removal of juvenile bamboo

shoot for food and trade purpose. This pernicious practice has already caused severe damage to the bamboo forests in many places of Hemgir Range. Human agency has affected adversely the ecology and environment of forests of this Division and the pace of depletion and destruction of valuable forest resource is increasing. List of supply of railway sleepers is given in **Annexure 18 (Page 226 of volume II)**..

2.7.2 Fire

During dry weather, i.e. from March to middle of June most of the forest areas of this Division are prone to fire hazards. The forest fire has already become regular phenomenon and most of the forests blocks are severely affected from it. Annual repeated fires are causing damage both directly and indirectly to the forests .It burns leaves and other residues lying on the forest floor and destroys microbial population of the soil. It is one of the main factors responsible for the mortality of seedlings, saplings and even of pole size crops. It also makes trees unsound and hollw and is responsible for dessication and hardening of the soil which accelerates the process of soil erosion. It is responsible for increasing dryness of the tract which in turn gives way to the intervention of weeds, grasses and xerophytic fire hardy species. It is responsible for whippy and sub-whippy stages of Sal regeneration and its dying back phenomenon; Setting of forest fire is mostly intentional and rarely accidental in this Division. The list of fire damage report is given in **Annexure 19 (Page 227 to 229 of volume II)**..

The fire hazard is a great problem of this division. Every year a lot of ground regeneration is damaged severely due to ground fire, which leads to devastation of the forest. Hence modern equipments for forest fire and mobility of staff with vehicles are very much necessary especially during summer season. Intensive motivation and organizing VSS co-ordination meeting can bring awareness among citizens regarding fire hazards. The main factors responsible for causing fire in the forests are:

- (i) Setting fire in beginning of dry season in the forest floor for clearing ground for collection of mohua flower.
- (ii) Setting fire for increasing production of young tender kendu leaves.
- (iii) Setting forest fires in forest areas by the tribals during the summer season for driving wild animals for poaching purpose.
- (iv) Setting accidental forest fire by the labourers camping inside the forest due to their carelessness and by the local people carrying torchers during night time.
- (v) Setting fire in the forest by poachers for driving animals towards desired place.

A sizable amount has been spent every year under fire protection which includes cost of extinguishing fire in the forest, engaging fire Watchers and signage etc. The details of the forest affected by the fire each year is not available. However, the year wise money spent under this head is given in the following table:

Expenditure on Forest Fire Control Measures

YEAR	AMOUNT(RS)	YEAR	AMOUNT(RS)
1979-80	4000	1991-92	40000

1980-81	9921	1992-93	39999
1981-82	10020	1993-94	40000
1982-83	10000	1994-95	40000
1983-84	13985	1995-96	40000
1984-85	15000	1996-97	40000
1985-86	15000	1997-98	10000
1986-87	40000	1998-99	30000
1987-88	29990	1999-2000	23214
1988-89	30000	2000-01	20000
1989-90	28900	2001-02	15998
1990-91	35000		

2.7.3 . ANIMALS

Severe damage is caused to the forest crop due to the grazing by domestic animals. Like human population, the population of the domestic animals has also increased over the years causing pressure on the division. It is observed that large herds of cattle, buffallows, goats and sheep are kept by the villagers for their domestic requirements. The villagers spend negligible amount for the maintenance of their domestic animals and animals are left loose for grazing and browsing purpose inside forest areas. This uncontrolled grazing and browsing in the forest area causes severe damage to the forest vegetation. Excessive grazing is also one of the factors affecting adversely natural regeneration and establishment of seedlings of Sal and others species. In some of the forest areas adjacent to the human habitations, uncontrolled and excessive grazing has led to the replacement of mesophytic flora by relatively more xerophytic, dry and thorny types of vegetation. In some places it has exposed forest floor and made it prone to soil erosion. The incidence of grazing is more in the forest areas of Sundargarh, Ujalpur and Gopalpur Range while it is less in other Ranges.

Except some remote blocks like Sagjore, Panchara, Jamkani, Garjanpahar etc; rest all blocks are heavily grazed. Although the grazing rules have been prescribed but in the absence of sufficient UDPF there is hardly any thing left for the cattle. So the R.Fs has to bear the pressure. In Hemgir areas cattle are seen damaging the young bamboo shoots (Karadis). Strict adherence to grazing rule is now felt essential. The cattle population of Sundergarh Division stands at almost 15 lakhs as per 1995 census in comparison to 12.5 lakhs of human population as per 1991 census. Hence per capita cattle population comes to 1.2. This may be slightly higher due to four years gap in both census operations. Such a huge population of cattle depends on forests for grazing. The stall feeding concept is only for cross breed animals which is only 0.74 percent of total cattle population.

Severe damage to young seedlings is caused by grazing and the goats eat away even unpalatable and thorny species. Trampling by cattle hardens the soil which hinders regeneration. Lopping of fodder species also degrades the growth of forest. On the whole, cattle grazing accelerate the process of degradation of the forests. Revenue collected from grazing in this Division during the last plan period is provided in the following table for better understanding of the quantum of grazing which needs to be discontinued for protection of forests.

Revenue on Grazing

Year	Amount(Rs)	Year	Amount(Rs)
1979-80	11,891.50	1990-91	6,579.60
1980-81	19,822.13	1991-92	3,736.00
1981-82	20,021.65	1992-93	5,528.15
1982-83	13,302.75	1993-94	6,756.10
1983-84	9,125.30	1994-95	3,409.85

1984-85	12,009.05	1995-96	2,944.00
1985-86	11,156.85	1996-97	3,442.20
1986-87	7,557.00	1997-98	669.00
1987-88	5,465.50	1998-99	289.00
1988-89	7,551.10	1999-2000	185.00
1989-90	3,967.25	2000-01	0

Sub-Division wise 15 th quinquennial live stock Census						
		Sundargarh Sub Division		Panposh Sub Division		
Sl. No.	Category	Rural	Urban	Rural	Urban	Total
1.	Cow (a+b)	55001	5535	57912	9580	228028
	(a) Cross Breed	4608	1443	1838	6211	
	(b) Indigenous	150393	4092	56074	3369	
2.	Cattle (a+b)	366081	8929	14839	3413	536818
	(a) Cross breed	6523	1772	2155	7039	
	(b) Indigenous	359558	7157	146240	6374	
3.	Buffallow	27378	1151	14545	5639	48713
4.	Sheep	21110	85	29069	404	50668
5.	Goats	468001	4249	90519	6257	56902
6.	Pigs	38903	1268	29499	1779	71449

(Source: D.S.O.Sundergarh)

2.7.4 (a) Insects: The damage caused to the natural forest vegetation and to the plantation by defoliators, borers and other insects appears to be very less. The Sal wood borer (*Holocerambyx spinicornis*) is the only heart wood borer found in dead and diseased Sal trees and in unbarked logs. Green healthy trees are rarely attacked.

(b) Loranthus: The parasite is noticed in few Sal trees but the incidence and intensity of the attack is neither serious nor wide spread.

(c) Fungi: Dry rot is prevalent in the forests of Sundargarh. However, in most cases the rot is confined to only a few feet from the ground and damage caused by it is less.

(d) Climber: There is considerable damage to the pole crop of Sal and other species due to climber attack. As such the climbers are in abundance in all parts of the division. Their incidence is much heavier in most regions of the Division. The common climbers available are *Acacia piñata*, *Combretum decandrum*, *Bauhinia vahlii*, *Milletia auriculata*, *Smilax microphylla* and *Butea superba*. The menace of climber is increasing day by day as very less climber cutting operations have been carried out in the past.

(e) Weeds: *Eupatorium odoratum* is the main weed adversely affecting the growth of forest vegetation. Its attack is more in PRF. Weeds have also come up in the areas which were subjected to continuous heavy grazing by domestic cattle. *Lantana camara* is another weed whose impact is more in Kuarmunda and Sundargarh Ranges.

2.7.5 Climate

(i) **Drought:** The forest of this division except the moist blocks are exposed to severe drought due to the fact that rainfall is experienced only within span of about 3 months. Drought helps forest fires to occur and hinders establishment of seedlings.

(ii) **Wind:** Strong wind storms are generally experienced during the month of April, May and June and sometime in the October but their adverse affect is very much localized and extent of damage is negligible. However, some damage occurs at irregular intervals when the intensity of cyclone is severe.

(iii) **Frost:** Damage due to frost is rare in winter season. It is not severe to cause substantial damage to the forest crops.

2.7.6 ILLICIT FELLING

It is the worst form of damage to crops. At places due to illicit felling particularly the very character of vegetation has changed. Sal forests now present miscellaneous look as Sal trees have been the target of illicit removal. Many small blocks have been reduced to bushy forests. Removal of young bamboo shoots (karadi) for food is very rampant in this Division which hinders great deal in the production of bamboos. Besides trade on bamboo, mat making is a cottage industry in this Division. Earlier it was limited to Turies, Betras, Dhanwar tribes only but now there is no such class barrier. Anybody can follow this occupation and the young bamboos particularly one year old are exploited to the maximum.

Hemgir Range is highly prone to illicit felling and smuggling of timber and also highly problematic from protection point of view. Presence of Saw Mills in township area along with good road communication facility increases illicit removal of timber. Effective steps have been taken by the Divisional staff to check illicit removal of timber but these are very less in comparison to the vast quantum of illicit removal. Offence cases booked in this Division during last 7 years has been given in a tabular form for easy understanding of this problem.

OFFENCE CASES BOOKED IN SUNDERGARH DIVISION								
Year	U/s-56	P.R.	Others	Total of O.R. Cases	U.D. Cases	Offence Cases	O.R. Cases	U.D. Cases
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
95-96	70	148	-	5008	514	5740	4985	461
96-97	78	198	-	5597	335	6208	5562	317
97-98	90	210	-	4774	383	5457	4754	334
98-99	98	152	-	4482	341	5073	4472	315
99-00	123	190	-	5268	410	5991	5243	362
00-01	123	120	-	4822	480	5553	4792	448
01-02	138	151	-	3685	494	4468	3618	437

(Source: D.F.O. Sundargarh)

The general problems are as under:

1. Lack of adequate number of staff.
2. Lack of adequate instruments like jeep, motor cycle, van etc and lack of funds for their maintenance.
3. Lack of adequate funds for repair and maintenance of Govt .quarters in the interior pockets of this Division.
4. Lack of modern arms and ammunitions with the field staff.
5. Inadequate allotment of funds under T.E to meet traveling expenses for frequent touring
6. Lack of refresher course training for Sub-ordinate staffs.
7. Lack of communication facilities like walky-talkies and V.H.F etc at Beat and Section headquarters.
8. Low rate of conviction by the Court.

All these facts may be considered at appropriate level and proper action should be taken to tackle this menace. Illicit Felling Survey was done in all Forest Blocks of Division.

2.7.7 ENCROACHMENTS

The Division is seriously affected by this menace. Except Hemgir area and the forests of Jharbeda, Bhainsamunda, Rangamatia, Sagjore, Chhatamb, the encroachment for both dry and wet cultivation is rampantly being done since long. People from neighboring districts of Chhatishgarh and Jharkhand have encroached Reserved forests with the help of their relations inhabiting this Division. Many middle men take advantage of the situation and motivate local people to go for encroachments. It is observed that the valley portion adjoining to perennial streams are mostly affected by this menace. List of Post-1980 encroachments are given in **Annexure 20 (Page 230 to 233 of volume II).**

2.7.8. WILD ANIMALS

The damage caused by wild animals is very less except elephant problem which causes loss to crops and human beings.

2.7.9 FAMINE.

Famine is not experienced. These areas do not have sufficient irrigation facility and agricultural practices are dependent upon the rains.

2.7.10 FLOOD

Flood is not experienced. Except localized once of very short duration usually the banks of big nalla are affected. The damage to crop is rather negligible. The main attributing factors of these floods are the denudation of hills plateau of adjoining portions.

2.7.11 SOIL EROSION

Soil erosion in all its manifestations starting from sheet erosion to gully erosion including land slide and land slip are met with in the Division particularly in Hemgir area due to sedimentary rock formation and high table lands. The main contributing factors for soil erosion are:

- (1) Large scale deforestation on the hill slopes particularly in the central part of the Division.
- (2) Besides, in the lime stone quarry area where the mining has been completed no measures have been taken to consolidate the soil.
- (3) The encroachment into the forest at steep slopes i.e. areas actually unsuitable for cultivation are encroached for shifting cultivation.
- (4) Improper method of cultivation by the aboriginals inside Division and by outsiders poses a serious problem of soil erosion. The problem is acute in plain forest areas.

PART-I

Chapter-III

UTILISATION OF THE PRODUCE

3.1 AGRICULTURAL CUSTOMS AND WANTS OF THE PEOPLE

3.1.1 DEMOGRAPHIC FEATURES

As per census, the total population of this Division is 512655, out of which 54442 belong to S.C and 298382 to S.T. The male constitutes 51.78% of the total population. The sex ratio is 931 women per 1000 men. The rural population account for 94.05 percent of total population. The list of Census data of Sundargarh Division is given in **Annexure 21(Page 234 to 268 of volume II)**.. The detailed block wise population data is given below.

DETAILED BLOCK-WISE AND SEX-WISE DISTRIBUTION OF POPULATION

Sl. No.	Name of Block/ Town	SC			ST			OTHERS			TOTAL
		RURAL	Male	Female	Total	Male	Female	Total	Male	Female	Total
1	2	3	4	5	6	7	8	9	10	11	12
1	Bargaon	2219	2142	4361	17576	17750	35326	8577	7903	16480	56167
2	Balisan-kara	3044	3038	6082	22637	23531	46168	8175	8101	16276	68526
3	Hemgir	4559	4476	9035	15549	15490	31039	13550	12667	26217	66291
4	Kutra	2324	2233	4557	24134	24212	48386	5577	5301	10878	63781
5	Lephri-para	3998	4002	8000	18329	18229	36558	10139	9984	20123	64681
6	Subdega	2075	2082	4157	18989	19504	38493	5825	5476	11301	53951
7	Sundargarh	3884	3823	7707	14668	14651	29319	10337	10081	20418	57444
8	Tangarpali	3771	3815	7586	12995	12987	25982	8948	8946	17894	51462
Rural Population		25874	25611	51485	144877	146354	291271	71128	68459	139587	482303
Urban Population											
1	Sundargarh (M)	1535	1422	2957	3529	3582	7111	10815	9469	20284	30352
Grand Total		27409	27033	54442	148406	149936	298382	81943	77928	159871	512655

Source: D.S.O. Sundergarh)

Density of population

The density of population comes to 128 people per square kilometer .The low density of population is due to availability of extensive agricultural land, medium and small scale industries and large tract of forest area. Among the scheduled tribes Kisan, Oram, Dhanuar, Munda, Kharia and Routia are predominating and they confined mostly to tribal pockets scattered though out the Division. The population growth is increasing rapidly and its pressure is felt on encroachment of forest land, destruction of forest cover, poaching and conversion of forest land into agriculture land.

3.1.2 DISTRIBUTION OF VILLAGES, TOWNS AND HOUSEHOLDS

Census reveals 697 number of Revenue Villages in this Division out of which, 684 number are inhabited and 13 numbers are not inhabited. There are 102420 nos. of household and 493 nos. of persons in average per family is found. There are 135 nos. of Gram Panchayats and 6 numbers of towns in this Division. The detailed block-wise distribution of villages and households etc are given below:

DISTRIBUTION OF VILLAGES, TOWNS AND HOUSE HOLDS							
Sl.No	Block / Town	No. of G.P.	No. of villages		Total	No. of residential houses	No. of H/Hs.
			Inhabited	Un-inhabited			
	RURAL						
1	Bargaon	9	69	-	69	10121	11468
2	Balisankara	11	84	3	87	13044	14160
3	Hemgir	11	136	5	141	11622	14527
4	Kutra	9	58	-	58	11591	11936
5	Lephripara	10	103	2	105	11953	14159
6	Subdega	9	73	2	75	10769	11420
7	Sundergarh	9	88	1	89	10779	12288
8	Tangarpali	7	73	-	73	10508	11434
	Total	75	684	13	697	90387	101392
	URBAN						
1	Sundergarh(M)	-	-	-	-	1016	1028
	Total	-	-	-	-	91403	102420

3.1.3 OCCUPATIONAL STRUCTURE

Census figure shows that there are 232832 workers in this Division out of which 55662 are marginal and 177170 are main workers. Among the total main labour population, male workers are 62.78 % while male labour percentage among marginal workers are 6.32 %. The workers are mainly engaged in cultivation, industries, trade, commerce and

transportation. The detailed Block wise and Sex wise distribution of labour force is furnished below in a tabular form.

**TOTAL NUMBER OF MAIN WORKERS, MARGINAL WORKERS
BY SEX IN DIFFERENT BLOCKS AND URBAN AREAS**

Sl.	Dist./Block/	Total workers			Main workers			Marginal workers		
No.	Urban	Male	Female	Total	Male	Female	Total	Male	Female	Total
-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
	Rural									
1	Bargaon	16219	11818	28037	15679	4233	19912	540	7585	8125
2	Balisankara	19233	12982	32215	18678	4635	23313	555	8347	8902
3	Hemgir	20048	9083	29131	19576	4117	23693	472	4966	5438
4	Kutra	17174	8700	25874	16692	3302	19994	482	5398	5880
5	Lephripara	19035	12356	31391	18551	4485	23036	484	7871	8355
6	Subdega	15376	10678	26054	15151	4642	19793	225	6036	6261
7	Sundergarh	16521	10097	26618	16103	3451	19554	418	6646	7064
8	Tangarpali	15230	9676	24906	14948	4515	19463	282	5161	5443
	Rural Workers	138836	85390	224226	135378	33380	168758	3458	52010	55468
	Urban									
1	Sundergarh (M)	7353	1253	8606	7290	1122	8412	63	131	194
	Total	146189	86643	232832	142668	34502	177170	3521	52141	55662

(Source: D.S.O. Sundergarh)

DETAILS OF BLOCK/TOWN WISE AND PROFESSION WISE DISTRIBUTION OF WORKERS										
Name of the Block /U.L.B	Cultivater	Agricultural Laborers	Livestock forestry fishing hunting & plantation orchard & allied	Mining and quarrying	Manufacturing processing servicing and repairs in house hold industries	Other than house hold	Constructions	Trade and commerce	Transport storage and communication	Other services
-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11
Bargaon	11989	5157	97	13	556	158	37	386	46	1483
Balisankara	13554	5515	252	9	1012	187	31	612	41	2100
Hemgir	12217	7557	125	71	689	166	19	573	47	2229
Kutra	12047	3020	75	1984	500	317	90	558	164	1239
Lephripara	1164	8076	74	613	741	145	19	355	44	1805
Subdega	10909	5953	82	16	738	109	41	386	55	1504
Sundergarh	8837	6460	211	17	532	809	46	381	108	2153

Tangarpali	8370	7979	118	124	508	261	54	282	33	1734
Sub-Total	79087	49717	1034	284 7	5276	2152	337	3533	538	1424 7
Urban										
Sundergarh	685	415	332	18	272	438	247	1420	325	4260
Total	79772	50132	1366	286 5	5548	2590	584	4953	863	1850 7
(Source: D.S.O. Sundergarh)										

3.1.4 LITERACY RATE

According to census report, there are 243153 literate persons within this Division out of which 157195 are male and they constitutes 64.64 % of total literate population while the female literacy percentage is 35.35 %, The detailed block wise and sex wise literacy chart is given in the following table.

LITERACY RATE					
BLOCK-WISE AND SEX-WISE LITERACY RATE					
Sl. No	C.D. Block/ Towns	No. of Male Literate	No. of Female Literate	Total literate(Male + Female)	Percentage of Literacy
1	2	3	4	5	6
1	Bargan	16509	8639	25148	44.77
2	Balishankara	18922	9919	28841	42.08
3	Hemgir	21558	11072	32630	49.22
4	Kutra	17949	9644	27593	43.26
5	Lephripara	19184	10463	29647	45.84
6	Subdega	15066	7999	23065	42.75
7	Sundergarh	19125	10094	29219	50.86
8	Tangarpali	15385	8239	23624	45.9
Total Rural		143698	76069	219767	45.56
	URBAN				
1	Sundergarh (M)	13497	9889	23386	77.04
	TOTAL	157195	85958	243153	47.43

(Source: D.S.O. Sundergarh)

3.1.5 LAND USE PATTERN AND CROPPING PATTERN

The census shows density of 196 persons per sq k.m. whereas the per capita forest area is about 0.00142 ha. 48 % of total population is scheduled tribes belonging mainly to Oram, Munda, Kharia, Dhanuar and Routia whereas 9 % are scheduled caste. The size of land holding by them is small and comes to below one acre per person at many places. The Agarias are the pioneer among the people practising agriculture. Kultas are ancient agriculturist. In the Industrial areas the main labour force of young and able bodied

male and female are drawn towards the industries and mining. Agriculture is practiced by people who own the land and can't afford to keep it fallow. The agricultural technique is of primitive type. The Agharias though a little bit advanced are far behind the labourers of adjoining Sambalpur District. This is mainly due to lack of irrigation facility. The river system of this Division is such that it is not possible to construct big irrigation projects. The other alternative i.e. lift irrigation is yet to take lift in this regard.

Crops like rice, maize, wheat, arhar, kulthi, millet, jawar, ragi and oil seeds like til, groundnut are cultivated. Sugar cane is grown in a limited area and it is mainly used in preparation of gur (raw sugar). Rice production is much less because it is fully dependent upon unpredictable rain. Industrial and mining operations in this Division cause lot of food scarcity for which rice is imported from Sambalpur. Requirement of forest produce by the local people are mainly firewood for fuel, timber big and small. Though firewood is compensated by gas in urban area, it still has its importance in the rural areas where it is the cheapest and readily available cooking fuel. The land is mostly utilized for one crop and rarely for two crops every year. The irrigation facility is not available and agriculture is dependent upon monsoon.

3.2 PEOPLES NEED FOR FOREST PRODUCE

There is huge gap in demand and supply of forest materials in urban area. The urban area meets the supply of fuel with gas, kerosene and electricity but rural population depends fully upon forest for fodder, fuel and firewood. People depend on forest in many ways. Various forest products e.g. timber, bamboos, thatch grass, and fibers are used in their house construction. Economically well off people use timber for door, windows, beams, and furniture. The rural poor use timber and bamboos for beams and other supports, grass is used for thatching of roofs, small timber is used for cots, furniture, carts and other agricultural implements. Firewood remains the main source of domestic energy and even valuable species like teak are used for this purpose. Poles and saplings are used for fencing homestead lands and field. Cattle graze in forests for more than ten months a year. People collect a variety of non-timber forest product (flowers, seeds, barks, fibers, fruit and leaves) from the forests and several medicinal plants find use in local health traditional uses in rural areas.

Forests are being increasingly used over time, Increase in human and cattle population, increasing demand of various forest products by urban population and changing life styles is putting enormous pressures on forest. Heavy incidence of poverty and other unfavorable socio-economic conditions in rural areas also compel people to extract more and more from forests. Most rural families, particularly those below poverty line, fall back on forests for their sustenance for 8-10 month every year. Collection of timbers, firewood, bamboos and several NTFP items, including kendu leaves, mahua flowers and seeds, sal

seeds, siali leaves and fibers are undertaken by many families. Forestry sector also provides labor work to many families.

Domestic energy requirements are mostly met from forests. According to one estimate, total annual requirement of fire wood alone for the entire Division is approximately 50 lakh quintals. As availability of firewood from legal means is extremely limited, must of the firewood, timbers and other removals are illegal. It has been estimated that value of forest produce illegally removed from forest of this division is about Rs. 50 crores per year. Main timber species used by local people for a variety of purposes are given in table.

Principal timber species locally used in Sundergarh Division

Sl. No.	Botanical Name	Oriya Name	Uses
1	<i>Mitragyna parviflora</i>	Mundi	Planks
2	<i>Shorea robusta</i>	Sal	Building purpose, sleepers, cart frame, plough etc.
3	<i>Pterocarpus marsupium</i>	Piasal	Doors, window shutter, planks and furniture.
4	<i>Ougenia ougenensis</i>	Bandhan	Wheels cart.
5	<i>Madhuca indica</i>	Mohul	Cattle troughs
6	<i>Dalbergia latifolia</i>	Sisoo	Furniture
7	<i>Grewia tilaefolia</i>	Dhaman	Axe handle, cross pick, cart frame.
8	<i>Gmelina arborea</i>	Gambhari	Furniture
9	<i>Diospyros melanoxylon</i>	Kendu	Beam rafters
10	<i>Anogeissus latifolia</i>	Dhaura	Axles and plough
11	<i>Adina cardifolia</i>	Haland	Rafter, planks, furniture
12	<i>Terminalia tomentosa</i>	Asan (Sahaj)	Buidling purpose
13	<i>Chloroxylon swetenia</i>	Bheru	Fancy box, yolks and axe handle.
14	<i>Cleistanthus collinus</i>	Karada	Rafters in house buildings, bark for tanning.
15	<i>Soyimida febrifuga</i>	Rohini	Cattletrough, agricultural implements
16	<i>Terminalia arjuna</i>	Arjun	Bark used for tanning, tassar being reared on these plants.

3.3 NON-TIMBER FOREST PRODUCE

3.3.1 No study has been done so far to quantify the NTFPs of the division, even the qualitative assessment of different NTFPs in different forest areas is lacking. During the present revision of the plan attempt has been made to record commonly available NTFP species while conducting strip sampling for crop enumeration. Criteria as shown in Table have been used for representing the availability status of NTFP in different forest blocks.

3.3.2 Criteria for NTFP availability status

Sl. No.	Plants/ Ha	Availability status
1.	More than 800 plants per ha.	Abundant
2.	Between 400 to 800 plants per ha.	Good

3.	Less than 400 plants per ha.	Sparse
4.	No NTFP plants available	Nil

The Range wise/ block wise distribution and availability of various NTFP items using above criteria is provided in the table. The distribution and availability of various NTFPs in important forest blocks is given below.

Forest Block	NTFP Items found	Status
Chengapahad	Siali leaf, siali fibre, mahua flower and seed, lodha, medha, sal seed, genduli gum, honey, wax, hill broom, kamagundi, ban haldi and gilo	Abundant
Hundarkhol	Siali leaf & fibres, kusum seed, char seed, bana tulsi and dhatuki.	Abundant
Makarchata	Bana haldi, bankul honey, wax, gilo seed, sal seed and mohua flowers.	Sparse
Giripahad	Myrobalan, lodha, medha, sal seed, genduli gum, gilo seed, hill broom and siali leaf	Good
Rohini	Sal seed, kusum seed, charseed, bantulsi and bankhajuri	Sparse
Athkosia A	Kendu leaf, mohua flowers, seed, myrobalans, bantulsi, dhatki, genduli gum and wax etc.	Good
Athkosia B	Sal seed, mohua flowers, siali leaf & fibre, broom grass, Banhaldi and bankulthi	Abundant
Dhangergudi	Kusum seed, sal seed, mohua flower & seed, ban khajuri, dhatuki, bantulsi, baghnakhi and honey.	Sparse
Kusumura	Sal seed, kendu leaf, genduli gum, bantulsi, hill broom and dhatuki.	Abundant
Bindhapahar	Sal seed, bankhajuri, mohua seed and kusum seed.	
Jamkani	Salseed, mohua seed, myrobalans, nux vomica, lodha, medha and dhatuki etc.	Good
Garjanpahad	Kendu leaf, siali fibre, bantulsi, bankulthi, dhatuki and myrobalans.	Abundant
Dhanubans	Genduli gum, dhatuki, broom grass, mohua flowers, honey, wax and bantulsi.	Sparse
Punjipahad	Sal seed, mohua flowers, genduli gum, kusum seed, siali leaf & fibre and dhatuki.	Abundant
Kalatpani	Dhatuki, sal seed, kusum seed, genduli gum, honey, wax, siali leaf and kendu leaf.	Good

Further a survey was conducted in different villages of this division to ascertain the order of preference given by the local people to NTFP items and the average earning per family in a year. The results are shown in the table.

3.3.3 Composition of NTFP collection

Name of NTFP items	Percentage of total NTFP collection
1. Kendu leaf	52 %
2. Mohua flowers and seed	28 %
3. Siali fibre and leaf	08 %

4. Sal seed	07 %
5. Other items	05 %

Survey revealed that an average family of five members earns approximately Rs. 5500 per year from the collection of NTFP items, if all the members of family are involved in the collection. Kendu leaf provides major income up to 55 % to 65 % of the total income from the NTFP collection to a family. This income is more important as it comes in lean period between October to May when they are virtually free from agricultural activities. Important fruit bearing trees, fibers, oil, tannin, gum, and resin yielding forest species found in this division are given below on the table.

3.3.4 Important Fruit bearing trees

Sl. No.	Common Name	Scientific Name	Period of consumption	Utilization
1	Amba	<i>Mangifera indica</i>	April/May	Ripe fruit are eaten and raw are used for making pickles etc.
2	Anla	<i>Emblica officinalis</i>	Oct/April	Fruit is eaten raw and used in pickles
3	Ban Khajuri	<i>Phaseolus acaulis</i>	May/June	Ripe fruit are eaten
4	Ata	<i>Anona squamosa</i>	July/Aug	Ripe fruit are eaten
5	Barkoli	<i>Zizyphus jujube</i>	Jan/Mar	Ripe fruit are eaten and used for making pickles
6	Bel	<i>Aegle marmelos</i>	One year after fruiting	Ripe fruits are eaten
7	Bhalia	<i>Semecarpus anacardium</i>	June/July	Fruit kernel eaten and used for pickles
8	Bhursunga	<i>Murraya koenigi</i>	Through out the year	Leaves eaten and used in curry
9	Jamu	<i>Syzygium cumini</i>	June/July	Ripe fruits are eaten
10	Kadmba	<i>Anthocephalous cadamba</i>	October	Ripe fruits are eaten
11	Kaju	<i>Anacardium occidentale</i>	March/April	Hypothalamus and seeds are eaten
12	Kendu	<i>Diospyros melanoxylon</i>	May/June	Ripe fruit is eaten
13	Kusum	<i>Schleichera oleosa</i>	June/July	Flesh of the fruit is eaten
14	Mohul	<i>Madhuca indica</i>	May / June	Flowers eaten and used for preparation of country liquor, unripe fruit used as vegetable, oil from seeds used for cooking
15	Panas	<i>Artocarpus integrifolia</i>	May/Aug	Unripe fruit as vegetable pickles, ripe fruits and seeds are eaten
16	Rai	<i>Dillenia poentagyana</i>	August	Young fruits are cooked and eaten
17	Sajana	<i>Moringa</i>	Through out	Flowers, leaves and fruits

		<i>pterigosperma</i>	the year	used as vegetable
18.	Tentuli	<i>Tamarindus indica</i>	Dec/Jan	Fruits, flowers and leaves are used for vegetation.

3.3.5 Important fibre yielding forest species

Sl. No.	Common Name	Botanical Name	Part yielding fibre	Utilization
1	Bamboo	<i>Bambusa arundinacea</i>	Stem	Manufacture of paper
2	Bamboo	<i>Dendrocalamus strictus</i>	Stem	Manufacture of paper
3	Dhaman	<i>Grewia tiliacifolia</i>	Inner bark	Used for rope making
4	Kanchan	<i>Bauhinia variegata</i>	Bark	Used as cordage
5	Palash	<i>Butea frondosa</i>	Bark	Used for rope making and for boats
6	Siali	<i>Bauhinia vahlii</i>	Inner bark	Used as cordage
7	Sisal	<i>Agave sisalana</i>	leaves	Used for rope making and weaving mats

3.3.6 Important oil yielding forest species

Sl. No.	Common Name	Botanical Name	Part yielding oil	Utilization
1	Karanja	<i>Pongamia pinnata</i>	seeds	Oil used as medicine, antiseptic, soap making, perfume and leather tanning
2	Kusum	<i>Schleichera olosa</i>	Seed karnels	Oil as hair oil, for cooking, lighting, soap making
3	Mohua	<i>Madhuca indica</i>	seeds	Oil used for soap, hair oil, and adulterant for ghee
4	Neem	<i>Azadirachta indica</i>	seeds	Oil used as medicine, for soap making, oil cake as fertilizer
5	Sal	<i>Shorea robusta</i>	seeds	For cooking, lighting soap making in confectionary

3.3.7 Important tannin yielding forest species

Sl. No.	Common Name	Scientific Name	Part yielding tannin	Utilization
1	Babul	<i>Acacia arabica</i>	Bark of tree	Tanning of leather
2	Dhaura	<i>Anogeissus latifolia</i>	Dry matured leaves	Dyeing
3	Sunari	<i>Cassia fistula</i>	Bark	Blending and tanning of leather

3.3.8 Important gum and resin yielding plants

Sl. No.	Common Name	Botanical Name	Part yielding gum and resin	Utilization
1	Asan	<i>Terminalia</i>	Stem	Gum used as incense and in

		<i>tomentosa</i>		cosmetic
2	Genduli	<i>Sterculia urens</i>	Stem	Gum karaya, used in confectionary
3	Moi	<i>Lannea coromandellica</i>	Stem (thingan gum)	In calico painting, paper and cloth sizing, varnishes and confenctioary, adhesive
4	Piasal	<i>Pterocarpus marsupium</i>	Stem (Kino gum)	Used as medicine
5	Sal	<i>Shorea robusta</i>	Stem (Oleoresin)	Used as an incense and disinfectant, fumigant
6	Salai	<i>Boswellia serrata</i>	Stem (Guggal)	Used in incense, curing rheumatism and nervous disorders.

The pasture is not adequately available in most areas. The area where most of the Khesra jungles have been converted into agricultural land, the dearth of pasture is being felt more. The reserved forests generally do not provide good quality grasses due to repeated fire hence the less palatable grasses come up. In the absence of alternatives the live stock used to graze in the forest. This is more or less equally felt throughout the Division. Cattle population has already been described in the last chapter and it is seen that 536,818 nos. of cattle, 48,713 nos. of buffalos, and 71,449 nos. of pigs are available as per census report. Out of all these cattle population about 85 % are totally dependent on near by forest area which poses a great threat to the regeneration of forest species.

3.4 MARKETS AND MARKETABLE PRODUCTS

The main market for the forest products like timber, Charcoal and fire wood etc are Kanika, Sundergarh, Rajgangpur and Rourkela. For Kendu leaf there is no market in the Division. There are a number of Bidi Factories in and around Sundergarh where local leaves are consumed. For Kendu leaf nearest market is Sambalpur. Since Howrah-Mumbai Railway line passes through this Division almost all forest produce are easily transported to different parts of Central and North India. Mohua flower is mostly utilized locally in country liquor distillation. Myrobalans, Kusum seeds, Char seeds, Gum (*Sterculia* and *Dhaura*) are collected and exported outside. Sal seed is also collected and utilized for oil extraction. The details list of production of Kendu Leaves under the jurisdiction of Sundargarh Forest Division is given in Annexure 22 and 25(Page 269 & 271 of volume II)..

3.4.1 DESCRIPTION OF MARKETS

In the past Sal was mainly utilized for railway sleeper purpose. As the use of sal for railway sleeper has been banned in the State, there is less market for forest timber and other important forest produces. Most of the forest timbers and minor forest produces are

exported outside the Division. They are mainly transported to Rourkela and Jharsuguda from where these are sent to Calcutta, Delhi and other places. Now demand for all varieties of timber has increased in the towns and cities in side and out side the State. The lease of forest produce has been banned in the State and O.F.D.C. Ltd is the marketing agency for timber and firewood extracted from this Division. Bamboo coupes were leased out to O.F.D.C. Ltd in the past and bamboo working was stopped. The bamboo working has again started from 2005 onwards. The detailed list of production of Bamboo of Sundargarh Forest Division is given in **Annexure 23(Page 270 of volume II)**.. The main marketable products of this Division are timber of various species, fire wood, bamboo, charcoal, tassar and other minor forest products.

Marketable Products

1	Timber
2	Poles
3	Fire wood
4	Charcoal
5	Bamboo
6	Kendu leaves
7	Sal seeds
8	Mahua flowers and seeds
9	Siali leaves and fibers
10	Other N.T.F.P.

- 1. Timber:** Sal which constitutes more than 75 % of total timber production of this Division is the main demand of the present market. Other species like Asan, Piasal, Sisoo, Kusum, Kasi, Senha etc. are marketed in form of logs and poles, scantlings, sizes etc.
- 2. Poles:** Poles of Sal and other misc. species are in huge demand for centering in building construction and mining purposes.
- 3. Fire wood:** Salvaging of fallen and uprooted tree will produce fire wood which has great demand in the industrial markets of Rourkela and Rajgangpur etc.
- 4. Charcoal:** Main consumption of charcoal is for domestic fuel. Goldsmith and blacksmiths use a little quantity. Other charcoal based industries at Rourkela and Kalunga use charcoal to great extent.
- 5. Bamboo:** Salia bamboo is the main species available in this Division. Local demands of bamboos are met from Khesra Forest where as Coupes were being worked by O.F.D.C.Ltd and paper mills. The coupe working was stopped as per Govt. decision and has resumed working from 2005.
- 6. Kendu leaves:** It is the highest revenue yielding item worked out departmentally through out the Division by K.L. Wing and its marketing is done by O.F .D.C. Ltd.
- 7. Sal seeds:** Sal seed is an important item and O.F.D.C. Ltd has been appointed as agent for collection and marketing of the said produce.

- 8. Other NTFP items:** New N.T.F.P. policy came into force with effect from 31.3.2000 as per Govt. Resolution No.5503/F & E dt 31.03.2000 and in pursuance to this all MFP items will be exploited by the traders through Gram Panchayats. The N.T.F.P. items like gums, lac, siali fibres, tassar cocoons and sal seeds will be worked through O.F.D.C. Ltd. /T.D.C.C. Ltd. / M/S.STSCS Ltd or through other Cooperative Societies of Govt. of Orissa undertaking. For sal seeds O.F.D.C. Ltd. and for tassar cocoons M/S STSCs are sole agents of this Division at present. The list of production of sal seedes is given in **Annexure 24 (Page 270 of volume II)**. The annual potential of various NTFP items of the Division is given .

NTFP Potential.

Sl. No. (1)	Name of N.T.F.P. (2)	Approximate annual potential (3)
1.	Siali leaves	300 M.T.
2.	Mohua flower	5000 M.T.
3.	Tamarind	200 M.T.
4.	Myrobalans	300 M.T.
5.	Broom grass	100 M.T.
6.	Mohua seed	1000 M.T.
7.	Karanja seed	100 M.T.
8.	Kusum seed	150 M.T.
9.	Chakunda seed	100 M.T.
10.	Mango kernel	100 M.T.
11.	Siali fibre	50 M.T.
12.	Gum	10 M.T.
13.	Lac	10 M.T.
14.	Sal seed	1000 M.T.
15.	Tassar cocoon (280000 no.)	800 Kahana

Markets and marketable products

- (i) Main marketable products are timber, firewood, bamboo, bamboo basket, kendu leaf and some NTFP items like siali leaf and fibres, mohua flower, sabai grass, sal seeds, harida, bahada and Nux vomica etc. Timber of Sal, Asan, Bijasal, Sisoo, Mundi, Kasi, Dhaura and Kendu are delivered to the OFDC Ltd by DFO Sundergarh as salvaged and offence case materials. The OFDC Ltd conducts public auction of seized materials to meet the local demand. After the ban on green felling in 1988, no coupe is being worked by OFDC Ltd. and only dead and dry trees are being salvaged in the Division.
- (ii) Bamboo is a major source of revenue. It is concentrated mainly in Hemgir, Gopalpur, Rajgangapur and some parts of Ujalpur Range. After nationalization of bamboo the OFDC Ltd is working bamboo coupes. M/s O.P. Mills was working as raw material procurer (RMP) of M/s OFDC Ltd and was buying product from the OFDC Ltd. No bamboo working has been done from 1999 to

2004. Long Bamboo is also supplied to the public at concessional rates by the OFDC Ltd.

- (iii) Kendu leaf is the highest revenue fetching forest produce in Sundergarh. High quality leaves are available both in Khesra and Reserved Forests. After nationalization in 1973, the Kendu leaves wing of the Forest department collects and processes kendu leaves, which are then delivered to the OFDC Ltd. Details of kenduleaves production is given at **Annexure-25 (Page 271 of volume II)**..
- (iv) Main local markets are Sundergarh, Ujalpur, Lephripada, Guruidihi, Kinjerkela, Hemgir, Gopalpur and Badgan.

Local Handicrafts and cottage Industries

There is hardly any organized cottage industry in this division. Some local activities depend on forests for their raw materials. These activities include:

- (a) Cart making.
- (b) Mat making from ban khajuri by local people.
- (c) Baskets and mats from bamboos
- (d) Brooms from brooms grass
- (e) Ropes from grasses, siali fibres for binding of kendu leaf,
- (f) Bidi making
- (g) Collection of NTFPs like siali leaf, karanja seeds, neem seeds, mahua, sal seeds, char and kusum.

3.5 INDUSTRIES AND OTHER AVENUES

There are few cottage industries like Bidi making, comb making, basket making and toy making. Timber of damkurudu, kurum species and bamboos are mainly used for this purpose. Two species of grasses are used in making the Brooms. Sabai grass is not available in sizeable quantity. Ropes are prepared from sabai grass which is mainly used in preparing the cot. Tassar cocoons are utilized locally. As regards timbers for building constructions, plough heads, carts, agricultural implements, small poles, rafters, bamboos are the chief forest products required by the people. Thatch grass and brush wood is some times used by rural people for house construction. Pot-tiles are commonly used for roofing purpose. Young bamboos of one year or more are removed for preparing mats, baskets and small hand fans. Bamboo shoots (Karadi) are eaten by the people. The Betras, Turias, Dhanuars generally cut and use bamboo at the stump site and leave unused bamboo inside the forest which creates fire hazard.

3.6 LINES OF EXPORT

3.6.1 RAIL, ROAD AND RIVER NETWORK

The main means of transportation of forest products is the railways. The Division is connected with a network of good road system connected by a number of village roads, forest roads, State Highway No.10 and MDR-23. The transportation is mainly done by trucks. Occasionally the bullock carts are utilized for transporting kendu leaf, mohua flowers and sal seeds from the interior villages to the market places, road side depots for onward transport by rail or truck. River channels are now obsolete for transport of forest produce though they were used previously for the purpose.

3.7 METHODS OF EXPLOITATION

3.7.1 The exploitation of forest produce was done previously by contractors on royalty basis. But after merger of the khalsa area annual sale by public auction was introduced. N.T.F.P. items were leased out for short term leases. Since 1962, O .F. D .C. Ltd was working the annual coupes on royalty basis. From 1988, annual bamboo coupes were leased out to O .F .D .C .Ltd and from 1993 Paper Mills are directly working the bamboo coupes. From 1973 Kendu Leaf is collected departmentally by Rourkela, Jharsuguda, Kuchinda K.L.Divisions and marketed through O .F. D .C .Ltd. Since 1995 Sal seeds were collected by M/s Utkal Forest Products. Siali Fibres were collected by Rourkela (K.L) Division while siali leaf is being collected by T .D. C. C .Ltd. Now as per Government decision most of N.T.F.P. items are given to Gram Panchayats for collection and a few to private sectors as mentioned in the last section.

In this Division, usually tree felling is done by axe and logging and debarking are done at stump site. These logs are then dragged manually or by buffaloes to truck able points from where those are transported to depots. Lops and tops are converted in to fire wood and stacks of size 12' x 3' x 3' are made at convenient places for transportation. The exploitation of timer, bamboo and firewood is generally done by local people and tribals with the help of axe. The exploitation through traditional means leads to wastage of forest materials and destruction of regeneration of young shoots inside the forest.

Bamboo felling is usually done by axe and they are converted in to pieces of 2.3 meters length. 21 such pieces makes a bundle. In case of Daba bamboo each bundle contains 7 pieces each of 2.3 mt. length. These bundles are stacked on the truck able points from where they are transported to nearest bamboo depots of O .F. D. C. Ltd. and finally

despatched to different paper mills of Brajaraj Nagar. In case of the kendu leaves, collection, purchasing and bagging is done departmentally. During processing leaves are graded quality wise and are bundled into 5 kg bundle. Twelve such bundles of five kilograms each make a bag and 100 such bags form a lot. These lots are sold by O.F.D.C. Ltd through tender/auction sale.

3.7.2 COST OF EXPLOITATION

Cost of exploitation of various forest products are as follows:

Head of Service	Items	Cost
	Felling, logging and debarking of trees	Rs. 38/- to Rs.40/- per cft.
	Conversion of ballies	Rs. 14.75 per cum
	Passing of timber	Rs. 3/- per cum
	Dragging and stacking of timber in plain areas	Rs. 80/- per cum
	Dragging and stacking in hilly areas	Rs.150/- per cum
	Felling of hollow trees	Rs.1.50 to Rs.2.00 per foot girth
Production cost of Timber at site	Conversion and stacking of T.L.	Rs.1.50 per place
	Conversion and stacking bark	Rs.190/- per truck load of 14'x7'x11' (Specific approval of D.M. is required)
	Fire protection	Rs. 10/- per hect.
	Temporary camp shed	Rs.2500/- per camp
	Sundry expenditure (K.Oil, stationeries coupe Rija etc.)	Rs.5/- to Rs.6/- per Camp
	Camp watcher	Rs.25/- per day per camp
	Conventional expenditure	Rs.4/- per cum
	Construction and repairing of extraction path	Rs. 100/- to 110/- per day
	Spreading, re-measurement, dressing, numbering, stacking, U.D. salvaged materials during joint verification.	Rs.16/- per cum.
Production cost of Bamboo at site	Cutting, bundling and dragging	Rs.195/- per sale unit
	Construction and maintenance of extraction path	Rs. 62/- per sale unit
	Transport including loading and unloading	Rs. 125/- per sale unit
	Sabai string	Rs. 17/- per sale unit
	Construction and maintenance of camp shed	Rs. 5/- per sale unit
	Fire protection	Rs. 6/- per sale unit
	Cleaning of clumps	Rs. 2/- per sale unit
	Recruitment of labourers	Rs. 4/- per sale unit
	Contingent expenditure	Rs. 4/- per sale unit
Production cost of bamboo at Depot	Site preparation	Rs. 2/- per sale unit
	Rebundling stacking	Rs.10/- per sale unit
	Fire protection	Rs.1/- per sale unit
	Construction and maintenance of Depot shed	Rs.

	Insurance	Rs.6/- per sale unit
	Sabai string	Rs.7/- per sale unit
	Contingent expenditure	Rs.5/- per sale unit

Procurement price	For one K.G. of sal seed	Rs.1.75
	For one K.G. of mohua flower	Rs.3/-
	Remeasurement / numbering of logs including cost of paints	Rs.16/- per cum
	Stacking of round timber lot into sale lots	Rs.22/- per cum
	Stacking of ballies	Rs.19/- per cum
	Stacking other than above restacking	Rs.16/- per cum
	Passing and stacking of colliery DG and SD timber	Rs.19/- per lcum
Production cost of Timber at Depot	Cross cutting of lots	Rs.25/- on daily wage basis
	Sawing charges	Rs.per tender / actual
	Feeding to saw bench at Sambalpur	Rs.23/- per cum
	Feeding to saw bench at Rourkela	Rs.31/- per cum
	Stacking of sawn sizes	Rs.46/- per cum
	End cutting of sawn sizes	Rs.25/- on daily wage basis
	Spreading and passing of sleepers	Rs.13/- per cum
	Stacking of T.L sleepers	Rs.13/- per stack
	Weighment of fire wood	Weigh bridge rate where available @ per quintals
	Wagon loading(round and sawn timber)	Rs.400/- per
	Conventional expenditure	Rs.500/- per depot
Production cost of fire wood	Conversion and stacking of fire wood at conversion rate	Rs.63/- per stack (12' X 3' X 3')
	Stacking of fire wood at depot	Rs.63/- per stack (12' X 3' X 3')

(Source: O.F.D.C. Ltd)

The detailed schedule of rate of Sundargarh Division and outstanding royalty against O.F.D.C.Ltd and T.D.C.C.Ltd are given in **Annexure 26(Page 271 of volume II)..**

3.7.3 PAST REVENUE FROM FOREST PRODUCTS OF SUNDERGARH DIVISION ROYALTY / REVENUE

Sl. No.	Year	(Timber + Fire wood)	Bamboo	M.F.P. item	Total
(1)	(2)	(3)	(4)	(5)	(6)
2	79-80	N.A	Not worked	2,42,248.87	
3	80-81	39,13,965	Not worked	1,57,373.25	
4	81-82	11,27,221	N.A	2,62,213.76	
5	82-83	30,63,240	N.A	53,562.27	
6	83-84	24,62,120	N.A	12,90,198.80	
7	84-85	20,87,269	N.A	5,08,649.85	
8	85-86	20,11,958	N.A	25,51,865.00	
9	86-87	24,54,100	N.A	6,97,654.99	

10	87-88	24,39,500	N.A	6,70,285.75	
11	88-89	19,99,700	5,21,236	45,855.00	

12	89-90	18,43,000	7,26,084	65,400.00	
13	90-91	18,06,300	19,72,201	4,87,319.00	
14	91-92	3,24,600	8,96,985	5,99,982.00	
15	92-93	Not worked	4,15,022	59,067.00	
16	93-94	1,09,030	8,64,308	93,283.00	
17	94-95	Not worked	15,88,263	54,327.00	
18	95-96	Not worked	7,17,008	59,997.00	
19	96-97	29,38,722	6,27,332	1,13,708.00	
20	97-98	18,46,977	11,54,547	3,65,407.00	
21	98-99	21,47,500	14,62,618	2,68,486.00	
22	99-2000	N.A	Not worked	2,98,038.00	
23	00-01	N.A	Not worked	4,84,498.00	
24	01-02	N.A	Not worked	1,38,707.00	

(Source: D.F.O. Sundergarh)

3.8 LOGGING AND HARVESTING

Axe was the only equipment used for logging and debarking in this Division earlier. Bigger logs were converted into rough squarish sleepers inside the forest and dragged to the depot. The situation changed during working of corporation and saws were brought into use to reduce the wastage. At present logging is done by Saw. Use of power chain is not in practice. The principle of logging is to get the longest straight logs of 9-5', 6-7', 12-15', 18' or 22' or their combinations. These are based on the demand of timber for frame, window, doors, bodies of truck etc. The longer the length of the straight log more the price it fetches when they are transported to the depot. The use of power chain saw greatly reduces the time for cutting and wastage. Hence, the use of power chain saw is recommended for logging operation in future. It not only saves time and material but also reduces the cost of salvaging.

3.9 PRESENT STATUS OF INDUSTRIAL UTILIZATION

There is only one saw mill at Rourkela of Orissa Forest Development Corporation. The approximate capacity of the above saw mill is 8000 cubic feet per month. There is no other forest based industry in the division. The bamboo production of this division is very small and hardly meets the demand of local people. The quantum of other NTFP produced is not very high and it is sent out side for consumption in industries. The siali plates are made by local people in the rural area. The sal seeds are collected by TDCC and are taken outside the district for marketing. There is no other forest based industry in the division.

3.10 SCOPE OF INDUSTRIAL DEVELOPMENT

Manufacturing of Siali plate, ropes, brooms are some of cottage industries in this division. There is no major industry in this Division. Value addition to NTFP collected should be encouraged. There is plenty of forest produce in the division on which the sustainable forest

based industries can be established. The production of forest produce is to be considered as viable source to cater to the needs of the forest based industry like furniture industry and it should be encouraged and alternatives should be searched for the same. The list of average outturn of round timber per tree in cum worked out SWCS of Sundargarh Division is given in **Annexure 27 and 28(Page 271 & 272 of volume II)..** Collection of forest produce is given at **Annexure- 29(Page 272 of volume II).** . Status of saw mills and saw pits is given at **Annexure-30(Page 273 of volume II)..**

MINOR FOREST PRODUCE OF SUNDERGARH FOREST DIVISION

Sl. No.	Name of the items	1990-91	1991-92	1992-93	1993-94
(1)	(2)	(3)	(4)	(5)	(6)
1	Sal seeds	3.0855 MT	2502.435 MT	2001.514 MT	2633.075 MT
2	Tassar cocoons	K515.16.17	K.594.12.11	K.625.1.13	K.715.41.12
3	Mahua Flowers	98,946 Qtl	93,531.25 Qtl	53510 Qtl	70,950 Qtl
4	Mohua seeds	249.47 Qtl	117.26 „	27.896 „	248.72 „
5	Tamarind	4891.52 „	2228.33 „	601.77 „	85.17 „
6	Myrobalans	1966.56,,	2372.48 „	1486.00,,	-
7	Kusum seeds	151.45 „	85.80 „	38.999 MT	235.40 „
8	G u m	99.50,,	154.26 „	206.00 Qtl	304.20 „
9	Siali leaves	1959.00,,	2186.12 „	795.00 Qtl	1563.53 „
10	L a c	2.55,,	0.20 „	-	20.17 „
11	Dhatuki Flowers	50.00,,	6.82 „	-	210.75 „
12	Broom Grass	NA	540.00 „	1170.00 Qtl	1543.40 „
13	Char Seed	237.62,,	170.90 „	629.00 „	1.91 „
14	Karanja seeds	N.A	122.61 „	21.930 „	59.67 „
15	Chakunda	N.A	2171.27 „	24.145 „	352.90 „
16	Gilo	4.30,,	32.22 „	2.00 „	8.67 „
17	N e e m	N.A	N.A	0.440 MT	1.05 „
18	Palas	N.A	N.A	0.022 MT	-
19	Bantulsi	2205.91,,	331.90 „	4.500 MT	629.75 „
20	Mango Karna	6.40 „	8.70 „	0.060 MT	134.96 „
21	Lodha Bark	-	955.00 „	510.00 Qtl	746.76 „
22	Moida Bark	-	940.00 „	585.00 Qtl	1280.77 „
23	Phenphena Bark	-	22.10 „	N.A	203.40 „

Sleeper production in Sundergarh Division

YEAR	B.G.SLEEPER	M.G.SLEEPER	N.G.SLEEPER	SPL. SLEEPER	TOTAL
(1)	(2)	(3)	(4)	(5)	(6)
80-81	335	665	220	2145	3355
81-82	198	140	125	1925	2388
82-83	1010	630	525	992	3087
83-84	1199	635	-	366	2200
84-85	1740	2337	2000	1865	7942
85-86	1091	1130	-	1290	3511
86-87	750	550	112	2046	3458
87-88	-	-	-	3899	3899
88-89	-	-	-	-	-

89-90	-	-	-	6314	6314
90-91	-	-	-	638	638
Total	6323	6077	2982	21,410	36,792

PAST REVENUE FROM N.T.F.P. (1979-80 ONWARDS)

Year	Name of NTFP Item	Out turn	Royalty in Rs. (B)(V) MFP Divn. Office.
(1)	(2)	(3)	(4)
1979-80	-	-	2,42,248.87
1980-81	-	-	1,57,373.25
1981-82	-	-	2,62,213.76
1982-83	-	-	53,562.27
1983-84	-	-	12,90,198.80
1984-85	-	-	5,08,649.85
1985-86	-	-	25,51,865.00
1986-87	-	-	6,97,654.99
1987-88	-	-	6,70,285.75
1988-89	-	-	45,855.00
1989-90	-	-	65,400.00
1990-91	-	-	4,87,319.00
1991-92	-	-	5,99,982.00
1992-93	-	-	59,067.00
1993-94	-	-	93,283.00
1994-95	-	-	54,327.00
1995-96	-	-	59,997.00
1996-97	-	-	1,13,708.00
1997-98	-	-	3,65,407.00
1998-99	-	-	2,68,486.00
1999-00	-	-	2,98,038.00
2000-01	-	-	4,84,498.00
2001-02	-	-	1,38,707.00

PAST REVENUE FROM 79-80 TO 1990-91 ON MAJOR FOREST PRODUCE

Sl. No.	Year	Timber and firewood out turn (in cum.)	Royalty (in Rs.)	Bamboo out turn in S.U	Royalty (in Rs.)
(1)	(2)	(3)	(4)	(5)	(6)
1	1979-80	Not available	-	not worked	-
2	1980-81	do-	39,13,965	-do-	-
3	1981-82	do-	11,27,221	8,087.50	Not available
4	1982-83	do-	30,63,240	12,752.50	Not available
5	1983-84	do-	24,62,120	4,026.92	Not available
6	1984-85	do-	20,87,269	3,976.83	Not available
7	1985-86	do-	20,11,958	5,120.51	Not available
8	1986-87	do-	24,54,100	8,857.84	Not available
9	1987-88	do-	24,39,500	1,627.68	Not available
10	1988-89	do-	19,99,700	1,627.69	5,21,236
11	1989-90	do-	18,43,000	2,135.54	7,26,084
12	1990-91	(T) 406 cum	18,06,300	5,554.98	19,72,016
		(FW) 709 stack			

(Source: D.F.O. Sundergarh Division)

PAST REVENUE AND EXPENDITURE FROM 79-80 ONWARDS

YEAR	REVENUE	EXPENDITURE	EXPENDITURE
		TOTAL FIELD ESTT.	2406 FORESTRY & WILD LIFE(N.P)
(1)	(2)	(3)	(4)
1979-80	34,55,640.09	-	17,46,760.14
1980-81	39,96,167.47	14,15,014.80	17,41,435.04
1981-82	59,34,901.71	17,53,770.20	21,88,823.67
1982-83	44,46,772.51	24,75,328.77	28,22,465.27
1983-84	55,14,736.16	25,28,619.70	38,32,797.36
1984-85	55,36,042.76	24,63,991.91	28,68,509.70
1985-86	77,66,562.57	28,43,358.27	33,56,358.27
1986-87	59,39,886.76	30,16,811.70	38,05,051.68
1987-88	58,62,876.75	36,16,288.93	43,43,383.89
1988-89	39,10,269.33	37,73,081.68	03,02,264.60
1989-90	48,52,470.42	44,92,848.50	51,93,013.02
1990-91	36,17,214.15	46,43,461.26	54,32,571.04
1991-92	72,58,139.67	55,40,765.63	64,64,368.14
1992-93	39,02,532.12	73,49,302.00	90,11,050.32
1993-94	20,21,190.38	79,03,638.90	86,86,937.40
1994-95	13,63,866.75	80,75,145.44	02,23,888.50
1995-96	48,27,740.00	86,41,329.03	04,34,331.60
1996-97	24,66,799.37	98,05,317.80	1,16,20,315.32
1997-98	24,28,588.40	1,03,96,058.00	1,20,96,979.42
1998-99	24,05,679.60	1,19,86,392.10	02,62,203.50
1999-00	27,63,195.00	1,55,78,558.70	03,05,550.60
2000-01	45,80,481.00	1,53,29,754.74	1,63,84,505.46
2001-02	28,63,601.00	1,41,20,360.00	03,40,852.00
(Source: D.F.O. Sundergarh)			

Statement showing coupe-wise production of bamboo and royalty from 1991-92 to 2000-2001

Name of the Bamboo	Total production of		Total	Rate of	Total royalty charged
Coupe Worked by	Industrial Bamboo in		production in	royalty	against
OFDC Ltd	Full Bundles	Half Bundles	Sale Unit	Per S.U	OFDC Ltd. (4 x 5)

1991-92

(1)	(2)	(3)	(4)	(5)	(6)
Dhanubans BCA	29,477	8,250			
Garjanpahar BCA	31,383	20,066			
Jamkani BCA	23,844	13,214	2,411.25	372.00	8,96,985.00
Sarapgarh BCA	1,025	4,200			
Jamkani Addl.Area	8,837	3,867			
Grand Total	94,566	50,497	2,411.25	372.00	8,96,985.00

1992-93

Dhanubans BCB	27,855	11,878			

Garjanpahar BCB	519	762			
Sukhabandh BCB	1,363	804	1,064.16	390.00	4,15,022.00
Jamkani BCB	10,663	3,904			
Ostali DPF addl.area	1,732	1,990			
Hundarkhol addl area	550	1,058			
Grand Total	42,682	20,396	1,064.16	390.00	4,15,022.00

1993-94

Daghora BCC	11,439	5,583			
Garjanpahar BCC	15,558	6,835	1,878.93	460.00	8,64,308.00
Dhanubans BCC	52,874	14,566			
Grand Total	79,871	26,944	1,878.93	460.00	8,64,308.00

1994-95

Dagora BCD	1,03,458	23,158			
Garjanpahar BCD	32,406	11,129	3,288.33	483.00	15,88,263.00
Dhanubans BCD	6,533	2,334			
Jamkani addl.area	2,178	1,020			
Grand Total	1,44,575	37,641	3,288.33	483.00	15,88,263.00

1995-96

Dhanubans BCA	14,424	1,650			
Garjanpahar BCA	29,833	8,223	1,347.76	532.00	7,17,008.00
Jamkani BCA	12,936	9,680			
Grand Total	57,193	19,553	1,347.76	532.00	7,17,008.00

1996-97

Dhanubans BCB	20,404	5,228			
Garjanpahar BCB	19,582	5,333	1,122.24	559.00	6,27,332.00
Jamkani BCB	7,240	3,688			
Ostali BCB	1,000	826			
Grand Total	48,226	15,075	1,122.24	559.00	6,27,332.00

1997-98

Daghora BCC	8,149	3,567			
Garjanpahar BCC	23,664	8,433	1,966.86	587.00	11,54,547.00
Dhanubans BCC	54,235	11,369			
Grand Total	86,048	23,369	1,966.86	587.00	11,54,547.00

1998-99

Daghora BCD	73,073	11,192			
Garjanpahar BCD	29,896	5,398	2,374.38	616.00	14,62,618.00

	Name of the lease holder	Name of the MFP	Potentiality in MT	Quantity Produced in MT 1998-99	Quantity sold	Royalty due for the year	Royalty realized	Balance royalty for the year to be realized	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	M/s. ST & SCs Ltd Bhubaneswar	Tassar cocoons	800K	505.03.12K	505.03.12K	61,108.00 Provisional royalty	55,324.00	5,784.00	
2	OFDC Ltd.	Sal seed	340 MT	259.065 MT	259.065 MT	51,813.00	51,813.00	-	
3	TDCC Ltd.	Lac Tamarind Myrobolans Broom grass Siali leaves Honey Char gum	 300 MT 300 MT 100 MT 300 MT 5 MT 30 MT	 2.55 MT 12.545 MT 5.8 MT 26.70 MT - 1.218 MT	 2.55MT 12.545 MT 5.8 MT 26.70 MT - 1.218 MT	 3,867.00 20,691.00 11,495.00 42,593.00 1,96,625.00 7,000.00 23,480.00 3,05,751.00	 NIL	 3,05,751.00	
4	Rorukela KL	Siali fibres	20 MT	-	-	20,320.00	NIL	20,320.00	Provisional royalty
5	P.K. Agarwala, Bisra	Siali leaves	300 MT	344.90 MT	344.90 MT	1,96,625.00	1,96,625.00	-	-do-
6	Sawarmal Gododia Rajgangapur	Char gum	30 MT	17.5 MT	17.5 MT	6000.00	6000.00	-	-do-
7	S.S. Kerhari, JSG	Broom grass	100 MT	46.4 MT	46.4 MT	12,000.00	12,000.00	-	-do-
8	Excise License holder	Mohua flowers	5000 MT	3,535.0MT	963.3 MT	3,23,500.00	3,23,500.00	-	-do-
9	M/s Priti Oils, Sambalpur	Mango kernel	100 MT	-	As per export permit	-	-	-	-do-
Dhanubans BCD			5,889	1,658					
Grand Total			1,08,858	18,248	2,374.38	616.00	14,62,618.00		

The validity of the working plan was up to 31.03.1999. The validity was extended up to 30.06.2001 by Govt. of India M.O.E.F., Bhubaneswar vide No.13-FCWP-OS-SUNDERGARH dt.13.04.2000 received during May 2000. Hence, the coupes could not be worked due to shortage of time and non fulfillment of condition No.5 of the Govt. order in time.

2000-2001

As per decision of the Empowered committee dt.06.01.2001 the O.F.D.C.Ltd was authorized to work bamboo coupes to produce commercial bamboo only during 2000-2001. The O.F.D.C.Ltd were intimated vide letter No.1939/ Dated 08.11.2000 about non-availability of commercial bamboo in Division. Hence, the coupes remained un- worked during 2000-2001.

(Source: D.F.O. Sundergarh)

Quantity of Forest Produce sold and royalty realised from 90-91 to 98-99

		1990-	91	1991-	92	1992-	93	1993-	94	1994-	95	1995-	96	1996-	97	1997-	98	1998-	99	
Sl. No.		Product.	Royalty	Product.	Royalty	product.	Royalty	product.	Royalty	product.	Royalty	product.	Royalty	product.	Royalty	product.	Royalty	product.	Royalty	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
1	Timber			406 cum		107		289 cum		352 cum	-	345 cum	-	583 cum		205 cum		433 cum		
2	FW			709 st		792st		652st		120 st	-	425 st	-	726 st	2938722	672 st	1846977	559 st		
3	Bamboo	5553 su	1971201	2411su	896985	1064 MT	415022	1878 su	864308	3288 su	1588263	1347 su	717008	1122 su	627332	1966 su	1154547	2374 su	1462618	
4	Sal seed	3 MT	1626	2502 MT	5207843	2001 MT	4165371	2633 MT	5479719	238 MT	496801	1615 MT	192662	435 MT	180000	259 MT	51813	-		
5	Tassar	515k	4275	594k	4703	625k	5180	715k	5700	736 k	6270	106k	6900	-	7590	688k	8350	452k		
6	Mohua flower	5456 MT	401016	9894 MT	727209	5660 MT	416010	7095 MT	521480	5672 MT	416892	2296 MT	168756	4083 MT	300100	2928 MT	218200	3535 MT	323500	
7	Tamarind	489 MT	17100	222 MT	17100	60 MT	17100	8 MT	17100	-	18810	58 MT	3097	2 MT	3097	-	20691	-		
8	Myrobalan	196 MT	9500	237 MT	9500	148 MT	9500	-	9500	52 MT	10450	26 MT	10450	42 MT	10450	-	11495	Do		
9	Gum	9 MT	21345	16 MT	21345	20 MT	21345	30 MT	21345	14 MT	23480	-	23480	0.4 MT	23480	no sale	-	unsold		
10	Siali leaves	195 MT	90000	218 MT	90000	79 MT	258500	156 MT	258500	82 MT	284350	61 MT	162500	207 MT	162500	215 MT	162500	307 MT		
11	Lac	0.2 MT	3195	0.2 MT	3195	-	3195	2 MT	3195	1 MT	3515	1.2 MT	3515	1 MT	3515	0.5 MT	3867	unsold		
12	Dhatki flower	5 MT	-	0.6 MT	-	31 MT	-	23 MT	-	28 MT	-	9.6 MT	-	-	-	-	-	Do		
13	Broom grass	7.5 MT	35201	54 MT	35201	117 MT	35201	154 MT	35201	115 MT	38721	136 MT	38721	84 MT	38721	-	42593	79 MT		
14	Siali fibres	11 MT	-	-	-	10 MT	-	10 MT	-	19 MT		-		-		-		-		
15	Baghnakhi			0.1 MT				-		-		-		-		-		do		
16	Mahua seed	24 MT	centrally	11 MT	centrally	28 MT		15 MT		57 MT		41.4 MT		1.2 MT		3.6 MT		do		
17	Karanj seed	-	paid in	12 MT	paid	22 MT		3 MT		6 MT		0.4 MT	centrally	0.2 MT		0.4 MT		do		
18	Kusum seed	15 MT	0/0 the	122 MT		39 MT	centrally	3 MT	centrally	2 MT	centrally	1 MT	paid	1 MT	centrally	10.4 MT	centrally	do		
19	Palas seed	-	PCCF	0.1 MT		0.2 MT	paid	-	paid	0.1 MT	paid	0.1 MT		-	paid		paid	do		
20	Char seed	23 MT	Orissa	17 MT		0.6 MT		0.1 MT				-		-				do		
21	Gaba	-		-		-		-				-		0.2 MT				do		
22	Indrajob	0.1 MT		0.1 MT		-		0.3 MT				-		-				do		
23	Chakunda	-		217 MT		24 MT		35 MT		16 MT		-		28 MT				do		
24	Mango kernel	0.6 MT														135.1 MT		do		

(Source: D.F.O. Sundergarh)

PART-I

Chapter-IV

STAFF AND LABOUR SUPPLY

4.1 STAFF AND ORGANISATIONAL STRUCTURE

Sundergarh Division was created on 01.04.1958 with merger of forests of Hemgir, Nagra and Hatibari Ex-zamindary State with Gangpur State. The incumbency chart of D.F.Os in charge of this Division is as follows.

Sl. No.	Name of the Officer	Form	To
1	Sri B.Das, IFS	01.04.1958	31.03.1959
2	Sri S.B. Das, IFS	01.04.1959	27.04.1961
3	Sri J. Mishra, ACF	28.04.1961	14.05.1961
4	Sri S.B. Das, IFS	15.05.1961	28.06.1962
5	Sri J. Mishra, ACF	29.06.1962	08.07.1962
6	Sri T. Ratha, IFS	09.07.1962	30.11.1963
7	Sri S.N. Pati, IFS	01.12.1963	05.01.1964
8	Sri P. Pradhan, ACF	06.01.1964	16.01.1964
9	Sri M.P. Das, IFS	17.01.1964	08.08.1965
10	Sri P.C Mahapatra, IFS	09.08.1965	12.07.1976
11	Sri B. Mahapatra, IFS	13.07.1967	04.04.1968
12	Sri L.K Jagdev, IFS	05.04.1968	22.05.1968
13	Sri J. Patel, IFS	23.05.1968	17.08.1971
14	Sri S.N Pati, IFS	18.08.1971	21.07.1974
15	Sri S.S Panigrahi, IFS	22.07.1974	26.08.1975
16	Sri H.K Patnaik, IFS	27.08.1975	26.10.1975
17	Sri M.N Mitra, IFS	27.10.1975	02.07.1978
18	Sri P.K Thakur ACF	03.07.1978	04.07.1978
19	Sri A. Pradhan, IFS	05.07.1978	07.07.1981
20	Sri S.N. Pati, IFS	08.07.1981	27.11.1982
21	Sri P.K Thakur, ACF	28.11.1982	27.02.1983
22	Sri P.N. Padhi, IFS	28.02.1983	04.12.1984
23	Sri B.P Singh, IFS	05.12.1984	09.05.1987
24	Sri A Chitranshi, IFS	10.05.1987	12.06.1987
25	Sri B.P Singh, IFS	12.06.1987	19.07.1987
26	Sri J.P Singh, IFS	20.07.1987	28.04.1989
27	Sri M Satyanarayan, IFS	28.04.1989	25.07.1991
28	Sri D.K Pradhan, ACF	26.07.1991	05.08.1991
29	Sri P Behera, IFS	06.08.1991	05.11.1993

30	Sri S.C Swain, IFS	06.11.1993	10.11.1997

31	Sri H.S Upadhyay, IFS	11.11.1997	04.06.2000
32	Sri A.O.F Bakhla, IFS	05.06.2000	06.07.2000
33	Sri A.C Dinakar, IFS	07.07.2000	11.10.2002
34	Dr K.Murugeson, IFS	12.10.2002	04.10.2006
35	Sri B.N. Thakur, OFS-I	04.10.2006	11.05.2012
36	Sri Arjun Behera, OFS -A (Sr.B)	11.05.2012	Conyinuing

This Division is headed by a Deputy Conservator of forests under the administrative control of Regional Conservator of Forests, Rourkela Circle. There are six ranges in this Division under the charge of a Forest Ranger each. Sundargarh Division has been divided into two divisions with effect from 01.10.2003 due to reorganization of Forest Department. Out of seven ranges, Gopalpur Range, Hemgir Range, Ujalpur Range and Sundargarh Ranges have been included in Sundargarh Division whereas Rajgangpur Range (part), Kuarnmunda Range and Bisra Range have been included in Rourkela Division. The details of section, beat and other details after reorganization are given in **Annexure 31 to 36 (Page 273 to 284 of volume II)**. As per cadre strength the executive and office establishment of this Division as on 1.04.2014 is as follows:

Type of Establishment	Cadre	Cadre strength
(1)	(2)	(3)
Executive	D.F.O.	1
	A.C.F.	2
	Forest Rangers.	8
	Dy. Ranger	2
	Foresters	42
	Forest Guards	130
	FEO	2
	Head Clerk	1
Ministerial	Accountant	2
	Stenographer	1
	Sr. Clerk	6
	Jr. Clerk	9
	Choukidar	2
	Dak Runner	1
	Mali	2
	Driver	2
	Amin	1
	Chainman	1

	Office peon	1
	Sweeper	1

The detailed statement showing the distribution of section and beats in different Ranges is given below in a tabular form.

Sl. No.	Name of Range	Name of Section	Name of Beat
(1)	(2)	(3)	(4)
1	Sundargarh	Sundargarh	(1) Sundargarh
			(2) Podajalanga
			(3) Baladmal
			(4) Kirei
		Jamtalia	(1) Deoli
			(2) Bhedabahal
			(3) Baragad
			(4) Jamtalia
		Subdega	(1) Subdega
			(2) Karamdihi
			(3) Dumerbahal
			(4) Ban Sikar
			(5) Kiralaga
			(6) Karamdihi C/G
		Rouldega	(1) Rouldega
			(2) Kanheighara
			(3) Hutu Pani
			(4) Rengali
			(5) Balisankara
			(6) Bhandarisankara
			(7) Tilia
			(8) Dhudinuagaon
		Salepali	(1) Amasaranga
			(2) Salepali
			(3) Aunlajore
			(4) Ghumunda
			(5) Salangabud
2	Gopalpur	Gopalpur	(1) Gopalpur
			(2) Tikilipara
			(3) Goddwar
			(4) Garjanbahal
			(5) Sarangijhria
		Duduka	(1) Duduka
			(2) Manoharpur
			(3) Laikera
			(4) Saraikela
		Topria	(1) Topria
			(2) Jamjharia
			(3) Kuchedega
			(4) Chhatbar
		Tiuria	(1) Tiuria

			(2) Bhograkachhar
			(3) Jamkani
			(4) Sumura

3	Hemgir	Hemgir	(1) Hemgir
			(2) Ostali
			(3) Arjuna
		Kodbahal	(1) Kodbahal
			(2) Kendudihi
			(3) Jhulenbar
		Kanika	(1) Kanika
			(2) Burta
			(3) Tngardihi
			(4) Ratakhendi
			(5) Kanaktura
		Daghora	(1) Daghora
			(2) Purna
			(3) Lipospali
			(4) Kathubahal
			(5) Lambaibahal
			(6) Beheramunda
		Rohini	(1) Rohini
			(2) Kaodarah
			(3) Keserjhima
			(4) Kanika C/G
4	Bargaon	Bargaon	(1) Tiklipara
			(2) Runuga
			(3) Salepali
		Itma	(1) Itma
			(2) Jarangloi
			(3) Sankaraposh
			(4) Patuabeda
		Tudalaga	(1) Tudalaga
			(2) Latalaga
			(3) Kadopada
			(4) Kusumdegi
			(5) Kutra
		Panchara	(1) Panchara
			(2) Kalija Pathar
			(3) Nuagaon
			(4) Gairbahal
			(5) Khatkurbahal
			(6) Geleibahal
5	Lephipara	Lephipara	(1) Lephipara
			(2) Didigajharan
			(3) Deoli
			(4) Chhatenpali
			(5) Badhunjharia
		Gundiadihi	(1) Gundiadihi
			(2) Halma
			(3) Dhangergudi
			(4) Dhamakpur
			(5) Bailama
		Dumabahal	(1) Dumabahal
			(2) Rajbahal
			(3) Sarapgarh
6	Ujalpur	Ujalpur	(1) Ujalpur
			(2) Tasaladihi
			(3) Turungagarh

			(4) Gambharidihi
			(5) Rupabahal

	Ujalpur	Kinjirkela	(1) Kinjirkela
			(2) Brahmanmara
			(3) Birkaldihi
			(4) Khamarimunda
			(5) Kusumura
		Nuadihi	(1) Nuadihi
			(2) Raidihi
			(3) Gultha
			(4) Sargipali
			(5) Diamunda
			(6) Badbanga
		San Patrapali	(1) San Patrapali
			(2) Balijori
			(3) Rajpur
			(4) Bankibahal

4.2 LABOUR SUPPLY

4.2.1 Unskilled labourers are available throughout the year except during cultivation period and harvesting seasons when there is shortage of labor for forestry operations. However, in the interior forest blocks, especially towards Gundiadihi there is shortage of labourers due to low population density. Large numbers of unskilled labourers are being engaged in various mining operations in different ranges still there is no dearth of unskilled labourers for various forestry operations. Large number of Kolha and Santhals from Bihar work in the mining areas while the local labourers prefer forestry work.

4.2.2 Skilled labourers such as masons, carpenters, technicians etc., are available in limited numbers around Sundargarh and Rourkela. Their number is less in interior areas. In such areas, they are procured from the nearby towns. In general, in most of the areas, higher wages are to be paid to skilled labourers for inducing them to forest work and even with higher wages they are not always willing or available.

4.2.3 WAGE RATE

Wages have gone up enormously during last few years and keep on changing from time to time. The Govt. prescribed wage rates prevalent at different periods in this Division are given in table. The wage rate for skilled and unskilled labour as fixed by Govt. of Orissa, Labor Department vide Notification No 8536-LL-I(AR)-2/12/LESI. Dated the 6th October, 2012. Revised minimum wage rate is furnished below.

Unskilled	: Rs. 150.00
Semi -skilled	: Rs. 170.00
Skilled	: Rs. 190.00
Highly skilled	: Rs. 205.00

Govt. has fixed the minimum wage rate to prevent exploitation. The minimum wage rate is revised from time to time keeping in view rise in price and higher cost of living. The people of this district are aware that they get minimum wage rate fixed by the Govt. The minimum wage rate fixed by the Govt. is given in the table.

MINIMUM WAGES (Rs/day) in current prices: 1969 – 2000

UN- SKILLED LABOUR

Type of labour	1969	1974	1984	1986	1989	1990	1996	1998	2000
Male Mulia	2.00	4.00	7.50	-	11.00	25.00	30.00	32.50	40.00
Female Mulia	1.50	4.00	7.50	-	11.00	25.00	30.00	32.50	40.00
Mate	-	5.00	9.00	-	12.75	25.00	-	-	-
Peon	-	-	-	10.00	11.00	-	-	-	-
Sweeper	-	-	-	10.00	11.00	-	-	-	-
Mali	-	-	-	10.00	11.00	-	-	-	-
Chowkidar	-	-	-	10.00	11.00	-	-	-	-
Cleaner	-	-	-	10.00	11.00	-	-	-	-
Majdoor	-	-	-	10.00	11.00	-	-	-	-
Watcher	-	-	-	10.00	11.00	-	-	-	-

SEMI – SKILLED

Thatcher	-	5.00	-	-	-	30.00	-	32.50	48.00
Painter	-	7.00	-	-	-	-	36.00	38.50	48.00
Polisher	-	7.00	-	-	-	-	36.00	38.50	48.00
Cutter	-	-	12.00	-	-	-	-	-	-
Mistry	-	-	12.00	-	-	-	-	-	-
Mahajur	-	-	-	-	12.75	-	-	-	-
Plumber	-	-	-	-	12.75	35.00	36.00	38.50	48.00
Blacksmith	-	7.00	-	-	16.00	35.00	-	-	-
Helper/ Carpenter	-	5.00	-	-	12.75	25.00	36.00	38.50	48.00
Helper/ Fitter	-	-	-	-	-	25.00	36.00	38.50	48.00

The wage rates change frequently and financial implications shall be changed according to prevailing wage rates.

PART-I

Chapter-V

PAST SYSTEM OF MANAGEMENT

5.1 GENERAL HISTORY OF THE FOREST

5.1.1 1883-90

Construction of Bengal-Nagpur Railway line was started in 1883 for which there was demand for railway sleepers. An Inspector was appointed for supply of sleepers to contractors on realization of royalty. Trees felled for conversion of sleepers were not being marked. The forests were regarded as the property of Maharaja and timber assumed importance as source of revenue. The Zamindars put forward their claim of forest rights in their estates. This was granted by Mr. Howett, the Divisional Commissioner at Ranchi. The khalsa portion of the estate was left to the Maharaja and Zamindars were recognized with full forest rights within their own areas.

5.1.2 1890-1900

This state of affair which was prevailing during 1883-90 continued till the promulgation of Gangapur State Forest Act of 1945. As per provisions of the said act the management of Zamindar forest was placed under the control of the Durbar for granting right to revenue. Some attempts were made to regularize the operation of contractors. Regular leases were granted by the Maharaja for a period of about 10 year on specified terms. There was little or no provision for proper management of forest by limiting the number of trees to be removed. Sal trees were tapped for resin. In 1908 Sri R.B. Bohidar, the then Secretary to Maharaja made an effort to organize forest department by appointing two Range Officers on payment of salary @ Rs 30 per month and 13 Forest Guards on payment of salary @ Rs.8/- per month.

5.1.3 1900 –1910

In 1909 Sri Kasiram Das, a Dehra Dun trained Ranger was appointed but he did not stay longer and the department was again placed in charge of Sri Bohidar who was the then Tahasildar. In 1911 Sri S.N. Khanna was appointed in charge of the Department, which he held till his retirement in 1937.

5.1.4 1911-1924

It is from this year that the history of forest management in Gangapur Khalsa commenced. Separate arrangements were made for administration of forest in Zamindaries. Till 1910 there was no systematic forest management and the revenue was obtained from the nistar cess and a small sum was realized from villagers as royalty for wood used by them for house construction.

The land revenue settlement started (Connolly's settlement) and several blocks were declared as reserved forests, which were reserved previously by the Maharaja. Many other forests were also reserved. These forests were demarcated by the forest officers and for a decade the forest staffs were engaged in this job without paying attention towards exploitation of trees. The policy followed by Mr. A. N. Grieve, the then Agency forest officer of Orissa feudatory State, was to provide closure to the forests, which were over exploited over the years. The policy was sound. To rehabilitate the forests was the primary need and for a quarter century strict restraint was put for exploitation of forests. It was a period when very sound policy for forest protection was framed. In 1920, a set of forest rules were framed by Mr. G. M. Cooper, the then Agency Forest Officer. The first working plan was prepared by Sri S. N. Khanna under the guidance of Mr. H. F. Mooney, IFS. The plan period was for a short period and it did not bring any significant change in the existing forest management practices.

The first working plan was preliminary in nature with 3 working circles, i.e., (1) the High forest working circle (2) the Coppice working circle and (3) the Miscellaneous working circle. Its prescriptions were very simple because the forests were in most irregular condition and had not recovered from previous maltreatment even after 25 years. It was necessary by that time to introduce some sort of order in the management of the forest.

5.1.5 The 1925 Working Plan

The plan was prepared for a period of ten years but its prescriptions were extended from time to time by the order of darbar because of lack of time and staff to revise the plan. Then the Second World War came in the way and staff was busy in meeting the demands of war.

High Forest Working Circle

The high forest working circle covered an area of 82,411 acres and comprised of six felling series, i.e., Chhatamb, Panchora, Lamti-banglaphad, Kiralaga, Rungaon and Athkasia. The system prescribed was selection combined with improvement felling on a 20 years felling cycle. On the whole result of the working circle was satisfactory as the young crops gradually came up with sal. The system of clear felling gave better results than the selection system. It gave good financial returns. There were a few blocks in khalsa, where only possible system was selection owing to inaccessibility and poor and open nature of crop.

COPPICE WORKING CIRCLE

There were six felling series. This number was increased by two in 1935 by the inclusion of Panchora and part of Chhatam and a further one in 1939 by the inclusion of Datni RF. The coppice felling gave good results. The new crop was very promising and was said to be better than the previous ones. The thinning which was prescribed to follow and the main

fellings in the 10th or 11th year were neglected and were done only during the war period i.e. 1942-1945.

5.1.6 HEMGIR EX-ZAMINDARY AREA

The Dhanuars and the Pabias constitute aboriginal class, who used to practice shifting cultivation in the past. As a result of repeated cutting, grazing and burning the soil condition deteriorated with development of an open bamboo forest. Prior to 1913, there was no sign of forest conservation in the estate although some rules were framed by government for disposal of forest produce during the regime of the then Jamindar Chandan Singh. Before introduction of these rules the local people used to get their requirements from any forest on payment of Rs.5.00 per plough. The outsiders were permitted to remove and export as much timber as they wanted on payment of three mounds of rice to the Jamindar. The Dhanuars and Pabias were allowed to practice shifting cultivation on payment of Rs.12.00 per acre but no limit was put to the area that they utilized for shifting cultivation. At that time it was practiced with the idea that forest is the inexhaustible resource and this gift of nature will continue to retain its productivity in perpetuity. The selection and demarcation of the reserved forests were taken up at the close of the settlement in 1910. Progress in pillar erection and survey work was very slow. The visit of Agency forest officer, Mr. Grieve in 1913 geared up the work and it was completed in 1944.

Little work seems to have been done in the forest prior to the opening of the sleeper operation by M/S Bengal Trading Company in 1893. There was no provision in the lease as regards to proper working of the forest and on economic conversion of timber. No limit was fixed on the number of trees to be felled in one year or during the period of contract. This type of work continued for 15 years and the forests were stripped of all sound trees over 3 feet girth. The forests of the estate were inspected by Mr. Grieve, the first Agency forest officer in 1930. In his inspection report he felt sorry for the over exploited condition of the forest and recommended for a policy of self denial with a view to build up the depleted growing stock. He advocated a policy of strict prohibition of felling of all green trees. He drew up a scheme for cutting of bamboos on three year cutting cycle.

When Dr. Mooney visited the forests in 1923, he appreciated the policy of Mr. Grieve because considerable improvement had taken place in stocking and condition of

regeneration has improved. By this time bamboos were being extracted only from the forests lying closer to the railway station on payment of royalty.

COPPICE SYSTEM AND ITS RESULTS

In 1931 Mr. Heart drew up a scheme for working of forest lying south of the railway line prescribing coppice system on a rotation of 40 years. Four coppice felling series were formed in 1933 and the work commenced. At this stage such low rotation was not desirable. In those days there must not have been such heavy demand for medium sized timber and poles when the forest was capable of producing big size timber.

BAMBOO WORKING

A three years lease for extraction of bamboos was granted to one Sarangi of Chakradharpur in 1936 on payment of prescribed rates of royalty. Sarangi's lease expired in 1941 and the T.S.T Co. of Chakradharpur was granted a 12 years lease for the exploitation of bamboo on prescribed terms. In 1940 on the advice of Dr. H. F. Mooney, a few felling series were added to Bamboo Working Circle to include forest lying north of Garjanpahar Block. The cutting cycle was increased to four years.

EXPLOITATION OF MFP

Kendu leaves were leased out in favour of Shri Abudul Rehman Hamid on payment of Rs. 10,000/- per annum to estate for a period of 5 years which expired in 1947. Among the minor forest produce harida, mahua seeds and char seeds were leased out to the same contractor on annual payment of Rs.10,000/- for a period of three years from 1943 onwards. Khair was auctioned at about Rs.400/- per annum. Since 1940 extra felling were done to meet the urgent demand of war but the supplies were made chiefly from Khesra forests. The timber felled from the reserved forests for this purpose constituted a negligible portion.

The advice of the Agency forest officer was followed in the management of the forest and as a result of which, the estate possessed a valuable property of 145 square miles of sal and bamboo forests. There was a progressive increase in the revenue since 1913 to 1944. The forest was worked under a working scheme drawn by Mr. Hart and Mr. Moony in their inspection notes.

1. The coppice-working circle (overlapping)
2. The bamboos working circle (part overlapping)

PRESCRIPTION OF COPPICE WORKING CIRCLE

Each felling series was divided into 40 annual coupes of approximately equal area, where four felling series were constituted with 40 years rotation. Chitkikhadu, Rohini, Budulakhaman, Dheknapani and Singaribahal Blocks were allotted to this working circle.

RESULTS OF PRESCRIPTIONS

The constitution and working of the coppice coupes immediately provided a great financial gain. The clear felling of all tree growth gave a new life to the bamboo clumps through sudden admission of light and severe reduction of root competition. Bamboo growth increased at places and the growth of the coppice shoots was seriously impeded. In order to eliminate this evil, cleaning operations were prescribed in the next plan for 2 to 3 years successively after the clear felling. These operations involved climber cutting and removal of bamboo clumps which were suppressing the valuable coppice shoots. But thinning was neglected. In order to increase the value of crop, the successional relationship between these two species should have been maintained. Manipulation of the canopy appears to be the only method for keeping the bamboos in the present sub-climax stage and this was not provided in this plan. The felling of clumps on thinning basis gave best results and resulted in the production of maximum number of new culms.

NAGARA AND HATIBARI AREA

Majority of the existing reserved forests were demarcated and reserved between 1905 to 1910. Nothing was done to introduce systematic management until 1922 when two to three coupes were opened. Prior to that some felling were done but there is no record available to that effect. In 1927, the first Working Plan was written. By that time there were hardly big trees over 16 feet d. b. h available throughout Nagara and Hatibari areas, which could be ascribed to two reasons. The first was destructive method of shifting cultivation practiced by the villagers owing to the fact that such lands were not assessed for rent and over exploitation of forests undertaken by the M/s Nagra Timber Trading Co. (subsequently Bengal Timber Trading Co. Ltd.) for sleeper supply. Not many restrictions were imposed on the company and probably no control was exercised by the estate. No attempt was made to regulate the yield or to restrict the size of trees, which were felled.

The first lease of the company was in 1893 for seven years. The royalty for B.G. sleeper was six annas per sleeper during that period. The lease was extended up to 1920. The rate paid during these two decades being only eight annas per B.G. sleeper. From 1908-1917, sleepers were not converted but only dry logs were extracted. In 1917, and for two to three years afterwards, sleepers of Asan, Jamun, Kurum and Arjun were exported. When Dr. H. F.

Mooney visited South Chirobeda forest in January, 1924, sleepers were still being extracted but the company work was stopped in that year or soon after.

WORKING PLAN BY DR. H. F. MOONEY

1927 PRESCRIPTION

In 1927 a simple Working Plan was prepared by Dr. H.F. Mooney which included the forests of Nagra area, but the forests of Hatibari area were not supervised at that time. The prescriptions were coppice with standard in 30 blocks constituting 22 felling series, improvement felling in South Chirobeda, closure in Bhainsamunda, Ergeda, Santoshpur and Bandomunda for the period of the plan and systematic working of bamboos in North and South Chirobeda Block on a three years cutting cycle. Other prescriptions were provided for thinning, control of grazing, fire protection and climber cutting. The prescriptions were simple as far as possible due to the shortage of trained staff those days.

RESULTS OF PRESCRIPTIONS

The condition of the forest improved. Regular coppice shoots, excellent standard young crop in coppice coupes due for thinning further improved their quality adding considerably to the annual yield. Due to improvement felling in South Chirobeda, whole of old over mature stock was removed which left the forest in a more healthy condition. Of course some over felling took place in that Block to meet the war demand which was paramount and almost all forests in the country suffered from that. The condition of crops was still immature when climber cutting was carried out satisfactorily in Bhainsamunda. During war period trees of other species and not Sal were supplied to meet the heavy demand. The revenue increased due to more intensive method of working introduced in 1927. Remarkable price was obtained due to all round increase in price of all commodities during the war period. There was a steady increase in coppice coupes prices.

FIRE PROTECTION

Due to Kendu leaves trade, the forests were subjected to annual and repeated burning in dry seasons. Due to repeated fire, the establishment of seedling was retarded and the forest turned towards xerophytic condition usually due to production of more hardy species. In order to check this menace, regular fire fighting equipment with staff is required to be maintained.

PLANTATION

Under various schemes plantations had been raised both by the territorial and afforestation divisions. But the plantation had been raised by afforestation division outside the R.F. Afforestation division had done fencing and other cultural operations in certain areas.

5.1.7 WORKING PLANS BY SRI A.B. LAL (1945-46 to 1964-65)

Sri A.B. Lal prepared the first working plan for the period from 1945-46 to 1964-65. Five working circles were constituted the namely the selection Working Circle, the coppice Working Circle, the Bamboo Working Circle, the Nistar Working Circle and the Protection Working Circle.

5.1.8 D.S. PATTNAIK PLAN (1979-80 TO 1998-99)

This plan expired during March 99 and it was extended up to 30.6.01. The following Working Circles had been constituted in the said plan.

1. The Sal conversion Working circle.
2. The Selection cum improvement working circle.
3. The Coppice with reserve working circle.
4. The Bamboo over lapping Working circle.
5. The Soft wood over lapping Working circle.
6. The Plantation Working Circle.
7. The Rehabilitation Working Circle.
8. The Re-creation Working Circle.

1. The Sal Conversion Working Circle

Forest blocks covered under this working circle are under jurisdiction of Rourkela division. Results have been discussed in Rourkela plan.

2. The Selection cum improvement working circle

Selection coupes working of forest blocks were done up to 1991. Then ban on tree felling was imposed by Govt. Improvement aspect was very much neglected and it created gaps at many places. Total area allotted to this working plan circle was 38849 ha and total nos of filling series were 11 nos. Details of selection coupes worked during 1979-80 to 1991-92 is given below.

WORKING OF SELECTION COUPES AS PER LAST SUNDARGARH W.P.					
Year	Nos of coupes due for working	Total area in ha.	Nos of Coupes worked out	Total coupe area worked out.	Amt of Royalty obtained(Rs.)
1	2	3	4	5	6
1979-80	11	1631.288	9	1077.5	424300
1980-81	11	1768.07	8	1447.5	449500

1981-82	11	1696.037	8	1337.08	845500
1982-83	11	1668.114	8	1340.723	479640
1983-84	11	1972.438	9	1683.087	591100
1984-85	11	1876.93	7	1580.3	370400
1985-86	11	1730.436	8	1526.88	1300960
1986-87	11	1579.893	7	1164.86	698900
1987-88	11	1900	7	1449.584	950600
1988-89	11	1791.33	3	702.939	684100

1989-90	11	2006.836	4	1048.54	275800
1990-91	11	1892.31	4	906.76	573800
1991-92	11	1700.084	2	596.911	170400
Total	143	23213.766	84	15862.664	7815000

Due to rapid industrial growth in and around Jharsuguda and in neighbouring Raigarh (Chhatishgarh), heavy illicit took place in the forest blocks. Many permanent gaps have been created. Forest blocks kept under selection working circle except few blocks like Garjanpahad, Chhengapahad, Dhanubans have been degraded. Most degraded forest blocks which were kept in this w.c. are Kukuda compt., Jorajam, Dhobadoli, Bhudajh aran, Bardergichi, Kodapani, Mahabir

3. The Coppice with Reserve Working Circle

The coppice coupes worked out during the plan period is given below in atabular statement. 71 Forest blocks were kept in this w.c. and 52 filling series formul.

WORKING OF COPPICE COUPES (1979-80 to 1991-92).					
Year	Nos of coupes due for working	Total area in ha.	Nos of Coupes worked out	Total coupe area worked out.	Amt of Royalty obtained(Rs.)
1	2	3	4	5	6
1979-80	52	1378.394	27	917.844	852100
1980-81	52	1383.558	7	363.006	269200
1981-82	52	1352.45	27	991.362	1244700
1982-83	52	1312.145	25	907.311	1205090
1983-84	52	1323.69	21	833.898	1025400
1984-85	52	1331.017	23	853.062	744400
1985-86	52	1346.437	22	875.314	1221830
1986-87	52	1323.727	19	746.248	1071300
1987-88	52	1309	19	732.27	979600
1988-89	52	1306.136	16	650.077	798600
1989-90	52	1347.602	17	677.449	1110200
1990-91	52	1332.926	10	452.853	660900

1991-92	52	1349.256	2	59.115	154200
Total	676	17396.338	235	9059.809	11337520

Forest blocks kept under this working circle have been deteriorated except few blocks like Rohini RF, Dhenkenapani Rf, Singaribahal, Panchara North, Chitkikhadu, Sissopahad, Baladmal, etc. The coppice forests of Ujalpur and Sundargarh Range were much degraded due to heavy biotic pressure and degree of encroachment is very high. Human habitation have come up in the blocks like Athakosia A & B RFs. Reserve trees were less in number in this working circle and less regeneration was coming up.

4. The Bamboo over lapping Working Circle

There was haphazard working of Bamboo coupes in the past. Silvicultural operation of Bamboo was not taken up properly. As a result culms and clumps of Bamboo (*Dendrocalamus strictus*) reduced drastically in bamboo coupes of Hemgir Range. Bamboo coupes were worked out up to 1998-99. 14 RF blocks work kept in this overlapping w.c. Total area of the W C was 34078 ha. But working was mainly concentrated to Dhanubans and Garjanpahad felling series. Year-wise production of bamboo is furnished below.

Bamboo Production

Year	Production			Total S.U.	Amount(Rs.)	Rate
	FB	HB	LB			
1	2	3	4	5	6	7
1988-89	40572	80041	2022	1627.69	521036	@320/-
1989-90	81176	49878	0	2135.54	726084	@340/-
1990-91	229385	93214	250	5554.98	1972016	@355/-
1991-92	94566	50497	0	2411.25	896985	@372/-
1992-93	42682	20396	0	1064.16	415022	@390/-
1993-94	79871	26984	0	1878.93	864308	@460/-
1994-95	144575	37641	0	3288.33	1588263	@483/-
1995-96	57193	19553	0	1347.76	717008	@532/-
1996-97	48226	15075	0	1122.24	627332	@559/-
1997-98	86041	23369	0	1966.86	1154547	@587/-
1998-99	108858	218248	0	2374.38	1462618	@616/-
Total	1013145	634896	2272	24772.12	10945219	

Caupe wise bamboo production from 1991-92 to 1998-99 is given at page -60.

Due to heavy biotic pressure on bamboo forests, all bamboo forests except Garjanpahad RF blocks have been degraded. Potential of Dhanubans RF has also been lowered.

5. The Soft wood over lapping Working Circle

Total 5 nos of filling series were formed. Each series had 10 coupes. The O.F.D.C. Ltd. had worked Rai, Moi and Salai during coupe working. Population of these soft wood species have decreased drastically. More nos is seen in Athkosia A & B RFs, Dhangergudi RF, Baladmal RF.

6. The Plantation Working Circle

Total area of this working circle was 15846.27 ha. and 9 plantation series were formed. The list of plantation done is given at Annexure -15. There is much deviation in selection of site for plantation and in many cases exotic species have been given priority during plantation. Total area planted during the plan period is 4481.89ha. out of which 1792 ha has been done in WP area.

7. The Rehabilitation Working Circle

Total area of this working circle was 21901.58 ha. Gap plantation with trench fencing has been taken up in many forest blocks but all the forest blocks prescribed in the last plan have not been covered. In many cases trenches have not been renovated and purpose of trench fencing has become futile.

8. The Recreation Working Circle.

This working circle was very much neglected. The number of carnivores as well as herbivores has gone down drastically. The construction of game tanks, salt licks, tourist huts and watch towers were not done in adequate numbers under works of improvement. The number of wild animals has reduced. The bamboo forests have been devastated by the local inhabitants inside forest and as a result of which elephants menace has increased.

5.2 EXPLOITATION OF MFP AND GRAZING

The exploitation of M.F.P is very common by local people and they sell the same in market or consume for their own requirements. The grazing by goats, sheep and domestic cattle inside forest are very common in Sundergarh Division.

Revenue obtained from local people for timber, fire wood and grazing during last plan period

Year	Timber	F.W.	Grazing	M.F.P.	Total
88-89	5,389.50	10,155.70	9,551.10	-	25,096.30
89-90	4,470.40	5,241.50	3,967.25	-	13,679.15
90-91	1,939.70	3,070.60	6,579.60	-	11,589.90
91-92	1,907.95	2,939.90	3,573.00	-	8,420.85
92-93	1,366.05	896.35	5,528.15	-	7,790.55
93-94	975.40	509.65	6,756.10	-	8,341.15
94-95	2,530.31	1,585.19	3,409.85	-	7,526.34
95-96	1,828.30	971.20	2,944.00	-	5,843.50
96-97	1,082.25	398.75	3,442.20	-	4,923.20
97-98	80.00	17.00	669.00	-	766.00
98-99	88.50	1,026.50	289.00	-	3,788.15
99-00	138.50	13.50	185.00	-	337.00

The revenue figure shows declining trend and inhabitants were reluctant to pay revenue for collection of fire wood and grazing.

5.2.1 RESERVATION OF FOREST BLOCKS

The list of forest blocks shows that some D.P.Fs was declared as P.R.F. during last plan period thus increasing the number to 26.

5.2.2 ROADS AND BUILDINGS

The list of roads and buildings is given in Para 19.2 and 19.3.

5.3 PAST REVENUE AND EXPENDITURE

PAST REVENUE AND EXPOENDITURE FROM 79-80 ONWARDS

YEAR	REVENUE	EXPENDITURE	EXPENDITURE
		TOTAL FIELD ESTABLISHMENT	2406 FORESTRY & WILD LIFE(N.P)
(1)	(2)	(3)	(4)
1979-80	34,55,640.09	-	17,46,760.14
1980-81	39,96,167.47	14,15,014.80	17,41,435.04
1981-82	59,34,901.71	17,53,770.20	21,88,823.67
1982-83	44,46,772.51	24,75,328.77	28,22,465.27
1983-84	55,14,736.16	25,28,619.70	38,32,797.36
1984-85	55,36,042.76	24,63,991.91	28,68,509.70
1985-86	77,66,562.57	28,43,358.27	33,56,358.27
1986-87	59,39,886.76	30,16,811.70	38,05,051.68
1987-88	58,62,876.75	36,16,288.93	43,43,383.89
1988-89	39,10,269.33	37,73,081.68	03,02,264.60
1989-90	48,52,470.42	44,92,848.50	51,93,013.02
1990-91	36,17,214.15	46,43,461.26	54,32,571.04
1991-92	72,58,139.67	55,40,765.63	64,64,368.14
1992-93	39,02,532.12	73,49,302.00	90,11,050.32
1993-94	20,21,190.38	79,03,638.90	86,86,937.40
1994-95	13,63,866.75	80,75,145.44	02,23,888.50
1995-96	48,27,740.00	86,41,329.03	04,34,331.60
1996-97	24,66,799.37	98,05,317.80	1,16,20,315.32
1997-98	24,28,588.40	1,03,96,058.00	1,20,96,979.42
1998-99	24,05,679.60	1,19,86,392.10	02,62,203.50
1999-00	27,63,195.00	1,55,78,558.70	03,05,550.60
2000-01	45,80,481.00	1,53,29,754.74	1,63,84,505.46
2001-02	28,63,601.00	1,41,20,360.00	03,40,852.00
2002-03	30,53,169	1,53,92,191	2,06,12,012

2003-04	28,84,203	1,48,39,364	2,07,04,836
2004-05	32,70,175	1,29,25,986	1,64,77,485
2005-06	73,94,660	1,40,65,693	40,31,922
2006-07	23,20,969	1,31,20,715	83,03,639

2007-08	58,55,036	1,47,19,301	1,49,13,524
2008-09	12,69,538	1,95,02,131	1,67,45,606
2009-10	18,29,868	2,58,31,739	1,66,57,797
2010-11	95,41,390	2,84,65,798	1,55,15,080
2011-12	28,66,049	2,74,38,028	1,54,65,740
2012-13	25,96,329	3,08,16,703	4,90,34,746
2013-14	31,55,161	3,46,66,353	8,40,01,723

The above figures show that expenditure was made in all heads and attempt was made to save forest and wildlives of the Division.

5.4. Intervention Carried out during the Plan Holidays.

The D. S Pattanaik Working plan was valid up to 31.03. 1999 and was extended up to 30.06.2001. vide notification No. MoEF Bhubaneswar No. 13-FCWP-OS-Sundargarh dtd. 13.04.2000. But to keep the forests and wildlife of the division in normal condition, few interventions have been made during the plan holiday period as per prescriptions of the outgoing plan. Details of activities taken up in the division are furnished below.

1. Work in Selection Forests.

No felling has been done. But salvaging of fallen trees have been carried out and its the statement is given below.

Year	Qty of Timber in CFT	Firewood in Stacks (12'x3.x3')
2001-02	5260.73	1081.5
2002-03	5252.51	1113.3
2003-04	2612.68	335

2004-05	971.7	360
2005-06	1616.44	88
2006-07	118.9057	664
2007-08	51.5309	738
2008-09	80.7992	922
2009-10	80.0834	1052
2010-11	59.3988	560
2011-12	69.7561	507.5
2012-13	16.7902	547
2013-14	171.64	140
Total	16362.9643	8108.3

2. Afforestation Activities taken up.

From 2001-02 to 2013-14, plantation have been taken up in the working plan area as well as in outside of the working plan area. List of plantation raised during plan holiday period is stated below.

Afforestation Activities during Plan Holidays.(2001-02 to 2013-14) Sundargarh Division							
Year	Location		Scheme	Plantation Raised in ha.			Plantat ion in side Workin g Plan Area (in ha.)
	Range	Name of the site		AR	ANR	Bambo o	
1	2	3	4	5	6	7	8
2000-01	NIL						
2001-02	Ujalpur	Kusumura RF	Drought	50			50
	Badgaon	Udarama RF	Drought	25			25
2002-03	Ujalpur	Chirelkhaman RF	Comp. Affn.	22.09			22.09
		Chirelkhaman RF	Comp. Affn.		15.78		15.78
	Sundargarh	Ghumunda-Banrai RF	Comp. Affn.	28.08			28.08
	Ujalpur	Bankidihi RF	Comp. Affn.		13.5		13.5
	Ujalpur	Gutighagra RF	b. Eco. pltn	80			80
	Ujalpur	Kuarbaga DPF	b. Eco. pltn	30			30
2003-04	Ujalpur	Jorajam RF	b. Eco. pltn	70			70
	Ujalpur	Kurumura RF	b. Eco. pltn	30			30
	Ujalpur (L.para)	Dhangergudi RF	b. Eco. pltn	75			75
	Ujalpur	Tangarpali DPF	b. Eco. pltn	25			25

	Ujalpur	Mahikani DPF	b. Eco. pltn	25			25
	Ujalpur	Nialipali DPF	b. Eco. pltn	25			25
2004-05	Ujalpur	Patuakudar RF	b. Eco. pltn	25			25
	Ujalpur	Gireldungri RF	b. Eco. pltn	20			20
	Ujalpur	Budhajharan	b. Eco. Pltn.	40			40
	Lephipara	Dhangergudi	b. Eco. Pltn.	75			75
	Lephipara	Dhangergudi (Dhuker chuan)	b. Eco. Pltn.	40			40
	Sundargarh	Bundeldungri RF (Balisankara)	b. Eco. Pltn.	30			30
	Bargaon	Mahabir RF	b. Eco. Pltn.	70			70
	Ujalpur	Gireldungri RF	Comp. Affn.	23.8 36			23.836
	Ujalpur	Bhursipatra RF	Comp. Affn.	47.7 7			47.77
	Lephipara	Chirelkhaman RF	Comp. Affn.	17.0 62			17.062
	Sundargarh	Tentulijharia RF	Comp. Affn.	2.82			2.82
	Sundargarh	Jublec Park	DRDA	20			
	Lephipara	Sahebdera	DRDA	30			
2005-06	Ujalpur	(Kusumura RF)	Comp. Affn.		200		200
	Sundargarh	Chitabhanga KF	DRDA	25			
	Lephipara	Bandega KF	DRDA	25			
2006-07	Ujalpur	Kusumura RF	Comp. Affn.		99		99
	Sundargarh	Bargamal MIP	Comp. Affn.	20			20
		Rasrajpur RF					
	Ujalpur	Gireldungri RF	b. Eco. Pltn.	25	18.2		43.02
	Ujalpur	Patnakudar RF	b. Eco. Pltn.	25			25
	Hemgir	Ahidannala SWS	RVP		100		100
	Hemgir	Khursinala SWS	RVP		70		70
2007-08	Lephipara	Lampahad RF	Comp. Affn.	125			125
	Sundargarh	Kheriakani RF	b. Eco. Pltn.		25		25
	Sundargarh	Sapkundal RF	b. Eco. Pltn.		25		25
	Hemgir	Makridungri RF	b. Eco. Pltn.		50		50
	Hemgir	Garjanpahad RF	b. Eco. Pltn.		50		50
	Gopalpur	Punjipahad RF	b. Eco. Pltn.		50		50
	Gopalpur	Pandripani RF	b. Eco. Pltn.		50		50
	Bargaon	Runga RF	b. Eco. Pltn.		50		50
	Sundargarh	Deoli RF	b. Eco. Pltn.	25			25
	Ujalpur	Karlaghati RF	b. Eco. Pltn.	25			25
	Ujalpur	Bharatpur RF	b. Eco. Pltn.	25			25
	Lephipara	Jamkani RF	b. Eco. Pltn.	35			35
	Hemgir	Ahidanala (RVP)			30		30

	Hemgir	Khursinalla	(RVP)		25		25
2008-09	Sundargarh	Satparlia RF	Comp. Affn.		44		44
	Lephipara	Dhangergudi RF	Comp. Affn.		155.78		155.78
	Sundargarh	Tentulijharia RF	Comp. Affn.	4.96			4.96
	Gopalpur	Budapahad RF	Comp. Affn.	5.99 6			5.996
	Sundargarh	Jarmal RF	B. Economic		50		50
	Ujalpur	Karlaghai RF	B. Economic		50		50
	Lephipara	Lampahad RF	B. Economic		50		50
	Hemgir	Garjanpahad RF	B. Economic		50		50
	Ujalpur	Jharmunda RF	B. Economic	25			25
	Ujalpur	Kukridihi RF	B. Economic	35			35
	Lephipara	Godashar RF	B. Economic	30			30
	Lephipara	Gutishagara RF	B. Economic	30			30
	Sundargarh	Kerai VSS	Non-Plan (Support to VSS)		40		
	Bargaon	Jamarla VSS	Non-Plan (Support to VSS)		40		
	Hemgir	Kamalaga VSS	Non-Plan (Support to VSS)		40		
	Hemgir	Baddibahal VSS	Non-Plan (Support to VSS)		40		
	Gopalpur	Kund VSS	Non-Plan (Support to VSS)		40		
	Gopalpur	Garjan jore VSS	Non-Plan (Support to VSS)		40		
	Lephipara	Kaputikra VSS	Non-Plan (Support to VSS)		40		
	Lephipara	Loketjharan VSS	Non-Plan (Support to VSS)		40		
	Ujalpur	Karla (Nimdihi) VSS	Non-Plan (Support to VSS)		40		
	Ujalpur	Dainidihi VSS	Non-Plan (Support to VSS)		40		
2009-10	Gopalpur	Kulapur (Gopalpur) RF	Comp. Affn.	4.77			4.77
	Ujalpur	Kusumura RF	Comp. Affn.		7.16		7.16
	Lephipara	Lampahad RF	Comp. Affn.		56.49		56.49
	Sundargarh	Bundel RF	B. Economic		50		50
	Ujalpur	Kusumura RF	B. Economic		50		50
	Gopalpur	Dhokarpahad RF	B. Economic		50		50
	Hemgir	Rohini RF	B. Economic		50		50

	Lephipara	Bindha RF	B. Economic		50		50
	Hemgir	Brahmani RF (Garjanpahad RF)	B. Economic		50		50
	Sundargarh	Kherikani RF	B. Economic	25			25
	Lephipara	Dhangergudi RF	B. Economic	25			25
	Ujalpur	Atkosia RF	B. Economic	25			25
	Gopalpur	Jhupurunga RF	B. Economic	25			25
	Gopalpur	Kund RF	B. Economic	25			25
	Hemgir	Singharibahal RF	B. Economic	25			25
	Gopalpur	Budapahad DPF	State Plan			10	10
2010-11	Sundargarh	Deoli RF	B. Economic	20			20
	Sundargarh	Kherikani	B. Economic	5			5
	Ujalpur	Jagladihi	B. Economic	20			20
	Lephipara	Rajbhal RF	B. Economic	25			25
	Lephipara	Sahebdera RF	B. Economic	10			10
	Gopalpur	Kuchedega RF	B. Economic	20			20
	Hemgir	Bad-ghumunda	B. Economic	10			10
	Hemgir	Kendudihi RF	B. Economic	10			10
	Bargaon	Chhamunda Mahabir RF	B. Economic	10			10
	Ujalpur	Tamganala SWS	Forest Deposit (RVP)		400		
	Sundargarh	Ghurlijore SWS	Forest Deposit (RVP)		138		
	Hemgir	Ahidanallah SWS	Forest Deposit (RVP)		270		
	Hemgir	Khursinalla SWS	Forest Deposit (RVP)		200		
	Lephipara	Chelgudri RF	State Plan			10	10
	Hemgir	Hundalkhol RF (Khuntipani)	State Plan			10	10
	Sundargarh	Bhalubud	CAMPA	60			60
	Sundargarh	Didga	CAMPA	50			50
	Sundargarh	Podajalanga	CAMPA	40			40
	Ujalpur	Beheradihi	CAMPA	50			50
	Ujalpur	Dainidihi	CAMPA	50			50
	Lephipara	Danardampur	CAMPA	60			60
	Lephipara	Laikera	CAMPA	80			80
	Lephipara	Kulabira	CAMPA	50			50
	Gopalpur	Goddwar	CAMPA	100			100
	Gopalpur	Balbaspur	CAMPA	50			50
	Gopalpur	Garjanjore	CAMPA	50			50
	Gopalpur	Kiripsira	CAMPA	40			40
	Hemgir	Singaribahal	CAMPA	70			70
	Hemgir	Khuntipani	CAMPA	50			50
	Bargaon	Kustuna	CAMPA	50			50
	Ujalpur	Rupabahal	NBM(Bamboo)			10	10
	Gopalpur	Durubaga DPF	NBM(Bamboo)			10	10

	Hemgir	Khuntipani R.F	NBM(Bamboo)			10	10
	Sundargarh	Bundeldungri R F	NBM(Bamboo)			10	10
	Sundargarh	Tentulijharia (PWD By Pass - C A)	Comp. Affn.	0.19 2			0.192
2011-12	Ujalpur	Kulabira RF	b. Economic	15			15
	Ujalpur	Telipara	b. Economic	15			15
	Lephipara	Surulata	b. Economic	25			25
	Gopalpur	Daldali (Kuchedega)	b. Economic	25			25
	Hemgir	Ankelbira	b. Economic	30			30
	Bargaon	Mahaveer RF	b. Economic	20			20
	Sundargarh	Panchabati RF	State Plan-Bamboo			10	10
	Ujalpur	Patkijore RF	State Plan-Bamboo			10	10
	Hemgir	Hundalkhol RF	State Plan-Bamboo			5	5
	Gopalpur	Khadu	NBM-Bamboo (Non-Forest land)			10	10
	Hemgir	Hemgir KF	NBM-Bamboo (Non-Forest land)			10	10
	Sundargarh	Nabarangpur	13th FCA	20			
	Ujalpur	Raibaga KF	13th FCA	20			
	Gopalpur	Kulda OCP Lalma RF	Comp. Affn. (CAMPA)	2.15 3			2.153
2012-13	Sundargarh	Jamuna RF	b. Economic	20			20
	Ujalpur	Beheradihi	b. Economic	20			20
	Lephipara	Halma	b. Economic	20			20
	Gopalpur	Daldali RF	b. Economic	30			30
	Hemgir	Biswanathpur (Hundalkhol RF)	b. Economic	25			25
	Bargaon	Katanga RF	b. Economic	15			15
	Sundargarh	Madhupur	13th FCA	20			20
	Ujalpur	Raibaga	13th FCA	20			20
	Sundargarh	Panchabati	SP Bamboo			5	5
	Gopalpur	Daldali RF	SP Bamboo			10	10
	Hemgir	Hundalkhol RF				10	10
	Sundargarh	Goppur (Runga RF)	NBM Bamboo (Forest land)			15	15
	Ujalpur	Kakerjore (Athkoshia RF)	NBM Bamboo (Forest land)			10	10
	Lephipara	Sikajore RF	NBM Bamboo (Forest land)			15	15
	Gopalpur	Daldali (Garjanpahad RF)	NBM Bamboo (Forest land)			15	15

	Hemgir	Khuntipani (G.Pahad RF)	NBM Bamboo (Forest land)			15	15
	Sundargarh		NBM Bamboo (Fadi House)			4	4
	Ujalpur		NBM Bamboo (Fadi House)			4	4
	Lephipara		NBM Bamboo (Fadi House)			4	4
	Gopalpur		NBM Bamboo (Fadi House)			4	4
	Hemgir		NBM Bamboo (Fadi House)			4	4
	Bargaon		NBM Bamboo (Fadi House)			5	5
	Sundargarh	Jamuna	NREGS	10			10
	Ujalpur	Budapahad	NREGS	10			10
	Lephipara	Kulabira	NREGS	10			10
	Gopalpur	Durubaga	NREGS	10			10
	Hemgir	Aunajore		10			10
	Bargaon	Katang		10			10
	Sundargarh	Tiljora (Hamirpur)	NREGS (with gap)		50		
	Ujalpur	Raidihi	NREGS		50		
	Lephipara	Masabira (Chhelgudri)	NREGS		50		
	Gopalpur	Daldali (Kuchedega)	NREGS		50		
	Hemgir	Badrampia (Jhulenbar)	NREGS		50		
	Bargaon	Katang	NREGS		50		
2013-14	Hemgir	Kodbahal DPF	SP Bamboo			25	25
	Sundargarh	Sikipani kF	13th FC (outside WP)	20			
	Ujalpur	Bankibahal KF	13th FC (outside WP)	20			
	Sundargarh	Badalpara DPF	13th FC (WP)	20			20
	Sundargarh	Jamuna RF	13th FC (WP)	30			30
	Ujalpur	Bhaludungri RF	13th FC (WP)	25			25
	Lephipara	Sialkhaman DPF	13th FC (WP)	65			65
	Lephipara	Chhelgudri RF	13th FC (WP)	30			30
	Lephipara	Kukuda RF	13th FC (WP)	30			30
	Gopalpur	Khadudaldali DPF	13th FC (WP)	50			50
	Gopalpur	Jamkani RF (Tiuria)	13th FC (WP)	25			25
	Gopalpur	Balijori RF	13th FC (WP)	50			50
	Hemgir	Kaudarha-Tilia DPF	13th FC (WP)	20			20
	Hemgir	Chitikikhadu RF	13th FC (WP)	25			25
	Hemgir	Khuntipani DPF	13th FC (WP)	30			30

	Bargaon	Kharikamunda RF	13th FC (WP)	25			25
	Bargaon	Itma RF	13th FC (WP)	25			25
	Bargaon	Mahabir RF (Birtola)	13th FC (WP)	50			50
	Sundargarh	Sublaya PRF	13th FC		25		25
	Sundargarh	Gurabasa RF	13th FC		50		50
	Sundargarh	Bijlikhaman RF	13th FC		28		28
	Sundargarh	Gopikudar RF	13th FC		16		16
	Sundargarh	Satparlia RF (Salangabud)	13th FC		160		160
	Sundargarh	Kurei RF	13th FC		200		200
	Sundargarh	Runga RF	13th FC		221		221
	Ujalpur	Budapahad RF	13th FC		200		200
	Ujalpur	Budhajharan RF	13th FC		300		300
	Ujalpur	Bhaludungri RF	13th FC		200		200
	Lephipara	Lephipara DPF (Bilamdihi)	13th FC		90		90
	Lephipara	Badkhalia PRF	13th FC		30		30
	Lephipara	Karadega DPF	13th FC		80		80
	Lephipara	Koilanga DPF	13th FC		250		250
	Lephipara	Sahebdera (Gutighagra RF)	13th FC		120		120
	Lephipara	Bhursidand (Dhangergudi)	13th FC		130		130
	Gopalpur	Khadudaldali DPF	13th FC		200		200
	Gopalpur	Jamkani RF (Gopalpur)	13th FC		200		200
	Gopalpur	Jamkani RF (Tiuria)	13th FC		200		200
	Gopalpur	Balijori RF	13th FC		235		235
	Hemgir	Chhengapahad RF	13th FC		175		175
	Hemgir	Bandbahal DPF	13th FC		125		125
	Hemgir	Singaribahal RF	13th FC		200		200
	Hemgir	Chitkikhadu RF	13th FC		200		200
	Bargaon	Raidihi RF	13th FC		130		130
	Bargaon	Runga RF (Petpur)	13th FC		42		42
	Bargaon	Runga RF (Aludega)	13th FC		58		58
	Bargaon	Jharmunda RF	13th FC		82		82
	Bargaon	Nakti DPF	13th FC		88		88
	Bargaon	Pamra Dungri RF	13th FC		200		200
	Bargaon	Pamra Dungri DPF	13th FC		100		100
	Sundargarh	Jamuna RF (Barpali)	b. Economic	20			20

	Ujalpur	Beheradihi (Patuakudar RF)	b. Economic	20			20
	Lephipara	Lampahad RF	b. Economic	20			20
	Gopalpur	Kuchedega DPF	b. Economic	30			30
	Hemgir	Garjanpahad RF	b. Economic	25			25
	Bargaon	Mahabir RF	b. Economic	15			15
	Gopalpur	Daldali in Forest land	NBM Bamboo			20	
	Gopalpur	Daldali in Non-Forest area (Govt. land)	NBM Bamboo			10	
	Ujalpur	Mahulpali KF	CAMPA Bald Hill	23			
	Bargaon	Litibeda KF	CAMPA Bald Hill	27			
	TOTAL			3652.7	7677.91	290	9669.459

Afforestation over 9669.45 ha (both AR and ANR) have been done in side the WP area.

3. Bamboo working has been carried out as per the approved working scheme. Year-wise production of bamboo has been furnished below.

Bamboo Production(2004-05 to 2013-14)							
Sl.No	Year	Name of the Bamboo	Coupe Area in ha.	Actual Production			
				F.B.	H.B.	Total	C.B.
1	2	3	4	5	6	7	8
1	2004-05	Dhanubansa B/C D	2184.54	6700	1040	145.3	
		Garjanpahad B/C D	1401.46	3233	437	69.46	
2	2005-06	Dhanubansa B/C A	1214.08	43609	9470	972.91	4150
		Garjanpahad B/C A	4821.93	31108	7241	698.91	14990
3	2006-07	Dhanubansa B/C B	809.39	11002	3172	253.33	2392
		Garjanpahad B/C B	1375.15	32180	6364	711.66	
4	2007-08	Dhanubansa B/C C	2043.47	28144	6446	631.261	
		Garjanpahad B/C C	2439.5	17679	2611	382.063	
5	2008-09	Dhanubansa B/C D	2184.54	21833	5688	496.624	
		Garjanpahad B/C D	1401.46	20647	2014	435.786	
6	2009-10	Dhanubansa B/C A	1214.08	12550	1250	265.14	
		Garjanpahad B/C A	4821.93	17452	640	351.66	
7	2010-11	Dhanubansa B/C B	809.39	7564	1170	997.113	4055
		Garjanpahad B/C B	1375.15	39609	3580		
8	2011-	Dhanubansa B/C C	2043.47	15298	2026	1730.116	3500

	12	Garjanpahad B/C C	2439.5	68629	2116		
9	2012-13	Dhanubansa B/C D	2184.54	0	0		5000
		Garjanpahad B/C D	1401.46	0	0		
10	2013-14	Dhanubansa B/C A	1214.08	0	0		3000
		Garjanpahad B/C A	4821.93	21650	4100	476.962	





Bald Hill Plantation-2013-14



Teak Plantation-Dhangergudi RF



Bamboo Plantation- Panchabati(Sundargarh Range)

Further, SSO work has been carried out in the bamboo forests. Year wise work taken up is stated below.

Bamboo SSO carried out during Plan Holiday Period

Year	Scheme	Name of the coupe	Area covered in ha.	Nos. of clumps. Treated.
1	2	3	4	5
2008-09	Non Plan	Garjanpahad BC-C	18	3175
	12th FC grant	Gajapahad BC-C	35	2337
		Dhanubauns BC-C	465	10997
2009-10	CAMPA APO 09-10	Goddwar	100	4200
		Balbaspur	100	7645
		Garjanjore	100	3815
	NBM	Gajapahad BC-D	148	17575
		Dhanubauns BC-D	100	17400
	Non Plan	Garjanpahad RF	38	2675
	12th FC Grant	Garjanpahad BC-D	681.46	14260
		Dhanunauns BC-D	866.54	18070
2010-11	Non Plan	Garjanpahad BC-A	27	1235
		Dhanubauns BC-A	10	1220
2011-12	CAMPA APO 11-12	Dhanubauns BC-B	150	5899
		Garjanpahad BC-B	450	17763
	Non Plan	Dhanubauns BC-B	32	1490
		Garjanpahad BC-B	32	1480
2012-13	Non Plan	Dhanubauns BC-C	109	2855
	13th FC Grant	Garjanpahad BC-C	2570	51037
	CAMPA APO 12-13	Dhanubauns BC-D	1450	70900
		Garjanpahad BC-D	1550	75500

4. Wildlife Habitat Management.

Water bodies have been created for wildlife in their habitats . List is furnished below.

Wildlife Habitat Improvement

Year	Location	Activity (Waterbody / Fodder Plantation etc.)
1	2	3
2006-07 (CP)	Makridunguri RF	Waterbody - 1
CAMPA APO 09-10	Punjipahad RF (G)	Water body -1
CAMPA APO 10-11	Kuchedega DPF	Water body -1
CAMPA APO 11-12	Danardanpur (L)	Waterbody - 1
	Bileibahal(Ghodaghat DPF)	Renovation - 1
	Garjanpahad RF	Renovation - 1
	Kusumura RF	Waterbody - 1
2011-12 (SP)	Jarangloi	Water body - 1
CAMPA APO 12-13	Runga RF	Water body - 1 + 1
	Jogijogian RF	Water body - 1
	Khaprilat RF	Water body - 2
	Dhenkigada (Kusumura RF)	Water body - 1
	Patuaghara RF	Water body - 1
	Rangiadhapa(G.pahad RF)	Water body - 1 + 1
	Garianal RF	Water body - 1
	Tikilipara RF	Water body - 1
-do- (WL)	Jamkani RF (Tiuria)	Water body - 1 + 1

5. Maintenance of old teak plantations.

Under CAMPA, silvicultural operation were carried out in old teak plantations

Maintenance of Old Teak Plantations.

Year	Type of plantation	Operation carried out	Area covered	Location
1	2	3	4	5
CAMPA APO 11-12	Old Teak Plantation	Silvi. Operation, SMC, Fire line, Watching etc.	25 ha.	Sirmunda
		-do-	25 ha.	Patuakudar
		-do-	25 ha.	Gotighagra
		-do-	25 ha.	Dhangergudi

CAMPA APO 12-13	Old Teak Plantation	Silvi. Operation, SMC, Fire line, Watching etc.	11	Sahebdera
		-do-	10	Birendhap
		-do-	9	Kharalchhapal
		-do-	20	Lakrajore
		-do-	25	Mahulgaon
		-do-	15	Singaribahal (Kankani)
		-do-	10	Chhengapahad

6. Eradication of evasive weds.

Year	Location	Area covered in ha.
1	2	3
2009-10	Bhalubud	15
	Didga	15
	Podajalanga	15
	Beheradihi	15
	Dainidihi	15
	Danardanpur	15

Year	Location	Area covered in ha.
2009-10	Laikera	15
	Kulabira	15
	Goddwar	20
	Balbaspur	20
	Garjanjore	20
	Kiripsira	20
	Singaribahal	20
	Khuntipani	15
	Kustuna	15
	Total:-	250

7. Protection Activities.

Emphasis has been given on protection of forest and wildlife. A large nos of offence cases have been booked and forest produce seized during this plan holiday period.

Year	No. of OR cases booked	No. of UD cases booked	Total	No. of u/s 56 cases booked	No. of PR cases booked
1	2	3	4	5	6
2000-01	4790	488	5278	122	232
2001-02	3738	513	4251	70	131
2002-03	4050	300	4350	51	137

2003-04	2934	136	3070	34	34
2004-05	1220	121	1341	44	34
2005-06	1910	79	1989	18	30
2006-07	2651	130	2781	44	59
2007-08	2391	99	2490	40	24
2008-09	2478	147	2625	85	37
2009-10	3324	98	3422	19	22
2010-11	2744	112	2856	18	12
2011-12	2825	152	2977	20	10
2012-13	2383	100	2483	8	7
2013-14	2251	85	2336	9	9

Forest Produce involved							
Timber in cum.		FW in qtls.		Poles in nos.		Bamboo in nos.	
OR	UD	OR	UD	OR	UD	OR	UD
7	8	9	10	11	12	13	14
240.256	142.7525	756	760	7140	135	939	-
264.292	140.9052	750	890	7065	130	948	-
253.224	132.8281	720	989	7153	122	902	-
92.7197	129.2406	466	2101	5164	122	140	-
153.99	139.3204	461	137	2873	109	291	-
31.2896	82.4895	185	48	3919	-	592	-
15.5385	93.7283	201	52	4931	66	598	-
13.9190	40.5766	166	149	5002	367	21	-
22.0545	50.6766	232	218	5494	408	504	-
27.6852	51.8107	238	85	8313	159	300	-
15.0968	39.3655	551	179	7003	7	438	-
13.2015	54.2448	432	152	4898	5	562	-
6.1028	57.3323	727	75	7557	-	56	-
9.8190	47.5425	621	64	8394	-	30	-

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PART-I
Chapter-VI
STATISTICS OF GROWTH AND YIELD

6.1 PAST STATISTICS

To ascertain growth and yield of forest species we have to go through experimental figures. This Division does not have any sample or experimental plot to ascertain the same. The systematic study of any important species has not been made in this Division. In the absence of all these we have referred to the following important literatures on growth and statistics for different species. Sal is the dominant species in this Division associated with Asan, Bija, Dhaura and Sisoo etc. The help of following literatures were taken up.

- (1) General volume table for Sal by S. H. Harward published as Indian Forest Records (Silvicultural Series) volume-X (Part VI) 1924.
- (2) Yield and Stand Table for Sal by A. L. Griffith and Bakshi Sant Ram published as Indian Forest Records (New series) Silvicultural volume- 4(A), No.4, 1943.
- (3) Volume and out turn table for Sal by S. N. Harward published as Indian Forest Records (silvicultural Series) Vol. XII, Part- I, 1925.
- (4) General standard and commercial volume table for Asan by A.L.Griffith and Baskhi Sant Ram published as Indian Forest records (New series) silvicultural volume 4 (A) No.5 (1947).
- (5) General volume table for Bija based on data procured from Andhra Pradesh, Maharastra, Orissa and Bihar published as Indian Forest Records (New series) Silvicultural Vol. II, No.7, (1969).
- (6) General standard volume table and commercial volume table based on data from Bihar, Orissa, Maharastra, Madhya Pradesh by S. M. Dabral published as Indian forest records (New series) Silvicultural Volume II, No.5 (1964).
- (7) Standard volume table for Moi based on data from Andhra Pradesh, Maharastra, Bihar and Uttar Pradesh by S. N. Dabral and D.C.Sharma published as Indian forest records (New series) Silvicultural volume II, No.7 (1969).

The quality class of Sal as used in all India yield and volume table has been recognized and administered in this plan. The quality of Sal of each compartment has been recorded in the concerned compartment history. The criteria adopted for Sal quality classes are as follows:

Quality-I Area where the matured Sal crop attains height of 33 m. and above.

Quality-II Area where the matured Sal crop attains height between 27 to 33 m.

Quality-III Area where the matured Sal crop attains height between 21 to 27 m.

Quality-IV Area where the matured Sal crop attains height between 15 to 21 m.

Quality-V Area where the matured Sal crop attains height of less than 15m.

One percent enumeration has been carried out in strip sampling method over 10 RFs. and 3 PRF and twelve out of thirteen have been included in the Selection Working Circle. Crop composition of each block has been reflected in the stock maps prepared on Topo sheet of 1:25,000 scales which have been attached to compartment histories of the concerned blocks.

6.2 Enumeration

One percent enumeration was taken up in eight R.F. and 3 P.R.F. of the Division. There was no tree of exploitable girth available in Lalma R.F. and it was excluded from Selection Working Circle. Rest ten Forest blocks was included in Selection Working Circle.

6.3 Analysis of enumeration result

Enumeration results show that sal is the dominant species in all the forest blocks followed by Asan, Dhaura and Bija. Among other species Kendu and Char are available in plenty. Sal trees of exploitable girth are available in plenty and exploitation of sal trees will not effect the forest growth because regeneration is profuse in all the forest blocks.

6.4 Estimation of total population of the division (species wise and girth class wise) is given below.

ESTIMATED TOTAL UNITS SPECIES WISE AND GIRTH CLASS WISE

Number of trees (Girth class wise and species wise)

Total area of 13 blocks: 33, 084.01 ha. Area of enumeration: 335 ha.

Sl. No	Species	30-59 cm	60-89 cm	90-119 cm	120-149 cm	150 cm and above	Total
1	Sal	12,15,088.98	8,27,492.49	4,44,995.96	1,78,098.38	63,599.42	27,29,275.23
2	Asan	3,20,297.08	1,39,298.73	32,499.70	8,599.92	2,599.98	5,03,295.41
3	Bija	51,599.53	32,199.71	17,899.84	4,999.95	1,899.98	1,08,599.01
4	Dhaura	2,82,597.43	1,41,098.72	38,099.65	5,999.95	1,899.98	4,69,695.73
5	Bandhan	14,999.86	7,499.93	1,799.98	499.99	0	24,799.76
6	Mundi	10,699.90	3,499.97	2,199.97	1,699.98	499.99	18,599.82
7	Gambhar	3,399.97	1,799.98	99.99	199.98	0	5,499.94
8	Kurum	14,399.87	6,099.94	3,799.96	899.99	599.99	25,799.75
9	Sisoo	1,999.98	699.99	0	99.99	0	2,799.96
10	Kendu	4,81,195.62	1,86,798.30	59,499.46	13,099.88	4,299.96	7,44,893.22
11	Bahada	11,899.89	11,599.89	2,799.97	1,899.98	1,099.98	29,299.72

12	Harida	31,499.71	14,499.87	5,599.95	899.99	0	52,499.52
13	Char	5,51,994.97	77,799.29	6,499.94	199.99	0	6,36,494.19
14	Neem	0	0	0	0	0	0
15	Rai/Moi	1,40,798.72	60,999.44	14,899.86	3,699.97	899.99	2,21,297.98
16	Mahul	1,25,298.86	76,999.29	37,399.65	14,999.86	5,599.95	2,60,297.61
17	Kasi	21,599.80	12,999.88	3,499.97	1,299.98	399.99	39,799.63
18	Jamun	81,299.27	43,799.61	17,999.84	4,499.96	1,599.98	1,49,198.67
19	Sidha	1,02,599.08	29,599.73	7,999.93	1,499.99	1,099.99	1,24,798.72
20	Tentuli	16,099.86	8,199.93	2,799.98	799.99	399.99	28,299.76
21	Anla	33,499.96	6,899.94	799.99	0	0	41,199.89
22	Salai	9,799.91	14,599.87	12,799.88	5,199.95	1,899.98	44,299.59
23	Bela	7,699.93	1,299.98	299.99	0	0	9,299.91
24	Kusum	10,399.91	9,799.91	4,399.96	5,799.95	1,399.99	31,799.72
25	Amba	32,899.70	21,499.81	1,899.98	99.99	0	56,399.48
26	Kumbhi	32,899.70	21,499.81	1,899.98	99.99	0	56,399.48
27	Misc	6,49,994.15	1,75,698.42	44,499.59	10,799.90	2,999.97	8,83,992.03
	Total	42,36,823.98	19,17,282.58	7,66,657.32	2,67,297.49	93,599.1	72,81,660.47

6.5 Estimation of Growing Stock of the Division

IN SITU CAPITAL VALUE OF GROWING STOCK

The total unit value of the enumerated forest blocks can be obtained by multiplying the unit value for each girth class with the estimated number of trees. The total units of timber available are presented here under.

ESTIMATED TOTAL UNITS SPECIES WISE AND GIRTH CLASS WISE

Total area of 13 Forest blocks: 33084.01 hactares

Area of Enumeration: 335 ha.

Sl. No.	Species	30-59 cm	60-89 cm	90-119 cm	120-149 cm	150cm and above	Total
1	Sal	303772	413746	444996	356197	254398	1773109
2	Asan	38436	34825	16250	8600	5200	103311
3	Bija	12900	16099	17900	9999	7600	64498
4	Dhaura	16956	16932	9525	3000	1900	48313
5	Bandhan	3750	3750	1800	1000	0	10300
6	Mundi	1284	875	1100	1700	1000	5959
7	Gambhar	850	900	100	400	0	2250
8	Kurum	3600	3050	3800	1800	2400	14650
9	Sissoo	500	350	0	200	0	1050
10	Kendu	57743	46700	29750	13100	17200	164493
11	Bahada	714	1392	700	950	1100	4856
12	Harida	1890	1740	1400	450	0	5480
13	Char	33120	9336	1625	100	0	44181
14	Neem	0	0	0	0	0	0
15	Rai/Moi	8448	7320	3725	1850	900	22243
16	Mahul	15036	18999	18700	15000	11200	78935
17	Kasi	2592	3250	1750	1300	800	9692
18	Jamun	9756	10950	9000	4500	3200	37406
19	Sidha	12312	7400	4000	1500	2200	27412
20	Tentora	1932	2050	1400	800	800	6982
21	Anla	2010	828	200	0	0	3038
22	Salai	588	1752	3200	2600	1900	10040
23	Bela	462	156	75	0	0	693
24	Kusum	624	1176	1100	2900	1400	7200
25	Amba	1572	1125	750	1400	1600	6447

26	Kumbhi	1974	2580	475	50	0	5079
27	Misc.	39000	21084	11125	5400	3000	84688
	TOTAL	571821	625365	584446	434796	317798	2534226

6.6 Estimation of volume of the growing stock

The total in situ capital value of the growing stock is as under

- (i) Total estimated units of growing stock = 2534226
- (ii) Unit value = Rs.583/-
- (iii) Total in situ value of the growing stock= Rs.1,47,74,53,758/-

6.7 The average outturn of round timber per tree for different girth classes in cubic metres for some forest blocks is given below. These out-turn figures have been obtained from the conversion registers maintained by O.F.D.C.Ltd.

GIRTH CLASS WISE OUT TURN OF TIMBER IN THE WORKED OUT SELECTION COUPES BY THE O.F.D.C.LTD, SUNDERGARH (C) DIVISION

Average out-turn of Round Timber per tree (in cum.)

Name of the coupes	30 to 59 cm	60 to 89 cm	90 to 119 cm	120 to 149 cm	150 to 179 cm	180 cm and above
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Banderghicha II	0.0538	0.1189	0.2165	0.5276	-	-
Budhajharan II	0.0397	0.0991	0.1787	0.3307	0.2165	-
Budhajharan V	-	0.1207	0.2498	0.4180	0.4629	-
Budhajharan VI	-	-	0.4055	0.3881	0.4916	1.0001
BudhajharanVII	-	0.0772	0.1339	0.3184	0.4967	-
Dhanubans VI	-	-	0.4143	0.5528	0.8713	0.7941
DhanubansXIII	0.0554	0.1315	0.3163	0.4267	0.6883	0.5056
Gopalpur II	-	0.2896	0.2070	0.4426	0.7563	0.7722
Gopalpur VI	-	-	0.3919	0.6000	1.0065	0.9082
Kadopani X	-	0.1423	0.2993	0.4549	0.7395	0.7560
Kadopani XI	-	-	0.2519	0.4328	0.7480	1.3781
Kadopani XII	-	-	0.2150	0.4980	0.7110	0.8190
Kanika XII	-	-	-	0.6324	0.9997	1.2246

Abstract of 1% Enumeration

Range - Hemgir		Block Chhengapahad RF.										Area- 1017.41 Ha.			
Sl. No.	Species	Area of Enumeration - 10.50 Ha													
		30-59 Cm		60-89 Cm		90-119 Cm		120-149 Cm		150 Cm & Above		Total		G. Total	
		S	U	S	U	S	U	S	U	S	U	S	U		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
1	Sal	78	-	99	3	80	21	75	7	23	4	355	35	390	
2	Asan	5	-	8	-	2	-	-	-	-	-	15	-	15	
3	Bija	2	-	-	-	-	-	-	-	-	-	2	-	2	
4	Dhaura	6	-	16	-	4	2	2	-	-	-	28	2	30	
5	Bandhan	-	-	-	-	-	-	-	-	-	-	-	-	-	
6	Mundi	-	-	-	-	-	-	-	-	-	-	-	-	-	
7	Gambhar	-	-	-	-	-	-	-	-	-	-	-	-	-	
8	Kurum	-	-	-	-	-	-	-	-	-	-	-	-	-	
9	Sisoo	-	-	-	-	-	-	-	-	-	-	-	-	-	
10	Kendu	86	-	68	-	17	3	5	2	1	-	177	6	183	
11	Bahada	-	-	4	-	1	-	2	-	1	-	8	-	8	
12	Harida	1	-	3	-	2	-	1	-	-	-	7	-	7	
13	Char	60	-	58	-	7	1	-	-	-	-	125	1	126	
14	Neem	-	-	-	-	-	-	-	-	-	-	-	-	-	
15	Rai/Moi	6	-	3	-	4	-	2	-	-	1	15	1	16	
16	Mohul	7	-	6	-	11	-	5	-	1	-	30	-	30	
17	Kasi	1	-	5	-	1	-	2	-	-	-	9	-	9	
18	Jamu	1	-	3	-	2	-			-	-	6	-	6	
19	Sidha	8	-	21	-	1	-	-	-	-	-	30	-	30	
20	Tentala	-	-	-	-	-	-	-	-	-	-	-	-	-	
21	Anla	6	-	3		-	-	-	-	-	-	9	-	9	
22	Salai	5	-	2	-	-	-	-	-	-	-	7	-	7	
23	Bel	10	-	1		-	-	-	-	-	-	11	-	11	
24	Kusum	-	-	2	-	3	-	2	-	1	-	8	-	8	
25	Amba	-	-	-	-	1	-	1	-		-	2	-	2	
26	Kumbhi	5	-	10	-	-	-	-	1	-	-	15	1	16	
27	Misc	150		97	0	14	2	8	1	1	1	270	6	276	
	Total	437		409	3	150	29	105	11	28	6	1129	52	1181	

Range- Hemgir				Barbahali PRF						Total area -400.65 ha.					
Sl No.	Species	Area of Enumeration - 4.00 ha.													
		30-59 Cm.		60-89 Cm.		90-119 Cm.		120-149 Cm.		150 cm and above		Total		G. Total	
		S	U	S	U	S	U	S	U	S	U	S	U		

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	Sal	15	6	28	8	31	4	21	3	9	7	104	28	132
2	Asan	1	0	12	0	5	0	1	0	1	0	20	0	20
3	Bija	0	0	0	0	14	0	13	0	3	0	30	0	30
4	Dhaura	5	1	12	2	10	2	5	0	3	0	35	5	40
5	Bandhan	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mundi	0	0	0	0	1	2	0	0	1	0	2	2	4
7	Gambhar	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Kurum	6	1	3	1	2	2	0	1	2	1	13	6	19
9	Sisoo	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Kendu	64	26	31	11	19	1	3	2	2	0	119	40	159
11	Bahada	1	1	3	2	2	0	1	0	2	0	9	3	12
12	Harida	1	0	3	0	0	0	0	0	0	0	4	0	4
13	Char	29	4	15	3	0	0	0	0	0	0	44	7	51
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Rai/Moi	2	0	3	0	3	0	1	0	0	0	9	0	9
16	Mohul	6	0	2	0	1	0	3	1	5	1	17	2	19
17	Kasi	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Jamu	0	0	1	0	0	1	0	0	0	1	1	2	3
19	Sidha	17	4	25	11	9	7	4	2	2	2	57	26	83
20	Tentala	0	0	1	0	0	0	0	0	0	0	1	0	1
21	Anla	0	0	2	0	0	0	0	0	0	0	2	0	2
22	Salai	0	0	0	0	0	0	0	0	0	0	0	0	0
23	Bel	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Kusum	2	0	5	0	1	0	1	0	0	0	9	0	9
25	Amba	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Kumbhi	3	0	1	0	0	0	0	0	0	0	4	0	4
27	Misc	124	63	81	52	16	8	2	3	2	0	225	126	351
	Total	276	106	228	90	114	27	55	12	32	12	705	247	952

Abstract of 1% Enumeration 6231.57 ha.												Area –		
Range -Gopalpur				Block Dhanubans RF										
Sl No.	Species	Area of Enumeration - 63.0 ha.												
		30-59 Cm		60-89 Cm		90-119 Cm		120-149 Cm		150 cm and above		Total		G. Total
		S	U	S	U	S	U	S	U	S	U	S	U	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	Sal	2389	0	2108	35	1467	89	565	67	206	34	6735	225	6960
2	Asan	433	0	393	0	52	5	16	4	5	3	899	12	911
3	Bija	41	0	36	0	18	0	0	0	0	0	95	0	95
4	Dhaura	385	0	283	0	99	15	5	4	2	3	774	22	796
5	Bandhan	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mundi	12	0	8	0	7	0	10	2	2	0	39	2	41
7	Gambhar	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Kurum	10	0	12	0	8	2	4	0	0	0	34	2	36
9	Sisoo	5	0	0	0	0	0	0	0	0	0	5	0	5
10	Kendu	753	0	286	8	91	12	15	0	3	2	1148	22	1170
11	Bahada	36	0	31	0	14	2	3	1	0	0	84	3	87
12	Harida	77	0	22	0	24	2	0	0	0	0	123	2	125
13	Char	958	0	163	0	3	0	0	0	0	0	1124	0	1124
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Rai/Moi	152	0	114	0	17	17	7	11	0	0	290	28	318
16	Mohul	283	0	181	0	68	6	28	2	4	0	564	8	572

17	Kasi	18	0	37	0	11	3	2	0	0	0	68	3	71
18	Jamu	119	0	71	0	29	3	8	2	1	0	228	5	233
19	Sidha	97	0	29	0	12	7	2	0	0	0	140	7	147
20	Tentala	27	0	37	0	12	0	4	1	0	0	80	1	81
21	Anla	76	0	36	0	4	1	0	0	0	0	116	1	117
22	Salai	13	0	9	0	7	0	0	0	0	0	29	0	29
23	Bel	15	0	8	0	2	0	0	0	0	0	25	0	25
24	Kusum	19	0	3	0	15	0	31	2	4	0	72	2	74
25	Amba	0	0	0	0	0	12	8	4	5	0	13	16	29
26	Kumbhi	62	0	76	0	0	0	0	0	0	0	138	0	138
27	Misc	1427	0	348	0	144	4	40	13	5	0	1964	17	1981
	Total	7407	0	4291	43	2104	180	748	113	237	42	14787	378	15165

Range- Bargaon			Block-Panchara (N) RF						Total area-1153.39 ha.					
Sl. No.	Species	Area of Enumerataion-11.659 ha												
		30-59cm		60-89 cm		90-119cm		120-149cm		150 cm and above		Total		G.Total
		S	U	S	U	S	U	S	U	S	U	S	U	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	Sal	390	220	67	31	3	6	0	5	0	1	460	263	723
2	Asan	151	36	11	4	1	1	0	0	0	0	163	41	204
3	Bija	47	8	2	0	0	0	0	0	0	0	49	8	57
4	Dhaura	251	75	16	9	1	1	0	0	0	0	268	85	353
5	Bandhan	3	1	2	1	1	2	0	0	0	0	6	4	10
6	Mundi	0	0	0	1	0	0	0	0	0	0	0	1	1
7	Gambhar	5	1	0	0	0	0	0	0	0	0	5	1	6
8	Kurum	0	1	1	0	0	1	0	0	0	0	1	2	3
9	Sisoo	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Kendu	105	63	20	19	4	3	0	0	0	0	129	85	214
11	Bahada	3	1	4	0	0	0	1	0	0	0	8	1	9
12	Harida	2	1	0	0	0	0	0	0	0	0	2	1	3
13	Char	224	51	16	5	0	0	0	0	0	0	240	56	296
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Rai/Moi	79	36	13	10	3	2	0	0	0	0	95	48	143
16	Mohul	42	12	13	10	7	7	1	0	0	0	63	29	92
17	Kasi	11	7	1	1	1	1	0	0	0	0	13	9	22
18	Jamu	17	14	2	3	0	2	0	0	0	0	19	19	38
19	Sidha	10	4	2	0	0	0	0	0	0	0	12	4	16
20	Tentala	6	1	3	2	0	0	0	0	0	0	9	3	12
21	Anla	15	14	4	0	0	0	0	0	0	0	19	14	33
22	Salai	3	2	2	1	1	1	0	0	0	0	6	4	10
23	Bel	3	1	0	0	0	0	0	0	0	0	3	1	4

24	Kusum	1	0	1	0	1	0	0	0	0	1	0	4	0	4	
25	Amba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26	Kumbhi	1	0	1	0	1	0	0	0	0	0	0	4	7	20	
27	Misc	66	80	18	14	2	1	0	1	0	0	0	86	96	182	
Total		1444	635	200	112	26	28	2	6	1	1	1673	782		2455	
Sl No.	Species	Area of Enumeration = 1.0 Ha.														
		30-59 Cm.		60-89 Cm.		90-119 Cm.		120-149 Cm.		150-179Cm		180 & above		Total		G. Total
		S	U	S	U	S	U	S	U	S	U	S	U	S	U	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1	Sal	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2	Asan	13	0	0	0	0	0	0	0	0	0	0	0	13	0	13
3	Bija	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	Dhaura	7	0	0	0	0	0	0	0	0	0	0	0	7	0	7
5	Bandhan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mundi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	Gambhar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Kurum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Sisoo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Kendu	12	0	0	0	0	0	0	0	0	0	0	0	12	0	12
11	Bahada	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	Harida	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Char	19	0	0	0	0	0	0	0	0	0	0	0	19	0	19
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Rai/Moi	6	0	0	0	0	0	0	0	0	0	0	0	6	0	6
16	Mohul	2	0	0	0	0	0	0	0	0	0	0	0	2	0	2
17	Kasi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	Jamu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Sidha	3	0	0	0	0	0	0	0	0	0	0	0	3	0	3
20	Tentala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	Anla	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Salai	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	Bel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Kusum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	Amba	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Kumbhi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	Misc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	63	0	0	0	0	0	0	0	0	0	0	0	63	0	63

Abstract of 1% Enumeration														Area –		
10038.17 ha.																
Range Gopalpur		Garjanpahad RF														
Sl. No.	Species	Area Of Enumeration - 101.619 ha.														
		30-59 Cm.		60-89 Cm.		90-119 Cm.		120-149 Cm.		150-179 Cm.		180 &Above		Total		G. Total
		S	U	S	U	S	U	S	U	S	U	S	U	S	U	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1	Sal	1359	1082	1099	1099	826	515	434	128	106	23	27	11	3851	2858	6709
2	Asan	121	61	162	31	34	6	3	2	0	0	0	0	320	100	420
3	Bija	63	23	135	34	101	23	27	8	8	6	1	0	335	94	429
4	Dhaura	273	111	316	71	70	11	7	4	1	0	0	0	667	197	864
5	Bandhan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mundi	4	1	0	0	0	1	0	0	1	0	1	0	6	2	8
7	Gambhar	5	2	6	0	0	0	1	0	0	0	0	0	12	2	14
8	Kurum	5	1	5	2	3	2	3	0	2	0	1	0	19	5	24
9	Sisoo	3	0	1	0	0	0	0	0	0	0	0	0	4	0	4
10	Kendu	736	546	392	251	151	90	43	16	8	4	0	0	1330	907	2237
11	Bahada	33	10	50	13	14	1	8	3	6	1	1	0	112	28	140
12	Harida	46	30	63	17	13	5	3	2	0	0	0	0	125	54	179
13	Char	402	207	77	17	5	4	0	0	0	0	0	0	484	228	712
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Rai/Moi	221	196	121	78	19	5	4	0	2	0	0	0	367	279	646
16	Mohul	224	150	198	127	121	54	55	10	20	5	7	3	625	349	974
17	Kasi	18	9	9	4	1	1	2	1	2	0	0	0	32	15	47
18	Jamu	70	119	48	87	24	44	6	11	1	2	1	0	150	263	413
19	Sidha	150	132	65	43	20	7	1	1	0	1	0	0	236	184	420
20	Tentala	12	6	5	6	8	0	1	0	1	0	0	0	27	12	39
21	Anla	26	26	2	3	1	0	0	0	0	0	0	0	39	29	68
22	Salai	2	0	2	1	1	2	0	1	0	0	0	0	5	4	9
23	Bel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Kusum	17	12	24	20	12	6	9	3	3	0	0	0	65	41	106
25	Amba	0	0	1	0	0	1	0	0	0	1	0	0	1	2	3
26	Kumbhi	77	60	75	33	13	5	0	0	0	0	0	0	165	98	263
27	Misc	547	509	198	132	48	22	16	5	2	1	1	2	812	671	1483
	Total	4414	3293	3054	2069	1485	805	623	195	163	44	40	16	9789	6422	16211

Abstract of 1% Enumeration														Area -611.09 ha.
Range Gopalpur Punjipahad RF														
Sl. No.	Species	Area of Enumeration - 6.50 ha												
		30-59 cm		60-89 cm		90-119 cm		120-149 cm		150 cm and above		Total		G. Total
		S	U	S	U	S	U	S	U	S	U	S	U	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	Sal	26	0	8	0	0	0	0	0	0	0	34	0	34
2	Asan	80	0	63	0	7	1	0	0	0	0	150	1	151
3	Bija	2	0	0	0	0	0	0	0	0	0	2	0	2
4	Dhaura	61	0	38	0	6	2	1	0	0	0	106	2	108
5	Bandhan	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mundi	6	0	4	0	0	0	0	0	0	0	10	0	10
7	Gambhar	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Kurum	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Sisoo	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Kendu	94	0	18	0	1	0	0	0	0	0	113	0	113
11	Bahada	2	0	1	0	0	0	0	0	0	0	3	0	3
12	Harida	3	0	2	0	1	0	0	0	0	0	6	0	6
13	Char	163	0	15	0	0	0	0	0	0	0	178	0	178
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Rai/Moi	33	0	22	0	1	0	0	0	0	0	56	0	56
16	Mohul	0	0	0	0	0	0	0	0	0	0	0	0	0
17	Kasi	7	0	3	0	0	0	0	0	0	0	10	0	10
18	Jamu	0	0	0	0	0	0	0	0	0	0	0	0	0
19	Sidha	39	0	14	0	1	0	0	0	0	0	54	0	54
20	Tentala	0	0	0	0	0	0	0	0	0	0	0	0	0
21	Anla	21	0	3	0	0	0	0	0	0	0	24	0	24
22	Salai	0	0	0	0	0	0	0	0	0	0	0	0	0
23	Bel	11	0	2	0	0	0	0	0	0	0	13	0	13
24	Kusum	6	0	8	0	2	0	1	0	0	0	17	0	17
25	Amba	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Kumbhi	15	0	1	0	0	0	0	0	0	0	16	0	16
27	Misc	417	0	89	0	20	4	3	0	0	0	529	4	533
	Total	986	0	291	0	39	7	5	0	0	0	1321	7	1328

Range--Gopalpur		Block- Tamkina PRF						Total area of the block – 1274.78 ha.							
Sl. No.	Species		Area of Enumeration – 12.8 ha.												
		30-59 Cm		60-89 Cm		90-119 Cm		120-149 Cm		150-Above		Total		G.Total	
		S	U	S	U	S	U	S	U	S	U	S	U		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
1	Sal	1949	0	910	63	64	64	5	8	0	0	2928	135	3063	
2	Asan	513	1	62	4	0	2	0	0	0	0	575	7	582	
3	Bija	38	0	3	0	0	0	0	0	0	0	41	0	41	
4	Dhaura	212	0	12	1	0	0	0	0	0	0	224	1	225	
5	Bandhan	24	0	0	0	0	0	0	0	0	0	24	0	24	
6	Mundi	51	0	6	0	0	0	0	0	0	0	57	0	57	
7	Gambhar	4	0	0	0	0	0	0	0	0	0	4	0	4	
8	Kurum	22	3	3	0	0	0	0	0	0	0	25	3	28	
9	Sisoo	4	0	0	0	0	0	0	0	0	0	4	0	4	
10	Kendu	539	0	54	7	0	2	0	0	0	0	593	9	602	
11	Bahada	15	0	2	0	0	0	0	0	0	0	17	0	17	
12	Harida	67	0	2	0	0	0	0	0	0	0	69	0	69	
13	Char	919	0	12	0	0	1	0	0	0	0	931	1	932	
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	Rai/Moi	225	0	9	0	0	0	0	0	0	0	234	0	234	
16	Mohul	176	0	29	1	1	1	0	0	0	0	206	2	208	
17	Kasi	47	0	4	0	0	0	0	0	0	0	51	0	51	
18	Jamu	79	0	15	0	0	0	0	0	0	0	94	0	94	
19	Sidha	58	0	5	0	0	0	0	0	0	0	63	0	63	
20	Tentala	61	0	2	0	0	0	0	0	0	0	63	0	63	
21	Anla	80	0	3	0	0	0	0	0	0	0	83	0	83	
22	Salai	18	0	8	1	0	2	0	0	0	0	26	3	29	
23	Bel	0	0	0	0	0	0	0	0	0	0	0	0	0	
24	Kusum	15	0	10	0	0	0	0	0	0	0	25	0	25	
25	Amba	0	0	0	0	0	0	0	0	0	0	0	0	0	
26	Kumbhi	24	0	7	0	0	0	0	0	0	0	31	0	31	
27	Misc	496	0	8	1	0	0	0	0	0	0	504	1	505	
	Total	5636	4	1166	78	65	72	5	8	0	0	6872	162	7034	

Range -Gopalpur				Block-Bahala-PRF				Total area of the block -1095.11 Ha.						
Sl. No.	Species	Area of Enumeration – 11. 0 ha.												G.Total
		30-59 Cm		60-89 Cm		90-119 Cm		120-149 Cm		150-Above		Total		
		S	U	S	U	S	U	S	U	S	U	S	U	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	Sal	1101	4	860	17	255	56	51	50	23	36	2290	163	2453
2	Asan	422	0	167	2	18	4	5	1	1	1	613	8	621
3	Bija	48	0	16	1	6	0	0	0	0	1	70	2	72
4	Dhaura	173	0	145	1	15	6	2	0	0	0	335	7	342
5	Bandhan	35	0	10	0	0	0	0	0	0	0	45	0	45
6	Mundi	6	0	1	0	1	0	0	0	0	0	8	0	8
7	Gambhar	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Kurum	3	0	0	0	1	0	0	0	0	0	4	0	4
9	Sisoo	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Kendu	600	7	234	63	32	47	1	9	0	3	867	129	996
11	Bahada	2	0	1	0	0	0	0	0	0	0	3	0	3
12	Harida	25	0	8	0	0	1	0	0	0	0	33	1	34
13	Char	921	0	111	3	11	1	1	0	0	0	1044	4	1048
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Rai/Moi	82	0	33	0	2	0	1	0	0	0	118	0	118
16	Mohul	153	0	92	0	18	4	2	1	2	0	267	5	272
17	Kasi	13	0	8	0	0	0	1	0	0	0	22	0	22
18	Jamu	98	3	85	0	39	5	7	3	2	3	231	14	245
19	Sidha	47	0	14	0	2	0	0	0	0	0	63	0	63
20	Tentala	3	0	0	0	0	0	0	0	0	0	3	0	3
21	Anla	55	1	8	0	2	0	0	0	0	0	65	1	66
22	Salai	4	0	2	0	2	0	0	1	1	2	9	3	12
23	Bel	0	0	0	0	0	0	0	0	0	0	0	0	0
24	Kusum	8	0	3	1	2	0	1	0	1	0	15	1	16
25	Amba	3	0	1	0	1	0	1	0	2	0	8	0	8
26	Kumbhi	21	0	5	0	0	0	0	0	0	0	26	0	26

27	Misc	764	0	139	0	18	0	1	0	1	0	923	0	923
	Total	4587	15	1943	88	425	124	74	65	33	46	7062	338	7400

Range- Gopalpur				Block-Kalatpani RF						Total area - 792.80 ha.				
Sl. No.	Species	Area of Enumeration - 8.0 ha.										Total		G. Total
		30-59 Cm		60-89 Cm		90-119 Cm		120-149 Cm		150-Above				
		S	U	S	U	S	U	S	U	S	U	S	U	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	Sal	127	0	18	0	3	0	0	0	0	0	148	0	148
2	Asan	98	0	15	0	4	0	0	0	0	0	117	0	117
3	Bija	12	0	1	0	0	0	0	0	0	0	13	0	13
4	Dhaura	107	0	52	0	3	9	0	0	0	0	162	9	171
5	Bandhan	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Mundi	15	0	3	0	1	0	0	0	0	0	19	0	19
7	Gambhar	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Kurum	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Sisoo	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Kendu	77	0	23	0	2	0	0	0	0	0	102	0	102
11	Bahada	8	0	4	0	2	0	0	0	0	0	14	0	14
12	Harida	15	0	3	0	1	0	0	0	0	0	19	0	19
13	Char	118	0	60	0	16	0	0	0	0	0	194	0	194
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Rai/Moi	2	0	14	0	7	3	0	0	0	0	23	3	26
16	Mohul	30	0	7	0	4	0	2	0	0	0	43	0	43
17	Kasi	17	0	13	0	8	0	1	0	0	0	39	0	39
18	Jamu	141	0	28	0	5	0	0	0	0	0	174	0	174
19	Sidha	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Tentala	0	0	0	0	0	0	0	0	0	0	0	0	0
21	Anla	0	0	0	0	0	0	0	0	0	0	0	0	0
22	Salai	0	0	0	0	0	0	0	0	0	0	0	0	0
23	Bel	25	0	2	0	0	0	0	0	0	0	27	0	27

	24	Kusum	12	0	8	0	1	0	0	0	0	0	21	0	21
	25	Amba	114	0	31	0	0	0	0	0	0	0	145	0	145
Abstract of 1% Enumeration															
607.05 ha.	26	Kumbhi	36	0	2	0	0	0	0	0	0	0	38	0	38
	27	Mis Bargaon	548	0	19	0	0	0	0	0	0	0	632	3	635
		Block Panchara (S) RF								1	3	0			
Sl. No.	Total Species	1502	0	303	Area of Enumeration	102	6.120		1	3	0	1930	15	1945	
		30-59 Cm		60-89 Cm		90-119 Cm		120-149 Cm		150-above		Total		G. Total	
		S	U	S	U	S	U	S	U	S	U	S	U		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	
1	Sal	388	188	33	23	1	1	0	0	0	0	422	212	634	
2	Asan	62	30	7	1	0	1	0	0	0	0	69	32	101	
3	Bija	16	4	1	0	0	0	0	0	0	0	17	4	21	
4	Dhaura	29	24	2	2	1	0	0	0	0	0	32	26	58	
5	Bandhan	5	2	1	1	0	0	0	0	0	0	6	3	9	
6	Mundi	0	0	0	0	0	0	0	0	0	0	0	0	0	
7	Gambhar	1	2	0	0	0	0	0	0	0	0	1	2	3	
8	Kurum	0	0	0	0	0	0	0	0	0	0	0	0	0	
9	Sisoo	2	2	1	1	0	0	0	0	0	0	3	3	6	
10	Kendu	38	32	3	8	2	4	1	2	0	0	44	46	90	
11	Bahada	0	0	0	0	0	0	0	0	0	0	0	0	0	
12	Harida	3	1	0	0	0	0	0	0	0	0	3	1	4	
13	Char	198	47	8	6	0	0	0	0	0	0	206	53	259	
14	Neem	0	0	0	0	0	0	0	0	0	0	0	0	0	
15	Rai/Moi	47	18	4	3	0	0	0	0	0	0	51	21	72	
16	Mohul	14	8	2	2	2	2	2	0	0	0	20	12	32	
17	Kasi	5	3	1	0	0	0	0	0	0	0	6	3	9	
18	Jamu	0	0	0	0	0	0	0	0	0	0	0	0	0	
19	Sidha	7	3	0	0	0	0	0	0	0	0	7	3	10	
20	Tentala	1	1	2	1	0	0	0	0	0	0	3	2	5	
21	Anla	0	0	0	0	0	0	0	0	0	0	0	0	0	
22	Salai	0	0	0	0	0	0	0	0	0	0	0	0	0	
23	Bel	0	0	0	0	0	0	0	0	0	0	0	0	0	
24	Kusum	0	0	1	0	0	0	0	0	0	0	1	0	1	
25	Amba	5	7	2	1	0	0	0	0	0	0	7	8	15	
26	Kumbhi	0	0	0	0	0	0	0	0	0	0	0	0	0	
27	Misc	64	76	18	21	4	1	0	0	0	0	86	98	184	
	Total	885	448	86	70	10	9	3	2	0	0	984	529	1513	

6.7 (a) TREE ENUMERATION FOR TEST CHECK

As per decision of the Working Plan Committee dtd. 28.04.2014, tree enumeration was carried out in 10 forest block of the division as the data given in the book relates to 2001-02 enumeration. List of Forest Block where enumeration was conducted is given below.

TREE ENUMERATION IN FOREST BLOCK

Sl No.	Name of the Forest Block	No. of sample plot taken	Area of sample plots (In Ha.)
1	Bahala PRf	10	0.10
2	Tamkinala PRF	12	0.12
3	Garjanpahad RF	113	1.13
4	Dhanubanus RF	51	0.51
5	Punchipahad RF	6	0.06
6	Kalatpani RF	8	0.08
7	Badbahal PRF	30	0.30
8	Chhangapahad Rf	15	0.15
9	Panchara North	5	0.05
10	Panchara South	5	0.05
	Total	243	2.43

Abstract of enumeration

ABSTRACT											
Range - Hemgir											
Forest Block - Chhangapahad R.F											
Nos of trees (Girth Class - wise)											
		30-60 CM		60-90 CM		90 - 120cm		120 - 150 cm		150 cm & above	
		S	US	S	US	S	US	S	US	S	US
1	Sal	25	0	18	0	22	1	21	0	27	3
2	Asan	2	0	-	-	2	0	1	0	-	-
3	Bija	-	-	-	-	-	-	-	-	-	-
4	Dhaura	-	-	1	0	-	-	-	-	-	-
5	Bandhan	-	-	-	-	-	-	-	-	-	-
6	Mundi	5	0	-	-	-	-	-	-	-	-
7	Gambhar	-	-	-	-	-	-	-	-	-	-
8	Kurum	-	-	-	-	-	-	-	-	-	-
9	Sisoo	-	-	-	-	-	-	-	-	-	-

10	Kendu	21	0	11	1	7	0	7	0	5	0
11	Bahada	4	0	1	0	1	0	2	0	-	-
12	Harida	1	0	-	-	3	0	2	0	-	-
13	Char	22	0	7	0	1	0	-	-	-	-
14	Neem	1	0	-	-	-	-	-	-	-	-
15	Rai/Moi	-	-	-	-	-	-	-	-	-	-
16	Mahul	3	0	4	0	1	0	8	0	2	2
17	kasi	2	0	1	0	-	-	-	-	-	-
18	Jamun	-	-	-	-	1	0	-	-	-	-
19	Sidha	7	1	3	0	-	-	-	-	-	-
20	Tentuli	-	-	-	-	-	-	-	-	-	-
21	Anla	-	-	-	-	-	-	-	-	-	-
22	Salai	-	-	-	-	-	-	-	-	-	-
23	Bela	-	-	-	-	-	-	-	-	-	-
24	Kusum	3	0	-	-	-	-	1	1	-	-
25	Amba	-	-	-	-	-	-	-	-	-	-
26	Kumbhi	6	0	-	-	-	-	-	-	-	-
27	Teak	12	0	-	-	-	-	-	-	-	-
28	Misc	44	0	10	0	4	0	1	0	3	0
	Total	158	1	56	1	42	1	43	1	37	5

ABSTRACT

Range - Hemgir
Forest Block - Dhanubans R.F

Nos of trees (Girth Class - wise)

		30-60 CM		60-90 CM		90 - 120cm		120 - 150 cm		150 cm & above	
		S	US	S	US	S	US	S	US	S	US
1	Sal	74	61	72	30	37	20	46	10	59	7
2	Asan	8	8	16	1	5	0	3	0	6	1
3	Bija	14	0	21	1	5	0	0	0	0	0
4	Dhaura	6	9	7	7	4	1	4	0	0	1
5	Bandhan	0	0	0	0	0	0	0	0	0	0
6	Mundi	4	5	7	1	1	2	0	0	3	0
7	Gambhar	0	0	0	0	0	0	0	0	0	0
8	Kurum	0	0	0	0	0	0	0	0	0	0
9	Sisoo	0	0	0	0	0	0	0	0	0	0
10	Kendu	7	14	11	7	14	4	5	2	4	1
11	Bahada	3	1	3	1	1	0	1	1	2	0
12	Harida	3	1	0	1	1	1	0	0	1	0
13	Char	30	14	7	1	2	0	0	0	0	0
14	Neem	0	0	0	0	0	0	0	0	0	0
15	Rai/Moi	7	16	10	10	5	5	2	1	0	1
16	Mahul	4	14	6	2	8	4	1	6	3	0
17	kasi	6	2	2	1	1	1	0	0	0	0
18	Jamun	0	2	0	0	2	0	1	1	1	0

19	Sidha	5	8	0	1	0	0	0	1	0	0
20	Tentuli	0	0	0	0	0	0	0	0	0	0
21	Anla	2	1	1	0	0	0	0	0	0	0
22	Salai	4	2	9	1	1	1	0	0	1	0
23	Bela	0	0	0	0	0	0	0	0	0	0
24	Kusum	1	5	3	2	3	1	0	0	0	0
25	Amba	0	0	0	0	0	0	0	0	0	0
26	Kumbhi	0	5	1	1	0	0	0	0	0	0
27	Teak	0	0	0	0	0	0	0	0	0	0
28	Misc	53	86	36	22	6	8	2	1	0	3
	Total	231	254	212	90	96	48	65	23	80	14

ABSTRACT

Range - Hemgir
Forest Block - Garjanpahad R.F (73 Plots)

Nos of trees (Girth Class - wise)

		30-60 CM		60-90 CM		90 - 120cm		120 - 150 cm		150 cm & above	
		S	US	S	US	S	US	S	US	S	US
1	Sal	195	46	142	23	106	13	69	7	46	4
2	Asan	93	14	51	5	24	4	15	0	12	0
3	Bija	25	1	11	2	6	2	1	0	1	0
4	Dhaura	44	14	23	5	19	2	5	0	5	1
5	Bandhan	7	0	0	0	0	0	1	0	0	0
6	Mundi	13	2	5	0	2	0	2	0	3	0
7	Gambhar	5	1	1	0	0	0	0	0	0	0
8	Kurum	3	0	3	0	0	0	0	0	0	0
9	Sisoo	0	0	0							
10	Kendu	157	36	81	11	58	9	17	6	22	2
11	Bahada	13	2	15	0	11	1	1	0	2	0
12	Harida	4	0	8	0	2	0	0	0	1	0
13	Char	181	17	34	6	1	0	2	0	0	0
14	Neem	6	1	1	0	0	0	2	0	0	0
15	Rai/Moi	21	1	10	2	1	1	0	0	0	0
16	Mahul	49	1	40	1	26	0	11	1	14	0
17	kasi	8	0	2	0	3	0	1	0	0	0
18	Jamun	12	2	16	6	6	0	4	2	2	0

19	Sidha	75	6	29	2	12	1	2	0	0	0
20	Tentuli	0	0	0	0	0	0	0	0	0	0
21	Anla	5	0	1	0	0	0	0	0	0	0
22	Salai	7	0	2	0	2	0	1	1	0	0
23	Bela	4	0	4	0	0	0	0	0	0	0
024	Kusum	3	1	5	0	4	0	2	1	5	1
25	Amba	0	0	0	0	0	0	0	0	0	0
26	Kumbhi	13	0	7	0	0	0	0	0	0	0
27	Teak	0	0	0	0	0	0	0	0	0	0
28	Misc	466	111	91	21	39	9	8	1	6	1
	Total	1409	253	582	84	322	42	144	19	119	9

ABSTRACT											
Range - Lephripara Forest Block - Tinkinala D.P.F											
Nos of trees (Girth Class - wise)											
Sl. No	Species										
		30-60 CM		60-90 CM		90 - 120cm		120 - 150 cm		150 cm & above	
		S	US	S	US	S	US	S	US	S	US
1	Sal	47	0	71	2	36	0	9	10	4	4
2	Asan	7	0	3	0	-	-	-	-	-	-
3	Bija	4	0	3	0	-	-	-	-	-	-
4	Dhaura	6	0	5	1	1	0	-	-	-	-
5	Bandhan	-	-	-	-	2	0	-	-	-	-
6	Mundi	-	-	-	-	-	-	-	-	-	-
7	Gambhar	-	-	-	-	-	-	-	-	-	-
8	Kurum	-	-	-	-	-	-	-	-	-	-
9	Sisoo	-	-	-	-	-	-	-	-	-	-
10	Kendu	11	0	9	0	2	0	-	-	-	-
11	Bahada	2	0	-	-	-	-	-	-	-	-
12	Harida	-	-	-	-	-	-	-	-	-	-
13	Char	18	0	4	0	-	-	-	-	-	-
14	Neem	-	-	-	-	-	-	-	-	-	-
15	Rai/Moi	1	0	1	0	-	-	-	-	-	-
16	Mahul	4	0	6	0	2	2	1	1	-	-
17	kasi	-	-	-	-	-	-	-	-	-	-
18	Jamun	-	-	-	-	-	-	-	-	-	-

19	Sidha	-	-	-	-	-	-	-	-	-	-
20	Tentuli	-	-	-	-	-	-	-	-	-	-
21	Anla	-	-	-	-	-	-	-	-	-	-
22	Salai	-	-	-	-	-	-	-	-	-	-
23	Bela	-	-	-	-	-	-	-	-	-	-
24	Kusum	-	-	-	-	-	-	-	-	-	-
25	Amba	-	-	-	-	-	-	-	-	-	-
26	Kumbhi	-	-	-	-	-	-	-	-	-	-
27	Teak	-	-	-	-	-	-	-	-	-	-
28	Misc	1	0	-	-	-	-	-	-	-	-
	Total	101	0	102	3	43	2	10	11	4	4

ABSTRACT

Range - Lephripara
Forest Block - Bahala D.P.F

Nos of trees (Girth Class - wise)

Sl. No	Species										
		30-60 CM		60-90 CM		90 - 120cm		120 - 150 cm		150 cm & above	
		S	US	S	US	S	US	S	US	S	US
1	Sal	46	10	59	10	16	10	8	3	1	0
2	Asan	43	3	12	0	3	0	-	-	1	0
3	Bija	2	0	3	0	2	0	-	-	-	-
4	Dhaura	23	0	16	0	2	0	-	-	-	-
5	Bandhan	2	1	-	-	-	-	-	-	-	-
6	Mundi	2	0	-	-	-	-	-	-	-	-
7	Gambhar	-	-	-	-	-	-	-	-	-	-
8	Kurum	-	-	-	-	-	-	-	-	-	-
9	Sisoo	-	-	-	-	-	-	-	-	-	-
10	Kendu	33	7	20	5	13	2	-	-	-	-
11	Bahada	-	-	1	0	-	-	-	-	-	-
12	Harida	-	-	1	0	0	1	-	-	-	-
13	Char	86	0	15	0	-	-	-	-	-	-
14	Neem	-	-	-	-	-	-	-	-	-	-
15	Rai/Moi	1	0	13	0	2	0	-	-	-	-
16	Mahul	14	0	12	0	8	1	-	-	-	-
17	kasi	-	-	-	-	-	-	-	-	-	-
18	Jamun	8	0	3	4	4	0	-	-	-	-
19	Sidha	5	1	3	0	0	1	-	-	-	-

20	Tentuli	-	-	-	-	-	-	-	-	-	-
21	Anla	1	0	-	-	-	-	-	-	-	-
22	Salai	4	0	5	0	1	0	-	-	-	-
23	Bela	-	-	-	-	-	-	-	-	-	-
24	Kusum	-	-	4	1	2	1	-	-	-	-
25	Amba	-	-	-	-	-	-	-	-	-	-
26	Kumbhi	3	0	-	-	1	0	-	-	-	-
27	Teak	-	-	-	-	-	-	-	-	-	-
28	Misc	41	2	6	0	2	0	1	0	-	-
	Total	314	24	173	20	56	16	9	3	2	0

ABSTRACT

Range - Gopalpur

Forest Block - Kalatpani R.F (8 Plots)

Nos of trees (Girth Class - wise)

Sl. No	Species										
		30-60 CM		60-90 CM		90 - 120cm		120 - 150 cm		150 cm & above	
		S	US	S	US	S	US	S	US	S	US
1	Sal	6	1	3	-	2	1	1	-	-	-
2	Asan	9	2	2	1	8	2	1	-	-	-
3	Bija	-	-	1	-	4	1	-	1	-	-
4	Dhaura	8	1	12	1	14	2	-	-	-	-
5	Bandhan	-	-	-	-	-	-	-	-	-	-
6	Mundi	-	-	4	2	2	-	-	-	1	-
7	Gambhar	-	-	-	-	-	-	-	-	-	-
8	Kurum	-	-	-	-	-	-	-	-	-	-
9	Sisoo	-	-	-	-	-	-	-	-	-	-
10	Kendu	6	3	5	1	12	2	3	-	3	-
11	Bahada	-	-	-	-	1	-	1	-	2	-
12	Harida	1	-	-	-	2	1	-	1	-	-
13	Char	9	-	3	-	2	-	-	-	-	-
14	Neem	-	-	-	-	-	-	-	-	-	-
15	Rai/Moi	1	-	5	1	4	-	2	-	-	-
16	Mahul	5	-	2	2	4	2	2	-	1	-
17	kasi	-	-	-	-	-	-	-	-	-	-

18	Jamun	1	-	-	-	-	-	-	-	-	-
19	Sidha	12	2	4	2	-	-	1	-	-	-
20	Tentuli	-	-	-	-	-	-	-	-	-	-
21	Anla	-	-	-	-	-	-	1	-	-	-
22	Salai	-	-	-	-	-	-	-	-	-	-
23	Bela	-	-	-	-	-	-	-	-	-	-
24	Kusum	-	1	-	-	1	-	-	1	-	-
25	Amba	-	-	-	-	-	-	-	-	-	-
26	Kumbhi	-	-	-	-	-	-	-	-	-	-
27	Teak	-	-	-	-	-	-	-	-	-	-
28	Misc	20	15	7	6	6	7	2	-	1	-
	Total	78	25	48	16	62	18	14	3	8	-

ABSTRACT

Range - Gopalpur
Forest Block - Pungipahar R.F. (6 Plots)

Nos of trees (Girth Class - wise)

Sl. No	Species										
		30-60 CM		60-90 CM		90 - 120cm		120 - 150 cm		150 cm & above	
		S	US	S	US	S	US	S	US	S	US
1	Sal	11	4	2	1	2	4	1	1	-	1
2	Asan	14	-	2	-	1	-	-	-	1	-
3	Bija	1	-	-	-	-	-	-	-	-	-
4	Dhaura	19	4	3	2	1	-	-	-	-	1
5	Bandhan	-	-	-	-	-	-	-	-	-	-
6	Mundi	1	-	-	2	1	1	-	-	-	-
7	Gambhar	-	-	-	-	-	-	-	-	-	-
8	Kurum	-	-	-	-	-	-	-	-	-	-
9	Sisoo	-	-	-	-	-	-	-	-	-	-
10	Kendu	21	-	9	-	4	1	-	-	-	-
11	Bahada	-	-	-	-	-	-	-	-	-	-
12	Harida	3	-	-	1	-	-	-	-	-	-
13	Char	29	-	6	-	1	-	1	-	-	-
14	Neem	-	-	-	-	-	-	-	-	-	-
15	Rai/Moi	10	-	13	1	-	-	-	-	-	-
16	Mahul	5	-	5	-	-	-	-	-	1	-

17	kasi	-	-	-	-	-	-	-	-	-	-
18	Jamun	-	-	-	-	-	-	-	-	-	-
19	Sidha	-	-	-	-	-	-	-	-	-	-
20	Tentuli	-	-	-	-	-	-	-	-	-	-
21	Anla	1	-	-	-	-	-	-	-	-	-
22	Salai	5	-	2	-	4	-	1	-	-	-
23	Bela	-	-	-	-	-	-	-	-	-	-
24	Kusum	1	-	-	-	-	-	-	-	-	1
25	Amba	-	-	-	-	-	-	-	-	-	-
26	Kumbhi	-	-	-	-	-	-	-	-	-	-
27	Teak	-	-	-	-	-	-	-	-	-	-
28	Misc	58	31	10	1	2	1	-	2	3	-
	Total	179	39	52	8	16	7	3	3	5	3

ABSTRACT

Range - Bargaon				Forest Block - Panchra North R.F							
Nos of trees (Girth Class - wise)											
Sl . No	Species										
		30-60 CM		60-90 CM		90 - 120cm		120 - 150 cm		150 cm & above	
		S	US	S	US	S	US	S	US	S	US
1	Sal	27	0	52	2	9	5	0	1	0	2
2	Asan	10	0	9	0	2	0	-	-	-	-
3	Bija	-	-	-	-	-	-	-	-	-	-
4	Dhaura	3	0	5	0	2	1	-	-	0	1
5	Bandhan	-	-	-	-	-	-	-	-	-	-
6	Mundi	-	-	-	-	-	-	-	-	-	-
7	Gambhar	-	-	-	-	-	-	-	-	-	-
8	Kurum	-	-	-	-	-	-	-	-	-	-
9	Sisoo	-	-	-	-	-	-	-	-	-	-
10	Kendu	3	0	7	0	4	0	-	-	1	0
11	Bahada	3	0	1	0	-	-	-	-	-	-
12	Harida	1	0	-	-	-	-	-	-	-	-
13	Char	5	0	15	0	3	0	1	0		
14	Neem	-	-	-	-	-	-	-	-	-	-
15	Rai/Moi	-	-	-	-	-	-	-	-	-	-
16	Mahul	1	0	3	0	-	-	1	0	0	1
17	kasi	-	-	-	-	-	-	1	0	-	-

18	Jamun	2	0	1	0	-	-	-	-	-	-
19	Sidha	3	0	3	0	-	-	-	-	-	-
20	Tentuli	-	-	-	-	-	-	-	-	-	-
21	Anla	-	-	-	-	-	-	-	-	-	-
22	Salai	-	-	-	-	-	-	-	-	-	-
23	Bela	-	-	-	-	-	-	-	-	-	-
24	Kusum	-	-	3	0	-	-	-	-	-	-
25	Amba	-	-			-	-	-	-	-	-
26	Kumbhi	1	0	1	0	-	-	-	-	-	-
27	Teak					-	-	-	-	-	-
28	Misc	15	0	22	0	1	1	-	-	-	-
	Total	74	0	122	2	21	7	3	1	1	4

ABSTRACT

Range - Bargaon
Forest Block - Panchra South R.F

Nos of trees (Girth Class - wise)											
Sl . No	Species										
		30-60 CM		60-90 CM		90 - 120cm		120 - 150 cm		150 cm & above	
		S	US	S	US	S	US	S	US	S	US
1	Sal	32	0	14	5	0	3	0	2	0	0
2	Asan	8	0	4	0	1	0	0	0	0	0
3	Bija	-	-	-	-	-	-	-	-	-	-
4	Dhaura	12	1	4	0	2	0	1	0	0	5
5	Bandhan	-	-	-	-	-	-	-	-	-	-
6	Mundi	-	-	-	-	-	-	-	-	-	-
7	Gambhar	-	-	-	-	-	-	-	-	-	-
8	Kurum	-	-	-	-	-	-	-	-	-	-
9	Sisoo	-	-	-	-	-	-	-	-	-	-
10	Kendu	2	0	9	0	2	0	3	0	1	0
11	Bahada	0	0	1	0	-	-	-	-	-	-
12	Harida	-	-	-	-	-	-	-	-	-	-
13	Char	52	0	14	0	1	0	-	-	-	-
14	Neem	-	-	-	-	-	-	-	-	-	-
15	Rai/Moi	8	0	4	0	1	0	-	-	-	-
16	Mahul	4	0	-	-	3	0	-	-	-	-
17	kasi	-	-	-	-	-	-	-	-	-	-

18	Jamun	-	-	-	-	-	-	-	-	-	-
19	Sidha	1	0	1	0	1	0	-	-	-	-
20	Tentuli	-	-	-	-	-	-	-	-	-	-
21	Anla	1	0	-	-	-	-	-	-	-	-
22	Salai	-	-	-	-	-	-	-	-	-	-
23	Bela	-	-	-	-	-	-	-	-	-	-
24	Kusum	-	-	-	-	-	-	-	-	-	-
25	Amba	-	-	-	-	-	-	-	-	-	-
26	Kumbhi	1	0	-	-	-	-	-	-	-	-
27	Teak	-	-	-	-	-	-	-	-	-	-
28	Misc	1	2	5	0	-	-	-	-	-	-
	Total	122	3	56	5	11	3	4	2	1	5

Comparative Statement Of Nos Of Tree Per Ha.

SUNDARGARH DIVISION

Name of the block Enumerated	No.of trees per ha. As per previous Enumeration				No.of trees per ha. As per Test Enumeration			
	I	II	I	II	I	II	I	II
	Sal		Others		Sal		Others	
Bahala PRF	5.36	9.18	1.81	3.45	1	11	1	1
Tamkina	0	0	0	2	6.66	15		1.66
Barbahali DPF	4	6	7	10.75	8	28.33	2.66	7.33
Dhanubanas RF	3.81	10.03	0.62	3.63	20	16.96	8.48	9.68
Garjanpahad RF	164	5.53	0.94	2.52	4.42	6.72	6.90	7.69
Punjipahad RF	0	0	0	0.77	1.66	3.33	11.66	6.66
Kalatpani RF	0	0	0.38	2.63		1.25	10	20
Panchara (N) RF	0.09	0.43	0.09	0.26	4	2	6	6
Panchara (N) RF	0	0	0	0.48		4	12	8
Chhengapahad Rf	2.57	7.81	0.67	3.24	20	14	8	15

PART-I
Chapter-VII
ESTIMATE OF CAPITAL VALUE OF FORESTS

7.1 Total area of 94 R.Fs, 26 P.R.Fs and 92 D.P.Fs covered under this plan is 176536.36 ha. The Forest types, crop composition, crop quality, crop density etc of the growing stock are not uniform through out the Division but vary from place to place. Even variations are noticed within the same block and compartment. To have a realistic estimate of the capital value of the standing crop, we must have a complete set of information /data on growing stock. Information have been collected through enumeration, Stock mapping & Compartment inspection etc., but due to factors like vastness of the forest area, heterogeneity of vegetation, relatively low intensity of enumeration etc, it is difficult to make proper estimate of the capital value of the growing stock of the Division. However attempt has been made to calculate capital value basing on the available data /information. For the purpose of estimation of the population, volume and capital value of the growing stock, following facts have been taken into consideration.

- 1.** Out of 94 RFs, 26 PRFs and 92 DPFs, growing stock of 10 RFs and three PRFs have been enumerated. There was no tree of exploitable girth available in Lalma R.F. So ten forest blocks have been included in Selection Working Circle.
- 2.** The enumerated area is 335 ha which is 0.191 percent of the total forest area of the Division excluding area under village forests and un-classed forest.

3. The standing crop in rest of the forest blocks does not have sufficient growth for enumeration i.e. percentage of trees of higher girth class is very less for any effective enumeration. Hence, it is not possible to estimate the growing stock in these blocks.
4. Intensity of enumeration is one percent and it has been carried out by linear strip sampling method. The total enumerated area of 10 RF and 3 PRF blocks is 335.0 ha.
5. For growing stock of trees having 30 cm. girth at breast height and above trees have been enumerated and grouped into 27 different species. Other trees are grouped into miscellaneous category.
6. Stock mapping of growing stock has been carried out for the whole Division in 212 forest blocks and stock maps have been prepared.
7. Comparison with previous enumeration data is not feasible as no enumeration had been carried out during the preparation of the plan.
8. Local volume equations developed by Forest Survey of India based on forest inventory of some portions of Orissa have been used for estimating the volume of the growing stock.
9. Thus estimation of capital value of 13 forest blocks over an area of 335.0 ha. has been done.

7.2 The unit volume of timber has been calculated by the method prescribed by Memo No.12224 (4)/5F ST-20/81 dt.7.6.1982 and No.17544/5F.ST-20/83 dt. 4.9. 1987 of Principal Chief Conservator of Forests, Orissa, Bhubaneswar. As per these circulars, the ratio for conversion into units is presented in the following table. Ratio for conversion into 'UNITS'.

Girth class (in cm.)	1 st Class Species	2 nd Class Species	3 rd Class Species
Less than 60 cm.	0.25	0.12	0.06
60 - 89	0.50	0.25	0.12
90 - 119	1.00	0.50	0.25
120 to 149	2.00	1.00	0.50
150 to 179	4.00	2.00	1.00
180 and above	6.00	3.00	1.50

1st Class - Sal, Sissoo, Bandhan, Gambhar, Mundi, Bija

2nd Class - Kasi, Asan, Mango, Kendu, Jamu, Dhaura.

3rd Class - All other species except Teak and Sandal wood.

The unit value of timber is taken at Rs.583/- .This is obtained by taking average of the unit value of Selection coupes of this Division last operated during 93-94.

7.3 IN SITU CAPITAL VALUE OF GROWING STOCK

The total unit value of the enumerated forest blocks can be obtained by multiplying the unit value for each girth class with the estimated number of trees. The total units of timber available are presented here under.

ESTIMATED TOTAL UNITS SPECIES WISE AND GIRTH CLASS WISE

Total area of 13 Forest blocks: 33084.01 hectares

Area of Enumeration: 335 ha.

Sl. No.	Species	30-59 cm	60-89 cm	90-119 cm	120-149 cm	150 cm and above	Total
1	Sal	303772	413746	444996	356197	254398	1773109
2	Asan	38436	34825	16250	8600	5200	103311
3	Bija	12900	16099	17900	9999	7600	64498
4	Dhaura	16956	16932	9525	3000	1900	48313
5	Bandhan	3750	3750	1800	1000	0	10300
6	Mundi	1284	875	1100	1700	1000	5959
7	Gambhar	850	900	100	400	0	2250
8	Kurum	3600	3050	3800	1800	2400	14650
9	Sissoo	500	350	0	200	0	1050
10	Kendu	57743	46700	29750	13100	17200	164493
11	Bahada	714	1392	700	950	1100	4856
12	Harida	1890	1740	1400	450	0	5480
13	Char	33120	9336	1625	100	0	44181
14	Neem	0	0	0	0	0	0
15	Rai/Moi	8448	7320	3725	1850	900	22243
16	Mahul	15036	18999	18700	15000	11200	78935
17	Kasi	2592	3250	1750	1300	800	9692
18	Jamun	9756	10950	9000	4500	3200	37406
19	Sidha	12312	7400	4000	1500	2200	27412
20	Tentora	1932	2050	1400	800	800	6982
21	Anla	2010	828	200	0	0	3038
22	Salai	588	1752	3200	2600	1900	10040
23	Bela	462	156	75	0	0	693
24	Kusum	624	1176	1100	2900	1400	7200
25	Amba	1572	1125	750	1400	1600	6447
26	Kumbhi	1974	2580	475	50	0	5079
27	Misc.	39000	21084	11125	5400	3000	84688
	TOTAL	571821	625365	584446	434796	317798	2534226

7.4 ESTIMATION OF POPULATION OF GROWING STOCK

As mentioned earlier 13 forest blocks have been enumerated with the linear strip sampling method with the enumeration intensity of about one percent and while carrying out enumeration exercise, the forest blocks have been taken as a unit. The population of different species in different girth classes has been computed block wise. For this purpose, following empirical formula has been used.

P	=	$P_e \times \frac{A_t}{A_e}$

where, P_e = Population of tree species 'S' in girth class 'x-y' in the forest block 'A'

A_t = Total area of forest block 'A'

A_e = Enumerated area of forest block 'A'

The growing stock of RF blocks of Chhatamb, Bhaisamunda and many others have not been enumerated. For above mentioned forest block, enumeration figures of the adjoining and nearby RF blocks having similar type of crops have been taken into account. The girth class wise population of different species in these forest blocks has been computed by using empirical formula applicable for enumerated forest blocks. Many RF and PRF blocks are having degraded forest vegetation and are to be managed under Rehabilitation Working Circle. Girth class wise total population of different species in these blocks has been computed using following empirical formula.

$$P_t = P_{avg} \times A \times Y$$

Where P_{avg} = Average per ha. population of species 'S' in girth class 'x-y' in enumerated forest blocks.

A = Area of remaining un-enumerated forest blocks.

Y = Numerical factor which varies with girth class and has been arrived on the basis of field observations.

The value of numerical factor 'Y' for different girth classes has been taken as given below:

Y = 0.40 for 30-59 cm. girth class.

Y = 0.30 for 60-89 cm. girth class.

Y = 0.25 for 90-119 cm. girth class.

Y = 0.15 for 120-149 cm. girth class.

Y = 0.05 for 150 cm. and above girth.

Using above cited empirical formulate, the total population of different species in different girth class in all the 314 nos. of forest blocks have been computed and is furnished in the following table.

Sl. No.	Species	30-59 cm	60-89 cm	90-119 cm	120-149 cm	150 cm and above	Total
1	Sal	12,15,088.98	8,27,492.49	4,44,995.96	1,78,098.38	63,599.42	27,29,275.23
2	Asan	3,20,297.08	1,39,298.73	32,499.70	8,599.92	2,599.98	5,03,295.41

3	Bija	51,599.53	32,199.71	17,899.84	4,999.95	1,899.98	1,08,599.01
4	Dhaura	2,82,597.43	1,41,098.72	38,099.65	5,999.95	1,899.98	4,69,695.73
5	Bandhan	14,999.86	7,499.93	1,799.98	499.99	0	24,799.76
6	Mundi	10,699.90	3,499.97	2,199.97	1,699.98	499.99	18,599.82
7	Gambhar	3,399.97	1,799.98	99.99	199.98	0	5,499.94
8	Kurum	14,399.87	6,099.94	3,799.96	899.99	599.99	25,799.75
9	Sisoo	1,999.98	699.99	0	99.99	0	2,799.96
10	Kendu	4,81,195.62	1,86,798.30	59,499.46	13,099.88	4,299.96	7,44,893.22
11	Bahada	11,899.89	11,599.89	2,799.97	1,899.98	1,099.98	29,299.72
12	Harida	31,499.71	14,499.87	5,599.95	899.99	0	52,499.52
13	Char	5,51,994.97	77,799.29	6,499.94	199.99	0	6,36,494.19
14	Neem	0	0	0	0	0	0
15	Rai/Moi	1,40,798.72	60,999.44	14,899.86	3,699.97	899.99	2,21,297.98
16	Mahul	1,25,298.86	76,999.29	37,399.65	14,999.86	5,599.95	2,60,297.61
17	Kasi	21,599.80	12,999.88	3,499.97	1,299.98	399.99	39,799.63
18	Jamun	81,299.27	43,799.61	17,999.84	4,499.96	1,599.98	1,49,198.67
19	Sidha	1,02,599.08	29,599.73	7,999.93	1,499.99	1,099.99	1,24,798.72
20	Tentuli	16,099.86	8,199.93	2,799.98	799.99	399.99	28,299.76
21	Anla	33,499.96	6,899.94	799.99	0	0	41,199.89
22	Salai	9,799.91	14,599.87	12,799.88	5,199.95	1,899.98	44,299.59
23	Bela	7,699.93	1,299.98	299.99	0	0	9,299.91
24	Kusum	10,399.91	9,799.91	4,399.96	5,799.95	1,399.99	31,799.72
25	Amba	32,899.70	21,499.81	1,899.98	99.99	0	56,399.48
26	Kumbhi	32,899.70	21,499.81	1,899.98	99.99	0	56,399.48
27	Misc	6,49,994.15	1,75,698.42	44,499.59	10,799.90	2,999.97	8,83,992.03
	Total	42,36,823.98	19,17,282.58	7,66,657.32	2,67,297.49	93,599.1	72,81,660.47

7.5 VOLUME EQUATIONS

Volume equations have been used for computing the volume of growing stock. As mentioned earlier, these volume equations for some important species have been developed by Forest Survey of India, Dehradun. These local volume equations have been derived on the basis of forest inventory done by FSI in the forests of Sambalpur Division, Koraput Division and few other areas of Orissa. In a particular volume equation 'V' represents the under bark round timber volume of standing tree in cum and 'D' is the over bark diameter at breast height in mts. The local volume equation gives the volume of the main stem upto the point where stem can not be differentiated from the branches. The following table gives local volume equations for different species.

Name of the Species	Local volume equations	Remarks
1	2	3

Sal	$\sqrt{V} = 0.19994 + 4.57179 D - 1.56823 \sqrt{D}$	Based on the forest inventory of Sambalpur
Bija	$\sqrt{V} = 0.16276 - 2.82002 D + 0.04034 D^2$	-do-
Asan	$V = 0.05061 - 1.11994 D + 8.77839 D^2$	-do-
Dhaura	$V = 0.13928 - 2.87067 D + 20.22404 D^2 - 13.80572 D^3$	-do-
Kendu	$\sqrt{V} = 0.06728 + 4.06351 D - 0.99816 \sqrt{D}$	-do-
Kurum	$V = 0.08507 + 0.19669 D + 7.16812 D^2$	-do-
Kasi	$\sqrt{V} = 0.1162 + 4.12711 D - 1.08508 \sqrt{D}$	-do-
Jamu	$\sqrt{V} = 0.30706 + 5.12731 D - 2.0987 \sqrt{D}$	-do-
Sidha	$V = 0.07199 - 1.25923 D + 9.28416 D^2$	-do-
Bandhan	$\sqrt{V} = 0.03456 + 3.81921 D - 0.80884 \sqrt{D}$	-do-
Bahada	$V = 0.14823 + 2.44138 D - 6.86434 D^2 + 18.05444 D^3$	-do-
Moi	$V = 0.01071 - 0.66528 D + 9.54478 D^2 - 4.58876 D^3$	-do-
Karda	$\sqrt{V} = 0.12956 + 3.7819 D - 1.04671 \sqrt{D}$	-do-
Salai	$V = 0.36432 - 1.32768 D + 9.48471 D^2$	-do-
Simul	$V = 0.02834 + 4.68381 D^2$	-do-
Sissoo	$V = 0.00965 + 0.58546 D + 2.5605 D^2 + 24.34215 D^3$	-do-
Mundi	$V = 0.08444 - 1.26801 D + 8.75274 D^2$	Based on the forest inventory done by F.A.O.
Tentra	$V = 0.27 - 2.953 D + 12.836 D^2$	-do-
Kumbhi	$V = 0.003 - 0.848 D + 7.342 D^2$	-do-
Anla	$V = 0.406 + 3.54 D - 3.231 D^2$	-do-
Mahul	$V = 0.10423 - 1.38429 D + 8.39379 D^2$	Based on the forest inventory of Korapur.
Misc.	$\sqrt{V} = 0.06063 + 3.43666 D - 0.75571 \sqrt{D}$	Based on the forest inventory of Sambalpur.

For the tree species, e.g., Char, Harida, Rai, Dhubeni, Bheru, Sunari, Bel, Kusum, Amba, Kadamba and Teak volume equations are not available. Hence, for these species, volume equation applicable for miscellaneous species is used.

7.6 VOLUME OF GROWING STOCK

Using above local volume equations, girth class wise volume of growing stock has been computed. While computing the volume of a particular tree species in a particular girth class, diameter corresponding to mid-girth class has been taken as a representative of that girth class. The value of 'D' for different girth classes has been taken as below:

D	=	0.14 m for girth class	30-59 cm.
D	=	0.24 m for girth class	60-89 cm.

D	=	0.33 m for girth class	90-119 cm.
D	=	0.43 m for girth class	120-149 cm.
D	=	0.53 m for girth class	150 cm and above

7.7 SELLING RATES OF ROUND TIMBER AT ROURKELA O.F.D.C. DEPOT

Following table gives girth class wise approximate selling rates for different species at Rourkela O.F.D.C.Depot. These rates have been deduced from the selling rate provided by O.F.D.C.Ltd and are approximate in nature. These rates are for the financial year 1996-97.

Species	30-59 cm.	60-89 cm.	90-119 cm.	120-149 cm.	150 cm. above
(1)	(2)	(3)	(4)	(5)	(6)
Sal	2100.00	3800.00	5600.00	7200.00	7500.00
Asan	1250.00	2000.00	2300.00	2700.00	3000.00
Bija	2200.00	3900.00	5800.00	7500.00	9500.00
Dhaura	1400.00	2750.00	3700.00	4000.00	4500.00
Kendu	1150.00	2100.00	2300.00	2500.00	2800.00
Bandhan	1700.00	3550.00	3800.00	4200.00	5000.00
Kurum	1450.00	3100.00	4100.00	4800.00	6500.00
Mundi	1250.00	2050.00	2500.00	2600.00	3000.00
Gambhari	2450.00	4000.00	5800.00	8200.00	10500.00
Sissoo	5500.00	9200.00	11800.00	13800.00	15500.00
Char	1100.00	2000.00	2200.00	2400.00	2600.00
Bahada	1200.00	2000.00	2200.00	2400.00	2600.00
Harida	1200.00	2000.00	2200.00	2400.00	2600.00
Moi	700.00	1100.00	1200.00	1300.00	1450.00
Rai	700.00	1100.00	1200.00	1300.00	1450.00
Mahul	1200.00	2000.00	2200.00	2400.00	2600.00
Kasi	1700.00	3700.00	4400.00	5100.00	6700.00
Jamu	1400.00	2750.00	3700.00	4000.00	4500.00
Sidha	1200.00	2000.00	2200.00	2400.00	2600.00
Tentra	1400.00	3400.00	3700.00	5100.00	6100.00
Dhuben	1000.00	1800.00	2000.00	2200.00	2300.00
Bheru	750.00	950.00	1050.00	1100.00	1200.00
Anla	1200.00	2000.00	2200.00	2400.00	2600.00
Salai	700.00	1100.00	1200.00	1300.00	1450.00
Karada	1200.00	2000.00	2200.00	2400.00	2600.00
Sunari	750.00	950.00	1050.00	1100.00	1200.00

Bel	1000.00	1800.00	2000.00	2200.00	2400.00
Semul	700.00	1100.00	1200.00	1300.00	1450.00
Kusum	1200.00	2000.00	2200.00	2400.00	2600.00
Amba	900.00	1400.00	1700.00	2000.00	2200.00
Kadam	1400.00	2750.00	3700.00	4000.00	4500.00
Kumbhi	750.00	950.00	1050.00	1100.00	1200.00
Teak	5500.00	9200.00	11800.00	13800.00	15500.00
Misc.	1200.00	2100.00	2300.00	2500.00	2700.00

7.8 PRODUCTION COST OF ROUND TIMBER

It has been hypothetically assumed that all standing crop will be clear felled and converted into round timber, firewood and Bamboo sale units at the site by the O.F.D.C.Ltd. and then afterwards will be transported to their depot at Rourkela for selling purpose. All these process of felling, logging, conversion, transportation etc. involve huge amount of expenditure. For estimating the in situ capital value of standing crop (round timber) it is necessary to estimate the production cost of round timber which will be inclusive of expenditure incurred at the site, transportation cost and cost incurred at the depot.

Estimation of volume of the growing stock

The total in situ capital value of the growing stock is as under

- (1) Total estimated units of growing stock = 2534226.
- (2) Unit value = Rs.583/-
- (3) Total in situ value of the growing stock = Rs.1,47,74,53,758/-

7.9 ESTIMATION OF CAPITAL VALUE OF FIRE WOOD

The forest of this division is primarily of broad leave deciduous type. In this type of forest about 20% of total volume of tree constitutes the fire wood. Species-wise volume estimation of the round timber of growing stock of girth 30 cm. and above has been done and these figures have further been used for estimating the volume of fire wood portion of the standing crop empirical formula has been used.

$$V_f = 0.25 \times V_r$$

Where V_r = Total volume of round timber of species 'S' in 314 nos. of forest blocks in girth class 30 cm. and above.
 V_f = Total volume of firewood of species 'S' in 314 nos. of forest blocks in girth class 30 cm. and above.

Using above mentioned method, total fire wood volume of all the species has been roughly computed. The total fire wood volume of different species has been converted into equivalent weight by multiplying volume with specific gravity (at oven dry weight and green volume) selling rate of fire wood has been taken as Rs.200.00 per MT at Rourkela.

PRODUCTION COST OF FIREWOOD

Estimated value of firewood comes to Rupees fifty crores only. For estimating the insitu capital value of firewood portion of the standing crop, it is necessary to estimate the production cost of firewood. Production cost will be inclusive of expenditure incurred in conversion of lops and tops, stacking at site, transportation cost and cost incurred at depot. In situ capital value of growing stock of firewood comes to Rupees fifty crores approximately.

7.10 ESTIMATE OF CAPITAL VALUE OF BAMBOOS

Enumeration of bamboo in the bamboo bearing forest area of various RF and PRF blocks has also been done simultaneously alongwith the enumeration of tree species. While carrying out bamboo enumeration only number of culms per clump has been counted and girth and length of each have not been measured. Since the selling rate of bamboo culms varies as per length and girth class, so the average in situ capital value of each culm has been taken at Rs. 2.00 basing on above facts and assumptions, total insitu capital value of bamboo forest of the Division comes out to be Rs.5.00 crores. The O.F.D.C.Ltd has not worked bamboo coupes during 1999-2001 due to non-availability of bamboo in bamboo coupes. However, it is expected that bamboo production will improve after silvicultural operations are taken up. The bamboo working has been started from 2005 onwards in this Division.

7.11 TOTAL IN SITU CAPITAL VALUE OF GROWING STOCK (Round timber, fire wood and bamboos)

(i)	Total insitu capital value of round timber	=	Rs. 147.74 crores
(ii)	Total insitu capital value of firewood	=	Rs. 50.00 crores
(iii)	Total insitu capital value of bamboos	=	Rs. 5.00 crores
	So, the total in situ capital value of growing stock	=	Rs. 202.74 crores

7.12 ASSESSMENT OF ENVIRONMENTAL VALUE OF THE FOREST

Forest is a vast treasure of various valuable resources. It provides both tangible and intangible benefits to the living beings. Apart from providing timber, firewood, fodder, fruits, seeds, resin, gums, tans, medicinal herbs and various others non-timber products, it also provides many other benefits which are observed in day to day activities. The immense biomass of the forest continuously improves the quality of the atmosphere by absorbing harmful gases like Carbon dioxide etc. and by releasing Oxygen in the environment. Forest is also a large reservoir of both surface and underground water. Forests have capacity to retain soil with water and prevent soil erosion. Forest improves the fertility of the soil by providing essential organic matter to the soil. Forest cover improves the landscape to great extent and enhances the aesthetic value of surrounding environment. It is also a great source of recreation for the living beings.

Keeping in view the above cited tangible and intangible benefits provided by the forest eco-system the environmental value of one hect. of fully stocked forest having density 1.0 is computed at Rs.126.74 lakhs to accrue over a period of 50 years. It improves water retaining capacity, prevents soil erosion, improves fertility of soil and provides many other benefits. The value of forest of Sundergarh Division comes to Rs.1550 crores per year at an average density of 0.5 for all categories of forests.

Environmental value of the forest is comprehensive in nature and is inclusive of so many tangible and intangible values. From the above computations, it is evident that the capital value of the forest of Sundargarh Division is less than 8 percent of the environment value. Though, the timber, firewood, bamboo etc. are apparently major forest produce from commercial point of view but their overall contribution in the welfare of the living beings is small fraction as compared to other benefits provided by the forest. Hence, we have to be very cautious regarding felling of the trees and should make all possible efforts to conserve and preserve this valuable natural resource in perpetuity.

PART-I

Chapter-VIII

WILDLIFE

8.1 GENERAL HISTORY

8.1.1 Orissa comes under the bio-geographical zone of Deccan peninsula. The central or core area of Indo-Malayan or Oriental realm containing tropical forests represent the richest bio-geographic area from biodiversity point of view. The wildlife existing in Orissa is classified under the Indian Peninsular sub-region that forms a part of the Oriental Zoogeographical realm of the world.

8.2 WILDLIFE MANAGEMENT IN PREVIOUS PLANS

The forest of Sundergarh was very rich with diverse flora and fauna in the past. Massive hunting of tiger and regular poaching of other animals took place in the past by the Ex-rulers of Sundergarh and by poachers. The Ex-rulers of Sundargarh District took up unabated poaching of animals and specific control measures were not implemented. The tribals of Sundargarh forest, encroachers inside the forests and local people were very often indulging in 'Shikar' and that resulted in low population of animals, unbalanced prey-predator ratio, high rate of mortality, low birth rate of herbivores, migration of animals and destruction of habitat. There was tremendous decrease in population of wild animals, loss of cover and habitat due to destruction of forests. The density of forest in majority of forest blocks of

Ujalpur, Sundargarh and Badgan Ranges decreased considerably and that resulted in loss of cover for the animals.

The water sources, both annual and perennial decreased in the past due to diversion of stream near forest areas by the local inhabitants and encroachers for the purpose of cultivation. Diversion of streams, nallah and small water sources for agriculture purposes forced the animals to migrate to distant areas in search of water during pinch period. In the past severe damage was caused to wild animals' habitat due to large scale reclamation of forest area and resettlement of revenue villages inside the forests. The removal of timber by various agencies in the past, mining activities, human interference, new village settlements as encroachments inside forest areas, opening of new roads, illicit felling of trees and rapid urbanization and industrialization have shown adverse effects on the wild animals and their population has decreased considerably. The list of injury caused to human beings, crop damage, house damage and cattle damage along with compensation paid to the victims are given in **Annexure 39,40,42,43,44 and 45(Page 286,286 to287,288,289,290, &290 of Volume II).**

8.3 PRESENT STATUS OF WILDLIFE

The general census report along with information on man-animal conflict is given in **annexure 37 and 38 (Page 285 of volume II).** The herbivores and birds are thriving well in the forests of Sundergarh Division but carnivores have become almost extinct from this Division according to census report. It shows that hidden poaching of carnivores is taking place. The encroachers and tribals, who want to save their domestic cattle from predation by carnivores, are killing the carnivores. The male, female and calves ratios are not maintained in all animals except elephants. Tiger (*Panthera tigris*) was available plentifully in Chhatamb R.F., Haldipani R.F., Athakosia R.F., Gajanpahad R.F., Dhanubans R.F., but due to increase in population their numbers have decreased through out the division. Jungle cats are seen in almost all R.F. Wild boar is available in plenty in Garjanpahad R.F., Dhanubans R.F. and Jamkini R.F. Hidden poaching of wild boar was reported in Athakosia R.F. Sloth Bear is common in Garjanpahad R.F. and Dhanubans R.F. Sloth bear are very often attacking human beings due to fragmentation of habitat and non-availability of food. Spotted deer are available in Jamkani R.F., Dhanubans R.F. and Garjanpahad R.F and most of the dense forest blocks.

The elephants are found roaming in all the seven ranges of Sundargarh Divisions. The elephant migrate from Jharkhand state and Chhatisgarh state through different routes and intermixing with elephants of Orissa is commonly available. The best home ranges of elephants are Jamkani R.F., Garjanpahad R.F., Dhanubans R.F. and Punjipahad R.F.in Gopalpur range. In Hemgir range, Chhengapahad R.F. provides shelter to elephants. These

habitats are the original home of elephants and migration through corridors and intermixing with other elephants are very common. The migratory path of elephants sometimes changes and they keep moving in herd of 3 to 12 elephants through different forest blocks. Bison have become extinct from the division. Haeyana, porcupine, barking deer, monkey, rhesus macaque, mongoose and hare are commonly available in almost all the bigger forest blocks of Sundargarh division. The important migratory routes of elephants should be joined with corridors and human habitations in that area should be evicted. The man-elephant conflict takes place in the migratory routes because adequate food and water are not available in the area. The prey-predator ratio is highly imbalanced and association among wild animals has reduced.

8.4 SANCTUARY AND NATIONAL PARK

There are no Sanctuary and National Parks existing in this Division.

8.5 RIGHTS AND CONCESSIONS

After the enactment of Wild Life (Protection) Act, 1972 and its further amendments, the Ex-rulers of Sundargarh and the common citizens of Sundargarh have no rights regarding poaching, shooting and trade in wild animals and wild life articles.

8.6 COMMON INJURIES TO WILD LIFE

There are many factors responsible for causing damage to wild lives and destroying food, water, cover and instinctive needs of animals. They are discussed below.

8.6.1 Destruction of habitat

There has been massive destruction of habitat due to illicit felling of trees and encroachments inside forest areas, removal of trees, destruction of forests cover, collection of NTFP by local tribals, diversion of water course of nallah and stream for agricultural purposes, cultivation of agriculture crops inside encroached areas, infestation by weeds in blank areas, decrease in cover of wild animals due to removal of trees from forest area and interference by local habitants inside the forest. Major predators, i.e., tiger and leopard are not available in forest according to census report.

8.6.2 Lack of food

There is tremendous shortage of food for both predators and prey inside the forest. The bamboo is not available in sufficient quantity for elephants and as a result the elephants are migrating to different areas. Tall grasses, which were available in plenty in the past, have decreased and small grasslands have been converted into agricultural fields by encroachers. The ambush cover has decreased and ungulate population is unable to breed successfully. There is acute shortage of fruit bearing trees for herbivores including monkeys and elephants. Due to lack of grazing land, frequent forest fire, hunting, lack of water and lack of cover, the breeding among herbivores is not taking place properly. As a result, herbivores population has decreased tremendously. The number of prey has decreased and as a result, the number of predators has decreased.

8.6.3 Lack of Water

There is one major river, Ib river flowing in this Division. Other perennial streams like Ichha nala, Basundhara nala, Garia nala, Saphei nala etc are flowing inside the forest. The local encroachers have diverted most of the perennial streams for agricultural purposes. During summer, the animals are migrating to different places in search of water.

8.6.4 Lack of Cover

Due to massive destruction of forest, decrease in density of the forest, encroachment by human population, increase in number of domestic cattle, grazing and frequent fire, the cover of animals have decreased. As a result breeding among the animals, increase in population and development and growth of the animals is poor. The male-female ratio is not balanced and lack of cover is coming in way to breeding. There is definite loss of natural vegetal cover due to decrease in density of forests. Non-vegetal cover i.e. caves etc. are available. Refuge cover has decreased in Sundargarh, Ujalpur and Badgaon Range due to heavy destruction of forests. Ambush cover is available in almost all the Ranges. Loafing cover is available in Gopalpur, Hemgir and Lephripara Range. Breeding cover is available in all Ranges and it has decreased slightly in Sundargarh, Ujalpur and Badgaon Ranges due to industrialization. Roosting cover for birds is sufficient throughout the Division.

8.6.5 Departmental Working of Timber

In the past departmental working of timber was taken up without giving full consideration to wild lives and as a result the wild animals population has decreased. Snags are less and there are gaps created by local inhabitants between patches of forest area. The growth of bamboo is stagnated at many places and weeds have replaced the grasses and grassland. Continuous patch of forest is seen in Hemgir and Gopalpur Ranges. Weed eradication and silvicultural operation of bamboo clumps are immediately required.

8.6.6 Plantation Programme

Massive plantations were taken up along with trench fencing in most of RFs, PRFs and DPFs. Common species, which have been planted, are Teak, Eucalyptus, Acacia, Chakunda and Gambhari etc. These commercial plantations have adversely affected the wild animals' habitat.

8.6.7 Encroachment

The number of wild animals is much below the carrying capacity of forest area because the number of local cattle inside the forest has increased tremendously. The encroachers and local inhabitants are keeping plenty of cows, buffaloes, goats and sheep. These domestic animals are grazing inside the forest, polluting water of streams, nalla and ponds and spreading diseases among wild animals. The wild animals, both herbivores and carnivores are migrating to different places in search of food and water.

8.6.8 Diseases

Common diseases observed are Anthrax, Foot and Mouth diseases etc. Vaccination of domestic cattle is essentially required through out the Division.

8.6.9 Fire

Annual fires are reported throughout the Division in most of the forest blocks. Fire destroys the organic matter, burns grass and calfs of animals inside the grasses. The wild animals loose their cover due to frequent fire and are forced to migrate to different areas. Fire control measures are required to be adopted to save the habitat especially in Garjanpahad R.F., Dhanubans R.F., Athakosia R.F. and Kiralaga R.F.

8.6.10 Increasing demand of forest product

The demand of forest product, i.e., timber, fire wood, fodder, NTFP, bamboo and other forest products has increased due to pressure of industrialization and urbanization through out the Division. It has adversely affected the ecological balance of the area.

8.6.11 Poaching

The local tribals and encroachers of the Division very often go for hunting of the animals. It needs to be checked by regular patrolling in the area and punishing the offenders by legal measures. The poaching cases have been detected and prosecutions have been sent to Court for trial. The details are given in **annexure 41(Page 288 of Volume II)**. The compensation paid for human kills are given in annexure 42. The damage caused to houses by wild animals, cattle lifted, crop damaged, and compensations paid are mentioned in **Annexures 39,40,43, 44 and 45(Page 286,286 to 287,289, 290 &290 of Volume II)..**

8.6.12 Method of hunting and shooting

The hunting and shooting of wild animals by common citizens, Ex-Rulers and poachers are stopped completely according to Wild Life (Protection) Act, 1972. For research work, scientific proposes and for animals, which are, causing threat to life and property of common citizens, special permission from Chief Wild Life Warden, Orissa, Bhubaneswar is required.

8.7 EXISTING SALT LICKS AND WATER HOLES

(A) Number of Game Tanks and their location

There are three Game Tanks in this Division, which are as follows:

<u>Location</u>	<u>Range</u>
1. Giripahada RF	Hemgir Ranger
2. Budhajharan RF	Ujalpur Range

(B) Number of Salt licks and their location

One natural salt lick is available in Garjanpahad RF of Hemgir Range near Sukhabandh village. It is proposed to create ten new salt licks at different places throughout the division.

(C) Number of watch tower and their location:

There is no watch tower in this

Division.

8.8 WILD LIFE RULES

Prior to enactment of Wild Life (Protection) Act, 1972, the following legislations of the Ex-Rulers and State Government were in operation in Sundargarh Division.

1. The Reserved Forests Shooting Rules.
2. The Elephant Preservation Act, 1879.
3. The Wild Birds and Animals Protection Act.

The rules and laws were comprehensive in nature but there was no provision for controlling trade, imposing penalties on poachers and enforcing wild life protection rules on offenders. The Wild Life (Protection) Act 1972 enacted by the Central Government and subsequent Wild life (Protection), Orissa Rules, 1974 has brought some changes. As a result, poaching and trade of wild animals have reduced. The Divisional Forest Officer, Sundargarh (T) has been declared as Ex-officio Wild Life Warden in respect of Sundargarh (T) Division.

PART-I

Chapter-VIII

WATER SHED, HYDROLOGY AND SOIL EROSION

9.1 GENERAL

A good chunk of geographical area is under forest cover with adequate forest growth. A good nos. of streams is flowing through this Division but most of them are non-perennial. Hence, from watershed point of view all the existing forest area need to be properly managed. Two important rivers Ib and Brahamani are flowing through un-divided Sundargarh Division. Ib on the Western side and Brahamani on the Eastern side make the middle portion of the Division well drained and dry. These rivers are fed by several perennial and non-perennial streams as detailed in Chapter 1. After re-organisation, Brahamani flows in Rourkela Division.

There are several minor irrigation projects in this Division. Out of those, Sarapgarh Dam and Rengali Dam is worth mentioning. The soil conservation works taken up by Forest Department are negligible although there is scope for check dams, water harvesting structures and mini-watersheds inside forest.

9.2 SOIL EROSION

Denudation of forest growth results in soil erosion and once it is started will continue till the complete devastation of the whole area. The importance of forest in changing the micro climate, increasing the number of rainy days, regulating the water in streams, reducing silt load in rivers and streams ultimately increases the longevity of multi-purpose river valley projects for power generation. Soil erosion is wide spread especially in Khalsa and Hatibari areas by the cultivators of marginal lands particularly in the areas where a dry nalla flows. Such nallas are blocked at various points and its banks are widened gradually for cultivation.

Mining operation involve extensive excavation of forest land and are causing considerable damage to forest crop and are responsible for soil erosion. Decrease in forest cover increases water run off and increases the risk of flood. No specific fund for watershed development, prevention of soil erosion has been allotted to this Division over the years. Due to paucity of funds no significant work has been taken up in this Division as regard to watershed development and soil conservation measures.

The maximum temperature experienced in this Division is 45.5⁰ centigrade during the month of May and June where as the minimum temperature is 6 degree centigrade recorded in the month of January. The details of rain fall have already been furnished in Chapter-I of Part-I. The details of agricultural practices have been furnished in Chapter-III. Degraded forest areas requiring immediate rehabilitation measures have been dealt in Rehabilitation Working Circle and appropriate treatment measures for such areas have been dealt in that chapter. A good number of Mining Projects are in operation through out this Division. These mining operations involve extensive as well as intensive excavation of the prime forest land and are thus causing considerable damage to the forest vegetation and are responsible for soil, water and noise pollution. Detailed treatment measures to these mining effected areas have been furnished in Part-II of this plan under different working circles.

Though water harvesting structures have not been taken up by Forest Department in this Division, 641 nos. of water harvesting structures have been constructed by Soil Conservation Department in this Division which includes reservoirs, diversion weirs, D/bund barrages etc from the year 1970-71 to 2000-01. An amount of Rs.385 .1966 lakh have been spent on these operations. Moreover 384.8 hectares of Sisal plantation at 13 sites 63 hectares

of miscellaneous plantation at 17 sites have been taken up by Soil Conservation Department in this Division. In the forest areas wind erosion is the most common type of erosion. The rate of run off of water in forest area is regulating information of gully especially in hilly area. Gully plugging and construction of check dams are required in most of RFs of Lephripara Range, Hemgir Range and Badgaon Range.

9.3 RIVER SYSTEM AND CATCHMENTS

River Brahamani and Ib are two main river flowing through old Sundergarh District. Sankha and Koel, the two tributaries of river Brahamani unite at Vedavyash, 1 Km. from Panposh on the up stream side. This confluence place, Vedavyash, is considered as a sacred place and people from far and near come here to offer their prayer to deity Siva in the 'Mahasivaratri' every year and a grand mela for seven days is celebrated here with much pump & ceremony. Now, Vedvyas is in Rourkela Division. The river Ib originating from Madhya Pradesh enters this Division in the north-west corner at Telijore and after traversing a long way from north to south emerges from this Division at Daldali, almost in the south-west corner. The District headquarter of Sundergarh is located on the eastern bank of this river.

The main feeder tributaries of river Ib are Dangrongjor, Bandojor, Gahira, Khudung, Saraswati, Ichha nalla etc. Saphai nalla is the biggest tributary of this river which meets at Remonda. The Westren side of this river is drained by Basundhara nalla which meets the river at Rajpur of Sambalpur District

These rivers are perennial in nature and water flow continues during summer also. These rivers have to play major role in the forest management of this Division. The presence or Hirakud Dam on river Mahanadi demands the up keep of the catchments areas belonging to this Division and necessitates proper management of the existing forest. The denuded forest land of Bihar and Madhya Pradesh in the catchments area of these rivers contributes to the irregular water flow besides soil erosion and requires proper management of the forest of this Division to get sustained water flow in these rivers.

9.4 WORKS OF IMPROVEMENT UNDERTAKEN

The works of improvement regarding soil conservation and watershed taken up by forest department are very less. The soil conservation works of Soil Conservation Department are included in **Annexure 46(Page 291 to 310 of Volume II)..**

PART – II

Chapter - I BASIS OF PROPOSAL

10.1 GENERAL CONSIDERATIONS

Forest plays a multi-dimensional role in sustaining all kinds of life forms and majority of life forms are dependent upon forest for their requirements. This is true especially for Sundargarh Division which is inhabited mainly by tribals and rural people. The rapid depletion and degradation of forests is primarily due to poverty and population growth which are responsible for increasing demand on forests for fuel wood, fodder and timber etc. Keeping in view the above circumstances and National Forest Policy 1988, the basic aim of management of the forest covered under this plan will be to fulfill the increasing demand of forest produce without disturbing the environmental stability and ecological balance which are vital for the sustenance of all life forms.

10.2 GENERAL OBJECTIVES OF MANAGEMENT

The general objective of management is to restore forests of Sundergarh Division to normalcy with indigenous flora and fauna. The objectives shall be achieved by taking suitable silvicultural, rehabilitation and afforestation measures. The general objectives of management set for this working plan are as follows:

1. To prevent degradation of environment by restricting felling of trees and giving emphasis on conservation of flora and fauna.
2. To improve the condition, composition and productivity of the existing forests by enriching the standing crop through scientific management.

3. To meet the requirements of local people living in and around forest areas.
4. To rehabilitate the barren and degraded forest areas and mining degraded areas through artificial regeneration and soil conservation measures.
5. To provide employment to poor people living in and around forest areas by involving them in various forestry operations.

10.3 METHOD OF TREATMENT TO BE ADOPTED

To fulfill the above cited objectives, required change in management practices has been made and forest areas have been allotted to different working circles. In the outgoing plan and prior to that best Sal forest areas lying on moderately hilly and plain areas were kept under Sal Conversion Working Circle with the objective to convert the irregular crop to more or less even aged crop and to obtain sustained yield of timber of high quality. Most of these objectives could not be achieved due to various constraints and adverse factors like increasing population pressure, uncontrolled fire hazards, excessive grazing, illicit removal of trees and continuous operation of large number of mining projects in these areas. In most of these areas, regeneration is poor in general and even absent in some localities. Status of pole crop which serves as future crop is also not satisfactory. These forests will be worked under selection system with the objective to take up suitable silvicultural operations including opening of the canopy in order to create favorable conditions for natural regeneration.

Most of the forests which have been worked under selection system in the past are having limited number of exploitable girth class trees at present. Hence, restricted marking and felling is proposed for all the forest areas which are to be worked under Selection System and more emphasis will be given on subsidiary silvicultural operations for improving the quality of growing stock. The guidelines issued by Government of India with regard to implementation of Forest Conservation (Amendment) Act, 1988, clearly restricts the management of forest under coppice system. Moreover, it has been found in the past that the main objectives like improvement in the quality and quantity of crop, better coppicing etc. from the forest area maintained under coppice system could not be achieved due to want of various silvicultural and tending operations accompanied with other adverse factors. Natural regeneration is sufficient in many areas because root stock is available in plenty. Most of the trees left as standards have been removed illegally by local inhabitants. Because of these factors, these forest areas are to be managed under Selection, Rehabilitation and Plantation Working Circle in the present plan.

The potentiality of bamboo forests have reduced to an alarming level. There is an urgent need to increase the potential of these forests, preferably through cultural operations and by following cutting rules at the time of working of clumps. It should be kept in mind that natural vegetation, however, inferior it may be, is not to be replaced by monoculture or with

plantation of fast growing exotic species. The existing growth in the natural forest will be improved and it will be planted with the species natural to these areas. Keeping the view above facts and objectives following working circles have been formed for the purpose of better management of forests for coming ten years. Considering the above facts the present working plan proposes following nine Working Circles.

1. Selection Working Circle
2. Rehabilitation Working Circle
3. Protection (overlapping) Working Circle
4. Plantation(Over lapping) Working Circle
5. Bamboo(Overlapping) Working Circle
6. NTFP(Overlapping) Working Circle
7. Village Forest Working Circle
8. Wild life (Overlapping) Working Circle
9. Eco-Restoration (Overlapping) Working Circle

1. SELECTION WORKING CIRCLE

This Working Circle includes the Sal as well as miscellaneous forests available in the terrain varying from level plain to steep hilly slopes. Forest areas which were worked under Sal Conversion Working Circle, Selection-cum-Improvement Working Circle and Coppice with Reserve Working Circle in the previous Plan are included in this Working Circle for improvement of forest growth. In addition to these areas, the Working Circle also includes three PRF. These PRF and RF blocks will be worked for first time under a regular scientific management system. The total area of this Working Circle is 23221.99 Ha.

2. REHABILITATION WORKING CIRCLE

This Working Circle includes forest areas which have degraded to great extent. The average crop density of these areas is less than 0.4. The worked out coppice areas, old plantation areas, 87 RF Blocks , 23 PRF blocks and 92 DPF have been allotted to this Working Circle. The PRF and DPF blocks have degraded type of growth. The main objective of this Working Circle is to provide rest to these areas covered for the plan period and to restock them adequately by suitable rehabilitation and afforestation measures. Then the area will be restocked with commercially valuable species. The objective also includes reclaiming shifting cultivated and encroachment areas through social, administrative and silvicultural measures. The total area under this Working Circle is 98381.38 hectares.

3. PROTECTION (OVERLAPPING) WORKING CIRCLE

The Working Circle overlaps other other working circles. The forest blocks which are having more biotic pressure and having specific problems and requiring specific

silvicultural requirement such as (i) Ecologically fragile areas (ii) Areas under active encroachment for cultivation and habitation purposes. The main objective of this Working Circle is to provide stringent protection measures to vulnerable forest blocks to illicit felling.

Forest Blocks bordering state boundary have been kept in the WC.

4. PLANTATION WORKING CIRCLE

The present condition of the areas allotted to this Working Circle is due to excessive biotic pressure and extraction without silvicultural operations. The Working Circle includes the areas of plantation Working Circle of the outgoing plan and the old existing plantations. This includes the areas having blank stretches of forest land in the forest blocks allotted under Rehabilitation Working Circle. It is stated in the review of past management of this Working Circle that afforestation area were rarely successful except for a few patches. Due to absence of regular and coordinated effort with advance planning and adequate resources, the efforts of creating man-made forests are not encouraging. The plantation areas of the past due to their excessive failure are allotted to be worked under this Working Circle.

Main objective of this Working Circle is to reforest the barren and depleted areas as quickly as possible, rotation is of theoretical value for this Working Circle. Programmes of plantations are prepared to create and expand forest resource base especially for the need of the people and as source of industrial raw materials. Since natural regeneration is less in barren/depleted areas, regeneration will be done through artificial means.

5. BAMBOO (OVERLAPPING) WORKING CIRCLE

This Working Circle is large and overlaps a portion of Selection Working Circle. It falls only in Hemgir and Gopalpur Ranges where bamboo occurs. Hence, this Working Circle shall overlap the bamboo forest area of other Working Circles in the proposed plan. This Working Circle covers an area of 30,361.95 ha. approximately in 8 RFs i.e Garjanpahad, Chengapahad, Hundarkhol, Giripahad RFs of Hemgir Range and Garjanpahad, Budapahad, Jamkani, Kalatpani, Dhanubans RFs of Gopalpur Range and Ostali PRF, Bahala PRF, Latiapani DPF and Arjunda DPF.

6. NTFP (OVERLAPPING) WORKING CIRCLE

This overlapping Working Circle includes all other Working Circles except the areas under the Protection Working Circle. The term Non-Timber Forest Produce (NTFP) includes all forest produce except timber, small timber and fuel wood of Sundargarh Forest Division. The tribals who constitute major part of population (50.74%) along with other rural people are dependent on forest produce for sustenance. Non-Timber Forest Produce can provide increased employment opportunities and has income generating capabilities. The high potential of NTFP should be utilized through scientific management aided by research, acquisition of technology and peoples participation.

7. VILLAGE FOREST WORKING CIRCLE

The plantations raised by the Social Forestry Project in Sundargarh Division have been declared as Village Forests by the State Government in accordance with Section-30 (I) of Orissa Forest Act, 1972. These areas are notified and have been included in the Working Circle. Village Forests cover an area of 1048.10 Ha in 146 villages situated within Sundargarh Division.

8. WILD LIFE (OVERLAPPING) WORKING CIRCLE

The Working Circle includes the Wildlife (overlapping) Working Circle and the Recreation Working Circle of the out going plan. Hence, the Working Circle includes all forest areas having importance of wildlife and recreation of Sundargarh Division. In the past, under the patronage of Ex-rulers, the Sundargarh Division was rich in wildlife, both in variety and numbers. However, during the past few decades due to various adverse factors the population of wild animals has diminished and some of them are on the verge of extinction. Wild life is an integral part of forest ecosystem and there is need to protect them and improve their habitats by suitable protective measures.

9. ECO-RESTORATION (OVERLAPPING) WORKING CIRCLE

The working circle includes all forest areas of old Recreation Working Circle and areas of aesthetic importance. For city dwellers and industrial workers, a biological park on the lines of Nandankanan at Sundargarh shall be planned. This will create awareness among the visitors and improve their concern for the cause of protection, preservation and propagation of both flora and fauna for bio-aesthetic purposes. Efforts shall be made to restore ecosystem to normalcy through development measures.

The Archeology Department of Orissa has identified 19 archaeological sites in Lephripara, Gopalpur and Hemgir Ranges of the Division which are located inside Ushakothi PRF, Jamkani, Chhengapahad, Dhanubans and Garjanpahad RFs. These archeological sites have prehistoric rock carvings and paintings and adjoining forests have tremendous archeological importance. The pre-historic sites along with the forest vegetation inside the RFs will make excellent centers of eco-tourism in the area. The Division has undertaken the development of these sites with financial assistance from State Archeology Department during 2000. Further, Minor Irrigation Department has constructed many small reservoirs at Sarapgarh and Rengali adjoining to the forest areas. Permanent closed cover is maintained at

hill slopes and catchments of reservoirs to check soil erosion, maintain hydrological cycle and regulate water supply.

10.4 ALLOTMENT OF AREA TO DIFFERENT WORKING CIRCLES

The present Working Plan covers forest blocks consisting of 94 RFs, 26 PRFs, 92 DPFs and 146 village forests. All the blocks and compartments have been shown in management, stock and other maps. The compartment boundaries are based generally on natural features. Some new compartments have been constituted in revised plan. The allocation of blocks, compartments and sub-compartments in different working circles are presented in respective Working Circle Chapters. An abstract of Range wise and forest blocks wise allotment of area to various Working Circle is presented in **Annexure 46 (page 290 to 309 of volume II)**.

10.5 BLOCKS AND COMPARTMENTS

There is no change in the names of Reserve Forest blocks dealt with in the outgoing plan. The Proposed Reserve Forest blocks notified as RFs have now been incorporated in the present plan. In addition to these 26 PRF blocks, 92 DPF blocks have been incorporated in this plan for the first time. Area of all RF and PRF blocks has been computed from the latest topographical sheets of scale 1:25,000. Most of the PRF & DPF blocks were not depicted in the latest topographical map of Survey of India. Such PRF and DPF blocks were transformed from trace maps of Scale 4"=1 mile to latest topo maps of scale 1:25,000 by co-ordinate method. Computed area of some of the RF, PRF, DPF block do not tally with the corresponding notified areas as maintained in the records of Division Office.

All the RF blocks have been divided into compartments and demarcated in the field on the basis of conspicuous topographical features. Compartments have been formed and delineated in topographical maps only for the RF, PRF and DPFs. All the Compartment line of various blocks have been demarcated on the ground by giving double rings of white paints on prominent trees at breast height.

10.6 PERIOD OF PLAN AND NECESSITY FOR INTERMEDIATE REVISION

This Working Plan has been prepared for a period of 10 years commencing from the year 2014-15 to 2023-24 Intermediate revision is not anticipated. However, if situation warrants, intermediate revision shall be taken up with the approval of the Working Plans Committee.

PART – II

Chapter - II

SELECTION WORKING CIRCLE

11.1 GENERAL CONSTITUTION

Ten well-stocked forest blocks having density higher than 0.5 coupled with moderate to excellent regeneration and higher degree of bio-diversity are allotted to Selection Working Circle. The forest area under this Working circle is distributed over 7 RFs and 3 PRFs. Selection, Conversion and Coppice un-worked areas of the out going plan are included in this Working Circle. For the first time PRF, blocks with adequate number of maturing /matured trees have been incorporated in revised working plan. Total area allotted to the Selection Working circle is 23221.99 ha.

11.2 CHARACTER OF VEGETATION

The forest allotted to this Working Circle fall mainly under Moist Peninsular and Dry Peninsular Sal Forests. The high level Moist Peninsular Sal Forest occurs in upper slopes and hills of Dhanubans, Garjanpahad and Chhengapahad RFs. These areas contain mostly laterite soil and granite rocks. Here the sal is of quality III and IV and crop is slightly open. The crop density varies from 0.4 to 0.8. The regeneration is adequate but fire hazard is the limiting factor for establishment of the seedlings. The common associates of sal are *Terminalia tomentosa*, *Anogeissus latifolia*, *Syzygium cuminii* etc.

The low level Moist Peninsular Sal Forest occurs in lower hill slopes of Dhanubans, Garjanpahad, Chhengapahad and Bahala PRF. The soil in these localities is clayey loam or alluvium. Sal constitutes 40 to 50 percent of standing crop and the crop density varies from 0.5 to 0.8. The regeneration is good. Due to occurrence of annual fire and severe biotic pressure, establishment of seedlings is poor. In general, the quality of Sal is III.

The Dry Peninsular Sal Forest occurs in Panchora North, Panchora South and Kalatpani RF blocks. Soil in these localities is derived usually from crystalline and metamorphic rocks and is shallow in nature. Sal forms 25 to 40 percent of standing crop and its quality is IV. The crop density varies from 0.4 to 0.6. Regeneration of sal is fairly good.

Here common associates of sal are *Terminalia tomentosa*, *Adina cordifolia*, *Terminalia chebula*, *Buchanania lanzan* etc. The PRF blocks Bahala, Tamkinala and Badbahali are having mostly quartz schist and quartzite type of rocks with sandy loam soil. The lower hill slopes and low-lying areas are covered with quality III sal and upper slope ridges and hill tops are having sal forests confirming to quality IV. The density of crop is more than 0.5 and regeneration is adequate.

Moist mixed deciduous Forest with Sal is present in Kalatpani, Chhengapahad and Punjipahad RF. Regeneration of Sal and other species varies from fair to good. The crop density varies from 0.4 to 0.6. The bamboo occurs extensively in Dhanubans and Garjanpahad RF. Among the bamboo species, *Dendrocalamous strictus* (Salia bamboo) is the most important species available in these blocks.

11.3 SPECIAL OBJECTIVES OF MANAGEMENT

The special objectives of management set for this Working Circle are within the scope and ambit of the general objectives of management of the Working Plan. The objectives are as follows:

- (i) To build up the growing stock and improve the stand structure and to encourage natural regeneration by taking suitable silvicultural operations with emphasis on soil and water conservation measures.
- (ii) To remove the mature and silviculturally available trees before they become unsound on sustainable basis.
- (iii) To maintain and improve biodiversity of forest blocks.

11.4 AREA STATEMENT

The following table gives Range, block and compartment wise distribution of RF and PRF blocks allotted to this working circle.

Felling Series-wise Area of Selection Working Circle

Sl No	Name of Felling Series	Name of the Range	Name of R.F.	Compartments	R F Area in Ha
1	2	3	4	5	6
1	Panchara FS	Bargaon	Panchara (North)	1 to 4	1153.39
		Bargaon	Panchara (S)	1 to 3	607.05
		Total			1760.44
2	Kalatpani FS	Gopalpur	Kalatpani	1 to 9	792.80
		Gopalpur	Punjipahad	1 & 2	611.09
		Total			1403.89

3	Garjanpahad FS	Gopalpur	Garjan-pahad- Part	1 to 16	4090.65
4	Dhanubans FS	Gopalpur	Dhanubans (P)	11 to 17	2023.57
		Hemgir	Dhanubans (P)	1 to 10	4208.00
		Total			6231.57

5	Chhenga- pahad FS	Hemgir	Chenga- pahad	1 to 4	1017.41
		Hemgir	Barbahali PRF	Entire	400.65
		Total			1418.06
6	Hemgiri FS	Hemgir	Garjanpahad (Part)	17 to 30	5947.47
7	Bahala FS	Lephripara	Bahala PRF	1 to 3	1095.11
		Lephripara	Tamkinala PRF	1 to 4	1274.80
		Total			2369.91
	Grand Total:-				23221.99

11.5 ANALYSIS AND VALUATION OF CROP

As recommended in 2nd PWPR one percent enumeration by systematic strip sampling method was conducted in 11 Forest blocks. Enumeration details of these blocks are furnished in Chapter 6. After enumeration, it was found that Lalma RF does not contain matured/maturing trees and it was excluded from SWC and included in rehabilitation working circle. The crop composition shows that all the forest blocks are dominated by sal trees.

11.6 SILVICULTURAL SYSTEM

Selection-cum-Improvement system will be adopted with emphasis on sustainable production and stability of the ecosystem. The failure of conversion to uniform system adopted in the out going plan has necessitated the adoption of this silvicultural system.

11.7 CHOICE OF SPECIES

No species will be preferred at the cost of miscellaneous species. The emphasis is on conservation of bio-diversity and development of balanced forest in which natural selection of species will be encouraged. Sal is the most important species in all forest blocks of this Working Circle and is to be treated as principal species. In addition Bija, Sissoo, Gambhar, Halanda are also to be treated as principal species. Asan, Kurum, Dhaura, Kasi, Mundi, Bandhan, Tendra and bamboo are to be treated as secondary species. Fruit bearing and NTFP yielding species such as Mahul, Amba, Anla, Bahada, Tentuli, Karanja, Jamu, Char and Bela etc are to be treated as guest species. Rest other species will be given due importance.

11.8 EXPLOITABLE GIRTH CLASS

The exploitable girth class fixed for various species is based on the silvicultural rotation period. The other factors such as production capacity, growth, yield, demand, site quality, and size beyond which the unsoundness begins to develop etc. have also been taken into account. The exploitable girth of different species at g.b.h is provided in the following table.

<u>Species</u>	<u>Exploitable girth at breast height</u>
1. Sal	150 cm and above
2. Bijasal, Gambhar, Haland, Kasi, Mundi, Moi, Asan, Kurum	150 cm. and above
3. Bandhan	120 cm and above
4. Miscellaneous	150 cm and above

11.9 FELLING CYCLE

Felling cycle is fixed at 10 years which synchronises with the period of the Working Plan.

11.10 ROTATION

From silvicultural point of view, the concept of rotation may not be applicable to the selection system as under this system the forest area is to be reworked after fixed interval known as “Felling Cycle”. However, the theoretical rotation may be taken as the age at which the principal species attains exploitable girth, i.e, where the MAI (Mean Annual Increment) curve meets CAI (Current Annual Increment) curve on stem timber volume consideration. From this point of view, the rotation for sal may be taken as 120 years.

11.11 CALCULATION OF YIELD

The yield has been regulated by area with a percentage check as removal of selection trees arrived at by Smythie’s safeguard formula. For rate of growth and other statistics pertaining to sal All India Yield Table has been referred. The numerical check has been computed for sal only basing on following assumptions and facts.

- (i) The exploitable trees already exist and young recruit are available everywhere and not in any particular compartment only. Felling passes regularly through the forests in consecutive annual coupes in felling cycle of 10,15,20,25 or 30 years.
- (ii) The basic objective of management is to ensure sustained and increased yield of exploitable trees above the exploitation limit in every felling cycle.

- (iii) The middle aged and younger diameter classes are well represented and present rate of recruitment into two highest diameter classes (I and II) will not decrease for a few decades.
- (iv) Sustained yield of Selection trees is adequately safeguarded, if the number of trees to be felled is limited to the number that grows by the time one felling cycle is complete.

According to the Smythie's safeguard formula, the number of Class-II trees (X) per ha that pass into class-I within the felling cycle is determined by following formula.

$$X = \frac{F(B - Z \% \text{ of } B)}{T} \quad \text{--- (1)}$$

where **B**=No. of trees in pre-exploitable girth class or approach class (120-150 cm for Sal and others, 90-120 cm. for Bandhan)

X= Number of trees in approach class which passes into the exploitable class.

F=Felling cycle. (10 years)

T= Time period in years that takes approach class to pass into exploitable class (Here 40 years)

Z= Percentage of Class II trees that do not pass into class I in T years, due to mortality or removal or thinning etc.

The percentage of trees available for exploitation (Y) is calculated as follows.

$$Y = \frac{X}{(I + X/2)} \times 100 + A \quad \text{--- (2)}$$

where **A** = Arbitrary value to get the round figure of Y

X = Number of trees in approach class which passes into the exploitable class.

I = Number of trees already existing in the exploitable class.

If the value of **X** as per equation (1) is substituted in the equation (2) the resulting equation is as follows.

$$Y = \frac{2 F B (100 - Z)}{200 I T + F B (100 - Z)} \times 100 + A \quad \text{--- (3)}$$

The value of **T** is 36 years for average site quality III. In respect of irregular sal forests, the value of **T** and **Z** as per yield table are 39 years and 43 %. In hill forests, the value of **T** and **Z** for sal in this plan is 40 years and 43 % and for other species 40 years and 50 percent.

By substitution of these values of **T** and **Z** in equation (3), we get

$$\text{For Sal } Y = \frac{114 B}{(800 I + 57 B)} \times 100 + A$$

$$\text{For others } Y = \frac{10B}{80 I + 5B} \times 100 + A \quad \text{if } T \propto Z \text{ for other species are 40 years and 50\% respectively.}$$

YIELD CALCULATION TABLE

Sl. N o.	Name of the block Enumerated	No. of trees				Yield (Y) %		Tree limit / ha.		Total
		Sal		Others						
		I	II	I	II	Sal	Others	Sal	Others	
1	Chhengapahad RF – 10.50 ha.	2.57	7.81	0.67	3.24	35.6	46.58	0.91	0.31	1.2
2	Bahala PRF -11.00 ha.	5.36	9.18	1.81	3.45	21.7	21.23	1.17	0.39	1.6
3	Tamkinala PRF – 12.8 ha.	0	0	0	2	0	0	0	0	0
4	Barabahali PRF- 4.0 ha.	4	6	7	10.75	19.3	120.37	0.77	0.53	1.3
5	Dhanubans RF 63.0 ha.	3.81	10.03	0.62	3.63	31.6	53.69	1.20	0.33	1.5
6	Garjanpahad RF – 101.62 ha.	1,64	5.53	0.94	2.52	38.7	28.57	0.64	0.27	0.9
7	Punjipahad RF – 6.5 ha.	0	0	0	0.77	0	0	0	0	0
8	Kalatpani RF – 8.0 ha.	0	0	0.38	2.63	0	60.87	0	0.23	0.2
9	Panchara (N) RF- 11.659 ha.	0.09	0.43	0.09	0.26	52.5	31.58	0.05	00.03	0.1
10	Panchara (S) RF – 6.1 ha.	0	0	0	0.48	0	0	0	0	0

Abstract of Yield Regulation

Sl. No.	Name of the Block/ Felling Series	Average Yield %		Average tree limit/ ha.		
		Sal	Others	Sal	Others	Total
1	Chhengapahad	35.6	46.58	0.91	0.31	1.2
2	Bahala	21.7	21.23	1.17	0.39	1.6
3	Tamkinala	0	0	0	0	0
4	Barabahali	19.3	120.37	0.77	0.53	1.3
5	Dhanubans	31.6	53.69	1.20	0.33	1.5
6	Garjanpahad	38.7	28.57	0.64	0.27	0.9
7	Punjipahad	0	0	0	0	0
8	Kalatpani	0	60.87	0	0.23	0.2
9	Panchara (N)	52.5	31.58	0.05	00.03	0.1
10	Panchara (S)	0	0	0	0	0

11.11(a) Result of Test Enumeration Conducted During 2014

Basing on the number of trees found in the exploitable girth class and approach class, no. of trees per ha. has been calculated and compared to the result of previous tree enumeration. A tabular statement is given at page 117. A small change in the no. of trees per ha. is noticed in few forest blocks except Bahala PRF. Where no. of trees per ha. has come down to 0.88 except Bahala Forest Blocks, for tree exploitation in the

selection coupe, we may safely used the figure of previous enumeration result. Fresh yield calculation for Bahala F.S. has been done for which yield % is 87.88 fir Sal and 0 for others. Accordingly, average tree limit per ha. is 0.88

11.12 FELLING SERIES

In total there are seven felling series covering the entire area of Working Circle. The felling series have been constituted taking into account of silviculturally available exploitable trees and extraction of timber in the working coupes. This has led to division of some of the compartments in slope direction. The statement showing the composition and area of different felling series is given in the following table.

Selection Working Circle									
Garjanpahad Felling Series									
Year of working	Coupe No.	Block and Comptt.	Area (in ha.)	Total area of annual coupe (in ha.)	Harvesting of Sal trees	Harvesting of other trees	Assumed volume of timber in cum		Map Reference 1:25,000
							Sal	Non-sal	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2014-15	I	Ga-1	351	351	225	95	229.02497	96.6199	64 O / 9 NE
2015-16	II	Ga-2(Part) and 3	422	422	270	114	275.35196	116.1641	64 O / 9 NE
2016-17	III	Ga-2(P) 12(P)	437.65	437.65	280	118	285.56347	120.4721	64 O / 9 NE
2017-18	IV	Ga-11,12(P)	355	355	227	96	231.63494	97.7210	64 O / 9 NE
2018-19	V	Ga-4 Part	306	306	196	83	199.66280	84.2327	64 O / 9 NE
2019-20	VI	Ga-5 & 6	487	487	312	131	317.76399	134.0567	64 O / 9 NE
2020-21	VII	Ga-7(P),& 9	472	472	302	127	307.97660	129.9276	64 O / 9 NE
2021-22	VIII	Ga-7(P) & 8	473	473	303	128	308.62909	130.2029	64 O / 9 NE
2022-23	IX	Ga-4 (P) &10	380	380	243	103	247.94726	104.6028	64 O / 9 NE
2023-24	X	Ga-11(P) & 13	407	407	260	110	265.56457	112.0351	64 O / 9 NE
Ga – Garjan pahad RF		Total	4090.65	4090.65	2618	1104	2669.10336	1125.5501	

Selection Working Circle									
Hemgir Felling Series									
Year of Working	Coupe No.	Block and Comptt.	Area (in ha.)	Total area of annual coupe (in ha.)	Harvesting of Sal trees	Harvesting of other trees	Assumed volume of timber in cum	Assumed volume of timber in cum	Map Reference 1: 25,000
							Sal	Non-Sal	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2014-15	I	Ga-15	714	714	457.0	192.78	465.879859	196.543066	64 O / 13 NW
2015-16	II	Ga-14 ,16(P)	558	558	357.1	150.66	364.090982	153.600883	64 O / 13 NW
2016-17	III	Ga-16(P) & 18	619	619	396.2	167.13	403.893043	170.392378	64 O / 13 NW
2017-18	IV	Ga-17 & 19(P)	623	623	398.7	168.21	406.503014	171.493459	64 O / 13 NW
2018-19	V	Ga-19(P) & 20	532	532	340.5	143.64	347.12617	146.443853	64 O / 13 NW
2019-20	VI	Ga-21 & 22(P)	545.47	545.47	349.1	147.2769	355.915248	150.151745	64 O / 13 NW
2020-21	VII	Ga-23 & 24(P)	526	526	336.6	142.02	343.211213	144.79223	64 O / 13 NW
2021-22	VIII	Ga-22(P) & 24(P)	621	621	397.4	167.67	405.198029	170.942918	64 O / 13 NW
2022-23	IX	Ga-25 & 26	605	605	387.2	163.35	394.758144	166.538592	64 O / 13 NW
2023-24	X	Ga-27 & 29	604	604	386.6	163.08	394.105651	166.263322	64 O / 13 NW
Ga - Garjan Pahad RF		Total	5947.47	5947.47	3806.4	1065.8169	3880.70093	1086.62165	

Selection Working Circle

Panchora Felling Series									
Year of working	Coupe No.	Block and Comptt.	Area (in ha.)	Total area of annual coupe (in ha.)	Harvesting of Sal trees	Harvesting of other trees	Assumed volume of timber in cum	Assumed volume of timber in cum	Map Reference 1:25,000
							Sal	Non-Sal	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2014-15	I	PN – 1 Part	161.39	161.39	8.070	4.842	8.225	4.936	73 B/ 7 SE
2015-16	II	PN – 2	146.00	146.00	7.3	4.38	7.441	4.465	73 B/ 7 SE
2016-17	III	PN – 3(P),I (P)	200.00	200.00	10	6	10.193	6.117	73 B/ 7 SE
2017-18	IV	PN – 3(P),I(P)	153.00	153.00	7.65	4.59	7.797	4.680	73 B/ 7 SE
2018-19	V	PN – 4 Part	163.00	163.00	8.15	4.89	8.307	4.985	73 B/ 7 SE
2019-20	VI	PN – 4 Part	130.00	130.00	6.5	3.9	6.625	3.976	73 B/ 7 SE
2020-21	VII	PS – 3 Part	218.05	218.05	0	0	0.000	0.000	73 B/ 7 SE
2021-22	VIII	PS – 3 (P)	168.00	168.00	0	0	0.000	0.000	73 B/ 7 SE
2022-23	IX	PS – 2(P)	218.00	218.00	0	0	0.000	0.000	73B/ 7 SE
2023-24	X	PS-I (P)	203.00	203.00	0	0	0.000	0.000	73B/ 7 SE
		Total	1760.44	1760.44	47.6695	28.6017	48.587259	29.1600052	

Selection Working Circle

Chhengapahad Felling Series									
Year of working	Coupe No.	Block and Comptt.	Area (in ha.)	Total area of annual coupe (in ha.)	Harvesting of Sal trees	Hatvesting of other trees	Assumed volume of timber in cum	Assumed volume of timber in cum	Map Reference 1:25,000
							Sal	Non-Sal	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2014-15	I	Ch- 1 Part	147.00	147.00	133.77	45.57	136.345	46.447	64 O / 9 NE
2015-16	II	Ch- 1 Part	136.41	136.41	124.1331	42.2871	126.523	43.101	64 O / 9 NE
2016-17	III	Ch- 2 Part	140.00	140.00	127.4	43.4	129.853	44.236	64 O / 9 NE
2017-18	IV	Ch- 2Part	154.00	154.00	140.14	47.74	142.838	48.659	64 O / 9 NE
2018-19	V	Ch-2 & 3(Part)	142.00	142.00	129.22	44.02	131.708	44.867	64 O / 9 NE
2019-20	VI	Ch- 3,4 (Part)	153.00	153.00	139.23	47.43	141.911	48.343	64 O / 9 NE
2020-21	VII	Ch- 4 Part	145.00	145.00	131.95	44.95	134.490	45.815	64 O / 9 NE
2021-22	VIII	Ba-(Part)	130.00	130.00	118.3	40.3	120.578	41.076	64 O / 9 NE
2022-23	IX	Ba-(Part)	132.00	132.00	120.12	40.92	122.433	41.708	64 O / 9 NE
2023-24	X	Ba-(Part)	138.65	138.65	126.1715	42.9815	128.601	43.809	64 O / 9 NE
		Total	1418.06	1418.06	1290.4346	439.5986	1315.279	448.062	

Selection Working Circle

Kalatpani Felling Series

Year of working	Coupe No.	Block and Comptt.	Area (in ha.)	Total area of annual coupe (in ha.)	Harvesting of Sal trees	Harvesting of other trees	Assumed volume of timber in cum	Assumed volume of timber in cum	Map Reference 1:25,000
							Sal	Non-Sal	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2014-15	I	PP-I (P)	155.00	155.00	Nil	Nil	Nil	Nil	64 N / 16 SW
2015-16	II	PP-1 (P)	140.00	140.00	Nil	Nil	Nil	Nil	64 N / 16 SW
2016-17	III	PP-II	150.10	150.10	Nil	Nil	Nil	Nil	64 N / 16 SW
2017-18	IV	PP-II –(P)	166.00	166.00	Nil	Nil	Nil	Nil	64 N / 16 SW
2018-19	V	Ka-I- (P)	130.00	130.00	Nil	Nil	Nil	Nil	64 N / 16 SW
2019-20	VI	Ka-I- (P)	135.00	135.00	Nil	Nil	Nil	Nil	64 N / 16 SW
2020-21	VII	Ka-I- (P)	132.00	132.00	Nil	Nil	Nil	Nil	64 N / 16 SW
2021-22	VIII	Ka-II- (P)	135.00	135.00	Nil	Nil	Nil	Nil	64 N / 16 SW
2022-23	IX	Ka- II-(P)	130.00	130.00	Nil	Nil	Nil	Nil	64 N / 16 SW
2023-24	X	Ka- II –(P)	130.79	130.79	Nil	Nil	Nil	Nil	64 N / 16 SW
		Total	1403.89	1403.89					
		Ka-Kalatpani RF 792.80 Ha.							
		PP- Punjipahad RF 611.09 Ha.							

Selection Working Circle									
Bahala Felling Series									
Year of working	Coupe No.	Block and Comptt.	Area (in ha.)	Total area of annual	Harvesting of Sal trees	Harvesting of other trees	Assumed volume of	Assumed volume of	Map Reference 1:25,000

				coupe (in ha.)			timber in cum	timber in cum	
							Sal	Non-Sal	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2014-15	I	Ta- 1	210	210	0	0	0	0	64 N / 12 NE
2015-16	II	Ta-2	215	215	0	0	0	0	64 N / 12 NE
2016-17	III	Ta- 3	210	210	0	0	0	0	64 N / 12 NE
2017-18	IV	Ta-4	202	202	0	0	0	0	64 N / 12 NE
2018-19	V	Ba-1	212	212	186.56	0	190.15	0	64 N/12 SE
2019-20	VI	Ba- 1(P)	225.78	225.78	198.69	0	202.51	0	64 N/12 SE
2020-21	VII	Ba -2 (P)	252	252	221.76	0	226.03	0	64 N/12 SE
2021-22	VIII	Ba- 2 (P)	289	289	254.32	0	259.22	0	64 N/12 SE
2022-23	IX	Ba- 3 (P)	275	275	242.00	0	246.66	0	64 N/12 SE
2023-24	X	Ba 3 (P)	279.11	279.11	245.62	0	250.35	0	64 N/12 SW
		Total	2369.89	2369.89	1348.94	0	1374.91	0	
				Ta-Tamkinala PRF 1274.78 Ha.					
				Ba-Bahala PRF 1095.11 Ha					

Selection Working Circle									
Dhanubans Felling Series									
Year of working	Coupe No.	Block and Comptt.	Area (in ha.)	Total area of annual coupe (in	Harvesting of Sal trees	Harvesting of other trees	Assumed volume of timber in cum	Assumed volume of timber in cum	Map Reference 1:25,000

				ha.)			Sal	Non-Sal	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2014-15	I	Dh - 1	694	694	832.8	229.02	848.834	233.429	64 O/ 9 NE
2015-16	II	Dh - 2	648	648	777.6	213.84	792.571	217.957	64 O/ 9 NE
2016-17	III	Dh - 3,4 Part	681.57	681.57	817.884	224.9181	833.630	229.248	64 O/ 9 NE
2017-18	IV	Dh - 4(P), 5	567.5	567.5	681	187.275	694.111	190.881	64 O/ 9 NE
2018-19	V	Dh - 7, 8 Part	482.75	482.75	579.3	159.3075	590.453	162.375	64 O/ 9 NE
2019-20	VI	Dh – 8 (P), 9(P)	622	622	746.4	205.26	760.770	209.212	64 O/ 9 NE
2020-21	VII	Dh - 9 (P), 10, 13	769	769	922.8	253.77	940.566	258.656	64O/ 9 NE
2021-22	VIII	Dh - 11, 12, 14	661	661	793.2	218.13	808.471	222.330	64 O/ 9 NE
2022-23	IX	Dh - 16	516.75	516.75	620.1	170.5275	632.039	173.811	64 O/ 9 NE
2023-24	X	Dh - 15, 17	589	589	706.8	194.37	720.408	198.112	64O/ 9 NE
		Total	6231.57	6231.57	7477.884	2056.4181	7621.852	2096.009	
Dh- Dhanubans RF									

11.13 SEQUENCE OF FELLING

The annual coupes of all felling series have been shown in the management map of scale 1:25,000. The coupes have been formed by taking natural features, compartment boundaries, administrative boundaries of different ranges and the crop condition. Seven felling series have been constituted and each felling series has been divided into 10 annual coupes, so that the entire felling series is covered during the plan period. The coupe working will commence from 2010-11.

11.14 METHOD OF EXECUTION OF FELLING AND DEMARCATION

11.14.1 DEMARCATION OF ANNUAL COUPES

- (i) The demarcation of coupes shall be carried out in the winter season (October to December) in the year preceeding the year of Working.
- (ii) If the coupe line coincides with the compartment line, then it is to be cleared to a width of 5 m. The trees already marked with white paint double rings along the compartment line shall be again painted.
- (iii) When the coupe line is not coinciding with the compartment line, then a strip of 3 meter width shall be cleared along the coupe line, stone cairns of size 90 cms X 60 cms X 60 cms shall be erected at 300 m. intervals along the coupe line and at coupe corners with serial numbers on it. Clearance shall be done for the purpose of identification and visibility. Trees of large girth occurring along coupe line at visible distance shall be painted with double coal-tar rings at the breast height.
- (iv) In case, a coupe overlaps two or more compartments, each shall not be treated as separate lot, which will ensure proper maintenance of compartment history. In all these cases, the lot line should be demarcated with single coal-tar ring along the compartment/sub-compartment line.
- (v) Coupes shall be indicated by sign boards at corners or at points of intersection with roads, inspection paths, boundary lines of RF etc. The signboards should contain the name of felling series, serial number of the coupe, area, year of working and compartment number etc.
- (vi) Coupes shall be demarcated by an officer not below the rank of a trained Forester and shall be checked by Range Officer before commencement of marking. Coupe should be demarcated as per plan irrespective of availability of exploitable girth trees as coupe demarcation is essential not only for felling of trees but also for carrying out subsidiary silvicultural operations.

11.14.2 MARKING RULES

- (i) The marking officer shall assess illicit felling inside the annual coupes prior to marking. The number of trees illicitly felled shall reduce the quantum of marking. Thus, the trees to be marked shall be difference between the maximum permissible number of trees due for marking and number of trees illicitly felled between previous felling and current felling. If the difference is negative then no marking shall be done in that coupe.

1. All dead, diseased, uprooted, malformed and fallen trees shall be marked for felling irrespective of their girth class. A tree whose top one-third portion is already dead shall be treated as a dying tree.
 2. All trees above the exploitable girth class shall be marked. Out of all the exploitable girth trees available, only four trees per hectare in case of Sal and one tree per hectare in case of other species of trees shall be marked for felling.
- (iv) The trees retained should be well grown and vigorous. The reserved trees shall be painted with single white paint ring at breast height and at base and serially numbered in each coupe. The list of such trees shall be maintained in the compartment history and coupe register.
 - (v) All trees to be marked for felling shall be given two blazes approximately of size 15cm X 15cm, one at breast height and the other as close to the ground as possible and on the sides opposite to each other. The blazes should be marked with marking hammer and numbered serially.
 - (vi) Marking shall not be done within 50 meters from roadside on either side of nallah banks. Marking shall not be done within 50 meter of radius around the key habitat of wild animals such as den, salt lick, wallows, game tank and water holes etc.
 - (vii) If a tree is marked for felling than other trees should not be marked for felling within a radius of 15 meters.
 - (viii) No marking shall be done in eroded areas and in the areas having steep slopes except for removal of dead and uprooted trees.
 - (ix) Marking should be done only for those trees whose removal will not create a permanent gap in the canopy and will not affect regeneration.
 - (x) The guest species like Mahul, Mango, Jamu, Char, Tentuli, Anla, Bel, Harida, Bahada and other fruit bearing species shall not be marked for felling unless dead or uprooted.
 - (xi) The maximum number of trees to be removed in a particular coupe shall be regulated as per yield table described previously.
 - (xii) All climbers shall be cut at the time of marking at two places, one at the base and other at the area of reach.
 - (xiii) Once marking is over then the marking officer shall prepare the marking list on the following format.

Name of Felling Series:-

Coupe Serial Number:-

Year of Working:-

Tree S.L.N o.	Species	Girth h (in cm.)	Approximate height (in mt)	Sound/ Unsound	Dead/diseased/ uprooted / malformed

After preparation of the marking list, the marking officer shall prepare an abstract of marking species wise and girth class wise. Each page of the marking list shall be given facsimile impression of the marking hammer used for marking of the coupe. Each page of the marking list shall be signed by the marking officer.

- (xiv) The marking officer shall submit the marking list to the Range officer concerned and it is mandatory for the Range officer to check 70 % of the marking. After completion of checking at the level of Range office, the marking list shall be submitted to the Divisional Forest Officer. The Divisional Forest Officer shall check marking up to 10%.
- (xv) In case of plantation raised inside the selection coupes, the marking rules shall not be applicable. The Divisional Forest Officer shall prepare site-specific scheme for working out plantation with provision for fresh plantation with approval of the competent authority.
- (xvi) A tree forked at breast height and above shall be treated as one tree and forked below breast height shall be treated as two trees.

11.14.3 EXECUTION OF FELLING

- (i) The method of disposal of trees marked for felling shall be as per Chapter-XIV of the Orissa Forest Department Code, 1979 as modified by Government from time to time.
- (ii) Felling and extraction in any annual coupe shall be allowed from 1st October to 30th June. No felling, logging, passing and dragging shall be allowed from 1st June to 30th September every year. The DFO shall, if required, allow extension of time only after physical verification.
- (iii) The felling shall start from one end of the coupe and shall proceed ahead in a systematic manner. For this purpose, the coupe shall be divided into convenient number of lots. All the marked trees in a lot shall be felled before proceeding to the next lot. Felling, logging, dragging and passing should be completed by March. Transportation of timber and firewood shall be completed by May-June.
- (iv) Felling and conversion work shall be done as far as possible with saw as it reduces wastage. The felling should be as close to the ground as possible. Trees shall be lopped before felling otherwise it may damage the young crops including seedlings and saplings. The trees shall be felled towards up hillside and adequate care should be taken to avoid damage to the standing crop.
- (v) Details of works e.g. number of lots formed, detailed passing list, deviation, if any and subsidiary silvicultural operations under taken must be mentioned in the compartment history.

11.15 SUBSIDIARY SILVICULTURAL OPERATIONS

Silvicultural operations shall be carried out departmentally in the year following the main felling. It shall be done over the entire coupe except the degraded areas and steep slopes. The following operations are prescribed.

1. All the marked trees left standing by the coupe purchaser will be felled and removed from annual coupes.
2. All the trees damaged during main felling, which do not have any scope for survival, shall be felled and removed from annual coupes.
3. All the other species under 60 cms. g.b.h interfering with the growth of established regeneration of principal and secondary species will be felled and removed.
4. All high stumps shall be cut and removed.
5. Thinning in congested group of principal and secondary species under 60 cm g.b.h. will be done so that most promising young crops are free from interference. For this purpose under mentioned formula may be applied.

$$D=0.25 d$$

Where **D** = the distance in meters between two consecutive stems after thinning and
d = the average crop diameter in cms.

6. All the climbers left during marking per chance shall be cut.
7. In the eroded areas, only dead and uprooted trees will be removed and no cleaning operation will be carried out.
8. All fallen pieces of branches, small wood left during the main felling shall be removed to avoid fire hazard.
9. Soil and moisture conservation measures required shall be assessed. The conservation operation such as gully plugging, contour bunding, dry stone packing and construction of check dams etc. shall be carried out in subsequent years.

11.16 CONTROL

Compartment histories, control forms, and other records shall be maintained for each selection coupe, comport. and felling serine in accordance with the provision of the working Plan code.

11.17 MISCELLENEOUS REGULATIONS

11.17.1 GRAZING

The annual coupes will be closed for grazing for a minimum period of 5 years after main felling. Grazing shall be regulated in other areas on the basis of rotation. Lopping is strictly prohibited. Sheep and goats shall not be allowed to graze.

11.17.2 FIRE PROTECTION

The worked out areas shall be rigidly protected from fire hazard for a period of at least 5 years. For taking suitable fire protection measures, the provision of rule 283 of Orissa Forest Department Code and Orissa Forest (Fire Protection) Rules shall be followed. Efforts shall be taken to maintain coupe lines as fire lines every year.

11.17.3 RIGHTS AND CONCESSIONS

Rights and concession shall be regulated as per the provision of the Orissa Forest Act, 1972 and rules made under relevant Govt. policies in vogue.

11.17.4 SAMPLE PLOTS

Due to heavy biotic pressure it is not possible to lay sample plots.

11.18 WORKING NORM

The total area under Selection Working Circle is 23,221.99 ha. The cost norm followed is given below:

(Labor wage rate @ Rs.150.00 per day)

- (a) **Demarcation of coupe** at the rate of 10 ha /day /labor.

i.e. $0.1 \times 150.00 = \text{Rs.15.00 per ha.}$ or Rs. 15/-.

- (b) **Marking of coupe** at the rate of 5 ha. /day /labor

i.e. $0.2 \times 150.00 = \text{Rs.30.00 per ha.}$

(c) Treatment of Selection coupe which includes subsidiary silvicultural operations, maintenance of RF boundary, tracing of fire lines and protection against grazing at the rate of 10 man days per hectare = Rs.1500.00 per ha.

Total cost of management is around = Rs.1545.00 per ha.

Total requirement of funds under this working circle will be Rs.35878089.65 or 359 lakhs and the annual requirement of funds shall be around Rs.71.75 lacs with subsequent rise of 5 percent every year.

11.19 INTERMEDIATE REVISION

Intermediate revision is not expected during the plan period. However, if necessary prescriptions may be reviewed after 5 years jointly by the concerned Conservator of Forests (Territorial) and the Conservator of Forests, Working Plans. Any deviation suggested shall be subject to the sanction of the competent authority.

PART – II
Chapter - III
REHABILITATION WORKING CIRCLE

12.1 GENERAL CONSTITUTION

The forest blocks that are in various stages of degradation are allotted to this Working Circle. The degradation of these forest blocks is due to biotic interference such as illicit felling, repeated fire, grazing etc. The area can be restocked with commercially valuable species by gap plantation. The forest area of this working circle covers 86 RF blocks in full, 23 PRF blocks in full and 92 DPF blocks in full. Coppice worked areas and blocks worked under Rehabilitation Working Circle of the out going plan and the areas where plantations have been raised in the past are included in this Working Circle. The PRF and DPF blocks have been incorporated for the first time in the regular plan. The total area of this circle is 84569.26 ha. Many forest blocks covered under this working circle are situated near thickly populated habitation and they have been repeatedly exploited by local inhabitants for meeting their requirements of small timber, fire wood and fodder etc. Proper protection coupled with silvicultural operation will improve the crop condition in these blocks.

12.2 CHARACTER OF VEGETATION

The forest blocks of this working circle are widely scattered and spread over all the Ranges. All forest types present in the Division are present in this working circle. The area allotted to this working circle covers the regions of moist peninsular Sal forest (3C₂/2e), Northern dry mixed deciduous forest 5BC₂ and Dry peninsular sal forest (5 B-C₁/1C). In general, the crops are quite open having density less than 0.5 and regeneration status is poor. The forest varies from less stocked to highly degraded hills.

The coppice worked out area of the RF blocks like Makarchata, Sissoopahad, Ragadakhhol, Panikhulia, Jamkani, Rohini, Dhenkanapani, Singaribahal, Runga, Kurei-Banrai, Peruabhadi, Satparlia (5 comppt.), Athkosia 'B' etc are in degraded condition and need immediate suitable rehabilitation measures. These blocks are situated near the vicinity of populated tracts. In most of these areas adverse factors like overgrazing, repeated occurrence of annual fire, illicit felling etc are hampering the growth and the tree crop has been reduced to bushes. At places soil erosion is from moderate to intense. In these areas, even left out standards and mother trees have been illicitly removed by the local inhabitants and smugglers. Sal is the dominant species in the RF blocks of Sissoopahad, Ragdakhhol, Panikhulia, Jamkani (Part), Dheknapani, Singaribahal, Kurei, Tiklipara, Itma, Jogijogen, Satparlia, Athkosia'B', Balijore and Jhantikhol RF blocks.

Among miscellaneous species Asan, Karada, Sidha, Dhaura and Kurei are prominent. Over all, the status of natural regeneration is not satisfactory and the coppice regeneration in the worked out area is also not adequate.

The forest vegetation in the small RF blocks i.e. Satbhaya, Haldipani RF (Sagjore Compartment) part, Kharikamunda, Brahmani, Kusumura have depleted to a great extent and reduced to scrub type. In the last plan a good number of plantations have been raised in the degraded patches of these blocks. The vegetation in PRF blocks is primarily of miscellaneous type with poor growth. The low lying areas and lower slopes of some PRF blocks are mainly covered with dry peninsular Sal type of forest while upper slopes and hill tops of these blocks are covered with dry mixed deciduous forest. Due to unsystematic management of forests of these PRF blocks in the past as well as due to severe biotic pressure, distribution of various species is not uniform.

The natural species which find their occurrence in the areas of this Working Circle are mainly Sal, Asan, Dhaura, Kasi, Bija, Kendu, Jamu, Bahada, Karada, Kurei, Mahul, Bel, Tentuli etc. However, the natural growth is mostly confined to young age group with very less proportion of higher girth class trees. Over all, the areas bearing vegetation of natural origin are in degraded stage and require immediate rehabilitation measures. Areas where the plantations have been raised in the past are also more or less in poor state with out adequate growth. Most of the plantations have not been subjected to regular weeding, cleaning and thinning operations. The planted species in these blocks are mainly Teak, Sissoo, Gambhar, Cassia, Acacia, Cashew, Asan, Bamboo, Eucalyptus, Siris and Karanja etc.

12.3 SPECIAL OBJECTIVE OF MANAGEMENT

The following special objectives of management are set for this working circle which is within the ambit of the general objective of management. These are as follow:

1. To enrich the micro-edaphic conditions and ensure maximum conservation of soil and water through proper soil conservation measures and through involvement of local people.
2. To tend and improve the existing growing stock through suitable silvicultural measures.
3. To regenerate the barren and blank patches by planting suitable indigenous species. Part of forest blocks which were under shifting cultivation in the past will be planted and rehabilitated.
4. To boost up growth of Sal and other valuable species of coppice origin by appropriate cultural operation.
5. To tend the existing plantation so as to get maximum annual increment.
6. To provide adequate protection to the areas having rootstock and constitute JFM Committee to involve the local people.

7. To meet the bona fide needs of local inhabitants like fire wood, small timber, fodder, NTFP etc in future when restocked.

12.4 AREA STATEMENT AND REHABILITATION SERIES

Total 98381.38 hectares of area shall be rehabilitated within the plan period. For this purpose, 21 rehabilitation series have been constituted. Each rehabilitation series has been divided into 10 Annual Rehabilitation Coupes as shown in **Annexure 48 (Page 316 to 326 of volume II)**. Rehabilitation area of 86 RF, 23 PRF and 92 DPF blocks have been covered under this Working Circle and have been delineated in the topographical map of scale 1:25,000. In the present plan RF/PRF/DPF blocks have been fixed for annual rehabilitation. It shall be the responsibility of concerned Range Officer to delineate and demarcate the respective annual rehabilitation areas after field survey in consultation with the DFO in the year in which it is due for working. The following table gives the area and composition of each Rehabilitation Series for each Range.

Forest Area Allotted to Rehabilitation Working Circle						
Sl.No	Name of the Range	Name of the Forest Block.		Legal Status	Forest Block Area in Ha.	Area allotted to RWC in Ha.
1	2	3		4	5	6
1	Bargaon	1	Bangala-pahad	R.F	346.82	346.82
	Bargaon	2	Lamtipahad	R.F	310.80	310.80
	Bargaon	3	Brahmani	R.F	829.64	829.64
	Bargaon	4	Bhursalia	R.F	76.89	76.89
	Bargaon	5	Udarama	R.F	273.17	273.17
	Bargaon	6	Mahabir	R.F	633.35	633.35
	Bargaon	7	Jharbeda (Katang)	R.F	162.08	162.08
	Bargaon	8	Dahigira	R.F	190.20	190.20
	Bargaon	9	Latalaga	R.F	82.96	82.96
	Bargaon	10	Rajabasa	R.F	47.34	47.34
	Bargaon	11	Mukundpur (Andiabira)	R.F	99.15	99.15
	Bargaon	12	Pamradunguri	R.F	101.17	101.17
	Bargaon	13	Tikilipara	R.F	627.29	627.29
	Bargaon	14	Itma	R.F	252.94	252.94
	Bargaon	15	Raidihi	R.F	238.77	238.77
	Bargaon	16	Kharika-munda	R.F	80.94	80.94
	Bargaon	17	Jharmunda	R.F	87.42	87.42
	Bargaon	18	Rungaon (part)	R.F	2942.94	2942.94
	Bargaon	19	Dahijira	P.R.F	18.31	18.31
	Bargaon	20	Tudalaga	P.R.F	66.67	66.67
	Bargaon	21	Khatkurbahal	P.R.F	110.48	110.48
	Bargaon	22	Kustuna	D.P.F.	121	121

	Bargaon	23	Salbira Nakti	D.P.F.	111.49	111.49
	Bargaon	24	Tilaimal(Mundajore0	D.P.F.	68.79	68.79
	Bargaon	25	Baibai	D.P.F.	59.08	59.08
	Bargaon	26	Salepali	D.P.F.	60.78	60.78
	Bargaon	27	Panchara (Nuagaon)	D.P.F.	80.94	80.94
	Bargaon	28	Kalijapathar	D.P.F.	146.49	146.49
	Bargaon	29	Pamra	D.P.F.	151.94	151.94
	Bargaon	30	Rangiadhipa	D.P.F.	19.85	19.85
2	Sundargarh	31	Rungaon-P	R.F	1960.00	1960.00
	Sundargarh	32	Kurai	R.F	3334.73	3334.73
	Sundargarh	33	Kirelaga	R.F	8103.31	8103.31
	Sundargarh	34	Gurabasa	R.F	56.66	56.66
	Sundargarh	35	Bijlikhaman	R.F	30.35	30.35
	Sundargarh	36	Gopikudar	R.F	14.16	14.16
	Sundargarh	37	Deoli	R.F	72.85	72.85
	Sundargarh	38	Jamtalia	R.F	242.82	242.82
	Sundargarh	39	Satparlia (Alanpani)	R.F	2076.11	2076.11
	Sundargarh	40	Brahmani- pahar	R.F	121.41	121.41
	Sundargarh	41	Ghumuda	R.F	56.25	56.25
	Sundargarh	42	Jarmal	R.F	40.47	40.47
	Sundargarh	43	Khariakani	R.F	105.63	105.63
	Sundargarh	44	Rasrajpur	R.F	57.06	57.06
	Sundargarh	45	Peruabhadi	R.F	1375.98	1375.98
	Sundargarh	46	Jugigugian	R.F	344.00	344.00
	Sundargarh	47	Tiljura	R.F	76.89	76.89
	Sundargarh	48	Satparlia (Kumbahal)	R.F	485.64	485.64
	Sundargarh	49	Mahulgaon	R.F	627.29	627.29
	Sundargarh	50	Kurai (Banrai)	R.F	194.26	194.26
	Sundargarh	51	Simdega	R.F	77.70	77.70
	Sundargarh	52	Ghoghar	R.F	604.62	604.62
	Sundargarh	53	Sublaya	P.R.F	27.72	27.72
	Sundargarh	54	Kadopani	D.P.F.	14.71	14.71
	Sundargarh	55	Amasranga	D.P.F.	66.53	66.53
	Sundargarh	56	Amasdegi	D.P.F.	48.16	48.16
	Sundargarh	57	Badalpada	D.P.F.	55.18	55.18
	Sundargarh	58	Bihabar	D.P.F.	136.78	136.78
	Sundargarh	59	Bhedabahal	D.P.F.	80.93	80.93
	Sundargarh	60	Gadiajore	D.P.F.	62.12	62.12
	Sundargarh	61	Gadiajore-II	D.P.F.	36.12	36.12
	Sundargarh	62	Bhawanipur	D.P.F.	49.69	49.69
	Sundargarh	63	Jamtalia-I.	D.P.F.	31.88	31.88
	Sundargarh	64	Jamtalia-II	D.P.F.	29.95	29.95
	Sundargarh	65	Kisanikhol	D.P.F.	103.2	103.2
	Sundargarh	66	Mangarkunda	D.P.F.	55.64	55.64

	Sundargarh	67	Madhapur	D.P.F.	7.48	7.48
	Sundargarh	68	Mahuljore	D.P.F.	29.14	29.14
	Sundargarh	69	Thithitangar	D.P.F.	55.84	55.84
	Sundargarh	70	Tilia	D.P.F.	954.26	954.26
	Sundargarh	71	Sagjori	D.P.F.	46.14	46.14
	Sundargarh	72	Talsara	D.P.F.	321.76	321.76
3	Ujalpur	73	Bankidihi	R.F	24.28	24.28
	Ujalpur	74	Rajpur	R.F	1643.08	1643.08
	Ujalpur	75	Athakosia-A(Part)	R.F	9915.55	9915.55
	Ujalpur	76	Sapanbira	R.F	121.41	121.41
	Ujalpur	77	Bhursipatra	R.F	84.98	84.98
	Ujalpur	78	Kurladungri	R.F	121.41	121.41
	Ujalpur	79	Athkosia-B (Part)	R.F	2027.95	2027.95
	Ujalpur	80	Kusumura	R.F	2116.58	2116.58
	Ujalpur	81	Tildegga	R.F	414.41	414.41
	Ujalpur	82	Chakramal	P.R.F	16.59	16.59
	Ujalpur	83	Megdegga	P.R.F	26.3	26.3
	Ujalpur	84	Badbahal,Kanakjora -Part-I & II	D.P.F.	47.75	47.75
	Ujalpur	85	Bharatpur- Badbanga	D.P.F.	42.89	42.89
	Ujalpur	86	Bharatpur- Nialipali	D.P.F.	143.26	143.26
	Ujalpur	87	Chhotbanga	D.P.F.	97.13	97.13
	Ujalpur	88	Bhaludungri	D.P.F.	39.34	39.34
	Ujalpur	89	Raidihi	D.P.F.	224.61	224.61
	Ujalpur	90	Mahikani	D.P.F.	93.07	93.07
	Ujalpur	91	Tangarpali A & B	D.P.F.	426.55	426.55
	Ujalpur	92	Darlipali-Ghantamal	D.P.F.	105.22	105.22
	Ujalpur	93	Sribhubanpur	D.P.F.	104	104
	Ujalpur	94	Dwarikhol A & B	D.P.F.	29.14	29.14
	Ujalpur	95	Beheradihi	D.P.F.	32.37	32.37
	Ujalpur	96	Sanpatrapali	D.P.F.	32.37	32.37
	Ujalpur	97	Budabahal	D.P.F.	275.19	275.19
4	Lephri-para	98	Dhanger-gudi	R.F	8271.66	8271.66
	Lephri-para	99	Sikajore -A	R.F	1578.33	1578.33
	Lephri-para	100	Chirelkhaman	R.F	40.47	40.47
	Lephri-para	101	Sikajore-B	R.F	725.22	725.22
	Lephri-para	102	Bindhya-Pahar	R.F	103.60	103.60
	Lephri-para	103	Kurumkel	R.F	641.44	641.44
	Lephri-para	104	Dalkijharan	R.F	32.31	32.31
	Lephri-para	105	Athkosia-A (Part)	R.F	5597.41	5597.41
	Lephri-para	106	Athkosia-B (Part)	R.F	441.12	441.12
	Lephri-para	107	Bichutungri	R.F	20.31	20.31

	Lephri-para	108	Jamkani (Part)	R.F	1080.55	1080.55
	Lephripara	109	Baladbandha	P.R.F	47.75	47.75
	Lephripara	110	Bendojharua	P.R.F	49.77	49.77
	Lephripara	111	suruguda	P.R.F	47.75	47.75
	Lephripara	112	Badkhalia	P.R.F	60.7	60.7
	Lephripara	113	Pithabhuin	P.R.F	56.65	56.65
	Lephripara	114	Sikajore	P.R.F	82.96	82.96
	Lephripara	115	Chhatenpali	P.R.F	22.25	22.25
	Lephripara	116	Lephripara	D.P.F.	91.46	91.46
	Lephripara	117	Kulabira	D.P.F.	58.28	58.28
	Lephripara	118	Kadomal	D.P.F.	398.62	398.62
	Lephripara	119	Baadgamal	D.P.F.	74.46	74.46
	Lephripara	120	Karadega	D.P.F.	107.65	107.65
	Lephripara	121	Suarijore	D.P.F.	101.17	101.17
	Lephripara	122	Banujore	D.P.F.	37.64	37.64
	Lephripara	123	Lampahad	D.P.F.	110.08	110.08
	Lephripara	124	Dhatkipahad	D.P.F.	356.29	356.29
	Lephripara	125	Koilaga	D.P.F.	612.1	612.1
	Lephripara	126	Gadaghat	D.P.F.	396.6	396.6
	Lephripara	127	Ushakothi	D.P.F.	503.16	503.16
	Lephripara	128	Banrai	D.P.F.	181.1	181.1
	Lephripara	129	Sialikhaman	D.P.F.	511.94	511.94
	Lephripara	130	Litiapani	D.P.F.	612.1	612.1
	Lephripara	131	Banjikachhar	D.P.F.	401.21	401.21
5.	Gopalpur	132	Jamkani (Part)	R.F	7924.83	7924.83
	Gopalpur	133	Panikhalia	R.F	165.92	165.92
	Gopalpur	134	Regedakhhol	R.F	95.91	95.91
	Gopalpur	135	Jhantikhhol	R.F	590.45	590.45
	Gopalpur	136	Balijori	R.F	537.84	537.84
	Gopalpur	137	Pandripani	R.F	205.18	205.18
	Gopalpur	138	Runjisarua	R.F	30.35	30.35
	Gopalpur	139	Sidarmunda	R.F	65.56	65.56
	Gopalpur	140	Dhokar- pahad	R.F	74.46	74.46
	Gopalpur	141	Kanhupahad	R.F	12.54	12.54
	Gopalpur	142	Kalamegha pahad	R.F	108.05	108.05
	Gopalpur	143	Budhapahad	R.F	252.53	252.53
	Gopalpur	144	Pankipahad	R.F	105.62	105.62
	Gopalpur	145	Lalma	R.F	80.94	80.94
	Gopalpur	146	Dhanuardihi	R.F	12.95	12.95
	Gopalpur	147	Sarangi-jharia-A	R.F	55.27	55.27
	Gopalpur	148	Karelkachhar	P.R.F	60.7	60.7
	Gopalpur	149	Sareikela	P.R.F	89.03	89.03
	Gopalpur	150	Kaletpani	P.R.F	225.82	225.82
	Gopalpur	151	Jamjharia	D.P.F.	63.43	63.43

	Gopalpur	152	Tapria	D.P.F.	70.82	70.82
	Gopalpur	153	K.Daldali(Kucheidega)	D.P.F.	344.02	344.02
	Gopalpur	154	K.daldali	D.P.F.	57.46	57.46
	Gopalpur	155	Balinga	D.P.F.	19.74	19.74
	Gopalpur	156	Duduka	D.P.F.	289.11	289.11
	Gopalpur	157	Satparlia	D.P.F.	22.26	22.26
	Gopalpur	158	Saraikela B	D.P.F.	19.96	19.96
	Gopalpur	159	Jhupruna	D.P.F.	10.75	10.75
	Gopalpur	160	Sarangijharia B	D.P.F.	41.86	41.86
6	Hemgir	161	Hundarkhol	R.F	775.00	775.00
	Hemgir	162	Sissopahad	R.F	485.23	485.23
	Hemgir	163	Makarchata	R.F	368.27	368.27
	Hemgir	164	Giripahad	R.F	392.96	392.96
	Hemgir	165	Budla-khaman	R.F	252.53	252.53
	Hemgir	166	Makri-dungiri	R.F	68.39	68.39
	Hemgir	167	Budhadugri	R.F	64.34	64.34
	Hemgir	168	Behera-munda	R.F	48.15	48.15
	Hemgir	169	Ghantia-chhapal	R.F	27.11	27.11
	Hemgir	170	Satparlia	R.F	114.12	114.12
	Hemgir	171	Tangopahad	R.F	72.44	72.44
	Hemgir	172	Chitkikhadu	R.F	1455.70	1455.70
	Hemgir	173	Rohini	R.F	1298.27	1298.27
	Hemgir	174	Singaribahal	R.F	1279.66	1279.66
	Hemgir	175	Dheknapani	R.F	1270.75	1270.75
	Hemgir	176	Kaudaraha-Tilia	P.R.F	991.51	991.51
	Hemgir	177	Kanthidungri	P.R.F	259	259
	Hemgir	178	Beheramunda	P.R.F	56.65	56.65
	Hemgir	179	Garjanpahad-Ext.	P.R.F	29.94	29.94
	Hemgir	180	Mitheitungri	P.R.F	261.03	261.03
	Hemgir	181	Ostali	P.R.F	172.88	172.88
	Hemgir	182	Hundarkhol	P.R.F	29.78	29.78
	Hemgir	183	Khutipani	D.P.F.	104.57	104.57
	Hemgir	184	Tangardihi	D.P.F.	52.77	52.77
	Hemgir	185	Julumbahal	D.P.F.	279.64	279.64
	Hemgir	186	Jaraikela	D.P.F.	25.09	25.09
	Hemgir	187	Kutrajore-Bendrichuan	D.P.F.	161.47	161.47
	Hemgir	188	Bandhabahal-B	D.P.F.	54.96	54.96
	Hemgir	189	Badranpia	D.P.F.	592.88	592.88
	Hemgir	190	Kurludihi	D.P.F.	103.76	103.76
	Hemgir	191	Kanaktura	D.P.F.	90.73	90.73
	Hemgir	192	Raichuan	D.P.F.	32.78	32.78
	Hemgir	193	Bheluatikra	D.P.F.	115.26	115.26
	Hemgir	194	Kodbahal	D.P.F.	275.19	275.19

	Hemgir	195	Arjunda-Biswanathpur	D.P.F.	254.95	254.95
	Hemgir	196	Dhanubans-Extn.	D.P.F.	22.25	22.25
	Hemgir	197	Arjunda	D.P.F.	224.68	224.68
	Hemgir	198	Burta	D.P.F.	505.86	505.86
	Hemgir	199	Kanika-Ghumunda	D.P.F.	283.28	283.28
	Hemgir	200	Sukhabandh	D.P.F.	131.53	131.53
	Hemgir	201	Tilia-Singaribahal	D.P.F.	192.63	192.63
	Hemgir	202	Hemgir-Budhadungri	D.P.F.	121.4	121.4
	Hemgir	203	Bandhabahal A	D.P.F.	180.44	180.44
	Hemgir	204	Dheknapani	D.P.F.	64.75	64.75
	Hemgir	205	Surulata	D.P.F.	505.86	505.86
	Hemgir	206	Tangoparbat	D.P.F.	266.94	266.94
	Total				98381.38	98381.38

12.5 ANALYSIS AND VALUATION OF CROP

Due to inappropriate management in the past and severe biotic pressure in the form of illicit felling, overgrazing, fire hazard, encroachment etc., most of areas covered under this Working Circle are in various stages of degradation. At many places, the original vegetation has been replaced by a series of secondary flora comprising of inferior bushy and scrubby species which are capable to withstand regular felling, grazing and annual fires. The available crop shows poor, stunted growth and contains irregular age and dia class-wise trees distributed irregularly. The floristic diversity index shows that regeneration of different species is coming up well and all forest blocks will gain normalcy within a period of ten years. The areas of some PRF, DPF blocks have been incorporated for the first time in this working circle. These blocks were not subjected to any regular silvicultural system in the past. The existing crop cover in these blocks is in irregular form.

12.6 SILVICULTURAL SYSTEM

The first and foremost concern of management is to protect and improve the existing growth through rehabilitation measures. No exploitation will be done in natural vegetation area except removal of dead, dying disease moribund trees. Hence, no formal silvicultural system is prescribed.

12.7 CHOICE OF SPECIES

The areas to be rehabilitated are in general sparsely vegetated with average stock density less than 0.4 and for that reason improvement, thinning and fencing operations are not required. However, in the clusters of dense growth, tending and thinning operations are required for improving the growth of vigorous species. For that purpose Sal, Asan, Kusum, Dhaura, Kurum, Kasi, Gambhar will be taken as principal species and the rest will be treated as secondary species. While carrying out these operations, it should be kept in mind that no undesirable gap is created in the canopy.

The choice of species will also depend upon the needs and requirements of local inhabitants. The plantations raised should be of mixed type and the species planted should be site specific. In the areas subjected to uncontrolled grazing, non-browsable species like *Cassia siamea*, *Agave sisalana*, *Karanj*, *Euphorbia* species etc. are to be given priority for plantation. In the area effected with annual fire, species like *Dalbergia sissoo*, *Cleistanthus collinus*, *Tectona grandis* and *Gmelina arborea* may be preferred.

SPECIES SUITABLE FOR PROBLEMATIC SITES

Site	Measures to be taken	Species to be planted
Ravine	1. Soil & water conservation measures 2. Full protection from grazing and fire. 3. Safe disposal of run-off. 4. Grassland development. 5. Afforestation.	<i>Dalbergia sissoo</i> , <i>Albizia lebbek</i> , <i>Acacia catechu</i> , <i>Acacia nilotica</i> , <i>Azadirachta indica</i> , <i>Agave americana</i> , <i>Agave hybrid</i> , <i>Agave sisalana</i> and <i>Eulaliopsis binata</i> and soil binding grasses.
Laterite soil	1. Soil and water conservation measures 2. Full protection from grazing and fire. 3. Application of fertilizer. 4. Afforestation.	<i>Eucalyptus hybrid</i> , <i>Dendrocalamus strictus</i> , <i>Acacia auriculiformis</i> , <i>Madhuca indica</i> , <i>Bombax ceiba</i> , <i>Soyimida febrifuga</i> , <i>Cleistanthus collinus</i> , <i>Albizia lebbek</i> , <i>Anacardium occidentale</i> , <i>Agave species</i> and soil binding grasses.
Water logged areas	1. Preparation of mounds. 2. Planting of tall plants. 3. Application of anti-termite chemicals. 4. Early planting. 5. Drainage.	<i>Eucalyptus robusta</i> , <i>Anthocephalus chinensis</i> , <i>Syzygium cumini</i> , <i>Terminalia arjuna</i> , <i>Bombax ceiba</i> , <i>Lagerstroemia speciosa</i> , <i>Sisoo</i> , <i>Derris indica</i> , <i>Acacia nilotica</i> .

12.7.1 Depending upon the local factors, particularly soil condition, the species to be raised shall be selected carefully for gap plantation. Since the primary objective is to restock this area and to improve the existing forest growth, preference shall be given to local indigenous species that have the best potential to adapt to these sites. A list of species that can be grown for treatment of different sites in this Working Circle is presented in the following table.

12.7.2 Soil conservation measures

Various measures will be adopted to check soil erosion by plugging the gullies, creation of check dams and adopting anti-erosion vegetation measures to check soil erosion. The soil conservation measures will be site specific.

12.7.3 Choice of Species

The areas to be rehabilitated are in general sparsely vegetated with average stock density less than 0.4 and for that reason improvement, thinning and fencing operations are not required. However, in the clusters of dense growth, tending and thinning operations are required for improving the growth of vigorous species. For that purpose Sal, Asan, Kusum, Dhaura, Kurum, Kasi, Gambhar will be taken as principal species and the rest will be treated as secondary species. While carrying out these operations, it should be kept in mind that no undesirable gap is created in the canopy. The choice of species will also depend upon the

needs and requirements of local inhabitants. The plantations raised should be of mixed type and the species planted should be site specific. In the areas subjected to uncontrolled grazing, non-browsable species like *Cassia siamea*, *Agave sisalana*, *Karanj*, *Euphorbia* species etc are to be given priority for plantation. In the area effected with annual fire, species like *Dalbergia sissoo*, *Cleistanthus collinus*, *Tectona grandis* and *Gmelina arborea* may be preferred.

Species	Fodder/ Non-fodder	Habitat factors	Successional status
1. <i>Aristida setacea</i>	Fodder	Soil having brown sandyloam with gravel, pH 7.0 soluble salt content. 0.028 percent medium in potash, very low in phosphate and devoid of CaCO ₃	Retrogression Sehima/ Dicanthium cover as a result of grazing
2. <i>Arundinella benghalensis</i>	Fodder	Soil colour yellowish brown, sandy loam pH 6.2	Themada/Arundinella cover
3. <i>Arundinella nepalensis</i>	Fodder	Slopes having good drainage and permeability, soil sandy loam, pH 6.5	Themada/Arundinella cover
4. <i>Bothriochloa intermedia</i>	Fodder	Level sites but extends in hilly topography too, Grows in variety of soil in subtropical condition.	Themada/Arundinella cover
5. <i>Bothriochloa pertusa</i>	Fodder	Variety of soil, pH ranges from 5.8 to 7.5 fine-textured soils.	Sehima/Dicanthium &Themda/ Arundinella cover.
6. <i>Cenchrus ciliaris</i>	Fodder	Grasses of Semi-arid zone. Dry sandy soil, pH 7.6 to 7.75	Dicanthium, Cenchrus lasiurus
7. <i>Cenchrus setigerus</i>	Fodder		Dicanthium, Cenchrus lasiurus

8. <i>Chrysopogon aciculatus</i>	Fodder	It has creeping rhizome and prefers sandy loam, acidic soils on level or moist slopes, pH 5.1 to 6.1. This is one of the few grasses, which can withstand heavy grazing. Cannot survive on dry stones or sandy soils, Promising species for stabilization of embankments etc.	Pharagmites/ Saccharum imperata cover.
9. <i>Chrysopogon fulvus</i>	Fodder	Hilly gravely soils, black cotton soils, red soil with low level of moisture.	Sehima/ Dicanthium & Themeda/ Arundinella covers.
10. <i>Chrysopogon gryllus</i>	Fodder	Strong acidic soil on high hills, pH 4.2	Themeda/ Dicanthium thin cover on burning.
11. <i>Cymbopogon coloratus</i>	Non-fodder	Occurs on a variety of sites in dry areas (Rain fall 500 to 1000 mm) having gravelly to sandy loam, exposed rocks, acidic to neutral soil on hill and plains.	Sehima/ Dicanthium thin cover on burning
12. <i>Cymbopogon iwarancusa</i>	Non-fodder	Level to hilly topography, sandy and rocky soil, pH 6.5 to 7.5	Sehima/ Dicanthium thin cover on burning.
13. <i>Cymbopogon martini</i>	Non-fodder	Very wide distribution below tropic of cancer, pH 5.2 to 7.0	Sehima/ Dicanthium thin cover on burning
14. <i>Cynodon dactylon</i>	Fodder	All type of soil on level land prefers moist area and stands moderate grazing and trampling.	Dicanthium, Cenchrus cover.
15. <i>Dactyloctenium indicum</i>	Fodder	Dry area, level terrain, first colonizer of freshly deposited alluvial sands, Prefers slightly alkaline soil.	Dicanthium/ Cenchrus lasiurus cover.
16. <i>Demostachys bipinnate</i>	Fodder	A grass of semi-arid and arid region, tolerates pH as high as 9.5	Dicanthium/ Cenchrus lasiurus cover
17. <i>Dicanthium species, Dicanthium annulatum, Dicanthium caricosum</i>	Fodder	A species of level land prefers sandy loam to loamy soil, moist areas.	Dicanthium/ Cenchrus lasiurus cover

18. <i>Dimeria uscescens</i>	Fodder	A grass of North-east, prefers good drainage and permeability, pH 4.2	Themeda/Arundinella cover
19. <i>Elesine compressa</i>	Fodder	A grass prefers good drainage and permeability, pH 4.2	Themeda/Arundinella cover
20. <i>Eragrostis coarctata</i>	Fodder	A xerophytic grass	Sehima/Decanthium cover
21. <i>Eremopogon foveolatus</i>	Fodder	A grass for deep soil, high calcium and low land of north east.	Sehima/Decanthium cover
22. <i>Eulalia trispicata</i>	Fodder	A grass for deep soil, high calcium and low land of north east	Sehima/Decanthium cover
23. <i>Eulaliopsis binata</i>	Non-fodder	Can grow in slopes up to 50%, hot dry localities withstands forest fire	Sehima/Decanthium cover
24. <i>Heteropogon contortus</i>	Non-fodder	Shallow eroded, black or red soil, pH 6.8 to 7.00	Sehima/Decanthium cover
25. <i>Imperata cylindrica</i>	Fodder	Wide range of soil moist to swampy areas, pH 4.00 to 7.5	Sehima/Decanthium cover
26. <i>Ischaemum indicum</i>	Fodder	Low lying wet ground on black soil, pH 7.00 to 8.5	Sehima/Decanthium cover
27. <i>Sporobolus narginatus</i>	Fodder	Level sandy tract of arid zone	Sehima/Decanthium cover
28. Themeda quadrivalvis	Fodder	A grass of western Himalaya above 2000 M and RF 1100 mm	Sehima/Decanthium cover
29. Themeda quadrivalvis	Fodder	Rainfall 500 to 1250 mm. Foothill, kankar belts, pH 7 to 8.5, stands in very dry sal forests, fairly gregarious.	Sehima/Decanthium cover
30. Themeda triandra	Fodder	Gravelly soil on hills, pH acidic to neutral, Rainfall 1000 mm and above.	Sehima/Decanthium cover
31. <i>Vetiveria zizanoides</i>	Non-fodder	Low lying ill drained land where water table is high. Soil sandy loam to clay, pH 4.0 to 7.5, prefers neutral soil.	Sehima/Decanthium cover

12.8 REHABILITATION CYCLE

The Rehabilitation cycle is fixed at 10 years which synchronizes with the period of the Working Plan.

12.9 CALCULATION OF YIELD – No yield is prescribed.

12.10 SEQUENCE OF REHABILITATION OPERATIONS

In total 23 rehabilitation series have been constituted and each of them has been divided into 10 annual rehabilitation coupes. All these rehabilitation series have been formed in such a manner so as to rehabilitate the covered areas within the plan period. The annual rehabilitation area has been shown in the topographical sheets of the scale 1:25,000. As far as possible the backlog annual rehabilitation areas should be taken up for treatment simultaneously along with the current year areas. The year wise areas to be rehabilitated in each rehabilitation series is furnished in **Annexure 48(Page 316 to 326 of volume II)**.

12.11 METHOD OF EXECUTION OF REHABILITATION OPERATIONS

12.11.1 Demarcation of Annual Rehabilitation Area

For ensuring timely field operations, the annual rehabilitation areas are to be delineated in the map and demarcated in the field in the year preceding that in which it is due for working. This will be done in following manner.

- (i) For identifying and locating the annual rehabilitation areas for respective rehabilitation series a preliminary reconnaissance survey will be carried out in the month of October.
- (ii) If the forest block or Compartment has been divided into more than one annual coupe, then the whole area shall be surveyed and as per the degree of degradation, annual rehabilitation area will be identified and located. The areas which more degraded are to be rehabilitated first than the less degraded areas.
- (iii) Once the annual rehabilitation area is identified then it should be delineated in the management map and demarcated in the field.
- (iv) In the situation when the coupe line is not coinciding with the block or Compartment lines, it is to be demarcated by cleaning a strip of 2m width and stone cairns of size 90 cmX60 cm are to be erected at the corners at visible intervals along the line. While clearing 2mt strip, all trees below 30 cm are to be felled. Trees of larger girth occurring along coupe line at visible distances are to be given with two coal tar rings at breast height.
- (v) When coupe line is co-terminus with block or compartment line then the latter will be maintained.
- (vi) When the coupe line is coterminous with compartment line and the same has not been demarcated earlier, then two white paint rings at breast height are to be given in the trees standing along the Compartment line.
- (vii) The sign boards exhibiting the serial number of the coupe and extent of rehabilitation area, name of rehabilitation series and year of working etc. shall be posted at prominent places preferably at the points where coupe line meets the road.

12.12 PREPARATION OF TREATMENT MAP

Once the annual rehabilitation areas has been identified, delineated and demarcated in the field then an officer not below the rank of Range Officer, shall inspect and examine such area and prepare a treatment map. The treatment map so prepared should exhibit measures to be taken for different patches within the annual rehabilitation area. The areas included under this Working Circle are in different stage of degradation and require different type of site-specific treatment. While preparing treatment map following three types of areas will be distinguished:

Type “A”

Thinning in congested crops or coppice with standards in areas having rooted waste with good coppice vigour. Areas previously worked under coppice system requiring singling out of coppice shoot, pruning, climber cutting removal of high stumps and other tending operations.

Type “B”

The areas, which were cut back, will be treated with replanting in areas biotically suppressed and having poor coppice vigour. Degraded patches having plain to gentle slope require plantation of fast growing species. Hill slopes devoid of vegetation or having scanty forest growth requiring soil conservation and afforestation measures.

Type “C”

The soil moisture conservation with protection measures are suggested in highly degraded and eroded areas of different forest blocks. Some of the areas subjected to encroachment in the past having bushy and scrubby type of growth requiring soil conservation as well as afforestation measures shall be included in this type. The blocks or patches having scrubby vegetative growth up to 4 ha or more shall be identified and depicted on the treatment map for taking up plantation along with other rehabilitation measures. Similarly, all the blanks having areas less than 4ha and the patches having poor stocking are to be identified and reflected on the treatment map for taking up gap plantation and other rehabilitation operations including soil conservation measures. The treatment map should also reflect erosion channels and indicate various mechanical and vegetative measures required for preventing soil erosion.

12.13 TREATMENT PLAN

12.13.1 Each rehabilitation coupe shall be treated for four years excluding the zeroth (0th) year. The concerned Range Officer shall prepare an Annual Treatment Plan in the Zeroth year. It shall include all vital information like,

- (i) Site identification i.e. Forest Block/ Compt No. / Coupe No.
- (ii) Area and Treatment map.
- (iii) Site Category.
- (iv) Site characteristics (terrain, slope, drainage, soil type and depth).
- (v) Vegetation and extent of regeneration.
- (vi) Extent of degradation.
- (vii) Year of operations (including maintenance if any).
- (viii) Major operation to be undertaken.
- (ix) Cost norms and calendar of operations.

12.13.2 The Treatment Plan shall also include provision for monitoring of the execution of operations. The DFO/ACF, who is responsible for the implementation of the approved plan, shall check the annual action plan and it will be approved by the concerned Conservator of Forests.

12.14 EXECUTION OF REHABILITATION METHOD

All the rehabilitation measures in annual coupes shall be carried out systematically as per the treatment map and suggestions having prior approval of the DFO. The treatment of rehabilitation areas require enough funds under RDF and other plantation Schemes. Therefore, depending availability of funds, DFO should ensure continuity of

rehabilitation operations as per sequence prescribed in the plan. When funds are insufficient to cover the whole target area in a particular year then the balance area should be taken up in the next year. Proper records should be maintained and deviation statement should be submitted to the all concerned. Depending upon degree of degradation, various rehabilitation areas will require different types of area specific treatment. For that purpose following area specific rehabilitation measures is suggested.

Operation in Type 'A' areas

This covers coppice worked out areas and areas having Sal rooted waste. In these areas, following operations are suggested.

1. Cutting back of high stumps.
2. Cutting of climbers and uprooting them wherever possible.
3. Singling out of multiple coppice shoots and retaining most promising ones.
4. 'C' grade thinning in congested patches. Under this dead, moribund, diseased, suppressed, dominated and defective trees are to be removed without creating gap in canopy. Planting of two year old seedlings of bamboo along with fruit bearing and NTFP species. Required tending and thinning operations are to be carried out in such areas. Besides, enrichment plantation by Sissoo, Teak, Bija Sal and Bamboo are to be taken up in the gaps.

Operations in Type 'B' areas

This covers degraded patches having plain to gentle slope. These areas are to be rehabilitated by following operations.

1. Planting of fast growing leguminous species like Acacia, Cassia and Subabul etc.
2. Planting of species like Ailanthus, Siris, Karada, Sidha, Neem, Chakunda, Kusum, Sisso etc. in the plain barren areas.
3. Planting of Babul, Khair, Rohini, Sabai grass etc in eroded patches.
4. Planting of Jamun, Karanja, Arjun etc in the low lying degraded patches having higher moisture content.
5. Planting of bamboo wherever possible.
6. While carrying out plantation activity in these areas the plant spacing should be closer, i.e. 2m. x 2m. for tree species and 6m x 6m for bamboo.
7. Causality replacement, soil working, manuring and weeding shall be taken up for all the gap plantations in the 1st and 2nd year.

Operations in Type 'C' areas

This covers the hill slopes devoid of vegetation or with scanty vegetative growth. For such type of areas, following measures may be taken up

1. Suitable soil conservation measures such as gully plugging check dams done of brush wood, rubbles etc across the gullies. Where the gully erosion is acute, then masonry may be provided. Diversion channels are also to be provided to divert

the run-off .Just after the advent of monsoon, the beds of gullies should be planted with the species like sabai grass, *Ipoemia cornea*, *Agave*, *Acacia*, *Ailanthus excelsa*, *Vitex negundo* and *Sisoo* etc and the spacing for the same should be kept as 2m X 2m.

2. For the areas having more than 15°, slope staggered contour trenches will be dug along the contour. The size of contour trenches should be 6mX0.3m and their spacing should be 8m along the contour line and 10 m along the slopes. The dug out earth of the contour trench shall be deposited on the down hill side and the same will serve as seed bed for raising tree species like *Acacia*, *Khair*, *Sisoo*, *Babul*, *Siris* etc. *Agave* and *Sabai* grass may be planted in the intervening space of contour trenches.
3. All the preventive measures against soil erosion should be completed before the end of April so that soil and trenches settle suitably before the onset of monsoon.
4. Enrichment plantation shall be taken up in degraded patches, while block plantation will be done in blank and open patches having scanty growth .All the planting operations will be completed within the time schedule as prescribed in the plantation manual. This covers the areas which were subjected to shifting cultivation and encroachment in the past and which are either open with no vegetative growth or covered with bushy scrubby type of vegetation.
5. The patches which are open with no vegetative growth are to be planted with fast growing species.
6. In the areas having dense bushy and scrubby type of growth, the cleaning and pruning operations are to be carried out. All the bushy growth is to be removed except the saplings, poles and trees of important and useful species. The site is to be given control burning without causing any harm to retained species .Afterwards, as per requirement enrichment plantation is to be taken up.
7. Wherever required, necessary soil and water conservation measures are to be taken up.
8. Necessary administrative and educative measures are to be taken up for dissuading tribals against shifting cultivation and encroachments.

12.15 REHABILITATION OPERATIONS

(i) Fencing

The biotic interferences are most prominent cause of degradation of the areas covered under this working circle. To minimize the intensity of this factor it is essential to close the forest areas affected by grazing, browsing and illicit felling. The fencing is the key to success of rehabilitation measures .The DFO should ensure proper fencing of all the area selected for rehabilitation measures.

(a) Vegetative fencing

It is a very useful and the cheapest mode of fencing. Species which form close hedges and which are non-brows able shall be planted .For this purpose Euphorbia and Agaves species are preferred. These species can be readily grown from cuttings, possess thorns and are disliked by animals .These species are to be planted in a staggered manner in six rows at a spacing of 1m X 1 m along boundaries of the block. Two rows of votive grass 30 cm apart may be sown in the inner side of boundary next to the rows of planted species .This type of fencing should be done as a pre- rehabilitation measure.

(b) Trench fencing

Where the entire block is allotted to this working circle trapezoidal cattle proof trenches may be excavated on the boundary lines with a depth of 1.5 m and width at bottom and top being 1.0 m 2.0 m respectively. The dug earth of trench should be heaped in the form in ridges on inner side of the rehabilitation area. Such ridges should be provided with gaps at regular intervals. The trench digging should be confined to gentle slope or plain areas .The undulated terrains should be avoided for this purpose as that may give rise to subsequent erosion and gully formation. This operation should start in winter and should be completed before the end of May. During the month of June, sowing of seeds of Babul, Neem and Acacia etc shall be taken up around the trench. The bulbils of Agave may be planted to provide additional protection. Though the trench fencing is one of the most effective protection measures, it involves a large amount of expenditure, which may not be always available at Divisional level. So this type of fencing is to be resorted to when surplus funds for this purpose are available.

(c) Stone wall fencing

Where trench fencing is not feasible due to rocky or boulder terrains, the construction of stone wall may be preferred. The size of stone wall should be 2.0 m at bottom and 1.0 m at top with a height of 1.5 mt .The stone wall shall be provided with sufficient numbers of gaps for drainage of water. The prime importance of this fencing is easy availability of stones and relatively low labour cost. However, this type of fencing needs repeated repairs and is not very effective against goats.

12.16 REHABILITATION IN DIFFERENT REHABILITATION SERIES.

The site-specific rehabilitation scheme for afforestation and soil conservation measures shall be prepared by Divisional Forest Officer depending upon availability of allotment in that year.

12.17 CONTROL

The Journals and other records will be maintained for each rehabilitation coupe in accordance with the provisions of Orissa Forest Plantation Manual 1972. Necessary entries shall be made in the compartment histories about all the works undertaken inside the annual coupes.

12.18 MISCELLANEOUS REGULATIONS

12.18.1 Grazing

All the annual rehabilitation areas and new plantation shall be closed to grazing for a minimum period of 5 years. However, depending upon the result, the DFO can further extend the closure period. In case, it is decided to open the area for grazing, it shall be regulated as per carrying capacity of the area-concerned. The Orissa Forest (Grazing of Cattle) Rules, 1980 should be strictly followed.

12.18.2 Fire Protection

The entire rehabilitation area should be rigidly protected from fire hazard. The fire protection measures shall be regulated as per the Orissa Forest (Fire Protection) Rules, 1979 and Chapter-XVIII of Orissa Forest Department Code.

12.19 RIGHTS AND CONCESSIONS

Rights and concessions shall be regulated as per the existing provisions of the relevant Gazette notifications of the respective forest blocks and the Govt. of Orissa policy with regard to JFM.

12.20 WORKING NORM

- (I) The total area under Rehabilitation Working Circle is 98381.38 hectares. Thus, the average annual rehabilitation area to be worked out comes to 9838 hectares.
- (II) The cost norm that will be followed in Rehabilitation working circle will be Rs. 67600/- per hectare approximately.
- (III) The total annual requirement under this circle will be Rs.6650 lakhs per year with subsequent rise of 10 percent every year.

Cost norm for activities under Rehabilitation Working Circle with labour rate @ Rs.150/- per day.

Work	Mandays	Amount	Material cost	Total cost
ADVANCE WORK				
1. Survey and demarcation	4	600	-	600
2. Weeding and climber cutting	10	1500	-	1500
3. Regeneration cleaning, multiple shoot cutting, coppicing and pruning.	15	2250	-	2250
4. Raising of nursery stock at the rate of 400 plants per ha including 10 % for current year casualty.	4	600	1000	1600
5. Pitting over gaps at the rate of 400 pits per ha of size 45 cm x 45 cm x 45 cm	10	1500	-	1500
6. Miscellaneous expenses	-	-	400	400
Total	43	6450	1400	7850

CREATION

1. Maintenance of nursery from January to June	3	450	-	450
2. Carriage and planting over gaps	4	600	-	600

3. Soil working, weeding and twice manuring.	4	600	-	600
4. Cost of chemical fertilizer, NPK and urea at the rate of 50 gm each including application.	2	300	1700	2000
5. Cost of bio-fertilizer including application.	1	150	1400	1550
6. Maintenance of regenerated area by weeding and cleaning.	2	300	-	300
7. Fire tracing and inspection path	2	300	-	300
8. Miscellaneous expenses	-	-	3300	3300
Total	18	2700	6400	9100

SECOND YEAR

1. Cutting back of weeds growth and climbers	10	1500	-	1500
2. Singling of shoots of tree species.	15	2250	-	2250
3. Casualty replacement at the rate of 10% over gap planted area including pitting, carriage and cost of seedlings.	1	150	1400	1550
4. Tending of seedlings planted over gap through soil working, weeding and manuring.	4	600	-	600
5. Cost of chemical fertilizers at the rate of 50 gm of DAP per plant including application.	2	300	3300	3600
6. Fire tracing	4	600	-	600
7. Miscellaneous expenses	-	-	3300	3300
Total	36	5400	8000	13400

THIRD YEAR

1. Cutting back of weeds, climber and cleaning.	10	1500	-	1500
2. Tending of seedlings including weeding and pruning.	5	750	-	750
3. Fire tracing	4	600	-	600
4. Miscellaneous expenses	-	-	3300	3300
Total	19	2850	3300	6150

The estimate is for one hectare and the labour cost is Rs.90/- per day.

ABSTRACT	Man days	Amount	Material cost	Total cost
Advance work	43	6450	1400	7850
Creation	18	2700	6400	9100
2 nd year maintenance	36	5400	8000	13400
3 rd year maintenance	19	2850	3300	6150
TOTAL	116	17400	19100	36500

Break up of expenditure for soil and moisture conservation measures

Work	Mandays	Amount
1. Digging up of trenches of size 0.5m x 0.5m x 2.0 m.	20	3000
2. Gully plugging with loose boulders/vegetative materials to check run off of water.	10	1500
3. Miscellaneous expenses	-	3300
Total	30	7800

SECOND YEAR

1. Renovation of trenches.	10	1500
2. Maintenance of structures erected during 1 st year	4	600

3. Miscellaneous expenses	-	3300
Total	14	5400
THIRD YEAR		
1. Renovation of trenches	10	1500
2. Maintenance of structures	4	600
3. Miscellaneous expenses	-	3300
Total	14	5400
A B S T R A C T		
1 st Year	30	7800
2 nd Year	14	5400
3 rd Year	14	5400
Total	58	18600
Break up for Entry Point Activities		
WORK	AMOUNT (in Rupees)	
FIRST YEAR		
1. Training of staff and VSS members	700	
2. Awareness through meeting, dialogue and audio visual programmes.	300	
3. Fencing of plantation area with brush wood.	800	
4. Promotional activities through supply of fuel efficient chulhas etc.	800	
5. Miscellaneous expenses	300	
SECOND YEAR		
1. Extension activities to sustain awareness	700	
2. Monitoring and evaluation	300	
3. Maintenance of fencing	300	
4. Miscellaneous expenses including stationery and publicity materials etc.	300	
THIRD YEAR		
1. Extension activities	300	
2. Training, extension and promotional activities	500	
3. Micro Planning	800	
4. Fencing	1200	
5. Monitoring and evaluation	700	
Total	12500	
A B S T R A C T		
Work	Total (in Rupees)	
Advance work	7850	
Creation	9100	
2 nd Year	13400	
3 rd Year	6150	
Soil and moisture conservation	18600	
E.P.A.	12500	
TOTAL	Rs.67,600.00	

12.21 INTERMEDIATE REVISION

No major changes in the prescription of the Working Circle are anticipated. However, it may be reviewed, if necessary, after 5 years jointly by the C.F. (T) and the CF (WP). Any deviations suggested shall be subjected to sanction of competent authority.

PART – II
Chapter - IV

THE PROTECTION OVERLAPPING WORKING CIRCLE

13.1. GENERAL CONSTITUTION

This overlapping working circle extends to all those forest blocks which need special protection measures from biotic interferences. The blocks and compartments which are existing in the ecologically sensitive pockets are also included in this working circle. After 1990, population in this tract has increased in rapid pace due to speedy industrialization around Jharsuguda and Belpahar creating great demand for forest products. This has led to heavy illicit felling. The intense biotic

pressure from human and cattle has put a large number of forest blocks of this division under various stages of degradation. Unless proper steps are taken to prevent forest fire, illicit felling, encroachment, illegal mining and poaching, the degradation process cannot be checked. Further, it will be difficult to reverse the process of degradation if suitable remedial measures are not taken in time. It is also essential to see that forest on steep slopes and ecologically fragile areas are not disturbed and are completely protected.

13.2. GENERAL OBSERVATION AND VEGETATION

The forests of this division are subjected to continuous biotic pressure. Incidence of encroachments for agriculture or illegal mining/ quarry are also on the rise. Rural population collect their daily / annual requirement of fire wood, small timber, leaves, bamboos and NTFPs from nearby forests. These regular and continuous biotic interferences as discussed has led to decrease in vegetative cover and opening of canopy at places resulting on high run-off, rapid soil erosion and even flash floods in low lying areas. Majority of the forest blocks included in this working circle are those forest blocks which have been badly affected due to regular removal of biomass and also those blocks having valuable high forests which are now becoming targets of timber smugglers. Both these type of blocks need intensive protection measures so that pressure of biomass removal is reduced substantially. This will help to yield desired results through implementation of prescriptions of silvicultural operations of the main working circle.

After field survey and discussion with the Divisional Forest Officer, Range Officers and his field functionaries, the forest blocks bordering neighbouring states ie Chhatisgarh and Jharkhand and neighbouring Jharsuguda Forest Division coming under the jurisdiction of Hemgir, Gopalpur, Lephripura, Ujalpur, Sundargarh and Badgaon are kept in the purview of this working circle. The type and classification of forests included in this circle has already been dealt in Chapter-II of Part – I. However, majority of the area under this circle is of Northern Tropical Dry Deciduous Forests (5B) with subtypes of Dry Deciduous & Scrub Forests (5/DS₁). The principal species in these forests are Sal, Asan, Dhaura, Kurum, Kasi, Char, Moi and Sidha etc.

13.3 SPECIAL OBJECTIVES OF MANAGEMENT

The forest blocks included in this working circle require complete protection measures coupled with improvement of the vegetative cover. The special objectives of this circle can be stated as follows:-

- i. To keep delicate and eco-fragile area undisturbed and ecologically intact by maintaining the density, condition and composition of forest cover.
- ii. To arrest further depletion in forest resource & environmental degradation and enhance the natural regeneration adopting strong protection measures to minimize biotic interference.
- iii. To protect these forest blocks from fire and grazing and also to provide strict vigil against illicit felling, encroachment and poaching.

13.4 AREA AND ALLOTMENT

The area of the forest blocks allotted to this Working Circle is 48381.08 ha. However, a statement of allocation of blocks and compartments together with area is given in **Table**

13.5 ANALYSIS AND VALUATION OF CROP

As stated above, the blocks included in this circle have either degraded forest or high forest which needs intensive protection measures. It is expected that with proper protection and stoppage of illegal removal of biomass from these degraded blocks, the area will quickly rejuvenate and regain its original status. Protection to high forest blocks will ensure check on depletion in forest cover and environmental degradation. Protection from grazing and fire will ensure improvement in the regeneration status of these blocks. All these observations advocate strongly in favour of protection of these forests.

13.6 SILVICULTURAL SYSTEM

The forest blocks included in this circle are to be protected strictly without any other consideration. As protection is the principal cause, no silvicultural system has been prescribed for these blocks. However, for achieving the special objectives of this circle, the following operations are prescribed:-

- i. The forest blocks shall be rigidly protected from illegal biomass removal and allow them to grow under nature's own care and nursing.
- ii. Forest cover on steep precipitous slopes and eco-fragile zones would be specially protected to ensure no loss of vegetation and soil cover.
- iii. Adequate steps shall be taken to prevent forest fires and grazing.
- iv. Boundary of compartments and blocks shall be maintained properly.

- v. Forest road network shall be improved for better mobility and supervision.
- vi. Communication network – VHF and HF sets shall be used effectively.
- vii. Special anti-smuggling squads and fire fighting squads shall be created for each Protection Unit.
- viii. Steps shall be taken to create public awareness for protection of forests.

FOREST BLOCKS ALLOTTED TO PROTECTION OVERLAPPING WORKING CIRCLE

Name of the Protection Unit	Name of the Range	Name of RF	Area in Ha.
1	2	3	4
Daghora	Hemgir	Budlakhaman RF	252.53
		Chitikhadu RF	1455.7
		Garjanpahar RF	10038.12
	Hemgir	Chhangapahar RF	1017.41
		Singaribahal RF	1279.66
	Gopalpur	Dhanubans RF (P)	2023.57
Gundiadihi	Lephipara	Sikajore RF	1578.33
		Athakosia RF (Kukudajharan Compt.)+ Patuaghara	3251
		Dhangergudi RF	8271.66
	Ujalpur	Athakosia RF (Kukudajharan Compt.)+ Gireldungri comp	1578.33
		Kusumura RF	2116.58
Rouldega	Sundargarh	Sirimunda RF	627.26
		Kurai Banrai RF	194.26
		Kiralaga RF	8103.31
	Bargoan	Mahabir RF	633.35
		Latalaga RF	82.96
		Tiklipada RF	627.29
		Rungaon RF	4902.94
		Bangalapahad RF	346.82
		TOTAL	

13.7 PROTECTION UNIT AND CYCLE

The principal aim and objective of this circle is to provide special protection to all its constituent blocks. It is therefore required to create different protection units in the Division to achieve the desired end results. Formation of protection units will facilitate implementation of operations like maintenance of boundary to prevent encroachments, repair of existing roads and creation of new road network to ensure regular patrolling in vulnerable and theft-prone forest blocks/compartments, action of anti-smuggling squads to check all illegal activities in a planned and systematic way. It is expected that the aforesaid arrangement will definitely help in tackling protection 'hotspots'. Accordingly, after field verification, area of the working circle has been divided into three protection units as per the blocks and area wise details furnished in the Table.

Since entire working circle area is to be treated within the plan period, the protection cycle of 5 years is prescribed so that the earmarked areas will be treated twice during the plan period.

13.8 METHODOLOGY AND EXECUTION OF OPERATIONS

Division into Annual Protection Areas

- i) In order to exercise stringent protection measures, each protection unit has been divided into 5 (five) annual coupes to facilitate systematic operations. The annual coupe shall be attended to as per the sequence prescribed in the plan. The table given below shows the annual coupes (protection unit wise) with its number and the year of treatment along with the name of the forest block and area included in the coupe.
- ii) The annual coupes of all the units have also been depicted in the Management Map.

STATEMENT SHOWING ANNUAL COUPES UNDER PROTECTION WORKING CIRCLE

Year	Coupe	Forest Block Details	Area	Coupe	Year	Coupe	Forest Block	Area	Coupe Area

	No	Name	in ha.	Area in ha		No	Details Name	in ha.	in ha
Dhagora Protection Unit					Rouldega Protection Unit				
2014-15	I	Garjanpahad RF Part	3500	3500	2014-15	I	Kiralaga RF Part	3700	3700
1015-16	II	Garjanpahad RF Part	3500	3500	2015-16	II	Kiralaga RF Part	3700	3700
2016-17	III	Garjanpahad RF Part	3038.1	3038.12	2016-17	III	Kiralaga RF Part	703.31	2241.14
2017-18	IV	Budalakhman RF	252.53	1708.23			Sirimunda	627.26	
		Chitikikhadu RF	1455.7				Kurai Banrai RF	194.26	
2018-19	V	Singaribahal RF	1279.7	3303.23			Mahabir RF	633.35	
		Dhanubanus RF	2023.6				Latalaga RF	82.96	
2019-20	I	Garjanpahad RF Part	3500	3500	2017-18	IV	Rungaon RF Part	3500	3500
2020-21	II	Garjanpahad RF Part	3500	3500	2018-19	V	Tikilipara RF	627.29	2377.05
2021-22	III	Garjanpahad RF Part	3038.1	3038.12			Bangalapahad RF	346.82	
2022-23	IV	Budalakhman RF	252.53	1708.23			Rungaon RF Part	1402.9	
		Chitikikhadu RF	1455.7		2019-20	I	Kiralaga RF Part	3700	3700
2023-24	V	Singaribahal RF	1279.7	3303.23	2020-21	II	Kiralaga RF Part	3700	3700
		Dhanubanus RF	2023.6		2021-22	III	Kiralaga RF Part	703.31	2241.14
Gundiadihi Protection Unit							Sirimunda	627.26	
2014-15	I	Dhangergudi RF Part	3500	3500			Kurai Banrai RF	194.26	
2015-16	II	Dhangergudi RF Part	3500	3500			Mahabir RF	633.35	
2016-17	III	Athkosia RF (Kukuda Compt.)	3251	3251			Latalaga RF	82.96	
2017-18	IV	Sikajore RF	1578.3	3156.66	2022-23	IV	Rungaon RF Part	3500	3500
		Athkosia RF (Kukuda Compt.)	1578.3		2023-24	V	Tikilipara RF	627.29	2377.05
2018-19	V	Dhangergudi RF Part	1271.7	3388.24			Bangalapahad RF	346.82	
		Kusumura RF	2116.6				Rungaon RF Part	1402.9	
2019-20	I	Dhangergudi RF Part	3500	3500					
2020-21	II	Dhangergudi RF Part	3500	3500					
2021-22	III	Athkosia RF (Kukuda Compt.)	3251	3251					
2022-23	IV	Sikajore RF	1578.3	3156.66					
		Athkosia RF (Kukuda Compt.)	1578.3						
2023-24	V	Dhangergudi RF Part	1271.7	3388.24					
		Kusumura RF	2116.6						

Demarcation of Annual Coupes and preparation of Annual Plan of Action

- i) The annual coupes shall be demarcated in the preceding season of treatment. Since each coupe overlaps two or more compartments, each compartment shall be treated as a separate treatment area. This will ensure proper maintenance of compartment histories. Signboards, showing details of the forest block, working circle, compartment no., area and year of treatment shall be displayed at suitable places on prominent and easily identifiable trees.
- ii) The Divisional Forest Officer shall ensure preparation of an annual action plan with a calendar of operations before execution of works. The guiding factors for incorporation of different components shall be as per the activities stipulated above at paragraph - 13.6

Forest Protection Measures: The protection coupes shall be strictly closed for grazing and illegal removal of forest produce.

- i. All the forest blocks of this working circle shall be strictly protected against illicit felling, forest fires and all other biotic interferences. Anti-smuggling squads at vulnerable points in every Protection Unit shall be created by deployment of manpower from other less important areas besides engagement of protection (anti-smuggling/fire) watchers. The Divisional Forest Officer shall evolve the modalities for its effective functioning.
- ii. All the check gates shall be strengthened with adequate staff. The staff at the check gates shall not be posted for more than a year. Similarly, in theft prone and problematic beats/sections, the staff shall be rotated on yearly basis. The forest cases shall be dealt with firmly. Soon after detection, the cases shall be investigated thoroughly and charges framed as per the Act/Rule with no loss of time. The case records should not be kept pending at the FG/Forester/Range Officer level.

- iii. The concerned Range Officer/ACF shall periodically monitor the performance of each Beat Forest Guard and Section Forester. The DFO shall review the performance of each Range/Section/ Beat at least once in six months with regard to the protection efforts, monitor illicit felling and take required remedial measures as are considered necessary and feasible. For better coordination, the communication network including VHF network shall be strengthened and made effective.
- iv. The field forest staff shall also take steps to control encroachment in the forests and take suitable steps for eviction of the same in the treatment area. Resurvey & demarcation of forest blocks and construction/repair of boundary pillars according to provisions of Rule 168 and 169 of O.F.D. Code, 1979 is absolutely necessary to control this growing problem. The location (latitude & longitude) of boundary pillars through GPS shall be recorded and kept at Range / Division level. The cases of encroachment shall firmly be dealt with. The prosecution cases filed in the court shall be pursued regularly.
- v. The success of protection efforts should be monitored with regard to the number and nature of forest offence cases, encroachers evicted, timber and vehicle seized and the manner in which the booked offence cases are investigated and contested in the appropriate courts of law.
- vi. The DFO and his subordinate officers shall constantly pursue the offence cases in the competent courts of law so as to ensure higher rate of conviction. More conviction will dissuade the offenders and this will have long lasting effect even on the over all protection in the entire Division as well.
- vii. A fully functional 'Divisional Mobile Squad' with vehicle, required staff and arms shall be constituted. The divisional mobile will be deployed by the DFO for regular patrolling and for supporting field staff as and when required in emergencies.
- viii. The DFO shall review forest offence cases in every Protection Unit at the Divisional level regularly in every month besides detailed review in the field during his routine inspections. The outcome of such reviews shall invariably find place even in his monthly tour diaries.
- ix. The forest cases detected shall not be compounded as a matter of routine. Proper investigation shall be conducted to convert the UD cases to PR cases so that the accused are brought to the books. Further, the PR cases shall be submitted in time duly following the procedure stipulated in the Orissa Forest Offence (Detection, Enquiry & Disposal) Rules'1980. The PR cases filed in the court shall be regularly pursued through the Public Prosecutor/Assistant Public Prosecutors. More over, the technical issues and bottlenecks may be brought for discussion/ redressal in the Senior Officers' Meeting at the District level.

Forest Road Network:

- i. The existing forest roads as per details at Table given below I are not properly maintained due to poor allocation of funds. The forest field staff mostly use these roads for transportation of forest produce, for supervision of forestry operations and for patrolling to check smuggling, illicit felling and poaching. The forest fringe villagers also use these forest roads as a major network for their transportation and communication. Hence, these roads are required to be improved and maintained properly as all weather roads.

List of Forest Road

These forest roads/ tracks shall be provided drains on either side. The side drains shall be periodically cleared to allow surface runoff without any blockade. Cross-drains across the roads shall be provided on hill slopes. Existing causeways and temporary bridges shall be improved. Light morrum topping of road should be done periodically so as to prevent soil loss and erosion because of surface runoff and constant use. Roads should be repaired during November and December.

- ii. Attempt should be made to develop the existing important forest roads up to grade-II metalling and then black topping in a phased manner. All other roads /tracks shall be developed as all weather roads connecting vulnerable forest blocks so as to intensify patrolling during the rainy season.

- iii. The concerned Range Officer shall prepare plan and estimates for annual repair/special repair after physical verification of forest roads and obtain approval of the competent authority prior to execution of the work. In case of any new construction, detailed investigation shall be undertaken and prior approval of competent authority shall be obtained before execution of any such project.

Forest Fire Protection

- i. In Part- I, analysis of the extent, causes of forest fire and damage caused to forests has been explained. Forest blocks vulnerable to fire, based on satellite imageries have been identified. Protection against fire requires concerted effort of the field staff and the forest fringe dwellers during the period February to June.
- ii. Fire continues to be the major threat to forest regeneration and establishment. Almost every square meter of forest floor gets affected by it causing severe damage to forest and wildlife resources. Fire Watcher system needs to be strengthened in the identified vulnerable areas. Depending upon the requirement and availability of funds, fire watchers shall be provided to every Protection Unit.
- iii. The VSS should be involved in containing forest fires. Incidence of annual fire should be entered in the compartment history. Fire prone areas should be identified and adequate precautionary measures taken in time. Every year fire maps need to be prepared block wise. Fire protection incentive schemes may be developed.
- iv. Annual fire line clearance of 1 to 2-chain width in fire sensitive areas, coupled with controlled burning shall be done under the personal supervision of the Forester/Range Officer. Moreover, old fire lines, forest roads, boundary lines, village ring shall be kept clean by taking up control burning in 1-chain strip on both sides of it.
- v. Field staff should be equipped with modern fire fighting tools. They should also be trained to use those fire fighting tools effectively.
- vi. Awareness on the damage caused by forest fire shall be created amongst the people by holding meetings/ discussion frequently.

Communication System and Mobility: The VHF system in vulnerable pockets of the Division needs to be strengthened. Fixed sets, mobile sets and hand sets should be made available. Each Protection Unit should be provided with at least one fixed set and one hand set.

- i. Since quick communication is vital for transmitting information and also for deployment as well as re-enforcement in an emergency case, there shall be VHF system with fixed stations at the Divisional office and all the Range headquarters and in every Protection Units. Besides, all four wheel vehicles of the Division shall also be equipped with mobile VHF sets.
- ii. Attempt shall be made to provide every Protection Unit with a jeep/van.
- iii. All important communication through VHF shall be recorded in registers. Similarly, details of patrolling done by the staff in protection and mobile units should be maintained properly.

13.9 MISCELLANEOUS REGULATIONS

Control of Grazing: Forest blocks/compartments of annual protection coupes shall remain closed for grazing for at least next five years. Grazing may be controlled in forests outside the protection series areas. Fodder cultivation shall be encouraged and stall-feeding advocated through agricultural extension services. Steps shall be taken, in consultation with local people, to develop fodder resources for the use of affected local people who will be allowed to cut grasses/collect fodder for stall-feeding of their cattle/livestock. However, the Orissa Forest (Grazing of Cattle) Rules, 1980 shall be followed meticulously.

People's Participation: JFM is an accepted way to involve people in protection and regeneration of forests. Hence, local people shall be increasingly involved in forest protection and management in accordance with the Government policy in vogue. Steps should be taken by the DFO to constitute VSS for forest protection in vulnerable pockets.

Rights and Concessions: Rights and concessions under this Working Circle shall be regulated in accordance with the provisions of the Orissa Forest Act, 1972 and Rules made there under besides the Government policies in force.

Control: All the entries regarding further encroachments, encroachment evictions, consolidation, illicit felling, poaching etc needs to be entered in the compartment histories. All the works undertaken in the working circle must be entered in the compartment histories. The checking of compartment histories should form a part of the office inspections by the Conservator and the DFO.

13.10 SCOPE FOR INTERMEDIATE REVISION AND COST NORM

No major changes in the prescriptions of this Working Circle are anticipated. However, it may be reviewed if necessary, after five years jointly by the Conservator of Forests and Conservator of Forests (Working Plan). Any deviations suggested shall be subjected to the sanction of competent authority.

The total annual requirement under this Circle will be Rs.40 lakhs per year with subsequent rise of 10% every year.

FINANCIAL FORECAST FOR PROTECTION (OVERLAPPING) WORKING CIRCLE

Sl. No.	Particulars of works to be taken up every year	Amount required (in lakhs)
1	Maintenance of forest roads	Rs. 6.00
2	Cement concrete structures for road maintenance.	Rs. 3.00
3	Construction and maintenance of pillars	Rs. 2.00
4	Maintenance of forest crime records	Rs. 2.00
5	Maintenance of sign boards	Rs. 1.00
6	Construction of VHF towers	Rs. 3.00
7	Expenditure on POL	Rs. 6.00
8	Engagement of protection watchers	Rs. 5.50
9	Engagement of fire watchers	Rs. 3.00
10	Construction of barrack	Rs. 11.00
11	Purchase of arms and ammunitions	Rs. 2.00
12	Rewards and incentives	Rs. 1.00
13	Maintenance of check gates	Rs. 3.00
	TOTAL	Rs. 48.50

PART – II

Chapter – V.

PLANTATION (Overlapping) WORKING CIRCLE

14.1 GENERAL CONSTITUTION

This working circle includes all those blocks that have permanent blanks and barren land, which are devoid of rootstock and natural regeneration. Also included under this overlapping working circle are the old existing plantations raised during the outgoing plan period and during the plan holidays. In Sundargarh Forest Division, the Plantation (overlapping) Working Circle mainly overlaps the rehabilitation working circle and the selection working circle.

Broadly two categories of lands are included in this working circle. The first one is that of blank areas to an extent of more than 4 ha. needing complete artificial regeneration/plantation available in the forest blocks and the 2nd one being that of areas to an extent of more than 4 ha. with old plantations of teak and other species including compensatory afforestation areas which need only protection and tending/thinning operations. Both these categories of land in this Working Circle overlaps over an area of 17393.55 ha, of which the existing plantation area is 14393.55 ha. and the area prescribed for raising new plantation is 3000.00 ha.

14.2 GENERAL OBSERVATION AND VEGETATION

The area allotted to this Working Circle is devoid of forest growth barring scattered grass patches and bushy growths distributed through out the division. The present condition of the area allotted to this working circle is mostly due to excessive biotic pressure. Plantations are prescribed in the planting series of out going plan and some RDF plantations were raised during last plan period. In all the blocks there is good cover of soil and choice of species will depend upon the type of soil in each block. Areas where the plantations have been raised in the past are also in poor stage. Most of the plantations have not been subjected to regular weeding, cleaning and thinning operations. The planted species are mainly Teak, Sisoo, Gambhar, Cassia, Accasia, Cashew, Asan, Bamboo, Eucalyptus, Siris, Karanja and Neem etc.

The regeneration of Sal and other species are less because of continuous cutting of trees, encroachment, grazing and forest fire etc. The description of crop which once dominated these areas was Northern Dry Mixed Deciduous Scrub Forest. The details of soil analysis in respect of these forest blocks have been described in Part I. The list of old plantations of Sundargarh Division during the last plan period and during the plan holidays are furnished in Annexure 15 and 16.

All the old plantations which are more than 4 ha existing in RFs/PRFs/DPFs are included here. However in most of such plantations, proper record on whether operations like tending/thinning etc have been carried out or not have not been maintained properly. However, information on the year of formation and extent of area have been assessed basing on the records available in the division office from the record of out going plan.

14.3 SPECIAL OBJECTIVE OF MANAGEMENT

The special objectives of management set for this Working Circle are within the ambit of the general objectives of management of the Working Plan. These are as follows:

1. To restock all barren areas through artificial regeneration.
2. To maintain and tend the existing plantations through suitable silvicultural measures.
3. To improve land productivity through soil and moisture conservation measures.
4. To raise block plantations preferably of economic importance in large gaps having area of more than 4 ha.
5. To increase the biodiversity of species in the Division.

14.4 ANALYSIS AND VALUATION OF CROP

The plantation activity in the Division began during the year 1961-62. Most of the plantations raised are of mixed type and Teak. The data for Teak, Sissoo and other

important species planted have been recorded in the past. The plantations raised in the division have not been exploited so far. In most of plantations regular weeding, thinning, pruning and other cultural measures have not been taken up. Hence the planted stocks are not up to mark and in some areas it is poor and growth is also not satisfactory. The plantations taken up in the Division have mostly failed due to biotic factors, illicit felling, grazing, browsing and lack of post plantation care. At many places coppice shoots have come up but their growth is stunted.

14.5 AREA ALLOTMENT AND PLANTING SERIES

Total forest area allotted to this overlapping working circle is 17393.55 ha out of which 14393.55 ha forest land is the area of old existing plantations. Only 3000 ha of forest land have been kept in this working circle for creation of new plantations during the plan period. List of old plantations are kept at **Annexures 15 & 16(Page 204 to 212 & 213 to 221)**. The Divisional Forest Officer may prepare annual action plan for treatment of the existing plantations as per silvicultural requirement. Statement of year-wise plantations raised in the working plan area of this division is given in the tabular statement below.

Year	Plantation raised in Ha	Year	Plantation raised in Ha	Year	Plantation raised in Ha
1	2	1	2	1	2
1981-82	8.00	1992-93	50	2003-04	250
1982-83	72.5	1993-94	80	2004-05	391.488
1983-84	435	1994-95	210	2005-06	200
1984-85	113	1995-96	305	2006-07	332.02
1985-86	152	1996-97	545	2007-08	465
1986-87	1632	1997-98	36.59	2008-09	530.736
1987-88	265	1998-99	0	2009-10	460
1988-89	90	1999-00	0	2010-11	1040.192
1989-90	605	2000-01	0	2011-12	177.153
1990-91	125	2001-02	100	2012-13	350
1991-92	0	2002-03	189.45	2013-14	4990

Under artificial regeneration, the following forest blocks are allotted to the overlapping plantation working circle. Permanent blocks having more than 4 ha area will be taken for plantation. Range-wise distribution of forest and year-wise target for creation of new plantation is furnished in the tabular statement.

Year	Name of the Forest Block	Name of the Range	Extent of area to be planted(in Ha)
1	2	3	4

2014-15	Nil	Nil	Nil
2015-16	Athkosia A RF (Kumbhkani Comp.)	Ujalpur	100
	Ushakothi DPF	Lephripura	100
	Tamkinala PRF	Lephripura	100
	Jamkani RF (Comp. 1)	Gopalpur	100
2016-17	Athkosia A RF (Kumbhkani Comp.)	Ujalpur	100
	Ushakothi DPF	Lephripura	100
	Tamkinala PRF	Lephripura	100
	Jamkani RF (Comp. 1)	Gopalpur	200
2017-18	Athkosia A RF (Kumbhkani Comp.)	Ujalpur	100
	Ushakothi DPF	Lephripura	100
	Tamkinala PRF	Lephripura	100
	Jamkani RF (Comp. 1)	Gopalpur	200
2018-19	Dahijira RF	Badgaon	50
	Tamkinala PRF	Lephripura	100
	Jamkani RF (Comp. 1)	Gopalpur	100
2019-20	Panchara(S) RF	Badgaon	50
	Bahala PRF	Lephripura	100
	Jamkani RF (Comp. 1)	Gopalpur	200
2020-21	Latalaga RF	Badgaon	50
	Tamkinala PRF	Lephripura	100
	Jamkani RF (Comp. 1)	Gopalpur	200
2021-22	Tildegga RF	Ujalpur	100
	Dhanubans RF	Gopalpur	200
2022-23	Sikajore RF	Lephripura	50
	Dhanubans RF	Gopalpur	200
2023-24	Bahala PRF	Lephripura	100
Total			3000

14.6 SILVICULTURAL SYSTEM

No silvicultural system is prescribed. The silvicultural operations to be carried out shall include plantation and associated works such as protection, tending, soil and moisture conservation measures and thinning works in existing plantation.

14.7 CHOICE OF SPECIES

For the purpose of enrichment plantation and block plantation, the choice of species will be determined by site quality, soil and moisture condition, topography, economic value, availability of genetically superior seeds and demand in the Division. The choice of species will also depend upon the needs and requirement of the local inhabitants. Indigenous species shall be preferred for planting operations. The plantations raised should be of mixed type and the species planted should be site specific. Plantation of bamboo, minor forest produce bearing trees, fruit bearing trees, fuelwood and leguminous species shall be preferred. In general, the species planted will be Teak, Sissoo, Asan, Dhaura, Gambhar, Siris, Semul, Arjun, Cassia, Acacia, Sabai grass, Bamboo etc. Fruit bearing, NTFP and fodder yielding species like Mahua, Amba, Tamarind, Jack fruit, Karanj, Subabul and Kusum etc. shall also be given due importance in future plantations. Grasses will be planted as soil and moisture conservation measure in the plantation areas. While carrying out the plantation activity following guidelines is to be observed:-

1. The monoculture is to be avoided as far as possible.
2. Site exacting species are to be preferred.
3. The needs and requirements of local inhabitants in respect of small timber fire wood, fodder etc. are to be given due consideration.
4. Wherever possible, the broadcasting of seeds of grasses of *Chrysopogon*, *Eulaliopsis*, *Eragrostis*, *Sehima*, *Sporobobus*, *Themetia*, *Cynodon* and *Vetiveria* etc. may be taken up as part of plantation.
5. Teak, Sissoo, Simul and Bamboo are the species suitable for the terrain from plain to gentle slope with deep sandy loam type of soil.
6. Arjun, Jamu, Babul, Karanj, Tendra and Eucalyptus are the species suitable for low-lying areas having high moisture content.
7. Neem, Siris, Mahaneem, Anla, Chakunda etc. are the species suitable for undulated areas.
8. Fruit bearing and NTFP species should have adequate representation in all forest blocks.
9. In the areas subjected to uncontrolled overgrazing, non-browsable species like *Cassia siamea*, *E. Tereticornis*, *Acacia auriculiformis*, *Agave sisalana* and *Euphorbia* species etc are to be given due consideration.
10. In the areas effected by annual fire, species like *Dalbergia sissoo*, *Cleistanthus collinus*, *E. hybrid* and *Gmelina arborea* may be preferred.

SPECIES SUITABLE FOR PROBLEMATIC SITES

Site	Measures to be taken	Species to be planted
Ravine	1. Soil & water conservation measures 2. Full protection from grazing and fire. 3. Safe disposal of run-off. 4. Grassland development. 5. Afforestation.	<i>Dalbergia sisoo</i> , <i>Albizia lebbek</i> , <i>Acacia catechu</i> , <i>Acacia nilotica</i> , <i>Azadirachta indica</i> , <i>Agave americana</i> , <i>Agave hybrid</i> , <i>Agave sisalana</i> and <i>Eulaliopsis binata</i> and soil binding grasses.
Laterite soil	1. Soil and water conservation measures 2. Full protection from grazing and fire. 3. Application of fertilizer. 4. Afforestation.	<i>Eucalyptus hybrid</i> , <i>Dendrocalamus strictus</i> , <i>Acacia auriculiformis</i> , <i>Madhuca indica</i> , <i>Bombax ceiba</i> , <i>Soymida febrifuga</i> , <i>Cleistanthus collinus</i> , <i>Albizia lebbek</i> , <i>Anacardium occidentale</i> , <i>Agave</i> species and soil binding grasses.
Water logged areas	1. Preparation of mounds. 2. Planting of tall plants. 3. Application of anti-termite chemicals. 4. Early planting. 5. Drainage.	<i>Eucalyptus robusta</i> , <i>Anthocephalus chinensis</i> , <i>Syzygium cumini</i> , <i>Terminalia arjuna</i> , <i>Bombax ceiba</i> , <i>Lagerstroemia speciosa</i> , <i>Sisoo</i> , <i>Derris indica</i> , <i>Acacia nilotica</i> .

In the areas subjected to uncontrolled grazing, non-browsable species like *Cassia siamea*, *Agave sisalana*, *Karanj*, *Euphorbia* species etc are to be given priority for plantation. In the area effected with annual fire, species like *Dalbergia sissoo*, *Cleistanthus collinus*, *Tectona grandis* and *Gmelina arborea* may be preferred. Natural grasses are coming up well and adequate protection will be provided for their growth.

Species	Fodder/ Non-fodder	Habitat factors	Successional status
1. <i>Aristida setacea</i>	Fodder	Soil having brown sandy loam with gravel, pH 7.0 soluble salt content. 0.028 percent medium in potash, very low in phosphate and devoid of CaCO ₃	Retrogression Sehima/ Dicanthium cover as a result of grazing
2. <i>Arundinella benghalensis</i>	Fodder	Soil colour yellowish brown, sandy loam pH 6.2	Themada/Arundinella cover
3. <i>Arundinella nepalensis</i>	Fodder	Slopes having good drainage and permeability, soil sandy loam, pH 6.5	Themada/Arundinella cover
4. <i>Bothriochloa intermedia</i>	Fodder	Level sites but extends in hilly topography too, Grows in variety of soil in subtropical condition.	Themada/Arundinella cover
5. <i>Bothriochloa pertusa</i>	Fodder	Variety of soil, pH ranges from 5.8 to 7.5 fine-textured soils.	Sehima/Dicanthium & Themda/ Arundinella cover.
6. <i>Cenchrus ciliaris</i>	Fodder	Grasses of semi-arid zone. Dry sandy soil, pH 7.6 to 7.75	Dicanthium, Cenchrus lasiurus
7. <i>Cenchrus setigerus</i>	Fodder	-do-	Dicanthium, Cenchrus lasiurus

8. <i>Chrysopogon aciculatus</i>	Fodder	It has creeping rhizome and prefers sandy loam, acidic soils on level or moist slopes, pH 5.1 to 6.1. This is one of the few grasses, which can withstand heavy grazing. Cannot survive on dry stones or sandy soils, Promising species for stabilization of embankments etc.	Pharagmites/ Saccharum imperata cover.
9. <i>Chrysopogon fulvus</i>	Fodder	Hilly gravely soils, black cotton soils, red soil with low level of moisture.	Sehima/ Dicanthium & Themeda/ Arundinella

			covers.
10. <i>Chrysopogon gryllus</i>	Fodder	Strong acidic soil on high hills, pH 4.2	Themeda/ Dicanthium thin cover on burning.
11. <i>Cymbopogon coloratus</i>	Non-fodder	Occurs on a variety of sites in dry areas (Rain fall 500 to 1000 mm) having gravelly to sandy loam, exposed rocks, acidic to neutral soil on hill and plains.	Sehima/ Dicanthium thin cover on burning
12. <i>Cymbopogon iwarancusa</i>	Non-fodder	Level to hilly topography, sandy and rocky soil, pH 6.5 to 7.5	Sehima/ Dicanthium thin cover on burning.
13. <i>Cymbopogon martini</i>	Non-fodder	Very wide distribution below tropic of cancer, pH 5.2 to 7.0	Sehima/ Dicanthium thin cover on burning
14. <i>Cynodon dactylon</i>	Fodder	All type of soil on level land prefers moist area and stands moderate grazing and trampling.	Dicanthium, Cenchrus cover.
15. <i>Dactyloctenium indicum</i>	Fodder	Dry area, level terrain, first colonizer of freshly deposited alluvial sands, Prefers slightly alkaline soil.	Dicanthium/ Cenchrus lasiurus cover.
16. <i>Demostachys bipinnate</i>	Fodder	A grass of semi-arid and arid region, tolerates pH as high as 9.5	Dicanthium/ Cenchrus lasiurus cover
17. <i>Dicanthium species, Dicanthium annulatum, Dicanthium caricolum</i>	Fodder	A species of level land prefers sandy loam to loamy soil, moist areas.	Dicanthium/ Cenchrus lasiurus cover
18. <i>Dimeria uscescens</i>	Fodder	A grass of North-east, prefers good drainage and permeability, pH 4.2	Themeda/ Arundinella cover
19. <i>Elesine compressa</i>	Fodder	A grass prefers good drainage and permeability, pH 4.2	Themeda/Arundinella cover
20. <i>Eragrostis coarctata</i>	Fodder	A xerophytic grass	Sehima/Dicanthium cover
21. <i>Eremopogon foveolatus</i>	Fodder	A grass for deep soil, high calcium and low land of northeast.	Sehima/Dicanthium cover
22. <i>Eulalia trispicata</i>	Fodder	A grass for deep soil, high calcium and low land of north east	Sehima/Dicanthium cover
23. <i>Eulaliopsis binata</i>	Non-fodder	Can grow in slopes up to 50%, hot dry localities withstands forest fire	Sehima/Dicanthium cover
24. <i>Heteropogon contortus</i>	Non-fodder	Shallow eroded, black or red soil, pH 6.8 to 7.00	Sehima/Dicanthium cover
25. <i>Imperata cylindrica</i>	Fodder	Wide range of soil moist to swampy areas, pH 4.00 to 7.5	Sehima/Dicanthium cover
26. <i>Ischaemum indicum</i>	Fodder	Low lying wet ground on black soil, pH 7.00 to 8.5	Sehima/Dicanthium cover
27. <i>Sporobolus narginatus</i>	Fodder	Level sandy tract of arid zone	Sehima/Dicanthium cover
28. Themeda quadrivalvis	Fodder	A grass of western Himalaya above 2000 M and RF 1100 mm	Sehima/Dicanthium cover
29. Themeda quadrivalvis	Fodder	Rainfall 500 to 1250 mm Foothill, Kankar belts, pH 7 to 8.5, stands very dry sal forests, fairly gregarious.	Sehima/Dicanthium cover
30. Themeda triandra	Fodder	Gravelly soil on hills, pH acidic to neutral, rainfall 1000 mm and above.	Sehima/Dicanthium cover
31. Vetiveria zizanoides	Non-fodder	Low lying ill drained land where water table is high. Soil sandy loam to clay pH 4.0 to 7.5, prefers neutral soil.	Sehima/Dicanthium cover

14.8 PLANTATION CYCLE

All the areas included in this working circle should be planted in 10 years to synchronise with the working plan period.

14.9 CALCULATION OF YIELD

The yield shall be regulated in future according to area and exploitable class of trees available for harvesting.

14.10 TABLE OF OPERATION

Divisional Forest Officer will prepare the site-specific table of operation in tabular form where each plating series shall be divided into 10 annual coupes commencing the planting operation from the year 2014-15 to 2023-24.

14.11 METHOD OF EXECUTION OF PLANTING OPERATIONS CLEARANCE OF SITE

The clearance of plantation site will be done during the month of February. All the undesirable bushy growth, which may hamper growth of future plantations, will be removed except sapling, poles and trees of Sal, Bija, Bandhan, Asan, Gambhar and other useful species. The retained sapling and poles also are pruned up to 2/3rd of the height. The site selected for plantation is to be given minimum two to three controlled burning without causing any harm to the retained growing stock.

14.11.1. PREPARATION OF SITE, TREATMENT AND PLAN

A site map in the scale of 1:25,000 showing the details of area, direction of slope, nature of erosion, biotic interference, site specific species, and other factors shall be prepared. A treatment map shall be prepared where financial requirement shall be projected. This job shall be done by an officer not below the rank of Forest Ranger

14.11.2 . NURSERY

Nursery shall be started one year in advance. Permanent nurseries shall be started for raising seedlings. The permanent nurseries are at Ujalpur, Bhojpur, Jarangloi etc. These nurseries require improvement.

14.11.3 COLLECTION OF SEEDS

The assessment of seedlings to be raised in the nursery for gap and block planting purpose should be made and accordingly an estimate of required quantity of seeds of various species is to be prepared. The seeds should be of good quality. The Teak seed may be treated by alternate soaking and drying method for 21 days. The cow dung may be applied while soaking. The treatment of teak seeds should be started in the 1st week of May so that treated seeds are ready for sowing during June.

14.11.4 PREPARATION OF NURSERY BED

In permanent nursery, the beds are prepared by ploughing the area up to 30 cm depth. The prepared beds are then mixed with farm yard manure or with suitable fertilizers. The size of beds should be approximately 1.2 mtrs x 12 mtrs. The preparation of nursery beds should commence from the first week of January. As per requirement temporary nurseries are also prepared at the site of plantations. The work for preparing temporary nursery should be started from 1st week of January with clearance of site, fencing, polythene bag filling and seed dibbling operations one after another in sequence. These operations should be completed by the end of February every year.

SOWING OF SEEDS AND RAISING OF SEEDLING

The seedlings of slow growing species or whose seeds are having low viability are to be raised in the permanent nurseries. Seedling for Teak and Sissoo should be raised one year in advance and stumps should be prepared out of one year old seedlings. The stump should be about 25 cms in length out of which 2.5 cm will be from shoot and rest should be from the root. Stumps should have thickness of thumb size.

14.11.5 STACKING, PITTING AND PLANTING

After the completion of site preparation, the operations like alignment, stacking and pitting should be done at the spacing of 2.5 meters x 2.5 meters or 2 meter x 2 meter depending upon the species. The planting spots are to be marked with the help of sticks made of bamboo or any other locally available materials. Pitting operation will be taken up on the spots marked for planting. The pits of size 30 cm x 30 cm x 45 cm shall be dug. The dug out soil is to be piled on both sides of the pits for proper weathering. Before planting, the dug out soil may be treated with fertilizers and insecticides. While planting seedlings in the pits, the upper half dug out soil is to be filled first and then the lower half. Stacking and pitting operations are to be completed by May every year.

Planting shall be taken up immediately after onset of monsoon and completed by second week of July. Required dosage of insecticides and fertilizers shall be applied during planting. Planting will be done departmentally. Stump planting should be taken up after pre-monsoon showers and it should be completed by the end of June.

14.11.6 POST PLANTING OPERATIONS

Two weeding should be carried out in the year of planting. The first being after one month of planting i.e by the middle of August and second one about one month after the first weeding i.e in the middle of September. Casualty replacement shall be done at the time of first weeding. Third weeding if found necessary may be done towards the early part of October. Mulching shall be done after completion of second weeding. During the second year operation weeding with deep soil working around the plants, casualty replacement and manuring shall be done in July. Post plantation operation in 3rd year shall be done by carrying out soil working, casualty replacement, pruning and singling of shoots.

14.11.7 METHOD OF EXECUTION OF PLANTING

Plantation technique and operations should be carried out in accordance with guide lines laid down in “The Forest Plantation Manual, 1977” which is a comprehensive treatise dealing with all aspects of afforestation and Reforestation work in the State. The D. F. O. should follow site specific and area specific prescriptions for plantations because different areas of forest have different requirements. Prescriptions given in the Manual should be followed meticulously in addition to the following guidelines.

14.11.8 DEMARCATION OF ANNUAL PLANTATION AREA

- (i) The annual plantation coupes shall be demarcated in the Winter Season (October to December) of the year preceding to the year of plantation. Coupe lines usually coincide with natural features. In other cases, small stone cairns of half meter height will be erected at visible distances or coltar ring should be painted at breast height of trees standing on the coupe line.
- (ii) The plantation coupe shall be indicated by sign boards at corners or at point of inter section with roads, inspection paths and boundary lines of the Forest blocks. The sign boards should contain the name of the plantation series, coupe number, area, year of working and compartment number.
- (iii) The patches selected for block plantations should have at least 4.0 hectares of area. When the selected patches have large area, then they will be divided into smaller plots each with 3.0 mt. wide section lines and 40-meter wide section path.

14.11.9 CONTROL

The Nursery Journal, the plantation journal and other records will be maintained for each plantation separately in accordance with the provisions of “The Orissa Forest Plantation Manual, 1977” including the physical and financial achievements. The plantation journal should have details of all informations and cultural operations. The observation on growth, mortality, insect attack and damage should also be recorded in the plantation journals. It should also reflect the observations of inspecting officer.

14.12 SUBSIDIARY SILVICULTURAL OPERATION

The young plantations need regular attention otherwise if they are left uncared till first thinning. Miscellaneous coppice shoots occurring previously in that area will suppress most of the plantations. The cleaning operations are to be taken up in the sixth year of plantation. It is to be carried out to boost the best pole or tree from undesirable ones of the same age, which are interfering or likely to interfere with their growth. It is also necessary for reducing the competition for light. In case of light demander species like Teak, Gambhar etc. the density of cleaning should be high, while in case of shade demanders it may be low. The thinning shall be carried out in Teak and Gambhar plantations in 7th, 13th, 20th, 30th and 45th year of plantation. The first two thinning shall be mechanical in nature and will be done diagonally. Subsequently thinning shall be

silvicultural in nature considering the development of crown. At the time of thinning operation like climber cutting, singling out of shoots and pruning etc are to be taken up.

In the plantations where important species like Sissoo, Rosewood mixed with bamboo thinning is to be carried out in the 8th, 16th, 28th and 40th year of plantation both the thinning will be of silvicultural ordinary C Grade type. In the mixed plantations the first thinning will be carried out in 8th year and will be mechanical in nature. The second thinning will be silvicultural ordinary C Grade type and will be carried out in 15th year of the plantation. The 3rd and 4th thinnings will be selective in nature and will be carried out in 25th and 40th year of plantation. All the thinning operations are to be carried out under the direct supervision of Range Officer.

14.13 TREATMENT OF EXISTING PLANTATIONS

Cleaning and pruning of the plantations will be taken up along with climber cutting and removal of weeds growth in the entire area. Tending operations including thinning in old plantation may be taken up and only tending operations including climber cutting, singling out of shoots and thinning are prescribed. No formal silvicultural system is prescribed for this working circle. JFM mode is prescribed with the help of local villagers in the area.

For existing plantations tending operations will be taken up which shall comprise of both gap plantations as well thinning operations coupled with strict protection from biotic interference. Soil and moisture conservation measures will also be undertaken. The teak plantations are varying in age and there is need of silvicultural operations to boost their growth. They require pruning, thinning, climber cutting, removal of all dead trees accompanied with gap plantation in the area. The age of old plantations could not be ascertained and detailed thinning regime has not been prescribed here. The DFO should verify the Plantation Journal and confirm the age of all old plantations before taking up any thinning operations.

SILVICULTURAL SYSTEM

No silvicultural system will be adopted in the Plantation (Overlapping) Working Circle. For the plantations which are surviving tending operations shall be taken up which comprises gap planting and thinning operations along with full protection from biotic interference. Soil and moisture conservation measures shall be taken up depending upon the site specific requirements of the plantation area.

TREATMENT AND METHODOLOGY

The existing plantations shall constitute the tending series. The growth of existing plantations is not uniform at all places. In some plantations growth and survival is

adversely affected by biotic interference whereas in some other cases plantations are being protected by VSS members. Most of the surviving plantations and coppice growth of plantations have not reached harvesting stage. As such uniform treatment for harvesting of all plantations is not possible.

Due to above mentioned factors; no plantation has been divided into annual areas of treatment. The DFO will inspect the area, verify the crop and demarcate annual coupes in tending series depending upon availability of mature trees and take up thinning operation. About ten to twenty five hectares of area under plantation shall be taken up every year for the treatments so as to cover entire area within the plan period. The DFO shall prepare site-specific treatment plan of the plantation area and thinning etc shall be decided and approved every year before taking up operations. The growth of plantations tends to become bushy, irregular and branchy surrounded by climbers and miscellaneous species of natural growth. The tending operations which will be taken up in plantations shall include:

1. Weeding and pruning till 8th year of plantation.
2. Regular climber cutting.
3. Removal of dead and diseased trees.
4. Thinning will be taken up in congested crop on the line of 'A' grade and 'B' grade thinning.
5. Gaps shall be planted with suitable indigenous species.

14.14 MISCELLANEOUS REGULATIONS

14.14.1 GRAZING

The planted area should be strictly protected against grazing for a minimum period of five years till the plantation reaches safe height against browsing.

14.14.2 FIRE PROTECTION

Complete fire protection is recommended. The fire protection measures shall be regulated as per Orissa Forest (Fire Protection) Rules, 1979.

14.15 RIGHTS AND CONCESSION

No rights and concessions shall be allowed in this Working Circle. However usufruct rights may be allowed in accordance with the provision of current policies and programmes of the State Govt. with regard to JFM areas.

14.16 ANNUAL COSTS OF OPERATIONS AND WORKING NORM

Annual cost of operations and working will be the norm as prescribed by the Principal Chief Conservator of Forests, Orissa and Government from time to time. For the

current year norm for block plantation will be Rs 53250/- per hectare for 1600 seedlings. The norm for RDF work at the rate of 200 seedlings per hectares will be Rs 19500/- per hectare.

WORKING NORM

It has been based on integrated afforestation, eco-development project schemes and calamity reserve fund Project Schemes prepared and approved by the office of the Principal Chief Conservator of Forests, Orissa. The total area under Plantation Working circle is 17393.55 hectares. Cost of silvicultural treatment for old plantations shall be based on the approved cost norm prevailing at that time.

Cost Norm for Block Plantation per ha. for plantation module 1600 seedlings per ha.
Minimum wage rate : @ Rs 150/- man day.

Sl. No.	Item of work	Mandays	Labour cost @Rs.150/-	Material cost	Total cost
(a) 0th year (Advance work) pre-planting operation.					
1	Survey demarcation & pillar posting	2	300	0	300
2	Site preparation	8	1200	0	1200
3	Alignment and stacking of pits	2	300	0	300
4	Digging of pits of 30 cm. Cube	40	6000	0	6000
5	Nursery Cost (1 year old seedlings)(Part)	80	6000	6000	12000
	Sub-Total:-	132	13800	6000	19800
(b) 1st YEAR PLANTING YEAR / YEAR OF CREATION					
1	Nursery Cost (1 year old seedlings)balance	16	2100	300	2400
2	Carriage planting,CR,manuring,insecticides application	21	3150	0	3150
3	Cost of insecticide & fertilizer	21	0	3150	3150
4	First weeding (Complete weeding)	7	1050	0	1050
5	Manuring	5	750	0	750
6	Second weeding (Complete weeding)	5	750	0	750
7	Soil working (50cm. Radius around the plant)	7	1050	0	1050
8	Fire line tracing & inspection path	3	450	0	450
9	Soil conservation measure in the form of staggered.	10	1500	0	1500
10	Watch & ward	7	1050	0	1050
	Sub-Total:-	102	11850	3450	15300
(c) 2nd YEAR MAINTENANCE					
1	Casulty replacement with nursery cost	12	1800	0	1800
2	Weeding (Complete weeding)	6	900	0	900
3	Application of fertiliser	4	600	0	600
4	Cost of fertilizer	12	0	1800	1800
5	Soil working (50cm. Radius around plants)	7	1050	0	1050
6	Fire line tracing (2m Wide fire line over 400m long)	3	450	0	450
7	Watch & ward	15	2250	0	2250
	Sub-Total:-	59	7050	1800	8850
(d) 3rd YEAR MAINTENANCE					
1	Weeding and application of fertilizer	7	1050	0	1050
2	Cost of fertilizer	12	0	1800	1800
3	Soil working (50 cm. radius around the plant)	7	1050	0	1050
4	Fire line tracing (2m Wide fire line over 400m long)	3	450	0	450
5	Watch & ward	15	2250	0	2250
	Sub-Total:-	44	4800	1800	6600

(e) 4th YEAR MAINTENANCE

1	Fireline tracing (2m Wide fire line over 400m long)	3	450	0	450
2	Watch & ward	15	2250	0	2250
	Sub-Total:-	18	2700	0	2700

ABSTRACT

Work	Total (in Rupees)
Advance work	19800
Creation	15300
2 nd Year	8850
3 rd Year	6600
4th Year	2700
TOTAL	53250

14.17 INTERMEDIATE REVISION

Intermediate revision is not anticipated. However, if necessary prescriptions may be reviewed after 5 years jointly by the Conservator of Forests (T) and the Conservator of Forests, Working Plans. Any deviation suggested shall be subject to approval by the competent authority.

PART – II**Chapter – VI.****BAMBOO (OVERLAPPING) WORKING CIRCLE****15.1 GENERAL CONSTITUTION**

This is an overlapping working circle and overlaps the forest blocks allotted to the selection and rehabilitation working circles falling within Hemgir and Gopalpur Ranges and covering an area of 30,361.95 hectares. In total, 4 RF blocks of Hemgir Range namely Garjanpahad, Chhengapahad, Hundarkhol, Giripahad RF and 4 blocks of Gopalpur Range namely Jamkani, Budapahad, Kalatpani and Dhanubans RF, in full / part are included alongwith Ostali PRF, Bahala PRF, Litiapani DPF and Arjunda DPF in this working circle.

The reduction in bamboo production in the Division from 5553 S.U. in 1990-91 to 1966 S.U. in 1997-98 clearly indicates that there is loss in potential of bamboo for exploitation. In the bamboo-working circle of the preceding plan, more than 50 percent of the 9 cutting series are not available for working economically and silviculturally. This is due to excessive illegal removal of young bamboo shoots as well as culms by the local people and bamboo artisan. In most of the blocks / compartments, the bamboo are confined to middle and up hills while the foothills and valley portion contain very little or no bamboo growth.

The bamboo was exploited unscientifically in the past. While easily accessible areas were over exploited, the difficult terrains were either under exploited or left without working. This has adversely affected the growth of bamboo clumps. Degeneration and degradation of bamboos in lower slopes and plains and congestion in upper slopes is the result of haphazard bamboo working in the past. Most of the clumps on an average do not contain minimum number of culms required for healthy growth of rhizomes.

15.2 CHARACTER OF VEGETATION

Two species of bamboo are found in the forests of this Division. The most important and commonly found species is Salia bamboo (*Dendrocalamus strictus*). The species (*Cephalostachium pergracile*) commonly called Dungi bans occurs in less number along perennial nallas and streams. The salia bamboo occurs extensively as under storey in Dhanubans and Garjanpahad RF. The forest types in which bamboo occurs are Dry peninsular sal (5B / C/e), Northern dry mixed deciduous sal forest (5 B/C2) and Dry bamboo brakes (5E/9).

15.3 SPECIAL OBJECTIVES OF MANAGEMENT

The special objectives of management set for this Working Circle are within the ambit of the general objectives of management of the working plan.

1. To apply proper silvicultural principles while working bamboo forests in order to secure sustained yield along with improvement of quality and quantity of bamboo clumps.
2. To rehabilitate the degraded bamboo areas through tending, cleaning and bamboo planting etc.
3. To meet the demand of local people and paper industries.
4. Providing employment to forest dwellers and local people.

15.4 ANALYSIS AND VALUATION OF THE CROP

A detail survey of bamboo crop and one percent enumeration was undertaken in forest blocks of Hemgir and Gopalpur Ranges of Sundargarh Division to ascertain the bamboo area. The results of survey are provided in the Table.

Sl. No.	Name of the Range	Forest Block RF/DPF/PRF	Area (in ha.)	Availability of Bamboo	Total area (in ha.)
1	Hemgir & Gopalpur	Garjanpahad RF	10038.04	Available	10038.04
2	Hemgir	Chengapahad RF	1017.40	Available	1017.40
3	Hemgir	Hundarkhol RF	774.99	Available	774.99
4	Hemgir	Ostali PRF	172.89	Available	172.89

5	Lephripara	Litiapani DPF & Banjikuchchar	675.84	Available	675.84
6	Lephripara	Bahala PRF	1137.19	Available	1137.19
7	Gopalpur	Budapahad RF	252.53	Available	252.53
8	Gopalpur	Jamakani RF	8651.15	Available	8651.15
9	Gopalpur	Kalatpani RF	792.79	Available	792.79
10	Hemgir & Gopalpur	Dhanubans RF	6231.48	Available	6231.48
11	Hemgir	Arjunda DPF & Dhanubans Extn.	224.69	Available	224.69
12	Hemgir	Gripahad RF	392.96	Available	392.96
	Total				30,361.95 ha.

It is seen from table that only 12 forest blocks namely Garjanpahad RF, Chengapahad RF, Dhanubans RF, Hundarkhol RF, Giripahad RF, Jamkani RF, Kalatpani RF, Budapahad RF, Litiapani DPF, Arjunda DPF, Bahala PRF and Ostali PRF have got bamboo growth.

15.5 ENUMERATION

Five sample plots of size 1 ha have been taken at random per forest block for the purpose of enumeration of clumps and culms which is provided in table.

Garjanpahad RF

Sl. No.	Area of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	1	105	320	410	335	106
2	1	122	350	500	342	109
3	1	110	280	460	318	120
4	1	48	150	210	144	55
5	1	25	135	70	91	60
	Total	410	1235	1650	1230	450

Average no. of clumps per ha. = 82

Dhanubans RF

Sl. No.	Area (ha.) of the sample plot 1 ha.	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	1	82	456	458	223	90
2	1	75	300	287	152	85
3	1	50	175	210	105	60
4	1	38	180	165	78	28
5	1	57	114	120	48	35
	Total	300	1225	1240	606	298

Average no. of clumps per ha. = 60

Jamkani RF

Sl. No.	Area (ha.) of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	1	70	157	295	62	15
2	1	42	200	218	48	10
3	1	48	105	118	50	9
4	1	65	38	62	85	5
5	1	30	35	79	29	-
	Total	255	535	772	280	47

Average no. of clumps per ha. = 51

Giripahad RF

Sl. No.	Area (ha.) of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	1	43	175	250	170	5
2	1	37	150	170	100	13
3	1	40	200	160	164	12
4	1	30	190	160	160	9
5	1	35	165	195	128	11
	Total	185	880	935	723	50

Average no. of clumps per ha. = 37

Arjunda DPF

Sl. No.	Area (ha.) of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
1	2	3	4	5	6	7
1	1	90	375	270	255	11
2	1	45	120	118	122	8
3	1	22	70	75	64	13
4	1	38	105	112	100	7
5	1	54	148	150	105	12
	Total	249	818	725	646	51

Average no. of clumps per ha. = 50

Ostali PRF

Sl. No.	Area (ha.) of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
1	2	3	4	5	6	7
1	1	74	205	222	495	60
2	1	43	77	68	239	25
3	1	17	8	17	94	10
4	1	35	88	118	80	-
5	1	40	90	95	75	-
Total	5	209	468	520	983	95

Average no. of clumps per ha. = 42

Chengapahad RF

Sl. No.	Area (ha.) of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.

1	2	3	4	5	6	7
1	1	28	56	90	87	15
2	1	20	60	61	68	11
3	1	30	85	75	88	9
4	1	31	65	82	96	12
5	1	19	45	57	60	11
Total	5	128	311	365	399	58

Average no. of clumps per ha.=26

Hundarkhol RF

Sl. No.	Area (ha.) of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
1	2	3	4	5	6	7
1	1	28	108	108	50	7
2	1	30	120	93	96	13
3	1	25	138	145	85	12
4	1	26	70	72	45	8
5	1	26	150	120	75	9
Total	5	135	586	538	352	49

Average no. of clumps per ha. = 27

Kalatpani RF

Sl. No.	Area (ha.) of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
1	2	3	4	5	6	7
1	1	15	35	48	40	10
2	1	8	20	20	25	07
3	1	13	29	44	35	03
4	1	12	30	48	41	05
5	1	12	30	35	42	05
Total	5	60	204	195	183	30

Average no. of clumps per ha.=12

Budapahad RF

Sl. No.	Area (ha.) of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
1	2	3	4	5	6	7
1	1	16	50	67	30	11
2	1	14	40	58	25	12
3	1	8	20	31	19	06
4	1	8	16	38	17	01
5	1	2	2	2	-	-
Total	5	48	128	196	91	30

Average no. of clumps per ha. = 10

Litiapani PRF

Sl. No.	Area (ha.) of the sample	No. of clumps	No. of culm < 1	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3

	plot		yr.			yrs.
1	2	3	4	5	6	7
1	1	15	20	20	39	-
2	1	12	22	24	31	-
3	1	20	22	25	44	-
4	1	10	12	15	25	-
5	1	20	14	14	33	-
Total		77	90	98	172	-

Average no. of clumps per ha. = 15

Bahala PRF

Sl. No.	Area (ha.) of the sample plot	No. of clumps	No. of culm < 1 yr.	No. of culm > 1 yr. & < 2 yrs.	No. of culm > 2 yrs. & < 3 yrs.	No. of culm > 3 yrs.
1	2	3	4	5	6	7
1	1	19	24	27	49	-
2	1	12	17	20	30	-
3	1	20	22	32	57	-
4	1	12	22	17	42	-
5	1	17	27	25	40	-
Total		80	112	121	218	-

Average no. of clumps per ha. = 16

15.6 WORKING OF BAMBOO

Treatment Type – A

Area with healthy and well-stocked Bamboo clumps consisting of

Clump Quality – I

Culms height of Bamboos 9 m and up.

Clump Quality – II

Culms height of Bamboos between 6 to 9 m.

Clump Quality – III

Culms height of Bamboos below 6 m.

Treatment Type – B

Areas with well-stocked but degraded, damaged, congested and/or fire burnt clumps. **Treatment Type – C**

Areas where bamboo clumps are sparse and scattered.

Cutting Rules for Salia Bamboo

Salia bamboo (*Dendrocalamus strictus*) will be worked as per the following prescription.

PART – I

Cutting Rules and other rules which are uniformly applicable to all the Treatment Types:

- (i) Karadi (culms up to one year of age) and the Bamboo culms over one year but under two years of age will not be cut under any circumstance. Such more than one year old

culms and the culms which are older than 2 years but less than 3 years of age are to be retained in the clump and their number should not be less than number of Karadis.

The minimum number of culms to be retained in a clump is fixed on the basis of quality of the clump and it is as follows:

Clump Quality – I - 20 culms.

Clump Quality – II - 15 culms.

Clump Quality – III - 10 culms.

- (ii) All bamboo culms of three years and more than three years old should be harvested (except 5 mature culms retained).
- (iii) No culm of 2 years and less than 2 years of age will be cut.
- (iv) A clump will be distinguished as an independent clump where its periphery is easily discernible, two clumps within one meter distance will be regarded as one.
- (v) No clump should be considered fit for harvesting unless it contains more than 10 mature culms (one year as well as two years included).
- (vi) The retained culms in a clump should be well spaced, preferably at the periphery in the following order of preference.
 - (a) Karadi bamboos.
 - (b) Kasi bamboos (older than one year but less than 2 years).
 - (c) Pakala bamboos (young green bamboos).
 - (d) Older live bamboos.
- (vii) Following culms shall be removed from all clumps.
 - (a) All dead, decayed and dry bamboo
 - (b) Culms whose half or more top part is broken or damaged
 - (c) Twisted or malformed culms.
- (viii) The height above which culms are cut shall not be less than 15 cm or more than 45 cm. from the ground level and in no case below the first prominent node from the ground.
- (ix) The cut shall be made with a sharp instrument to ensure that the stump remains intact without splitting.
- (x) Cleaning will be done in all clumps. It consists of following operations.
 - (a) Lops and tops of bamboos will be cleared to a distance of at least one meter away from the periphery of the worked clumps to avoid fire hazard.
 - (b) Climbers shall be cut from all the bamboos clumps during working of the coupes.
 - (c) The clumps should be cleaned of all debris.
 - (d) Soil should be heaped around smaller clumps or clumps with no culms or clumps with exposed rhizome.
- (xi) Bamboo strips will not be used in tying bamboo bundles.
- (xii) Bamboo cutting will not be permitted from 1st June to 30th September.

- (xiii) In case of sporadic flowering, flowered clumps will be clear-felled, once the seeds from such clumps have fallen.
- (xiv) In case of gregarious flowering the clumps will be clear-felled and extracted early just after the shedding of ripe seeds, so that the bamboo do not dry or deteriorate or become prone to fire damage. Disposal of such bamboos should be expeditiously arranged to prevent deterioration in quality and the prescribed treatment as mentioned below shall be adopted in the gregariously flowered areas.
- (xv) Lopping of bamboos either for feeding livestock or otherwise is strictly prohibited.
- (xvi) Bamboo cutting should be completed by the end of March and extraction from forest by the end of May.
- (xvii) Bamboo forests should be rigidly protected from fire. In any case forest fire should not occur during the year of working and year following it.
- (xviii) No grazing shall be permitted during rains in bamboo forests, which have been worked in the previous season.

PART – II

Rules applicable to specific treatment types

- (i) **Treatment Type – A**
 - 1. Commercial felling will be done in those clumps, which have more than the prescribed minimum number of culms in each clump.
 - 2. Cultural operations will be carried out in clumps having less than the prescribed minimum number of culms in each. In such clumps commercial felling will not be done.
- (ii) **Treatment Type – B**
 - 1. There will be no commercial felling in any clump.
 - 2. Only cultural operations will be carried out which will include following.
 - (a) Felling of all dead, dry, over-matured, burnt, broken and grossly damaged bamboos.
 - (b) Broken or cut bamboos or high stumps in green condition, having length of 2.5 meters or more may be retained, if necessary, to maintain size of the clumps.
 - (c) The minimum number of 10 culms to be retained per clumps.
 - 3. The congested bamboo clumps shall be clear felled by forming segments. The maximum number of segments under which a congested clump shall be worked, will be three and at each working not more than

one segment will be cut. Where three segments are formed, the middle segment will be in the shape of a triangle having apex at the first working. In subsequent cycles, side segments should be felled.

(iii) Treatment Type – C

1. Only cultural operations in the area planted with bamboo will be done as per the standard practice.
2. The bamboo potentiality of such forests will be augmented by raising bamboo plantation. The minimum area to be planted annually will be 10 hectares or one third of the area under this type.
3. Tending and cultural operations in the area planted with bamboo will be done as per the standard practice.

15.7 DELINEATION OF BAMBOO AREA INTO TREATMENT TYPES AND QUALITY CLASSES

From the twelve tables it is found that, the average no. of clumps per ha of the following blocks namely, Chengapahad R.F., Hundarkhol R.F., Kaletpani, R.F., Budapahad R.F., Litiapani P.R.F. and Bahala P.R.F. are 26,27,12,10,15 and 16 respectively. So the above forests come under Treatment Type – C as clumps are quite sparse and scattered. It is also found that following forest blocks namely Giripahad R.F, Arjunda DPF, Ostali PRF and Jamkani R.F. come under Treatment Type- B as average clumps per ha is between 30 to 60. As far as Garjanpahad R.F. and Dhanubans R.F are concerned, the average no of clumps per ha works to be 82 and 60 respectively. As bamboo clumps are healthy these confirm to be Treatment Type- A. In all 12 forest blocks mentioned above the average culms length is 6 mts. All the forest blocks come under Quality Class III. The treatment type and quality type class wise of 12 forest blocks are furnished in the table below:

Sl.No.	Name of Block	Area (in ha.)	Treatment Type	Quality Class
(1)	(2)	(3)	(4)	(5)
1	Garjanpahad R.F	10038.04	A	III
2	Dhanubans R.F	6231.48	A	III
3	Jamkani R.F.	8651.15	B	III
4	Giripahad R.F	392.96	B	III
5	Arjunda DPF	224.69	B	III
6	Ostali PRF	172.89	B	III
7	Chengapahad R.F	1017.40	C	III
8	Hundarkhol R.F	774.99	C	III
9	Kaletpani R.F	792.79	C	III
10	Budapahad R.F.	252.53	C	III
11	Litiapani P.R.F.	675.84	C	III
12	Bahala P.R.F.	1137.19	C	III

15.8 CLUMP & CULM ANALYSIS

Basing on the enumeration result, clump and culm analysis has been done as given below.

Name of the Forest Block	Average no of clumps per ha.	Quality Class	Average no. culms per clump				
			<1yr.	>1yr. & <2yrs.	>2yrs. & >2yrs.	>3 yrs.	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Garjanpahad R.F	82	III	3	4	3	1	11
Dhanubans R.F	60	III	4	4	2	1	11
Jamkani R.F.	51	III	2	3	1	-	6
Giripahad R.F	37	III	5	5	4	-	14
Arjunda DPF	50	III	3	3	3	-	9
Ostali PRF	42	III	2	2	5	-	9
Chengapahad R.F	26	III	2	3	3	-	8
Hundarkhol R.F	27	III	4	4	3	-	11
Kaletpani R.F	12	III	3	3	3	-	9
Budapahad R.F.	10	III	3	4	2	-	9
Litiapani P.R.F.	15	III	1	1	2	-	4
Bahala P.R.F.	16	III	1	1	3	-	5

15.9 ALLOTMENT OF THE AREA

Area allotted to Bamboo (Overlapping) Working Circle							
Range	Forest Block	Working Circle to which allotted in the outgoing plan	Area (in ha.)	Bamboo overlapping portion			
				Comptt. No.	W.C.	Area (in ha.)	T.Area (In Ha.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hemgir	Garjanpahad	Bamboo over lapping W.C	10038.04	-	Bamboo Over lapping	10038.04	10038.04
	Chengapahad	-do-	1017.40	-	-do-	1017.40	1017.40
	Hundarkhol	-do-	774.99	-	-do-	774.99	774.99
	Giripahad	-do-	392.96	-	-do-	392.96	392.96
	Arjunda	-do-	-	-	-do-	224.69	224.69
	Ostali	-do-	-	-	-do-	172.89	172.89
Gopalpur	Dhanubans	Bamboo over laping W.C	6231.48	-	-do-	6231.48	6231.48
	Jamkani	-do-	8651.15	-	-do-	8651.15	8651.15
	Kaletpani	-do-	792.79	-	-do-	792.79	792.79
	Budapahad	-do-	252.53	-	-do-	252.53	252.53
Lephripara	Litiapani	-do-	-	-	-do-	675.84	675.84
	Bahala	-do-	-	-	-do-	1137.19	1137.19
							30361.95

15.10 CONSTRUCTION OF BAMBOO CUTTING SERIES

Range	Cutting series	Forest Block	Comptt. No.	Area of Comptt. (in ha.)	Area of the cutting series (in ha.)
(1)	(2)	(3)	(4)	(5)	(6)
Hemgir	Garjanpahad	Garjanpahad	1 to 8	10038.04	10038.04
Gopalpur	Dhanubans	Dhanubans	1 to 4	6231.48	6231.48

15.11 SEQUENCE OF FELLING

CONSTRUCTION AND TIME TABLE OF CUTTING SERIES

Name of the Range – Hemgir

1. Name of the Cutting Series - Garjanpahad

Coupe No	Year of cutting	Name of the Forest Block	Comptt. No.	Comptt.Area (in ha.)	Coupe area (in ha.)
(1)	(2)	(3)	(4)	(5)	(6)
A	2017-18	Garjanpahad	3,6,7	4821.93	4821.93
	2021-22			-do-	-do-
	2025-26			-do-	-do-
	2029-30			-do-	-do-
B	2014-15	Garjanpahad	2	1375.15	1375.15
	2018-19			-do-	-do-
	2022-23			-do-	-do-
	2026-27			-do-	-do-
C	2015-16	Garjanpahad	1,5	2439.50	2439.50
	2019-20			-do-	-do-
	2023-24			-do-	-do-
	2027-28			-do-	-do-
D	2016-17	Garjanpahad	4	1401.46	1401.46
	2020-21			-do-	-do-
	2024-25			-do-	-do-
	2028-29			-do-	-do-

Name of the Range – Gopalpur

2. Name of the Cutting Series - Dhanubans

Coupe No	Year of cutting	Name of the Forest Block	Comptt. No.	Comptt.Area (in ha.)	Coupe area (in ha.)
(1)	(2)	(3)	(4)	(5)	(6)
A	2017-18	Dhanubans	1	1214.08	1214.08
	2021-22			-do-	-do-
	2025-26			-do-	-do-
	2029-30			-do-	-do-
B	2014-15	Dhanubans	2	809.39	809.39
	2018-19			-do-	-do-
	2022-23			-do-	-do-
	2026-27			-do-	-do-
C	2015-16	Dhanubans	3	2023.47	2023.47
	2019-20			-do-	-do-
	2023-24			-do-	-do-
	2027-28			-do-	-do-
D	2016-17	Dhanubans	4	2184.54	2184.54

	2020-21 2024-25 2028-29			-do- -do-	-do- -do-

15.12 ESTIMATED YIELD FROM BAMBOO COUPES

The yield estimation of Bamboo coupes

1. Garjanpahad Block

Area of R.F – 10038. 04

No. of clumps per ha. = 82

Clump Quality Class – III

Average Length of Culm – 6 mtrs.

From Table the average no. of culm/clump is as follows:

Name of the Forest Block	Average no of clumps per ha.	Quality Class	Average no. of culms per clump				Total
			<1yr.	>1yr. & <2yrs.	>2 yrs. & >3 yrs.	>3 yrs.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Garjanpahad R.F	82	III	3	4	3	1	11

As per the bamboo cutting rules 4 nos. of culms are estimated to be removed from clump but there are 3 nos. of culms in mature class, Secondly the total retention in quality class III clump should be 10. As per clump and culm analysis there are 11 nos. of culms (including culm of age more than 3 years). So only one culm will be removed per clump. The yield of Garjanpahad felling series in shape of S.U. is as follows:

Area of felling series x Nos. of clumps per ha. x No. of culm to be removed per clump x 0.0025 (6/2400) = 10038.04 x 82 x 1 x .0025 = 2057.8078.

2. Dhanubans Block

Area of R.F – 6231.48

No. of clumps per ha. = 60

Clump Quality Class – III

Average Length of Culm – 6 mtrs.

From Table the average no. of culm/clump is as follows:

Name of the Forest Block	Average no of clumps per ha.	Quality Class	Average no. of culms per clump				Total
			<1yr.	>1yr. & <2yrs.	>2 yrs. & >3 yrs.	>3 yrs.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dhanubans R.F	60	III	4	4	2	1	11

As per the bamboo cutting rules 2 nos. of culms are estimated to be removed from clump but there are 2 nos. of culms in mature class, Secondly the total retention in quality class III should be 10. As per clump and culm analysis there are 11 nos. of culms including culm of age more than 3 years. So only one culm is to be removed per clump. The yield of Dhanubans felling series is as follows:

Area of felling series x Nos. of clumps per ha. x No. of culm to be removed per clump x 0.0025 (6/2400) = 6231.48 x 60 x 1 x .0025 = 934.72

The yield of different of annual coupes of two bamboo felling series from 2005-06 to 2008-09 is as follows:-

Sl. No.	Cutting series	Estimated yield in sale Units				
		Coupe A	Coupe B	Coupe C	Coupe D	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Garjanpahad	988.50	231.91	500.09	287.30	2057.80
2	Dhanubans	182.11	121.41	303.52	327.68	934.72
	Total	1170.61	403.22	803.61	614.98	2992.52

15.13 FINANCIAL FORECAST

Total bamboo area proposed for working is 30361.95 ha and the area for different years under treatment A and B has been distributed as follows:-

Sl.No.	Year	Area (in ha.)
1	2017-18	8396.43
	2021-22	-do-
	2025-26	-do-
	2029-30	-do-
2	2014-15	4544.96
	2018-19	-do-
	2022-23	-do-
	2026-27	-do-
3	2015-16	6823.39
	2019-20	-do-
	2023-24	-do-
	2027-28	-do-
4	2016-17	5946.42
	2020-21	-do-
	2024-25	-do-
	2028-29	-do-

The financial forecast with regard to bamboo working has been assessed in terms of demarcation of bamboo coupes and simultaneous Silvicultural operation. The cost norms to be followed in the scheme are as follows:

(Labor Rate – 150.00 per man-day)

- (i) Demarcation of bamboo coupes – 1 MD/ha. = 150/ha.
- (ii) Silvicultural operation - 5 MD/ha. = 750/ha.

The activities like Serial numbering high stump rectification digging of half-moon trench, congestion treatment, climber cutting and soil and moisture conservation will be taken up under silvicultural operation.

- (iii) Thus the total cost of management of bamboo area per ha. is worked out at Rs.900/ha during 2005 – 06 with subsequent annual rise of 5%. During the year 2007 – 08 the rate per hectare comes to Rs.992/-.

Sl. No.	Year	Area (in ha.)	Norm/ ha.	Financial requirement (in ha.)
(1)	(2)	(3)	(4)	(5)
1	2014-15	8396.43	900/-	75,56,787/-
2	2015-16	4544.96	945/-	42,94,987/-
3	2016-17	6823.39	992/-	67,68,803/-

4	2017-18	5946.42	1042/-	61,96,170/-
5	2018-19	8396.43	1094/-	91,85,694/-
6	2019-20	4544.96	1149/-	52,22,159/-
7	2020-21	6823.39	1206/-	82,29,008/-
8	2021-22	5946.42	1266/-	75,28,168/-
9	2022-23	8396.43	1329/-	111,58,855/-
10	2023-24	4544.96	1395/-	63,40,219/-
11	2024-25	6823.39	1465/-	999,62,66/-
12	2025-26	5946.42	1538/-	91,45,594/-
13	2026-27	8396.43	1615/-	135,60,234/-
14	2027-28	4544.96	1696/-	77,08,252/-
15	2028-29	6823.39	1781/-	121,52,458/-

Gap planting

The norm for Bamboo Plantation is Rs.26,400/- per Ha with spacing 5 Mt x 5 Mt. and plant population is 400 per ha. In the proposed scheme the rhizomes to be planted will be 12.5 % of the normal Bamboo Plantation i.e., 50 per ha. The year wise financial requirement for 1 ha gap plantation is provided in the following table:

Sl. No.	Item of work	Year	Norm per ha for 400 rhizomes per ha.	Nor per ha. for 50 rhizomes per ha.
(1)	(2)	(3)	(4)	(5)
1	Nursery cost (Advance work)	0 th Year	6400/-	800/-
2	Advance work	0 th Year	5800/-	725/-
3	Plantation	1 st Year	6600/-	825/-
4	Maintenance- 2 nd year	2 nd Year	4200/-	525/-
5	Maintenance- 3 rd year	3 rd Year	3400/-	425/-
			26400/-	3300/-

As per the norm provided the financial requirement for raising gap planting with 50 rhizomes over 4650.74 ha treatment type C area of degraded bamboo forests is as follows:

Sl. No.	Item of work	Year	Total areas (in ha.)	Norm per ha. for 50 rhizomes per ha.	Total amount required
(1)	(2)	(3)	(4)	(5)	(6)
1	Nursery cost (Advance work)	0-year	4650.74	800/-	37,20,592/-
2	Advance work	0 th Year	4650.74	725/-	33,71,787/-
3	Plantation	1 st Year	4650.74	825/-	38,36,861/-
4	Maintenance- 2 nd year	2 nd Year	4650.74	525/-	24,41,639/-
5	Maintenance- 3 rd year	3 rd Year	4650.74	425/-	19,76,565/-
	Total				1,53,47,444/-

Thus total financial requirement for implementation of prescription of bamboo working circle in Sundergarh Forest division is worked out at Rs.1,53,47,444/- or Rs.154.00 lakhs.

15.14 MORPHOLOGICAL CHARACTER OF THE CULMS

Correct determination of age of each culm is essential for framing cutting rules. The following morphological characteristics may help in determining the age of culm in case of salia bamboos.

<u>Culms Age</u>	<u>Morphological character</u>
1. Kardi (First year culms)	Culm sheath present in lower half of culm. Branches present throughout the length of culm. Uniformly green bloom is abundantly present and comes off easily on finger. A fresh cut just under the node shows the same colouration even after one or two minutes.
2. Kasi (2 nd year culm) nodes. fresh cut one	Culm sheath is mostly absent and only traces of dark colour is seen. Branche present particularly at all Bloom is patchy and comes out less easily on finger. A just under the node shows the same colouration even after or two minutes.
3. Pakala (3 rd year culm)	Culm sheath is absent. Branches are present at all nodes. White bloom disappears and blackish grey blotches appear which comes out on finger on slight rubbing. A fresh cut under the node shows reddish brown colouration after one or two minutes.
4. Fourth year culm and node	Culms sheath absent. Dark blotches are more conspicuous come off on finger easily. A fresh cut made out under the shows reddish brown colouration after one or two minutes.

15.15 SUBSIDIARY SILVICULTURAL OPERATIONS

15.15.1 SIMULTANEOUS SILVICULTURAL OPERATIONS

Cleaning operation in worked out coupe includes removal of dead and dry culms and debris from the clump. All the left over debris should be removed to safer places to reduce chances of fire hazard. The exposed rhizomes shall be covered with soil from the surrounding area preferably from the uphill side of hilly or undulating terrain. Both these operations shall be done simultaneously along with main cutting operation. No damage shall be caused to rhizomes and rootstock.

15.15.2 IMPROVMENT OF BAMBOO FOREST

Sincere effort should be made to improve bamboo stock in degraded areas by taking up suitable cultural measures like tending and enrichment bamboo plantations etc. Appropriate tending measures like cutting of shrubs and weeds should be taken in the natural bamboo regenerated patches. This will help in establishment of bamboo seedling. In the bamboo degraded areas, measures like bunding and trenching around the clumps, climber cutting, covering of exposed rhizomes with slash and earth should be taken up. Application of

fertilizer (NPK) should be taken up for better development of clumps. All these measures should be carried out departmentally under proper supervision.

15.15.3 TREATMENT OF GREGARIOUSLY FLOWERED AREAS

- (i) Bamboo seedlings at a spacing of about 4m x 4m will be planted and retained and the rest will be thinned out.
- (ii) Cleaning, soil working and weeding will be done around bamboo seedlings up to a radius of 50 cm.
- (iii) To maintain continuity, planting of bamboo rhizomes will be done especially in big gaps.
- (iv) All the flowered clumps will be worked following the prescriptions of working plan.
- (v) The area should be closed for grazing
- (vi) Elaborate fire protection measures to be taken.

In selection forest, the age of clump varies alongwith intensity of gregarious/sporadic flowering. The delay in flowering in poor sites is due to the effect of site quality, which is related to storage of starch, sugar and other substances in the clump that helps in flowering. In a well-managed forest intensity of flowering is less as compared to un-worked forest consisting of congested clumps. Intensity of flowering is more in areas having more biotic interference in form of grazing and fire in comparison to protected areas. It is important to identify the character of flowering in salia bamboos to decide appropriate management techniques.

Sporadic flowering

1. Scattered nature of flowering. Only few clumps are involved in flowering.
2. Only a few culms flower in a clump.
3. The culm may or may not die after flowering.
4. The clump does not die.
5. It takes place usually/irregularly almost every alternate years.
6. No definite direction of flowering is noticed.
7. No definite time period for flowering in an area.

Gregarious flowering

1. Flowering occurs almost in the entire area.
2. It involves almost all or some portion of the clump.
3. All the culms of a clump die after flowering.
4. Flowering is followed by death of the clumps.
5. It follow a cycle of long interval of 20 to 65 years.
6. It progresses in a definite direction like an epidemic.
7. It takes 2 to 4 years to complete flowering in the area.

15.16 CONTROL

Necessary entries with regard to works taken up in bamboo coupes must be entered in the compartment history.

15.17 MISCELLANEOUS REGULATIONS

AREA TREATMENT

All clumps in worked out coupes shall be covered with soil to induce regeneration of culms. Stone packing shall be done in down hillside of clump to conserve water. This shall be done in the year following coupe work.

15.18 GRAZING AND FIRE PROTECTION

The regeneration coupe shall be protected from fire and grazing and it will be governed by the prescriptions of Selection Working Circle with which it overlaps.

15.19 INTERMEDIATE REVISION

Intermediate revision is not anticipated. However, if necessary prescriptions may be reviewed after 5 years whenever felt necessary basing on the inspection reports, compartment histories and joint inspection of Conservator of Forests (T) and Conservator of Forests, Working Plans. Any deviation suggested shall be subject to the sanction by the competent authority.

PART – II

Chapter – VII.

NON-TIMBER FOREST PRODUCE (OVERLAPPING) WORKING CIRCLE

16.1 GENERAL CONSTITUTION

This overlapping working circle includes all the working circles except areas under protection working circle. The area of this Working Circle comes to 101549.34 Ha. The term Non-Timber Forest Produce (NTFP) includes all forest produce except timber, small timbers and fuel wood. NTFP have great potential to support the people's economic development consistent with the principles of sustainable forest management. Sundergarh Forest Division having extensive jurisdiction and vast vegetative cover has a considerable potential of NTFP. The tribals, who constitute major part of population along with other rural people, are dependent on such forest produce for their sustenance. Some of the NTFP items supplement their food and other consumable requirements while the collection, transportation and marketing of other NTFP items provides regenerative work to them, especially during lean period.

The National Forest Policy 1988 has spelt out one of its strategies of rural development by associating the tribals and other rural people living in and around forest areas in protection, regeneration and development of forests by ensuring optimum collection of NTFP through them. Institutional arrangement for marketing the same will also be done to safeguard their customary rights and interests and to provide them employment. About 40% of livelihood of rural people including tribals is covered through collection and sale of various NTFP items. These items also contribute significant amount of revenue to the state exchequer. Many NTFP items have commercial importance. NTFP were neglected in the past and their collection was largely disorganised. Moreover, the present practice of collection of NTFP is not scientific and sustainable. In the light of above facts and with a view to provide avenues of economic development to rural and tribal people by generating employment the constitution of this working circle has been felt essential.

16.2 GENERAL OBSERVATION AND VEGETATION

The collection of NWFP items is not only confined to RF and PRF blocks but also spread to DPFs, Khesra Forest, Village Forest, Govt. Waste land and private lands. Sal is the dominant species in majority of forests of this division and forms pure crop in many forest blocks. Sal seeds, Sal leaves and Sal resin (Jhuna) are important NTFP items procured

from Sal forests of this Division and these items are available in substantial quantities. The primary and secondary associates of Sal along with under wood and under growth provide other important NTFP items like char seeds, kusum seeds, myrobalans, mahua flowers and seeds, karanja seeds, babul seeds, siali leaves and fibres, dhatuki flowers bhuineem, ban haldi, bankulthi, kanta badhuni, phul badhuni, bantulshi, gums and resins etc. Some of these items are exploited at commercial level.

Kendu leaf is another important NTFP item exploited at commercial level in this division. Kendu leaf bushes and shrubs are mostly available in Govt. waste land and private holdings and contribute about 80% of Kendu leaf productions. The mohul trees which yield mohua flowers and seeds are largely available in the village forests and private holdings and contribute more than 60% of Mohua flowers and seeds collection. Mohua trees are also available in many RF, PRF and DPFs. The total area covered under this working circle is 101549.34 hectares.

16.3 SPECIAL OBJECTIVES OF MANAGEMENT

The special objectives of management of this working circle are within the scope of general objectives of management prescribed for entire division. They are as follows:

- (1) Sustainable collection, extraction and utilization of NTFP in consistence with policy of Govt.
- (2) To develop the productivity of various NTFP items available in this Division by taking suitable silvicultural measures.
- (3) To protect NTFP trees and promote their regeneration.
- (4) To improve existing marketing institutions like NTFP co-operatives and forest marketing co-operative societies for payment of fair prices to primary collectors and save them from exploitation middle men.
- (5) To create alternate employment / income generation by developing village and cottage industries and using locally available NTFP items as input/ raw material.
- (6) To carry out extensive as well as intensive research for utilisation of various NTFP items and to explore their commercial viability.
- (7) To develop NTFP based industries.

16.4 UTILITY OF NTFP ITEMS

The NTFP items are useful in many respects to the local inhabitants. Traditionally, many edible NTFP items form part of the staple diet of tribal folk and are consumed by them. Fruits, seeds, flowers and leaves of many tree species as well as herbs and shrubs are edible and are consumed either in raw form or cooked. The fruits, flowers, seeds, leaves, bark, roots and gum etc of many trees species herbs and shrubs have medicinal values and are used by the local inhabitant for treating and curing various ailments. The oil seeds, fibres, Tanin, gums, resin, etc. procured from different tree species are commercially used for many purposes. The commercial utility of various important NTFP items available within Sundergarh Division are as follows.

	<u>Species</u>	<u>Botanical name</u>	<u>Usable parts</u>
1.	Amba	<i>Mangifera indica</i>	Fruit, Kernel, seeds.
2.	Anla	<i>Emblica officinalis</i>	Fruit, Root, Flowers Leaf
3.	Anantamula	<i>Hemidesmus indicus</i>	Stem root
4.	Arakh	<i>Calotropis gigantea</i>	Bark, stems
5.	Arjun	<i>Terminalia arjuna</i>	Dry bark leaves
6.	Asan	<i>Terminalia tomentosa</i>	Tassar cocoons
7.	Babul	<i>Acacia arabica</i>	Seed, bark, gum, leaves, fruit
8.	Bahada	<i>Terminalia bellerica</i>	Bark, fruit, seed.
9.	Baghnakhi	<i>Mortynia diandra</i>	Leaf

16.5 AREA ALLOTMENT

This overlapping working circle overlaps entire working plan area except forest blocks included in Protection Working Circle. The area of the Working Circle is 101549.34 Hactares.

16.6 COLLECTION

Most of the NTFP items available in this division have one year collection cycle. In general collection after the rains (October) and is over by the end of spring (Mar-April). This enables the poor and labour class people to take up NTFP collection after planting seasons and before harvesting season of major agricultural crops.

16.7 WORKING OF IMPORTANT NWFPs AND SOME PRESCRIPTIONS FOR IMPROVEMENT

16.7.1 KENDU LEAF: Kendu leaf (KL) is the most important NTFP items collected in this division and plays significant role in rural economy. The KL trade is regulated under the provisions of the Orissa KL (Control of Trades) Act 1961. Sale and disposal of K.L. is managed by OFDC Ltd. as an agent of the State Govt. The different operations of KL working are spread from February to December of the year and generate employment for the rural as well as tribal people. Not much has been done to improve the crop through appropriate silvicultural practices. There is an urgent need to undertake crop improvement measures, at least on some experimental sites, by concerned Kendu leaf Division. There is a pertinent problem of forest fire, deliberately caused to improve the Kendu leaf production both qualitatively and quantitatively. This should be avoided at all costs and cases may be booked against the persons violating the same.

16.7.2 MOHUA FLOWERS AND SEED: Mohua flowers and seeds are mostly collected by local inhabitants from Khesra forests and private holding. Though mohua flowers trade was nationalized in 1991 after one year of operation it was denationalized. At present Gram panchayat is regulating the trade of mohua flowers. Mohua flowers are

available during April and May. Usual practice of collection of mohua flowers is to set the ground surrounding the tree on fire for easy collection. This fire often spreads making it uncontrollable and damages valuable surroundings forests. Such practice should be avoided.

16.7.3 SAL SEED: Sal seed is another major NTFP item available in this division. Its trade is regulated under Orissa Forest Produce (Control and Trades) Act 1981. The OFDC Ltd. was appointed as agent for collection of Sal seeds of this division. Sal seed has gained commercial importance as it is used in soap making, manufacture of vanaspati, sweets and chocolates. Sal seeds are raked from forest floor alongwith leaf litter and humus. During the process of raking all previous years seedlings are either killed or their root systems are damaged. The removal of leaf litter and humus exposes the soil micro flora. Sal growth, which is dependent on mycorrhiza, is adversely affected. Hence, prevailing practice of sal seed collection should be done away with. Collection by picking the seeds from the forest floor shall only be allowed. Burning the forest floor is strictly prohibited.

16.7.4 The TDCC Ltd has been given long-term lease for NTFP items like gum, lac, tamarind, kusum seeds, harida, siali leaves, bantulshi seeds, mohua seeds, honey, hill broom, kanta badhuni, bhuineem and dhatuki flowers. The lease of siali leaves has been settled with Rourkela (K.L.) Division. The lease of 32 NTFP items was settled in favour of M/s Utkal Forest Product for 10 years from 1989-90 to 1998-99 vide order no 28403/FFAH dt.06-12-89 and 28971/FFAH dt. 14-12-89 and was cancelled vide notification No 10048/FFAH dt.05-05-90 and 10046/FFAH dt. 05-05-90.

The lease of 29 NTFP items was once again settled in favour of M/s Utkal Forest Product Ltd for 10 years from 1990-91 to 1999-2000 vide Order No.23632/FFAH dt.26.09.90 and 26145/FFAH dt.05-11-90. Out of these 10 items were surrendered by M/s Utkal Forest Product Ltd. At present the NTFP items like, kusum seeds, karanja seeds goba seeds, bankulthi, neem seed, mohua seeds, palas seeds, siali seeds, bena cher, chakunda seeds, babul seeds, basil, sikakai, mango kernel, indrajob, banhaldi, bantulsi, and chiranjidana are being worked by gram panchayat. The collection of NTFP items is generally done through traditional means, e.g., cutting of trees, lopping, putting fire around trees and removal of bark, tuber and corm etc. This can be substituted by scientific method of exploitation without disturbing the trees and forest growth.

16.7.5 MEDICINAL PLANTS

The plantations of medicinal plants will be taken up under plantation Working Circle and rare and endangered species will be protected. The collection of NTFP items will be done without destroying the trees and forest cover.

16.8 STATISTICS OF GROWTH AND YIELD

From study of collection figures of different NTFP items of Sundergarh Division it is observed that annual production for most of the NTFP items including sal seeds, mohua seeds, mohua flowers, siali leaves etc varies from year to year and shows a highly fluctuating trend. However, the official production figures neither indicate the optimum collection nor reflect the exploitable potential of different NTFP items of this division. This is because collection of different NTFP items depends upon various factors like agency of collection, procurement price, market demand, availability of alternate employment to the local inhabitants and natural production cycle. If these factors are favourable, then the collection of NTFP item will be on higher side and if the same are not favourable, then the collection and production will show declining trend. Many of these items are consumable and are sold only when available in surplus quantity. Therefore, the official production figures do not reflect the actual production of various NTFP items. Due to the factors mentioned above as well as due to the fact that NTFP yielding plants do not have uniform distribution and have scattered type of distribution, it is difficult to assess the actual periodical yield of different items. It is difficult to assess the production potential of different NTFP items. For these reasons, it is not possible to prescribe any regulation of yield.

16.9 INCIDENCE OF SMUGGLINGS

Local inhabitants at times illicitly store some of the NTFP items in quantity more than their bona fide requirement for the purpose of trading with unscrupulous traders. The illicitly smuggled NTFP items do not contribute to revenue of the Division.

16.10 FUTURE MANAGEMENT

For improving the productivity of non-wood Forest produce and for their scientific management following measures are prescribed.

16.10.1 Collection of NTFP items by Scientific Methods

Many times, while collecting NTFP items, the local inhabitants do not use proper scientific method. The setting fire in the forest floor for collecting Sal seed, cleaning beneath Mohua trees by setting fire for collecting Mohua flowers, lopping of branches bearing seeds and fruit uprooting the plants bearing useful roots and tubers, complete debarking of trees having barks of commercial importance etc are the examples of unscientific exploitation. The items shall be collected without causing any harm to the trees and plants yielding them. Following scientific methods are suggested for collection of various NTFP items.

16.10.2 (a) Seed Based

The burning of forest floor for easy collection of Sal seeds and setting fire for getting wing less sal seed shall be strictly prohibited as it poses fire hazard. For collecting mohua flowers and seeds, the floor beneath the tree should be cleared without setting fire. For collecting seeds, lopping of branches shall be strictly avoided and seeds will be collected in natural condition without branches and twigs.

16.10.3 (b) Leaf based

Only the usual scientific method of cutting bushes above ground shall be for production of kendu leaves. While plucking and collecting kendu leaves care should be taken not to damage buds, branches and shoots. As per the Govt. order number 2957/F&E dt.11.02.91, sal leaves are not to be plucked from silvicultural point of view.

16.10.4 (c) Bark based

The debarking of trees yielding bark of commercial importance, viz, lodha, medha, phenfena, arjun etc is to be done at least foot above the ground so as to prevent injuries from fire, microbes and white ants. The debarking should be confined to the arms reach only for preventing damage to tender barks and juvenile buds. It is to be confined to one face only and should not exceed more than 40% of surface of the bole. The remaining portion of bole should be left untouched so as to maintain continuity of the cambium. However, in view of the PCCF, Orissa instructions vide memo No. 10144 (31) dt.24-04-91, the lease for barks are to be discontinued on silvicultural grounds.

16.10.5 (d) Gum and resin based

While collecting gums and resins, no shall be done to the trees yielding them. Artificial incision made over trunk should not be too large and deep to adversely affect the growth of trees. Intensive tapping for gums and resins is to be avoided as it may lead to damage and death of trees. The blazing will be done in staggered manner and not haphazardly. The shape of blaze should be triangular with angles pointing towards the ground. The initial blaze should be given at the breast height.

16.10.6 (e) Root based

The roots and tubers of plants like Satabari, Dioscorea, Rauwolfia having commercial and medicinal importance are to be exploited in such a manner that least damage is caused to the plant. For this purpose, only some portion of peripheral roots and tubers are to be extracted. In no case, plants are to be uprooted. The exploitation of endangered plants species like *Dioscorea deltoides* (herbaceous climbers) *Dioscorea indica* (herb), *Rauwolfia serpentina* and some species of Entada (gila) is to be discouraged.

16.11 MEASURES TO IMPROVE PRODUCTION OF NTFP ITEMS

In all the rehabilitation areas NTFP yielding species are to be given due importance. Efforts are to be made to improve regeneration of NTFP yielding species in all forest blocks. As per the site requirement, the proportion of fruit bearing and NTFP yielding species are to be encouraged. The growth of existing NTFP yielding species is to be boosted by taking suitable silvicultural measures. The NTFP yielding species are not to be felled unless dead and uprooted. The collection of Sal seeds is to be strictly prohibited for five years after main felling in the worked out coupes. Over exploitation of seeds of various important

NTFP, yielding species is to be prevented for encouraging natural regeneration. Wherever possible, sisal plantation is to be taken up along the boundaries of RF and PRF blocks. Sisal plantation will not only facilitate clear demarcation of boundary lines on the ground but also act as barrier against grazing by domestic animals. It will also yield valuable fibers, which are to be used commercially for making mats and ropes etc.

16.12 EXTENSIVE RESEARCH AND STUDY RELATING TO NTFP ITEMS

Till date, hardly any effort has been made to study and assess potential, and production of various NTFP items. Similar is the case on exploring the significance and utility in the field of trade, commerce and medicine. Even the use of various NTFP items by local communities who are familiar with a number of plant species have not been. Such study and research would be much useful socially, economically and silviculturally for the forest management in particular and for the people in general. A comprehensive programme of identifying various forest produce assessing their potential uses and feasibility of their marketing etc. needs to be formulated. For this purpose, the required assistance from Indian Council of Forest Research and Education (ICFRE) Dehra Dun, Forest Survey of India (FSI), Botanical Survey of India (BSI) and Resource Survey unit of state forest department should be solicited.

16.13 MEASURES FOR ENSURING PROPER PAYMENT TO PRIMARY COLLECTORS

For most of the NTFP items including sal seed, kendu leaves, mohua flowers etc. the procurement price is fixed by government and as per market and other conditions, the same is revised annually. The primary collectors of this division are mostly tribals. Almost all the inhabitants are illiterate and vulnerable to cheating by the procuring agent (intermediaries). At times when they are aware about current price, they are compelled to sell NTFP items at low price to the agents due to their poverty and poor marketing facilities. These people do not get adequate remunerations, which they are supposed to get and in the process get exploited.

It should be responsibility of the field staff of this division to supervise and monitor the mode of payment to the primary collectors and to ensure that they are not exploited by the intermediaries. They should keep primary collectors aware of latest procurement prices. The Tribal Development Co-operative Corporation Ltd (TDCC) and State Tassar and Silk Co-operative Society Ltd. (STSC Ltd) are few agencies under State Government which are operating in this division and have been entrusted duty of collection and marketing of few NTFP items. These agencies due to various constraints are not able to function to desired standard. Most of the surplus NTFP items are sold by the primary collectors to the designated or private traders for which they do not get full price.

16.14 WORKING OF MAJOR NTFP AND SOME SUGGESTIONS OF IMPROVEMENT

16.14.1 Kendu Leves: The major source of earning for local and tribal people is through Kendu leaves. The production of Kendu leaves can be improved through bush cutting by sharp weapons, spray of insencticides on leaves, proper storage and binding etc. For this purpose, local people may be trained by Kendu leaf wing.

16.14.2 Sal Seed: Sal seeds became commercially viable and found many alternative uses in soap making, manufacture of vanaspati, sweets and chocolates etc. M/s TDCC Ltd. is the authorized agent to collect sal seeds in the division. It is necessary that not more that 30% of the total sal forest area, should be worked out at a time. Rest of the seeds should be left on the forest floor. To facilitate regeneration as well as to conserve the soil moisture leaf litter should be retained. This can be achieved if burning of forest floors, in the specified areas is banned.

16.14.3 Siali Leaves and Fibre: Siali leaves and fibre (leaves and fibre of *Bauhinia vahlii*) are largely used in making leaf plates, donas and food wrappers in hotels, parties, functions and ceremonies. The quality of siali leaves varies according to their size. Siali leaves have a high market potential throughout India. To ensure proper collection in different areas of the division, the field staff should intensify their supervision during the collection season. Siali leaf is a major source of income for the tribals. It is available in the month of February and March of the year. Most tribal families are engaged in collection of leaves. They collect the leaves and then stitch 5-6 leaves into a plate with the help of thin bamboo straws and then sell them in bundles. Each bundle contains 80 leaf plates. The bundles are sold at very low price. Panchayats and FDAs should be encouraged to provide stitching and pressing machines for value additions. The skills of the poor collectors may also be up-graded through training, demonstrations and other extension methods.

16.14.4 Myrobalans: The fruits of *Terminalia chebula*, *Terminalia bellerica* and *Emblica officinalis* (collectively known as myrobalans) are used for medicinal purposes. The best time for

collection is January. Myrobalan tan is usually blended with other quickly penetrating tans to produce good leather colour. Preliminary training should be given to primary collectors to use collection and processing methods which are not injurious to fruit-producing trees as well as to the produce. They will also help local processing and thus provide opportunities for local value-addition. These opportunities to primary collectors, for adding value at local level, shall help them get better price. This will also diversify and develop local economics. The skills of

these poor collectors may also be up-graded through training, demonstrations and other extension methods. VSS and NGO may also be involved in this venture.

16.14.5 Genduli Gum and Other Gums: Genduli gum or gum karaya is the most important of all gums. This is extracted from the bark of *Sterculia urens*. Matured trees of 120 cm. and above should be tapped. The skills of these poor collectors may also be up-graded through training, demonstrations and other extension methods. VSS and NGO may be involved in this venture.

16.14.6 Hill-brooms: Hill-brooms are prepared out of grass, *Thysanoleana maxima*. The collection time varies from March to June. Men, women and children are engaged in collection. Hill-brooms, however, need very simple processing. The brooms, which are generally 3 to 4 feet in length after cutting, are dried in sun for two to three days are separated into equal lengths. There is a considerable scope for value-addition at local level and to raise the income levels of poor collectors. The DFO shall provide preliminary training to primary collectors for collection and processing methods. They will also help local processing and thus provide opportunities for local value-addition. These opportunities to primary collectors, for adding value at local level, shall help them get better remuneration. VSS may also be involved in this venture. Fire is injurious to forests as well as to the produce. The areas should be protected from fire.

16.14.7 Mahua Flowers and Seeds: Mahua flowers and seeds are collected privately. Mahua flower is very popular among tribals for liquor. The villagers eat the dry corolla by frying and making cakes. They also use it as feed cattle. Mahua flower is available during April and May. Flowers fall down at night. People go early in the morning and collect them in Bamboo baskets. Fire should not be allowed during collection time. Awareness training shall be given for getting proper price in the market. To improve potentiality seeds should be allowed to regenerate through protection from fire, grazing etc.

16.14.8 Tamarind: *Tamarindus indica* occurs frequently in natural forests. Tamarind fruits generally become ripe for collection during March-April. Tamarind is used mainly as preservative and an important ingredient in pickles, juices and tamarind concentrates. Training should be imparted to the local people through Horticulture Deptt for value added products e.g. tamarind pickle, squash, etc.

16.14.9 Amba: Mango is abundantly found, the fruits are collected for consumption as well as the pulp of ripe fruit is dried in the sun to form mats known as amba sada.

16.14.10 Kochila (Nux Vomica): It is generally available in all forest blocks and is widely used in Homeopathy. The trees should be protected from lopping.

16.14.11 Cashew: is a very important NTFP item of the local people. It is usually collected from forest blocks.

Calendar of Operations of Major NTFPs

A tentative period of collection of a number of major NTFPs is provided in Table. No systematic study has been done till now to assess the potential of various NTFP items and it is required to be done.

Calendar for Collection of Major NTFPs					
Sl. No.	NTFP	Collection Time	Sl. No.	NTFP	Collection Time
1	Kendu leaves	February – June	23	Semal cotton	March- May
2	Sal Seed	May – June	24	Honey	January
3	Siali leaf	October- May	25	Khajuri leaves	October-May
4	Siali fibre	October-May	26	Sabai grass	October-April
5	Harida	November-January	27	Sunari	September-April
6	Bahada	January-April	28	Tentuli	March – April
7	Cashew nut	April-May	29	Neem seed	June-July
8	Amala	May-June	30	Genduli gum	October-May
9	Char seed	April-May	31	Kurei fruit	December-February
10	Mango	May-June	32	Hill broom	March- June
11	Bel	December-March	33	Khair	October- May
12	Marking nut	January-February	34	Sal resin	January-April
13	Lac (Maghsiri)	June-July	35	Broom grass	October- May
	Lac (Jestha)	October to March	36	Siali fibre	October- May
14	Gum	April to May	37	Lemon grass	March-April
15	Mahua flower	April to June	38	Kamal gundi	February-March
16	Mahua seed	May to June	39	Bana tulsi seeds	November-March
17	Kusum seed	May to June	40	Lodha bark	October-May
18	Karanja seed	December-January	41	Dantari bark	October-May
19	Kochila seed	December-January	42	Phenphena bark	October-May
20	Kendu fruits	April to May	43	Mango kernel	June- July
21	Dhakti flower	January to April	44	Thatch grass	January
22	Arrow root	December to January	45	Honey-wax	January

16.15 MISCELLANEOUS REGULATIONS

Most of the NTFP items are not collected due to of lack of marketing. The DFO should contact various co-operative agency and other organizations for marketing of NTFP available in the Division. The V.S.S and Gram panchayats should be given information about marketing prospects of various NTFPs. The Divisional staff should play a role of facilitation rather than regulation in the marketing of NTFPs and act as link between consumers and the primary suppliers. The awareness among masses regarding value of NTFP should be publicised by regular meeting and use of audio-visual aids. Collection of NTFP should not be allowed beyond the carrying capacity and regeneration potential of the forests.

16.16 RIGHTS AND CONCESSION

The tribals and local inhabitants have right to collect all NTFP item for their own consumption and overall right of collection vests with Gram Panchayat. Traders have no right to collect and sell NTFP from forest floor.

16.17 WORKING NORM

Working norm as fixed by Govt. for unskilled labour will be norm for collection of NTFP from forest areas.

16.18 NECESSITY FOR INTERMEDIATE REVISION

Intermediate revision is not anticipated. However if necessary prescriptions may be reviewed after five years jointly by the Conservator of Forests, Working Plans and Conservator of Forests (Territorial) .Any deviation suggested shall be subject to sanction of the competent Authority.

16.19 Result of NTFP Survey and Analysis done in Sundargarh Division .

NTFP survey have been carried out in the Division in all ranges during the year 2011-12 (two ranges) and 2012-13(four ranges). Sample survey has been conducted in 100 sample plots in each range having sample size 10mx100m rectangular plot. Range wise report on result of NTFP survey is kept at **Annexure - 64** (Page- 386 of Volume-II)

PART – II
Chapter - VIII
VILLAGE FOREST WORKING CIRCLE

17.1 GENERAL CONSTITUTION

All the plantations raised by Social Forestry Project, Sundargarh Division have been declared as Village Forest by the State government as per Section-30 (i) of Orissa Forest Act, 1972. The second PWPR emphasizes inclusion of all these Village Forest into newly constituted Village Forest Working Circle in this plan for intensive scientific management of these forests.

17.2 AREA

147 number of village forests of this division cover an area of 1048.10 hectares, the details of which have been furnished in the table.

17.3 SPECIAL OBJECTIVES OF MANAGEMENT

The basic objectives of Village Forests Management are as follows:

- (1) To protect, improve and regenerate the village forest areas.
- (2) To provide benefits from such forest such as forest produce and fodder to village community.
- (3) To manage village forest in accordance with resolution on Joint Forest Management as formulated by Government of Orissa.

17.4 METHOD OF MANAGEMENT

For smooth and effective management of Village Forests Government has formulated the framework of operation in their Resolution. The list of village forest is given below:

List of Village forests of Sundargarh Forest Division declared under Odisha Village Forests as per Section-30 (i) of Odisha Forest Act, 1972

Sl. No	Name of the District/Division	Name of the Tahasil	Name of the Range	Name of village forest	Area in Ha.
1	2	3	4	5	6
1	Sundargarh	Subdega	Sundargarh	Baragad	6.49
2	Sundargarh	Subdega	Sundargarh	Barangakachhar	5.40
3	Sundargarh	Subdega	Sundargarh	Mahuljore	8.16
4	Sundargarh	Sundargarh	Sundargarh	Simna	0.928
5	Sundargarh	Sundargarh	Sundargarh	Budabahal	8.58
6	Sundargarh	Sundargarh	Sundargarh	Sapdagar (Pradhanpada)	11.00
7	Sundargarh	Sundargarh	Sundargarh	Barpali	4.00
8	Sundargarh	Sundargarh	Sundargarh	Kurumkel (Babudihi)	14.00
9	Sundargarh	Sundargarh	Sundargarh	Chitabanga	12.80
10	Sundargarh	Rajgangpur	Sundargarh	Semna	13.28
11	Sundargarh	Rajgangpur	Sundargarh	Kainsara	8.40
12	Sundargarh	Balisankara	Sundargarh	Raidihi	1.50
13	Sundargarh	Balisankara	Sundargarh	Rengali	3.52
14	Sundargarh	Balisankara	Sundargarh	Ranpur	0.73
15	Sundargarh	Balisankara	Sundargarh	Katngidihi-Rasraipur	3.77
16	Sundargarh	Rajgangpur	Sundargarh	Simdega	0.70
17	Sundargarh	Rajgangpur	Sundargarh	Balisankara	8.30
18	Sundargarh	Rajgangpur	Sundargarh	Katngidihi-	3.48
19	Sundargarh	Rajgangpur	Sundargarh	Sapdagar	8.50
20	Sundargarh	Sundargarh	Sundargarh	Bhasma	5.00
21	Sundargarh	Sundargarh	Sundargarh	Jarmal	8.00
22	Sundargarh	Subdega	Sundargarh	Bansikar	5.00
23	Sundargarh	Subdega	Sundargarh	Bamdera	6.00
24	Sundargarh	Sundargarh	Sundargarh	Bhoipali	4.54
25	Sundargarh	Sundargarh	Sundargarh	Latagaon	22.0
26	Sundargarh	Subdega	Sundargarh	Chitabanga	12.14
27	Sundargarh	Sundargarh	Sundargarh	Jamtalia	4.80
28	Sundargarh	Sundargarh	Sundargarh	Gadiajore	5.06

29	Sundargarh	Sundargarh	Sundargarh	Gadajore	5.06
30	Sundargarh	Sundargarh	Sundargarh	Ghantibud	5.06
31	Sundargarh	Sundargarh	Sundargarh	Kinjirma	9.79
32	Sundargarh	Sundargarh	Sundargarh	Bhedabahal	10.12
33	Sundargarh	Sundargarh	Sundargarh	Pandermal	3.04
34	Sundargarh	Sundargarh	Sundargarh	Podbahal Kundukela GP	10.08
35	Sundargarh	Balisankara	Sundargarh	Balisankara	10.12
36	Sundargarh	Sundargarh	Sundargarh	Bhasma	0.40
37	Sundargarh	Sundargarh	Sundargarh	Podbahal	6.27
38	Sundargarh	Sundargarh	Sundargarh	Kundukela	3.84
39	Sundargarh	Balisankara	Sundargarh	Talsara	10.12
40	Sundargarh	Lephipara	Sundargarh	Bijadihi	7.32
41	Sundargarh	Lephipara	Ujalpur	Surguda	6.04
42	Sundargarh	Lephipara	Ujalpur	Chhatenpali	12.8
43	Sundargarh	Tangarpali	Ujalpur	Dambahal (Nialipalai)GP	8.79
44	Sundargarh	Lephipara	Ujalpur	Rupabahal	1.96
45	Sundargarh	Lephipara	Ujalpur	Rangiamunda	3.98
46	Sundargarh	Lephipara	Ujalpur	Chakramal	9.80
47	Sundargarh	Lephipara	Ujalpur	Tangarpali	2.00
48	Sundargarh	Lephipara	Ujalpur	Nuadihi (Sargidhipa)	7.60
49	Sundargarh	Balisankara	Ujalpur	Kulabira	11.00
50	Sundargarh	Balisankara	Ujalpur	Nialipali (Karladhipa)	13.308
51	Sundargarh	Balisankara	Ujalpur	Tasladihi	3.128
52	Sundargarh	Lephipara	Ujalpur	Bandhpali	11.22
53	Sundargarh	Lephipara	Ujalpur	Remda	8.60
54	Sundargarh	Balisankara	Ujalpur	Kepse	2.00
55	Sundargarh	Balisankara	Ujalpur	Kepse	8.61
56	Sundargarh	Lephipara	Ujalpur	Mundagaon	4.38
57	Sundargarh	Lephipara	Ujalpur	Mahulpali	11.79
58	Sundargarh	Subdega	Ujalpur	Karlaghati	13.75
59	Sundargarh	Subdega	Ujalpur	Gangpurgad (Kainsjore)	12.5
60	Sundargarh	Subdega	Ujalpur	Kukridihi Adhapada P-I	6.52
61	Sundargarh	Subdega	Ujalpur	Kukridihi - II	5.75
62	Sundargarh	Lephipara	Ujalpur	Kaputikra (Pithampur)	10.5
63	Sundargarh	Lephipara	Ujalpur	Kuanrbaga (P)	16.00
64	Sundargarh	Lephipara	Ujalpur	Kuanrbaga (P)	9.00
65	Sundargarh	Lephipara	Ujalpur	Nialipali (Singarmunda)	17.5
66	Sundargarh	Lephipara	Ujalpur	Rupabahal	5.00
67	Sundargarh	Lephipara	Ujalpur	Dumbahal	5.00
68	Sundargarh	Lephipara	Ujalpur	Bandhpali	6.00
69	Sundargarh	Lephipara	Ujalpur	Sianbahal	4.00
70	Sundargarh	Lephipara	Ujalpur	Kurladhipa	7.00
71	Sundargarh	Lephipara	Ujalpur	Tangarpali	5.00
72	Sundargarh	Lephipara	Ujalpur	Nialipali	5.00
73	Sundargarh	Lephipara	Ujalpur	Bandhpali	15.00
74	Sundargarh	Subdega	Ujalpur	Rajpur	1.46
75	Sundargarh	Subdega	Ujalpur	Raidihi	6.00
76	Sundargarh	Balisankara	Ujalpur	Kinkibandh	12.00

77	Sundargarh	Balisankara	Ujalpur	Kinjirkela	1.10
78	Sundargarh	Lephripa	Ujalpur	Ergapita	3.00
79	Sundargarh	Sundargarh	Ujalpur	Lemlema	5.636
80	Sundargarh	Lephripa	Ujalpur	Mangaspur (Sargipali)	5.40
81	Sundargarh	Lephripa	Ujalpur	Remenda	6.00
82	Sundargarh	Lephripa	Ujalpur	Dambahal	5.20
83	Sundargarh	Sundargarh	Ujalpur	Tangarbhadri	5.60
84	Sundargarh	Lephripa	Ujalpur	Surguda	5.00
85	Sundargarh	Lephripa	Ujalpur	Suanjore	5.00
86	Sundargarh	Lephripa	Ujalpur	Darlipali	13.00
87	Sundargarh	Lephripa	Ujalpur	Darlipali	6.964
88	Sundargarh	Lephripa	Ujalpur	Lephripa (Manbholapara)	5.00
89	Sundargarh	Lephripa	Ujalpur	Sunajore	5.00
90	Sundargarh	Lephripa	Ujalpur	Sagarpali	7.00
91	Sundargarh	Lephripa	Ujalpur	Lephripa (Manbholapara)	4.00
92	Sundargarh	Lephripa	Ujalpur	Kepse	1.44
93	Sundargarh	Lephripa	Ujalpur	Balijori	5.71
94	Sundargarh	Lephripa	Ujalpur	Kurga	10.00
95	Sundargarh	Lephripa	Ujalpur	Kenapali	5.20
96	Sundargarh	Lephripa	Ujalpur	Chotbanga	1.60
97	Sundargarh	Subdega	Ujalpur	Khutgaon	1.00
98	Sundargarh	Lephripa	Ujalpur	Duaruadihi	10.32
99	Sundargarh	Balisankara	Ujalpur	Kinkibandh	10.10
100	Sundargarh	Lephripa	Ujalpur	Chhatenpali	12.14
101	Sundargarh	Lephripa	Ujalpur	Mundagaon	1.38
102	Sundargarh	Lephripa	Ujalpur	Surguda	8.00
103	Sundargarh	Hemgir	Gopalpur	Pithampur P-I	5.00
104	Sundargarh	Hemgir	Gopalpur	Pithampur P-II	6.60
105	Sundargarh	Lephripa	Lephripa	Chakradharpur	10.12
106	Sundargarh	Hemgir	Lephripa	Biringibahal	2.49
107	Sundargarh	Hemgir	Lephripa	Ratansara (Ratanpur)	4.00
108	Sundargarh	Hemgir	Lephripa	Satjoria	11.4
109	Sundargarh	Rajgangpur	Bargaon	Dahurada	4.80
110	Sundargarh	Rajgangpur	Bargaon	Khatkurbahal	6.00
111	Sundargarh	Rajgangpur	Bargaon	Dandjamra	10.50
112	Sundargarh	Rajgangpur	Bargaon	Jajpur	12.00
113	Sundargarh	Rajgangpur	Bargaon	Jajpur	4.25
114	Sundargarh	Rajgangpur	Bargaon	Purkapali	8.00
115	Sundargarh	Rajgangpur	Bargaon	Purkapali	4.00
116	Sundargarh	Rajgangpur	Bargaon	Panchra (Raidihi)	15.00
117	Sundargarh	Rajgangpur	Bargaon	Lanjiberna	15.00
118	Sundargarh	Rajgangpur	Bargaon	Timna (Gentubahal)	5.00
119	Sundargarh	Rajgangpur	Bargaon	Purkapali	10.00
120	Sundargarh	Rajgangpur	Bargaon	Karmabahal	7.00
121	Sundargarh	Rajgangpur	Bargaon	Kutra (Chunipada)	6.00
122	Sundargarh	Rajgangpur	Bargaon	Birtula	7.00
123	Sundargarh	Rajgangpur	Bargaon	Kadopara	6.00
124	Sundargarh	Rajgangpur	Bargaon	Udarama	4.00
125	Sundargarh	Rajgangpur	Bargaon	Phulbari	0.93

126	Sundargarh	Rajgangpur	Bargaon	Jangli	6.05
127	Sundargarh	Rajgangpur	Bargaon	Kantiamura	12.00
128	Sundargarh	Rajgangpur	Bargaon	Gentubahal-Timna	6.664
129	Sundargarh	Rajgangpur	Bargaon	Kantiamura	4.64
130	Sundargarh	Rajgangpur	Bargaon	Chhamunda	3.50
131	Sundargarh	Rajgangpur	Bargaon	Laxmiposh	12.00
132	Sundargarh	Kuarmunda	Bargaon	Purnapani	9.00
133	Sundargarh	Rajgangpur	Bargaon	Mangalpara	5.00
134	Sundargarh	Rajgangpur	Bargaon	Chinimahul	2.40
135	Sundargarh	Rajgangpur	Bargaon	Gargadbahal	3.88
136	Sundargarh	Rajgangpur	Bargaon	Tudalaga	6.00
137	Sundargarh	Rajgangpur	Bargaon	Jajpur	4.50
138	Sundargarh	Rajgangpur	Bargaon	Salepali	12.06
139	Sundargarh	Kuarmunda	Bargaon	Lanjiberna	5.00
140	Sundargarh	Sundargarh	Sundargarh	Kirei	3.24
141	Sundargarh	Tangarpali	Ujalpur	Surda (NialipaliGP)	5.00
142	Sundargarh	Sundargarh	Sundargarh	Timadihi	15.00
143	Sundargarh	Bargaon	Bargaon	Samleimunda	12.00
144	Sundargarh	Bargaon	Bargaon	Samleimunda	5.00
145	Sundargarh	Bargaon	Bargaon	Nuagaon	15.00
146	Sundargarh	Bargaon	Bargaon	Rangniabahal	18.00
	Total			146 nos	1048.10

Abstract

Village Forest Notifications of undivided Sundargarh Division		
Sl. No	Notification no. & Date	Area in Ha
1	19617-AFFN(SIDA)89/91 dt.07.11.1991	57.964
2	1723-AFFN-SIDA-89/91 dt.25.01.1992	201.844
3	1715-AFFN-SIDA-89/91 dt.25.01.1991	187.110
4	10454-AFFN(SIDA)89/91 dt.04.05.1992	41.420
5	29566-AFFN(SIDA)89/91 dt.09.12.1992	144.066
6	948-AFFN-SIDA69/91 dt.11.01.1993	132.900
7	22017-AFFN(SIDA)19/93 dt.27.09.1993	35.000
8	26633-AFFN(SIDA)19/93 dt.08.12.1993	47.080
9	26643-AFFN(SIDA)19/93 dt.08.12.1993	28.500
10	26647-AFFN(SIDA)19/93 dt.08.12.1993	39.184
11	26655-AFFN(SIDA)19/93 dt.08.12.1993	4.500
12	26671-AFFN(SIDA)19/93 dt.08.12.1993	41.530

13	26675-AFFN(SIDA)19/93 dt.08.12.1993	98.790
14	26679-AFFN(SIDA)19/93 dt.08.12.1993	30.800
15	26685-AFFN(SIDA)19/93 dt.08.12.1993	<u>82.880</u>
	Total Village Forest Area of undivided Sundargarh Division	1173.568
	Sundargarh Division	1048.100
	Transferred to Rourkela Division	125.468

17.5 TREATMENT SERIES: Most of the plantations have either been illicitly felled or available in scattered patches with coppice shoots coming up from stumps.

17.6 ANALYSIS AND VALUATION OF CROP: Due to inappropriate management in the past and severe biotic pressure in the form of illicit felling, overgrazing, fire hazard, encroachment etc., most of areas covered under this Working Circle are in stage of degradation. At many places, the original vegetation has been replaced by a series of secondary flora comprising of inferior bushy and scrubby species which are capable to withstand regular felling, grazing and annual fires. The available crop shows poor, stunted growth and contains irregular age and diameter class-wise trees distributed irregularly. The Floristic Diversity index shows that regeneration of different species is coming up well and all forest blocks will gain normalcy within a period of ten years. These blocks were not subjected to any regular silvicultural system in the past. The existing crop cover in these blocks is in irregular form.

17.7 SILVICULTURAL SYSTEM

The area should be planted as RDF with 200 seedlings per hectare and no tree felling should be allowed. The first and foremost concern of management is to protect and improve the existing growth through rehabilitation measures. No exploitation will be done in natural vegetation area except removal of dead, dying, diseased and moribund trees. Hence, no formal silvicultural system is prescribed.

17.8 CHOICE OF SPECIES

Miscellaneous species with medical plants species will be planted, e.g. *Acacia*, *Eucalyptus*, *Amla*, *Harida*, *Bahada*, *Teak*, *Bamboo*, *Sissoo*, *Gambhari*, *Chakunda* and *Mango* etc. The areas to be rehabilitated are in general sparsely vegetated with average stock density less than 0.4 and for that reason improvement, thinning and fencing operations are not required. However, in the clusters of dense growth, tending and thinning operations are required for improving the growth of vigorous species. For that purpose Sal, Asan, Kusum, Dhaura, Kurum, Kasi, Gambhar will be taken as principal species and the rest will be treated as secondary species. While carrying out these operations, it should be kept in mind that no undesirable gap is created in the canopy.

The choice of species will also depend upon the needs and requirements of local inhabitants. The plantations raised should be of mixed type and the species planted should be site specific. In the areas subjected to uncontrolled grazing, non-browsable species like *Cassia siamea*, *Agave sisalana*, *Karanj*, *Euphorbia* species etc. are to be given priority for plantation. In the area effected with annual fire, species like *Dalbergia sissoo*, *Cleistanthus collinus*, *Tectona grandis* and *Gmelina arborea* may be preferred.

SPECIES SUITABLE FOR PROBLEMATIC SITES

Site	Measures to be taken	Species to be planted
Ravine	1. Soil & water conservation measures 2. Full protection from grazing and fire. 3. Safe disposal of run-off. 4. Grassland development. 5. Afforestation.	<i>Dalbergia sissoo</i> , <i>Albizia lebbek</i> , <i>Acacia catechu</i> , <i>Acacia nilotica</i> , <i>Azadirachta indica</i> , <i>Agave americana</i> , <i>Agave hybrid</i> , <i>Agave sisalana</i> and <i>Eulaliopsis binata</i> and soil binding grasses.
Laterite soil	1. Soil and water conservation measures 2. Full protection from grazing and fire. 3. Application of fertilizer. 4. Afforestation.	<i>Eucalyptus hybrid</i> , <i>Dendrocalamus strictus</i> , <i>Acacia auriculiformis</i> , <i>Madhuca indica</i> , <i>Bombax ceiba</i> , <i>Soymida febrifuga</i> , <i>Cleistanthus collinus</i> , <i>Albizia lebbek</i> , <i>Anacardium occidentale</i> , <i>Agave species</i> and soil binding grasses.
Water logged areas	1. Preparation of mounds. 2. Planting of tall plants. 3. Application of anti-termite chemicals. 4. Early planting. 5. Drainage.	<i>Eucalyptus robusta</i> , <i>Anthocephalus chinensis</i> , <i>Syzygium cumini</i> , <i>Terminalia arjuna</i> , <i>Bombax ceiba</i> , <i>Lagerstroemia speciosa</i> , <i>Sisoo</i> , <i>Derris indica</i> , <i>Acacia nilotica</i> .

Depending upon the local factors, particularly soil condition, the species to be raised shall be selected carefully for gap plantation. Since the primary objective is to restock this area and to improve the existing forest growth, preference shall be given to local indigenous species that have the best potential to adapt to these sites. A list of species that can be grown for treatment of different sites in this Working Circle is presented in the following table. The areas to be rehabilitated are in general sparsely vegetated with average stock density less than 0.4 and for that reason improvement, thinning and fencing operations are not required. However, in the clusters of dense growth, tending and thinning operations are required for improving the growth of vigorous species. For that purpose *Sal*, *Asan*, *Kusum*, *Dhaura*, *Kurum*, *Kasi*, *Gambhar* will be taken as principal species and the rest will be treated as secondary species. While carrying out these operations, it should be kept in mind that no undesirable gap is created in the canopy.

The choice of species will also depend upon the needs and requirements of local inhabitants. The plantations raised should be of mixed type and the species planted should be site specific. In the areas subjected to uncontrolled grazing, non-browsable species like *Cassia siamea*, *Agave sisalana*, *Karanj*, *Euphorbia* species etc. are to be given priority for plantation.

In the area effected with annual fire, species like *Dalbergia sissoo*, *Cleistanthus collinus*, *Tectona grandis* and *Gmelina arborea* may be preferred.

Species	Fodder/ Non-fodder	Habitat factors	Successional status
1. <i>Aristida setacea</i>	Fodder	Soil having brown sandyloam with gravel, pH 7.0 soluble salt content. 0.028 percent medium in potash, very low in phosphate and devoid of CaCO ₃	Retrogression Sehima/ Dicanthium cover as a result of grazing
2. <i>Arundinella benghalensis</i>	Fodder	Soil colour yellowish brown, sandy loam pH 6.2	Themada/Arundinella cover
3. <i>Arundinella nepalensis</i>	Fodder	Slopes having good drainage and permeability, soil sandy loam, pH 6.5	Themada/Arundinella cover
4. <i>Bothriochloa intermedia</i>	Fodder	Level sites but extends in hilly topography too, Grows in variety of soil in subtropical condition.	Themada/Arundinella cover
5. <i>Bothriochloa pertusa</i>	Fodder	Variety of soil, pH ranges from 5.8 to 7.5 fine-textured soils.	Sehima / Dicanthium & Themda/ Arundinella cover.
6. <i>Cenchrus ciliaris</i>	Fodder	Grasses of Semi-arid zone. Dry sandy soil, pH 7.6 to 7.75	Dicanthium, Cenchrus lasiurus
7. <i>Cenchrus setigerus</i>	Fodder		Dicanthium, Cenchrus lasiurus

8. <i>Chrysopogon aciculatus</i>	Fodder	It has creeping rhizome and prefers sandy loam, acidic soils on level or moist slopes, pH 5.1 to 6.1. This is one of the few grasses, which can withstand heavy grazing. Cannot survive on dry stones or sandy soils, Promising species for stabilization of embankments etc.	Pharagmites/ Saccharum imperata cover.
9. <i>Chrysopogon fulvus</i>	Fodder	Hilly gravelly soils, black cotton soils, red soil with low level of moisture.	Sehima/ Dicanthium & Themeda/ Arundinella covers.
10. <i>Chrysopogon gryllus</i>	Fodder	Strong acidic soil on high hills, pH 4.2	Themeda/ Dicanthium thin cover on burning.
11. <i>Cymbopogon coloratus</i>	Non-fodder	Occurs on a variety of sites in dry areas (Rain fall 500 to 1000 mm) having gravelly to sandy loam, exposed rocks, acidic to neutral soil on hill and plains.	Sehima/ Dicanthium thin cover on burning
12. <i>Cymbopogon iwarancusa</i>	Non-fodder	Level to hilly topography, sandy and rocky soil, pH 6.5 to 7.5	Sehima/ Dicanthium thin cover on burning.
13. <i>Cymbopogon martini</i>	Non-fodder	Very wide distribution below tropic of cancer, pH 5.2 to 7.0	Sehima/ Dicanthium thin cover on burning
14. <i>Cynodon dactylon</i>	Fodder	All types of soil on level land, prefers moist area and stands moderate grazing and trampling.	Dicanthium, Cenchrus cover.
15. <i>Dactyloctenium indicum</i>	Fodder	Dry area, level terrain, first colonizer of freshly deposited alluvial sands, Prefers slightly alkaline soil.	Dicanthium/ Cenchrus lasiurus cover.
16. <i>Demostachys bipinnate</i>	Fodder	A grass of semi-arid and arid region, tolerates pH as high as 9.5	Dicanthium/ Cenchrus lasiurus cover
17. <i>Dicanthium species, Dicanthium annulatum, Dicanthium caricosum</i>	Fodder	A species of level land prefers sandy loam to loamy soil, moist areas.	Dicanthium/ Cenchrus lasiurus cover
18. <i>Dimeria uscescens</i>	Fodder	A grass of North-east, prefers good drainage and permeability, pH 4.2	Themeda/ Arundinella cover

19. <i>Elesine compressa</i>	Fodder	A grass prefers good drainage and permeability, pH 4.2	Themeda/Arundinella cover
20. <i>Eragrostis coarctata</i>	Fodder	A xerophytic grass.	Sehima/Decanthium cover
21. <i>Eremopogon foveolatus</i>	Fodder	A grass for deep soil, high calcium and low land of north east.	Sehima/Decanthium cover
22. <i>Eulalia trispicata</i>	Fodder	A grass for deep soil, high calcium and low land of north east.	Sehima/Decanthium cover
23. <i>Eulaliopsis binata</i>	Non-fodder	Can grow in slopes up to 50%, hot dry localities withstands forest fire	Sehima/Decanthium cover
24. <i>Heteropogon contortus</i>	Non-fodder	Shallow eroded, black or red soil, pH 6.8 to 7.00	Sehima/Decanthium cover
25. <i>Imperata cylindrica</i>	Fodder	Wide range of soil moist to swampy areas, pH 4.00 to 7.5	Sehima/Decanthium cover
26. <i>Ischaemum indicum</i>	Fodder	Low lying wet ground on black soil, pH 7.00 to 8.5	Sehima/Decanthium cover
27. <i>Sporobolus narginatus</i>	Fodder	Level sandy tract of arid zone	Sehima/Decanthium cover
28. Themeda quadrivalvis	Fodder	A grass of western Himalaya above 2000 M and rainfall 1100 mm	Sehima/Decanthium cover

29. Themeda quadrivalvis	Fodder	Rainfall 500 to 1250 mm foothill, kankar belts, pH 7 to 8.5, stands very dry sal forests, fairly gregarious.	Sehima/Decanthium cover
30. Themeda triandra	Fodder	Gravelly soil on hills, pH acidic to neutral, rainfall 1000 mm and above.	Sehima/Decanthium cover
31. Vetiveria zizanioides	Non-fodder	Low lying ill drained land where water table is high. Soil sandy loam to clay pH 4.0 to 7.5, prefers neutral soil.	Sehima/Decanthium cover

17.9 CYCLE

10 years cycle is prescribed

17.10 CALCULATION OF YIELD

Yield will be controlled and regulated by village committee.

17.11 TABLE OF OPERATION

The plantations are not successful at many places and any operation is not required. However climber cutting, singling of shoots and other site specific improvement measures may be taken up.

17.12 METHOD OF EXECUTION OF OPERATIONS

No operation is required.

17.13 MANAGEMENT PRESCRIPTIONS

All the village forest is managed according to Village Forest Rules, 1985. The village forest committees will up-date and modify their old Micro Plans according to present day requirements. According to site of plantation, survival percentage and requirement of local people new Micro Plan will be prepared in consultation with DFO, Ranger, Forester and Forest Guard. The prescription in the revised Micro Plan will incorporate the needs of the village committee for future planning.

17.14 CONTROL

The journals and other records will be maintained for each village forest coupe in accordance with the provisions of Orissa Forest Plantation manual 1972. Necessary entries shall be made in the compartment histories about all the works undertaken inside the annual coupes.

17.15 MISCELLANEOUS REGULATIONS

17.15.1 Grazing

All the plantation area shall be closed to grazing for a minimum period of 5 years. However, depending upon the result, the DFO can further extend the closure period. In case, it is decided to open the area for grazing, it shall be regulated as per carrying capacity of the area concerned. The Orissa Forest (Grazing of Cattle) Rules, 1980 should be strictly followed.

17.15.2 Fire Protection

The entire area should be rigidly protected from fire hazard. The fire protection measures shall be regulated as per the Orissa Forest (Fire Protection) Rules, 1979 and Chapter-XVIII of Orissa Forest Department Code.

17.16 RIGHTS AND CONCESSIONS

Rights and concessions shall be regulated as per the existing provisions of the relevant Gazette notifications of the respective village forest blocks and the Govt. of Orissa policy with regard to JFM.

17.17 WORKING NORMS

The cost norm that will be followed in working circle will be Rs. 1000/- per hectares approximately. The total annual requirement under this Circle will be Rs.1.06 lakhs per year with subsequent rise of 10 percent every year.

17.18 INTERMEDIATE REVISION

No major changes in the prescription of the Working Circle are anticipated. However, it may be reviewed, if necessary, after 5 years jointly by the C.F. (T) and the CF (WP). Any deviation suggested shall be subjected to sanction of competent authority.

PART – II

Chapter - IX

WILD LIFE (OVERLAPPING) WORKING CIRCLE

18.1 GENERAL CONSTITUTION

This Working Circle includes Wildlife (Overlapping) Working Circle and Recreation Working Circle of the out going plan. This working circle shall include forest areas having importance of wildlife and recreation. Like wild flora, wild fauna also has genetic pool, which can be utilized for the future welfare of humanity. Wild animals and their products have great commercial value and due to excessive and illegal exploitation of this resource in the past, depletion of wild life has taken place.

It is essential to create awareness among the visitors and increase their concern for the cause of protection, preservation and propagation of flora and fauna for bio-aesthetic purposes. It is however observed that there is lack of adequate and concentrated wild fauna in

this division. It is therefore proposed to develop a sanctuary in North-Western part of Orissa in Hemgir Forest Range for increasing the population of existing species of wild fauna especially elephants by conservation measures. The wildlife is dependent on forests for their survival and is an integral part of forests. The forests of the division are very rich in wild animals. This working circle overlaps all the forest blocks of the division.

18.2 OBJECTIVES OF MANAGEMENT

Keeping the above stated facts in view the specific objectives of the Working Circle shall be:

- (a) To improve the habitat of wildlives by reducing biotic interference,
- (b) To create more water sources and salt licks to support the dwindling wild life population.
- (c) To conserve and preserve the diversity of flora and fauna within natural eco-system,
- (d) To educate and create awareness among masses about the importance of wild fauna in the forest eco-system.
- (e) To conserve and develop the existing important wildlife habitats and pre-historic sites including caves for the purpose of eco-tourism.

18.3 STRATEGIES

18.3.1 Despite overwhelming protection given to the conservation of biodiversity and wildlife during recent years, forest patches of Sundargarh Division are highly degraded. Wild life is an integral part of the forests and performs important functions in the ecosystem. Most of the forest areas, both reserved and unreserved are prone to mining activities and therefore it is proposed that one Sanctuary may be declared to save endangered and precious wildlife of Sundargarh.

Though there has been general decline in the forests and wildlife habitat, the Sundargarh Forest Division continues to have rich wildlife resources as stated in Part I. In fact different studies in Sundargarh have indicated that Reserved Forests in general contain a substantial number of floral and faunal species, and level of biodiversity is at par or often exceeding that of many PAs. Therefore, for protection of the existing wildlives, improvement of their habitat and conservation of bio-diversity, this overlapping Working Circle has been constituted that extends to entire Division.

18.4 GENERAL CHARACTER OF VEGETATION

The biotic pressure by humans and domestic cattle has adversely affected the biodiversity of flora and fauna due to degradation of forests over the years. No systematic biodiversity survey has been made in the Division in the past, barring some qualitative observations. Formal floral-diversity surveys have been taken for the first time during the

revision of this plan and by the Forest and Ecology Division of NRSA, which has been reported in chapter 2 of part I of this plan. This will provide a benchmark for future comparisons. Detailed description of the composition and diversity (including fauna) of the forests, allotted to this Working Circle, has been discussed in Chapter 2 of Part I of this Plan. Further, all the blocks allotted to this overlapping circle have been briefly described in Part I.

18.5 SPECIAL OBJECTIVES OF MANAGEMENT

The special objectives of management set for this Working Circle are within the general objectives of management. These include:

- i. To conserve, protect and improve wild life habitat.
- ii. To promote wildlife in general and endangered species in particular.
- iii. To create awareness among the local people regarding necessity to conserve and protect the wildlives and their habitat.
- iv. To conserve and develop important wildlife habitat for the purpose of eco-tourism.
- v. To increase biodiversity and wildlife population.
- vi. To help prevention of wildlife related crimes.

18.6 ANALYSIS AND EVALUATION

Wildlife census has been carried out at intervals for different species of wildlife but no formal analysis and valuation of all data has been done at the Divisional level except for statistical purpose. Due to degradation of the forest cover and habitat the number and type of wild animals in the forest is reducing. Wildlife habitat continues to degrade which results in wild animals coming out of the forests leading to man-animal conflicts. The causes for habitat destruction and loss in wildlife are:

- i. Increasing incidences of encroachment and shifting cultivation.
- ii. Increasing demand for fuel wood, timber, fodder and other NTFPs.
- iii. Poaching for sport and meat. Mass hunting associated with festivals.
- iv. Inadequacy of the forest staff to combat poaching.
- v. Lack of awareness among the people.
- vi. Less focus of management for improvement of habitat for wildlife.
- vii. Habitat destruction and fragmentation, which affects wild life population.

In spite of fewer inputs for wildlife and habitat improvement in the past, the Division still has rich variety of wild animals which has been described in details in Chapter-2.

18.7 AREA AND ALLOTMENT

All the forest blocks included in the Plan have been allotted to this overlapping Working Circle. The circle covers entire geographical area of the Division as far as protection of wildlife is concerned.

18.8 SPECIES STRUCTURE

Most of the forest blocks of the Division support miscellaneous / deciduous types of forest. The top canopy includes species like *Shorea robusta*, *Pterocarpus marsupium*,

Terminalia tomentosa, *Bombax ceiba*, *Mitragyna parviflora*, *Anogeissus latifolia* and *Gmelina arborea* etc. The middle storey consists of *Bridellia retusa*, *Dalbergia sissoo*, *Desmodium oojeinensis*, *Lannea coromandelica*, *Lagerstroemia parviflora*, *Buchanania lanzan*, *Aegle mermelos*, *Terminalia bellerica*, *Terminalia chebula*, *Semicarpus anacardium*, *Syzygium cumini*, *Diospyros melanoxylon*, *Schleichera oleosa*, *Madhuca indica*, *Cleistanthus collinus*, *Morinda tinctoria*, *Sterculia urens*, *Dillenia pentagyna*, *Emblica officinalis*, *Tamarindus indica*, *Anogeissus acuminata*, *Mangifera indica*, *Bauhinia variegata*, *Mallotus philippinensis* and *Pongamia pinnata* etc. Undergrowth like *Woodfordia fruticosa*, *Holorrhena antidyenterica*, *Indigofera pulchella*, *Andrographis paniculata*, *Phoenix acaulis*, *Tridax procumbens*, *Eupatorium odoratum* and *Clerodendron infortunatum* etc. are also noticed in forest. Interspersed amongst the wood land are grasslands which are in small patches and are very important for the herbivores in the forests. The species structure of major heterotroph communities is as follows:

- a) Primary heterotrophs are Sambar (*Cervus unicolor*), Cheetal (*Axis axis*), Braking deer (*Muntiacus muntjak*), Mouse deer (*Tragullus memina*) etc.
- b) Secondary heterotrophs are Tiger (*Panthera tigris*), Leopard (*Panthera pardus*), Jungle cat (*Felis chaus*), Civet cat (*Vivericula indica*), Leopard cat (*Felis bengalensis*) etc.
- c) Scavengers and other animals are Hyaena (*Hyaena hyaena*), Jackal (*Canis aureus*), Wild dog (*Cuon alpinus*), Sloth bear (*Melursus ursinus*), Mongoose (*Herpestes edwardsii*), Large Indian squirrel (*Ratufa indica*) and otters (*Lutrogale perspiculata*), Pangolin (*Manis crassicaudata*), Wild boar (*Sus scrofa*) etc.
- d) The primates are represented by the common Langur (*Presbytis entellus*) and the common Pati (*Macaca mullata*).
- e) Amongst the snakes, Dhamana (*Zamaris nucusus*), Cobra (*Naja tripudians*), Viper (*Vipera russelii*) and Krait (*Bungarus candidus*) are found throughout the Division with Python (*Python molurus*).
- f) The avifauna includes peafowl, red jungle fowl, common quail, green pigeon, imperial pigeon, doves, hill mynas, red-vented bulbuls, pied wood-peckers, koels, crow pheasants, large Indian parakeets and common king fisher, etc.

18.9 POACHING AND WILDLIFE CRIME

Wildlife crime comprises of poaching of wild animals, capture, possession, transport and trade of live animals and plants or their parts, products and derivatives. It also includes damaging or destroying the habitat besides mass hunting, which is associated with local festivals in different parts of the State as a customary practice. In fact, this crime is one of the fastest growing crimes in the world and is said to be next to narcotic trade due to the huge financial returns. A wildlife criminal may be a villager or a poor tribal or he may be a smuggler operating from towns/cities, depending on the level at which he is operating in the trade link starting from poaching within a locality to international border smuggling. The extent of poaching and the wildlife crimes detected in the Division are reflected in Chapter 8.

Methods of poaching wild animals vary from place to place depending upon the type of animal being poached. Shooting is common method for all kinds of mammals and birds. However, poisoning of big cats, birds and large herbivores, trapping mammals like deer and reptiles and netting small mammals, small birds and butterflies are frequently resorted to. Stick and glue, insecticides and pesticides for killing fast flying birds and taking young hatchlings from birds' nest holes on trees are commonly practiced. Digging out of snakes, porcupines, lizards etc. from underground pits is commonly seen.

Poaching of herbivores is quite frequent for meat and trophy and includes deer, sambhar, wild boar, mouse deer, hare etc. During summer months when natural streams become dry and rabi or other crop has ripened, these animals generally enter human habitation and are killed by the villagers. These animals are also killed by laying traps and snares on the jungle paths. Wire nooses for hare are common sight in most of the tribal dominated forest areas. Tribals use bows and arrows to kill deer and sambar. Most of them are expert in trekking wild animals and they follow them for two to three days accompanied by hunting dogs and finally kill the animals using arrows. Other traps to kill deer and other herbivores are also used. Many cases of poaching go undetected for variety of reasons. In fact, most of the poaching of birds and herbivores goes either undetected or unreported. However, organized poaching for trade is negligible. Poaching takes place for livelihood or as local custom, incidental kill or killing in retaliation. The extent of different animals poached and reported during the outgoing plan and intervening period is reflected in Chapter 8 of this plan.

18.10 MAINTAINING SPECIAL HABITATS

Special habitats are biological in origin and provide habitat functions for small wild animals. They include snags, snag recruit, den trees, down wood, isolated large old trees, trees with fluting boles, buttresses, lianas, significant species of fruit bearing trees and shrubs. These special habitats have been neglected in the past. Care should be taken while implementing the plan to maintain these special habitats especially in the areas coming under Selection Working Circle and Bamboo (Overlapping) Working Circle.

Snags: As a rule of the thumb, maintain at least 5 tallest and largest diameter snags per hectare, in a well distributed manner in all silvicultural treatments. Retained snags need to appear in the compartment history. These are vital for a variety of primary hole-nesting birds like Woodpeckers and Barbets, which are colonized by Hill Mynas and Owl etc during subsequent years.

Snag recruits: Likewise maintain 5 snag recruits per hectare. These are dying trees, mostly affected by heart rot fungus but not dead. They can be recognized by their external symptoms. All such trees, which are being retained, need to be reflected in the

compartment histories. These, along with snags provide a very good substrate for epiphytic orchids, especially of genus *Dendrobium*.

Down wood: In felling operations, among the rejects, large size irregularly shaped hollow logs often feature. Being uneconomical, they usually remain on site, or are converted into fire wood. Such large sized woody material provides critical ecological functions in support of maintenance of vegetation and animals' diversity, besides serving the function of cover and micro-habitat for several species. The largest size hollow logs, or rejects for any reason need to be maintained at the rate of three logs per hectare, and as far as practicable evenly distributed. These should find place in the compartment history.

Large old trees: These would naturally occur in low density areas. The *Ficus* *sp.* should not be counted among these since *Ficus* is not felled even otherwise. Large old trees of different species as and when encountered need to be preserved in any felling/tending operation. These trees (2 to 4 per ha.) need to be entered in the compartment histories and they will serve as daytime roosts/nesting sites for large owls and other species.

Trees with fluting boles ad buttresses and holes at the base: These trees occur in very low densities represented by a small number of species. They provide significant microhabitat functions for small mammals like Mouse Deer and Reptiles. One such tree needs to be retained per hectare and entered in the marking list.

Lianas and Climbers: Climber cutting operation is a standard practice and prescription given in all working circles. However, lianas provide significant functions in support of mobility of arboreal animals and depending on animal species serve as resting and escape cover for primates. They are equally important for arboreal small carnivores, rodents and lizards. A climber with tangles is especially important. It is recommended that at least two old climbers per hectare be retained and recorded in compartment histories.

Fruit bearing trees and shrubs: All fruit bearing tree species should be retained. Marking rules need to be specific on this point.

Roosting/Nesting trees: All trees which are known to support nesting colonies of water birds or roosting congregations of raptors/other birds need to be retained. This is crucial especially with reference to vultures, which are critically endangered along with Eagles.

18.11 DEVELOPMENT OF HABITAT

Habitat shall be developed with the cooperation of local people using sound silvicultural techniques. The aim should be to provide more food, water and shelter to the wild lives and reduce man-animal conflict.

18.11.1 Improving the cover: Providing adequate cover to wild animals within their habitat is necessary for shelter and protection of wild animals from weather, predators and enemies. Keeping in view this aspect, it has been prescribed in Selection Working Circle not to fell those mature trees, which create a lasting gap in the canopy. It is also prescribed not to fell trees near water holes, wallows and saltlicks to maintain cover. In case of Rehabilitation

Working Circle mixed plantations have been prescribed instead of pure plantations to create ground flora and middle storey to provide cover for different types of wild animals. Tree cover around the stream, water holes and salt licks shall be maintained and improved.

18.11.2 Improving availability of Food: The adequacy of food in wild life habitat depends upon the quality and quantity of food produced and the animal population living therein. Keeping in view this aspect of wild life management, the exploitable diameter of various species has been kept on higher side and the percentage of removal of exploitable size trees have been properly regulated and safe guarded. Similarly, under various subsidiary silvicultural operations like opening of canopy, thinning of congested patches, improving the general availability of food shall always be taken into consideration. For these reasons and also, for their utility as NTFPs, the fruit bearing trees have been prohibited from felling under the respective working circles. Further, the species as discussed in the following paragraphs will be part of any plantation/ retention operation taken in forest areas.

- i. Food availability in a habitat changes with the season. Herbivores depend on plant materials like leaves, barks, twigs, flowers, fruits and seed of species like *Mallotus philippinensis*, *Dendrocalamus strictus*, *Adina cordifolia*, *Albizzia lebbek*, *Aegle marmelos*, *Cassia fistula*, *Ficus bengalensis*, *Ougeinia ougenensis*, *Shorea robusta*, *Syzygium cumini*, *Terminalia alata*, *Terminalia bellerica*, *Zizyphus mauritiana*, *Bombax ceiba* etc.
- ii. Deer, Monkey, Langur, Rats and Hare feed on wild fruit of plants like *Ficus* species, *Terminalia belerica*, *Buchanania lanzan*, *Aegle marmelos*, *Syzygium cumini*, *Embllica officinalis*, *Zizyphus mauritiana*, *Diospyros melanoxylon*, *Grewia hirsute* etc. These animals help in dispersal of fruits and seeds in the forests.
- iii. Among the plant materials, grasses constitute major portion of the herbivores food. Grasses, which are highly preferred and consumed by herbivores, are *Axonopus compresses*, *Eragrostis pilosa*, *Saccharum bengalensis* etc. These grasses should be raised in the wild life concentrated areas to meet the food requirement of herbivores.

18.11.3 Distribution of natural salt licks: There are many natural salt licks scattered on sides of nallahs and in foothills. These shall be maintained and improved. New salt licks will be created in areas where better protection can be provided to the wildlife like near anti-smuggling/poaching camps, beat houses, rest houses etc. To improve the general wildlife condition it is proposed to improve administration and management.

- (i) Water holes and saltlicks should be provided as per the requirement.
- (ii) The poaching incidence should be investigated and the ranges vulnerable for poaching such as Hemgir, Gopalpur and Lephripara should be given special protection by creation of anti- poaching squad.
- (iii) The census of wild animals should be conducted periodically in association with Wildlife wing of the Forest Department.
- (iv) Local N.G.O. should also be involved. The awareness on wildlife conservation should be stressed among the general public. No conservation is

possible without people's participation. Wildlife week and other forestry related day should be celebrated and high publicity should be done.

- (v) The field staff of the division should be given training in wildlife management.

18.12 CLASSIFICATION OF HABITAT

The habitat can be divided into three types depending upon degree of deterioration.

(A) Habitat with lesser degree of deterioration, e.g., Gopalpur, Hemgir and Lephripara Ranges. Most of forest blocks of these ranges have been placed under Selection Working Circle and few in Rehabilitation Working Circle. In these areas forest cover will be enriched by gap planting in blanks and by suitable soil and water conservation measures in eroded areas.

(B) Habitat having deterioration of higher degree are seen in Ujalpur, Badgan and Sundergarh Ranges. Most of the forest blocks of these ranges come under protection and rehabilitation working circle where there will be no felling and only removal of dead, diseased, dried, hollow trees shall be allowed. The crop cover will be improved by gap planting and soil conservation measures to conserve moisture of the soil.

(C) Barren blocks: This category consists of barren blocks of Badgaon range and Sundergarh range. These areas are highly degraded and are kept under rehabilitation and plantation working circles to protect the existing crops and to improve condition in future. Extensive plantations under different schemes have been taken up in these areas and several blocks have been assigned to Vana Samarakshan Samities (VSS) for protection. As these areas are close to town ships, creating awareness among the children and public about the importance of wild life is required.

18.12.1 DEVELOPMENT WORK

Habitat shall be improved with the cooperation of local people by using sound silvicultural techniques. The aim should be to provide more food, water and shelter to wild life. The area under category 'A' is quite extensive to provide wilderness and should be managed as extended buffer of the sanctuary. Food availability in a habitat changes with the season, Herbivores depend on plant materials like leaves, barks, twigs, flowers, fruits and seeds of species like *Mallotus philippinensis*, *Dendrocalamus strictus*, *Adina cordifolia*, *Albizzia lebbek*, *Albizzia procera*, *Aegle marmelos*, *bauhinia purpurea*, *Cassia fistula*, *Ficus benghalensis*, *Ficus religiosa*, *Ougeinia ougenensis*, *lannea coromandelica*, *Shorea robusta*, *Syzygium cumini*, *Terminalia alata*, *Terminalia belerica*, *Zizyphus mauritiana*, *Bombax ceiba*, *Careya arborea* etc.

Wild elephants feed on bark and leaves of species, e.g., *Ficus benghalensis*, *Ficus religiosa*, *Mallotus philippinensis*, *Dendrocalamus strictus*, *Ougeinia ougenensis*, *bambax ceiba*, *Kydia calycina* and *Shorea robusta*. Deer, Money, langur, Rats and hare feed on wild fruits of plants like *Ficus species*, *Terminalia belerica*, *Buchanania lanzan*, *Aegle marmelos*, *Syzygium cumini*, *Emblica officinalis*, *Zizyphus mauritiana*, *Diospyros melanoxylon*, *Grewia*

hirsute etc. These animals help in dispersal of fruits and seeds in the forest areas. Among the plant materials grasses constitute major portion of the herbivore food. Grasses, which are highly preferred and consumed by herbivores, have been furnished in the following table. These grasses should be raised in the wild life concentrated areas to meet the food requirement of herbivores.

Sl. No.	Grass Species	Name of the herbivores, which consume/prefer
1	<i>Axonopus compresses</i>	All grazing herbivores
2	<i>Centotheca lappacea</i>	Deer
3	<i>Digitaria longiflora</i>	Smaller herbivores
4	<i>Eragrostis pilosa</i>	All grazing small herbivores
5	<i>Oryza granulata</i>	Deer
6	<i>Panicum flarescens</i>	All wild herbivores
7	<i>Saccharum spontaneous</i>	All larger herbivores
8	<i>Setaria glauca</i>	All smaller herbivores
9	<i>Setaria palmifolia</i>	All herbivores

18.12.2 WATER AVAILABILITY

Generally, there is no dearth of water from July to December. However, scarcity is felt from January to June, when most of the nallas and streams dry up. Hence, it is necessary to create waterholes and check dams on the higher slopes along nallas to improve water availability during pinch period. There are a few natural salt licks scattered throughout the division, mostly on sides of nallas and in foothills.

18.12.3 WILD LIFE IMPROVEMENT MEASURES

In general following measures should be taken up.

- (1) Special emphasis and attention should be paid for protection of endangered, rare and vanishing species from extinction. Necessary data should be collected on the above species and their populations should be closely monitored.
- (2) The fire lines should be cleared and material removed should be dumped in such a way that it facilitates rodents, insects, jungle fowl and other birds to build their nests for breeding.
- (3) No felling should be carried out in the areas having crown density of 0.4 and less.
- (4) All hollow trees and the trees supporting nesting dens of wild animals shall not be removed because that would adversely affect their growth. 2-3 such trees per hectare will be retained.
- (5) In the plantation areas creation of ground flora and middle storey should be encouraged by mixed type of plantations including fruit bearing trees. Emphasis should be given on improvement of floral composition and density.
- (6) No fruit-bearing tree like harida, bahada, aonla, zizyphus, kendu, mahul and ficus etc. should be felled.

- (7) Planting of grasses and trees favorable to wildlife should be taken up in blanks and in the eroded areas to meet the food requirement of wild animals.

18.12.4 FIRE PROTECTION MEASURES

Fire lines should be cleared and maintained regularly. As most of the forest fires are man-made, it can be prevented to a large extent by motivating and educating the local people. Adequate field staff should be stationed with necessary infrastructure in fire prone areas to control and suppress the fire menace during summer season.

GRAZING

It shall be regulated depending upon the carrying capacity of the area and without disturbing the requirements of the wild animals.

RIGHT AND CONCESSIONS

No rights are allowed unless admitted and prescribed in this plan or specifically granted by government.

CHECK GATE

To prevent poaching adequately staffed check gates should be erected in Hemgir, Kanika and Gopalpur on all major roads, footpaths and inter-state boundaries.

VHF SETS

Fast communication is the key for protection of forests and wild lives. For better communication, divisional headquarter, all range headquarters, Section headquarters, beats and check gates should be provided with VHF sets.

18.13 ANIMAL DEPREDAATION

Depredation of animals is increasing day by day. Crop damage by elephants during harvesting season is very high in Gopalpur, Hemgir Sundergarh and Birsa Ranges. The reason for this conflict is shrinkage of the habitat of Elephants and conversion of common land adjacent to forest into agricultural lands through encroachments. There is no immediate solution except driving away the elephants to their habitat during the harvesting season by traditional methods like beating of drums, using fire crackers etc. Creation of low cost corridor with sufficient food and water by raising plantations of bamboos and other palatable species may control the migration of elephants. To mitigate miseries of people due to wild animals, the compensation for crop damage, house damage, injuries and death should be disbursed to them as quickly as possible. Delay makes people loose faith in the department and they tend to take revengeful actions even at the cost of safety of wild animals.

18.14 RESEARCH

Though scope of research at Divisional level remains limited, efforts can be made to encourage some organization to take up research work in the division. A systematic collection of data of occurrence, dynamics and movements of wild animals at regular intervals or every year for five consecutive years will provide population estimate, variation in population structure with vegetation cover, breeding behavior, mortality rates etc. Following scientific studies can be taken up.

- (a) Migration pattern of wild animals.
- (b) Study on general health and diseases of wild animals and steps that can be taken for treatment.
- (c) Scientific study on food and feeding habits of important target species.
- (d) Scientific study on intra and inter-specific relations.
- (e) Scientific study on population dynamics of important target species.

(f) Life cycle study of different wild life in species habitat matrix, rare and endangered

Species and extinction etc.

18.15 COMMON WILD LIFE

Common wild animals

Leopard

Hyaena

Sambar

Spotted deer

Barking deer

Sloth bear

Mongoose

Common langur

Wild boar

Common wild birds

Babbler

Bulbul

Blue jay

Dove

Jungle fowl

Pea fowl

Common myna

Golden oriole

Rose ringed pigeon
Cuckoo



Crop Damage by Wild Elephant



House Damage by Wild Elephant

18.16 SANCTUARIES AND NATIONAL PARK

There is no Sanctuary and National Parks existing in this Division and in North-Western part of Orissa. Also there is no scope for creation of Sanctuary/ National Park in the division.

After the enactment of Wild Life (Protection) Act, 1972 and its further amendments, the Ex-rulers of Sundargarh and the common citizens of Sundargarh have no right regarding poaching, shooting and trade in wild animals and wild life articles. According to expired working plan of Sundergarh Division, no rights of any description were admissible in the Reserved Forests in Ex-zamindari areas but some concessions were granted as follows:

1. The tenants were allowed edible roots, fruits and creepers free of payment for their personal uses.
2. They were allowed to collect thatch grass on payment of one pice per bundle.
3. They were allowed green bamboos at the rate of nine annas per hundred and dry bamboos at the rate of seven annas per hundred.
4. Residents were permitted to graze animals with permits in the Reserved Forests.

Grazing of sheep, goats and pig was strictly prohibited in the R.F.

5. The villagers situated within the Reserve Forests and having insufficient nistar forests for grazing were allowed to graze their cattle in the R.F.

The name of villages and hamlets inside seven Reserved Forests are given below:

Sl.No.	Name of village/hamlet	G.P.	Name of R.F.	Population	Livestock
(1)	(2)	(3)	(4)	(5)	(6)
1.	Khajuribahal	Julubahal	Garjanpahar R.F.	105	Buff. -70 Catt. – 98 Goat - 20
2.	Brahmani	Kanika	Garjanpahar R.F.	56	Buff. -6 Catt. - 56 Goat - 22
3.	Bhalubahal	Ankelbira	Rohini R.F.	211	Buff. - Nil Catt. – 109 Goat - 86
4.	Khutipani	Hemgir	Dhanubans R.F.	95	Buff. -6 Catt. – 86 Goat – 56
5.	Bhairijharan	Hemgir	Garjanpahar R.F.	58	Buff. – 40 Catt. – 49 Goat – 60
6.	Kalundihi	Hemgir	Garjanpahar R.F.	29	Buff. -20 Catt. – 30 Goat – 28

18.17 WILD LIFE RULES

Prior to enactment of Wild Life (Protection) Act, 1972, the following legislations of the Ex-Rulers and State Government were in operation in Sundargarh Division.

1. The Reserved Forests Shooting Rules.
2. The Elephant Preservation Act, 1879.
3. The Wild Birds and Animals Protection Act.

The rules and laws were comprehensive in nature but there was no provision for controlling trade, imposing penalties on poachers and enforcing wild life protection rules among masses. The Wild Life (Protection) Act 1972 enacted by the Central Government and subsequent Wild life (Protection), Orissa Rules, 1974 brought some changes. As a result, poaching and trade of wild animals reduced subsequently. The Divisional Forest Officer, Sundargarh (T) has been declared as Ex-officio Wild Life Warden in respect of Sundargarh (T) Division.

18.18 MANAGEMENT PLAN

The Management Plan will be completed that will lay emphasis on following aspects:

1. Provision of Corridors
2. It is proposed to create one game tank and one salt lick in every territorial range.
3. Grazing by domestic cattle needs to be stopped.
4. Forest fire needs to be controlled with demarcation of fire line, use of fire swatters, water sprinklers and mass education.
5. Elephant Menace

The movement of elephants from Jharkhand and Chhatishgarh to Orissa and their regular migration are commonly seen in all forest blocks of Gopalpur Range, Hemgir Range Lephripara, Ujalpur and Sundargarh Range. The movement of elephants, nos. of calves, breeding among elephants in the forest blocks of Hemgir Range and elephant dung show that habitat is highly suitable for elephants. The following development measures are needed.

- (a) Establishment of corridors in different forest blocks of Hemgir, Gopalpur and Lephripara Range.
- (b) Plantation of fruit bearing trees, e.g., Zizyphus, Banana, Mango, Jack fruit, Mohua and Kendu etc.
- (c) Plantation of grass species in open patches.
- (d) Improvement of bamboo forest by silvicultural means.
- (e) Provision of clean water.

Unique habitats provide special functions not provided by successional stages and special habitats. They are geomorphic in origin. Large mammals like the tiger, leopard, bear and hyena use caves as shelter and for rearing cubs. In limestone formations caves may have stalactites and stalagmite, some of which can be significant for visitors. Caves have spring and small streams. They are important for amphibians,

reptiles, fishes and many species of birds. Several species of bats live in colonies inside caves. Caves need complete protection, even while located inside a worked area. Inventory of available caves in various forest blocks and their mention in compartment histories should be taken up during this plan period.

When soft rock underlying hard rock weathers away, an arch is formed which serves as a shelter for bee hives (pollinators), nesting colonies for swallows etc. such sites need to be protected. Survey of available overhangs in various forest blocks and entering them in compartment histories should be taken up during this plan period. These are much smaller and distinct from caves, usually dug in soft rock or earth cutting by animals such as wild dogs, hyena, wolves, foxes, porcupines, for the purpose of shelter and breeding. They are used by a variety of taxa such as small mammals and reptiles. Porcupines and pythons are known to share the same underground chambers. Dens are subject to human disturbance. Dens need to be protected. Inventory of available dens in various forest blocks and mentioning them in compartment histories should be taken up during this plan period.

Natural saltlicks are important for all herbivores and such sites need to be protected from disturbance such as road alignment, soil conservation or any other engineering work. Setting up labour camps or cattle camps in their vicinity etc. should be discouraged. In summary, the unique habitats are vulnerable for a variety of reasons. Depending upon the existing and anticipated situation, the DFO needs to prescribe appropriate protection strategies. Some of the prescriptions may be generic, while some need to be site specific with reference to critical sites that come into notice during the survey conducted. Tribals are often residing in old growth stands or groves and there are specific periods of pilgrimage. People follow several forest routes to go to holy sites. DFO need to have full information on the average number of people, activities on the pilgrimage site, travel routes needs of pilgrims etc. From the time pilgrims enter the forest area to the time of departure, their movements and activities are required to be regulated. They would enroute need fuelwood, camping sites and other requirements of forest resources.

The distribution of wildlife in different forest blocks shall be studied and their occurrence in different habitats in different seasons shall be recorded. Census of wild animals shall be done every alternate year in consultation with the Chief Wildlife Warden to assess the prey-predator base. Wildlife habitats of endangered species shall be identified and mapped. Presence of natural waterholes, saltlicks and natural meadows shall be recorded and their adequacy shall be assessed with reference to their population estimates. Watch towers shall be constructed near crucial waterholes and saltlicks.

Migration routes for wild animals shall be identified and preventive measures shall be taken to protect and improve corridors. The areas vulnerable to poaching shall be protected from all sorts of biotic interference. The fire lines shall be

cleared and material removed shall be dumped in such a way that it facilitates rodents, insects, jungle fowl and invertebrates for safe breeding. Throwing of unutilized food material in plastic, tin, poly bags and other containers should be strictly prohibited since this will ruin the aesthetic value of the site and may turn some wild animals to become scavengers. In order to spread conservation message among tourists, attempts should be made for use of proper signage, way side exhibits, Do's and Don'ts, Interpretive ideas, selling of wildlife posters, photograph, literature, interpretive nature trail and interpretive stall should be developed.

Provision of safe drinking water and public toilet is essential. Interpretation centre and visitor centre should be constructed near Hemgir. Use of loudspeaker should be banned strictly. The staff should be trained. Habitat improvement, plantation of ornamental trees and medicinal plants garden lawns, small park etc shall be developed below the dam site in tourism zone. The planned tourism management increases number of tourist in the area. It helps the tourists in developing awareness, appreciation and conservation education package. It generates public support for conservation of wildlives by providing enlightened wilderness experience and visitor's satisfaction. The management should collect proper feed back from the tourists of all classes of people including students, low and high-income group people. The management must regulate tourism in such a manner that habitat is not degraded due to excessive tourist pressure. The D.F.O. must generate employment for local people in the form of guides and other services and create a sense of involvement in management. The tourist movement must be limited within the tourism zone. Special staff must be deployed for tourism purpose. Visitor book must be maintained. Infrastructure viz. tourist complex, dormitory, boats, information centre, camping equipment should be provided to tourists.

18.19 MIGRATION OF ELEPHANTS AND REVIVAL OF HABITAT CORRIDOR

Sundergarh Division is close to some important elephant ranges of Chhatisgarh and Jharkhand states. Stringent protection and rehabilitation measures are required for forest protection and linking the corridors of two similar habitats, which are used by the elephants during migration. If we loose this link, it will lead to fragmentation and ultimately extinction of this long ranging animal. It is suggested to link the entire distributional range of population of elephants by revival of habitat corridors. During pinch period the elephants go for house raid and eat away the stored paddy, grains and country liquor etc.. Land use planning should recognize established migration routes and protect them from incompatible forms of development and settlement of people. Elephants and tigers are large bodied animals. Surviving in the fragmented habitats would force them to cross human occupied landscapes. Securing the corridors of elephant and other species for migration between habitats is crucial for their survival. Developmental plans in these regions must take elephant and other

species into consideration. This will ensure species survival, reduce conflict and ensure holistic conservation of all wildlife.

18.20.1 Corridor: Bamra Division to Sundargarh Range, Ujalpur Range, and Bargaon Range of Sundargarh Division.

This corridor connects Bamra Forest Division with Sundargarh and Ujalpur Forests. Human settlement and anthropogenic pressure is slowly degrading and fragmenting the habitat.

Length: 25-30 K.M Width: 3 K.M.

Forest Type: Tropical deciduous Sal forest.

Legal status: Major forest blocks include Kurei R.F., Kiralaga R.F., Gurubasa R.F., Mahulgaon R.F., Tikilipara R.F., Kharikamunda R.F., Raidihi R.F., Panchara North and South R.F., Banglapahad R.F., Kusumura, Kukuda R.F., Bankidihi R.F., Tildega Dunguri R.F., Runga R.F., Satparlia R.F., Athakosia A R.F., Dhangergudi R.F., D.P.F. and Revenue land. Athakosia R.F. and Kiralaga R.F. were the original home ranges of elephants in this area.

Major land use: Forest, Agriculture and settlement.

Frequency of use by elephant: Regular, used by herds of 20-25 elephants and bulls

- Threats:
1. Expansion of settlement and encroachment.
 2. Degradation of corridor forest.
 3. Conversion of forestland into the agricultural land.

18.20.2 Corridor: Sambalpur (N) Division (Jharsuguda) to Sundargarh Range of Sundargarh Division.

This corridor connects forests of Jharsuguda with Sundargarh Forest.

Length: 19-20 K.M Width: 2-2.5 K.M.

Vegetation: Tropical deciduous sal forest.

Legal status: Major forest blocks include Kiralaga R.F. and Kurei R.F., Jamtalia R.F., Deuli R.F., Bijillikhaman R.F., Gopikudar R.F. along with P.F., D.P.F. and revenue lands.

Major land use: Forest, Agriculture and settlement.

Human artifacts on corridors: Mines

Frequency of use by elephant: Regular, used by small herds of 10 – 15 elephants with bull.

- Threats:
1. Increasing human settlement because of mining and encroachment.
 2. Continuous movement of heavy vehicles and blasting in stone quarries.
 3. Degradation of corridor forests.
 4. Expansion of agricultural activities.

18.20.3 Corridor: Chhatisgarh State to Hemgir Range, Gopalpur Range, Lephripara Range and Ujalpur Range of Sundargarh Division.

This corridor connects forests of Chhatisgarh State with Hemgir Range and Gopalpur Range.

Length: 30-40 K.M Width: 5-6 K.M.

Vegetation: Tropical deciduous sal forest.

Legal status: Major forest blocks include Jamkani R.F., Garjanpahar R.F., Dhenkanapani R.F., Dhanubans R.F., Chhengapahad R.F., Chitikikhadu R.F., Rohini R.F., Chengapahar R.F., Jhatikhol R.F., Kaletpani R.F., Ragdakhhol R.F., Sarangijharia R.F., Dhangergudi R.F., Sikajor R.F., Athkosia R.F. and Hundarkhol R.F. alongwith P.F., D.P.F. and revenue lands.

Major land use: Forest, Agriculture and settlement.

Human artifacts on corridors: Mines and industries.

Frequency of use by elephant: Regular, used by herds of 20-30 elephants with bull.

- Threats: 1. Increasing human settlement because of stone quarries and encroachment.
2. Continuous movement of heavy vehicles and blasting in stone quarries.
3. Degradation of corridor forests.
4. Expansion of agricultural activities.

Conservation Plan

Declaration, demarcation and legal protection to corridors under various laws and shemes shall be provided and following steps shall be taken up:

1. Preparation of a detailed land use and environmental management plan for mining areas.
2. Improving forest cover in the areas linking corridors.
3. Eco-development activities in villages in the foot hills shall be taken up to reduce dependency of villagers on forest areas close to corridor.
4. Prevent expansion of agriculture land near corridors.

18.21 WILDLIFE PROTECTION MEASURES

The immediate need is to collect and tabulate all available spatio-temporal information about incidence of wildlife crime including identity and modus operandi of the criminals. The second step is to analyze the information and prepare a strategy and action plan while third step is to take action against poachers. The staff deployed for anti-poaching operations shall be alert, in good health with high motivation. They should be trained in handling arms and ammunition and in identification of wildlife species and their parts. They should be armed and provided with VHF sets for communication. Satisfactory maintenance of fixed and mobile VHF sets is a pre-requisite for efficient operation. The staff involved in the entire operation shall be well conversant with the basics of litigation and court procedure with regard to wildlife crime.

Further, the patrolling party/anti-poaching squads must be well acquainted with the terrain. Patrolling paths should be planned in advance and such paths should not always follow tracks but should be different based on specific information. As information collection is vital for prevention and detection of wild life crime, both covert and overt information shall be gathered. The officer who is handling the full time informers and information inflow should ensure proper follow up of the said information.

Lack of proper prosecution is leading to low rate of conviction in wildlife cases. The success of protection efforts can not be assessed on number and nature of wildlife offence cases booked but also on the effectiveness with which such offence cases are investigated and contested in courts of law. In most cases the offenders booked in wildlife offence cases are released on bail and/or acquitted and they commit crime again. Hence, appropriate training of staff in wildlife crime investigation methods and techniques is urgently required. It is vital that proper evidence is recorded at every stage of investigation and case records are built up meticulously. Moreover, the prosecution report shall be thoroughly scrutinized by the ACF/DFO before being filed in the court. The cases shall be pursued regularly in the court so as to ensure greater rate of conviction. These measures will have lasting effect on the forest and wildlife protection in the Division. Anti-poaching camp should be set up in vulnerable pockets where there is greater concentration of wildlives. During the fire season, these forest blocks should be given priority in protection from fire. There shall be inventory of all the gun license holders within 10 Km radius of Forrest blocks rich in wildlife. This inventory should be regularly posted up to date.

18.22 FINANCIAL REQUIREMENTS

The wild life (Overlapping) circle needs protection of forests, wild life, improvement of corridors, provision of vehicles, VHF, improvement of roads and mobile squads. It is proposed to spend about Rs. 165 lakhs during the plan period and about Rs. 15.00 lakhs every year for the improvement of this circle.

Year	Items of work	Amount of expenditure
2014-15	Improvement of corridors and other works	Rs.30.00 lakhs
2015-16	-do-	Rs.15.00 lakhs
2016-17	-do-	Rs.15.00 lakhs
2017-18	-do-	Rs.15.00 lakhs
2018-19	-do-	Rs.15.00 lakhs
2019-20	-do-	Rs.15.00 lakhs
2020-21	-do-	Rs.15.00 lakhs
2021-22	-do-	Rs.15.00 lakhs
2022-23	-do-	Rs.15.00 lakhs
2023-24	-do-	Rs.15.00 lakhs
	Total	Rs.165.00 lakhs

A regular database shall be maintained at Divisional level comprising of details like;

- Schedule species found in the area,
- Pictorial directory of all identified poachers to be prepared and circulated in the locality,
- List of traders in cattle and goatskins as well as tanneries,
- List of eating houses alleged to be serving bird/deer meat and,
- Timely and proper documentation of all the incidences of man-animal conflicts including poaching.

Further, the DFO shall also submit half-yearly report to the authorities concerned with regard to steps taken by him to protect wildlife and to improve their habitat. He shall also report constraints faced by him in implementing the prescriptions of this Working Circle. Depredation by wild animals is gradually increasing and the main reason for this conflict is shrinkage of their habitat and shortage of food. There are several reports of killings and injury of the human beings and damage to the crops in the division. The DFO should develop short-term and long-term measures to combat this problem. To mitigate miseries of people due to wild animals, the compassionate amount for crop damage, house damage, injuries and death, should be disbursed as quickly as possible. Delay makes people lose faith in the forest department and they tend to take revengeful self-protection measures even by resorting to killing and poisoning of wild animals.

18.23 MISCELLANEOUS REGULATIONS

18.23.1 Control of Grazing: The wildlife rich areas shall be closed for grazing. However, grazing may be controlled as per the provisions of the Orissa Forest (Grazing of Cattle) Rules, 1980. The local people and the VSS may be motivated to immunize their cattle, which graze inside the forests.

18.23.2 Fire protection measures: Fireline should be cleared and maintained regularly. As most of the forest fires are man-made, it can be prevented to a large extent by motivating and educating the local people. Adequate field staff should be stationed with infrastructure in fire prone areas to control and suppress the fire menace during summer season.

18.23.3 Incentives and Rewards: There shall be provision for rewards and incentives to the staff and public including the informers whose efforts lead to detection of wildlife crime and arrest of the offenders. Moreover, they shall be given publicity in the locality as well as recognition on the occasions like Wildlife Week and World Forestry Day.

18.23.4 Rights and Concessions: Rights and concessions under this Working Circle shall be regulated in accordance with the provisions of the Orissa Forest Act; Wildlife (Protection) Act 1972 and further rules and policies of Government in force.

18.24 INTERMEDIATE REVISION

No intermediate revision is anticipated. However, if so required, the Conservator of Forests (territorial) in consultation with the Conservator of Forests (Working Plans) will send a proposal for amendment of prescriptions to the competent authority for necessary approval.

PART – II
Chapter - X
ECO-RESTORATION (OVERLAPPING) WORKING CIRCLE

This Working Circle includes Wildlife (Overlapping) Working Circle and Recreation Working Circle of the out going plan. Eco-restoration shall be taken up with the help of local people which will improve the living condition of people and provide them regular employment. Eco-tourism is responsible travel to natural areas that conserves environment and sustains the well being of local people. Tourism involves traveling to relatively undisturbed areas with the specified object of studying, admiring and enjoying the scenery and wild plants and animals as well as existing cultural heritage (both of past and present) found in the area. Eco-tourism promises benefits for conservation and development. It can generate economic benefit at local and national level and provide incentives for action to conserve the resources on which it is dependent. It is also a tool to gain public support for conservation and encourage private sector conservation efforts at a time when traditional conservation through enforced protection of natural areas is being questioned for its effectiveness.

Strategies such as eco-tourism offer considerable potential for integrating conservation with development. Interpretation and nature education is a bigtool for eliciting public support for conservation. It is also an educational activity, which aims to reveal meanings and relationship through use of original objects by experience and illustrative media rather than by communicating factual information. The area included in this overlapping working circle comes to 121603.37 hectares.

19.1 OBJECTIVES

Sundargarh Division has considerable potential to provide positive contribution to conservation and development at many levels through eco-tourism which can generate revenue also and that can be reinvested for conservation and for providing income generating opportunity to remote and marginal communities. The objectives of Eco-Restoration Working Circle are as follows:

- (1) to help the people develop awareness, understanding and appreciation of forest.
- (2) to provide adequate employment opportunities to local inhabitants and improve their economic condition.
- (3) to evoke positive response towards conservation of natural, historical and cultural sites.
- (4) to enhance the forest cover and achieve management goals.
- (5) to build up public support for the biodiversity of area.

19.2 ISSUES AND PROBLEMS

Forest department have very less accommodation facilities for tourists at strategic points of eco-tourism importance. As the eco-tourism sites attract many tourists the sewage and garbage management system should be evolved. The tourist inflow has to be regulated as per the carrying capacity of the eco-system concerned. Administrative and interpretive signages should be displayed at national and state highways and near proposed Hemgir sanctuary. Recruitment of local unemployed youths as nature guide and interpreter will provide employment and improve management of the environment in perpetuity.

19.3 STRATEGIES

Constitution of Eco-tourism committees at Hemgir, Kanika and Gopalpur may be done to make above mentioned concepts self-sustaining. Nature guides and interpreters may be recruited in close consultation with committees and they must be educated and made conversant with the flora, fauna and other natural, historical and cultural heritage of the area. Visitors' book may be maintained in all eco-tourism sites for self education and future vision. Special staff may be deployed to deal with the tourists. Concept of Eco-hotel, eco-sporting and eco-adventures may be encouraged among local people and private sector enterprises. Construction of interpretation centre and visitors center at Hemgir and Gopalpur with different theme, halls, audiovisuals, digital screen and web site with attended and unattended services should be encouraged.

19.4 SELF GUIDED TRAILS

It is a device of natural history interpretation, which places people in direct contact with forest resources. S.G.T. is a means by which visitors' attention is drawn towards interesting features that might otherwise be overlooked or not fully appreciated. All caves can be developed as S.G.T. Audio devices can be developed with jungle calls etc.

19.5 IDENTIFICATION OF THE ZONES

There are three eco-tourism zones identified in the proposed Hemgir sanctuary namely,

1. Hemgir Eco-tourism zone.
2. Garjanpahad Eco-tourism zone.
3. Dhanubans Eco-tourism zone.

Eco-tourism committees will be provided with necessary equipments and utensils to cater to the needs of the visitors and to regulate them. Pilgrim accommodation facilities shall be developed and maintained wherever it is existing. Welcome gates with guide map and natures' trail, trekking and S.G.T. along with wayside signages shall be developed along with trekking routes at wildlife sighting points. A Visitors complex is

required to be constructed preferably near Hemgir. However, for preparation of ecotourism master plan a professional landscape architect may be consulted.

19.6 LOCAL AREA DEVELOPMENT

Eco-restoration will be taken up with the help of local inhabitants and efforts shall be made to generate maximum employment opportunities for people. The eco-tourism infrastructure should be self-reliant. The plan should create a database on visitor related activities and programmes. Visitors use of the resources should be monitored and pressure on habitat and infrastructure should be evaluated including efficiencies of regulations in providing tourism related experience and education. The result of evaluation should be used for improving strategies. Following measures are recommended.

- (1) Incorporate policies that encourage the reinvestment of revenues and profits back into conservation and community development.
- (2) Regulate access to sensitive areas in meaningful ways supported by appropriate fee structures to fully realize the potential for generating revenue.
- (3) Have policies, plans and regulations for development and management that are enforceable and lead to the establishment of standards and codes of conduct for self-regulation by industry and the consumers.
- (4) Actively involve local communities and key stakeholders from planning stage and encourage partnerships across sectors, organizations and individuals.
- (5) Rely on low impact design and technologies for reducing resource use, managing waste and promoting energy and water conservation.
- (6) Include and support ecologically sustainable green business practices that add value to tourism products and services.
- (7) Ensure available marketing leading to realistic expectations.
- (8) Incorporate and implement monitoring and audit mechanisms that assess progress and impacts.
- (9) Focus on interpretation of natural and cultural resources to enrich visitors' experience.
- (10) Be sensitive to local culture and traditions and involve other cultures in non-invasive ways.
- (11) Be supported by research in environmental and also social, cultural and economic impacts of tourism.
- (12) Lead to the strengthening and development of institutions that facilitate linkages between various stakeholders, particularly among conservation, community and tourism industry.
- (13) Give adequate importance to domestic visitors as they are more affected by sustainability issues and are likely to make greater contributions to conservation in the end.

19.7 DEVELOPMENT OF ECO-TOURISM

The following sites are included in this circle and it is proposed to preserve and improve the sites for bringing awareness among masses. The improvement measures shall give boost to eco-tourism, eco-restoration and environmental education.

19.7.1 CAVES INSIDE FOREST

Many areas including the pre-historic caves can be developed into eco-tourism sites where people can see and appreciate nature. It is proposed to develop and preserve all such sites for purpose of tourism and education. The Archeology Department of Orissa has identified 19 archeological sites in Gopalpur and Hemgir Ranges of the Division, which are located inside Garjanpahad RF, Dhanubans RF, Jamkani RF, Chengapahad RF, Tangopahad RF and Ushakothi DPF. These archeological sites have pre-historic rock carvings and paintings and have excellent archeological importance. The Division has taken up development of these sites with financial assistance from the State Archeology Department. The approach roads to the spots have also been developed during the year 2000. The pre-historic sites along with the forest vegetations inside the RFs will make excellent centers of eco-tourism in the area. The following pre-historic areas have been included in this overlapping working circle namely:

19.7.2 MANIK MODA

It is situated inside Garjanpahad RF of Hemgir Range at 21°53' N latitude and 83° 38'E longitude at 307 mtrs altitude near village Sukhabandha about 5 Kms South-West of Hemgir and about 66 Kms from Sundargarh. It is about 3 Kms from Himgir-Beheramunda Forest Road. This rock-shelter is painted with 57 pre-historic paintings of human, bulls, deer etc. with dark red, orange red,, yellow, white pigments locally available there.

LEKHAMODA	-	1 (Gangakhhol -1)
LEKHA MODA	-	2 (Gangakhhol-2)
LEKHAMODA	-	3 (Sukhamakar)
LEKHAMODA	-	4 (Sargikhol)
LEKHA MODA	-	5 (Badlimuda)
LEKHAMODA	-	6 (Chichrakhol -1)
LEKHAMODA	-	7 (Chichrakhol-2)
LEKHAMODA	-	8 (Kendu khulia-1)
LEKHAMODA	-	9 (Kendu khulia-2)

It is situated inside Chhengapahad RF of Hemgir range in between 21°54' N and 21° 56' N latitude and 83° 42' E to 83° 44'E longitude at 390 mtrs altitude.

LEKHAMODA	-	10(Babajimath-1)
LEKHAMODA	-	11(Babajimath-2)
LEKHAMODA	-	12(Phuldungri)

It is situated inside Garjanpahad RF of Hemgir Range in between 21° 54' N and 21° 56'N latitude and 83° 42'E to 83° 44'E longitude at about 340 mtrs altitude. All the above pre-historic rock shelters are situated within a reach of 5 Kms. from Kanika on Kanika—Hemgir M.D.R-42 near Brahmani village. Engravings are found in shelter rocks and as many as 500 nos. of pre-historic paintings of animals like Deer, Goat, Monkey; figures of birds like peacock and crane and figures of reptiles like snakes and lizards are also found. Human figures are found at places with horned headgears and stick in hands. All the paintings are painted in red, yellow, white pigments made out of red ochre, slates, and charcoal, hematite and iron pigments.

19.7.3 TONGO

It is situated inside Tongopahad RF of Hemgir Range near village Giripur on way from Tangardihi to Belpahad at about 2 Kms. Oriented at 21° 53'N latitude and 83° 49' E longitude at 378 Mtrs. altitude. This shelter rock has been engraved with 190 different shapes like palm foot, triangular shapes, resembling female genitals. The engraved grooves have been filled with pigments of red and yellow ochre.

19.7.3 IMLIMODA – 1

This shelter rock is situated inside Dhanubans RF of Gopalpur Range near the border areas of Chhatisgarh state at 21°57'N latitude, 83°32'E longitude and 244 mtrs altitude. Situated at a distance of about 15 Kms from Taparia leading from Jamjharia to C.G border near the bordering village Adbahal and Gadguria of Chhatishgarh State. About 35 Kms from Gopalpur and 85 Kms from Sundargarh. This shelter rock contains pigmented haemostatic paintings of different animals and figures of crops etc.

19.7.4 IMLIMODA-2 (Jodabil)

It is situated inside Dhanubans R.F. in Gopalpur Range at 21°57'N latitude, 83° 35'E longitude and 300 meter altitude near village Daldali on the bank of Kuchadega nala about 14 kms from Taparia, 34 km from Gopalpur and 84 kms from Sundergarh. This shelter rock contains paintings of red and yellow pigments of different animals.

19.7.5 USHAKUPA

This rock shelter is situated inside Jamkani R.F. of Gopalpur Range at 22° 6' N latitude, 83° 36'E longitude and 440 mtr altitude near village Girisima about 33 kms from Gopalpur on one side of Gopalpur-Jamkani Forest road and 83 kms from Sundergarh. The rock shelter contains paintings of different shapes. Paintings of animals and human being are also found in red, yellow and white pigments.

19.7.6 BAURIKUPA (Barakupa)

It is situated inside Jamkani RF of Gopalpur Range at 22° 6'N latitude, 83° 36'E longitude and 400 mtr altitude near village Girisima on the foot hill 40 mtrs down to Ushakupa, 33 kms from Gopalpur aside of Gopalpur- Jamkani forest road and 83 kms from Sundergarh. The primitive paintings on this rock shelter in red, yellow, brown and white pigments as in the rock shelter of USHAKUPA.

19.7.7 KHAMBAKHOL (Tumbikhoh)

It is situated inside jamkani RF of Gopalpur Range at 22° 8'N latitude, 83° 38' E longitude and 580 meter altitude. This rock shelter is situated at a distance of 18 kms from Gopalpur near village Tiuria at 3 kms distance 68 kms from Sundergarh. This shelter rock contains different paintings and engravings of animals and human being with red, yellow, white and brown pigments.

19.7.8 USHAKOTHI (Sitakunda)

It is situated inside Ushakothi D.P.F. of Gopalpur Range at 22° 13'N latitude, 83° 39' E longitude and 640-meter altitude near village Lakshmanpa. It is approachable from Lephripara via Sarapgarh. This is a rock shelter with engravings of pre-historic shapes in red, yellow and white pigments.

19.7.9 USHAKOTHI-2 (Rushikunda)

It is situated near Sitakunda, this shelter rock is painted with pre-historic paintings of red, yellow and white pigments, made out of red ochre and yellow slates and chalks.

19.7.10 USHAKOTHI-3 (Swarnakunda)

It is situated near Sitakunda. Two grinding holes are present on the floor of the shelter rock for the purpose of grinding, pasting, pigmenting colors from locally available minerals.

19.7.11 JHINKAMADA

It is situated inside Dhanubans RF of Hemgir Range at 21° 57' N latitude, 83° 36' E longitude and 200 mtrs altitude near village Surulata and Ramlata at a distance of 28 Kms from Kanika and 25 Kms. from Sundargarh. This shelter rock contains pre-historic paintings of animals, birds, reptiles and engravings of lipi language in dark red, brown, yellow and white pigments.

19.8 TEMPLES

19.8.2 SUKHA BANDH SHIV TEMPLE

A place of religious importance where “Lord Shiva” is worshipped, 5 Kms away from Hemgir, surrounded by natural habitats of flora and fauna, famous for perennial streams oozing out of deep crevices.

19.8.3 SARPESWAR TEMPLE : SUKHA MAHADEV

A pilgrim place, situated at Balishankara, where “Lord Shiva” is worshipped, a place about 42 Kms from Sundargarh.

19.8.4 BELSARA GUDI

A primitive Shiv temple told to be constructed of dry rocks before Christ situated in village Belsara at a distance of 3 Kms north of Block Headquarters Tangarpali and at a distance of 15 Kms from Sundargarh via Mahulpali. It has good aesthetic view as it is situated on the foothill of Budapahad RF. An orphanage is being run near the holy temple.



Ancient Cave- Ushakothi



Ancient Cave- Manikmunda

19.9 DAMS

19.9.1 SARPGARH DAM

Chhelgudri Compartment, Dhangergudi RF and Gutighagra Compartment surround a medium irrigation project situated at a distance of 12 Kms from Lephripara and 42 Kms from Sundargarh. A place of aesthetic view, spot for picnic, boating and fishing.

19.9.2 MASHINA DAM

It is situated near Teljora and Birkaldihi at a distance of 30 Kms from Sundargarh. This M.I.P is surrounded by Budhajharan Compartment and Dhabadoli Compartment of Athkoshia RF block. It has good aesthetic view and good spot of picnic for the local people.

19.9.3 TALSARA DAM

It is situated near Talsara at a distance of 10 Kms from Subdega and 35 Kms from Sundargarh. This MIP is surrounded by Kiralaga RF block embanking Bendajore Nalah. It has good aesthetic look and picnic spot for local people.

19.9.4 RUNGA DAM

It is situated near village Runga at a distance of 28 Kms from Sundargarh via Jarangloi. This M.I.P has been constructed embanking Purnajore nalla, surrounded by Runga RF. A good aesthetic place and picnic spot for the local people.

19.9.5 TURUNGAGARH DAM

It is situated at village Turungagarh, surrounded by Jorajam Compartment and Dhabadoli Compartment of Athkoshia Block. This MIP has been constructed embanking Sukhajor Nala(Tangaria) situated at a distance of 22 Kms from Sundargarh via Mahulpali. It has good aesthetic view and is a picnic spot for local people.

19.9.6 JOGI-JOGAN DAM

A proposed major irrigation dam project across the river Ib near Karamdihi at a distance of 13 Kms from Sundargarh.

19.10 ECO-DEVELOPMENT MEASURES

The awareness for wildlife preservation may be created through celebration of wildlife week, competitions and debate among the school/college students. The publicity material shall be distributed and the benefits of wildlife conservation explained through electronic media. The legal provisions under the Wildlife (Protection) Act 1972 shall be brought to the notice of people including the scope and extent of compassionate amount for wildlife depredation. To ensure better protection and to enhance their effectiveness, field staff shall be provided with modern equipments including arms and ammunition. For fast and better communication divisional headquarter, range headquarters, section headquarters,

beats and check gates shall be provided with VHF sets. More and more field staff shall be trained in wildlife management and in detection and investigation of wildlife crimes.

Formation of new institutions like V.S.S. /E.D.C. will be taken up with the help of successful J.F.M. villages. Listing of problems and aspirations of these villages may be done and ranking of the priorities should be done for different development activities. To ensure active and willing participation of all stake holders' financial accountability should be given to the local bodies after their due empowerment as applicable by law. Pasture and grazing lands (gochar) must be demarcated along with the practice of controlling the stray cattle and other animals for their stall feeding. Veterinary Department shall be consulted for improvement of the breed of cattle and other animals. Trust building exercises through entry point activities is the stepping-stone. Pisciculture along with leaf plate processing unit may be taken up to curb devastation of forest by the marginal people around. Self Help Groups (S.H.G.) may be formed with village based N.G.Os to uphold the traditional profession of different stakeholders and to give a face-lift to the economy of rural women. In addition to above cottage industries, cooperative and trade, energy, transport, water, education, medical care etc. are to be included in the micro plans for holistic village level development.

One of the reasons for failure of programmes in rural sector is the lack of monitoring and evaluation. The development programs will not succeed unless each activity of the programme is backed up by follow up action and people themselves take charge of the development work. Feed back and questionnaires from the individuals and institutions must be reviewed for ensuring success of the programmes. Monitoring committees should be headed by A.C.F and consist of R.Os, Dy. FR, Foresters and F.Gs alongwith 5 members of villages. The eco-development measures should be taken up along with development programs of villages. The expenses will be met from the budget provisions made in this plan and funds will be procured from district administration and other national and international funding agencies. The peripheral area will be developed with following measures.

1. Employment generation: The rural poor and tribal people will be provided employment opportunities by various means. Every year about ten thousand people in the fringe area will be provided employment measures, which do not disturb the wild life habitat. The provision of apiculture, sericulture, goatry and poultry will help change the mentality of people and they will leave the habit of timber smuggling.
2. Alternate cash crops help in checking man-elephant conflict around sanctuary. The local villagers will be provided opportunity for taking up alternate cash crops. It will change their habit of traditional farming and will stop elephants from invading agriculture fields.
3. The provision of high yielding variety seeds and improved breed of livestock will improve their income and they will switch over from timber smuggling to development works, which are beneficial for the local people.
4. Construction of new roads, culverts and maintenance of forest roads will provide them opportunity to work and gain employment.
5. Creation and maintenance of fire lines will provide employment to local people. Wages for fire watchers/ fire fighting squads will gain employment for the local people.
6. Creation of new and maintenance of existing water points, wallowing grounds including cross dams on the nalas.

7. Provision for artificial supply of drinking water during summer, viz. tube well, PVC pipes for transportation of water, pump sets, digging of percolation trenches.
8. Development and maintenance of meadows with grass seeds.
9. Planting of fodder species to cater to needs of local people.
10. Improvement of riparian zone in Rajgangpur Range.
11. Improvement of the vegetative cover on the fringes of reservoir near all dams.
12. Habitat corridor linking by improvement of vegetation cover.
13. Creation of nursery, mainly using indigenous, fruit and fodder spp., viz bamboo, zizyphus, ficus, bel, kendu, mango, jackfruit, jamun and plantations inside forest block.
14. RDF works in khesra forest and revenue lands. Vana Samrakhyana Samitis have been formed to develop areas with the help of local people.
15. Water shed approach, gully plugging on the catchments.
16. Check dams on nallas coming out from forest areas.
17. Contour trenches, staggered trenches at steep slopes.
18. Peripheral bunding on the slopes.
19. Maintenance of soil conservation structures.
20. Treatment of catchments with forestry, horticulture and agricultural species.
21. Construction and maintenance of inverted bunds.
22. Development of medicinal garden at Mandira dam.
23. Construction of interpretation center containing hides, skins, bones, Audio visual implements along with digital screen literature on different species with theme halls and visitor center at Hemgir and Kanika.
24. Agro forestry, silvipasture, fuel wood planting, Horticultural crops and alternate cropping with sps.of high yielding varieties.
25. Water harvesting structure construction.
26. RDF/Village wood lot in community forest.
27. Stall feeding, introduction of high yielding milch cattle and marketing of the products.
28. Roads, education, drinking water facilities and solar and gas chulhas in peripheral areas.
29. Income generating scheme, handicrafts, mushroom cultivation, basket making, etc.
30. Engagement of guides (local people after training.) Construction and maintenance of field museum.
31. Schooling for the local people.
32. Mobile van for eco development, distribution of commodities and rescue etc.
33. Regeneration of degraded forest along with gap plantation with fruit and fodder tree species @16,000/- per hac.
34. There is scarcity of drinking water and it will be fulfilled with the help of district administration.

35. Provision of Anti poaching Enforcement camp in the forest areas with provision of fuel, protection watcher, security personnel, Sabuja Bahini and Armed Police.
36. Immunization of cattle inside and outside proposed sanctuary is necessary to avoid infection and disease to the wild animals of the sanctuary and livestock of local villages. Hence immunization camps may be organized in the villages.
37. Forest Roads are required to be maintained as it is important in view of anti poaching. Improvement of 20 K.Ms of forest road may be taken up with Causeway, Hume pipe culvert and small bridges.
38. Provision of power supply including electricity and supply of solar power to the local villagers.
39. Fire incidence in the forest during summer is common. Creation of permanent fire lines over stretch of 10 kms is proposed.
40. Stall-feeding for village cattle will help solve the problem of grazing and browsing.
41. Stone idol making among young unemployed will be encouraged and they will be provided training for the same.
42. Firewood and timber depot will be opened to provide forest produce to the local people at reasonable prices. It will bring change in the traditional attitude of tribals and they will reduce their dependence on the forest areas.

19.11 BUDGET

For the development of wildlife and their habitat following measures are suggested. The budget includes requirements of funds for development of proposed Hemgir Sanctuary.

Sl. No.	Description	Amount
(1)	(2)	(3)
1.	PROTECTION Replacement of pillars, maintenance, construction of new cement concrete pillars of size 4'x 4'x 5'. Maintenance of boundary, fencing and demarcation of Garjanpahad R.F., Dhanubans R.F. and Jamkani R.F.	2.0
2.	Secret funds for collection of information regarding poaching and payment of rewards to individual informers, staff, VSS, institution and community.	1.0

Sl. No.	Description	Amount
(1)	(2)	(3)
1.	FIRE Creation and maintenance of fire lines in all forest blocks, especially in Dhanubans R.F., Garjanpahad R.F., Jamkani R.F., Chhengapahad R.F. and Dhenkanapani R.F.	1.0
2.	Wages for fire watchers/ fire fighting squads near Dhanubans R.F., Chitkikhadu R.F., Rohini R.F., Chhengapahar R.F., Hunderkhol R.F.	1.0
3.	Creation and maintenance of fire observation-cum- protection towers at Hemgir, Dhanubans and Garjanpahad section headquarters.	1.0
4.	Purchase and maintenance of fire fighting equipments, vehicle, fire swatters and fire extinguishers.	1.0
1.	RESOURCE HABITAT MANAGEMENT WATER MANAGEMENT. Creation of new and maintenance of existing water points, wallowing	1.0

	grounds including cross dams on the nalas near Dhanubans and Garjanpahad to revive the population of bison which have become extinct from the Division.	
2.	Provision for artificial supply of drinking water during pinch period, viz. tube well, PVC pipes for transportation of water, pump sets, digging of percolation trenches etc. in Chhengapahad R.F. and Garjanpahad R.F.	1.0
3.	Development and maintenance of meadows at Dhanubans R.F., Chhengapahad R.F. and Singaribahal R.F. and purchase of grass seeds etc.	1.0
4.	Plantation of fodder species in bigger R.F.s and improvement of bamboo areas by silvicultural measures in Dhanubans R.F., Garjanpahad R.F., Jamkani R.F., Chhengapahad and Hunderkhol R.F. Plantation of gambhari, sissoo, bamboo and acacia sps.	1.0
5.	Improvement of riparian zone in Rajgangpur Range. The Mandira dam site and Brahmani River catchment shall be treated.	1.0
6.	Construction and maintenance of hides and machines (limited)	1.0
7.	Weed eradication, implements, labour cost etc. The forest blocks, e.g., Runga R.F., Satparalia R.F., Chhatamb R.F., Athakosia R.F. Kiralaga R.F., Kurei R.F. and Dhangergudi R.F. are highly infested with weeds. It includes the cost of weed cutting, burning, stump removal, ploughing and grass plantation.	2.0
8	Improvement of vegetative cover on fringe areas by taking up plantations by fruit and fodder species. For the elephants Dhanubans R.F., Garjanpahad R.F. and Rohini R.F. shall be planted with fruit bearing and fodder species.	2.0
9	Habitat corridor linking by improvement of vegetative cover. 2.00 x 6 places. W.H.S. will be constructed in Garjanpahad R.F., Kiralaga R.F., Kurei R.F., Bhainsamunda R.F., Mudrapahar R.F. and North Sukuda R.F. Meadow creation and plantation of bamboo and fruit bearing trees will be taken up near North Chirobeda R.F., South Chirobeda R.F., North Sukuda R.F., South Sukuda R.F., Brahmanipahar R.F., Mudrapahar R.F., Bhainsamunda R.F., Rutkupedi R.F., Hunderkhol R.F., Chhengapahad R.F., Dhenkanapani R.F., Dhanubans R.F., Garjanpahar R.F., Jamkani R.F., Kurei R.F., Kiralaga R.F., Dhangergudi R.F., Athakosia R.F., Satparalia R.F., Runga R.F., Kiralaga R.F. and Kurei R.F.	12.0
10	Creation of nursery, mainly using indigenous, fruit and fodder spp., viz Bamboo zizyphus, Ficus, Bel, Kendu, mango, jackfruit, Jamu at bufferzone/ zone of influence.	2.0
11	Provision of salt licks. Salt licks will be created near North Sukuda R.F., South Sukuda R.F., Brahmanipahar R.F., Mudrapahar R.F., Bhainsamunda R.F., Rutkupedi R.F., Hunderkhol R.F., Chhengapahad R.F., Dhenkanapani R.F., Dhanubans R.F., Garjanpahar R.F., Jamkani R.F., Kurei R.F., Kiralaga R.F., Dhangergudi R.F., Athakosia R.F., Satparalia R.F., Runga R.F., Kiralaga R.F. and Kurei R.F.	1.0

	SOIL AND MOISTURE CONSERVATION MEASURES	
1	Water shed approach and gully plugging on the catchment area near forest blocks of Gopalpur Range and Ujjalpur Range. It is required near Mandira dam, Pitamahul dam, Sarpagarh dam, MKahsina, Talsira, RUnga, Turungagarh and Jogi-jogan dam	4.0
	Check dams on Nallas in all the ranges.	
	Contour trenches, staggered trenches at steep slopes around reservoir and periphery of proposed sanctuary.	
2	Peripheral bunding on the slopes near Mandira dam.	1.0
3	Contour bunding	1.0
4	Maintenance of soil conservation structure	1.0
5	Treatment of catchments with forestry, horticulture and agricultural species near all dam sites.	2.0
6	Construction and maintenance of inverted bunds near dam sites and water harvesting structures	2.0
7	Creation of Nature's Trail near Ushakothi DPF, Jamkani R.F., Garjanpahad R.F. and Dhanubans R.F.	4.0

8	Improvement of Caves at Manikmoda, Tongo, Imllimoda, Jodabil, Ushakupa, Baurikupa, Khambakhol, Ushakothi, Chhartri hill and Jhinkimada, etc. Improvement includes the cost of roads, water supply, signages, literature, guide and sanitary measurtes for the protection of caves.	10.0

ECO TOURISM		
1	Signage/interpretive equipments near Jamkani R.F. and at other important places	1.0
2	Construction of two watchtowers near Manikmoda and Ushakothi	3.00
3	Development of medicinal garden near Mandira dam	1.00
4	Construction of interpretation center at Hemgir Containing hides, skins, bones of wild animals, audiovisual implements, digital camera and literature on different species with theme halls and visitors center.	5.00

ECO DEVELOPMENT COMMITTEE/PERIPHERAL DEVELOPMENT ACITIVITY		
1	Agro forestry ((FERP) silvipasture, fuel wood planting, Horticultural corps and alternate cropping sps.of high yielding varieties. In the alternate crops pulses, vegetable, papaya etc shall be planted.	2.00
2	Stall feeding, introduction of high yielding milch cattle, and marketing of the products.	2.00
3	Community center at Gopalpur	1.00
4	Biogas, fuel-efficient chulhas and solar lights for local tribals of Gopalpur	1.00
5	Health camps in forest areas of Gopalpur and Sundergarh Ranges.	1.00
6	Income generating scheme, handicrafts, mushroom cultivation, basket making, poultry, ducker etc.	1.00
7	Regeneration of degraded forest along with gap plantation with fruit and fodder tree species @10,000/- per hac	2.0
8	Development of meadows	1.0
9	Immunisation of cattle inside and outside the sanctuary is necessary to avoid infection of disease to the wild animal of the sanctuary. Hence 5 Nos. of immunization camp may be organized in the village located inside the sanctuary and other fringe villages.	1.0
10	Provision of power supply including electricity, supply of solar power and purchase of generator for Hemgir.	2.00
11	Some people come forward suo moto to inform to the Forest Department regarding the smuggling of timbers, poaching of wildlife etc. Hence, to encourage them there should be provision of Reward for them	0.50
12	Payment of compensation for crop damage by the elephants in Hemgir Range and Gopalpur Range.	1.5
13	Fire incidence in the forest during the summer is common. Creation of permanent fire line in and outside the sanctuary area over stretch of 10 kms is proposed. Intensive fire based protection approach requires Rs.1.0 lakh.	1.00
14	Stall feeding for village cattle shall be arranged at block headquarters of Gopalpur, Ujjalpur, Hemgir and other places. The villagers will be persuaded to keep their domestic cattle, goats, sheep, cows and buffallows in their villages.	1.00

An amount of Rs. 85 lakhs is required during the plan period and Rs.9.00 lakhs is required every year for this circle.

Year	Items of work	Amount of expenditure
2014-15	Improvement of corridors and other wroks	Rs.18.00 lakhs
2015-16	-do-	Rs.06.00 lakhs

2016-17	-do-	Rs.06.00 lakhs
2017-18	-do-	Rs.07.00 lakhs
2018-19	-do-	Rs.07.00 lakhs
2019-20	-do-	Rs.07.00 lakhs
2020-21	-do-	Rs.08.00 lakhs
2021-22	-do-	Rs.08.00 lakhs
2022-23	-do-	Rs.09.00 lakhs
2023-24	-do-	Rs.09.00 lakhs
	Total	Rs.85.00 lakhs

A regular database shall be maintained at Divisional level comprising of details like;

- Schedule species found in the area,
- Pictorial directory of all identified poachers to be prepared and circulated in the locality,
- List of traders in cattle and goatskins as well as tanneries,
- List of eating houses alleged to be serving bird/deer meat and,
- Timely and proper documentation of all the incidences of man-animal conflicts including poaching.

The DFO shall submit half-yearly report to the authorities concerned with regard to steps taken by him to protect wildlife and to improve their habitat. He shall also report constraints faced by him in implementing the prescriptions of this Working Circle. Depredation by wild animals is gradually increasing and the main reason for this conflict is shrinkage of their habitat and shortage of food. There are several reports of killings and injury of the human beings and damage to the crops in the division. The DFO should develop short-term and long-term measures to combat this problem. To mitigate miseries of people due to wild animals, the compassionate amount for crop damage, house damage, injuries and death, should be disbursed as quickly as possible. Delay makes people lose faith in the forest department and they tend to take revengeful self-protection measures even by resorting to killing and poisoning of wild animals.

19.12 MISCELLANEOUS REGULATIONS

19.12.1 Control of Grazing: The wildlife rich areas shall be closed for grazing. However, grazing may be controlled as per the provisions of the Orissa Forest (Grazing of Cattle) Rules, 1980. The local people and the VSS may be motivated to immunize their cattle, which graze inside the forests.

19.12.2 Fire protection measures: Fireline should be cleared and maintained regularly. As most of the forest fires are man-made, it can be prevented to a large extent by motivating and educating the local people. Adequate field staff should be stationed with infrastructure in fire prone areas to control and suppress the fire menace during summer season.

19.12.3 Incentives and Rewards: There shall be provision for rewards and incentives to the staff and public including the informers whose efforts lead to detection of wildlife crime and arrest of the offenders. Moreover, they shall be given publicity in

the locality as well as recognition on the occasions like Van Mahotsava, Wildlife Week and World Forestry Day.

19.12.4 Rights and Concessions: Rights and concessions under this Working Circle shall be regulated in accordance with the provisions of the Orissa Forest Act; Wildlife (Protection) Act 1972 and further rules and policies of Government in force.

19.13 INTERMEDIATE REVISION

No intermediate revision is anticipated. However, if so required, the Conservator of Forests (territorial) in consultation with the Conservator of Forests (Working Plans) will send a proposal for amendment of prescriptions to the competent authority for necessary approval.

PART – II

Chapter - XI

MISCELLANEOUS REGULATIONS

Miscellaneous regulations deal with information about various activities of the Division. These are given below.

20.1 FOREST CHECK GATES

As many as 19 Nos. of Check gates were in operation in this Division during last plans period. All these gates were duly notified. Subsequently some gates which were not essential were closed due to development of better and new road connections and change of Govt. Policy on leasing of MFP items. The list of present functioning check gates are given below:

LIST OF CHECK GATES

Sl.No.	Name of check gate	Position	Date of notification
1	Bhasma	On Jharsuguda-Sundergarh SH 10 at 11 th kms from Jharsuguda	21.11.1958
2	Bandhapali	On Sundargarh, Hemgir PWD road 0.3 kms from Sundergarh	09.05.1967
3	Kanika	On Belphar-Hemgir State High-way at Kanika. 17 Kms from Belphar	-do-
4	Karamdihi	Karamdihi, jaspur PWD road (Bordering Chhatisgarh) 1/2 kms from Karamdihi SH-10 chowk	02.03.1979
4	Tapria	MDR-20 at Tapria Gopalpur-Raigarh (Chhatisgarh) 17 kms from Gopalpur	-do-

20.2 LIST OF BUILDINGS

		LIST OF BUILDINGS IN SUNDARGARH FOREST DIVISION						
Sl. No.	Range	Name of building	Location	Type	Year	Khata No.	Plot No.	Area (in acre)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Sundargarh	Division Office	Sundargarh	Pucca	45-46			
2		DFO Bunglow	-do-	Pucca	53-54			
3		Head Clerk Qrs.	-do-	Kacha	53-54			
4		Accountant Qrs.	-do-	Kacha	53-54			
5		Clerk Qrs	Dengibhadi	Kacha	46-47			
6		Clerk Qrs	-do-	Kacha	46-47			
7		Clerk Qrs	Sundargarh	Kacha	49-50			
8		Clerk Qrs	-do-	Kacha	53-54			
9		Range Qrs	-do-	Kacha	53-54			
10		Range Office	-do-	Kacha	53-54			
11		Fr. Qrs	Itma	Pacca	53-54			
12		-do-	Subdega	-do-	38-39			
13		-do-	Jamtlaia	Kacha	50-51			
14		FG Shed	Subdega	-do-	46-47			
15		-do-	Jamtalia	-do-	47-48			
16		Naka Guard shed	Bhasma	-do-	47-48			
17		FG Shed	Bhedabahal	-do-	48-49			
18		R.I-cum-FG Shed	Itma	-do-	1959			
19		FG Shed	Kulga	-do-	1956			
20		FG Hut	Deoli	-do-	1956			
21		-do-	Sundargarh	-do-	1958			
22		-do-	Kirea	-do-	1962			
23		-do-	Salepali	-do-	1957			
24		Fr. Qrs	Sundargarh	Pucca	1964			
25		LDC Qrs	-do-	-do-	1966			
26		-do-	-do-	-do-	1966			
27		-do-	-do-	-do-	1967			
28		Fr. Qrs	Salepali	-do-	1967			
29		-do-	Rouldega	-do-	1967			
30		OFG Qrs	Sundargarh	Kacha	1958			
31		Marking Shed	Pudajalanga	Pucca	1986			
32			Maheshdihi	-do-	1987			
33		LDC Qrs	Sundargarh	-do-	1974			
34		-do-	-do-	-do-	1982			
35		-do- No.5	-do-	-do-	1980			
36	Sundargarh	-do- No.6	Maheshdihi	-do-	1980			
37		-do- No.7	Sundargarh	-do-	1990			
38		-do- No.8	-do-	-do-	1990			
39		Fr. Qrs	Maheshdihi	-do-	1989			
40		Food grain Godawn	Sundargarh	-do-	1989			
41		Seed Godawn	-do-	-do-	1984			
42		Extn. To Divn. Office	-do-	RCC	1989			
43		Marking Shed	Maheshdihi	Pucca	1989			
44		FRS	-do-	-do-	1989			
45		Fr. Qrs	Bandhapali	Kacha				
46		Check Gata Qrs	-do-	-do-				
47		Fr. Qrs	Bhasma	-do-				
48		FG Qrs	-do-	-do-	47-48			
49		FG Qrs	Maheshdihi	Pucca				
50		Forest Barrack	Sundargarh	Kacha	44-45			
51	Ujalpur	Range Office	Ujalpur	Pucca	52-53			
52		FRS	-do-	-do-	53-54			
53		Fr. Qrs	Lephripa	-do-	1950			
54		RO Qrs	Ujalpur	-do-	53-54			
55		Forest Barrack	-do-	Kacha	44-45			
56		FG Hut	Nuadihi	-do-	53-54			
57		-do-	Gultha	-do-	46-47			
58		-do-	Balijori	-do-	46-47			

59		-do-	Sanpatrapali	-do-	1956			
60		Fr. Qrs	Gundiadihi	-do-	1956			
61		FG Qrs	-do-	-do-	1956			
62		FG Shed	Chhatenpali	-do-	1956			
63		-do-	Kurumkel	-do-	1956			
64		-do-	Lephripa	-do-	1959			
65		-do-	Dhamakpur	-do-	1959			
66		-do-	Tasladihi	-do-	1960			
67		-do-	Dhudi- Nuagaon	-do-	1957			
68		-do-	Didgajharan	-do-	1957			
69		-do-	Kinjirkela	-do-	1964			
70		-do-	Kusumura	Pucca	1964			
71		-do-	Gamardihi	-do-	1965			

72	Ujalpur	Marking Shed	Deoli	-do-	1980			
73		-do-	Meghdega	-do-	1989			
74		Fr. Qrs	Nuadihi	-do-	42-43			
75		-do-	Kinjirkela	-do-	39-40			
76		FG Barrack	Ujalpur	Kacha	44-45			
77		Fr. Qrs	Sanpatrapali	-do-				
78		Storage Godawn	Ujalpur	Pucca				
79		FG Shed	Khamarimunda	Kacha				
80		OFG Shed	Ujalpur C.Nursury	Pucca				
81		FG Shed	Deoli	Kacha	56-57			
82		Marking Shed	Lephripa	-do-				
83		-do-	Masabira	-do-				
84		-do-	Kinjirkela	-do-				
85		FG Shed	Dhamakpur	-do-	59-60			
86		Twin FG Shed	Ujalpur	-do-	44-45			
87		FG Shed	Bandhapali	-do-				
88	Gopalpur	Range Office- Residence	Gopalpur	Pucca				
89		Fr. Qrs	-do-	-do-				
90		FG Shed	-do-	-do-				
91		FRH	-do-	-do-				
92		FG Shed	Sumra	Kacha				
93		Marking Shed	Bileimunda	-do-				
94		-do-	Gopalpur	-do-				
95		-do-	Duduka	-do-				
96		Fr. Qrs	-do-	-do-				
97		FG Shed	Kuchedega	-do-				
98		Check Gata Qrs	Gopalpur	Pucca				
99		Fr. Qrs	Dumabahal	-do-				
100		Marking Shed	-do-	Kacha				
101		FG Shed	Gopalpur	Pucca				
102		-do-	Jamkani	Kacha				
103	Gopalpur	Fr. Qrs	Tapria	RCC				
104		FG Shed	-do-	Kacha				
105		Fr. Qrs	Tiuria	Pucca				
106		FG Shed	Manoharpur	Kacha				
107		Marking Shed	Tiuria	-do-				
108		-do-	Sumra	-do-				
109		-do-	Manoharpur	-do-				
110	Rajgangpur	Range Office	Rajgangpur	Pucca		443445	-	1.04
111		RO Qrs	-do-	-do-				
112		Fr. Qrs	Khatkurbahal	Kacha	54-55	190	-	0.15
113		FG Qrs	-do-	Pucca	56-57	190	-	0.2
114		R.I-cum-FG Shed	Panchora	Kacha		1534	-	0.07
115		FG Qrs	Nuagaon	-do-	56-57	1001	-	0.41
116		Fr. Qrs	Tudalaga	RCC	65-66	68	-	2.7
117		R.I-cum-FG Shed	Salepali	Kacha	56-57	420	-	0.84

118		-do-	Jajpur	-do-		799	-	0.06
119		-do-	Kutra	-do-	47-48	586	-	0.12
120		FG Qrs	Jharbeda	-do-	60-61	154	-	0.04
121		R.I-cum-FG Shed	Buchkupara	-do-	1955	110	-	0.05
122		FG Qrs	Kahachuan	-do-	1955	358,359,362	-	0.55
						363,364	-	
123		FRH	-do-	Pucca	1956	363,364,365,	-	0.57
						366	-	
124		R.I-cum-FG Shed	Sagjore	Kacha	1947	579	-	0.7
125		FG Qrs	Laing	-do-	56-57	1771	-	0.4
126		R.I-cum-FG Shed	Dungajore	-do-	1971	-	-	0.06
127		Fr. Qrs	Malidihi	RCC	65-66	105/2,216/1	-	1.3
128		FG Qrs	Ludhabasa	Kacha	56-57	473	-	0.2
129		Fr. Qrs	Sonakhan	Pucca	54-55	1267,1268	-	0.38
130		R.I-cum-FG Shed	Salangabahal	Kacha	1947	-	-	0.04
131		Marking Shed	Jharbeda	-do-		2346	-	23.5x18.5
132		FG Shed	Sonakhan	Pucca				
133		Marking Shed	Bhalulata	Kacha				
134		Marking Shed	Raiboga	Kacha	70-71			
135		FG Shed	Jajpur	Kacha	42-43			
136		-do-	Raiboga	-do-				
137		Marking Shed	Panchora	-do-	53-54			
138		FG Shed	Tudalaga	RCC	65-66			
139		Marking Shed	Bankhaman	Kacha	56-57			
140	Rajgangpur	FG Qrs	Malidihi	RCC	65-66	105/2,216/1	-	1.3
141		Marking Shed	Rajgangpur	Kacha	56-57			
142		Depot Fr.Qrs.	-do-	-do-	53-54			
143		Fr. Qrs	-do-	-do-	53-54			
144		Depot FG Qrs	-do-	-do-	53-54			
145		WFP Godawn	-do-	Pucca				
146		WFP Distribution Centre	-do-	-do-				
147		R.O Qtrs	-do-	-do-	53-54			
201	Hemgir	Marking shed	Rohini					
202		FRH	Kanika					
203	Hemgir	Res-Cum-Office	Kanika					
204		Fr. Qtrs	Kanika					
205		FG Shed	Kanika					
206		Forest Barrack	Kanika					
207		Clerk Qtrs	Kanika					
208		FG Qtrs	Tangardihi					
209		FG Qtrs	Ratakhendi					
210		FG Shed	Kaudarha					
211		ACF Qtrs.	Hemgir					
212		Forest Barrack	Hemgir	Damaged				
213		Fr. Qtrs	Kodbahal					
214		FG Shed	Kodbahal					
215		FG Shed	Kendudihi					
216		Fr. Qtrs	Daghara					
217		FG Shed	Daghara					
218		Marking shed	Beheramunda					
219		FG Shed	Beheramunda					
220		FG Shed	Buda					
221		FG Shed	Liposhpali	Damaged				
222		Fr. Qtrs	Rohini					
223		Marking shed	Rohini					

20.3 LIST OF FOREST ROADS (AS ON 31.12.2005)

Name of the Forest Road	Length (in K.Ms.)	Total

	PUCCA		KATCHA		MORRUM		
	R.F	PRF	R.F	PRF	R.F	PRF	(in KM.)
1. Jarangloi- Runga	-	-	16 KM.	-	-	-	16 KM.
2. Rasrajpur - Baladmal	-	-	2.69	-	11.31	-	14 KM.
3. Didga jharan – Gundiadihi	-	-	-	-	13	-	13 KM.
4. Alapaka – Monoharpali	-	-	-	-	8	-	8 KM.
5. Keshher jhima – Masabira	-	-	-	-	4.5	-	4.5 KM.
6. Kanakhora – Alapaka	-	-	2.7	-	18.3	-	21 KM.
7. Khamarimunda - Birkaldihi	-	-	5	-	-	-	5 KM.
8. Kanbika – Beheramnda	-	-	-	-	27	-	27 KM.
9. Gopalpur – Jamkani	0.250	-	-	-	32.75	-	33 KM.
10. Gopalpur-Tapria & Goilmumnda	-	-	-	-	9	-	9 KM.

11. Tiuria- Rajbajal	0.200	-	-	-	4.8	-	5 KM.
12. Sarangi jharia- Mahulpali	0.325	-	-	-	4.675	-	5 KM.
13. Hemgir - Beheramunda	-	-	-	-	10	-	10 KM.
14. Goilmunda – Surulata	-	-	-	-	7	-	7 KM.
15. Ankelbira- Keshherjhima	-	-	-	-	5	-	5 KM.
16. Tudalaga – Nuagaon	-	-	1.6	-	-	-	16 KM.
17. Duduka – Laikera	-	-	-	-	5	-	5 KM.
18. Rohini – Koilighogra		-	2.4	-	0.1	-	2.5 KM.
TOTAL	0.775	-	44.79	-	160.435	-	206 K.Ms.

20.4 : Maintenance of Preaservation plots.

It is proposed to demarcate two preservation plots of 10 ha. Each one in Dhanubans RF and the other in Garjanpahad RF for ecological study. The state Silviculturist shall undertake the work in the plan period. GPS reading of the proposed sites is given below.

Dhanubans RF N 21° 56' 50.3" E 83° 37' 34.9"

Garjanpahad RF N 21° 55' 53.7" E 83° 39' 31.8"_____

.....X.....

PART – II
Chapter - XII
ESTABLISHMENT AND LABOUR

21.1 ESTABLISHMENT AND LABOUR

This Division is having seven numbers of Territorial Ranges, 39 numbers of Sections and 169 numbers of beats in addition to Divisional Mobile Squad headed by a Forest Ranger with 2 Foresters and Forest Guards to assist him. The present strength of the Ministerial staff are adequate. The detailed information of field staff and ministerial staffs including distribution of sections, beats land range are given in Chapter IV of Part-I. The jurisdiction of Sundargarh Range in the North extends from Chhatishgarh State at Balisankara to Bhasma on the South. In the East it touches boundary of Rajgangpur Range at Katiamura to river Ib in the West. This Range has important Forest Blocks like Runga and Kiralaga.

The jurisdiction of Ujjalpur Range begins in the North from village Brahmanimura at boarder of Chhatishgarh State, to Darlipali on the South touching Sambalpur Division. In the East river Ib forms the Range Boundary extending upto Giringkela in the West. This Range has important Forest Blocks like Athkoshia 'A' and Athkoshia 'B'. The jurisdiction of Gopalpur Range starts at holy place Ushakothi in the North to Kathfali in the South an extending to Mashima I in the East to Chanderpur in the West touching boarder of Chhatishgarh State. This Range has important Forest Blocks like Jamkani and Garjanpahad. The jurisdiction of Hemgir Range starts in the North at Ostali village extending upto Kaudarha, and in the South touching Sambalpur Division extending upto Kanaktura, in the East upto Beheramunda and in the West touching Chhatishgarh State boarder on the bank of river Koel.

The jurisdiction of Rajgangpur Range starts from Rangamatia in the North on the boarder of Jharkhand State extends upto Mahabir RF in the South. In the East it touches Kuarmunda Range at MandiaKudar village at SH-10 and extends upto Kureibaga in the West. Important Forest Blocks like Chhatamb and Panchora are in this Range. The jurisdiction of Kuarmunda Range begins at Biramitrapur in the North and extends upto Birda on the South touching boarder Bonai ForestDivision. On the East, the Range extends from Bondomunda to San-nuagaon on the west. Important Forest Block like South Chirobeda of this Range is rich in Sal land and its associates. The Bisra range situated on the boarder of Saranda Forest

Block of Jharkhand State, starts from Jareikela in the north, and runs to Badramloi in the South and ends in the West near Bandomunda. This Range has good quality sal forest in Bagdega RF.

21.2 LABOUR SUPPLY

Unskilled labors are available in plenty except cultivation periods for forestry operations, maintenance of boundary and plantations operations etc. Semi-skilled and masons are available locally for non-forestry purposes like construction of culverts, buildings etc. The wages have been revised during last few years. The current wage rate for laborers as fixed by Government of Orissa, Labour Department is given below:

Unskilled	...	Rs. 150/- per day
Semi-skilled	...	Rs. 170/- per day
Skilled	...	Rs. 190/- per day
Highly skilled	...	Rs. 205/- per day

The labour rates keep changing from time to time and action plans shall be prepared according to current prevailing wage rates.

PART – II

Chapter – XIII

FINANCIAL FORECAST

22.1 ESTABLISHMENT

The cost of establishment of division in the year 2003-04 was approximately 92 lakhs. It is estimated that the cost of establishment will increase at the rate of 10 percent per annum.

22.2 TREATMENT OF SELECTION WORKING CIRCLE

The total area under selection working circle is 23,221.99 ha. The average annual area to be worked out is 2322 ha. The cost norms to be followed in this working circle are given below.

1. Demarcation of the coupe = 0.1 MD @150.00 MD = Rs. 15.00 (cost per ha.)
2. Marking of coupe = 0.2 MD = Rs. 30.00
3. Felling, debarking, dragging and stacking 15 MD = Rs.2250.00
4. Firewood and T.L sleeper =0. 3 MD = Rs. 45.00
5. Transportation = 0.3 MD = Rs. 45.00
6. Clearing of the coupe = 10 MD = Rs. 1500.00
7. Fire protection and grazing -1MD = Rs. 150.00
- Total + 26 MD = Rs.4035.00

The cost over the annual coupe area of 2322 ha. = Rs. 93, 69,270.00

8. Laying of sample of plots for different RFs = Rs 5000.00
9. Boundary maintenance over 258.84 km @ 20 MD = Rs. 7,76,520.00
- Total Annual Requirement under this working circle = Rs. 101,50,790.00

Therefore, the cost is about Rs. 101.50 lakhs with an annual escalation of 10 percent every year.

22.3 TREATMENT OF REHABILITATION WORKING CIRCLE

The total area under working circle is 98381.38 ha and the average annual area to be worked out is 9838 ha. The total cost of treatment will be Rs. 67,600/- per ha spread over four years. The total annual requirement under this working circle will be about Rs.665 lakhs with subsequent rise of 10 percent every year. The individual cost norms are given below in the table.

COST NORMS FOR REHABILITATION WORKING CIRCLE

Cost Norm for activities under Rehabilitation working circle with labour Rate @ Rs.150 /- day

Work	Mandays	Amount	Material cost	Total cost
ADVANCE WORK				
1. Survey and demarcation	4	600	-	600
2. Weeding and climber cutting	10	1500	-	1500
3. Regeneration cleaning, multiple shoot cutting, coppicing and pruning.	15	2250	-	2250

4. Raising of nursery stock at the rate of 400 plants per ha including 10 % for current year casualty.	4	600	1000	1600
5. Pitting over gaps at the rate of 400 pits per ha of size 45 cm x 45 cm x 45 cm	10	1500	-	1500
6. Miscellaneous expenses	-	-	400	400
Total	43	6450	1400	7850

CREATION

1. Maintenance of nursery from January to June	3	450	-	450
2. Carriage and planting over gaps	4	600	-	600
3. Soil working, weeding and twice manuring.	4	600	-	600
4. Cost of chemical fertilizer, NPK and urea at the rate of 50 gm each including application.	2	300	1700	2000
5. Cost of bio-fertilizer including application.	1	150	1400	1550
6. Maintenance of regenerated area by weeding and cleaning.	2	300	-	300
7. Fire tracing and inspection path	2	300	-	300
8. Miscellaneous expenses	-	-	3300	3300
Total	18	2700	6400	9100

SECOND YEAR

1. Cutting back of weeds growth and climbers	10	1500	-	1500
2. Singling of shoots of tree species.	15	2250	-	2250
3. Casualty replacement at the rate of 10% over gap planted area including pitting, carriage and cost of seedlings.	1	150	1400	1550
4. Tending of seedlings planted over gap through soil working, weeding and manuring.	4	600	-	600
5. Cost of chemical fertilizers at the rate of 50 gm of DAP per plant including application.	2	300	3300	3600
6. Fire tracing	4	600	-	600
7. Miscellaneous expenses	-	-	3300	3300
Total	36	5400	8000	13400

THIRD YEAR

1. Cutting back of weeds, climber and cleaning.	10	1500	-	1500
2. Tending of seedlings including weeding and pruning.	5	750	-	750
3. Fire tracing	4	600	-	600
4. Miscellaneous expenses	-	-	3300	3300
Total	19	2850	3300	6150

The estimate is for one hectare and the labour cost is Rs.150/- per day.

ABSTRACT	Man days	Amount	Material cost	Total cost
Advance work	43	6450	1400	7850

Creation	18	2700	6400	9100
2 nd year maintenance	36	5400	8000	13400
3 rd year maintenance	19	2850	3300	6150
TOTAL	116	17400	19100	36500

Break up of expenditure for soil and moisture conservation measures

Work	Mandays	Amount
1. Digging up of trenches of size 0.5m x 0.5m x 2.0 m.	20	3000
2. Gully plugging with loose boulders/vegetative materials to check run off of water.	10	1500
3. Miscellaneous expenses	-	3300
Total	30	7800

SECOND YEAR

1. Renovation of trenches.	10	1500
2. Maintenance of structures erected during 1 st year	4	600
3. Miscellaneous expenses	-	3300
Total	14	5400

THIRD YEAR

1. Renovation of trenches	10	1500
2. Maintenance of structures	4	600
3. Miscellaneous expenses	-	3300
Total	14	5400

ABSTRACT

1 st Year	30	7800
2 nd Year	14	5400
3 rd Year	14	5400
Total	58	18600

Break up for Entry Point Activities

WORK	AMOUNT (in Rupees)
FIRST YEAR	
1. Training of staff and VSS members	700
2. Awareness through meeting, dialogue and audio visual programmes.	300
3. Fencing of plantation area with brush wood.	800
4. Promotional activities through supply of fuel efficient chulhas etc.	800
5. Miscellaneous expenses	300
SECOND YEAR	
1. Extension activities to sustain awareness	700
2. Monitoring and evaluation	300
3. Maintenance of fencing	300
4. Miscellaneous expenses including stationery and publicity materials etc.	300
THIRD YEAR	
1. Extension activities	300
2. Training, extension and promotional activities	500

3. Micro Planning	800
4. Fencing	1200
5. Monitoring and evaluation	700
Total	12500

A B S T R A C T

Work	Total (in Rupees)
Advance Work	7850
Creation	9100
2 nd Year	13400
3 rd Year	6150
Soil and moisture conservation	18600
E.P.A.	12500
TOTAL	Rs.67,600.00

22.4 TREATMENT OF PROTECTION (OVERLAPPING) WORKING CIRCLE

1. The treatment includes protection of forests, maintenance of roads, VHF, arms and ammunitions, secret funds, maintenance of vehicles, provision of squads and detection of offences etc.
2. The annual expenditure on Protection Working Circle is Rs. 40 lakhs per year with subsequent rise of 10 percent every year.

22.5 TREATMENT OF PLANTATION WORKING CIRCLE

The total area under plantation working circle for new plantation is 3000 ha. Thus, the average plantation area to be worked will be about 300 hectares per annum. The cost norm that will be followed in plantation working circle is given in the table. The total cost of treatment will be Rs. 105,650/- per ha spread over four years. The total annual requirement under this working circle will be about Rs. 31695000/- per annum. Cost Norm for Activities under plantation working circle. (Labour Rate @ Rs.150/- day)

Work	Mandays	Amount	Materials cost	Total cost
ADVANCE WORK				
1. Survey and demarcation	4	600	-	600
2. Weeding and climber cutting	10	1500	-	1500
3. Regeneration cleaning, multiple shoot cutting, coppicing and pruning.	15	2250	-	2250
4. Raising of nursery stock at the rate of 1600 plants per ha including 10 % casualty for	40	6000	10000	10000

current year.				
5. Pitting over gaps at the rate of 1600 pits per ha of size 45 cm x 45 cm x 45 cm	40	6000	-	6000
6. Miscellaneous expenses	-	-	3300	2000
Total	109	16350	13300	29650

CREATION

1. Maintenance of nursery from January to June	10	1500	-	1500
2. Carriage and planting over gaps	10	1500	-	1500
3. Soil working, weeding and twice manuring.	10	1500	-	1500
4. Cost of chemical fertilizer, NPK and urea at the rate of 50 gm each including application.	2	300	8000	8300
5. Cost of bio-fertilizer including application.	1	150	7000	780
6. Maintenance of regenerated area by weeding and cleaning.	10	1500	-	1500
7. Fire tracing and inspection path	10	1500	-	1500
8. Miscellaneous expenses	-	-	4000	4000
TOTAL	53	7950	19000	26950

SECOND YEAR

1. Cutting back of weed growth and climber cutting	10	1500	-	1500
2. Singling of shoot of tree species.	15	2250	-	2250
3. Casualty replacement at the rate of 10 % over gap planted area including pitting and carriage and cost of seedlings.	1	150	1300	1450
4. Tending of seedlings planted over gap through soil working weeding and manuring	4	600	-	600
5. Cost of chemical fertilizer at the rate of 50 gm of DAP per plant including application.	2	300	3300	3600
6. Fire tracing	4	600	-	600
7. Miscellaneous expenses	-	-	3300	3300
TOTAL	36	5400	7900	13300

THIRD YEAR

1. Cutting back of weeds, climber and cleaning.	10	1500	-	1500
2. Tending of seedlings including weeding and pruning.	5	750	-	750
3. Fire tracing	4	600	-	600
4. Miscellaneous expenses	-	-	3300	3300
TOTAL	19	2850	3300	6150

The estimate is for one hectare and the labour cost is Rs.90/- per day

ABSTRACT	Man days	Amount	Material cost	Total cost
Advance work	109	16350	13300	29650
Creation	53	7950	19000	26950
2 nd year maintenance	36	5400	7900	13300
3rd year maintenance	19	2850	3300	6150
TOTAL	217	32550	43500	76050

Break up of expenditure for soil and moisture conservation measures

FIRST YEAR

Work	Mandays	Amount
1. Digging up of trenches of size 0.5m x 0.5 x 2.0 m	20	3000
2. Gully plugging with loose boulders/vegetative materials to check run off of water.	10	1500
3. Miscellaneous expenses	-	1700

Total	30	6200

SECOND YEAR

1. Renovation of trenches.	10	1500
2. Maintenance of structures erected during 1 st year	4	600
3. Miscellaneous expenses	-	3300
Total	14	5400

THIRD YEAR

1. Renovation of trenches	10	1500
2. Maintenance of structures	4	600
3. Miscellaneous expenses	-	2900
Total	14	5000

A B S T R A C T

1 st Year	30	6200
2 nd Year	14	5400
3 rd	14	5000
Total	58	16600

Break up for Entry Point Activities

WORK	AMOUNT
FIRST YEAR	
1. Training of staff and VSS members	700
2. Awareness through meetings, dialogue and audio visual programmes	300
3. Fencing of area with brush wood	1300
4. Promotional activities through supply of fuel efficient chulhas etc.	800
5. Miscellaneous expenses	300
SECOND YEAR	
1. Extension activities to sustain awareness	700
2. Monitoring and evaluation	300
3. Maintenance of fencing	300
4. Miscellaneous expenses including stationeries and publicity materials etc.	300
THIRD YEAR	
1. Extension activities	300
2. Training, extension and promotional activities	5000
3. Micro Planning	800
4. Fencing	1200
5. Monitoring and evaluation	700
Total	13000

A B S T R A C T

Work	Total (in Rupees)
Advance work	29650
Creation	26950
2 nd Year	13300
3 rd Year	6150
Soil and moisture conservation	16600
E.P.A.	13000
TOTAL	Rs. 105650

22.6 TREATMENT OF BAMBOO (OVERLAPPING) WORKING CIRCLE

In the proposed scheme the total bamboo areas proposed for working is 30361.95 ha having area for different years under treatment. (Labor Rate – Rs. 90.00 per manday)

- (1) Demarcation of bamboo coupes – 1 MD/ha. = 150/ha.
 (2) Silvicultural operation - 5 MD/ha. = 750/ha.

The activities like serial numbering, high stump rectification, digging of half-moon trench, congestion treatment, climber cutting and soil and moisture conservation will be taken up under silvicultural operation. Thus the total cost of management of bamboo area per ha. is worked out at Rs.540/ha during 2005–06 with subsequent annual rise of 5 percent. During the year 2007–08 the rate per hectare comes to Rs. 595/-.

Sl. No.	Year	Area (in ha.)	Norm/ ha.	Financial requirement (in ha.)
(1)	(2)	(3)	(4)	(5)
1	2014-15	8396.43	900/-	75,56,787/-
2	2015-16	4544.96	945/-	42,94,987/-
3	2016-17	6823.39	992/-	67,68,803/-
4	2017-18	5946.42	1042/-	61,96,170/-
5	2018-19	8396.43	1094/-	91,85,694/-
6	2019-20	4544.96	1149/-	52,22,159/-
7	2020-21	6823.39	1206/-	82,29,008/-
8	2021-22	5946.42	1266/-	75,28,168/-
9	2022-23	8396.43	1329/-	111,58,855/-
10	2023-24	4544.96	1395/-	63,40,219/-
11	2024-25	6823.39	1465/-	999,62,66/-
12	2025-26	5946.42	1538/-	91,45,594/-
13	2026-27	8396.43	1615/-	135,60,234/-
14	2027-28	4544.96	1696/-	77,08,252/-
15	2028-29	6823.39	1781/-	121,52,458/-

GAP PLANTING

The requirement for silvicultural operation of bamboo will be assessed by the DFO every year. The norm for bamboo plantation is Rs.26,400/- per ha. with spacing 5 Mt x 5 Mt. and plant population is 400 per ha. In the proposed scheme the rhizomes to be planted will be 12.5 % of the normal bamboo plantation i.e., 50 per ha. The year wise financial requirement for 1 ha gap plantation is provided in the following table:

Sl. No.	Item of work	Year	Norm per ha for 400 rhizomes per ha.	Norm per ha. for 50 rhizomes per ha.
(1)	(2)	(3)	(4)	(5)
1	Nursery cost (Advance work)	0 th Year	6400/-	800/-
2	Advance work	0 th Year	5800/-	725/-
3	Plantation	1 st Year	6600/-	825/-
4	Maintenance- 2 nd year	2 nd Year	4200/-	525/-
5	Maintenance- 3 rd year	3 rd Year	3400/-	425/-
			26400/-	3300/-

As per norm, the financial requirement for raising gap planting with 50 rhizomes over 4650.74 ha treatment type C area of degraded bamboo forests is as follows:

Sl. No.	Item of work	Year	Total areas (in ha.)	Norm per ha. for 50 rhizomes per	Total amount required

				ha.	
(1)	(2)	(3)	(4)	(5)	(6)
1	Nursery cost (Advance work)	2014-15	4650.74	800/-	37,20,592/-
2	Advance work	2014-15	4650.74	725/-	33,71,787/-
3	Plantation	2015-16	4650.74	825/-	38,36,861/-
4	Maintenance- 2 nd year	2016-17	4650.74	525/-	24,41,639/-
5	Maintenance- 3 rd year	2017-18	4650.74	425/-	19,76,565/-
	Total				1,53,47,444/-

Thus total financial requirement for implementation of prescriptions of bamboo working circle is worked out at Rs.1,53,47,444/- or Rs.154.00 lakhs. The gap plantation shall be taken up by the DFO in degraded areas and scheme shall be prepared depending upon availability of fund.

22.7 TREATMENT OF N.T.F.P. WORKING CIRCLE

1. The total area under Non-Timber forest produce (over lapping) working circle is 101549.34 ha. Thus the average annual area will be 10154 ha. for treatment.
2. The treatment includes preference of Non-timber forest produce species in planting operation, research on Non-timber forest produce items, publicity and marketing.
3. Thus annual expenditure on Non-Timber Forest Produce (overlapping) Working Circle is kept at lump sum amount of Rs. 10 lakh per annum with subsequent annual rise of 10 percent every year.

22.8 TREATMENT OF VILLAGE FOREST WORKING CIRCLE

1. The total area of this circle is 1048.10 hectares and about 106 hectares of area needs to be treated every year.
2. The maintenance of established trees, soil working, soil conservation measures and protection are some of the aspects for consideration.
3. The annual expenditure will be about ten man-days, i.e. Rs. 1500/- per annum per hectare. Thus Rs. 1, 59,000/- are required per annum for treatment of village forests.

22.9 TREATMENT OF WILD LIFE (OVERLAPPING) WORKING CIRCLE

1. The total area under this working circle is entire division of Sundergarh.
2. The treatment includes creation of waterholes, game tanks. Protection, research and publicity etc. The average total expenditure on these activities is expected to be Rs. 85 lakhs.
3. Thus, annual expenditure on bio-aesthetic working circle is Rs. 9 lakhs every year with subsequent rise of 10 percent every year.

22.10 TREATMENT OF ECO-RESTORATION (OVERLAPPING) WORKING CIRCLE

1. The total area under this working circle is entire Sundergarh Division.
2. The treatment includes creation of waterholes, game tanks, protection, research and publicity etc. The average total expenditure on these activities is expected to be Rs. 85 lakhs.
3. Thus, annual expenditure on bio-aesthetic working circle is Rs. 9 lakhs every year with subsequent rise of 10 percent every year.

22.11 COLLECTION OF TIMBER, FIREWOOD AND IRREGULAR EXPLOITATION

The expenditure on these collections is kept on lump at Rs. 5 lakhs with subsequent rise of 10 percent every year

22.12 MAINTENANCE OF BOUNDARY

The total length of the boundary is 1379.16 km. The average length of the boundary to be maintained annually is 275.832 km once in 5 years. The average number of pillars will be 2751 at the rate of 10 pillars per km.

- (i) Cost of clearance of boundary line = $276 \times 9 \times 50 = \text{Rs. } 136,620.00$
- (ii) Maintenance and posting of (90%) stone cairns pillars per annum
= $2476 \times 5 \times 50 = \text{Rs. } 680,900.00$
- (iii) Construction of 10 % massonary pillar at the rate of Rs. 400 per pillar
= $275 \times 400 = \text{Rs. } 1,10,000.00$

Hence, the total cost per annum on boundary line maintenance and pillar posting is Rs. 9,27,520 with a subsequent rise of 10 percent every year.

22.13 MAINTENANCE OF ROAD

The division has a network of 206 km. of forest roads. The forest roads require frequent maintenance and about Rs. 42,000 per km are required per annum. Thus, the total expenditure on repair and maintenance of road is Rs.86,52,000 lakhs per annum with a subsequent rise of 10 percent annually.

22.14 FOREST CONSOLIDATION

There are 26 proposed reserved forest blocks having an area of 5580.79 hectares. There are many objections raised by FSO, most of them relate to demarcation. For proper demarcation of these blocks an annual expenditure of Rs. one lakhs is required with a subsequent rise of 10 % of every year.

22.15 MAINTENANCE OF INFRASTRUCTURE

For the replacement of old vehicles, maintenance of VHF sets, purchase of new sets, expenditure on arms and ammunitions and other miscellaneous works and approximate amount of Rs. 5 lakhs is required annually with an escalation of 10 percent annually.

22.16 BUILDINGS

The condition of buildings is deplorable and many quarters require immediate renovation. The ACF quarter and Forest Rest House needs to be constructed at Sundergarh. There should be separate courtroom and a conference hall to carry out FDA and VSS meetings. Confinement rooms (hazat) are required in each range headquarter. For carrying out these works an annual expenditure of Rs. 10, 00,000 is required with an escalation of 10 percent every year.

22.17 LIBRARY, EQUIPMENTS, MAPS AND TOOLS

An amount of Rs. 5 laks is estimated on lump sum basis with an annual rise of 10 percent every year.

22.18 MISCELLANEOUS REGUALTIONS

An amount of Rs 2 lakh per annum is estimated with subsequent rise of 10 percent every year

22.19 PROJECTED COST OF THE PLAN

ESTIMATED REQUIREMENT OF THE WORKING PLAN (Rs. IN LAKHS)

Budget - Head	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Establishment	155	163	171	179	188	198	208	218	229	240	1949
Selection W.C	45	47	50	52	55	57	60	63	66	70	565
Rehabilitation W.C	600	630	662	695	729	766	804	844	886	931	7547
Plantation W.C.	43	45	47	49	52	54	57	60	63	66	536
Bamboo W.C	2	2	2	2	2	3	3	3	3	3	25
N.T.F.P W.C	1	1	1	1	1	1	1	1	1	2	11
Bio-Aesthetic W.C	5.5	5.8	6.1	6.5	7.0	7.5	8.0	8.5	9.0	9.5	73.4
Village Forest W.C	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.0	1.0	1.0	8.4
Timber Collection	5	5	6	6	6	6	7	7	7	8	63
Boundary Maintenance	9	9	102	10	11	11	12	13	13	14	112
Forest road	27	28	30	31	33	34	36	38	40	72	339
Forest consolidation	1	1	1	1	1	1	1	1	1	2	11
Infrastructure Dev.	5	5	6	6	6	6	7	7	7	8	63
Building	10	11	11	12	12	13	13	14	15	16	127
J.F.M.	1	1	1	1	1	1	1	1	1	2	11
Library and equipments	5	5	6	6	6	6	7	7	7	8	63
Miscellaneous	2	2	2	2	2	3	3	3	3	3	25
Total	917.8	961.4	1012.8	1060.3	1112.8	1179.4	1217.3	1289.5	1352	142.5.5	11528.8

22.20 COST BENEFIT ANALYSIS

The tangible benefits from forests include timber, firewood, poles, bamboo, NTFP items and medicinal plants etc. The number of trees available for marking in selection coupe is limited to 2 trees of sal per ha. and 2 trees of non-sal per ha. Thus total timber obtained from Selection Working Circle coupe annually is calculated as follows.

Total number of trees available for felling	= 4 trees per ha.
The unit volume of each tree	= 3 units
The number of units available	= 12 units
Annual selection area available	= 3087 ha.
Total units available per year	= 37044 units
Cost per unit	= Rs. 1065
Value of timber available lakhs.	= Rs. 39451860 or Rs. 400 lakhs.

Average bamboo production of the division is 2282.8 sale units or 2283 SU annually. The rate per sale unit is Rs. 749/-. The rate of bamboo available per year is 1709967 or 17 lakhs. The total production of kendu leaves is 12712 quintals in the division. The average rate per quintal is Rs. 2500/-. The total value of kendu leaves in this division is 31780000 or 317 lakhs. The value of firewood is calculated as follows. It is generally known that for one cubic meter of timber there will be outturn of one tonne of fire wood. The annual production of timber is 173160 cft. or 4947 cumt. So the out turn of fire wood will be 4947 M.T. The value of one M.T. is about Rs. 1000/- and total value of firewood is 4947000 or 49 lakhs. The total revenue received in the division during 2003-04 is 291 lakhs. This includes timber, firewood and miscellaneous revenue. The revenue received on rents, miscellaneous and other receipts is 3 lakhs. Estimated total benefit per annum from the forest is depicted in the following table.

Estimation of total revenue

Sl.No.	Item	Value (in lakhs)
1	Timber	369
2	Bamboo	17
3	Kendu leaves	317
4	Firewood	49
5	Revenue	3
Total		755

The projected benefit by assuming 5 % annual rise for next 10 years is calculated below:

ESTIMATED BENEFIT (IN LAKHS)

Year	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Amount	755	793	832	874	918	964	1012	1062	1115	1171	9496

The cost benefit ratio of plan is as follows:

Total cost of the plan	: 102 lakhs
Total projected benefit	: 9496 lakhs
Cost benefit ratio	: 1:93

22.21 FOREST REVENUE

During last plan period the forests of this division have been seriously exposed to biotic interference causing depletion, degradation of the forest crop and causing serious threat to the present eco-system. Hence, in this revised plan no significant yield and extraction of timber has been aimed. All forestry operations including felling of timber, firewood and Bamboo has been prescribed in this plan. Hence, some amount of revenue is expected from removal of wind fallen, uprooted, dead and silviculturally matured trees. In case of bamboo forest, yield is expected to improve, with the provision of intensive bamboo silvicultural operation prescribed in the bamboo overlapping working circle. Revenue from N T F P items is expected to increase because of its use in commercial as well as domestic purposes during the present plan period. On the whole division is expected to generate a good amount of revenue of about 5.8 cores at the rate of 2001 from sale of different forest produce like timbers, firewood, bamboos and N.T.F.P items. Past forest revenue collected in the division for the last 23 years is reflected in the table below.

	Year volume	Timber and FW amount	Bamboo Volume in	Amount	NTFP Items
1979-80	Not available	-	Not worked	-	2,42,248.87
1980-81	-do-	39,13,965	-do-	-	1,57,373.25
1981-82	-do-	11,27,221	8,087,50	-	2,62,213.76
1982-83	-do-	30,63,240	12,752,50	-	53,562,27
1983-84	-do-	24,62,120	4,026,92	-	12,90,198.80
1984-85	-do-	20,87,269	3,976.83	-	5,08,649.85
1985-86	-do-	20,11,958	5,120,51	-	25,51,865.00
1986-87	-do-	24,54,100	8,857,84	-	6,97,654,99
1987-88	-do-	24,39,500	1,627,68	-	6,70,285.75
1988-89	-do-	19,99,700	1,627,69	5,21,236	45,855.00
1989-90	-do-	18,43,000	2,135,54	7,26,084	65,400.00
1990-91	406 cum	18,06,300	5,554,98	19,72,016	4,87,319.00
1991-92		-	-	-	-
1992-93					59,067.00
1993-94					93,283.00
1994-95					54,327.00
1995-96					59,997.00
1996-97					1,13,708.00
1997-98					3,65,407.00
1998-99					2,68,486.00
1999-00					2,98,,038.00
2000-01					4,84,498.00
2001-02					1,38,707.00

The average revenue from the above table is given below:

Timber & Fire wood Rs.22,91,670/- annually

Bamboos Rs.10,73,112/- annually

Keeping in view the past revenue the anticipated annual revenue of the division during the ensuing plan period 2014-15 to 2023-24 with respect to present increase in price rate of 2001 at the rise of 5% per annum is furnished in the table below.

Year	Timber & F.W	Bamboos	NTFP item
2014-15	24,06,254	11,26,768	4,36,806
2015-16	25,26,567	11,83,106	4,58,646
2016-17	26,52,895	12,42,261	4,81,578
2017-18	27,85,540	13,04,374	5,05,657
2018-19	29,24,817	13,69,593	5,30,940
2019-20	30,71,058	14,38,073	5,57,487
2020-21	32,24,611	15,09,977	5,85,361
2021-22	33,85,841	15,85,476	6,14,629
2022-23	35,55,133	16,64,750	6,45,360
2023-24	37,32,890	17,47,987	6,77,628

Expenditure Statement

Year	Establishment	Non-Plan	State plan	Central plan (Sponsored)	Central plan	Capital outlet on forestry	Others
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1979-80							
1980-81	14,15,014.80	17,41,435.04	-	-	-	-	-
1981-82	17,53,770.20	21,88,823.67	-	-	-	-	-
1982-83	24,75,328.77	28,22,465.27	-	-	-	-	-
1983-84	25,28,619.70	38,32,797.36	-	-	-	-	-
1984-85	24,63,991.91	28,68,509.70	-	-	-	-	-
1985-86	28,43,358.27	33,56,358.27	-	-	-	-	-
1986-87	30,16,811.70	38,05,051.68	-	-	-	3,02,264.60	-
1987-88	36,16,288.93	43,43,383.89	-	-	-	-	-
1988-89	37,73,081.68	03,02,264.60	2,76,896.61	31,263.00	25,429.85	3,2,264.60	-
1989-90	44,92,848.50	51,93,013.02	2,49,847.51	36,605.00	53,829.60	4,77,877.74	-
1990-91	46,43,461.26	54,32,571.04	2,41,869.07	31,134.00	35,000.00	4,62,496.00	-
1991-92	55,40,765.63	64,64,368.14	94,838.12	54,838.12	-	4,58,799.45	22,45,641.25
1992-93	73,49,302.00	90,11,050.32	98,311.16	71,319.28	-	3,19,599.78	5,53,920.22
1993-94	79,03,638.90	86,86,937.40	1,52,539.91	82,477.00	-	3,82,740.00	28,11,964.32
1994-95	80,75,145.44	02,,23,888.50	2,23,888.50	1,28,374.50	-	1,97,558.00	1,16,83,842.41
1995-96	86,41,329.09	04,34,331.60	4,34,331.60	3,34,267.91	-	13,04,968.00	88,44,633.04
1996-97	98,05,317.80	1.16,20,315.32	2,84,080.00	2,85,558.99	-	7,24,260.00	1,01,13,947.25
1997-98	1,03,96,058.00	1,20,96,979.42	2,60,777.12	66,202.00	-	34,486.00	19,57,989.10
1998-99	1,19,86,392.10	2,62,203.50	2,62,203.50	10,000.00	-	88,765.00	32,72,794.00
1999-00	1,55,78,558.70	03,05,550.60	3,05,550.60	44,000.00	-	33,750.00	22,57,944.00
2000-01	1,53,29,754.74	1,63,84,505.46	1,02,410.00	-	3,84,500.00	45,000.00	-

Keeping in view the past expenditure for 20 years and over all price increase the expenditure on various proposed forestry operations during the present plan period is expected to increase by 5 percent every year.

22.22 COST OF THE PLAN

This revision of plan was started from February 1999 upto July 2003. Cost of the plan is Rs.1,01,36,985/-. The total forest area covered by the plan is 122,770.6016 ha of RF, PRF, and DPF. The expenditure under different heads is given in the table below.

Year	Establishment	W P	Total
(1)	(2)	(3)	(4)
1999-2000	19,91,394	2,19,791	22,11,185
2000-01	20,84,017	49,101	21,33,118
2001-02	18,46,703	48,968	18,95,671
2002-23	25,77,359	6,10,000	31,87,359
2003-04 (Up to 7/03)	6,69,421	40,231	7,09,652
TOTAL	91,68,894	9,68,091	1,01,36,985

The cost of plan has escalated due to lack of allotment during 00-01, 01-02 and lack of adequate staff. Allotment was received during 02-03 and topo sheets were purchased during 02-03. The plan was completed by the end of July 2003.

PART - II
Chapter – XIV
SUMMARY OF THE PRESCRIPTIONS

Chapter	Heading	Prescriptions	Para	Page
10. Basis of proposal	10.1 General Considerations	Forest plays a multidimensional role in sustaining all kinds of life forms and all life forms are dependent upon forest for their requirements.	10.1	138
	10.2 General Objectives of Management	1. To prevent degradation of environment by restricting felling of trees and giving emphasis on preservation of flora and fauna of forests. 2. To improve condition, composition and productivity of the existing forests by enriching the standing crop through scientific management. 3. To meet requirements of forest produce of local people living in and around forest area. 4. To rehabilitate the barren, degraded and depleted forest areas and mining degraded areas through artificial regeneration by adopting various soil conservation measures. 5. To generate employment to local people living in and around forest areas by involving them in various forestry operations including collection of various non-timber forest produce (NTFP).	10.2	138
	10.3 Method of treatment to be adopted	1. Selection working Circle 2. Rehabilitation Working Circle. 3. Protection(overlapping) Working Circle. 4. Plantation Working Circle. 5. Bamboo (Overlapping) Working Circle. 6. NWFP (Overlapping) Working Circle. 7. Village Forest Working Circle. 8. Wild life (Overlapping) Working Circle. 9. Eco-restoration (Overlapping) Working Circle.	10.3	138
	Total area			
	10.4 Allotment of area to different Working Circles	The Working Plan covers 212 forest blocks consisting of 94 RFs, 26 PRFs and 92 DPFs.	10.4	142
	10.5 Blocks and compartments	Area is divided in to blocks and compartments	10.5	143
	10.6 Period of Working Plan and necessity for intermediate revision.	The Working Plan has been prepared for a period of 10 years	10.6	143

11.Selection Working Circle	11.1 General Constitution	Well-stocked forest blocks having density more than 0.5.	11.1	144
	11.2 Character of vegetation	1. To improve the density and composition of forest crop and to encourage natural regeneration and establishment of principal species. 2. To emphasize soil and water conservation. 3. To maintain and improve the bio-diversity of forest blocks. 4. Obtain sustained yield. 5. To carry out cleaning operations with climber cutting.	11.2	
	11.3 Special objectives of management	1. To build up the growing stock and improve the stand structure and to encourage natural regeneration by taking suitable silvicultural operations with emphasis on soil and water conservation measures. 2. To remove the mature and silviculturally available trees. 3. To maintain and improve biodiversity of forest blocks.	11.3	144
	11.4 Area statement	Moist peninsular high level and low level Sal in top and lower hills of 8 RF and 3 PRF are covered under this plan. Area- 23,221.99 Ha.	11.4	145
	11.5 Analysis and valuation of crop	One percent strip sampling enumeration was conducted.	11.5	145
	11.6 Silvicultural System	Selection-cum-Improvement felling and thinning.	11.6	146
	11.7 Choice of Species.	No preferred species. Fruit bearing species not to be felled.	11.7	146
	11.8 Exploitable Girth Class.	1. Bandhan > 120 Cm. 2. All other species > 150 Cm.	11.8	146
	11.9 Felling cycle	Felling cycle of 10 years calculated on Smythies safeguard formula.	11.9	147
	11.10 Rotation	Sequence of felling 1. Demarcation of annual coupes. 2. Marking rules. 3. Execution of marking and felling.	11.10	147
	11.11 Calculation of yield.	The yield has been regulated by area with a percentage check as removal of selection trees arrived at by Smythie's safeguard formula.	11.11	147
	11.12 Felling Series	There are seven felling series covering the entire area of Working Circle.	11.12	149
	11.13 Sequence of felling	Felling will be done in annual coupes of seven felling series.	11.13	157

	11.14 Method of Execution of felling and demarcation	Demarcation of coupe will be done before felling. 11.14.1 Demarcation of annual coupes 11.14.2 Marking rules 11.14.3 Execution of felling	11.14	157
	11.15 Subsidiary Silvicultural Operations	1. Post felling operations 2. Treatment plan and map 3. Annual action plan	11.15	159
	11.16 Control	Compartments histories, control forms and other records shall be maintained for each selection coupe, compartment and felling series in accordance with the provision of the Working Plan Code.	11.16	160
	11.17 Miscellaneous Regulations	Grazing and lopping is strictly prohibited. Efforts shall be made to maintain coupe lines as fire lines every year.	11.17	160
	11.17.1 Grazing	Grazing shall be regulated.		
	11.17.2 Fire protection	For taking suitable fire protection.		
	11.17.3 Rights and Concessions	As per Orissa Forest Act 1972, rights and concession shall be regulated.		
	11.17.4 Sample plots	Sample plots will be laid.		
	11.18 Working Norm	23,221.99 ha areas is covered under Selection Working Circle.	11.18	160
	11.19 Intermediate revision	Intermediate revision may be taken up during the plan period, if required.	11.19	161
12 Rehabilitation Working Circle	12.1 General Constitution	Forest blocks having valuable crops in depleted condition in bushy form and at various stage of degradation.	12.1	162
	12.2 Character of Vegetation	1. To improve the density and composition of forest crop and to encourage natural regeneration and establishment of principal species. 2. To emphasize on soil and water conservation. 3. To maintain and improve the bio-diversity of forest blocks. 4. Obtain sustained yield. 5. To carry out cleaning operations with climber cutting.	12.2	162
	12.3 Special objectives of management	1. To enrich the micro-edaphic conditions. 2. Improve the existing growing stock 3. To regenerate the barren and blank patches 4. Soil and moisture conservation. 5. Encourage natural regeneration. 6. To boost up growth of Sal and other valuable species of coppice origin. 7. To provide adequate protection to the areas having root stock. 8. To meet the bonafide needs of local inhabitants.	12.3	163
	12.4 Area statement and rehabilitations series.	Area = 84569.26 ha.	12.4	164

	12.5 Analysis and valuation of crop	Degraded forest will be improved through rehabilitation measures.	12.5	169
	12.6 Silvicultural system	No silvicultural system is prescribed.	12.6	169
	12.7 Choice of species	Suitable species shall be planted.	12.7	169
		Soil conservation measures		
		Choice of species will be site specific.		
	12.8 Rehabilitation cycle	Ten year cycle.	12.8	172
	12.9 Calculation of yield	No yield is prescribed.	12.9	172
	12.10 Sequence of rehabilitation operations	31 Rehabilitation series divided into ten years have been constituted.	12.10	172
	12.11 Method of execution of rehabilitation operations	12.11.1 Demarcation of Annual Rehabilitation Area	12.11	172
	12.12 Preparation of Treatment map	Annual rehabilitation area shall be shown on treatment map.	12.12	173
	12.13 Treatment Plan	Each rehabilitation coupe shall be treated for four years.	12.13	174
	12.14 Execution of Rehabilitation Method	Rehabilitation measures will be done in annual coupes.	12.14	174
	12.15 Rehabilitation Operations	Fencing shall be taken up to protect forest.	12.15	176
	12.16 Rehabilitation in different series	Plantation will be taken up according to Rehabilitation series.	12.16	177
	12.17 Control	Control will be exercised by maintaining records.	12.17	177
	12.18 Miscellaneous Regulations	Grazing and fire will be controlled.	12.18	177
	12.19 Rights and concessions	As per Govt. Rules in force.	12.19	178
	12.20 Working norm	Rehabilitation measures will be taken up @ Rs.40,560/- per hectare.	12.20	178
	12.21 Intermediate Revision	May be reviewed after 5 years.	12.21	180
13 Protection Working Circle.	13.1 Protection Working Circle	The areas having little or no vegetation are included in this circle.	13.1	181
	13.2 General Observation and vegetation	Ecologically fragile areas of high hills around reservoirs susceptible to environmental degradation. The forest blocks under pernicious practice of shifting cultivation in the past with little or no vegetation.	13.2	181
	13.3 Special Objectives of management	1. To keep delicate and eco-sensitive areas ecologically intact by maintaining adequate vegetative cover especially in the catchment areas. 2. To rehabilitate the forest area.	13.3	181

	13.4 Area Statement and treatment series	20054.03 hectares.	13.4	181
	13.5 Analysis and valuation of crop	The plantated stock is not up to mark. No exploitation has been done.	13.5	183
	13.6 Silvicultural Systems	No felling will be done. Wind fallen and uprooted trees may be removed.	13.6	183
	13.7 Protection cycle	The cycle is fixed at 10 years, which synchronizes with the Working Plan.	13.7	184
	13.8 Calculation of yield	No yield is prescribed.	13.8	184
	13.9 Methodology and execution operations	Action plan will be prepared depending upon the protection measures required.	13.9	184
	13.10 Forest protection measures	1. Regular monitoring will be done by staff. 2. Grazing and browsing shall be stopped.	13.10	184
	13.11 Control	The journals and other records will be maintained for each protection coupe in accordance with Orissa Forest Plantation Manual 1972.	13.11	185
	13.12 Miscellaneous regulation	Full protection will be provided from fire and grazing	13.12	185
	13.12.1 Grazing	Annual rehabilitation areas and new plantation shall be closed to grazing for a minimum period of 5 years.		
	13.12.2 Fire Protection	The entire rehabilitation area should be rigidly protected from fire hazard.		
	13.13 Rights and Concessions	Rights and concessions shall be regulated as per the existing provisions of Government policy.	13.13	185
	13.14 Working norms	1. The total area under Protection Working Circle is 20054.03 ha. 2. The total annual requirement under this circle will be Rs.40 lakhs per year with subsequent rise of 10% every year.	13.14	186
	13.15 Intermediate revision	Any change in the prescription of the Working Circle, if anticipated by CF, may be reviewed after five years.	13.15	186
14 Plantation Working Circle	14.1 General Constitution	This Working Circle includes areas having blank/stretchers of forest blocks allotted under Rehabilitation Working Circle in the outgoing plan.	14.1	187
	14.2 General observation and vegetation	The area devoid of forest growth, bearing scattered gress patches and bushy growth widely distributed through out the Division.	14.2	187
	14.3 Special objectives of management	1. To reforest all barren areas and restock the degraded areas. 2. To maintain and tend the existing plantations. 3. To enhance the land productivity through soil and moisture conservation measures. 4. To increase the biodiversity. 5. To prevent soil erosion and conserve soil moisture.	14.3	188
	14.4 Analysis and valuation of crop	The planted stock is not up to mark. No exploitation has been done.	14.4	188

14.5 Area allotment and planting series	Range wise distribution of 10 RF blocks allotted to this working circle. Area- 13,812.1318 Ha.	14.5	188
14.6 Silvicultural System	No silvicultural system is prescribed.	14.6	190
14.7 Choice of Species	Local and indigenous species will be planted.	14.7	190
14.8 Plantation Cycle	Ten years cycle is prescribed.	14.8	193
14.9 Calculation of Yield	The yield shall be regulated according to area and exploitable class of trees.	14.9	193
14.10 Table of Operation	The site-specific table of operation will be prepared by DFO.	14.10	193
14.11 Method of execution of planting operations	According to plantation norm plantation will be taken up.	14.11	193
14.11.1 Preparation of site, treatment and plan	A site map in the scale 1:25,000 will be prepared.		
14.11.2 Nursery	Permanent nurseries shall be started for raising seedlings.		
14.11.3 Collection of seeds	The assessment of seedlings to be raised in the nursery for gap and block planting purpose should be made.		
14.11.4 Preparation of nursery bed	Nursery beds shall be prepared mixed with farmyard manure or with suitable fertilizers. Seeds will be sown in beds.		
14.11.5 Stacking, pitting and planting	Completion of site preparation, operations like alignment, stacking, pitting and planting should be done.		
14.11.6 Post planting operations	Two weeding should be carried out in the year of planting.		
14.11.7 Method of execution of planting	Plantation technique and operations should be carried out in accordance with guide lines in "The Forest Plantation Manual, 1977".		
14.11.8 Demarcation of Annual plantation area	1. The annual plantation coupes shall be demarcated in the Winter Season. 2. The plantation coupe shall be indicated by sign boards at corners or at point of inter section with roads. 3. The patches selected for block plantation should have at least 4.0 ha of area.		
14.11.9 Control	The observation on growth, mortality, insect attack and damage should be recorded in the Plantation Journals.		
14.12 Subsidiary Silvicultural operation	The young plantations need regular attention. Generally they are left uncared till first thinning.	14.12	196
14.13 Treatment of Existing Plantation	Cleaning, pruning etc.	14.13	196
14.14 Miscellaneous Regulation	14.14.1 Grazing: New plantation shall be closed to grazing for a minimum period of 5 years.	14.14	197
	14.14.2 Fire Protection: The area should be rigidly protected from fire.		
14.15 Rights and Concession	No rights and concessions shall be allowed in this circle.	14.15	198

	14.16 Annual costs of operations and working norm	Annual cost of operations and working will be the norm as prescribed by the Principal Chief Conservator of Forests, Orissa. It is recommended at Rs. 64,090/- per hectare.	14.16	198
	14.17 Intermediate Revision	Prescriptions may be reviewed and revised after five years by the reviewing authority.	14.17	199
15. Bamboo (Overlapping) Working Circle.	15.1 General Constitution	Forest blocks having good bamboo potential are included.	15.1	200
	15.2 Character of Vegetation	Two species of bamboo are found mainly in the forest of this division.	15.2	200
	15.3 Special objectives of Management.	1. Systematic management for sustained yield. 2. To rehabilitate the degraded bamboo areas. 3. Meet the demand of paper mills. 4. Generation of employment.	15.3	201
	15.4 Analysis and valuation of the crop	Detailed survey and enumeration was carried out in 12 Forest Blocks	15.4	201
	15.5 Enumeration	Five sample plots of one hectare forest blocks were taken for enumeration of clumps and culms.	15.5	202
	15.6 Working of Bamboo	Healthy and well-stocked bamboo clumps shall be worked.	15.6	205
	15.7 Delineation of Bamboo area into treatment types and quality classes	Forest blocks have been divided into three treatment types and quality class	15.7	207
	15.8 Clump and culm analysis	Twelve Forest Blocks were enumerated.	15.8	208
	15.9 Allotment of the area	Area allotted to Bamboo (Overlapping) Working Circle is 30361.95 ha.	15.9	209
	15.10 Construction of Bamboo cutting series	Bamboo coupes will be opened for working from October to June.	15.10	209
	15.11 Sequence of felling	Constitution and time table of cutting series	15.11	209
	15.12 Estimated yield from bamboo coupes	Yield estimate from different bamboo coupes.	15.12	210
	15.13 Financial Forecast	The financial forecast for demarcation of bamboo coupes and silvicultural operation is done for different years.	15.13	211
	15.14 Morphological characters of culms	Morphological character with age of each culm is essential for framing cutting rules.	15.14	213
	15.15 Subsidiary Silvicultural Operations	15.15.1 Simultaneous silvicultural operations 15.15.2 Improvement of bamboo forest 15.15.3 Treatment of gregariously flowered areas	15.15	214
	15.16 Control	Necessary entries will be made with regard to works taken up in bamboo coupes.	15.16	215
	15.17 Miscellaneous Regulations	Area treatment will be done. Stone packing shall be done in down hillside of clump to conserve water.	15.17	215
	15.18 Grazing and Fire Protection	Grazing and fire are prohibited	15.18	215
	15.19	Intermediate revision may be taken up after	15.19	215

	Intermediate revision.	inspection.		
16. Non-Timber Forest Produce (Overlapping) Working Circle.	16.1 General Constitution.	All forest blocks are covered.	16.1	216
	16.2 General observation and vegetation	1. Collection as per Government policy. 2. Productivity of various N.T.F.P. items. 3. Protect and promote regeneration. 4. Development of N.T.F.P. based industries. 5. Involving people for employment and income.	16.2	216
	16.3 Special Objectives of Management.	Sustainable collection, extraction and utilization of N.T.F.P. in consistence with Govt. Policy. Develop market and industry for NTFP and generate employment.	16.3	217
	16.4 Utility of N.T.F.P. items	1. Consumable, medicinal and commercial. 2. Consumed by rural people and local inhabitants.	16.4	217
	16.5 Area Allotment	The area of (overlapping) working circle is 101549.34 hactares.	16.5	218
	16.6 Collection	Most of the NTFP items available in this division have one-year collection cycle.	16.6	218
	16.7 Working of important NTFPs and some prescription for improvement	16.7.1 Kendu leaf 16.7.2 Mohua flowers and seed 16.7.3 Sal seed 16.7.4 The TDCC Ltd. has been given long-term lease for NTFP items. 16.7.5 Medicinal plants	16.7	218
	16.8 Statistics of growth and yield	The official production figures do not reflect the actual production of N.T.F.P. items.	16.8	219
	16.9 Incidence of smugglings	The illicitly smuggled NTFP items do not contribute to revenue of the division.	16.9	220
	16.10 Future Management	16.10.1 Collection of NTFP items by scientific methods 16.10.2 Seed based 16.10.3 Leaf based 16.10.4 Bark based 16.10.5 Gum and resin based 16.10.6 Root based	16.10	220
	16.11 Measures to improvement production of NTFP items	The growth of existing NTFP yielding species is to be boosted by taking suitable silvicultural measures.	16.11	221
	16.12 Extensive research and study relating to NTFP items	Research and study will be done to improve production	16.12	222
	16.13 Ensuring proper remuneration to primary collectors	Government policy shall be enforced.	16.13	222
	16.14 Working of major NTFP and some suggestions of improvement	16.14.1 Kendu leaves 16.14.2 Sal seed 16.14.3 Siali leaves and fibre 16.14.4 Myrobalans 16.14.5 Genduli gum and other gums 16.14.6 Hill brooms	16.14	223

		16.14.7 Mahua flowers and seeds 16.14.8 Tamarind 16.14.9 Amba 16.14.10 Kochila (Nux Vomica) 16.14.11 Cashew		
	16.15 Miscellaneous Regulations	Fire and biotic interference shall be controlled.	16.15	225
	16.16 Rights and concessions	The tribals and local inhabitants have right to collect all NTFP item for their own consumption	16.16	225
	16.17 Working norm	Working norm as fixed by Govt. for unskilled labour will be norm for collection of NTFP items shall be followed	16.17	226
	16.18 Necessity for intermediate revision	Intermediate revision is not anticipated.	16.18	226
17. Village Forest Working Circle	17.1 General Constitution	All the plantation areas raised by Social Forestry Project, Sundergarh Division have been declared as village forest by the State Govt.	17.1	227
	17.2 Area	146 nos. of village forest covering an area 1048.10 ha.	17.2	227
	17.3 Special objectives of management	1. Improve and regenerate the village forest areas. 2. Provide benefit from such forest to village community. 3. Management of forest in accordance with resolution on J.F.M.	17.3	227
	17.4 Method of management	Govt. has formulated the frame work of operation	17.4	227
	17.5 Treatment Series	Most of the plantations have scattered patches with coppice shoots coming up from stumps.	17.5	231
	17.6 Analysis and valuation of crop	As fixed by village committee.	17.6	231
	17.7 Silvicultural system	No silvicultural system. Only protection is required.	17.7	231
	17.8 Choice of Species	Miscellaneous species with medicinal plants species will be planted.	17.8	232
	17.9 Cycle	10 years cycle	17.9	234
	17.10 Calculation of yield	Yield will be controlled and regulated by village committee.	17.10	234
	17.11 Table of operation	Climber cutting, singling of shoots and other site-specific improvement measures may be taken up.	17.11	234
	17.12 Method of execution of operations	No operation is required.	17.12	235
	17.13 Management prescriptions	Old microplans will be up dated and new requirement will be added.	17.13	235
	17.14 Control	The journals and records shall be maintained and control shall be exercised through village committee.	17.14	235
	17.15 Miscellaneous Regulations	17.15.1 Grazing 17.15.2 Fire Protection	17.15	235
	17.16 Rights and concessions	Rights and concessions shall be regulated as per existing provisions of the Government.	17.16	235
	17.17 Working norm	Rs. 1000 per hectare and annual requirement of fund will be 1.05 lakhs per year.	17.17	235
	17.18	It may be reviewed by CF if required after five	17.18	235

	Intermediate revision	years.		
18. Wild Life (Overlapping) Working Circle	18.1 General constitution	All forest blocks having importance of wildlife and recreation have been included in this circle.	18.1	236
	18.2 Objectives of management	1. Improvement of the habitat of Wildlife. 2. To create more water sources and salt licks. 3. Conservation and preservation of the diversity of flora and fauna. 4. To educate and create awareness. 5. To conserve and develop the existing pre-historic sites for eco-tourism.	18.2	236
	18.3 Strategies	To help visitors develop awareness, understanding and appreciation of the area being visited. To make their experience enjoyable. To evoke positive response in them towards conservation of natural, historical and cultural sites. To achieve management goals. To build public support for the area	18.3	236
	18.4 General character of vegetation	The biodiversity of flora and fauna has been affected adversely due to fragmentation of habitat.	18.4	237
	18.5 Special objectives of management	To conserve, protect and improve wild life habitat. To increase biodiversity. To help prevent wild life crime.	18.5	237
	18.6 Analysis and evaluation	Wild life habitat has fragmented and reduced to very high extent and efforts shall be made to improve the habitat and bio-diversity in area.	18.6	237
	18.7 Area and allotment	Area: 121603.37 hectares.	18.7	238
	18.8 Species structure	Miscellaneous/Deciduous types of forest contain many species of wild animals.	18.8	238
	18.9 Poaching and wild life crime	Poaching of wild animals, capture, possession, transport and trade shall be stopped.	18.9	239
	18.10 Maintaining special habitats	Snags, snag recruits, down wood, large old trees, trees with buttresses, lianas, climbers, fruit bearing trees, roosting and nesting trees will be protected.	18.10	240
	18.11 Development of habitat	Improvement of cover, availability of food and salt licks etc shall be developed.	18.11	241
	18.12 Classification of habitat	Three types of habitats depending upon their deterioration have been discussed. Efforts will be made to improve food and water availability to animals along with other protection measures.	18.12	242
	18.13 Animal depredation	Animal depredation, crop damage and man-animal conflict has been discussed.	18.13	244
	18.14 Research	Research is required on migration, health, disease, population dynamics and endangered species.	18.14	245
	18.15 Common wild life	Common wild animals of Division are mentioned.	18.15	245
	18.16 Sanctuaries and National Parks	There is no sanctuary or National Park in this division. It has been proposed to create one sanctuary at Hemgir by merging areas of seven RF.	18.16	247
	18.17 Wild life Rules	Wild life rules are enforced from time to time.	18.17	248
	18.18 Works of improvement	Improvement measures have been suggested.	18.18	248
	18.19 Management	The management plan shall be prepared for new sanctuary.	18.19	250

	Plan			
	18.20 Migration of elephants and corridors	Four migration routes of elephants have been shown from nearby forest areas. Revival of habitat corridors will increase the number of elephants and stop habitat fragmentation.	18.20	251
	18.21 Wild life protection measures	Protection and anti-poaching measures are being taken.	18.21	252
	18.22 Financial requirements	Financial requirement for the plan period is Rs. 85 lakhs and Rs. 9.00 lakhs is required every year.	18.22	253
	18.23 Miscellaneous regulations	Control of grazing Fire protection measures Incentives and rewards Rights and concessions	18.23	254
	18.24 Intermediate revision	Intermediate revision may be taken up after five years on the recommendations of CF.	18.24	254
19. Eco - Restoration (Overlapping) Working Circle	19.1 Objectives	Eco-restoration is the prime objective for bringing the eco-system to normalcy. Plantations under different schemes, providing employment to local people and economic upliftment of the poor are part of objectives. Wild life is an integral part of the forest and performs important functions, develops awareness and understanding of the area.	19.1	255
	19.2 Issues and problems	The relentless biotic pressure by humans and domestic cattle has adversely affected the biodiversity of flora and fauna and habitat has been fragmented.	19.2	256
	19.3 Strategies	Eco-tourism committees will be constituted and interpretation centre will be constructed to bring awareness among people. Awareness about natural, historical and cultural heritage among people shall be taken up. Adequate employment opportunities shall be provided to rural people.	19.3	256
	19.4 Self-guided trails	Self-guided trails bring people in direct contact with nature and forest resources.	19.4	256
	19.5 Identification of the zones	Eco-tourism zones shall be developed.	19.5	256
	19.6 Local area development	Eco-restoration will make people self-reliant and people's participation shall be ensured.	19.6	257
	19.7 Development of Eco-Tourism	Eco-tourism will educate the people about forest, wild life and environment.	19.7	257
		19.7.1 The caves inside forest shall be revived and developed to educate people about bio-aesthetic values.		
	19.8 Temples	The temples inside forest shall be developed to educate people about bio-aesthetic values.	19.8	260
	19.9 Dams	The dams shall be developed for picnic and recreation of the people.	19.9	261
				261
	19.10 Eco-development measures	To conserve, protect and improve wild life habitat with special emphasis on the proposed sanctuary area and corridor for elephants. To promote wildlife in general and endangered species in particular. To conserve and develop important wildlife habitat for the purpose of eco-tourism. Increase in biodiversity and wildlife population	19.10	264

		has been recommended. Scientific study on food and feeding habits of important target species has been mentioned. Scientific study on intra and inter-specific relations and population dynamics of important target species shall be taken up.		
	19.11 Budget	The budget includes requirements of funds for development of proposed Hemgir Sanctuary. The development measures have been proposed for Rs. 9.00 lakhs per annum.	19.11	267
	19.12 Miscellaneous regulations	19.12.1 Control of Grazing 19.12.2 Fire Protection Measures 19.12.3 Incentives and Rewards 19.12.4 Rights and Concessions	19.12	267
	19.13 Intermediate revision	No intermediate revision is anticipated. In case of need it may be revised.	19.13	267
20. Miscellaneous regulations	20.1 Forest check gates	List of check gates	20.1	268
	20.2 List of buildings	List of buildings (Range wise)	20.2	268
	20.3 List of forest road	Name and length of the forest roads.	20.3	271
21. Establishment and labour	21.1 Establishment and labour	Field staffs and ministerial staffs including distribution of sections, beats and ranges	21.1	273
	21.2 Labour Supply	Wages of skilled and un-skilled labour	21.2	274
22 Financial forecast	22.1 Establishment	Estimate of the cost of establishment	22.1	275
	22.2 Treatment of Selection Working Circle	Total area under Selection working circle is 23,221.99 ha.	22.2	275
	22.3 Treatment of Rehabilitation Working Circle	Total area under Rehabilitation working circle is 84,569.26 ha.	22.3	275
	22.4 Treatment of Protection Working Circle	Treatment under Protection Working Circle is recommended for 20054.03 hectares of area of RF, PRF and DPFs.	22.4	278
	22.5 Treatment of Plantation Working Circle	Total area under Plantation working circle is 13,812.1318 ha.	22.5	278
	22.6 Treatment of Bamboo (Overlapping) Working Circle	Total area under Bamboo (overlapping) working circle is 30361.95 ha.	22.6	281
	22.7 Treatment of NTFP Working Circle	Total area under NTFP (overlapping) working circle is 101549.34 hectares.	22.7	282
	22.8 Treatment of Village Forest Working Circle	Total area under Village Forest working circle is 1048.10 hectares.	22.8	282
	22.9 Treatment of Wild life (Overlapping)	Total area under Bio-aesthetic working circle is 121603.37 hectares.	22.9	282

	Working Circle			
	22.10 Treatment of Eco-Restoration (Overlapping) Working Circle	Total area under Eco-restoration working circle is 121603.37 hectares.	22.10	283
	22.11 Collection of timber, firewood and irregular exploitation.	Rs.5 lakhs is required every year for collection of timber etc with subsequent rise of 10 percent every year.	22.11	283
	22.12 Maintenance of boundary	Total length of the boundary is 1379.16 Km.	22.12	283
	22.13 Maintenance of forest roads	Forest roads maintenance requires about Rs.10000 per km per annum.	22.13	283
	22.14 Forest Consolidation	26 PRF blocks having an area of 5580.79 ha are in the process of consolidation.	22.14	283
	22.15 Infra-structure maintenance	Replacement of old vehicle, maintenance of VHF sets and purchase of arms and ammunition are required.	22.15	284
	22.16 Buildings	The condition of buildings is deplorable and many quarters require immediate renovation.	22.16	284
	22.17 Library, equipments, maps and tools	To be maintained in Division Office.	22.17	284
	22.18 Miscellaneous regulations	Proper care will be taken for improvement of forest and wildlife.	22.18	284
	22.19 Projected cost of the Plan	Estimated cost of the working plan.	22.19	284
	22.20 Cost benefit analysis	Benefits from forests.	22.20	284
	22.21 Forest revenue	Past forest revenue collected.	22.21	285
	22.22 Cost of the Plan	The cost of plan has escalated due to lack of allotment.	22.22	286

PART - II

Chapter – XV

SUMMARY OF THE PRESCRIPTIONS

Chapter	Heading	Prescriptions	Para	Page
10. Basis of proposal	10.1 General Considerations	Forest plays a multidimensional role in sustaining all kinds of life forms and all life forms are dependent upon forest for their requirements.	10.1	138
	10.2 General Objectives of Management	1. To prevent degradation of environment by restricting felling of trees and giving emphasis on preservation of flora and fauna of forests. 2. To improve condition, composition and productivity of the existing forests by enriching the standing crop through scientific management. 3. To meet requirements of forest produce of local people living in and around forest area. 4. To rehabilitate the barren, degraded and depleted forest areas and mining degraded areas through artificial regeneration by adopting various soil conservation measures. 5. To generate employment to local people living in and around forest areas by involving them in various forestry operations including collection of various non-timber forest produce (NTFP).	10.2	138
	10.3 Method of treatment to be adopted	1. Selection working Circle 2. Rehabilitation Working Circle. 3. Protection(overlapping) Working Circle. 4. Plantation Working Circle. 5. Bamboo (Overlapping) Working Circle. 6. NWFP (Overlapping) Working Circle. 7. Village Forest Working Circle. 8. Wild life (Overlapping) Working Circle. 9. Eco-restoration (Overlapping) Working Circle.	10.3	138
	Total area			
	10.4 Allotment of area to different Working Circles	The Working Plan covers 212 forest blocks consisting of 94 RFs, 26 PRFs and 92 DPFs.	10.4	142
	10.5 Blocks and compartments	Area is divided in to blocks and compartments	10.5	143
	10.6 Period of Working Plan and necessity for intermediate revision.	The Working Plan has been prepared for a period of 10 years	10.6	143

11.Selection Working Circle	11.1 General Constitution	Well-stocked forest blocks having density more than 0.5.	11.1	144

11.2 Character of vegetation	1. To improve the density and composition of forest crop and to encourage natural regeneration and establishment of principal species. 2. To emphasize soil and water conservation. 3. To maintain and improve the bio-diversity of forest blocks. 4. Obtain sustained yield. 5. To carry out cleaning operations with climber cutting.	11.2	
11.3 Special objectives of management	1. To build up the growing stock and improve the stand structure and to encourage natural regeneration by taking suitable silvicultural operations with emphasis on soil and water conservation measures. 2. To remove the mature and silviculturally available trees. 3. To maintain and improve biodiversity of forest blocks.	11.3	144
11.4 Area statement	Moist peninsular high level and low level Sal in top and lower hills of 8 RF and 3 PRF are covered under this plan. Area- 23,221.99 Ha.	11.4	145
11.5 Analysis and valuation of crop	One percent strip sampling enumeration was conducted.	11.5	145
11.6 Silvicultural System	Selection-cum-Improvement felling and thinning.	11.6	146
11.7 Choice of Species.	No preferred species. Fruit bearing species not to be felled.	11.7	146
11.8 Exploitable Girth Class.	1. Bandhan > 120 Cm. 2. All other species > 150 Cm.	11.8	146
11.9 Felling cycle	Felling cycle of 10 years calculated on Smythies safeguard formula.	11.9	147
11.10 Rotation	Sequence of felling 1. Demarcation of annual coupes. 2. Marking rules. 3. Execution of marking and felling.	11.10	147
11.11 Calculation of yield.	The yield has been regulated by area with a percentage check as removal of selection trees arrived at by Smythie's safeguard formula.	11.11	147
11.12 Felling Series	There are seven felling series covering the entire area of Working Circle.	11.12	149
11.13 Sequence of felling	Felling will be done in annual coupes of seven felling series.	11.13	157
11.14 Method of Execution of felling and demarcation	Demarcation of coupe will be done before felling. Demarcation of annual coupes Marking rules Execution of felling	11.14	157
11.15 Subsidiary Silvicultural Operations	1. Post felling operations 2. Treatment plan and map 3. Annual action plan	11.15	159
11.16 Control	Compartment histories, control forms and other records shall be maintained for each selection coupe, compartment and felling series in accordance with the provision of the Working Plan Code.	11.16	160

	11.17 Miscellaneous Regulations	Grazing and lopping is strictly prohibited. Efforts shall be made to maintain coupe lines as fire lines every year.	11.17	160
	11.17.1 Grazing	Grazing shall be regulated.		
	11.17.2 Fire protection	For taking suitable fire protection.		
	11.17.3 Rights and Concessions	As per Orissa Forest Act 1972, rights and concession shall be regulated.		
	11.17.4 Sample plots	Sample plots will be laid.		
	11.18 Working Norm	23,221.99 ha areas is covered under Selection Working Circle.	11.18	160
	11.19 Intermediate revision	Intermediate revision may be taken up during the plan period, if required.	11.19	161
12 Rehabilitation Working Circle	12.1 General Constitution	Forest blocks having valuable crops in depleted condition in bushy form and at various stage of degradation.	12.1	162
	12.2 Character of Vegetation	1. To improve the density and composition of forest crop and to encourage natural regeneration and establishment of principal species. 2. To emphasize on soil and water conservation. 3. To maintain and improve the bio-diversity of forest blocks. 4. Obtain sustained yield. 5. To carry out cleaning operations with climber cutting.	12.2	162
	12.3 Special objectives of management	1. To enrich the micro-edaphic conditions. 2. Improve the existing growing stock 3. To regenerate the barren and blank patches 4. Soil and moisture conservation. 5. Encourage natural regeneration. 6. To boost up growth of Sal and other valuable species of coppice origin. 7. To provide adequate protection to the areas having root stock. 8. To meet the bonafide needs of local inhabitants.	12.3	163
	12.4 Area statement and rehabilitations series.	Area =98381.38 ha.	12.4	164
	12.5 Analysis and valuation of crop	Degraded forest will be improved through rehabilitation measures.	12.5	169
	12.6 Silvicultural system	No silvicultural system is prescribed.	12.6	169
	12.7 Choice of species	Suitable species shall be planted.	12.7	169
		Soil conservation measures		
		Choice of species will be site specific.		
	12.8 Rehabilitation cycle	Ten year cycle.	12.8	172
	12.9 Calculation of yield	No yield is prescribed.	12.9	172
	12.10 Sequence of rehabilitation operations	31 Rehabilitation series divided into ten years have been constituted.	12.10	172
	12.11 Method of execution of rehabilitation operations	Demarcation of Annual Rehabilitation Area	12.11	172

	12.12 Preparation of Treatment map	Annual rehabilitation area shall be shown on treatment map.	12.12	173
	12.13 Treatment Plan	Each rehabilitation coupe shall be treated for four years.	12.13	174
	12.14 Execution of Rehabilitation Method	Rehabilitation measures will be done in annual coupes.	12.14	174
	12.15 Rehabilitation Operations	Fencing shall be taken up to protect forest.	12.15	176
	12.16 Rehabilitation in different series	Plantation will be taken up according to Rehabilitation series.	12.16	177
	12.17 Control	Control will be exercised by maintaining records.	12.17	177
	12.18 Miscellaneous Regulations	Grazing and fire will be controlled.	12.18	177
	12.19 Rights and concessions	As per Govt. Rules in force.	12.19	178
	12.20 Working norm	Rehabilitation measures will be taken up @ Rs.40,560/- per hectare.	12.20	178
	12.21 Intermediate Revision	May be reviewed after 5 years.	12.21	180
13 Protection Working Circle.	13.1 Protection Working Circle	The areas having little or no vegetation are included in this circle.	13.1	181
	13.2 General Observation and vegetation	Ecologically fragile areas of high hills around reservoirs susceptible to environmental degradation. The forest blocks under pernicious practice of shifting cultivation in the past with little or no vegetation.	13.2	181
	13.3 Special Objectives of management	1. To keep delicate and eco-sensitive areas ecologically intact by maintaining adequate vegetative cover especially in the catchment areas. 2. To rehabilitate the forest area.	13.3	181
	13.4 Area Statement and treatment series	48381.08 hectares.	13.4	181
	13.5 Analysis and valuation of crop	The plantated stock is not up to mark. No exploitation has been done.	13.5	183
	13.6 Silvicultural Systems	No felling will be done. Wind fallen and uprooted trees may be removed.	13.6	183
	13.7 Protection cycle	The cycle is fixed at 10 years, which synchronizes with the Working Plan.	13.7	184
	13.8 Calculation of yield	No yield is prescribed.	13.8	184
	13.9 Methodology and execution operations	Action plan will be prepared depending upon the protection measures required.	13.9	184
	13.10 Forest protection measures	1. Regular monitoring will be done by staff. 2. Grazing and browsing shall be stopped.	13.10	184
	13.11 Control	The journals and other records will be maintained for each protection coupe in accordance with Orissa Forest Plantation Manual 1972.	13.11	185
	13.12 Miscellaneous regulation	Full protection will be provided from fire and grazing	13.12	185
	13.12.1 Grazing	Annual rehabilitation areas and new plantation shall be closed to grazing for a minimum period of 5 years.		
	13.12.2 Fire Protection	The entire rehabilitation area should be rigidly protected from fire hazard.		

	13.13 Rights and Concessions	Rights and concessions shall be regulated as per the existing provisions of Government policy.	13.13	185
	13.14 Working norms	1. The total area under Protection Working Circle is 20054.03 ha. 2. The total annual requirement under this circle will be Rs.40 lakhs per year with subsequent rise of 10% every year.	13.14	186
	13.15 Intermediate revision	Any change in the prescription of the Working Circle, if anticipated by CF, may be reviewed after five years.	13.15	186
14 Plantation Working Circle	14.1 General Constitution	This Working Circle includes areas having blank/stretchers of forest blocks allotted under Rehabilitation Working Circle in the outgoing plan.	14.1	187
	14.2 General observation and vegetation	The area devoid of forest growth, bearing scattered gress patches and bushy growth widely distributed through out the Division.	14.2	187
	14.3 Special objectives of management	1. To reforest all barren areas and restock the degraded areas. 2. To maintain and tend the existing plantations. 3. To enhance the land productivity through soil and moisture conservation measures. 4. To increase the biodiversity. 5. To prevent soil erosion and conserve soil moisture.	14.3	188
	14.4 Analysis and valuation of crop	The planted stock is not up to mark. No exploitation has been done.	14.4	188
	14.5 Area allotment and planting series	Range wise distribution of blocks allotted to this working circle. Area- 17393.55 Ha.	14.5	188
	14.6 Silvicultural System	No silvicultural system is prescribed.	14.6	190
	14.7 Choice of Species	Local and indigenous species will be planted.	14.7	190
	14.8 Plantation Cycle	Ten years cycle is prescribed.	14.8	193
	14.9 Calculation of Yield	The yield shall be regulated according to area and exploitable class of trees.	14.9	193
	14.10 Table of Operation	The site-specific table of operation will be prepared by DFO.	14.10	193
	14.11 Method of execution of planting operations	According to plantation norm plantation will be taken up.	14.11	193
	14.11.1 Preparation of site, treatment and plan	A site map in the scale 1:25,000 will be prepared.		
	14.11.2 Nursery	Permanent nurseries shall be started for raising seedlings.		
	14.11.3 Collection of seeds	The assessment of seedlings to be raised in the nursery for gap and block planting purpose should be made.		
	14.11.4 Preparation of nursery bed	Nursery beds shall be prepared mixed with farmyard manure or with suitable fertilizers. Seeds will be sown in beds.		
	14.11.5 Stacking, pitting and planting	Completion of site preparation, operations like alignment, stacking, pitting and planting should be done.		
	14.11.6 Post planting	Two weeding should be carried out in the year of planting.		

	operations			
	14.11.7 Method of execution of planting	Plantation technique and operations should be carried out in accordance with guide lines in “The Forest Plantation Manual, 1977”.		
	14.11.8 Demarcation of Annual plantation area	1. The annual plantation coupes shall be demarcated in the Winter Season. 2. The plantation coupe shall be indicated by sign boards at corners or at point of inter section with roads. 3. The patches selected for block plantation should have at least 4.0 ha of area.		
	14.11.9 Control	The observation on growth, mortality, insect attack and damage should be recorded in the Plantation Journals.		
	14.12 Subsidiary Silvicultural operation	The young plantations need regular attention. Generally they are left uncared till first thinning.	14.12	196
	14.13 Treatment of Existing Plantation	Cleaning, pruning etc.	14.13	196
	14.14 Miscellaneous Regulation	14.14.1 Grazing: New plantation shall be closed to grazing for a minimum period of 5 years.	14.14	197
		14.14.2 Fire Protection: The area should be rigidly protected from fire.		
	14.15 Rights and Concession	No rights and concessions shall be allowed in this circle.	14.15	198
	14.16 Annual costs of operations and working norm	Annual cost of operations and working will be the norm as prescribed by the Principal Chief Conservator of Forests, Orissa. It is recommended at Rs. 64,090/- per hectare.	14.16	198
	14.17 Intermediate Revision	Prescriptions may be reviewed and revised after five years by the reviewing authority.	14.17	199
15. Bamboo (Overlapping) Working Circle.	15.1 General Constitution	Forest blocks having good bamboo potential are included.	15.1	200
	15.2 Character of Vegetation	Two species of bamboo are found mainly in the forest of this division.	15.2	200
	15.3 Special objectives of Management.	1. Systematic management for sustained yield. 2. To rehabilitate the degraded bamboo areas. 3. Meet the demand of paper mills. 4. Generation of employment.	15.3	201
	15.5 Analysis and valuation of the crop	Detailed survey and enumeration was carried out in 12 Forest Blocks	15.4	201
	15.5 Enumeration	Five sample plots of one hectare forest blocks were taken for enumeration of clumps and culms.	15.5	202
	15.6 Working of Bamboo	Healthy and well-stocked bamboo clumps shall be worked.	15.6	205
	15.7 Delineation of Bamboo area into treatment types and quality classes	Forest blocks have been divided into three treatment types and quality class	15.7	207
	15.8 Clump and culm analysis	Twelve Forest Blocks were enumerated.	15.8	208
	15.9 Allotment of the area	Area allotted to Bamboo (Overlapping) Working Circle is 30361.95 ha.	15.9	209
	15.10 Construction of Bamboo cutting series	Bamboo coupes will be opened for working from October to June.	15.10	209

	15.11 Sequence of felling	Constitution and time table of cutting series	15.11	209
	15.12 Estimated yield from bamboo coupes	Yield estimate from different bamboo coupes.	15.12	210
	15.13 Financial Forecast	The financial forecast for demarcation of bamboo coupes and silvicultural operation is done for different years.	15.13	211
	15.14 Morphological characters of culms	Morphological character with age of each culm is essential for framing cutting rules.	15.14	213
	15.15 Subsidiary Silvicultural Operations	Simultaneous silvicultural operations Improvement of bamboo forest Treatment of gregariously flowered areas	15.15	214
	15.16 Control	Necessary entries will be made with regard to works taken up in bamboo coupes.	15.16	215
	15.17 Miscellaneous Regulations	Area treatment will be done. Stone packing shall be done in down hillside of clump to conserve water.	15.17	215
	15.18 Grazing and Fire Protection	Grazing and fire are prohibited	15.18	215
	15.19 Intermediate revision.	Intermediate revision may be taken up after inspection.	15.19	215
16. Non-Timber Forest Produce (Overlapping) Working Circle.	16.1 General Constitution.	All forest blocks are covered.	16.1	216
	16.2 General observation and vegetation	1. Collection as per Government policy. 2. Productivity of various N.T.F.P. items. 3. Protect and promote regeneration. 4. Development of N.T.F.P. based industries. 5. Involving people for employment and income.	16.2	216
	16.3 Special Objectives of Management.	Sustainable collection, extraction and utilization of N.T.F.P. in consistence with Govt. Policy. Develop market and industry for NTFP and generate employment.	16.3	217
	16.4 Utility of N.T.F.P. items	1. Consumable, medicinal and commercial. 2. Consumed by rural people and local inhabitants.	16.4	217
	16.5 Area Allotment	The area of (overlapping) working circle is 101549.34 hactares.	16.5	218
	16.6 Collection	Most of the NTFP items available in this division have one-year collection cycle.	16.6	218
	16.7 Working of important NTFPs and some prescription for improvement	Kendu leaf Mohua flowers and seed Sal seed The TDCC Ltd. has been given long-term lease for NTFP items. Medicinal plants	16.7	218
	16.8 Statistics of growth and yield	The official production figures do not reflect the actual production of N.T.F.P. items.	16.8	219
	16.9 Incidence of smugglings	The illicitly smuggled NTFP items do not contribute to revenue of the division.	16.9	220
	16.10 Future Management	Collection of NTFP items by scientific methods Seed based Leaf based Bark based Gum and resin based Root based	16.10	220

	16.11 Measures to improvement production of NTFP items	The growth of existing NTFP yielding species is to be boosted by taking suitable silvicultural measures.	16.11	221
	16.12 Extensive research and study relating to NTFP items	Research and study will be done to improve production	16.12	222
	16.13 Ensuring proper remuneration to primary collectors	Government policy shall be enforced.	16.13	222
	16.14 Working of major NTFP and some suggestions of improvement	Kendu leaves Sal seed Siali leaves and fibre Myrobalans Genduli gum and other gums Hill brooms Mahua flowers and seeds Tamarind Amba Kochila (Nux Vomica) Cashew	16.14	223
	16.15 Miscellaneous Regulations	Fire and biotic interference shall be controlled.	16.15	225
	16.16 Rights and concessions	The tribals and local inhabitants have right to collect all NTFP item for their own consumption	16.16	225
	16.17 Working norm	Working norm as fixed by Govt. for unskilled labour will be norm for collection of NTFP items shall be followed	16.17	226
	16.18 Necessity for intermediate revision	Intermediate revision is not anticipated.	16.18	226
17. Village Forest Working Circle	17.1 General Constitution	All the plantation areas raised by Social Forestry Project, Sundergarh Division have been declared as village forest by the State Govt.	17.1	227
	17.2 Area	146 nos. of village forest covering an area 1048.10 ha.	17.2	227
	17.3 Special objectives of management	1. Improve and regenerate the village forest areas. 2. Provide benefit from such forest to village community. 3. Management of forest in accordance with resolution on J.F.M.	17.3	227
	17.4 Method of management	Govt. has formulated the frame work of operation	17.4	227
	17.5 Treatment Series	Most of the plantations have scattered patches with coppice shoots coming up from stumps.	17.5	231
	17.6 Analysis and valuation of crop	As fixed by village committee.	17.6	231
	17.7 Silvicultural system	No silvicultural system. Only protection is required.	17.7	231
	17.8 Choice of Species	Miscellaneous species with medicinal plants species will be planted.	17.8	232
	17.9 Cycle	10 years cycle	17.9	234
	17.10 Calculation of yield	Yield will be controlled and regulated by village committee.	17.10	234
	17.11 Table of operation	Climber cutting, singling of shoots and other site-specific improvement measures may be taken up.	17.11	234
	17.12 Method of execution of operations	No operation is required.	17.12	235
	17.13	Old microplans will be up dated and new	17.13	235

	Management prescriptions	requirement will be added.		
	17.14 Control	The journals and records shall be maintained and control shall be exercised through village committee.	17.14	235
	17.15 Miscellaneous Regulations	Grazing Fire Protection	17.15	235
	17.16 Rights and concessions	Rights and concessions shall be regulated as per existing provisions of the Government.	17.16	235
	17.17 Working norm	Rs. 1000 per hectare and annual requirement of fund will be 1.05 lakhs per year.	17.17	235
	17.18 Intermediate revision	It may be reviewed by CF if required after five years.	17.18	235
18. Wild Life (Overlapping) Working Circle	18.1 General constitution	All forest blocks having importance of wildlife and recreation have been included in this circle.	18.1	236
	18.2 Objectives of management	1. Improvement of the habitat of Wildlife. 2. To create more water sources and salt licks. 3. Conservation and preservation of the diversity of flora and fauna. 4. To educate and create awareness. 5. To conserve and develop the existing pre-historic sites for eco-tourism.	18.2	236
	18.3 Strategies	To help visitors develop awareness, understanding and appreciation of the area being visited. To make their experience enjoyable. To evoke positive response in them towards conservation of natural, historical and cultural sites. To achieve management goals. To build public support for the area	18.3	236
	18.4 General character of vegetation	The biodiversity of flora and fauna has been affected adversely due to fragmentation of habitat.	18.4	237
	18.5 Special objectives of management	To conserve, protect and improve wild life habitat. To increase biodiversity. To help prevent wild life crime.	18.5	237
	18.6 Analysis and evaluation	Wild life habitat has fragmented and reduced to very high extent and efforts shall be made to improve the habitat and bio-diversity in area.	18.6	237
	18.7 Area and allotment	Area: 121603.37 hectares.	18.7	238
	18.8 Species structure	Miscellaneous/Deciduous types of forest contain many species of wild animals.	18.8	238
	18.9 Poaching and wild life crime	Poaching of wild animals, capture, possession, transport and trade shall be stopped.	18.9	239
	18.10 Maintaining special habitats	Snags, snag recruits, down wood, large old trees, trees with buttresses, lianas, climbers, fruit bearing trees, roosting and nesting trees will be protected.	18.10	240
	18.11 Development of habitat	Improvement of cover, availability of food and salt licks etc shall be developed.	18.11	241
	18.12 Classification of habitat	Three types of habitats depending upon their deterioration have been discussed. Efforts will be made to improve food and water availability to animals along with other protection measures.	18.12	242
	18.13 Animal depredation	Animal depredation, crop damage and man-animal conflict has been discussed.	18.13	244
	18.14 Research	Research is required on migration, health, disease, population dynamics and endangered species.	18.14	245
	18.15 Common wild life	Common wild animals of Division are mentioned.	18.15	245

	18.16 Sanctuaries and National Parks	There is no sanctuary or National Park in this division. It has been proposed to create one sanctuary at Hemgir by merging areas of seven RF.	18.16	247
	18.17 Wild life Rules	Wild life rules are enforced from time to time.	18.17	248
	18.18 Works of improvement	Improvement measures have been suggested.	18.18	248
	18.19 Management Plan	The management plan shall be prepared for new sanctuary.	18.19	250
	18.20 Migration of elephants and corridors	Four migration routes of elephants have been shown from nearby forest areas. Revival of habitat corridors will increase the number of elephants and stop habitat fragmentation.	18.20	251
	18.21 Wild life protection measures	Protection and anti-poaching measures are being taken.	18.21	252
	18.22 Financial requirements	Financial requirement for the plan period is Rs. 85 lakhs and Rs. 9.00 lakhs is required every year.	18.22	253
	18.23 Miscellaneous regulations	Control of grazing Fire protection measures Incentives and rewards Rights and concessions	18.23	254
	18.24 Intermediate revision	Intermediate revision may be taken up after five years on the recommendations of CF.	18.24	254
19. Eco-Restoration (Overlapping) Working Circle	19.1 Objectives	Eco-restoration is the prime objective for bringing the eco-system to normalcy. Plantations under different schemes, providing employment to local people and economic upliftment of the poor are part of objectives. Wild life is an integral part of the forest and performs important functions, develops awareness and understanding of the area.	19.1	255
	19.2 Issues and problems	The relentless biotic pressure by humans and domestic cattle has adversely affected the biodiversity of flora and fauna and habitat has been fragmented.	19.2	256
	19.3 Strategies	Eco-tourism committees will be constituted and interpretation centre will be constructed to bring awareness among people. Awareness about natural, historical and cultural heritage among people shall be taken up. Adequate employment opportunities shall be provided to rural people.	19.3	256
	19.4 Self-guided trails	Self-guided trails bring people in direct contact with nature and forest resources.	19.4	256
	19.5 Identification of the zones	Eco-tourism zones shall be developed.	19.5	256
	19.6 Local area development	Eco-restoration will make people self-reliant and people's participation shall be ensured.	19.6	257
	19.7 Development of Eco-Tourism	Eco-tourism will educate the people about forest, wild life and environment.	19.7	257
		19.7.1 The caves inside forest shall be revived and developed to educate people about bio-aesthetic values.		
	19.8 Temples	The temples inside forest shall be developed to educate people about bio-aesthetic values.	19.8	260
	19.9 Dams	The dams shall be developed for picnic and recreation of the people.	19.9	261
				261
	19.10 Eco-development measures	To conserve, protect and improve wild life habitat with special emphasis on the proposed sanctuary area and corridor for elephants. To promote wildlife in general and endangered species in particular. To conserve and develop important	19.10	264

		wildlife habitat for the purpose of eco-tourism. Increase in biodiversity and wildlife population has been recommended. Scientific study on food and feeding habits of important target species has been mentioned. Scientific study on intra and inter-specific relations and population dynamics of important target species shall be taken up.		
	19.11 Budget	The budget includes requirements of funds for development of proposed Hemgir Sanctuary. The development measures have been proposed for Rs. 9.00 lakhs per annum.	19.11	267
	19.12 Miscellaneous regulations	Control of Grazing Fire Protection Measures Incentives and Rewards Rights and Concessions	19.12	267
	19.13 Intermediate revision	No intermediate revision is anticipated. In case of need it may be revised.	19.13	267
20. Miscellaneous regulations	20.1 Forest check gates	List of check gates	20.1	268
	20.2 List of buildings	List of buildings (Range wise)	20.2	268
	20.3 List of forest road	Name and length of the forest roads.	20.3	271
21. Establishment and labour	21.1 Establishment and labour	Field staffs and ministerial staffs including distribution of sections, beats and ranges	21.1	273
	21.2 Labour Supply	Wages of skilled and un-skilled labour	21.2	274
22 Financial forecast	22.1 Establishment	Estimate of the cost of establishment	22.1	275
	22.2 Treatment of Selection Working Circle	Total area under Selection working circle is 23,221.99 ha.	22.2	275
	22.3 Treatment of Rehabilitation Working Circle	Total area under Rehabilitation working circle is 98381.38 ha.	22.3	275
	22.4 Treatment of Protection Working Circle	Treatment under Protection Working Circle is recommended for 20054.03 hectares of area of RF, PRF and DPFs.	22.4	278
	22.5 Treatment of Plantation Working Circle	Total area under Plantation working circle is 17393.55 ha.	22.5	278
	22.6 Treatment of Bamboo (Overlapping) Working Circle	Total area under Bamboo (overlapping) working circle is 30361.95 ha.	22.6	281
	22.7 Treatment of NTFP Working Circle	Total area under NTFP (overlapping) working circle is the geographical area of the division.	22.7	282
	22.8 Treatment of Village Forest Working Circle	Total area under Village Forest working circle is 1048.10 hectares.	22.8	282
	22.9 Treatment of Wild life (Overlapping) Working Circle	Total area under Bio-aesthetic working circle is 121603.37 hectares.	22.9	282
	22.10 Treatment of Eco-Restoration (Overlapping) Working Circle	Total area under Eco-restoration working circle is 121603.37 hectares.	22.10	283
	22.11 Collection of timber,	Rs.5 lakhs is required every year for collection of timber etc with subsequent rise of 10 percent every	22.11	283

	firewood and irregular exploitation.	year.		
	22.12 Maintenance of boundary	Total length of the boundary is 1379.16 Km.	22.12	283
	22.13 Maintenance of forest roads	Forest roads maintenance requires about Rs.10000 per km per annum.	22.13	283
	22.14 Forest Consolidation	26 PRF blocks having an area of 5580.79 ha are in the process of consolidation.	22.14	283
	22.15 Infra-structure maintenance	Replacement of old vehicle, maintenance of VHF sets and purchase of arms and ammunition are required.	22.15	284
	22.16 Buildings	The condition of buildings is deplorable and many quarters require immediate renovation.	22.16	284
	22.17 Library, equipments, maps and tools	To be maintained in Division Office.	22.17	284
	22.18 Miscellaneous regulations	Proper care will be taken for improvement of forest and wildlife.	22.18	284
	22.19 Projected cost of the Plan	Estimated cost of the working plan.	22.19	284
	22.20 Cost benefit analysis	Benefits from forests.	22.20	284
	22.21 Forest revenue	Past forest revenue collected.	22.21	285
	22.22 Cost of the Plan	The cost of plan has escalated due to lack of allotment.	22.22	286
