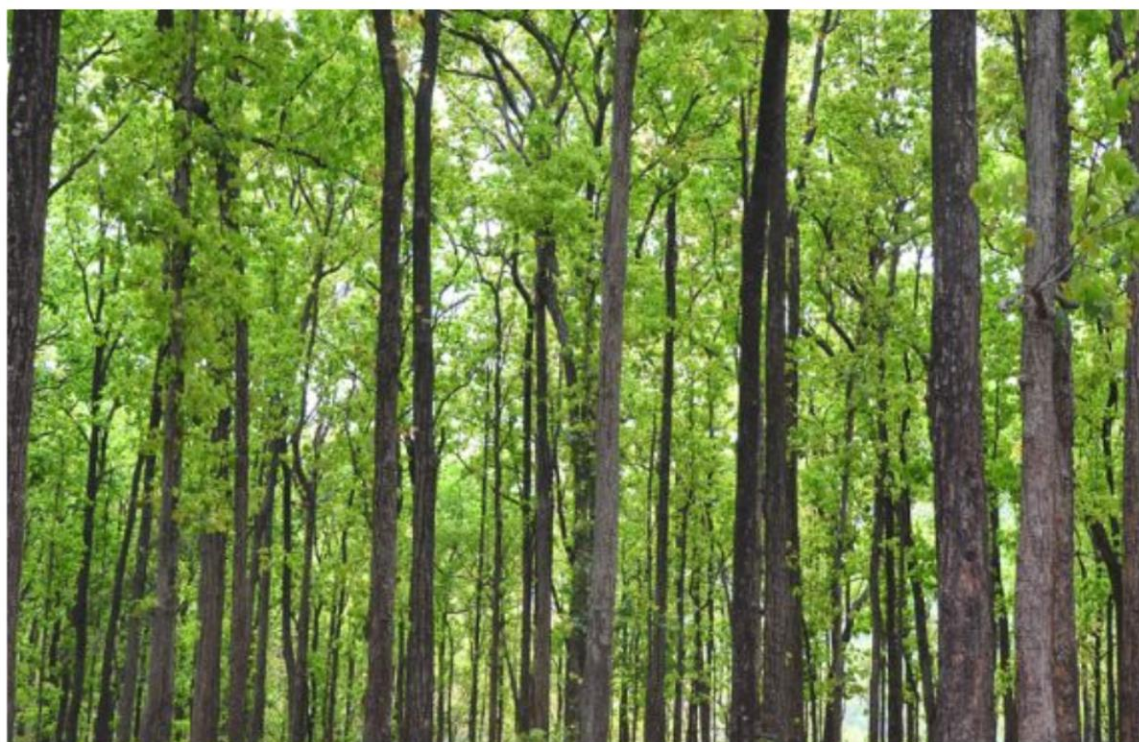




WORKING PLAN OF RAIRANGPUR DIVISION



For the Period 2021 to 2031

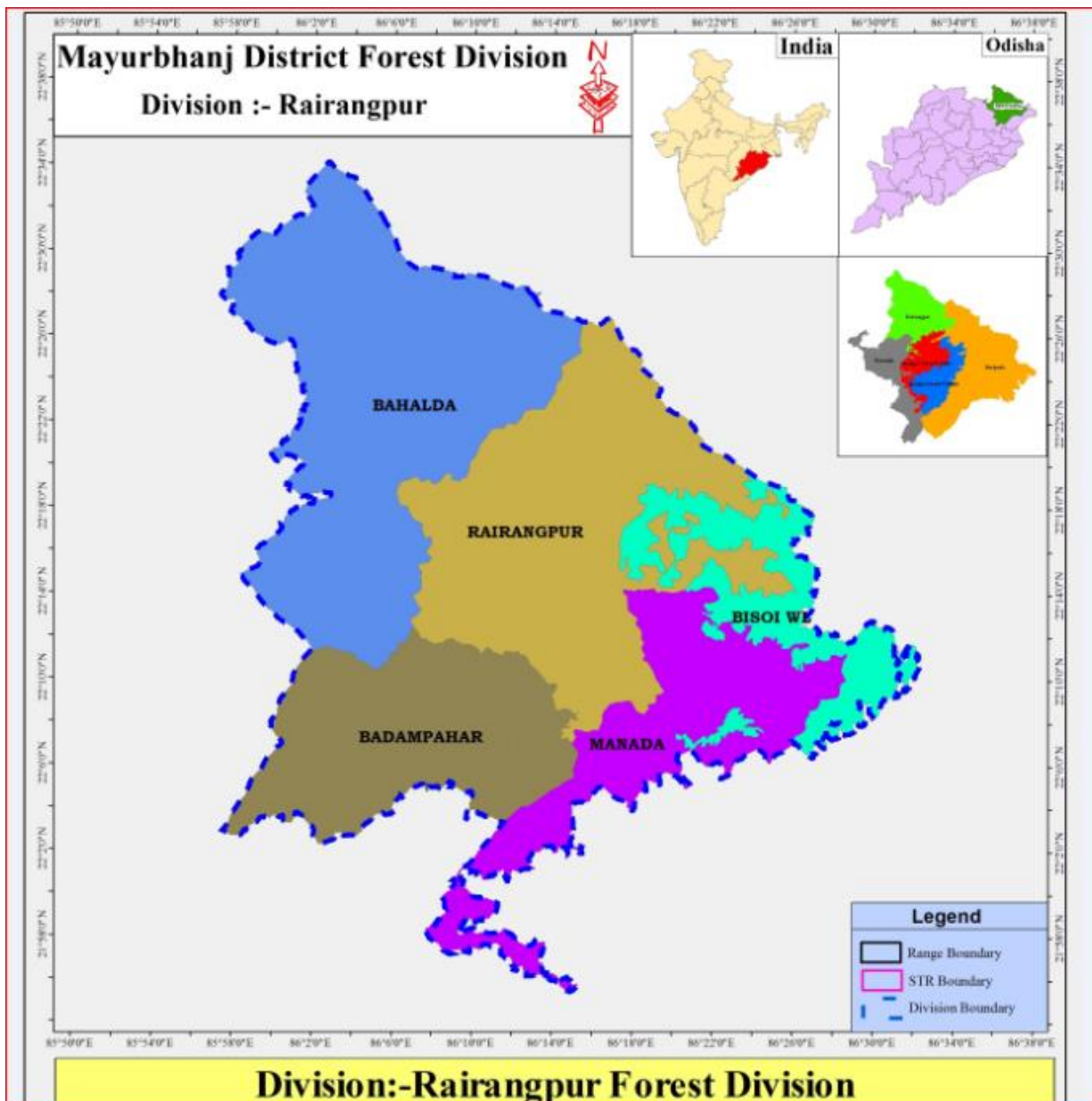
By

Dr. Arun Kumar Mishra, IFS

DIVISIONAL FOREST OFFICER, RAIRANGPUR DIVISION.



Working Plan of Rairangpur Forest division (2021 to 2031)





Working Plan of Rairangpur Forest division (2021 to 2031)





AUTHORS' PREFACE

Rairangpur Forest Division has been created on 1.10.2003 after re-organization of forest department. The Division was carved out from Karanjia Forest Division. Subsequently the Government vide notification no 1F- (A)-71/2018-3913/ F&E dated 21.02.2019 further reorganized the Division with consideration to Boundary of Similipal Tiger Reserve. By that time the Preliminary Working Plan Report was finalized and approved. The outgoing working plan by Sri A.O.F.Bakhla, IFS was for the reserved forests of this division only. The present plan has been prepared comprising all the Reserved Forests, Proposed Reserved Forest, Demarcated Protected Forest and Protected forest. The total geographical area of Rairangpur Division is 2002.48 Sq. Km after re-organization. The total forest area proposed for management is 441.98 sq. km which is about 22.07% of the total Geographical area.

This is the first plan for Rairangpur Division containing all forest areas under departmental administration. The forests under consideration are passing through a crucial stage where the crop is at young stage and few matured trees are available to be managed as seed bearers to sustain a high forest system. Further participatory forest management is gaining momentum all over the division matching with the footsteps in the State.

In my previous assignments as Divisional Forest Officer, I had an opportunity for preparing / associating in preparation of PWPR for Athgarh Division. The experience gathered in preparing PWPR and during management of Forests of Sundargarh Division helped me to assess the potentiality of the Forests of Rairangpur Division within a short period and tried my best to incorporate best possible management practices suitable to the forests of the division.

The present plan for the period 2021-22 to 2030-31 is prepared by utilizing the benefits of Modern techniques, Satellite imagery interpretation, GIS facilities of Forest Head quarters with the support of many individuals, organizations directly or indirectly. It is a great privilege and opportunity on my part to write the first working plan of this Division after its reorganization basing on the National Working Plan Code 2014. The ORSAC and the NRSA, Hyderabad have played a crucial & vital role using the Remote sensing techniques for selecting sample points, collections of primary data from sample points and its analysis for calculating the growing stock and preparation of Maps. Due to their extensive help and co-operation, it could be possible to write the plan within a small span of time.

I extend my heartfelt thanks to my predecessor Sri Gorakh Kalunge, IFS, who had drafted the PWPR. I am indebted to Sri H.K. Bist, IFS, Ex- Field Director, Similipal Tiger Reserve-cum-



Working Plan of Rairangpur Forest division (2021 to 2031)

Regional Chief Conservator of Forests, Baripada who had taken a lot of pain in giving proper shape to the PWPR and guiding principles in finalizing the working circles.

I am very much thankful to Sri Sandeep Tripathy, IFS, Principal Chief Conservator of Forests & HoFF, Odisha, Sri AK Jaiswal, IFS Conservator Forest (Working Plan) for their inspiration and valuable guidance from time to time in drafting the working plan.

Credit must go to Sri Bhimasen Maharana, Rtd. DFO of this Department for sharing his vast knowledge in preparation of working plan. His effort is extremely commendable.

Sri Amitav Brahma, IFS, Field Director, Similipal Tiger Reserve-cum- Regional Chief Conservator of Forests, Baripada has guided with his valuable suggestion on forest management. I extend my sincere thank for sharing his valued experience.

I am thankful to Heads of different line Departments of the District like Agriculture and water resource for providing required information on ground water related information.

I am thankful to all Range Officers, Foresters, Forest Guards, ministerial staffs and Data entry operators of this Division for their Valuable assistance for bringing out this plan to lime light.

Sri Purna Chandra Samal Retired Forest Ranger has contributed his best for compilation of required information for this plan and deserves all praise and commendation who has worked as an architect of this plan.

I hope, this Plan will lead to a sustainable management of Forest resource and act in a direction of checking the global Climate Change. It will provide vital guidance to field staffs, managers, planners, readers, Research scholars working in the field of Forestry & Wildlife.

At the end, once again I extend my heartfelt thanks and appreciation to all for their cooperation.

**Dr. Arun Kumar Mishra, IFS
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1. Abbreviations used:

AJY	Aama Jungal Yojana
ANR	Aided Natural Regeneration
Bd.TS	Badamtalia TS Treatment Series
Bg.IS	Budhabalanga Improvement Series
BGL	Below Ground Level
Bh.TS	Bhitaramda Treatment Series
BIS	Badabantha Improvement Series
Bn.IS	Bidhubhandar Improvement Series
BPS	Bahalda Planting series
Br.TS	Brahmani TS Treatment Series
BTS	Badampahad Treatment Series
Bu.TS	Budheirana Treatment Series
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CBD	Convention on Biological Diversity
CCF(P&SM)	Chief Conservator of Forests (Protection & Sustainable Management)
CDW	Community Development Works
CGWB	Central Ground Water Board
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DIS	Dublabeda Improvement Series
DLC	District Level Committee
DPAP	Drought Prone Area Program
DPF	Demarcated Protected Forest
DTS	Dhaupani Treatment Series
EAC	Environment Impact Assessment Committee
EDC	Eco Development Committee
EIA	Environment Impact Assessment
EPA	Entry Point Activities
F&E	Forest & Environment Department
F.W	Fire Wood
FAO	Food and Agriculture Organization
FDA	Forest Development Agency
FSI	Forest Survey of India



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FYM	Firm Yard Manure
GCF	Green Climate Fund
GDP	Gross Domestic Product
GHG	Green House Gas
GIS	Guddamura Improvement Series
GIS	Geographic Information Systems
GPS	Global Positioning System
GTS	Gorumahisani Treatment Series
IGA	Income Generation Activities
IUCN	International Union for Conservation of Nature
IWC	Improvement Working Circle
Ja.TS	Jari TS Treatment Series
JFM(O)WC	Joint Forest Management (Overlapping) Working Circle
JTS	Jharan TS Treatment Series
Ka.TS	Kanapa TS Treatment Series
KIS	Kanapat Improvement Series
KTS	Kherna TS Treatment Series
LBCD	Loose Boulder Check Dams
LIDAR	Light Detection and Ranging
LPG	Liberalization, Privatization and Globalization
MAP	Medicinal & Aromatic Plant
MBTS	Manada – Bisoi Treatment Series
MFP	Minor Forest Produce
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MIS	Mahubhandar Improvement Series
MTS	Manbir Treatment Series
NAP	National Afforestation Program
NDC	National Development Council
NGO	Non Government Organization
NITI	National Institution for Transforming India
NTFP	Non Timber Forest Produce
NTFP(O)WC	Non Timber Forest Produce (Overlapping) Working Circle
OFSDP	Odisha Forest Sector Development Projct.
ORSAC	Odisha Space Application Centre



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PCCF	Principal Chief Conservator of Forests.
PF	Protected Forest
PI	Performance Indicator
PRA	Participatory Rural Appraisal
PRA	Participatory Rural Appraisal
PRF	Proposed Reserved Forest
PRI	Pabchyat Raj Institutions
PTS	Patijhari Treatment Series
PWC	Plantation Working Circle
PWD	Public Works Department
QPM	Quality Planting materials
RATS	Ramgarh Asurghaty Treatment Series
REDD+	Reduce Emissions from Deforestation and forest Degradation
RF	Reserved Forest
RIS	Rajabasa Improvement Series
RPS	Rairangpur Planting series
RRA	Rapid Rural Appraisal
RTS	Radho Treatment Series
RWC	Rehabilitation Working Circle
SAPs	Special Action Plans
SDG	Sustainable Development Goal
SFP	Social Forestry Project
SHG	Self Help Groups
SIS	Sunajodia Improvement Series
Sk.IS	Sanakacha Improvement Series
SMC	Soil & Moisture Conservation
SOM	Standard Operating Method
Sr.IS	Sarali Improvement Series
TDCCOL	Tribal Development Cooperative Corporation Ltd
TIS	Tunguru Improvement Series
TOF	Tree outside the Forest
Tr.TS	Tirilipi Treatment Series
TTS	Tiring TS Treatment Series
UGC	University Grants Commission



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UNFCCC	United Nations Framework Convention on Climate Change
VF	Village Forest
VFC	Village Forest Committee
VFDF	Village Forest Development Fund
VSS	Vana Surakshya Samiti
VWPS	Village Woodlot Planting Series



2. List of Flora:

Sl No	Oriyas Name	Botinicaal Names	Family
Trees			
1	Amba	<i>Mangifera Indica</i>	<i>Anacardicaceae</i>
2	Ambada	<i>Spondias pinnata</i>	<i>Anacaradiasceaeamla</i>
3	Amla	<i>Embilica officinals</i>	<i>Euphorbiaceae</i>
4	Arjun	<i>Terminalia arjuna</i>	<i>Combreateaceae</i>
5	Asan	<i>Terminalia tomentosa</i>	<i>Combreateaceae</i>
6	Ashoka	<i>Saraca indica</i>	<i>Ceassalpinaceae</i>
7	Aswasttha	<i>Ficus religiosa</i>	<i>Moraceae</i>
8	Bahada	<i>Terminali chebula</i>	<i>Combretaceae</i>
9	Baheda	<i>Terimalia belerica</i>	<i>Combretaceae</i>
10	Bana champa	<i>Phoebe lanceolata</i>	<i>Lauraceae</i>
11	Bana karpur	<i>Cinnamomum caudatum</i>	<i>Lauraceae</i>
12	Banakopasia	<i>Kydia xalyxina</i>	<i>Malvaceae</i>
13	Bara	<i>Ficus benghalensis</i>	<i>Moraceae</i>
14	Barsapakor	<i>Grewia sapida</i>	<i>Tiliaceae</i>
15	Bastura/porjo	<i>Litsaea polyantha</i>	<i>Lauraceae</i>
16	Batguri	<i>Ardsia solenadea</i>	<i>Myrsinaceae</i>
17	Bela	<i>Aegle marmelos</i>	<i>Rutaceae</i>
18	Bhali Champaa	<i>Semexarpus anacardium</i>	<i>Anacardiaceae</i>
19	Bhurukunda (Kansa)	<i>Hymeodictyon exexelsum</i>	<i>Rubiaceae</i>
20	Champa	<i>Michelia champaca</i>	<i>Magnoliaceae</i>
21	Champati	<i>Phoyalthia cerasioides</i>	<i>Annonaceae</i>
22	Chandan (sandal)	<i>Santalum album</i>	<i>Santalaceae</i>
23	Chara	<i>Buchanania lanzan</i>	<i>Anacardiaceae</i>
24	Charia	<i>Holopetellia intergrifolia</i>	<i>Ulmaceae</i>
25	Chhatina	<i>Alstonia scholaris</i>	<i>Apocynaceae</i>
26	Dhaura	<i>Anogeissus latifolia</i>	<i>Combretaceae</i>
27	Dimiri	<i>Ficus racemosa / glomeratea</i>	<i>Moraceae</i>
28	Domsal/Gandha palasa	<i>Millius avelutina</i>	<i>Anonaceae</i>
29	Ekwsira/Mukha	<i>Schrebera swietenoides</i>	<i>Reaceae</i>
30	Gambhari	<i>Gmelina arborea</i>	<i>Verbenaceae</i>
31	Genduli	<i>Strexulia urens</i>	<i>Sterculiacease</i>
32	Ghadalanij/Kala Siris	<i>Albizia chinensis</i>	<i>Mimosaceae</i>



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33	Gohira	<i>Acacia leucophloea</i>	<i>Mimosaceae</i>
34	Gudikoik	<i>Mitragyna parviflora</i>	<i>Rubiaceae</i>
35	Gunda-guria	<i>Macarananga peltata</i>	<i>Euphorbiaceae</i>
36	Hinjal	<i>Barringtonia asiatica</i>	<i>Lecythidaceae</i>
37	Hopa/Pita alu	<i>Cochlospermum jossipium</i>	<i>Bixaceae</i>
38	Jagura	<i>Macranga denticulate muella</i>	<i>Euphorbiaceae</i>
39	Jamu	<i>Syzygium cumuni</i>	<i>Myrtaceae</i>
40	Jeuta	<i>Artocarpus lakoocha</i>	<i>Moraceae</i>
41	Kadamba	<i>Anthacephalus cadamba</i>	<i>Rubiaceae</i>
42	Kalchua	<i>Glochidion lanceolarium</i>	<i>Euphorbiaceae</i>
43	kamala gundia	<i>Mallotus philippinensis</i>	<i>Euphorbiaceae</i>
44	kanta buda	<i>Sideroxylon tomentosum</i>	<i>Sapotaceae</i>
45	Kanteikoli	<i>Flacourtia indica</i>	<i>Flacurtiaceae</i>
46	karanja	<i>Pongamia pinnata</i>	<i>Papilionaceae</i>
47	Kasi	<i>Bridelia retusa</i>	<i>Euphorbiaceae</i>
48	Katha kusum	<i>Garuga pinnata</i>	<i>Burseraceae</i>
49	kendu	<i>Diospyros melaanoxylon</i>	<i>Ebanaceae</i>
50	khajur	<i>Phoenix sylvestris</i>	<i>Palmaceae</i>
51	Kia/Mai	<i>Lannea coromandelica</i>	<i>Anacardiaceae</i>
52	Kodalo	<i>Sterculia villosa</i>	<i>Sterculiaceae</i>
53	koim	<i>Adina crodifolia</i>	<i>Rubiaceae</i>
54	Kuchila	<i>Strychnos nuxcomica</i>	<i>Loganiaceae</i>
55	Kultho/Dhaman	<i>Grewia tiliaefolia</i>	<i>Tiliceae</i>
56	Kumbhi	<i>Careya arborea</i>	<i>Lecythidaceae</i>
57	Kusum	<i>Schleichera oleosa</i>	<i>Oleaceae</i>
58	Lodha	<i>Symplocos racemosa</i>	<i>Styracaceae</i>
59	Magaki (Mahala)	<i>Ailanthus exxelsa</i>	<i>Simarubaceae</i>
60	MankarKendu	<i>Diospyros peregrine/ Montana</i>	<i>Ebenaceae</i>
61	Mohul	<i>Madhuca indica</i>	<i>Sapotaceae</i>
62	Moi	<i>Odina wodier</i>	<i>Anacardiaceae</i>
63	Nageswar	<i>Mesua ferrea</i>	<i>Guttiferaceae</i>
64	Nim	<i>Azadiracata indica</i>	<i>Meliaceae</i>
65	Padashi (Karada)	<i>Cleistanthus collinus</i>	<i>Euphorbiaceae</i>



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66	Palash	<i>Butea monosperma</i>	<i>Papilionaceae</i>
67	Panasa	<i>Artocarpus hetrophyllaus</i>	<i>Moraceae</i>
68	Panigambhari	<i>Trewia nuduflora</i>	<i>Euphobiaceae</i>
69	Paniudum	<i>Firmiana colorate</i>	<i>Sterusaceae</i>
70	Paruli	<i>Stereospermum suaveolens</i>	<i>Bignoniaceae</i>
71	Pia sal	<i>Pterocarpus marasupium</i>	<i>Papilionaceae</i>
72	Poijam	<i>Suzygium cerasprdum</i>	<i>Mytraceae</i>
73	Rai	<i>Dillenia pentagyna</i>	<i>Dilleniaceae</i>
74	Rimili,ramohi	<i>Protinm serratum</i>	<i>Bruseraceae</i>
75	Rohini	<i>Soymida febrifuga</i>	<i>Meliaceae</i>
76	Sal (sarigi)	<i>Shorea robusta</i>	<i>Dipterocarpaceae</i>
77	Salai	<i>Boswellia serrate</i>	<i>Burseraceae</i>
78	Sanchukuruchi	<i>Wrightia tomentosa</i>	<i>Asclepidaceae</i>
79	Siali	<i>Bauhinia vahlii</i>	<i>Caesalpiniceae</i>
80	Sidha	<i>Legerstroemia parviflora</i>	<i>Lythraceae</i>
81	Simli	<i>Bombax ceiba</i>	<i>Bombacaceae</i>
82	Siris (Kala)	<i>Albizia lebbak</i>	<i>Mimcsaceae</i>
83	Siris(Dhala)	<i>Albizia procera</i>	<i>Mimcsaceae</i>
84	Sisoo (Plantation)	<i>Dalbergia sisoo</i>	<i>Papilpnaceae</i>
85	Sisoo (Rose wood)	<i>Dalbergia latifllia</i>	<i>Papilpnaceae</i>
86	Soitani	<i>Micromelum minutum</i>	<i>Rufaceae</i>
87	Sojana (Bara baklia)	<i>Dalbergia paniculat</i>	<i>Papilpnaceae</i>
88	Strawbery bush	<i>Euonymus glaber</i>	<i>Celastraceae</i>
89	Sunari	<i>Cassia fistulae</i>	<i>Ceaslapiniaceae</i>
90	Tala	<i>Borassus flabellifer</i>	<i>Palmaceae</i>
91	Teak	<i>Tectona grandis</i>	<i>Verbenaceae</i>
92	Tentuli	<i>Tamarindus indica</i>	<i>Ceaslapiniaceae</i>
93	Toon	<i>Cedrus toona</i>	<i>Maliaceae</i>
Shurbs			
94	Bana Dadri	<i>Hyptianthera stricta</i>	<i>Rusiaceae</i>
95	Banda	<i>Dendrophote falcate</i>	<i>Lorntheceae</i>
96	Bchhuatl	<i>Mucuna prusuens</i>	<i>paplilionaceae</i>
97	Borokoli	<i>Zyziphus maurtitana</i>	<i>rhaamanceae</i>
98	Dhatuki	<i>Woodfrodia dructicosa</i>	<i>lythraceae</i>
99	Kangada	<i>Xylia xylocarpa</i>	<i>mimosaceae</i>



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100	Karanda (Ghrurudu)	<i>Gardenia gummifera</i>	<i>Rubiaceae</i>
101	kuduchi/Kurei	<i>Holarrhena antiyesenterica</i>	<i>Apocynaceae</i>
102	Saromutr	<i>Clerodendron serratum</i>	<i>Verbenaceae</i>
103	Willow (Sali)	<i>Salix tetra soermaa</i>	<i>Salicaceae</i>
Herbs			
104	Bana Saru	<i>Renusa sis vivipani</i>	<i>araceae</i>
105	Bilati Dhania	<i>Eryngium foetidum</i>	<i>Umsollifereceae</i>
106	Chhota Rasna	<i>Globa recemosa</i>	<i>zingibraceae</i>
107	Kalmegh	<i>Anadrographis paniculata</i>	<i>Acanthaceae</i>
108	Manjurijuti	<i>Elephanto pussecber</i>	<i>omposite</i>
109	Palo	<i>Curcuma gromatica</i>	<i>zingiberaceae</i>
110	Paro	<i>Curucumaan gustifiloia</i>	<i>zingiberaceae</i>
Climber			
111	Anantamula	<i>Hemidesmus Indicus</i>	<i>aselepaidaceae</i>
112	Atundi	<i>Combretum decandrum</i>	<i>combretaceae</i>
113	Durkuli	<i>Exycibepeniculate</i>	<i>convoaceae</i>
114	Gaichara (Satabari)	<i>asparagus racemosus</i>	<i>liliaceae</i>
115	Galio	<i>Gnetum labrongs (Galio)</i> (Gymnosperm)	<i>Gnetaceae</i>
116	Gillo	<i>entadas scandens</i>	<i>papilionaceae</i>
117	guadhuni	<i>millettia auriculata</i>	<i>Papilionaceae</i>
118	Lohi Palasa	<i>Burea superba</i>	<i>Papilionaceae</i>
119	Muturi	<i>Smilax macrophylla</i>	<i>Liliaceae</i>
120	Pitaalu	<i>Dioscorea bulbifera</i>	<i>Dioscoreaceae</i>
121	Rajdantani	<i>Smilax zeylanica</i>	<i>Liliaceae</i>
122	-	<i>Pathos scandens linn</i>	<i>Aracaceae</i>
123	-	<i>Cissus rependavahll</i>	<i>Vitaceae</i>
124	-	<i>Dioscorea spp</i>	<i>Dioscoreaceae</i>
Epiphyte			
125	-	<i>Asdisia multiflorum</i>	<i>Orchidaceae</i>
126	-	<i>Dendrobium transparens</i>	<i>Orchidaceae</i>
127	-	<i>Dendrobium aphyllum (Roxb)</i> <i>Ffisser</i>	<i>Orchidaceae</i>
128	-	<i>Luisi atrichorhiza (Blume)</i>	<i>Orchidaceae</i>
129	-	<i>Vanda</i>	<i>Orchidaceae</i>
130	-	<i>Habenaria spp</i>	<i>Orchidaceae</i>



3. List of fauna.

Sl.	English Name	Local Oriya Name	Zoological Name	Status
1	Bison (Gaur)	Gayala	<i>Bos gaurus</i>	Sch. II
2	Barking deer	Kutura	<i>Muntiacus muntjak</i>	Sch. III
3	Chitala / Spotted deer	Harina / Miriga	<i>Axis axis</i>	Sch. III
4	Common mongoose	Neula	<i>Herpestes edwardsi</i>	Sch. II
5	Common giant flying squirrel	Oleibudi	<i>Petaurita phillippensis</i>	Sch. II
6	Four horned antelope	Chausingha	<i>Tetracerus quadricornis</i>	Sch. I
7	Five striped palm squirrel	Gundichimusa	<i>Funambulus pennanti</i>	Sch. IV
8	Fulvous fruit bat	Badudi	<i>Rousettus leschenaulti</i>	Sch. V
9	Striped Hyaena	HetaBagha / Hundala	<i>Hyaena hyaena</i>	Sch. III
10	House rat	Musa	<i>Rattus rattus</i>	Sch. V
11	Indian Wolf	Bheriya	<i>Canis lupus pallipes</i>	Sch. I
12	Indian giant squirrel	Belera Musa	<i>Ratufa indica</i>	Sch. II
13	Indian Elephant	Hati	<i>Elephas maximus</i>	Sch. I
14	Indian Fox	Kokisiali	<i>Vulpes bengalensis</i>	Sch. II
15	Indian flying Fox	Badudi	<i>Pteropus giganteus</i>	Sch. V
16	Indian porcupine	Jhinka	<i>Hystrix indica</i>	Sch. IV
17	Jungle Cat	Banabilei	<i>Felis chaus</i>	Sch. II
18	Jackal	Bilua	<i>Canis aureus</i>	Sch. II
19	Large Indian civet	Kattas	<i>Viverra zibetha</i>	Sch. II
20	Langur, Common	Mankad	<i>Presbytis entellus</i>	Sch. II
21	Leopard	Kalarapatria Bagha	<i>Panthera pardus</i>	Sch-I
22	Leopard Cat	Chita Biradi	<i>Felis bengalensis</i>	Sch. I
23	Mouse deer / Indian chevrotain	Gurandi	<i>Tarangulus meminna</i>	Sch. I
24	Pangolin	Bajrakapta	<i>Manis crassicaudata</i>	Sch. I
25	Ratel / Honey badger	GadaBhalu	<i>Mellivora capensis</i>	Sch. I
26	Panther	Kalarapatria Bagha	<i>Panthera pardus</i>	Sch. I
27	Rhesus macaque	PatiMankada	<i>Macaca mulatto</i>	Sch.II
28	Royle's vole	Hill Rat	<i>Alticola roylei</i>	Sch.V
29	Sambar	Smbar	<i>Cervus unio</i>	Sch. III
30	Sloth bear	Bhalu	<i>Melursus ursinus</i>	Sch. II
31	Small Indian civet	SaliaPatani	<i>Viverricula indica</i>	Sch. IV
32	Small Indian Mongooses	Neula	<i>Herpestes auropunctatus</i>	Sch. IV
33	Short nosed fruit bat	Chemini	<i>Cynopterus brachyotis</i>	Sch. V



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34	Tiger	Mahabala Bagha	<i>Panthera tigris</i>	Sch. I
35	Toddy cat	Kattas	<i>Paradoxurus hermaphroditus</i>	Sch. II
36	Wild dog	BaliaKukura	<i>Cuor alpinus</i>	Sch. II
37	Wild pig	Barha	<i>Sus scrofa</i>	Sch. II





Vision 2031

Rairangpur Division

The present working Plan has been drafted with a vision to achieve different goals on various sectors by 2030-31 i.e. by end of the Plan Period. The Sector wise vision for Rairangpur Division perceived is as follows.

A. Increasing Forest Cover:

The Forest cover in the Division is about 29.82 % of the geographical area. This includes the Revenue Forests. It is aimed to increase the forest cover to 33% of the geographical area by 2030 through plantation on outside the forest area through people's participation on degraded waste land of the district. Farm Forestry, Avenue Plantation and creation of more village forests are the thrust area and there is ample scope to make the goal realistic.

B. Qualitative improvement:

The quality of forest under Forest department's control is to be enhanced from Degraded Forest status to Medium Dense Forest (MDF) through protection & Silvicultural practices. The growing stock per ha is to be enhanced to 90 cum per ha from present level of 70 cum per ha. The skewed crop composition is now heavily tilted towards lower girth class i.e. 30cm-60cm & 60cm to 90cm. Through appropriate silvicultural practices, diameter growth of existing crop will be stressed upon and distribution of trees to higher girth class i.e. above 120cm will be brought to a standard level i.e. above 20% of the total growing stock. Invasion of weeds to our forests will be checked completely allowing natural regeneration to establish.

C. Improvement of bamboo:

Virtually there are no Bamboo forests in this Division. Through plantations attempt have been taken to create bamboo forests as an under growth. It will be our vision to enhance bamboo forests through plantations not only in existing forest blocks but also through Farm Forestry, Forest Development Agency and through Odisha Bamboo Development Agency. By 2030, it is contemplated to popularize bamboo through Farm Forestry and land under Bamboo may achieve at least 1% of the area under private ownership. This seems to be achievable as there are plenty of planted bamboos in villages in private land viz- Bambusa nutans (Badi Bamboo), Bambusa bamboo (Kanta Bamboo), Dendraculomus Strictus (Salia Bamboo).



D. Conservation & Propagation of Wildlife:

Wildlife management will be augmented and people's participation & cooperation to a level of "Safe Wildlife habitat" will be restored. Wildlife habitat will be developed to provide adequate fodder, water and shelter to animals living with the forest. Animal depredation, Man- Animal conflict will be a matter of past. The buffer Zone of Similipal Tiger Reserves under Rairangpur division will be well protected with a better prey base. The Elephant Corridors will have a greater green cover with a changed cropping pattern. It will be ensured to have a safe elephant corridor. Migratory routes of Elephant, Movement of Leopard and Tiger will be in a safe zone. Human Resource will be adequately trained to handle wildlife management with a more professional manner.

E. Secured Forest Boundary & Encroachment.

All forest blocks will be digitized by DGPS Survey and made encroachment free gradually. All Forest boundaries (RF/PRF/DPF/PF and VF) will be secured with RCC Pillars. All plantations will be depicted on topo maps after DGPS survey.

F. Peoples Participation:

At present about 70% of Degraded Forest Land (DFL) has been assigned to JFM for participatory Forest management. Our vision is to increase the level of participation to at least 85% level with qualitative participation. Collection & marketing of NTFP Species will improve. Harvesting and value addition of NTFP / MAP will be most scientific and sustainable. Contribution of NTFP / MAP to people's economy especially to tribal will increase to a level of 30% of their annual income. Forest based NTFP resources are to be improved to that level so that, collection of various NTFP items will be economical and price will be at a competitive level.

G. Adoption of Modern technology in Forestry:

Recently many modern technologies have been developed and introduced in to forest management. Though tissue culture / vegetative propagation/ hybrid variety of many species in agriculture has developed and introduced, it has not been adopted to a desirable extent in forestry sector. It will be our endeavor to provide QPM (Quality Planting Materials) from Central High Tech nursery of the division. Seed orchards and Clonal orchards would be developed by end of this plan period and planting would be with advanced method



and technology. Fire fighting with high-tech gadgets viz- blower machines / use of chemical non polluting extinguisher would eliminate forest fire.

H. Forest Resilience, Biodiversity and Climate Change.

Adequate measures will be taken to combat Climate Change and increase Carbon Sequestration. Plastic Free environment will be handed over to our future generation. By 2030, alternatives to Plastic will be in use and eco friendly materials will be used in each house hold. Forest Department will be an active agent to reach every house hold in this matter. Global temperature rise will be checked and reversed to 2010 level by end of 2030. Maintaining and restoring biodiversity in forests promote their resilience to human – induced pressures and is therefore an essential insurance policy and safeguard against expected climate change impacts.





Executive summary

Rairangpur Forest Division has been created on 1.10.2003 after re-organization of forest department. The Division was carved out from Karanjia Forest Division with effect from 01.10.2003 vide Govt. Resolution No.13228 / F&E dated 08.08.2003. The erstwhile Social Forestry Division, Rairangpur was re-designated as Rairangpur Division with all the buildings, assets transferred to the newly created division. Subsequently the Government vide notification no 1F- (A)-71/2018-3913/ F&E dated 21.02.2019 have again reorganized the Division with consideration to Boundary of Similipal Tiger Reserve and created two Wildlife Division namely Similipal South Wildlife Division and Similipal North Wildlife Division with effect from 1st October, 2019. In the process, Rairangpur Division constituted during reorganization w.e.f 01.10.2003 has been further reorganized with a geographical area of 2002.48 Sq. Km consisting of Bamanghati Sub Division (Rairangpur), part of Bangripasi and Joshipur CD Block of Mayurbhanj District. The Rairangpur Division is the northern most forest division of the state of Odisha.

The forests under this division were being managed as per Working Plan of Karanjia Division prepared by Sri A.O.F Bakhla, IFS (1996-97 to 2015-16). The outgoing plan had covered only the Reserved Forests of the division. After expiry of the Plan, the forests are being managed basing on Annual Schemes prepared by the Division. This plan is the first complete Working Plan for the Rairangpur Division after reorganization.

In this plan all the forest blocks of Rairangpur Division under administrative control of Forest Department have been included and management practices have been prescribed. The forest area covered under this plan is 44,418.994ha (Reserved Forest – 34 Blocks- 27474.160 ha; PRF-1 Block-10871.250ha; DPF-39 blocks-5587.380 ha; PF-1 Block-200.00 ha and VF-38 blocks-286.204ha).

A. Administrative Setup:

For Administrative convenience, the division is divided in to five Ranges. Ranges have been further sub divided to 17 Sections and 42 Beats. Range is the executive unit of forest administration and Beat is the smallest unit headed by a Forest Guard. Besides the inherited buildings and assets, many buildings have been constructed under CAMPA to house all offices under the division. Residential buildings have also been constructed as required at various headquarters. At present there is no notified forest check gate in the division. There are eight



forest roads covering a length of 46.825 km for management, inspection of forests and transportation of Forest Produce.

B. Crop Condition:

The forests of Rairangpur Division are of North Indian Tropical Moist Deciduous Peninsular Low level Sal Forest (**3C/C_{2e(ii)}**) and Tropical Dry Deciduous Dry peninsular Sal Forest (**5B/C_{1c}**). Sal is the major crop with its associates like Asan, Piasal, Dhaura, Kendu, Kuruma, Jamu etc. Bamboo is absent. During Working Plan preparation 416 sample plots of 0.1ha was taken for Sample enumeration as per sample points provided by ORSAC, Bhubaneswar. The uploaded data have been analyzed by National Remote Sensing Centre for 389 sample points and analysis report has been received. The analysis report indicates that the existing crop is more tilted towards young crop i.e. towards Girth Class of 30-90cm. the crop composition above 90cm GBH is very less. Similarly the growing stock is available in younger girth class than in Girth class above 120cm. This indicates the crop is not at all harvestable on commercial point of view.

C. Non Timber Forest Produce:

Mayurbhanja District is a Tribal district and its forests are rich in NTFP (Non Timber Forest Produce). Rairangpur Division has limited NTFP Resource. These are Sal Leaf, Siali Leaf & Fiber, Kendu Leaf, Honey & Wax, Mahula, Sal Resin, Gums and Barks etc. At present the contribution of NTFP to Tribal family income is about 20%. Once forest is degraded, the availability of NTFP resources are also in a down ward trend. Unscientific collection methods have further added for its degradation and its poor availability year after year. The NTFP market is very unstable and volatile. All out efforts is required to improve NTFP resource in the forest, implement practice of scientific collections and ensure better price to primary gatherers. Though most of the NTFP collections and trade have been regulated by the Panchyats, forest personnel are required to put their efforts for improvement of the NTFP resources in forest.

D. Wildlife:

Elephant is the flag ship species of Rairangpur Division. It is a part of Mayurbhanja Elephant Reserve. There are two elephant corridors in the division namely Badampahar (Mayurbhanj) – Dhobadhobin (Jharkhand) and Badampahar (Mayurbhanj)- Karida (Jharkhand). Bidhubhandar PRF is partly within Similipal Tiger Reserve buffer zone (85.95 sq. km out of total 108.7125 sq. km area). These three important aspects relating to wildlife management need to be taken care of for better management of Wildlife in the division.



E. Peoples Participation & Natural Resource Management:

Joint Forest Management is the accepted way of Forest Management in order to achieve the objectives of forest management and improvement of forest resource. At present 230 VSS and 39 VFC (Village Forest Committee) are actively participating in the forest management and protection. 57.01 Percent of Forest area has been assigned to them. In most cases the area is required to be demarcated on ground. Executing of MoU, Preparation of Micro Plan and approval, dissemination of knowledge for skill development among villagers is desired. There is scope not only to increase the number of VSS and area assigned to them but also to qualitatively improve the level of participation in Joint Forest management. At present 100 VSS have been taken up under Odisha Forestry Sector Development Programme-II (OSDP-II) and very good works have been taken up for rehabilitation of degraded forests and improving livelihood of the local people.

F. Conservation & Improvement of Bio Diversity:

All the forest management practices were mostly elite species oriented. Primary species, Secondary species and inferior species concept is deeply associated with forest management. Now the concept has been changed towards bio diversity, its improvement and became basic objectives of all forest & wildlife management. Rairangpur division has basically Sal forest. Sal is about 90% of the vegetation. Due to moist environment, many herbs, shrubs and climbers are observed in forests close to Similipal Tiger Reserve. Steps are to be formulated for a better bio diversity management with preparation of Peoples Bio Diversity Register (PBR). The staff are to be re-oriented on this aspect.

G. Sacred Grove Management:

There are many sacred groves in Rairangpur Division associated with tribal culture and customs. Due to influence of modern thinking in young generation, the attachment to Sacred Groves is now weakening. The Sacred Groves are in path of shrinking its area. If adequate steps are not initiated in time Sacred Groves may vanish in a short period. Pro active steps are required to be formulated to save the Groves and conserve them. So far 74 Nos. of Sacred Grove Conservation Projects have been taken up under CAMPA.

H. REDD+ and Climate Change:

Most global issue on environment aspect at present is the Global warming, Climate change and Carbon sequestration to reduce the ill effects of population explosion and rapid



industrialization. The changing life style of modern days has its effect on all spheres of life. Effective steps on forest sector are required to be implemented with a measurable goal.

I. Implementation of Modern Technology:

Many modern technologies have been developed and used in forest management practices. Use of GPS, mobile applications for determining crop density, Soil erosion status, elephant movements, Application of Remote Sensing, vegetative propagation, tracking of animals through Radio signals etc. In spite of all developments, infrastructure development in production of Quality Seed, Quality Planting Materials and quick germination / pre treatment facilities are yet to be developed to required level. Modern technology in fire fighting front is required to be adopted in all sections / beats of this division. Development of modern high tech nursery with all facilities for speedy propagation of desirable species and required quantity in a short notice is essential.

In consideration of all the above aspects, this plan has been prepared with an aim to fill up the gaps between what we required and what is available. The forests have been proposed to be managed under the following Working Circles.

i.	Improvement Working Circle	21948.98ha	Independent Working Circle
ii.	Rehabilitation Working Circle	20558.10ha	
iii.	Plantation Working Circle	1691.804ha	
iv.	Wildlife (Overlapping) Working Circle	43912.680ha	Overlapping Working Circle
v.	Non Timber Forest Produce (Overlapping) Working Circle	43912.680ha	
vi.	Joint Forest Management (Overlapping) Working Circle	25343.474 ha	
vii.	TOF Working Circle	290 ha and 281.50 RKM avenue plantation	Outside the RF/PRF/DPF /PF & VF area
viii.	REDD+		General
ix.	Implementation of Modern Technology.		

The aim & objectives of each working Circle is basically to improve the forest and has been elaborated in the respective chapters. The summary of prescriptions has been furnished in Chapter 24. The cost of implementing the prescription has been furnished at Chapter- 23.





WORKING PLAN OF RAIRANGPUR DIVISION

PART-I



For the Period 2021-22 to 2030-31

BY

DR. ARUN KUMAR MISHRA, IFS

DIVISIONAL FOREST OFFICER, RAIRANGPUR DIVISION.



CHAPTER-1

THE TRACT DELT WITH

1.1 Name and Situation:

Rairangpur Forest Division has been created on 1.10.2003 after re-organization of forest department. The Division was carved out from Karanjia Forest Division with effect from 01.10.2003 vide Govt. Resolution No.13228 / F&E dated 08.08.2003. (**Annexure-I**). Subsequently the Government vide notification no 1F- (A)-71/2018-3913/ F&E dated 21.02.2019 (**Annexure-II**) have again reorganized the Division with consideration to Boundary of Similipal Sanctuary and created two Wildlife Division namely Similipal South Wildlife division and Similipal North Wildlife Division. In the process, Rairangpur Division constituted during reorganization w.e.f 01.10.2003 has been further reorganized with a geographical area of 2002.48 Sq. Km consisting of Bamanghati Sub Division (Rairangpur), part of Bangriposi and Joshipur CD Block of Mayurbhanj District. The Rairangpur Division is the northernmost forest division of the state of Odisha. Rairangpur division extends from **21°50'30" N to 22°34'15" N and 85°56'00" E to 86°36'30" E**.

1 Boundary:

Boundary of Rairangpur Division can be precisely described as follows:

North: Jharkhand State.

East: Baripada Forest Division.

South: Karanjia Forest Division.

West: Jharkhand State & Similipal North Wildlife Division.

The division find place in Survey of India Topo Sheet as mentioned below.

Sl No	SOI Topo Sheet No		Sl No	SOI Topo Sheet No	
	New	Old		New	
1	F45 I 2	73J/2	7	F45 H14	73F/14
2	F45 I 3	73J/3	8	F45 H15	73F/15
3	F45 I 4	73J/4	9	F45 H16	73F/16
4	F45 I 7	73J/7	10	F45 O1	73K/1
5	F45 I 8	73J/8	11	F45 O5	73K/5
6	F45 I 12	73J/12			



1.1.1 Geographical Area:

The total Geographical Area of the Division is 2002.48 Sq. Km comprising entire Bamanghati sub division and part of Baripada and Jashipur CD Block. The Division comprises one Municipality i.e. Rairangpur and 9 (Nine) CD Blocks / Tahasil as detailed in **Table No 1.1** below.

For better administration, the division is divided in to five Ranges. The range wise jurisdiction and geographical area is also furnished in **Table no 1.1**

Table No 1.1: Ranges & their Jurisdiction:					
Sl No	Name of the Range	Name of Tahasil / CD Block	Area in Sq. KM	Population as per 2011 census	Important Township / Municipality / NAC
1	Rairangpur	Rairangpur, Bijataila	542.26	1,32,520	Rairangpur , Bijataila
2	Bahalda	Bahalda, Tiring, Jamda	646.66	2,02,559	Bahalda, Jharadihi, Tiring, Jamda
3	Badampahar	Kusumi Hqs at Badampahar	340.81	1,11,543	Badampahar, Hatbadra
4	Bisoi WL	Bisoi, Bangriposi(part)	187.28	1,78,801	Bisoi, Bangriposi
5	Manada	Bisoi, Jashipur (part)	285.47	1,21,030	Manada
	5 Range	7 Block (total) & 2 Block (Part)	2002.48	7,46,453	

According to the 2011 Indian Census, Rairangpur Division has population of 7, 46,453 against total population 25, 19,738 of the district. The demographic profile of the Division is furnished at Table No-1.2. The geographical area of the division is 19.22% of the district where as 29.62% of total population of district residing. The population density is 372.76 persons per Sq. Km

Table No 1.2 Demographic Profile of Rairangpur Forest Division.						
Total House Hold	Total Population	Total Male	Total Female	SC Population	ST Population	Total Literacy.
174302	746453	367635	378818	45986	489287	388360
Percentage				6.16	65.55	52.03



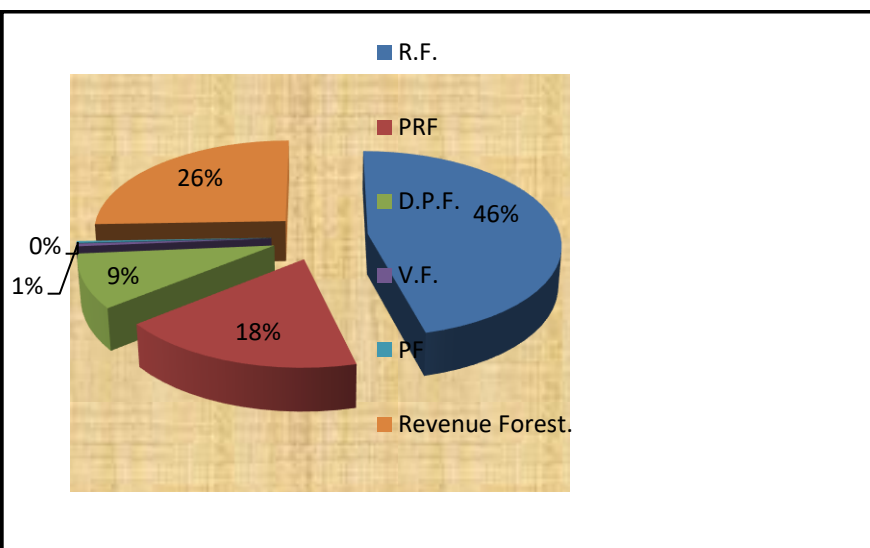
1.1.2 Forest Area:

There are 34 numbers of Reserved Forest, 1 PRF, 39 DPF, 1 PF and 39 numbers of Village Forest as declared under provisions of Odisha Forest Act, 1972 within the reorganized jurisdiction of Rairangpur Division.

Besides the forests under Administrative jurisdiction of Forest Department, there are Revenue Forests in the Division. The extents of Forest under various categories of Forests are furnished below.

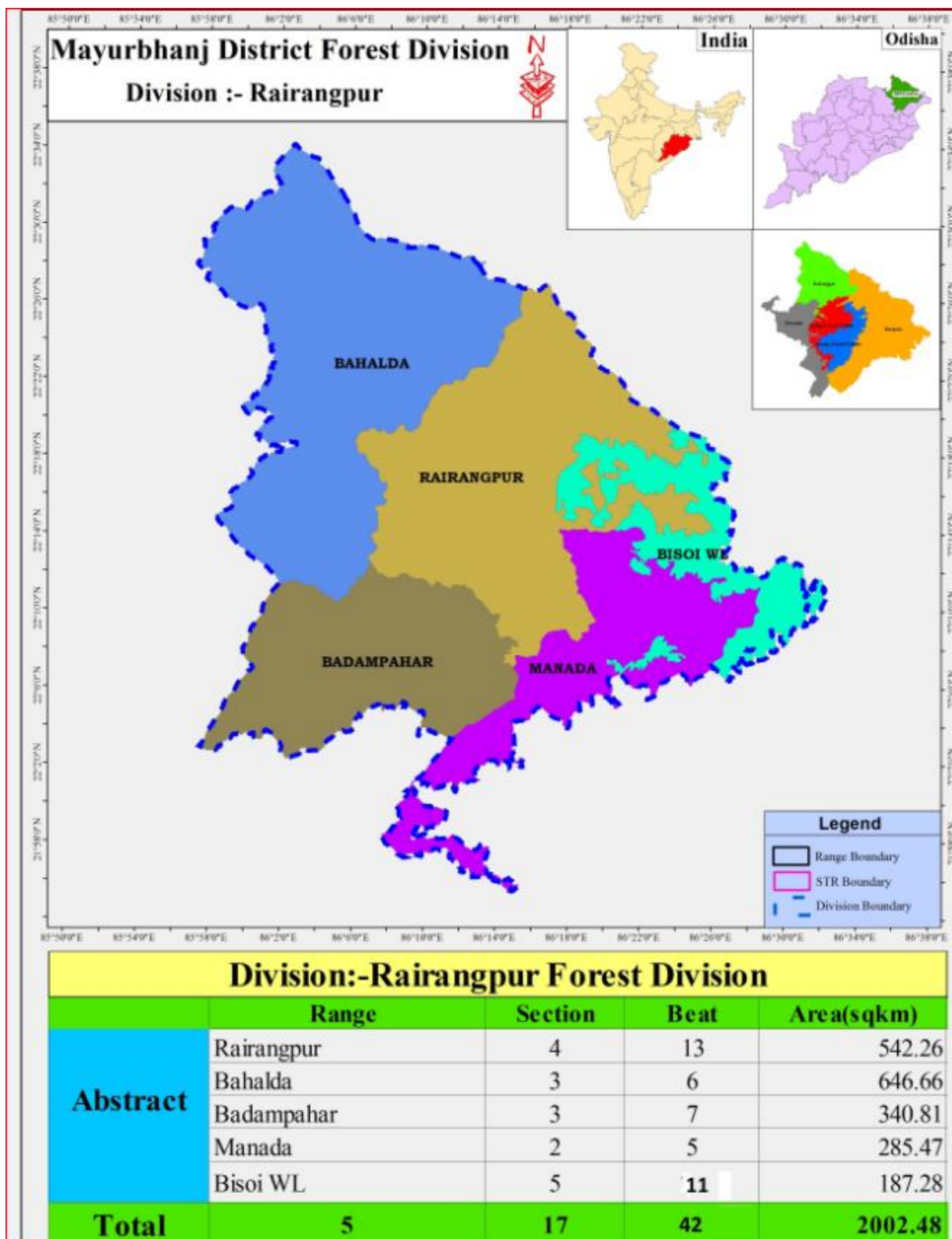
Table No 1.3 Forest area of the Division.

Sl.No.	Category of Forest	No. of Blocks	Area in Ha.	% of total Forest area of the Division
1	R.F.	34	27474.16	46.05
2	PRF	1	10871.25	18.22
2	D.P.F.	39	5587.38	9.37
3	V.F.	39	286.204	0.48
4	PF	1	200.00	0.34
5	Revenue Forest. (DLC)	791	15240.12	25.55
	TOTAL	904	59659.114	100.00





Working Plan of Rairangpur Forest division (2021 to 2031)





1.1.3 Administrative Setup:

For better management purpose, the division is sub divided to five ranges, seventeen sections and Forty two beats as furnished below.

Table No 1.4 Range / Section / Beat headquarters of the reorganized Division.					
Sl No	Name of Range / Hqs	Name of Section / Hqs	Sl No	Name of Beat /hqs	Coordinate of Hqs.
1	Rairangpur	1.Rairangpur	1	Rairangpur	N22° 15' 17.54"E86° 10' 8.7"
2			2	Dublabeda	N22° 16' 30.13"E86° 10' 49.43"
3			3	Ichinda	N22° 15' 45.78"E86° 10' 50.45"
4			4	Anlajodi	N 22° 20' 2.94" E86° 11' 42.86"
5		2.Badamtalia	5	Khanta	N22° 15' 6.19"E86° 14' 58.49"
6			6	Luhasila	N22° 15' 6.3"E86° 14' 58.34"
7			7	Bijjala	N22°12' 30.0" E86° 17' 56.6"
8		3.Gorumahisani	8	Gorumahisani	N22°20' 04.0"E86° 16' 36.5"
9			9	Dhalabeda	N22°1'8 19.8" E86° 15' 48.6"
10			10	Chhatramandal	N22°19' 04.0" E86° 20' 01.9"
11			11	Ruansi	N22°24' 01.6" E86° 16' 29.0"
12		4.Saragoda	12	Saragoda	N22°15' 31.7" E86° 23' 14.0"
13			13	Chadheipahadi	N22°18'.10.9" E 86° 23' 22.7"
14	Badampahar	5.Badampahar	14	Badampahar	N 22° 05' 32. 8" E 86° 06' 47.7"
15			15	Talapati	N 22° 07' 52. 8" E 86° 01' 22.9"
16			16	Purunapani	N 22° 08' 36.6" E 86° 10' 05.8"
17		6.Hatbadra	17	Hatbadra	N 22° 11' 05.9" E 86° 06' 55.7"
18			18	Dubulabeda	N 22° 10' 20.1" E 86° 03' 09.9"
19		7. Suleipat	19	Sueipat	N 22° 09' 00.3" E 86° 13' 55.6"
20			20	Jamjhari	N 22° 04' 15.4" E 86° 11' 11.6"
21	Bahalda	8. Jamda	21	Manbir	N22°15' 50.3 E86°03' 13.9"
22			22	Sunamora	N22°15' 51.1 E86°03' 14.5"
23			23	Jamda	N22°15' 50.3 E86°03' 13.9"
24		9. Bahalda	24	Bahalda	N22°15' 58.6 E86°03' 23.0"
25			25	Tiring	N22°15' 50.3 E86°03' 13.9"
26		10. Jharadihi	26	Jharadihi	N22°15' 51.1 E86°03' 14.5"
27	Bisoi (WL) Range, Bisoi	11. Bisoi/Bisoi	27	Pokharia /Kadapani	N 22°10' 04.9" E86° 25' 36.5"



Working Plan of Rairangpur Forest division (2021 to 2031)

28			28	Gargadi /Gargadi	N 22°12' 25.8" E 86° 22' 29.9"
29		12. Rajabasa /Kadapani	29	Manada /Manada	N 22°09' 29.2" E 86° 32' 37.2"
30			30	Rajabasa /Rajabasa	N 22°10' 45.9"E 86° 28' 03.2"
31		13. Nischinta /Bangriposi	31	Nischinta /Nischinta	N 22° 07' 28.4" E86° 29' 59.8"
32			32	Deopatta /Kadapani	N 22° 10' 04.8" E 86° 25' 36.1"
33		14. Saragoda /Saragoda	33	Saragoda-I / Saragoda	N 22° 09' 11.9" E 86° 13' 53.0"
34			34	Saragoda-II /Saragoda	N 22°08' 30.5" E 86° 14' 26.9"
35			35	Joka/Joka	N 22° 15' 15.4" E 86° 27' 10.8"
36		15. Chadheipahadi	36	Chadheipahadi	N 22°18' 49.5" E 86° 24' 25.8"
37			37	Luhasila	N 22° 14' 38.8" E 86° 19' 12.1"
38		16. Manada	38	Tulasibani	N21° 58' 7.0" E 86° 09' 15.8"
39			39	Manada	N22° 04' 53.9" E 86° 14' 02.9"
40	Manada		40	Bankidihi	N22° 06' 35.3" E 86° 17' 29.5"
41		17. Bisoi	41	Bisoi	N 22° 09' 39.8" E 86° 24' 10.7"
42			42	Deopatta	N22° 10' 31.0" E 86° 27' 41.2"

Sl No	Name of Range	No of section	No of Beat
1	Rairangpur	4	13
2	Badampahar	3	7
3	Bahalda	3	6
4	Bisoi (WL)	5	11
5	Manada	2	5
Total	5 Range	17 Section	42 Beat



1.1.4 Building & Forest Road;

1.1.4.1 Buildings:

The Division has eighty two (82) buildings to house Division Office, Range office, Section office and beats. The list along with its location is furnished below. (Table No 1.5)

Table No 1.5 List of Buildings in the Rairangpur Forest division.

Sl No	Name of Building	Location	Plinth Area	Year of Construction	Capital Cost as per record.
1	Range Office Campus	Rairangpur	Not available	2011-12	Not available
2	Forester Quarter, Rairangpur	Rairangpur Bazar	625 sqft.	Not available	-do-
3	Forest Guard Quarter, Rairangpur	Rairangpur Bazar	520 sqft.	2013-14	480000/-
4	Forest Guard quarter, Dublabeda	Dublabeda	675sqft.	Not available	Not Available
5	Forest Guard quarter, Ichinda	Ichinda	480 sqft.	2013-14	480000/-
6	Forest Guard quarter, Anlajodi	Rairangpur Bazar	520 sqft.	2013-14	480000/-
7	Forester Quarter, Saragoda	Saragoda	690 sqft.	2013-14	665000/-
8	Forest Guard quarter, Saragoda	Saragoda	520 sqft.	2018-19	684000/-
9	Forester quarter, Badamtalia	Bijatata	763 sqft.	2013-14	Not Available
10	Forest Guard Quarter, Bijatata	Bijatata	520 sqft.	2013-14	480000/-
11	Forest Guard quarter, Luhasila	Ramchandrapur	520 sqft.	2018-19	684000/-
12	Forest Guard Quarter, Khanta	Ramchandrapur	520 sqft.	2018-19	684000/-
13	Forest Guard Quarter, Dhalabeda	Gorumahisani	520sqft.	2013-14	480000/-
14	Forest Guard Quarter, Gorumahisani	Gorumahisani	569sft.	2010-11	Not Available
15	Forest Guard quarter, Chhatramandal	Gorumahisani	520sqft.	2015-16	-do-
16	Nursery shed, Kucheibudhi P.N	Kucheibudhi RF	440 sqft.	2013-14	-do-



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 1.5 List of Buildings in the Rairangpur Forest division.

Sl No	Name of Building	Location	Plinth Area	Year of Construction	Capital Cost as per record.
17	Nursery Shed, Ramchandrapur P.N	Hatibari RF	440 sqft.	2015-16	-do-
18	Malkhana, Range Office campus	Rairangpur	Not Available	2014-15	-do-
19	Vehicle shed	Rairangpur	620sqft.	Not Available	-do-
20	Watcher shed	Rairangpur	550sqft.	-do-	-do-
21	DFO Residence	Rairangpur	2700sqft	-do-	-do-
22	4 th grade staff quarter	Rairangpur	450sqft.	-do-	-do-
23	Clerk Quarter	Rairangpur	650sqft.	-do-	-do-
24	Clerk Quarter	Rairangpur	650sqft.	-do-	-do-
25	Forest Guard Quarter	Rairangpur	550sqft.	-do-	-do-
26	4 th grade quarter	Rairangpur	440sqft.	2017-18	-do-
27	4 th grade Quarter	Rairangpur	440sqft.	2016-17	-do-
28	4 th grade sweeper quarter	Rairangpur	400sqft.	Not Available	-do-
29	Driver quarter	Rairangpur	530sqft.	-do-	-do-
30	Clerk Quarter	Rairangpur	530sqft.	-do-	-do-
31	VFW quarter	Rairangpur	500sqft.	-do-	-do-
32	DFO Office (OFSDP-II)	Rairangpur	1140sqft.	2017-18	-do-
33	DFO office old	Rairangpur	5000sqft.	Not Available	-do-
34	Establish, Lease & ACF office	Rairangpur	1000sqft.	-do-	-do-
35	Barrack	Rairangpur	650sqft.	-do-	-do-
36	Toilet complex	Rairangpur	170sqft.	2018-19	-do-
37	Toilet complex old	Rairangpur	200sqft.	Not Available	-do-
38	Ministerial Quarter	Rairangpur	650sqft.	2016-17	-do-
39	Clerk Quarters-4 nos.	Rairangpur	2100sqft.	Not Available	-do-
40	Ministerial Quarter	Rairangpur	650sqft.	-do-	-do-
41	Toilet complex Rairangpur	Rairangpur	170sqft.	-do-	-do-
42	Ministerial Quarter	Rairangpur bazar	650sqft.	2018-19	-do-
43	4 th grade quarter Bazar	Rairangpur Bazar	440sqft.	2018-19	-do-
44	F.R Quarters	Jharadihi	697 sft'	2010	471,100.00
45	F.G Quarters	Bahalda	818.387sft	2010	269,033.00
46	R.O. Building	Bahalda	127.034 Sq.m	2012	957,581.00
47	F.G Quarters	Bahalda	51.025sq. M.	2013	415,800.00



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 1.5 List of Buildings in the Rairangpur Forest division.

Sl No	Name of Building	Location	Plinth Area	Year of Construction	Capital Cost as per record.
48	F.G Quarters	Tiring	51.025sq. m.	2014	525,200.00
49	Staff Barrack	Bahalda	54.977Sq.m	2014	1,045,387.00
50	F.R Quarters	Bahalda	697sft'	2014	658,250.00
51	F.R Quarters	Sunamora	530 sft	2015	530,000.00
52	F.R Quarters	Manbir	530sft	2015	477,390.00
53	R.O. Building	Bahalda	8879.58sft	2017	974,627.00
54	F.R Quarter	Jamda	697 sft	2018	25,000.00
55	F.G Quarter	Jamda	547 sft	2018	530,000.00
56	F.R Quarter	Jharadihi	530 sft	2018	750,000.00
57	F.R Quarter	Jamda	697sft	2019	942,000.00
58	Range Officer Residence	Badampahar	900 Sft.	2016-17	10,00,000/-
59	Forest Range Office	Badampahar	1000 Sft.	2011-12	11,00,000/-
60	Forest Rest House	Badampahar	1600 Sft.	Not Available	Not Availablr
61	Permanente Protection Camp	Patharkata	530 Sft.	2017-18	8,50,000/-
62	Permanente Protection Camp	Badampahar	530 Sft.	2015-16	8,00,000/-
63	Section Office-Cum-Residence	Badampahar Section Office	550 Sft.	Not Available	Not Available
64	Section Office-Office – Cum-Residence	Hatbadra Section Office	550 Sft.	Not Available	Not Available
65	Forester Quarters	Suleipat Section Office Campus	735 Sft.	2015-16	7,50,000/-
66	Forest Guard Quarters	Badampahar Beat	500 Sqft.	2013-14	4,80,000/-
67	Forest Guard Quarters	Talapati Beat	500 Sqft.	2013-14	4,80,000/-
68	Forest Guard Quarters	Purunapani Beat	500 Sqft.	2012-13	4,80,000/-
69	Forest Guard Quarters	Hatbadra Beat	500 Sqft.	2013-14	4,80,000/-
70	Forest Guard Quarters	Dubulabeda Beat	511 Sft.	2016-17	5,30,000/-
71	Forest Guard Quarters	Suleipat Beat	511 Sft.	2015-16	5,30,000/-
72	Forest Guard Quarters	Jamjhari Beat	511 Sft.	2016-17	6,84,000/-
73	Range Office Building	Manada	1123.0Sft.	2010-11	9,67.000
74	Barrack	Manada	1047Sft.	2012-13	10,87,000



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 1.5 List of Buildings in the Rairangpur Forest division.

Sl No	Name of Building	Location	Plinth Area	Year of Construction	Capital Cost as per record.
75	Forester Quarter	Manada	168Sft	2012-13	6,29,000
76	Range Officer Quarter	Manada	900Sft	2013-14	8,68,000
77	F.G. Quarter	Tulasibani	500Sft	2011-12	3,00,000
78	Range Office Building	Kadapani	1000 Sqft.	2013-14	11,00,000/-
79	Range Officers Resident	Kadapani	900 Sqft.	2013-14	8,68,000/-
80	Forester Quarter, Rajabasa section	Kadapani	550 Sqft.	2013-14	6,65,000/-
81	Forest Guard Quarter, Dudkundi Beat	Kadapani	500 Sqft.	2013-14	4,80,000/-
82	Forest Guard Quarter, Deopatta beat	Kadapani	500 Sqft.	2013-14	4,80,000/-

1.1.4.2 Forest roads:

There are seven forest roads covering a length of 43.825 km for management / inspection of forests and transportation of Forest Produce. The details of Forest Road is furnished at **Table No 1.6**

Table No 1.6 List of Forest Road of Rairangpur Forest Division as on 01.10.2019(After re-organization of Rairangpur Forest Division)

Sl No	Name of forest road	Length in Km	Nature of the Forest road.		Name of Range
			Black Top	Motorable	
1	Approach road-F.R.H Badampahar	0.50	-	0.50	Badampahar
2	Gorumahisani-Dahupani	8.00	-	8.0	Rairangpur
3	Gorumahisani-Chhtramandal	12.00	12.0	-	Rairangpur
4	Sarogoda-Chadheipahadi	15.00	15.0	-	Rairangpur
5	Chadheipahadi - Dumurikudar	3.00	3.0	-	Rairangpur
6	Kusumghaty-Dahupani	3.325	-	3.325	Rairangpur
7	Dahupani-Kukudimundi	2.00	-	2.0	Rairangpur
Total		43.825	30.00	13.825	

1.1.4.3 Forest Rest House:

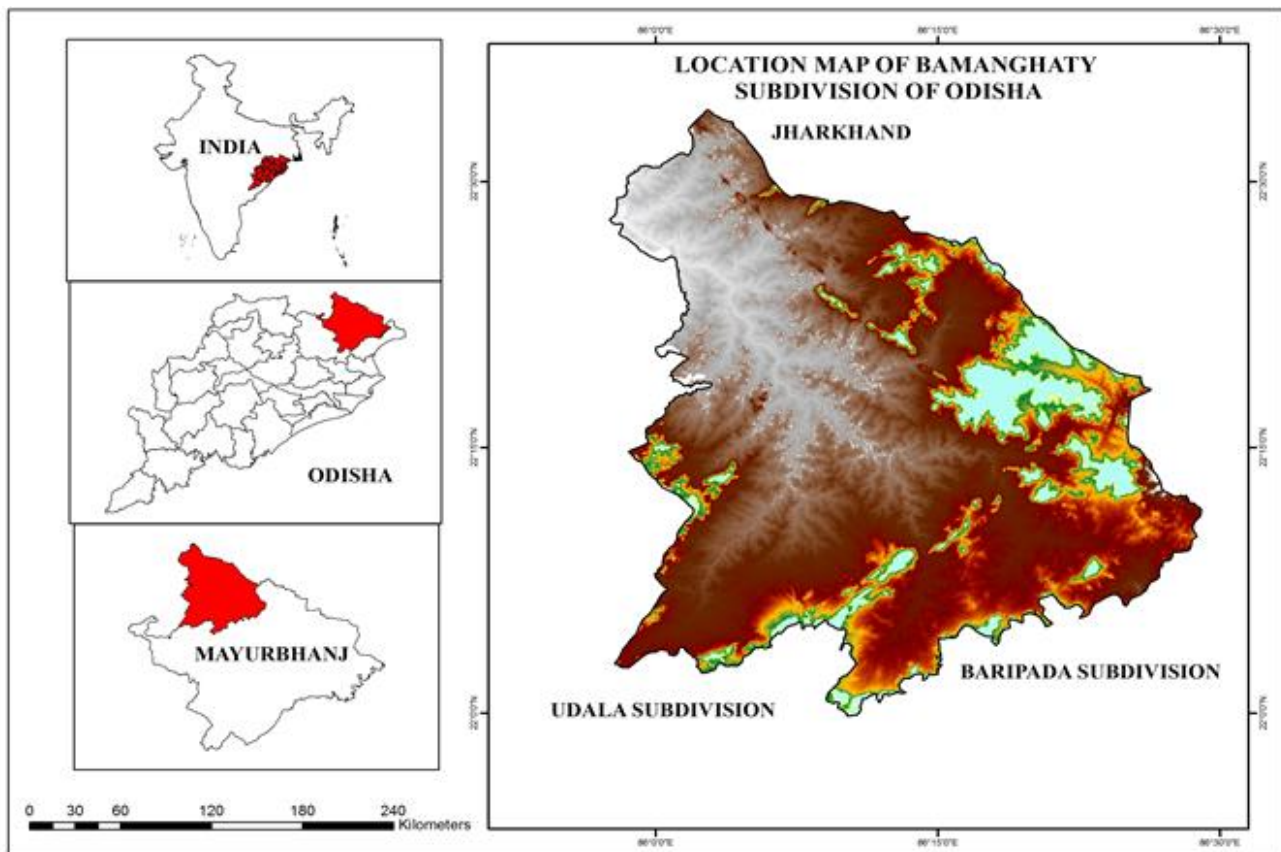
There is one **Forest Rest House (FRH)** at Badampahad in Badampahad Range.



1.2 Configuration of the ground:

1.2.1 Topography:

The topography of Mayurbhanj district is marked by hills and undulating plains. The most dominant feature of the topography of Mayurbhanj district is the Simlipal Range which covers the very center of the district. The geography of Mayurbhanj can be divided into three natural divisions. The first one is the hilly terrain that covers the centre of the district. The rest is broadly classified as western hilly tract and eastern plans. The Rairangpur division covers part of Central zone (Similipal Hill Range and Western Hills of Gorumahisani, Badampahad and Suleipat). Besides the hilly terrain some plains dotted with hills towards North Eastern part is observed.





1.2.2 Hills and Plateaus:

There are number of hills and plateaus within the division. The name of hills and its elevation as recorded from field study / maps is given at Table No 1.7

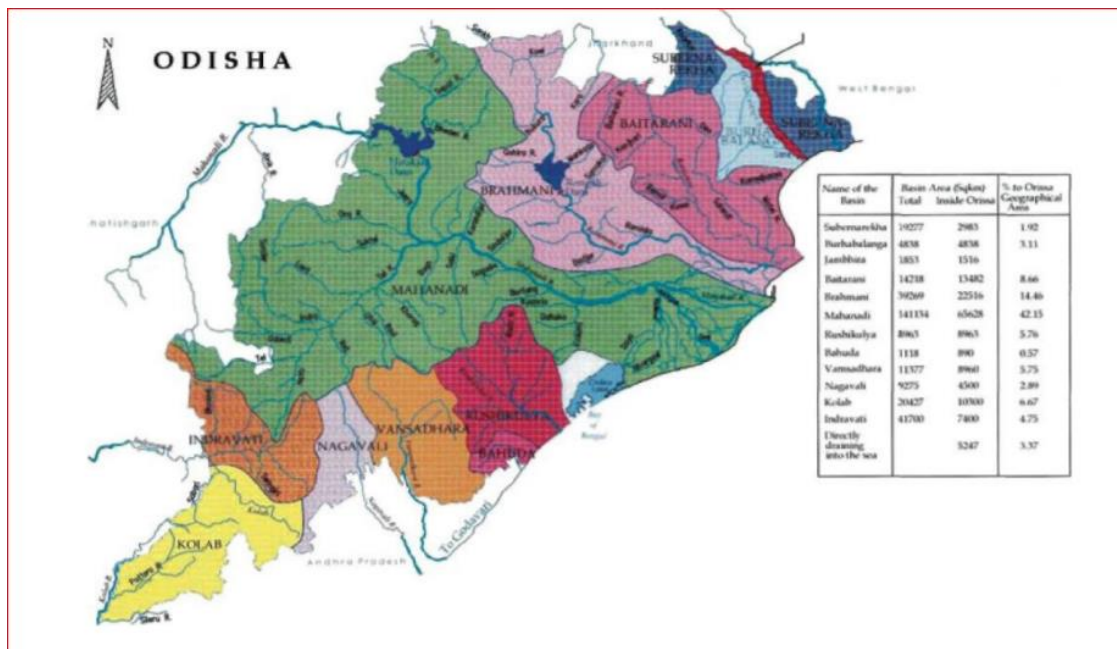
Table No 1.7 Name of the hills and its elevation		
Sl No	Name of Hill / Plateau	Elevation in m AMSL
1	Baghamuri Pahad	616
2	Turliga pahad	765
3	Kocharah Pahad	630
4	Sarali Phad	530
5	Bhitaramda Pahad	778
6	Budha budhi Pahad	521
7	Bamani Pahad	521
8	Kuljabe buraPahad	654
9	Tarna buru	489

1.2.3 River system:

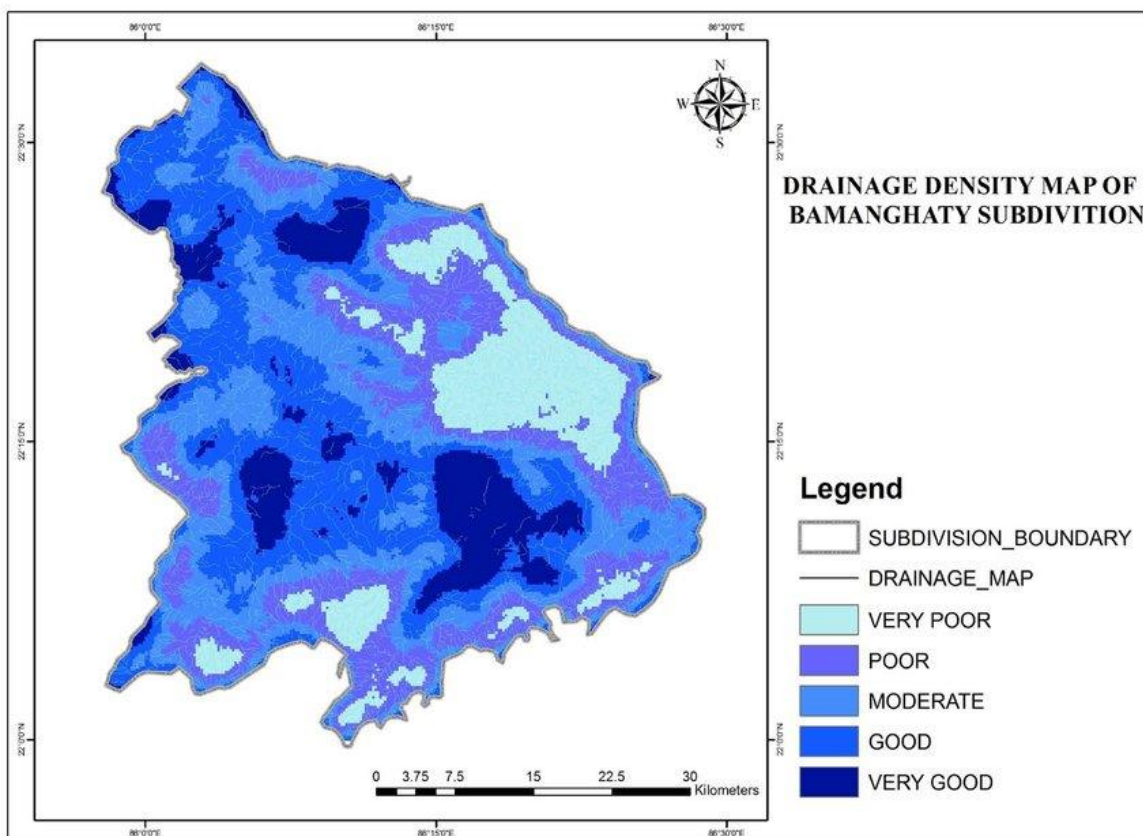
There is no important river system in the division. There are small rivers viz- Khadakhai and Bankabala over which two Dams have been constructed. The River Budhabalanga flows on the South Western boundary of the division. A part of the division drains to river Budhabalanga. The Budhabalanga River originates from the Similipal Range of hills on Mayurbhanj district and travels a total length of 198.75 km. before it finally empties into the Bay of Bengal. The prominent tributaries of the Budhabalanga are Palapala, Sunei, Kalo, Sanjo, Deo, Gangahari and Katra. Jambhira originates from Chandra Reserve forest in Mayurbhanj district and travels a total length of 90 km before it finally falls in Bay of Bengal. The prominent tributaries of river Jambhira are Mahanti, Gulfa, Surudi, Murli, Saan, Bans and Hansakara. Major Rivers flowing in the Division are Khadakhai, Kanhu, Bankbal, Naujoda, Nesha, Balisudra and Katra. The prominent nallas flowing are Golia, Luhasila, Judia, Machhkandana and Luhakani.



Working Plan of Rairangpur Forest division (2021 to 2031)



The drainage density map of Rairangpur (Bamanghati sub Division) is furnished below to depict the drainage pattern.





1.3 Geology, Rock and Soil:

1.3.1 Geology, Rock

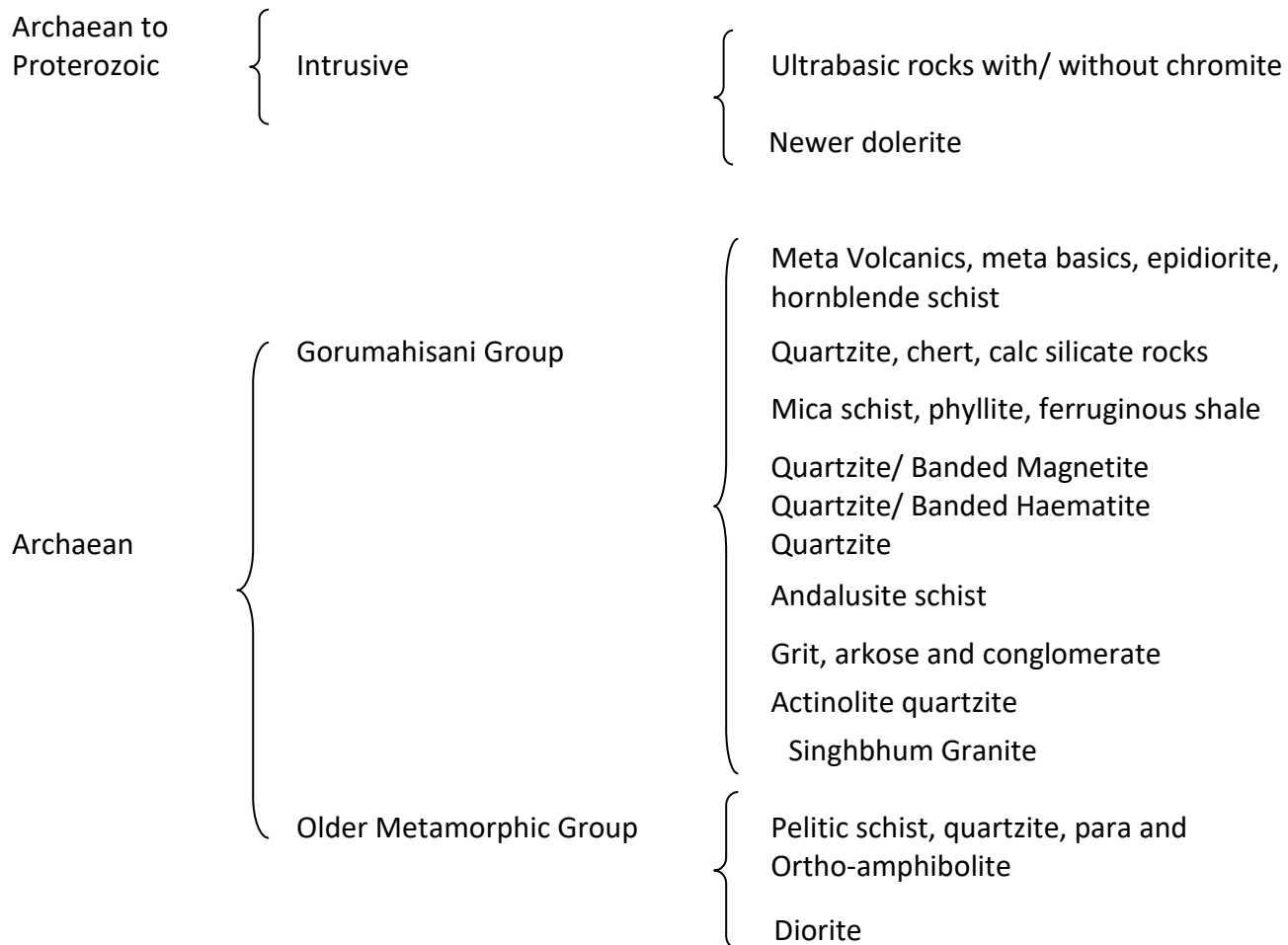
GEOLOGY:

The geology of the district is constituted by the Simlipal complex at its central part belonging to Palaeo-Proterozoic age, unconformably lying over the Singhbhum Granite and Banded Iron Ore Formation (BIF) of Gorumahisani Group of Archaean age. Simlipal complex constitutes three alternate bands of volcano sedimentary units disposed in a ring like circular pattern formed under submarine condition. The sedimentaries of Simlipal mostly comprise ortho-quartzites, arkose and minor band of ferruginous shales and phyllites. The quartzite are devoid of volcanic materials within it and exhibits well preserved cross beddings and palaeo current structures indicating shallow sub-marine origin. The dip of the quartzites is towards the center of the Simlipal basin. The three consecutive bands of volcanic denotes three periods of quiescence. At the centre of the Simlipal lies the Amjori sill which covers an area of about 130 sq kms. Baripada bed of Miocene age occurs to east of Simlipal built up by marine deposit in the form of continental shelf. The laterites of Eocene age are found overlying the others. Some parts are covered by in-situ and alluvial soil of Holocene age.

STRATIGRAPHY: The geological succession in the district is as follows:



Age	Formation/Group	Lithology
Holocene	Burhabalang Formation	Sand, silt
Late Pleistocene to Early Holocene	Kaimundi Formation	Greyish green Clay impregnated with caliche nodules
Pleistocene sand and pebble	Bolgarh Formation	Hard crust laterite with coarse
Cenozoic		Laterite
		Gravel Beds
Miocene fossiliferous limestone	Baripada Formation	Sandstone with interbands of
Mica schist, phyllite, hornblende		Younger Ultrabasic
	Singhbhum Group	Schist
		Quartzite
		Garnetiferous mica schist
		Garnetiferous phyllite
		Quartzite, conglomerate
Palaeo Proterozoic		Unclassified basalt, trachite, gabbro
		Phyllite /shale
	Simlipal Group	Differentiated basic-ultrabasic sills with nickel-silicates
		Spillitic lava
Quartzite with conglomerate,		shale and phyllite
Proterozoic	Intrusive	Romapahari Granite
		Bhuasuni Granite
		Porphyry dyke
		Gabbro-Anorthosite
		Granophyre



1.3.2 Mineral Occurrences:

a) Iron Ore:

In Mayurbhanj district iron ore deposits are located in Gorumahisani, Badampahar , Sulaipat, Asnabani, Bhitarmada, Ghusura, Kasiabera, Maharajpur, Nangalsila, Purunapani and Ekdalpahar area over a stretch of 40 km. The types of iron ores include viz; hard massive ore, laminated and biscuity ore, shaly ore, lateritic iron ore, maghemite and gruneritic iron ore. The ores of Gorumahisani show the following range in composition Fe: 60-66%, phosphorous: < 0.08%, sulphur < 0.03% and silica: 3.5%. The ore of Sulaipat shows Fe content as 66-68%. A total reserve of 98.43 million tonnes of iron ore has been assessed in the district.



b) Titaniferous and Vanadiferous Magnetite:

These deposits occur in association with gabbroanorthosite suite of rocks and are distributed in three belts viz. (i) Bisoi-Rairangpur Kumardubi (ii) Bisoi-Jashipur (iii) Baripada-Udala. The titaniferous and vanadiferous magnetite ore composed essentially of magnetite and illmenite with minor amount of haematite, limonite, rutile, coulsonite ($(\text{FeV})_3\text{O}_4$) and sulphides. The mineral coulsonite accounts for vanadium in the ore. The Bisoi-Rairangpur-Kumardubi belt extends over a length of 15 km. The important locations in this belt are Kumardubi, Betjharan, Nua Pahari, Hatichar, Basantpur, Amdabera, Kaduani, Kasipenth, Kunjakocha, Batichar, Bhargapahar, Gargari and Tuarburu. The ore bodies strike in E-W and its thickness varies from 3m to 36m. The main ore body around Hatichar occurs as a ridge and extends over a length of 265m with varying width of 15-20m. The reserve of Titaniferous and Vanadiferous Magnetite in this block has been estimated as 4.6 million tonnes with grade of ore ($\text{V}_2\text{O}_5\%$) varying between 0.5% to 1.8%. Similarly the Bisoi-Jashipur belt includes locations namely Keshan, Mayurbeka, Dhulabera, Sialnoi, Asanabari, Bariadihi and Kumdubari with a reserve of such ore as 1.03 million tonnes with a grade of ore ($\text{V}_2\text{O}_5\%$) varying between 0.21% to 1.5%. In Baripada-Udala belt the important occurrences are located at Bahalda, Banajori, Andipur and Chitrabania with a reserve of such ore as 0.05 million tonnes with a grade of ore ($\text{V}_2\text{O}_5\%$) varying between 0.70% to 2.41%. A total reserve of 5.68 million tonnes of Titaniferous and Vanadiferous Magnetite deposit has been estimated in the above three blocks. In addition to the above deposits eight additional occurrences of Titaniferous and Vanadiferous Magnetite deposits have been reported over a strike length of 17km aligned in NNE-SSW direction in the district. These deposits are located around Bariadihi (60mx40mx15m), Langaldhua (20mx10m), Kanchikana (150mx30mx2m), Kumudbari (500mx50mx1m), Ektali (60mx10mx10m), Basantpur (10mx10mx1m), Bhalupani (200mx30m) and Sansialinai (250mx50mx30m) (The bracketed data indicates dimension of the deposit).

c) China Clay:

The district has the richest china clay deposit of Odisha located around Jashipur, Chanchabani, Dumuria, Sarisbari, Jamkeswar, Ramchandrapur, Rugudi, Kurma and Gududiha etc. A total reserve of 268.2897 million tonnes of china clay has been assessed in the district with $\text{Al}_2\text{O}_3\%$ and $\text{SiO}_2\%$ varying between 34.35%-39.48% and 45.84%-49.40% respectively. The china clay is used in ceramic, pottery, cement, textile, paper, rubber and paint industries.



d) Copper Ore:

Copper mineralization has been located around Kesarpur, Madansahi and Dudhiasol area of the district. Out of these areas Kesarpur deposit is most promising with a strike extension of mineralized zone is more than 3km with nearly 1km width. A total reserve (both probable and possible) of 3.43 million tonnes of copper ore (2.16 million tonnes of cu with average grade of 1.5% cu at 0.8% cut-off & 1.27 million tonnes of cu with average grade of 0.55% cu) has been estimated in these areas.

e) Galena (Lead ore):

Occurrences of Galena as specks in quartz vein, quartz sericite schist and phyllitic rock has been reported around Bhatuabera, Mundabani, Srichandrapur, Pithabata, Beradiha, Pradha, Patingia, Champagarh, Shanjabani, and Nadabani areas of the district.

f) Nickel Ore:

In Simlipal area Nickel is concentrated within chemically weathered ultramafic rocks of the Amjori sill occupying an area of about 130 sq km in the central part of the Simlipal complex. It is also found in the laterite and soil cover. The Nickel ore occurrences around Gurguria, Nawana and Bhilapoga are noteworthy. Two large patches of prospective ore zones around Gurguria and Nawana blocks cover an aerial spread of more than 12sq km, whereas the Bhilapoga sector covers an area of 7 sq km. The mineralised zone varies in thickness from 7m to 12m and the content of Ni in ores varies between 0.55% and 1.10%. Possible reserve of 9.7 million tonnes of Ni ore with average grade of 0.9% at 0.8% Ni cut-off and 16.70 million tonnes with average grade of 0.79% Ni at 0.5% cut-off have been estimated in the area.

g) Gold:

Gold mineralization has been reported around Jashipur, Suriagora, Gohaldongri, Ruansi, Munisahi, Bijatola and Kalimati areas where there are evidences of old mining as well as local panning activities. The auriferous lodes are reported around Jenadungri, Idelkucha, Dublabera, Ambadiha, Besarpahadi and Bhalukani etc. A few old pits and shafts have been reported in the area. Surface explorations carried out in these areas indicate significant geochemical anomalies in terms of Au, Cu, and As over a strike length of 600m to 1.5km. Surface sampling over limited areas showed 0.1 to 2.5 g/t of Au over 1m to 2 m width in bed rock. Panning brought out visible gold around Kudersai and Sigora at the headwaters of the Borai River. The alluvial gold is also reported in the river sand of Subarnarekha near Baripada. Similar occurrences are also



reported in the near vicinity of Ruansi and Gohaldungri along the Godia stream. Nuggets weighing between 23.25 to 31.1 gm are obtained from a gravel bed in the neighbourhood of Gohaldungri.

h) Gemstone (Emerald):

Natural Emerald, green Beryl and opaque Beryl are reported to occur around Jaraguda, Pokharidiha, Bahadurpur, Ichinda, Khairakocha, Jamukunda, Nakulkocha, Kapadiha, Dunguridiha, Maheshpur, Kashidiha, Sagragora and Pokpoka. These localities are broadly grouped in to two bands namely (i) Jaraguda-Jamkunda band (8km long and 100m to 180m wide) (ii) Nakulkochapahar-Pokpoka band (9km long and 50m to 80m wide). Natural Emerald is precious and Green Beryl is semiprecious, whereas opaque beryl has no gemmological values.

i) Asbestos:

Asbestos deposits are found near Jashipur, Amdiha, Asurghati, Kudarsahi, Jhulan-Ruansi, Mankargoria, Balidihi and Chirderbari area. The asbestos deposits of this district are of tremolite variety and are reported to be high in calcium and iron.

J) Kyanite:

Kyanite occurrences are found in association with mica schist near Bangiriposi, Purnapani, Simlipal, Karpal and Panjia. The Panijia deposit is believed to be workable. The alumina content of the kyanite varies from 40% to 55%. At places Dumortierite occurs in association with Kyanite, but the quality is rather poor.

k) Soapstone:

Soapstone, steatite and talc are three terms used in trade of the one and the same mineral. Extensive deposits of soapstone occur on the hillock south of Dindarani Parbat. small deposits are reported from Lulng, Dublabera, Mayrisahi, Kedumundi, Diring, Simlipahar, Nulungi, Betiguda, Burudihi, Fulkan and Kesna etc. The soapstone is used for making stone wares, statues and potteries.

l) Dimension Stone:

Dimension stone refers to granite, granite-gneiss, migmatites, syenite, gabbro, anorthosite, charnockite, leptynite, pyroxene granulite, dolerite, pyroxinite and dunite etc. Odisha is well established in production of dimension stone, as out of 150 varieties of granite known from



India, more than 20 varieties of granite are available in this state. In Mayurbhanj district various coloured and black granites are found around Harsadahi, Jashipur, Andharijhar, Hatibari and Galusahi area. The total recoverable resource of Dimension stone in this district is 5,25,0000 cubic meter (up to 10m depth) and 26,25,000 cubic meter (up to ground level) covering an area of about 0.465 sq.km.

m) Quartzite:

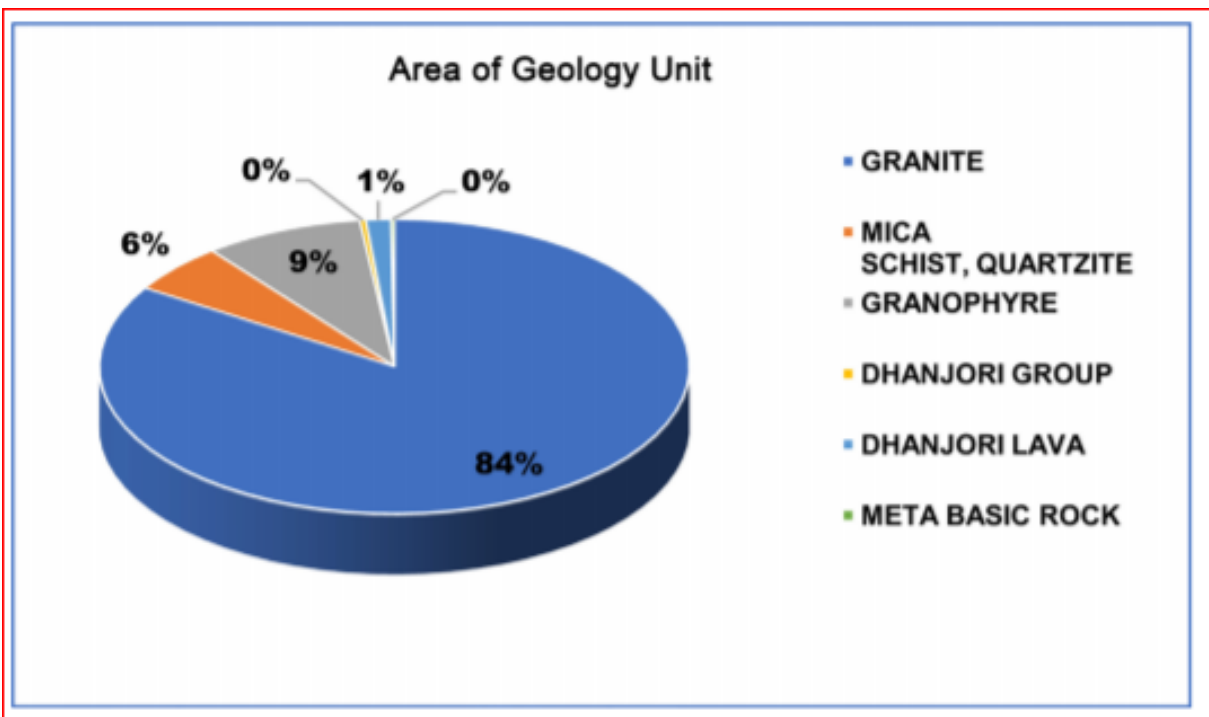
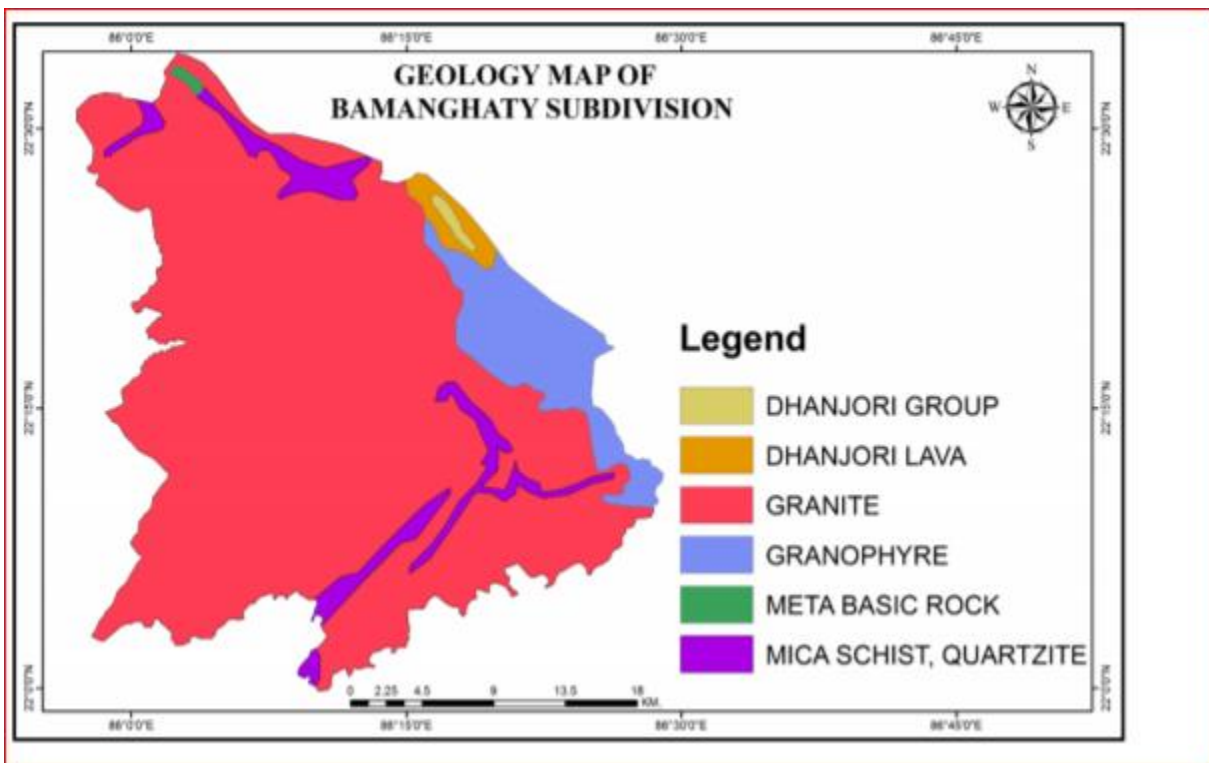
Extensive deposits of friable and almost pure quartzite occur near Souri, Balimunduli, Panjia, Kathsirsi and Balidihabandh. The quartzites available have been found to be suitable for manufacture of tinted glass for use in metallurgical industries. A large reserve of glass sand is available from the highly friable quartzite occurring around Panijia and east of Souri.

n) Manganese:

Manganese ore are mainly pyrolusite and psilomelane occur as stray pockets in Ostek and Budharaja. Total inferred manganese reserve in the district is of the order of 0.043 million tonnes. The Mn% varies from 30.75% to 41.45%.

o) Other Minerals:

Lime kankar occurs in moderate quantities along the banks of nallas and gullies of Ankulpur, Manda, Kusumbandh, Balidiha and Kuchi villages. This is locally used in pseudo cement industry. Yellow Ochre is found near Govindchandrapur. Andalusite is found near Patbera, Netraparbat, Kaliami and Kodalbani. Mica occurs near Sirsa at the vicinity of Bangriposi and Tangodia. The Tangodia area appeared to be promising. The pegmatite veins are exposed for considerable distance along the Sankrai river. Muscovite books and plates occurring in these pegmatite veins are found to be more than 8 sq. inches in size and blue coloured pyrophyllite are reported at Ankulpur and Ghagra near Jashipur.





1.3.3 Soil

Bamanghati Subdivision is characterized by the type of **soil** named as Laterite **soil** followed by other type of **soils** like Red **soil**, Brown Forest **Soil** and Black **Soil**. Though it is a high land yet a well drainage dendritic pattern, exists in it due to the river Kharkhai and its tributary Bankabala.

Soil Types: The soils of the district may be broadly grouped into two categories depending upon their occurrence, physical and chemical properties e.g. Alfisols, Ultisols.

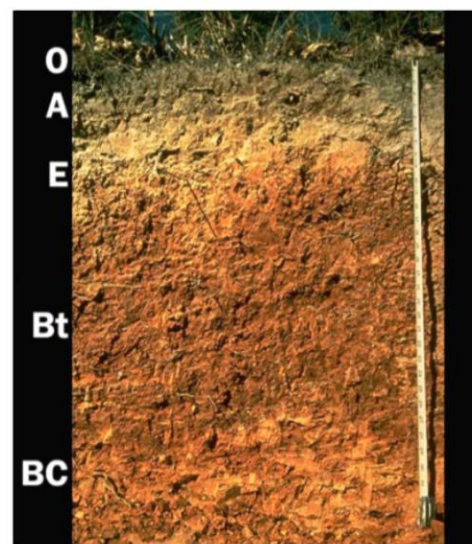
1.3.3.1 Alfisols :

It is distributed throughout the district, these include older alluvial soil and red earth soil. These soil are generally deficient in P O and N, pH varies in between 6.5-7.3. It is found under forest and savanna vegetation. Clay accumulations in subsoil horizons often are leached below topsoil (E horizon). It is generally fertile, with high **base saturation**%.



1.3.3.2 Ultisols:

It is a highly weathered leached red or reddish-yellow acid soil with a clay-rich B horizon, occurring in warm, humid climates. These soils include laterite, lateritic soil, red and yellow soil. These soils are poor in nitrogen, phosphate, potassium and organic matter. The pH ranges from 4.5-6.0.





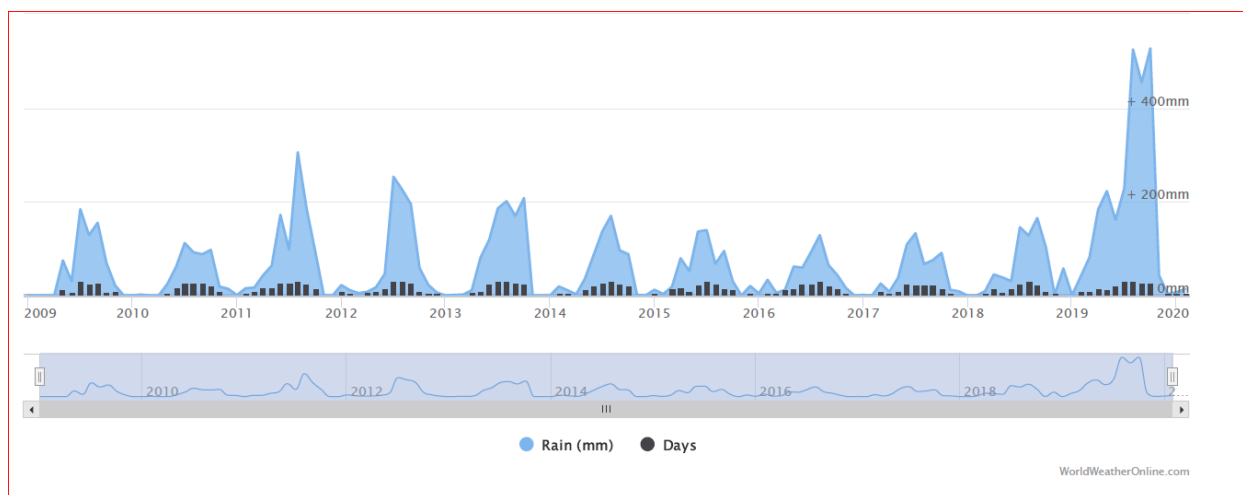
1.4 Climatic Parameters.

The district Mayurbhanj comes under “North Central Plateau agro-climatic region with an average rainfall of 1648.20 mm per annum. Being away from the coastal belt, the district experiences a sub-tropical climate with a hot summer, chilling winter with good precipitation.

1.4.1 Rainfall

The annual rain fall is about 1423mm. Most of the rainfall received is in between July-September. The rainfall recorded at Rairangpur for last 5 years is furnished below. The rainfall graph from 2009 to 2019 is also furnished in a graphical format which gives a clear position about rainfall.

Monthly Rainfall data of Rairangpur Division													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2015	5	0	67	149	59	129	691	109	30	80	0	61	1380
2016	7	19	2	0	106	163	113	367	231	9	17	0	1034
2017	2	0	29	0	192	108	453	334	127.5	256	33.5	0	1535
2018	0	0	0	143	101	188	291.5	426	232	69	0	57.5	1508
2019	0	130	64	107	155	175	139	468	210	206	0	4	1658
Total	14	149	162	399	613	763	1687.5	1704	830.5	620	50.5	122.5	7115
Avg	2.8	29.8	32.4	79.8	122.6	152.6	337.5	340.8	166.1	124	10.1	24.5	1423



1.4.2 Temperature:

The maximum temperature during hot weather raises upto 48.9⁰ C (120⁰ F) while the minimum temperature during cold season comes to 4.4⁰ C (40⁰ F). The relative humidity varies from

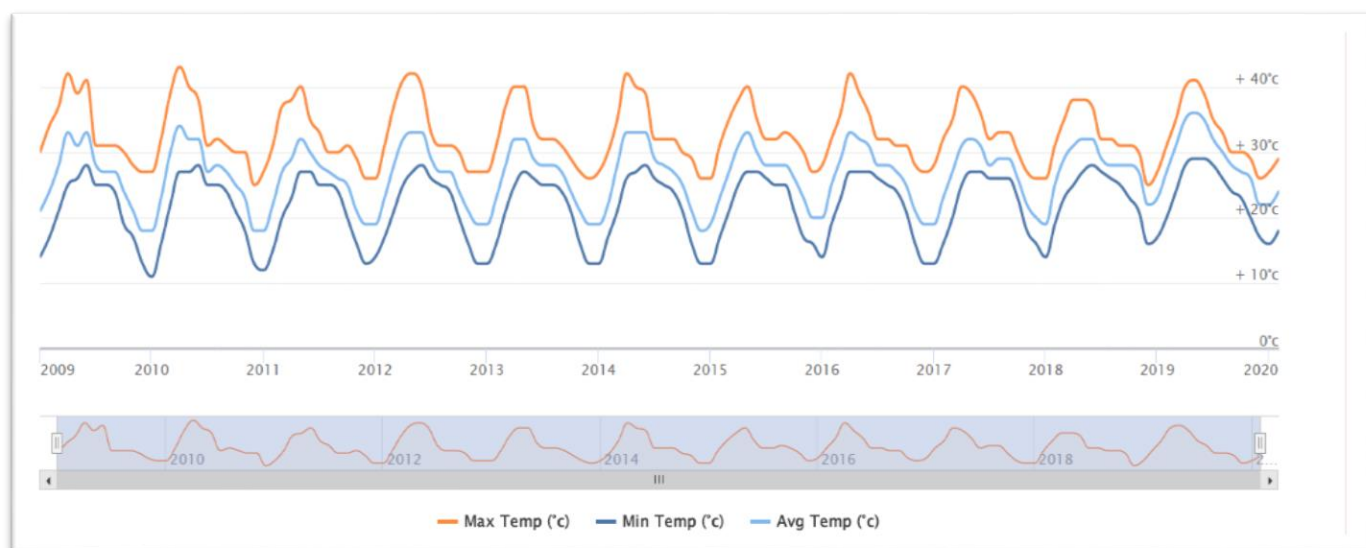


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25.0% to 82.5%. The mean temperature is found to vary from 21⁰ C to 29⁰ C. Due to proximity to the sea the humidity is higher on the Southern side. Portions of Panchipir Sub-Division and Similipal hills are cool in summer than other Sub-Divisions of the district. There is occurrence of heavy dew in the central highlands and in the forest clad areas in the southwest. Forest fire occurs annually in the western valleys of Similipal

Table No 1.8 Temperature in ⁰ C

Mo nth	2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
	M ax	M in	M ax	M in	M ax	M in	M ax	M in	M ax	M in	M ax	M in	M ax	M in	M ax	M in	M ax	M in	M ax	M in
Jan	27	12	26	12	26	15	27	13	28	14	28	15	28	14	28	13	26	14	27	17
Feb	32	17	31	16	31	18	31	17	31	17	33	18	32	19	32	15	31	19	31	20
Mar	40	22	37	21	36	22	37	22	26	22	36	23	36	23	35	20	35	25	35	24
Apr	46	27	40	24	41	27	41	27	43	27	40	24	42	27	40	25	38	27	40	28
May	43	29	42	28	43	29	42	29	43	28	44	30	39	27	39	27	38	32	31	29
Jun	40	29	37	28	41	30	36	27	42	30	39	29	36	27	36	27	37	27	39	29
Jul	32	25	33	25	34	27	34	26	35	27	35	27	32	26	32	26	32	26	35	28
Aug	33	22	31	25	32	25	33	25	34	25	35	26	32	25	33	29	32	25	33	26
Sept	31	24	30	24	32	24	34	24	34	24	35	25	31	24	33	29	31	21	30	24
Oct	31	21	31	21	31	20	30	22	32	21	34	22	31	21	30	23	31	16	30	24
Nov	29	19	29	17	28	16	30	16	31	16	32	19	28	16	27	18	30	23	29	23
Dec	25	14	26	14	27	13	28	14	28	13	30	17	27	13	26	16	25	21	26	17





1.4.3 Humidity

The tract experiences a dry climate. Humidity is comparatively at a low during winter (35-45%); summer (50%- 70%) and above 85% in August.

1.4.4 Wind

The area experiences wind from South West direction in monsoon which usually brings rain to this division. During winter North East wind brings cold wave. The preferred direction in different period is furnished below.

Season	Preferred Direction	Wind Speed in KM/hr in an average.
Summer	North-West	70
Monsoon	North-East	50
Autumn	South-West	45
Pre-winter	South-West	30
Winter	South-West	20
Spring	South-East	25

1.4.5 Drought

Drought is not normally felt in this division during last 10 years except in the year 2010, 2014 and 2015. The following blocks were declared as drought affected by the Government of Odisha.

Year	Name of CD Blocks declared as Drought affected
2010	Bahalda, Jamda
2014	Jamada, Bahalda, Kusumi, Bisoi
2015	Bahalda

1.4.6 Frost

No frost occurred in the division. At Similipal national Park, frost occurs during December-January and makes the climate very pleasant.



1.4.7 Cyclone / Storm

The state as well as the district faced cyclonic storm during 2013, 2014 and 2019. As the Rairangpur division is very far away from Sea coast and Similipal Hill Range stands in between Sea and this division, the effect is very marginal and limited to high rainfall with moderate wind.

1.4.8 Flood

There is no major river in this tract. No flood is normally occurs in this tract.





CHAPTER-2

MAINTENANCE & INCREASE IN THE EXTENT OF FOREST AND TREE COVER:

2.1 Area of Forests under different legal Classes:

The Rairangpur Forest Division has Reserved Forests/ Proposed Reserved Forests/ Demarcated Protected Forests/ Protected Forests and Village Forests covering an area of 44418.994 hectares at detailed below.

2.1.1 Reserved Forests:

The List of reserved forests coming within the administrative jurisdiction of Rairangpur division and coming within this Working Plan perview is furnished at **Table No 2.1. The Reserve notification is attached as Annexure-III**

Table No 2.1 List of Reserved Forests in Rairangpur division.

Name of the Range	Sl. No.	Name of RF	Area in Ha.	Notification No.
1	2	3	4	5
Badampahar	1	Badampahar (part)	2746.48	-
	2	Basila	220.54	-
	3	Hat Badra	90.54	-
	4	Dublabeda	498.16	-
	5	Jhatisiring	28.32	F.S.-86/77/85-R dt.02.01.1978
	6	Kherna	495.72	-
		Range Total	4079.76	-
Rairangpur	7	Brahmani	763.28	-
	8	Gorumahisani	2462.40	-
	9	Ichinda	64.14	-
	10	Hatibari	85.60	-
	11	Jari	2982.00	-
	12	Jhumukapahadi	70.40	-
	13	Karan Jharan Dhasra	540.60	-
	14	Kucheibudhi	211.52	-
	15	Naskaria	96.00	-



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Table No 2.1 List of Reserved Forests in Rairangpur division.

	16	Dumurikudar	34.40	-
		Range Total	7310.34	-
Bahalda	17	Tiring	766.44	-
	18	Bankmundi	433.30	-
	19	Ramgarh Asurghaty	907.06	-
	20	Chahalapada	620.80	-
	21	Debradihi	45.08	-
	22	Gambharia	455.26	-
	23	Manbir	656.52	-
	24	Budheirana	1376.34	-
	25	Khairpal	56.39	-
		Range Total	5317.19	-
Bisoi(WL)	26	Sargoda	106.78	FS-8/84-28709/R dt.29.05.1985
	27	Mahubhandar	1048.78	-
	28	Tunguru	3656.80	-
	29	Kanapat	3640.40	-
	30	Sarali	2028.90	-
	31	Tower –I	187.84	-
	32	Tower –II	13.35	-
		Range Total	10682.85	-
Manada	33	Tualsibani	3.50	SRO No. 873/75 dt.14.11.1975
	34	Khadambeda	80.52	FS 57/72-7340/F dt.04.02.1972
		Range total	84.02	-
	Division Total- 34 RF		27474.16	

2.1.2 Proposed Reserved Forests (PRF)

There is only one PRF in Bisoi Wildlife Range. The details of the PRF are furnished below (**Table No 2.2**). The PRF Notification is attached as Annexure-IV

Table No 2.2 List of PRF coming within Rairangpur Division.

Bisoi(WL)	1	Bidhubhandar PRF	10871.25	Dt. 28.05.1962
		Total PRF	10871.25	

2.1.3 Demarcated Protected Forests:

There are 39 DPF (Demarcated Protected Forests) in the Division. The details have been furnished at **Table No 2.3**



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 2.3 List of DPF (Demarcated Protected Forests) of Rairangpur Division.

Name of the Range	Sl No.	Name of the D.P.F.	Area in Ha.	Notification No.
1	2	3	4	5
Badampahar	1	Baneikala	52.22	FS 318/79-73580/8/R/18.10.79
	2	Dubulabeda	34.90	-
	3	Gundurua	20.72	FS 375/79-85324/R dt. 03.11.79
	4	Hatnabeda	81.95	FS 369/79-86569/R dt. 05.12.79
	5	Jaydhanposi	8.92	FS 109/80-21742/R dt. 22.03.80
	6	Jhatisiring	77.19	75-180/69/R dt. 01.09.69 (
	7	Patijhari	26.81	FS 309/78/82542/R 21.11.79
	8	Tirilipi	380.00	-
	9	Ukam-I	57.16	FS 142/82-40003/R dt. 19.06.84
	10	Sargoda –II	91.49	FS 125/79-34132/R dt. 01.05.79
		Range Total	831.36	
Rairangpur	11	Anandpur	24.28	FS 306/79-74339/R/22.10.79
	12	Badjari	47.69	FS 311/79-74343/R/22.10.79
	13	Betjharan – I	118.55	FS 143/42-3888/R dt.19.06.84
	14	Betjharan – II	85.36	FS 144/82-3888/R dt. 19.06.84
	15	Betjharan – III	32.74	FS 145 /82/39883/R/18.06.84
	16	Belpahari – VI	22.96	FS 141/82/40019/R/19.06.84
	17	Balarampur	120.80	S 108/85-46248/8/22.07.84
	18	Dahupani	1328.14	-
	19	Gorumahisani	20.13	FS 358/78-71888/R dt. 11.10.79
	20	Jhumkapahadi	21.85	FS 121/80-22305/R dt. 24.03.80
	21	Juapahadi	41.98	FS 106/83-46244/R dt. 12.07.84
	22	Kalataamak	29.95	FS 155/80-21746/R dt. 22.03.1980
	23	Kucheibudi	38.10	FS 120/80-21678 dt. 22.03.1980
	24	Radho	505.86	FS 123/79-43160/R dt. 07.06.79
	25	Saragada	124.44	-
	26	Merudihi	114.49	FS 325/79-73596 dt. 18.10.79
	27	Bhatgoda	20.24	-
		TOTAL	2697.56	-
Bahalda Range	28	Bahalda	25.49	FS 111/83-50130/R/27.07.84
	29	Bhitaramda	1060.62	FS 135/80-19511/R/25.03.81
	30	Dumadihi	36.73	N112/83-50134/R/27.07.84
	31	Jadunathpur	20.23	-
	32	Rutughutu	20.49	
	33	Sansadam	60.70	FS 109/83-50140/R dt. 27.08.83
	34	Salei	60.70	
		Range Total	1284.96	



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 2.3 List of DPF (Demarcated Protected Forests) of Rairangpur Division.

Manada Range	35	Dhenkia	384.34	FS case No. 16/65
	36	Ektali	3.79	FS- 331/7-74319 dt. 22.10.79
	37	Jamda-V	15.52	FS 140/82-40015/R dt. 19.06.84
	38	Pidhakata	335.20	FS 110/83-50126/R dt. 27.07.84
		Range Total	738.85	
Bisoi (WL) Range	39	Asansikal	34.65	FS 154/80-21722/22.03.80
		Range total	34.65	
	Divi. Total 39 -DPF		5587.38	

2.1.4 Village Forest (As notified u/s 30 of OFA,1972):

The village Woodlots created during Social Forestry Project has been declared u/s 30 of the Odisha Forest Act, 1972 as "Village Forest" The list of such Village Forests is furnished at Table no 2.4 below. The Village Forest Notification is attached as **Annexure-V**

Table No 2.4 List of Village Forest of Rairangpur Division.

Name of the Range	Sl No.	Name of the VF	Area in ha.	Notification No. & Dt.
Badampahar	1	Gopalpur	1.688 1.720	AFFN(SIDA)86/91 3768/FE , dt.18.02.1992
	2	Kaduani	6.720 1.720	
	3	Chingudipokhari	2.6 14.00	
	4	Bakedihi	2.240	
	5	Chulibhanga	12.460	AFFN(SIDA)34/90 20931/FE dt.30.08.1990
	6	Chahalapada	5.00	
	7	Chhanua	5.00	
	8	Dalki	5.00	
	9	Kasiabeda	10.00 15.00	1624AFFN (SIDA) 86/91 F&E Dt.23./24.01.1992
	10	Tirilidihi	10.00	
	11	Jhipabandh	7.672	
	12	Pechadara	13.356	1624AFFN (SIDA) 86/91 F&E Dt.23./24.01.1992
	13	Pandugandi	15.00	
	14	Dova	15.00	
	15	Ghodadega	10.00	AFFN(SIDA)34/90 20931/FE dt.30.08.1990
	16	Bargimora	10.00	
		Range Total	164.176	



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 2.4 List of Village Forest of Rairangpur Division.

Rairangpur	17	Kalarda	2.080	AFFN(SIDA) 86/913768/FE dt.18.02.1992
	18	Sijukala	0.160	
	19	Haldibani	5.00	
	20	Neuti	7.00	
		Range Total	14.24	
Bahalda	21	Gambharia	2.80	AFFN(SIDA)86/91 3768/F&E dt.18.02.1992
	22	Bhadusahi	1.408	
	23	Gudta	3.8	
	24	Jaritandi	1.540	
	25	Chadri	9.916	
	26	Surda	1.112	
	27	Asana	5.00	
	28	Kumbhirmundi	5.00	
	29	Dubulabeda	3.00	
			5.800	
	30	Bhaleidihi	3.960	AFFN(SIDA)86/91 3768/F&E dt.18.02.1992
	31	Kainpur	10.00	
			10.00	
	32	Jashipur	9.948	
	33	Jhadgaon	1.100	
	34	Gayalkata	0.280	
	35	Kuldiha	7.088	
	36	Brahmanbose	0.572	
	37	Pasna	9.00	
	38	Tarana	15.00	
		Range total	106.324	
Manada	39	Dhana	1.464	AFFN(SIDA) 86/91 3768/FE dt.18.02.1992
		Range total	1.464	
Division Total			286.204	

2.1.5 Protected Forests:

Only one block is considered as Protected Forest in the division. The list is furnished below as Table No 2.5

Table No 2.5 List of Protected Forest in Rairangpur Division.

Name of the Range	Sl No.	Name of the PF	Area in ha.	Notification No. & Dt.
Bisoi (WL) Range	1	Hatichhad PF	200.00	-
	Range Total - PF		200.00	-



2.1.6 Un Classed Forest

The area under administrative control of Forest department but not declared under provisions of Odisha Forest Act, 1972 are considered as un classed Forests. Such areas are furnished at **Table No 2.6**

Table No 2.6 List of Un- Classed Forests of Rairangpur Division.

Sl No.	Name of the Range	Description of Un-classed Forest	Area in ha.
1	Bahalda	F.R Quarters Jharadihi-cum-Campus F.G Quarters Bahalda-cum-Campus Pump House Mega Nursery Dumadihi R.O. Building Bahalda-cum-Campus Nursery shed Dumadihi Mega Nursery Range Office Boundary Wall Bahalda F.G Quarters Tiring-cum-Campus Barrack Bahalda-cum-Campus F.R Quarters Bahalda-cum-Campus F.R Quarters Sunamora-cum-Campus F.R Quarters Manbir-cum-Campus Office Building Dumadihi Mega Nursery Labour shed Dumadihi Mega Nursery Watch men Shed Dumadihi Mega Nursery Compound Wall Dumadihi Mega Nursery Boundary Wall Tiring Store House Dumadihi Mega Nursery Seed Godown Dumadihi Mega nursery Drying Yard Dumadihi Mega Nursery Pump House Dumadihi Mega Nursery Mixing yard Dumadihi Mega Nursery Vermi Compost Dumadihi Mega Nursery F.R Quarter Jamda-cum-Campus F.G Quarter Jamda-cum-Campus F.R Quarter Jharadihi-cum-Campus Compound Wall Jamda Boundary Wall Jharadihi	12.50



Table No 2.6 List of Un- Classed Forests of Rairangpur Division.

2	Badampahar	Range Officer Residence-cum-Campus Badampahar Forest Range Office Campus Forest Rest House-cum-Campus Watch Tower Suleipat Watch Tower Dubulabeda R.F Near Edelbeda Permanente Protection Camp Patharkata Permanente Protection Camp Badampahar Forest Range Office Campus Section Office-Cum-Residence Badampahar Section Office Campus Section Office-Office –Cum-Residence Hatbadra Section Office Campus Forester Quarters Suleipat Section Office Campus Forest Guard Quarters Badampahar Beat-cum-Campus Forest Guard Quarters Talapati Beat-cum-Campus Forest Guard Quarters Purunapani Beat-cum-Campus Forest Guard Quarters Hatbadra Beat-cum-Campus Forest Guard Quarters Dubulabeda Beat-cum-Campus Forest Guard QuarterSuleipat Beat-cum-Campus Forest Guard Quarters Jamjhari Beat-cum-Campus	9.90
3	Bisoi(WL)	Range Office BuldingKadapani-cum-Campus Range Officers Resident Kadapani-cum-Campus Forester Quarter, Rajabasa sectionKadapani-cum-Campus Forest Guard Quarter, Dudkundi BeatKadapani-cum-Campus Forest Guard Quarter, Deopatta BeatKadapani-cum-Campus Nursery shade Common public Toilet Kadapani Forest Guard Quarter, N.B. Pokharia BeatKadapani-cum-Campus Forest Guard Quarter, Manada BeatBangriposi-cum-Campus Seizure Yard	7.40



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 2.6 List of Un- Classed Forests of Rairangpur Division.

4	Rairangpur	Range office-cum-campus Rairangpur Forester Quarter, Rairangpur-cum-campus Forest Guard Quarter, Rairangpur-cum-campus Forest Guard quarter, Dublabeda-cum-campus Forest Guard quarter, Ichinda-cum-campus Forest Guard quarter, Anlajodi-cum-campus Forester Quarter, Saragoda-cum-campus Forest Guard quarter, Saragoda-cum-campus Forester quarter, Badamtalia-cum-campus Forest Guard Quarter, Bijatala-cum-campus Forest Guard quarter, Luhasila-cum-campus Forest Guard Quarter, Khanta-cum-campus Forest Guard Quarter, Dhalabeda-cum-campus Forest Guard Quarter, Gorumahisani-cum-campus Forest Guard quarter, Chhatramandal-cum-campus Nursery shed, Kucheibudhi P.N Nursery Shed, Ramchandrapur P.N Malkhana, Range Office Rairangpur DFO Office Building Rairangpur DMU Building Rairangpur DFO's Residential Building Rairangpur VHF Control Room Rairangpur Rest shed-cum-Seed Godown Rairangpur Barack Rairangpur Ministerial Qrts-5 nos. Rairangpur ACF Residential Building Rairangpur VFW Qrts adjacent to DFO Office Building-1 no. Rairangpur Nursery Shed inside Forest colony Rairangpur Seed Godown Qrts-1 no. Rairangpur Head Clerk Qrts Rairangpur VFW Qrts-1 no Rairangpur Peon Qrts-3 nos. Rairangpur Clerical Qrts-2 nos. Rairangpur SFP Range Office-cum- Residence Rairangpur	30.30
5	Manada	Range Office Building-cum-Campus Barrak cum-Campus Forester Quarters-cum-Campus	2.90



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 2.6 List of Un- Classed Forests of Rairangpur Division.

		Range Officer Quarters- cum-Campus Seizure Yard-cum-Campus Nursery Shed- cum-Campus F.G. Quarters- cum-Campus	
		Division Total	63.00

2.1.7 DLC Forest:

The DLC Forest accepted by District level Committee and submitted to Supreme Court of India is being maintained at Division Level and Tahasil Level. The Range wise / Tahasil wise abstract of DLC Forest is furnished at Table No 2.7 below.

Table No 2.7 DLC Forest in the Division.

Sl No.	Range	Name of the Tahasil	No. of Villages involved	DLC Forest		Total
				In ac	In ha.	
1	Bahalda	Bahalda	112	4321.32	1749.522	3058.061
2	Bahalda	Jamda	64	1933.78	782.907	
3	Bahalda	Tirirng	87	1298.31	525.632	
4	Badampahad	Badampahar	115	8112.85	3284.555	3284.555
5	Rairangpur	Rairangpur	285	13059.486	5287.241	5287.241
6	Bisoi WL	Bisoi	128	8917.350	3610.263	3610.263
		TOTAL	791	37643.096	15240.12	15240.12

The DLC Documents are voluminous and provided at **PART –III** of the Working Plan.

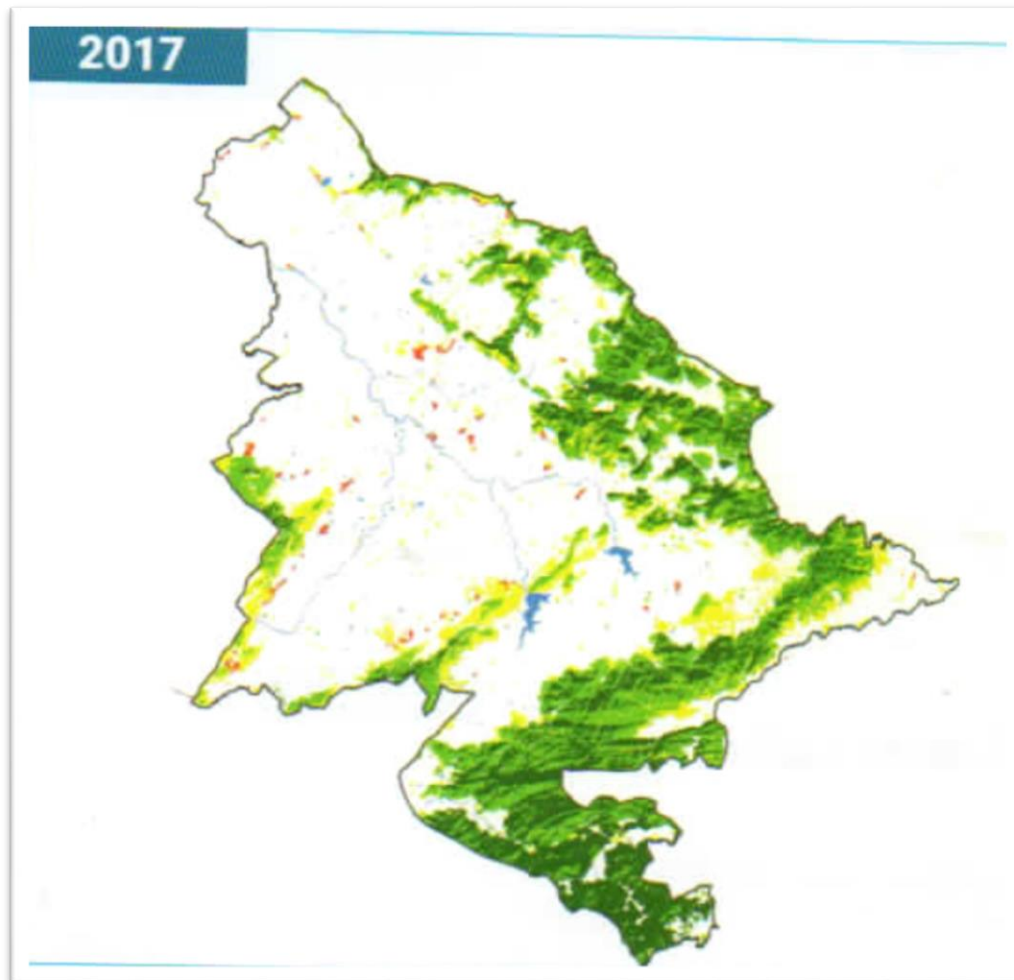
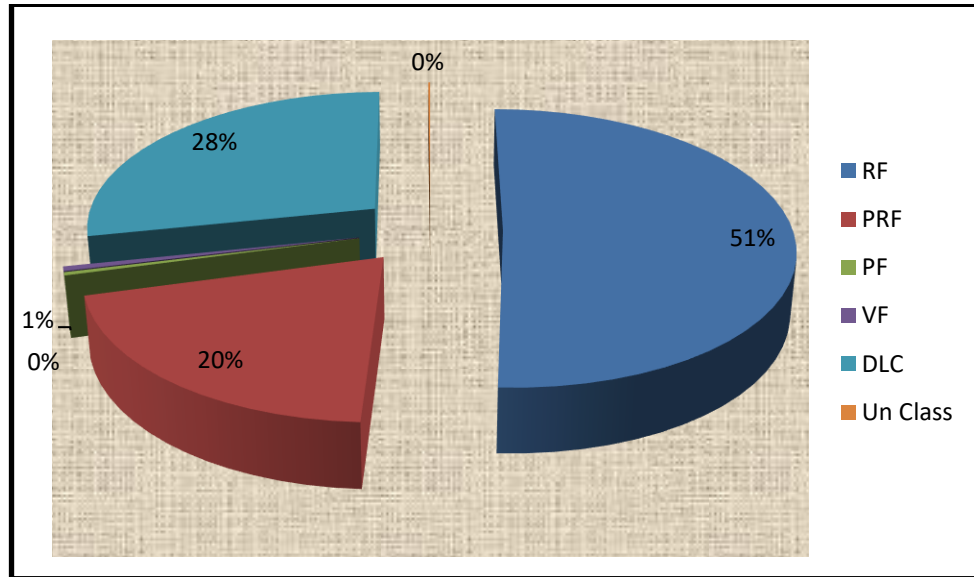
2.1.8 Total Forest area of the Division:

The Total Forest area in the Division is furnished in Table No 2.8

Table No2.8 Total Forest in the Rairangpur Division.														
Range	Reserved forest		PRF		DPF		PF		Village Forest		DLC Forest		Un-Classed in ha	Total Forest In Ha
	No	Area in ha	No	Area in ha	No	Area in ha	No	Area In ha	No	Area in ha	Village No	Area in ha		
Badampahad	6	4079.76			10	831.36			16	164.176	115	3284.555	9.90	8369.751
Rairangpur	10	7310.34			17	2697.56			4	14.24	285	5287.241	30.30	15339.68
Bahalda	9	5317.19			7	1284.96			18	106.324	263	3058.061	12.50	9779.035
Bisoi WL	7	10682.85	1	10871.25	1	34.65	1	200.0	0	0	128	3610.263	7.40	25406.41
Manada	2	84.02			4	738.85			1	1.464			2.90	827.234
Division Total	34	27474.16	1	10871.25	39	5587.38	1	200.0	39	286.204	791	15240.1	63.00	59722.11
% to total G. Area.		13.72		5.43		2.79		0.10		0.14		7.61	0.03	29.82

The total Forest area in the division has been computed to be **59,722.094** ha, which is **29.82%** of the total geographical area of the division.

The Forest cover map as prepared by FSI (Forest Survey of India) during 2017 is furnished below to illustrate the forest cover available and its location & distribution over the Division.





2.2 Forest Area under different Working Circle in Outgoing Plan:

The Rairangpur Division has been created by carving out area from Karanjia Forest Division. The outgoing plan was prepared by Sri A.O.F. Bakla IFS. The plan was for the period 1996-97 to 2015-16 i.e. for 20 years. The plan was for Karanjia and Baripada Division combine. At that time Rairangpur Division was not constituted. The prescriptions those are applicable for forests of Rainagepur Division were considered for preparing PWPR during 2016. Again it is now reorganized with effect from 01st October'2019. After further reorganization, the plan prescriptions as relates to present forest blocks within the division are only considered in this chapter for discussion.

2.2.1 Working Circles of Outgoing Plan:

The outgoing plan prescribed three working circle for the division i.e. Rehabilitation Working Circle, Plantation Working Circle and Wildlife (Overlapping) Working Circle. The Reserved Forest Blocks were only considered for management. The area distribution to different working circle is as given in Table No 2.9.

Table No 2.9 Area Allotment to Different Working circle as per Outgoing Plan.						
Name of the Range	Sl No	Category of forest	Total area under management	Name of the Working Circle and area allotted in ha.		
				RWC	PWC	WL (O) WC
Badampahar	1	Badampahar RF	2746.48	2746.48	0	2746.48
	2	Basila RF	220.54	220.54	0	220.54
	3	Dubulabeda RF	498.16	498.16	0	498.16
	4	Jhatisiring RF	28.32	28.32	0	28.32
Rairangpur	5	Jari RF	2982.00	2982.00	0	2982.00
	6	Jhumkapahadi RF	70.40	70.40	0	70.40
	7	Gorumahisani RF	2462.40	2462.40	0	2462.40
	8	Dumurikudar RF	34.40	34.40	0	34.40
	9	Brahamani RF	763.28	763.28	0	763.28
Bahalda	10	Manbir RF	656.52	656.52	0	656.52
	11	Budheirana RF	1376.34	1376.34	0	1376.34
	12	Ramgarh Asurghaty RF	907.06	907.06	0	907.06
	13	Debradihi	45.08	45.08	0	45.08
Bisoi(WL)	14	Tunguru RF	3656.80	3656.80	0	3656.80
	15	Mahubhandar RF	1048.78	1048.78	0	1048.78
	16	Kanapat RF	3640.40	3640.40	0	3640.40

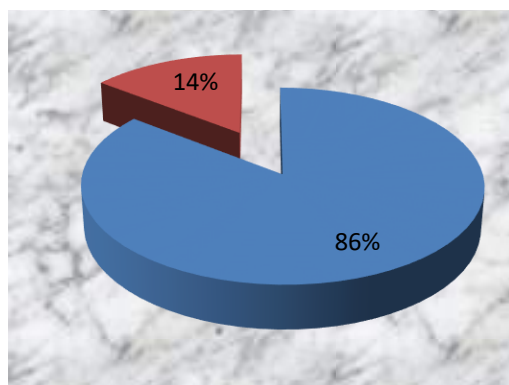


Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 2.9 Area Allotment to Different Working circle as per Outgoing Plan.

Name of the Range	Sl No	Category of forest	Total area under management	Name of the Working Circle and area allotted in ha.		
				RWC	PWC	WL (O) WC
Manada	17	Sarali RF	2028.90	2028.90	0	2028.90
	18	Tower-I&II RF	201.19	201.19	0	201.19
	19	Tulasibani RF	3.50	3.50	0	3.50
	20	Khadambada RF	80.52	80.52	0	80.52
		TOTAL	23451.07	23451.07	0	23451.07
Badampahar	21	Kherna RF	495.72	-	495.72	495.72
	22	Hat Badra RF	90.54	-	90.54	90.54
Rairangpur	23	Sargoda RF	106.78	-	106.78	106.78
	24	Karanjharan Dhusura RF	540.60	-	540.60	540.60
	25	Hatibari RF	85.60	-	85.60	85.60
	26	Naskaria RF	96.0	-	96.0	96.0
	27	Kucheibudhi RF	211.52	-	211.52	211.52
	28	Ichinda RF	64.14	-	64.14	64.14
Bahalda	29	Chahalapada RF	620.80	-	620.80	620.80
	30	Gambharia RF	455.26	-	455.26	455.26
	31	Tiring RF	766.44	-	766.44	766.44
	32	Bankamundi RF	433.30	-	433.30	433.30
		Total	3966.70		3966.70	3966.70
		G. Total	27417.77	23451.07	3966.70	27417.77

(NB: Khairpal RF of Bahalda Range was not included in the outgoing plan. This is included in this plan. RF Tower –I and Tower-II were taken as one combindly, now considered as two RF units.)





2.3 Percentage of Forest with Secured Boundaries:

There are 34 Reserved Forest block, 1 PRF, 39 DPF, 1 PF and 39 Village Forest blocks. The pillars of RF, PRF and DPF are posted maintained regularly. The current position RF, PRF and DPF are as follows. No detail survey has been done for PF and VF of the Division.

Table No 2.10 A Position of Boundary pillars in RF/ PRF of Rairangpur Division.

Name of the Range	Sl. No.	Name of RF/PRF	Area in ha.	Length of Boundary (in KM)	Condition of B. Pillars (no)			
					Total	Good	Damaged	Missing
Badampahar	1	Badampahar (part)	2746.48	56.3	473	153	253	67
	2	Basila	220.54	8.85	51	20	26	5
	3	Hatbadra	90.54	4.13	53	10	33	10
	4	Dublabeleda	498.16	11.4	93	55	22	16
	5	Jhatisiring	28.32	2.71	21	5	11	5
	6	Kherna	495.72	20.5	252	30	202	20
Rairangpur	7	Brahmani	763.28	21.2	200	175	25	0
	8	Gorumahisani	2462.40	35.5	157	135	22	0
	9	Ichinda	64.14	5.37	67	58	9	0
	10	Hatibari	85.60	6.17	73	68	5	0
	11	Jari	2982.00	33.2	141	121	20	0
	12	Jhumukapahadi	70.40	3.72	35	10	25	0
	13	Karan Jharan Dhasra	540.60	18.6	65	51	14	0
	14	Kucheibudhi	211.52	8.8	57	39	18	0
	15	Naskaria	96.00	4.38	47	29	18	0
	16	Sargoda	106.78	5	56	48	8	0
	17	Dumurikudar	34.40	2.7	46	21	5	20
Bahalda	18	Tiring	766.44	47	353	306	47	0
	19	Bankmundi	433.30	14.2	68	42	26	0
	20	Ramgarh Asurghaty	907.06	34.7	137	100	37	0
	21	Chahalapada	620.80	19.5	82	48	34	0
	22	Debaradihi	45.08	3.18	18	9	9	0
	23	Gambharia	455.26	19.3	88	30	58	0
	24	Manbir	656.52	18.5	51	25	26	0
	25	Budheirana	1376.34	27.4	140	100	40	0
	26	Khairpal	56.39	5.32	21	10	8	3
Bisoi(WL)	27	Mahubhandar	1048.78	14.4	234	198	36	0
	28	Tunguru	3656.80	49.70	324	161	144	19
	29	Kanapat	3640.40	51.40	152	130	20	2



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Table No 2.10 A Position of Boundary pillars in RF/ PRF of Rairangpur Division.

Name of the Range	Sl. No.	Name of RF/PRF	Area in ha.	Length of Boundary (in KM)	Condition of B. Pillars (no)			
					Total	Good	Damaged	Missing
	30	Sarali	2028.90	32.70	201	191	10	0
	31	Tower-I	187.84	5.56	21	12	9	0
	32	Tower-II	13.35	1.42	9	1	8	0
	33	Tulsibani	3.50	0.93	21	16	2	3
Manada	34	Khadambada	80.52	5.37	37	29	8	0
G. TOTAL OF RF			27474.160	599.110	3844	2436	1238	170
Bisoi(WL)	1	Bidhubhandar	10871.25	55	198	150	30	18
		TOTAL PRF	10871.25	55	198	150	30	18
		G. Total	38345.41	654.11	4042	2586	1268	188
		Percentage				63.98	31.37	4.65

Table No 2.10 B Positions of Boundary pillars in DPF of Rairangpur Division.

Name of the Range	Sl. No	Name of DPF	Area in ha.	Length of Boundary in Km	Condition of B. Pillars (no)			
					Total	Good	Damaged	Missing
Rairangpaur	1	Anandpur	24.28	2.55	25	13	5	7
	2	Badjari	47.69	2.73	22	7	15	0
	3	Betjharan- I	118.55	4.47	21	21	0	0
	4	Betjharan- II	85.36	4.44	20	20	0	0
	5	Betjharan- III	32.74	2.59	14	14	0	0
	6	Belpahadi- VI	22.96	3.49	29	17	12	0
	7	Balrampur	120.8	5.86	37	36	1	0
	8	Dahupani	1328.14	28.7	62	60	2	0
	9	Gorumahisani	20.13	1.8	18	18	0	0
	10	Jhmukapahadi	21.85	2.13	20	20	0	0
	11	Juapahadi	41.98	2.76	20	14	6	0
	12	Kalatomok	29.95	2.57	12	12	0	0
	13	Kuchaibudhi	38.1	2.96	10	10	0	0
	14	Radho	505.86	13.4	53	53	0	0
	15	Sarogada	124.44	6.1	31	11	20	0
	16	Merudihi	114.49	4.36	26	11	11	4
	17	Bhatgoda	20.24	1.7	17	17	0	0
Bahalda	18	Bahalda	25.49	5.68	102	88	14	0



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Table No 2.10 B Positions of Boundary pillars in DPF of Rairangpur Division.

Name of the Range	Sl. No	Name of DPF	Area in ha.	Length of Boundary in Km	Condition of B. Pillars (no)			
					Total	Good	Damaged	Missing
	19	Bhitaramda	1060.62	34.8	277	67	210	0
	20	Damadihi	36.73	3.99	55	39	16	0
	21	Jadunathpur`	20.23	2.53	22	11	11	0
	22	Rutughutu	20.49	2.5	26	26	0	0
	23	Sansadan	60.7	4.69	30	6	24	0
	24	Salei	60.7	4	31	19	12	0
Badampahad	25	Baneikala	52.22	3.57	21	5	8	8
	26	Dubulabeda	34.9	3	23	7	12	4
	27	Gundurua	20.72	2.5	25	15	3	7
	28	Hatnabeda	81.95	4.73	37	4	33	0
	29	Jaydhanposi	8.92	1.77	12	8	4	0
	30	Jhatisiring	77.19	5.55	61	28	23	10
	31	Patijhori	26.81	3.52	28	12	9	7
	32	Trilipi	380	11.9	96	30	54	12
	33	Ukam- I	57.16	3.68	30	3	20	7
	34	Saragda-II	91.49	5.52	40	23	14	3
Bisoi	35	Asansikal	34.65	5.52	50	31	19	0
Manada	36	Dhenkia	384.34	11.6	81	43	38	0
	37	Ektali	3.79	0.97	12	7	0	5
	38	Jamda V	15.52	2.1	47	47	0	0
	39	Pidhakata	335.2	10.6	99	64	6	29
		Total	5587.38	227.33	1642	937	602	103
		Percentage				57.06	36.66	6.27

Abstract of Pillar Position

Category of Forest	Boundary Length in KM	No of Total Pillars as per map	Position		
			Good	Damaged	Missing
RF	599.110	3844	2436	1238	170
PRF	55	198	150	30	18
DPF	227.33	1642	937	602	103
PF	Not assessed				
VF	Not assessed.				
Total	881.44	5684	3523	1870	291
Percentage			61.98	32.90	5.12



On analysis of data it is observed that out of Total 5684 pillars, 3523 (61.98%) pillars are in good condition balance 2161 (38.02%) are either in damaged condition or mission. Over all it can be inferred as boundary is secured. Detail verification for PF and VF may be taken up in a time bound manner.

2.3.1 Boundary Maintenance cycle suggested:

The boundary of the forest pillars will be maintained in a cycle of 5 years to improve the boundary condition. Maintenance cycle to be followed during plan period is furnished below.

Table No. 2.11: Boundary Maintenance cycle suggested.		
Year of Boundary maintenance	Sl no	Name of the forest block
2021-22 & 2026-27	1	Badampahar (part) RF
	2	Brahmani RF
	3	Tiring RF
	4	Mahubhandar RF
	5	Tulsibani RF
	6	Jhatisiring RF
	7	Karan JharanDhasra RF
	8	Bidhubhandar (part) PRF
	9	Anandpur DPF
	10	BahaldaDPF
	11	BaneikalaDPF
	12	AsansikalDPF
	13	DhenkiaDPF
	14	BalrampurDPF
	15	SansadanDPF
	16	PatijhoriDPF
2022-23& 2027-28	17	Basila RF
	18	Gorumahisani RF
	19	Bankmundi RF
	20	Tunguru RF
	21	Khadambada RF
	22	Kherna RF
	23	Jhumukapahadi RF
	24	Bidhubhandar (part) PRF
	25	BadjariDPF
	26	DahupaniDPF
	27	JadunathpurDPF
	28	SaleiDPF



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	29	DubulabedaDPF
	30	TrilipiDPF
	31	EktaliDPF
	32	PidhakataDPF
2023-24 & 2028-29	33	Hatbadra RF
	34	Ichinda RF
	35	RamgarhAsurghaty RF
	36	Kanapat RF
	37	Sarali RF
	38	Jari RF
	39	Manbir RF
	40	Bidhubhandar (Part) PRF
	41	Betjharan- I DPF
	42	Betjharan- II DPF
	43	Betjharan- III DPF
	44	BhitaramdaDPF
	45	GunduridaDPF
	46	Ukam- IDPF
	47	Jamda VDPF
	48	JaydhanposiDPF
2024-25 & 2029-30	49	Dublabeda RF
	50	Hatibari RF
	51	Sargoda RF
	52	Budheirana RF
	53	Khairpal RF
	54	Tower-I RF
	55	Tower-II RF
	56	Bidhubhandar (Part) PRF
	57	RadhoDPF
	58	SarogadaDPF
	59	MerudihiDPF
	60	DamadihiDPF
	61	HatnabedaDPF
	62	Saragda-IIDPF
	63	JhatisiringDPF
2025-26 & 2030-31	64	Kucheibudhi RF
	65	Naskaria RF
	66	Dumurikudar RF
	67	Chahalapada RF



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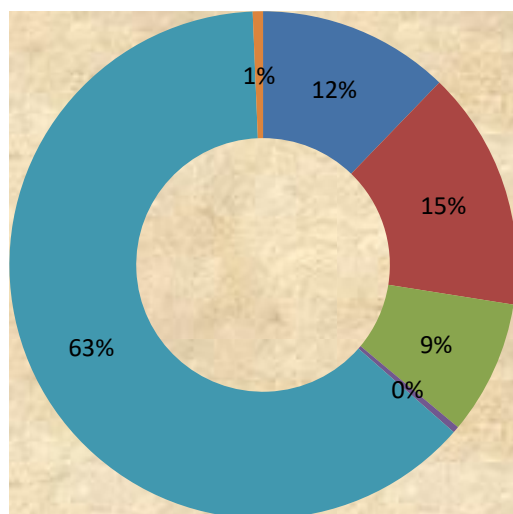
	68	Debaradihi RF
	69	Gambharia RF
	70	Bidhubhandar (Part) PRF
	71	Belpahadi- VIDPF
	72	GorumahisaniDPF
	73	JhmukapahadiDPF
	74	JuapahadiDPF
	75	KalatomokDPF
	76	KuchaibudhiDPF
	77	BhatgodaDPF
	78	RutughutuDPF

2.4 Land Use, Land Use Change and Forestry (LULUCF):

The Forest Survey of India (FSI) publication 2017 indicates land use pattern for Rairangpur Division as Follows.

Table No 2.12 Land Use pattern as per FSI Report.

Sl No	Land Use	Area in Ha	Area in Sq. Km	Percentage
1	Very Dense Forest (VDF)	29862.65	298.63	12.23
2	Medium Dense Forest	37297.03	372.97	15.27
3	Open Forest	20869.44	208.69	8.55
	Scrub land	999.02	9.99	0.41
4	Non Forest Use	153576.35	1535.76	62.89
5	Water body	1594.50	15.95	0.65
	Total	244198.99	2441.99	100.00



Land Use of rairangpur Division as on 2017- FSI Report.

- Very Dense Forest (VDF)
- Medium Dense Forest
- Open Forest
- Scrub land
- Non Forest Use
- Water body

2.5 Treats to the Forest:

The forests of the division are subjected to treat from Natural Calamities as well as from Biotic Factors.

2.5.1 Threat from Natural Calamities:

The threats from Natural Calamities are from

i) Cyclonic Storm,

The Division is a part of Northern Odisha away from Sea. Cyclonic storm is seldom faced in this part of the State. Some damage has been caused due to effect of **Phailin** occurred during October, 2013. The damaged caused to flora & fauna is limited. Cyclonic storm is not common in this tract.

ii) Heavy Flood.

There is no prominent river system in the division except Khadakhai River, Bankabala River and Nesha River over which dams have been constructed named after the River i.e. "Suleipat dam Bankabala dam and Nesha Dam". These are mostly for irrigation purpose. No flood is experienced in this tract. Budhabalanga River is flowing in West- South border of the division and no threat is feared from this river.



iii) Drought.

The tract experiences drought in a cycle of 3 to 4 years which affects the growth of plants / forests & plantations. No severe damage has been occurred within last plan period. The drought enhances the period of establishment of the regeneration of trees species, especially that of Sal.

2.5.2 Threat from Biotic Factors:

The forests are under very much pressure due to population rise and increase in demand for land, encroachment, Forest Produce, Grazing etc. The threats from biotic factors are

i. Population Explosion.

Exploding human population coupled with rapid urbanization and industrialization in and around this pre re-organized Division is the main cause of degradation of forest resources. Human beings are directly as well as indirectly responsible to a great extent for depletion and degradation of valuable forest of this Division. Illicit felling and removal, uncontrolled grazing, girdling and lopping, setting fire in forests with vested interest, encroachment of forestland are the notable causes of depletion. Poverty and unemployment is very common in the forest fringe villages as most of them are tribal. The demand for agricultural implements, fencing, small timbers for house hold requirements and firewood are increasing day-by-day. This is the major cause and danger to Forest & Forest land.

ii. Illegal collection of timber and firewood.

Forests are subjected to illegal removal of Forest Produce for Timber, Fuel Wood, Small poles etc. Though the magnitude is not alarming but hampers the growth & density of Forests. The supply of timber & firewood from legal sources is very low in comparison to demand of present population. Illicit felling is noticed in the forest blocks where there are few big Sal trees because of the demand of the townships for building materials. In some of the Forest blocks, the very character of the vegetation has been changed from Sal forests to miscellaneous mixed forests due to illicit removal of trees. Forests in the vicinity of the villages are also affected owing to collection for firewood and timber from forests. The selected matured trees of Bija and Sal have been targeted in these forest blocks by the smugglers in the recent days.



iii. Encroachment of forest.

Land grabbers and tribals near to many PRF / Village Forest, encroached upon the forest land. The Village forests created and notified during Social Forestry Project are mostly affected and in many cases, their existence is under threat.

iv. Grazing.

Cattle, Goat and sheep use the forest land as a grazing ground. No area could be closed to grazing due to public pressures the people are tribal. Due to grazing compacting of soil, damage of plantations and spreading of contagious disease to wild animals have been observed. Lack of ground flora, invasion of weeds due to heavy grazing pressure affects the maturity of soil and plant succession expected in open / degraded soil where secondary plant succession could have been noticed. Lopping of fodder species for feeding goats mostly in forest has also left poles / saplings and trees branchless and seriously affects the growth and quality of forest.

v. Forest fire.

The dry season in the area extends from the month of January to June and experiences a very hot summer during April to June. Due to the prolonged hot weather, forest blocks are vulnerable from forest fire. The occurrence of repeated forest fire year after year prevents regeneration of many valuable tree species. As a result of this phenomenon, many fire hardy species found to replace the economically important species in the forests. Annual repeated fires are causing a series of damages both directly and indirectly to the forests. It burns leaves and other residue lying on the forest floor and destroys the microbial population of the soil and thus prevents the formation of humus. The humus is very vital for the soil fertility and its absence adversely affects the growing stock. Forest fire is also one of the main factors responsible for the mortality of seedlings, sapling even of pole of size crop. It also causes desiccation and hardening of the soil which accelerate the process of soil erosion. Setting of forest fire is invariable intentional and rarely accidental. No crown fire is noticed in the division.

Causes of Forest Fire: Following are the major causes of fire, which are almost intentional.

- Burning of forest floor for good growth of grass or mushrooms in the next season,
- Hunting,
- Un-extinguished campfires by miscreants,



- Un-extinguished cigarettes or bidi butts being thrown in the forests coming on the passage / foot path.
- For collection of Minor Forest Produce particularly for collection Mohua flowers, local villagers sometimes set fire,
- To prevent movement of wild elephants people of adjoining villages set fire,
- Encroachers set fire to clean the encroached area of debris,
- Some cultivators set fire to get ashes into their cropland through runoff water.

The implementation of the Orissa Forest (Fire protection) Rules 1979 has been very poor and fire continues to be the major threat to forest regeneration and establishment in the Division. At present, mitigation measures are undertaken as per the SOP (Standard Operating Procedure) to tackle the forest fire in different forest blocks of the Division and adequate number of fire blowers have been provided to field staff along with specialized fire watchers, hired dedicated vehicles etc.

i. Insects & Borer:

The damage caused to the natural forest vegetation as well as the conditions by defoliators, borers and other insects is quite insignificant. The Sal heartwood borers (*Hoplocerambyx spinicornis*) only heartwood borers found in dead and deceased Sal trees and in unbarked logs. Green healthy trees are seldom attacked by this insect. There is no major damage due to insects / borers.

ii. Fungi:

The presence / abundance of fungi attack to dead trees / logs are seen in Sal Forests. In dry localities, heart rot disease caused due to fungi has been some times noticed.

2.6 Distribution of Different Forest Types:

The Rairangpur Forest Division comprises moist tract of Bisoi WL Range, Manada Range to dry tracts of Rairangpur and Bahalda Range, various types of soil to bear different vegetation, different degree of Biotic pressure to restrict the plant succession in a pre climax stage. Due to varied regions the tract bears dry hardy species to moist luxuriant species in Tulsibani RF, Mahubhandar RF, Dublabeda RF and Bindhubhadar PRF etc.

Forest type is 'a category of forest defined with reference to its geographical location, climatic and edaphic features, composition and condition'. Champion and Seth define it as 'a unit of vegetation which possesses (broad) characteristics in physiognomy and structure sufficiently



pronounced to permit of its differentiation from other such units. This is irrespective of physiographic, edaphic or biotic factors. It is selected in the first place subjectively from the ever-varying cover of vegetation, with boundaries arbitrarily imposed on what are in fact gradual changes'.

2.6.1 Basis of Classification:

The forests can be classified into forest types on the basis of

- (i) **Physiognomy** - Physiognomy means the general appearance of a forest community and, therefore, forms an easy basis for rough differentiation of very broad classes. It is described by dominant growth-form (e. g., trees, shrubs, grasses, etc.), the seasonal changes (e. g., evergreen and deciduous habit) and such other features as may be associated with very dry or very wet sites.
- (ii) **Structure** - Structure of a forest is described by stratification (i.e., the way in which different species are aligned in different layers of the forest) and dimensions of trees including height and spacing. It is generally observed that more favorable the site to tree growth the greater is the number of strata and the less favourable the site, the lesser is the number of strata in which the forest is divided. Therefore, structural stratification gives good basis for classifying forest types.
- (iii) **Function**- Function refers to the most common morphological characters of the species such as leaf character, leaf size, stem and root characters, e.g., buttress formation development of stilt roots, etc., which form the basis of classification.
- (iv) **Floristic**--Floristic refers to the species present in a particular forest. While this forms an important basis, for delimiting a forest type, there is a great difference of opinion as to whether the frequency of the species should be used as a basis or not. However, this can be used to distinguish subtypes.
- (v) **Dynamics**—As a result of interaction between vegetation and the site, there is continual change between the two. This results in succession and development of climax communities. Though the general view favours Whittaker's theory of vegetation gradients, it is convenient for the time being to classify the relatively stable types as climax, those still developing as seral, the stable community resulting from the special soil peculiarities as edaphic climax and that resulting from the biotic interference as biotic climax.



- (vi) **Habitat**—Habitat refers to the effective environmental conditions in which a forest community exists. Thus, climate and edaphic factors often form the basis of classifying forest vegetation.
- (vii) **Physiography**—Physiography refers to the natural features of the earth surface. As it modifies the micro climate and results in different vegetation occurring in the same climate on different aspects of the hill slope, it forms a good basis for classifying vegetation.
- (viii) **History**- History refers to past biotic influences on a site and its vegetation. Though these are very important in determining the present condition and future potentialities in vegetation communities, it is often difficult to assess these factors correctly.

2.6.2 Forest Types:

The forest types observed in this division as per **Revised Champian & Seth Classification** are as follows.

Table No 2.13 Forest Types observed in the Division.					
Sl No	Group	Sub Group	Type	Sub Type	Variety
1	3-Tropical Moist Deciduous Forest	3C-North Indian Tropical Moist Deciduous Forest	3C/C ₂ – Moist Sal Bearing Forest	3C/C _{2e} - Moist Peninsular Sal Forest.	3C/C _{2e(ii)} – Moist Peninsular Low level Sal
2	5-Tropical Dry Deciduous Forest.	5B-Northern Tropical Dry Deciduous Forest	5B/C ₁ - Dry Sal Bearing Forest	5B/C _{1c} – Dry Peninsular Sal	

1. Moist Deciduous Forest:

a) Moist Peninsular low level Sal-3C/C_{2e(ii)}

This type of forests occurs in the moist areas of the division bordering the Similipal Hill Range. The main species is Sal with its associates of *Pterocarpus marsupium* (Piasal), *Terminalia tomentosa* (Asan) in top storey. The middle storey *Emblia officinalis*, climber *Bahunia vehelai*, *Smilex* and under growth of *Cleodentron* are noticed. Natural regeneration is good to plenty.

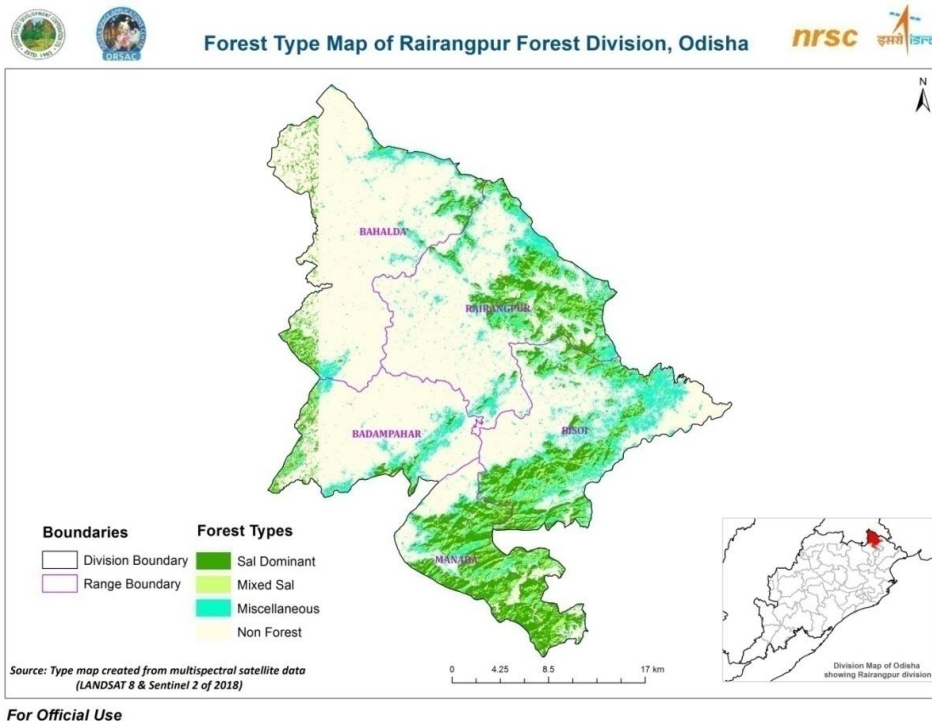
2. Tropical Dry Deciduous Forest:

a) Dry peninsular Sal—5B/C_{1c}

This subtype of forest occurs on shallow soil derived from crystalline and metamorphic rocks where soil moisture conditions are unfavourable for moist Sal. The over wood consists of Sal,



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Anogeissus, *Boswellia*, *Terminalia*, *Pterocarpus*, *Lagerstromia*, *Disospyros*, *Adina*, *Acacia catechu*, *Buchania*, *Madhuca* etc. Natural regeneration is fair but slow. Typical example is observed in Jari RF, Gorumahisani RF, Sarali RF, Kanapat RF, Budheirana RF etc.

2.6.3 Forest Blocks & Forest Type.

The Forest Type and Forest blocks assigned to it are broadly specified below.

Table No 2.14 Forest type and Forest block of Raingapur Division.		
Sl No	Forest Type	Name of Forest blocks under the type.
1	3C/C _{2e(ii)} – Moist Peninsular Low level Sal	Tulsibani RF, Khadambada RF, Mahubhandar RF, Tunguru RF, Badampahar RF, Basila RF, Badra RF, Dublabada RF, Jhatisiring RF, Kherna Rf and Bidhubhandar PRF
2	5B/C _{1c} – Dry Peninsular Sal	Jari RF, Gorumahisani RF, Sarali, RF, Kanapat RF, Budheirana RF, Ramgarh RF, Asurghaty RF, Chahalapada RF Dahupani, DPF, Bhitaramda DPF, Tirilipi DPF, RadhoDPF etc.

2.7 Tree Cover Outside Forest Area (TOF):

Besides the notified forest areas of the Division (RF, PRF, DPF and VF) there are many revenue forest areas, Avenue plantations, and fuel & Fodder plantations raised by department contribute to Tree outside the Forests (TOF). From Social Forestry Project period; Farm Forestry is being patronized by the Govt. by free distribution of seedlings.

The TOF are integrated contribution of



- Plantations takenup outside the conventional Forest area by Forest Department, Horticultural plantation and other department.
- Plantations raised by private individuals in their fellow land and back yard.
- Agro Forestry practices.
- Avenue Plantations.
- Institutional Plantations.

The plantations raised during last plan period are furnished below.

2.7.1 Avenue Plantations:

Form 2013-14 Avenue plantations have been taken up over 281.5 RKM on 43 Roads. These areas are furnished in Table No 2.15

Table No: 2. 15 List of Avenue Plantations Raised during last plan period. Rairangpur Division				
Sl No	Year	Name of Road	RKM Planted	No of Seedlings Planted.
1	2013-14	Jhaldungri to Balhadpur	10	2500
2	2013-14	Talka to Guhaldangiri	17	4250
3	2013-14	Rairangpur to Niranjana	13	3250
4	2013-14	National Highway 220	8	2000
5	2013-14	Bisoi to Madhupur	5	1250
6	2013-14	Bangriposi to Kalabadhia	5	1250
7	2014-15	Badampahar to Jhaldungri	10	2500
8	2014-15	Asanbani to Badamtalia	7	1750
9	2014-15	Balarampur to Tulasibani	23	5750
10	2014-15	Ba;Rampur to Kalsibhanga	14	3500
11	2014-15	National Highway 220	6	1500
12	2014-15	National Highway 220	4	1000
13	2014-15	Bisoi to Pokharia	10	2500
14	2015-16	Bagdega to Bhandan	4	1000
15	2015-16	Dova to Kathbharia	10	2500
16	2015-16	Neuti to Anlajodi	3	750
17	2015-16	Chadheipahadi to Bhimkanda	6	1500
18	2015-16	Bijatala to Tualsibani	8	2000
19	2015-16	Sanmarada to Shyamsundarpur	8	2000
20	2015-16	Dangapani to Bhaludihi	8	2000
21	2015-16	Chegjoda Chhak to Raghunathpur	2.5	825



**Table No: 2. 15 List of Avenue Plantations Raised during last plan period.
Rairangpur Division**

Sl No	Year	Name of Road	RKM Planted	No of Seedlings Planted.
22	2015-16	Chegjoda Chhak to Satpur	3	750
23	2015-16	Chengjodi to Satpuri RD Road	3	750
24	2015-16	Kulgi to Kumbirmundi RD Road	5	1250
25	2015-16	Jharadihi to Maliokedam RD Road	2	500
26	2015-16	Jharadihi Railway Phattak to Majhigaon RD Road	2	500
27	2015-16	Jharadihi to Gorumahisani RD Road	6	1500
28	2015-16	Gohira to Pasna RD Road	5	1250
29	2015-16	Dhalpur to Dumadihi RD Road	5	1250
30	2015-16	Basantpur to Matiali RD Road	5	1250
31	2015-16	Kundulia to Judia	5	1250
32	2015-16	Baunsabudi to Mangarh	5	1250
33	2015-16	Begunia to Badsialinai	4	1000
34	2016-17	Dhangdimuta to Dighiabeda	4	1000
35	2016-17	Purunapani to Chuapani	4	1000
36	2016-17	Kashiabeda Chhak to Kashiabeda Village	2	500
37	2016-17	Nagalsila to Suleipat	2	500
38	2016-17	Bhuyanbasa to Bhitaramda	2	500
39	2016-17	Gorumahisani to Chhatramandal	10	2500
40	2016-17	Kuleisila to Kalimati	8	2000
41	2016-17	Jambani to Udaypur	6	1500
42	2016-17	Rakhasahi to Badadara	6	1500
43	2016-17	Badhunja-Chuakanakr Road	6	1500
		Total	281.5	70575

2.7.2. Plantations outside the Forest area taken up by Forest Department:

Besides plantations raised within the Forest area under department control, plantations have been raised elsewhere under different schemes. All total 170.00 ha of plantations have been raised. The list of Plantation is at table No 2.16 below.



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Table No 2.16 List of Plantations Raised Outside the Forest Area.

Name of Range	Name of Planting Site	Year of Plantation	Area in Ha	Present growth Status	Survival %
Badampahar	Timitma	2011-12	20.0	Good	60
	Suliduma	2011-12	20.0	Good	58
	Badhatnabeda Revenue Land	2012-13	20.0	Good	70
	Badhatnabeda	2013-14	5.0	Good	65
	Badhatnabeda	2014-15	10.0	Good	60
	Gobindpur	2015-16	10.0	Good	62
	Bhandan Bald Hill	2019-20	5.0	Good	80
Rairangpur	Badbaikala	2013-14	10.0	Good	65
	Dahanimari	2013-14	10.0	Good	72
	Mahuldiha	2015-16	20.0	Good	85
Bahalda	Gayalkota	2012-13	15.0	Good	50
	Bad Narayani	2012-13	15.0	Good	56
	Maghua	2015-16	10.0	Good	52
Total			170.0		

2.7.3. Distribution of seedlings.

Distribution of Seedlings under farm forestry to a tune of 33.39 lakh has been achieved. The year wise details are furnished at Table No 2.17

Table No: 2.17 Distributions of Seedlings under Farm Forestry.

Year	Number of seedlings distributed	Area of coverage in ha. @1600 plant per ha
2010	315000	196.88
2011	250000	156.25
2012	225000	140.63
2013	425000	265.63
2014	1005500	628.44
2015	649540	405.96
2016	423750	264.84
2017	-	
2018	-	
2019	45500	28.44
Total	3339290	2087.06



2.7.4 Plantations raised under FDA (Outside the Forest area):

Under National Afforestation Program (NAP), plantations have been raised through people's participation. The plantations raised outside the forest area is furnished at table no 2.18

Table No 2.18 Plantations under FDA taken up outside the Forest area.

Name of Range	Year of Plantation	Name of VSS	Location	AR (Block Plantation) in Ha	ANR (in Ha)
Badampahar	2004-05	Dubulabeda	Dubulabeda		40.0
Badampahar	2013-14	Badhatnabeda	Badhatnabeda	5.00	
Badampahar	2013-14	Jhipabandh	Jhipabandh	10.00	
Badampahar	2013-14	Edelbeda	Edelbeda	5.00	
Badampahar	2013-14	Thuntipani	Thuntipani	15.00	
Badampahar	2014-15	Bhuyanbasa	Bhuyanbasa		5.0
Badampahar	2014-15	Jhipabandh	Jhipabandh		5.0
Badampahar	2014-15	Thuntipani	Thuntipani		5.0
Badampahar	2014-15	Badhatnabeda	Badhatnabeda		5.0
Badampahar	2014-15	Edelbeda	Edelbeda		5.0
Badampahar	2015-16	Hatisikuli	Hatisikuli	5.00	
Badampahar	2015-16	Timtima	Timtima		10.0
Badampahar	2017-18	Rayasahi	Rayasahi		5.0
Range / Division Total				40.0	80.0

2.8 Shifting Cultivation (Jhumming):

Shifting cultivation is not observed in Mayurbhanja district. The Rairangpur division also doesn't experience shifting cultivation.





CHAPTER-3

MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY:

3.1 Forest Composition & Distribution:

Forests of Rairangpur Division are of two distinct types i.e. Moist Sal Forests those are proximity to Similipal Sanctuary /Tiger Reserve / National Park. **Similipal** is the abode of 94 species of orchids and about 3000 species of other plants. These include two species of orchids which are endemic, eight plants which are endangered, eight species whose status is vulnerable and thirty four other rare species of plant. The forests coming within Bisoi Wildlife Range and Manada Range depict the characteristics of Similipal Flora.

Dry Sal Forests: this type of forests occurs in Rairangpur, Bahalda and part of Badampahad Range. The species observed in dry deciduous forests are Sal, Asan, Arjun, Bija, Bahada, Chatian, Dhaura, Harida, Haldu, Jamu, Kasi, Kochila, Lodha, Rohini, Simal, Sidha, Sisoo, Tentuli, Kendu, Mahul, Achhu, Ankula, Amla, Agasti, Bara, Bela, Bheru, Chara, Salai, Moi, Palas, Kantei, Ghurudu, Jajangi, Atundi, Kaincha, Broom grass, Duba etc. Bamboo is not seen in the forests of this tract.

On critical study of the flora of the area, the following species of rare threatened and endangered species are recorded. These are at Table No 3.1

Table No 3.1 List of Rare, endemic and threatened taxa in Bamanghaty subdivision.

Sl No	Name	Family	Status.
1	Aristolochia indica	Aristolochiaceae	VU
2	Boswellia serrata	Burseraceae	R
3	Celastrus paniculata	Celastraceae	VU
4	Garcinia xanthochymus	Clusiaceae	R
5	Gloriosa superba	Liliaceae	EN
6	Operculina turpethum	Convolvulaceae	VU
7	Oroxylum indicum	Bignoniaceae	EN
8	Paederia foetida	Rubiaceae	VU
9	Pterocarpus marsupium	Leguminosae	EN
10	Rauvolfia serpentina	Apocynaceae	EN
11	Rubia cordifolia	Rubiaceae	VU
12	Saraca asoca	Leguminosae	CR



Table No 3.1 List of Rare, endemic and threatened taxa in Bamanghaty subdivision.

13	<i>Strychnos potatorum</i>	Loganiaceae	VU
14	<i>Urginea indica</i>	Liliaceae	VU

VU= Vulnerable, CR=Critically Endangered, E=Endangered, R= Rare. Conclusion These sacred groves are grand repository of Rare, endemic.

3.2 Plant Species Diversity:

For working plan purpose, to record the variety of species available in the forests point sampling method has been adopted. The abundance of Species has been computed and furnished below.

Table No: 3.2A Frequency of Species as recorded during Point sampling.

Sample Point No	Forest Block	Name of Species recorded	Frequency of species			
			above20% - <40%	Above 40%- <50%	Above 50% - <60%	Above 60%
RRG- 32,33,31,18,17, 16,30,26,28,22, 20,4, 25,13,29,14,06, 03,07,11,19,09, 24,15,05,21,12, 08,10, 23	Badampahar R.F	<i>Shorea robusta</i> (Sal)	-	-	-	Above 60 %
		<i>Semecarpus anacardium</i> (Bhalia)	Below20 %	-	-	-
		<i>Buchanania lanzan</i> (Char)	Above 20%	-	-	-
		<i>Terminalia tomentosa</i> (Asan/ Sahaja)	Above20 %	-	-	-
		<i>Diospyros melanoxylon</i> (Kendu)	Below20 %	-	-	-
		<i>Tectona grandis</i> (Teak)	Below20 %	-	-	-
		<i>Lannea coromandelica</i> (Mai)	Below20 %	-	-	-
		<i>Terminalia belerica</i> (Bahada)	Below20 %	-	-	-
		<i>Cassia fistula</i> (Sunari)	Below20 %	-	-	-
		<i>Madhuca indica</i> (Mahula)	Below20 %	-	-	-
RRG- 32,33,31,18,17, 16,30,26,28,22, 20,4, 25,13,29,14,06, 03,07,11,19,09,	Badampahar R.F	<i>Anogeissus latifolia</i> (Dhaura)	Below20 %	-	-	-
		<i>Garuga pinnata</i> (Kenkat)	Below20 %	-	-	-
		<i>Dalbergia sissoo</i> (Sissoo)	Below20 %	-	-	-



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No: 3.2A Frequency of Species as recorded during Point sampling.

24,15,05,21,12, 08,10,23	<i>Pterocarpus marsupium</i> (Piasal)	Below 20 %	-	-	-
	<i>Scheichera oleosa</i> (Kusum)	Below 20 %	-	-	-
	<i>Butea monosperma</i> (Palas)	Below 20 %	-	-	-
	<i>Cleistanthus collinus</i> (Karada)	Below 20 %	-	-	-
	<i>Albizia lebbek</i> (Sirish)	Below 20 %	-	-	-
	<i>Syzigium cumini</i> (Jamu)	Below 20 %	-	-	-
	<i>Ficus glomerata</i> (Dimiri)	Below 20 %	-	-	-
	<i>Bauhinia variegata</i> (Kanchan)	Below 20 %	-	-	-
	<i>Careya arborea</i> (Kumbhi)	Below 20 %	-	-	-
	<i>Eugenia heyneana</i> (Katha Jamu)	Below 20 %	-	-	-
	<i>Alangium lamarckii</i> (Ankula)	Below 20 %	-	-	-
	<i>Dalbergia latifolia</i> (Pahadi Sissoo)	Below 20 %	-	-	-
	<i>Wrightia tinctoria</i> (Pala Dhua)	Below 20 %	-	-	-
	<i>Bridelia retusa</i> (Kasi)	Below 20 %	-	-	-
	<i>Adina cordifolia</i> (Haldu/Kuruma)	Below 20 %	-	-	-
	<i>Boswellia serrata</i> (Salai)	Below 20 %	-	-	-
	<i>Ficus bengalensis</i> (Bara)	Below 20 %	-	-	-
	<i>Emblica officinalis</i> (Anla)	Below 20 %	-	-	-
	<i>Terminalia arjuna</i> (Arjuna)	Below 20 %	-	-	-
	<i>Ficus religiosa</i> (Aswastha)	Below 20 %	-	-	-
	<i>Moringa oleifera</i> (Sajana)	Below 20 %	-	-	-
	<i>Gardenia latifolia</i> (Damkuruda)	Below 20 %	-	-	-
	<i>Bombax ceiba</i> (Simli)	Below 20 %	-	-	-



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Table No: 3.2B Frequency of Species as recorded during Point sampling.

Sample Point No	Forest Block	Name of Species recorded	Frequency of species			
			above 20% - <40%	Above 40% - <50%	Above 50% - <60%	Above 60%
RRG-365 & 366	Sargoda DPF	<i>Anogeissus latifolia</i> (Dhaura)	Below 20%	-	-	-
		<i>Buchanania lanzan</i> (Char)	Below 20%	-	-	-
		<i>Cassia fistula</i> (Sunari)	Below 20%	-	-	-
		<i>Terminalia tomentosa</i> (Asan/ Sahaja)	Above 20 %	-	-	-
		<i>Shorea robusta</i> (Sal)	-	-	Above 50 %	-
RRG-42,43,44	Basila R.F	<i>Diospyros melanoxylon</i> (Kendu)	Below 20%	-	-	-
		<i>Semecarpus anacardium</i> (Bhalia)	Below 20%	-	-	-
		<i>Madhuca indica</i> (Mahula)	Below 20%	-	-	-
		<i>Shorea robusta</i> (Sal)	-	-	-	Above 60 %
		<i>Acacia auriculiformis</i> (Acacia)	Below 20%	-	-	-
		<i>Anogeissus latifolia</i> (Dhaura)	Below 20%	-	-	-
		<i>Cleistanthus collinus</i> (Karada)	Below 20%	-	-	-
		<i>Buchanania lanzan</i> (Char)	Below 20%	-	-	-
RRG-133,134,135,136,137,138,139,140,141	Dubulabeda R.F	<i>Aegle marmelos</i> (Bela)	Below 20%	-	-	-
		<i>Bridelia retusa</i> (Kasi)	Below 20%	-	-	-
		<i>Symplocos racemosa</i> (Lodha)	Below 20%	-	-	-
RRG-133,134,135,136,137,138,139,140,141	Dubulabeda R.F	<i>Anogeissus latifolia</i> (Dhaura)	Below 20%	-	-	-
		<i>Buchanania lanzan</i> (Char)	Below 20%	-	-	-
		<i>Diospyros melanoxylon</i> (Kendu)	Below 20%	-	-	-
		<i>Lagerstroemia parviflora</i> (Sidha)	Below 20%	-	-	-
		<i>Madhuca indica</i> (Mahula)	Below 20%	-	-	-
		<i>Pterocarpus marsupium</i> (Piasal)	Below 20%	-	-	-
		<i>Shorea robusta</i> (Sal)	-	-	Above 50%	-



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	<i>Bixa Orellana</i> (Sakta)	Below 20%	-	-	-
	<i>Casearia elliptica</i> (Khakada)	Below 20%	-	-	-
	<i>Cleistanthus collinus</i> (Karada)	Below 20%	-	-	-
	<i>Lagerstroemia speciosa</i> (Patuli)	Below 20%	-	-	-
	<i>Semecarpus anacardium</i> (Bhalia)	Below 20%	-	-	-
	<i>Diospyros sylvatica</i> (Kalachua)	Below 20%	-	-	-
	<i>Adina cordifolia</i> (Haldu/Kuruma)	Below 20%	-	-	-
	<i>Ficus virens</i> (Jida)	Below 20%	-	-	-
	<i>Grewia tiliacifolia</i> (Dhaman)	Below 20%	-	-	-
	<i>Albizia procera</i> (Dhala sirish)	Below 20%	-	-	-
	<i>Bauhinia variegata</i> (Kanchan)	Below 20%	-	-	-
	<i>Wrightia tinctoria</i> (Anchhu)	Below 20%	-	-	-
	<i>Hymenodictyon excellsum</i> (Kansa)	Below 20%	-	-	-
	<i>Elaeodendron glaucum</i> (Chauli)	Below 20%	-	-	-
	<i>Pongamia pinnata</i> (Karanja)	Below 20%	-	-	-



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Table No: 3.2C Frequency of Species as recorded during Point sampling.

Sample Point No	Forest Block	Name of Species recorded	Frequency of species			
			above20% - <40%	Above 40%- <50%	Above 50% - <60%	Above 60%
RRG-198	Jaidhanposi DPF	<i>Diospyros embryopteris</i> (Mankad a Kendu)	Below 20%	-	-	-
		<i>Terminalia arjuna</i> (Arjuna)	Below 20%	-	-	-
		<i>Buchanania lanzan</i> (Char)	-	Above40 %	-	-
		<i>Shorea robusta</i> (Sal)	-	-	Above60 %	-
		<i>Terminalia tomentosa</i> (Asan/ Sahaja)	Below 20%	-	-	-
RRG-792	Ukam DPF	<i>Madhuca indica</i> (Mahula)	Below 20%	-	-	-
		<i>Semecarpus anacardium</i> (Bhalia)	Below 20%	-	-	-
		<i>Shorea robusta</i> (Sal)	-	-	Above60%	-
		<i>Terminalia tomentosa</i> (Asan/ Sahaja)	Below 20%	-	-	-
RRG-259	Kherna R.F	<i>Acacia auriculiformis</i> (Acacia)	Below 20%	-	-	-
		<i>Butea monosperma</i> (Palas)	Below 20%	-	-	-
		<i>Syzigium cumini</i> (Jamu)	Below 20%	-	-	-
RRG-202,203,204,205	Jhatisiring R.F	<i>Buchanania lanzan</i> (Char)	Below 20%	-	-	-
		<i>Cleistanthus collinus</i> (Karada)	Below 20%	-	-	-
		<i>Madhuca indica</i> (Mahula)	Below 20%	-	-	-
		<i>Aegle marmelos</i> (Bela)	Below 20%	-	-	-
		<i>Anogeissus latifolia</i> (Dhaura)	Below 20%	-	-	-
		<i>Ficus religiosa</i> (Aswastha)	Below 20%	-	-	-
		<i>Semecarpus anacardium</i> (Bhalia)	Below 20%	-	-	-
		<i>Terminalia tomentosa</i> (Asan/ Sahaja)	Below 20%	-	-	-



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Table No: 3.2D Frequency of Species as recorded during Point sampling.

Sample Point No	Forest Block	Name of Species recorded	Frequency of species			
			above20% - <40%	Above 40%- <50%	Above 50% - <60%	Above 60%
RRG-264, 265, 266, 267, 268, 269, 270& 271	Mahubhandar RF	<i>Anogeissus latifolia</i> Dhaura	Below 20%	-	-	-
		<i>Gmelina arborea</i> Gamhari	Below 20%	-	-	-
		<i>Terminalia tomentosa</i> Asan/ Sahaja	Below 20%	-	-	-
		<i>Lannea coromandelica</i> Mai	Above 20%	-	-	-
		<i>Scheichera oleosa</i> Kusum	Below 20%	-	-	-
		<i>Shorea robusta</i> Sal	-	-	-	Above 60%
		<i>Adina cordifolia</i> Haldu (kurum)	Below 20%	-	-	-
		<i>Pterocarpus marsupium</i> Piasal/ Bijasal	Below 20%	-	-	-
		<i>Tectona grandis</i> Saguan	Below 20%	-	-	-
		<i>Lagerstroemia speciosa</i> Patuli	Above 20%	-	-	-
		<i>Madhuca indica</i> Mahula	Above 20%	-	-	-
		<i>Buchanania lanzan</i> Char	Above 20%	-	-	-
		<i>Terminalia belerica</i> Bahada	Below 20%	-	-	-
		<i>Ougeinia oojeinensis</i> Bandhan/Tinsa	Below 20%	-	-	-
		<i>Anogeissus latifolia</i> Dhaura	Above 20%	-	-	-
		<i>Diospyros melanoxylon</i> kendu	Above 20%	-	-	-
		<i>Albizzia lebbek</i> Siris	Below 20%	-	-	-



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Table No: 3.2E Frequency of Species as recorded during Point sampling.

Sample Point No	Forest Block	Name of Species recorded	Frequency of species			
			above 20% - <40%	Above 40% - <50%	Above 50% - <60%	Above 60%
RRG- 61, 81, 85, 77, 76, 285, 69, 65, 67, 68, 75, 79, 60, 62, 63, 64, 66, 70, 71, 72, 73, 74, 78, 80, 82, 83 & 84	Bidubhandar PRF	<i>Shorea robusta</i> Sal	-	-	-	Above 60%
		<i>Anogeissus latifolia</i> Dhaura	Below 20%	-	-	-
		<i>Terminalia tomentosa</i> Asan/ Sahaja	Above 20%	-	-	-
		<i>Dalbergia latifolia</i> Sisoo	Above 20%	-	-	-
		<i>Dalbergia latifolia</i> Pahadi Sisoo	Below 20%	-	-	-
		<i>Scheichera oleosa</i> Kusum	Below 20%	-	-	-
		<i>Cleistanthus collinus</i> Karada	Above 20%	-	-	-
		<i>Albizzia lebbek</i> Siris	Below 20%	-	-	-
		<i>Lagerstroemia speciosa</i> Patuli	Below 20%	-	-	-
		<i>Pterocarpus marsupium</i> Piasal/ Bijasal	Above 20%	-	-	-
		<i>Buchanania lanzan</i> Char	Above 20%	-	-	-
		<i>Diospyros melanoxylon</i> kendu	Above 20%	-	-	-
		<i>Aegle marmelos</i> Bela	Below 20%	-	-	-
		<i>Ficus retusa</i> Jari	Below 20%	-	-	-
		<i>Bridelia retusa</i> Kasi	Below 20%	-	-	-
		<i>Lagerstroemia parviflora</i> Sidha	Below 20%	-	-	-
		<i>Madhuca indica</i> Mahula	Above 20%	-	-	-
		<i>Syzigium cumini</i> Jamu	Above 20%	-	-	-
		<i>Lannea coromandelica</i> Mai	Below 20%	-	-	-
		<i>Semecarpus anacardium</i>	Below 20%	-	-	-



		Bhalia				
		<i>Gmelina arborea</i>	Below 20%	-	-	-
		Gamhari				
		<i>Acacia auriculiformis</i>	Below 20%	-	-	-
		Acacia				
		<i>Terminalia belerica</i>	Above 20%	-	-	-
		Bahada				

(NB: Bio diversity encountered in some of the important Forest Blocks have been furnished above)

3.2.1 Principles of Biodiversity Index Calculation:

A **diversity index** (also called **phylogenetic or Simpson's Diversity Index**) is a quantitative measure that reflects how many different types (such as species) there are in a dataset (a community) and that can simultaneously take into account the phylogenetic relations among the individuals distributed among those types, such as *richness, divergence* or *evenness*. These indices are statistically representations of biodiversity in different aspects (richness, evenness and dominance).

Richness R simply quantifies how many different types the dataset of interest contains. For example, species richness (usually noted S) of a dataset is the number of different species in the corresponding species list. Richness is a simple measure, so it has been a popular diversity index in ecology, where abundance data are often not available for the datasets of interest. Because richness does not take the abundances of the types into account, it is not the same thing as diversity, which does take abundances into account. However, if true diversity is calculated with $q = 0$, the effective number of types (${}^0D$) equals the actual number of types (R).

3.2.2 Shannon Index:

The Shannon index has been a popular diversity index in the ecological literature, where it is also known as Shannon's diversity index, the Shannon–Wiener index, the Shannon–Weaver index and the Shannon entropy. The measure was originally proposed by Claude Shannon to quantify the entropy (uncertainty or information content) in strings of text. The idea is that the more different letters there are, and the more equal their proportional abundances in the string of interest, the more difficult it is to correctly predict which letter will be the next one in the string. The Shannon entropy quantifies the uncertainty (entropy or degree of surprise) associated with this prediction. It is most often calculated as follows:

$$H' = - \sum p_i \ln p_i$$



Where p_i is the proportion of characters belonging to the i^{th} type of letter in the string of interest. In ecology, p_i is often the proportion of individuals belonging to the i^{th} species in the dataset of interest. Then the Shannon entropy quantifies the uncertainty in predicting the species identity of an individual that is taken at random from the dataset.

Although the equation is here written with natural logarithms, the base of the logarithm used when calculating the Shannon entropy can be chosen freely. Shannon himself discussed logarithm bases 2, 10 and e , and these have since become the most popular bases in applications that use the Shannon entropy. Each log base corresponds to a different measurement unit, which have been called binary digits (bits), decimal digits (decits) and natural digits (nats) for the bases 2, 10 and e , respectively. Comparing Shannon entropy values that were originally calculated with different log bases requires converting them to the same log base: change from the base a to base b is obtained with multiplication by $\log_b a$.

It has been shown that the Shannon index is based on the weighted geometric mean of the proportional abundances of the types, and that it equals the logarithm of true diversity as calculated with $q = 1$:

$$H' = - \sum_{i=1}^R p_i \ln p_i = - \sum_{i=1}^R \ln p_i^{p_i}$$

This can also be written

$$H' = -(\ln p_1^{p_1} + \ln p_2^{p_2} + \ln p_3^{p_3} + \dots + \ln p_R^{p_R})$$

which equals

$$H' = -\ln p_1^{p_1} p_2^{p_2} p_3^{p_3} \dots p_R^{p_R} = \ln \left(\frac{1}{p_1^{p_1} p_2^{p_2} p_3^{p_3} \dots p_R^{p_R}} \right) = \ln \left(\frac{1}{\prod_{i=1}^R p_i^{p_i}} \right)$$

Since the sum of the p_i values equals unity by definition, the denominator equals the weighted geometric mean of the p_i values, with the p_i values themselves being used as the weights (exponents in the equation). The term within the parentheses hence equals true diversity ^1D , and H' equals $\ln(^1D)$.

When all types in the dataset of interest are equally common, all p_i values equal to $1/R$, and the Shannon index hence takes the value $\ln(R)$. The more unequal the abundances of the types, the larger is the weighted geometric mean of the p_i values, and the smaller the corresponding Shannon entropy. If practically all abundance is concentrated to one type, and the other types are very rare (even if there are many of them), Shannon entropy approaches zero. When there



is only one type in the dataset, Shannon entropy exactly equals zero (there is no uncertainty in predicting the type of the next randomly chosen entity).

3.2.3 Renyi entropy:

The Renyi entropy is a generalization of the Shannon entropy to other values of q than unity. It can be expressed:

$${}^qH = \frac{1}{1-q} \ln \left(\sum_{i=1}^R p_i^q \right)$$

which equals

$${}^qH = \ln \left(\frac{1}{\sqrt[q-1]{\sum_{i=1}^R p_i p_i^{q-1}}} \right) = \ln({}^qD)$$

This means that taking the logarithm of true diversity based on any value of q gives the Rényi entropy corresponding to the same value of q .

3.2.4 Simpson Index:

The Simpson index was introduced in 1949 by Edward H. Simpson to measure the degree of concentration when individuals are classified into types. The same index was rediscovered by Orris C. Herfindahl in 1950. The square root of the index had already been introduced in 1945 by the economist Albert O. Hirschman. As a result, the same measure is usually known as the Simpson index in ecology, and as the Herfindahl index or the Herfindahl–Hirschman index (HHI) in economics.

The measure equals the probability that two entities taken at random from the dataset of interest represent the same type. It equals:

$$\lambda = \sum_{i=1}^R p_i^2,$$



Where R is the richness i.e. the total number of types in the dataset. This equation is also equal to the weighted arithmetic mean of the proportional abundances p_i of the types of interest, with the proportional abundances themselves being used as the weights. Proportional abundances are by definition constrained to values between zero and unity, but it is a weighted arithmetic mean, hence $\lambda \geq 1/R$, which is reached when all types are equally abundant.

By comparing the equation used to calculate λ with the equations used to calculate true diversity, it can be seen that $1/\lambda$ equals ^2D , i.e. true diversity as calculated with $q = 2$. The original Simpson's index hence equals the corresponding basic sum.

The interpretation of λ as the probability that two entities taken at random from the dataset of interest represent the same type assumes that the first entity is replaced to the dataset before taking the second entity. If the dataset is very large, sampling without replacement gives approximately the same result, but in small datasets the difference can be substantial. If the dataset is small, and sampling without replacement is assumed, the probability of obtaining the same type with both random draws is:

$$\ell = \frac{\sum_{i=1}^R n_i(n_i - 1)}{N(N - 1)}$$

where n_i is the number of entities belonging to the i th type and N is the total number of entities in the dataset. This form of the Simpson index is also known as the Hunter–Gaston index in microbiology.

Since mean proportional abundance of the type's increases with decreasing number of types and increasing abundance of the most abundant type, λ obtains small values in datasets of high diversity and large values in datasets of low diversity. This is counterintuitive behavior for a diversity index, so often such transformations of λ that increase with increasing diversity have been used instead. The most popular of such indices have been the inverse Simpson index ($1/\lambda$) and the Gini–Simpson index ($1 - \lambda$).¹Both of these have also been called the Simpson index in the ecological literature, so care is needed to avoid accidentally comparing the different indices as if they were the same.

3.2.5 Inverse Simpson index

The inverse Simpson index equals:



$$\frac{1}{\lambda} = \frac{1}{\sum_{i=1}^R p_i^2} = {}^2D$$

This simply equals true diversity of order 2, i.e. the effective number of types that is obtained when the weighted arithmetic mean is used to quantify average proportional abundance of types in the dataset of interest.

The index is also as a measure of the effective number of parties.

3.2.6 Gini–Simpson index:

The original Simpson index λ equals the probability that two entities taken at random from the dataset of interest (with replacement) represent the same type. Its transformation $1 - \lambda$ therefore equals the probability that the two entities represent different types. This measure is also known in ecology as the probability of inter-specific encounter (*PIE*) and the Gini–Simpson index. It can be expressed as a transformation of true diversity of order 2:

The Gibbs–Martin index of sociology, psychology and management studies, which is also known as the Blau index, is the same measure as the Gini–Simpson index.

The quantity is also known as the expected heterozygosity in population genetics.

3.2.7 Berger- Parker Index:

The Berger–Parker index equals the maximum p_i value in the dataset, i.e. the proportional abundance of the most abundant type. This corresponds to the weighted generalized mean of the p_i values when q approaches infinity, and hence equals the inverse of true diversity of order infinity ($1/{}^\infty D$).

3.2.8 Effective number of Species or Hill numbers:

When diversity indices are used in ecology, the types of interest are usually species, but they can also be other categories, such as genera, families, functional types or haplotypes. The entities of interest are usually individual plants or animals, and the measure of abundance can be, for example, number of individuals, biomass or coverage. In demography, the entities of interest can be people, and the types of interest various demographic groups. In information science, the entities can be characters and the types the different letters of the alphabet. The most commonly used diversity indices are simple transformations of the effective number of types (also known as 'true diversity'), but each diversity index can also be interpreted in its own



right as a measure corresponding to some real phenomenon (but a different one for each diversity index).

Many indices only account for categorical diversity between subjects or entities. Such indices however do not account for the total variation (diversity) that can be held between subjects or entities which occurs only when both categorical and qualitative diversity are calculated.

True diversity, or the effective number of types, refers to the number of equally abundant types needed for the average proportional abundance of the types to equal that observed in the dataset of interest (where all types may not be equally abundant). The true diversity in a dataset is calculated by first taking the weighted generalized mean M_{q-1} of the proportional abundances of the types in the dataset, and then taking the reciprocal of this. The equation is:

$${}^qD = \frac{1}{M_{q-1}} = \frac{1}{\sqrt[q-1]{\sum_{i=1}^R p_i p_i^{q-1}}} = \left(\sum_{i=1}^R p_i^q \right)^{1/(1-q)}$$

The denominator M_{q-1} equals the average proportional abundance of the types in the dataset as calculated with the weighted generalized mean with exponent $q-1$. In the equation, R is richness (the total number of types in the dataset), and the proportional abundance of the i th type is p_i . The proportional abundances themselves are used as thenominal weights. The numbers are called Hill numbers of order q or effective number of species.

When $q = 1$, the above equation is undefined. However, the mathematical limit as q approaches 1 is well defined and the corresponding diversity is calculated with the following equation:

$${}^1D = \frac{1}{\prod_{i=1}^R p_i^{p_i}} = \exp \left(- \sum_{i=1}^R p_i \ln(p_i) \right)$$

Which is the exponential of the Shannon entropy calculated with natural logarithms (see above). In other domains, this statistic is also known as the *perplexity*.

The value of q is often referred to as the order of the diversity. It defines the sensitivity of the diversity value to rare vs. abundant species by modifying how the weighted mean of the species proportional abundances is calculated. With some values of the parameter q , the value



of M_{q-1} assumes familiar kinds of weighted mean as special cases. In particular, $q = 0$ corresponds to the weighted harmonic mean, $q = 1$ to the weighted geometric mean and $q = 2$ to the weighted arithmetic mean. As q approaches infinity, the weighted generalized mean with exponent $q-1$ approaches the maximum p_i value, which is the proportional abundance of the most abundant species in the dataset. Generally, increasing the value of q increases the effective weight given to the most abundant species. This leads to obtaining a larger M_{q-1} value and a smaller true diversity (${}^qD$) value with increasing q .

When $q = 1$, the weighted geometric mean of the p_i values is used, and each species is exactly weighted by its proportional abundance (in the weighted geometric mean, the weights are the exponents). When $q > 1$, the weight given to abundant species is exaggerated, and when $q < 1$, the weight is given to rare species. At $q = 0$, the species weights exactly cancel out the species proportional abundances, such that the weighted mean of the p_i values equals $1 / R$ even when all species are not equally abundant. At $q = 0$, the effective number of species, ${}^0D$, hence equals the actual number of species R . In the context of diversity, q is generally limited to non-negative values. This is because negative values of q would give rare species so much more weight than abundant ones that ${}^qD$ would exceed R .

The general equation of diversity is often written in the form

$${}^qD = \left(\sum_{i=1}^R p_i^q \right)^{1/(1-q)}$$

3.2.9 Methods adopted to calculate Bio diversity:

There are four Ranges in the division. Each Range is taken as strata. There are 264 Sample plots of 0.1 ha (31.62 m Sq) in each range. Three Sample plot of Binka Range, Six points from Sonapur Range, five points from Ullunda Range and three points from Birmaharajpur Range (total -17 sample point) data have been analyzed for Bio Diversity index) to find out Shannon-Weiner Species Diversity Index, Evenness Index, Index of Dominance using the formula furnished below.

A) Shannon-Weiner Species Diversity Index has been calculated as per the following expression:



$$\bar{H} = -\sum \frac{n}{N} \log_e \frac{n}{N}$$

where,

$\bar{H}$ = Shannon-Weiner Species Diversity Index

n = No. of individuals per species

N = Total number of individuals of all species

B) Evenness Index has been calculated by the following expression:

$$e = \frac{\bar{H}}{\log_e S}$$

where,

e = Evenness Index

$\bar{H}$ = Shannon Weiner Species Diversity Index

S = No. of species

C) Index of Dominance has been calculated by the following expression

$$c = \sum \left(\frac{n}{N} \right)^2$$

where,

c = Index of Dominance

n = No. of individuals per species

N = Total number of individuals of all species



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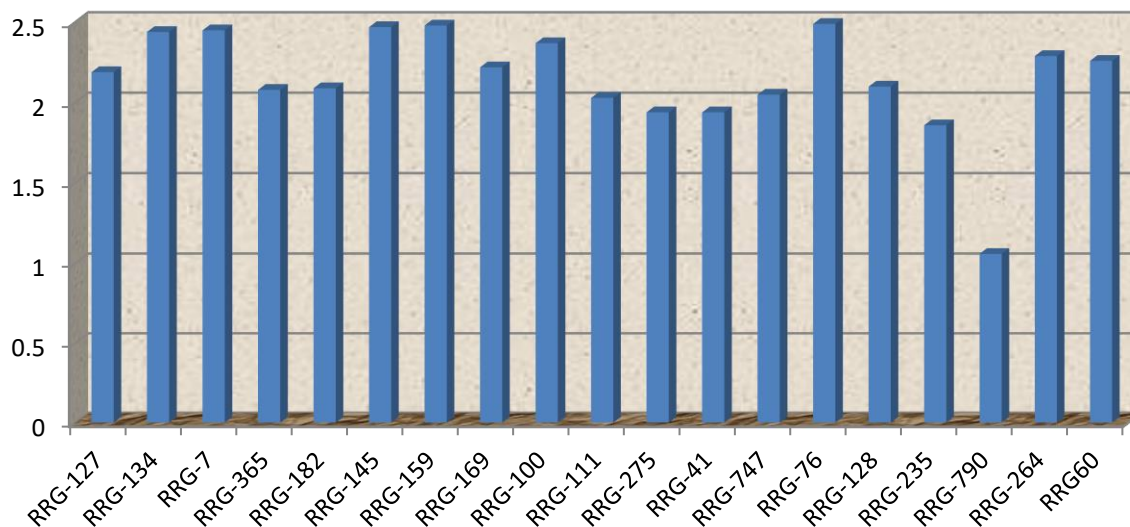
Table No 3.1 Bio Diversity Index for different Sample points.

Name of Range	Sample Point no	Name of Forest Block	Shannon-Weiner SDI	Evenness Index	Index of Dominance	Simpson index	Inverse Simpson index
Badampahad	RRG-27	Badampahad RF	2.19	0.91	0.135	0.135	7.407
Badampahad	RRG-134	Hatbhadra RF	2.44	0.76	0.142	0.142	7.042
Badampahad	RRG-7	Purunapani RF	2.45	0.96	0.095	0.095	10.526
Badampahad	RRG-365	Jamjhari DPF	2.08	0.81	0.207	0.207	4.831
Rairangpur	RRG-182	Gorumahisani RF	2.09	0.87	0.163	0.163	6.135
Rairangpur	RRG-145	Khanta RF	2.47	0.94	0.131	0.131	7.634
Rairangpur	RRG-159	Dhalabeda RF	2.48	0.94	0.097	0.097	10.309
Rairangpur	RRG-169	Gorumahisani RF	2.22	0.82	0.164	0.164	6.098
Bahalda	RRG-100	Budheirana RF	2.37	0.84	0.125	0.125	8.00
Bahalda	RRG-111	Cahalapada RF	2.03	0.85	0.175	0.175	5.714
Bahalda	RRG-275	Manbir RF	1.94	0.67	0.26	0.26	3.846
Bahalda	RRG-41	Bankamundi RF	1.94	0.67	0.26	0.26	3.846
Bahalda	RRG-747	Tiring RF	2.05	0.82	0.175	0.175	5.714
Manada	RRG-76	Bidhubhandar PRF	2.49	0.88	0.12	0.12	8.333
Manada	RRG-128	Dhenkdia DPF	2.1	0.96	0.136	0.136	7.353
Bisoi WL	RRG-235	Chhatramandal RF	1.86	0.62	0.354	0.354	2.825
Bisoi WL	RRG-790	Tunguru RF	1.06	0.59	0.521	0.521	1.919
Bisoi WL	RRG-264	Mahubhandar RF	2.29	0.92	0.122	0.122	8.197
Bisoi WL	RRG60	Bidubhandar PRF	2.26	0.83	0.174	0.174	5.747

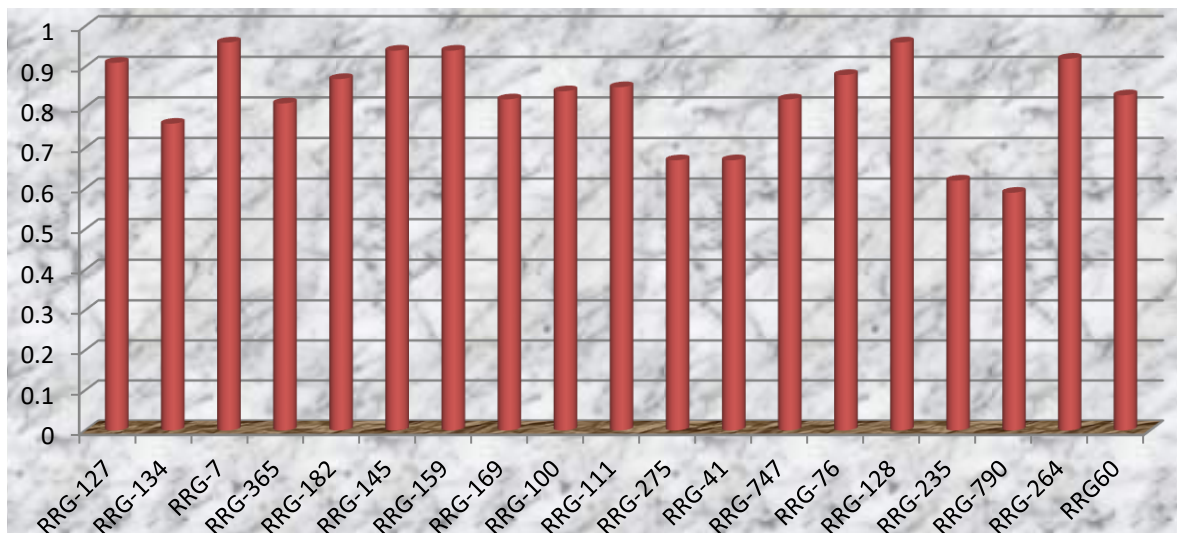
The sample Point enumeration information is at **Annexure-VI** for reference.



Shannon-Weiner SDI

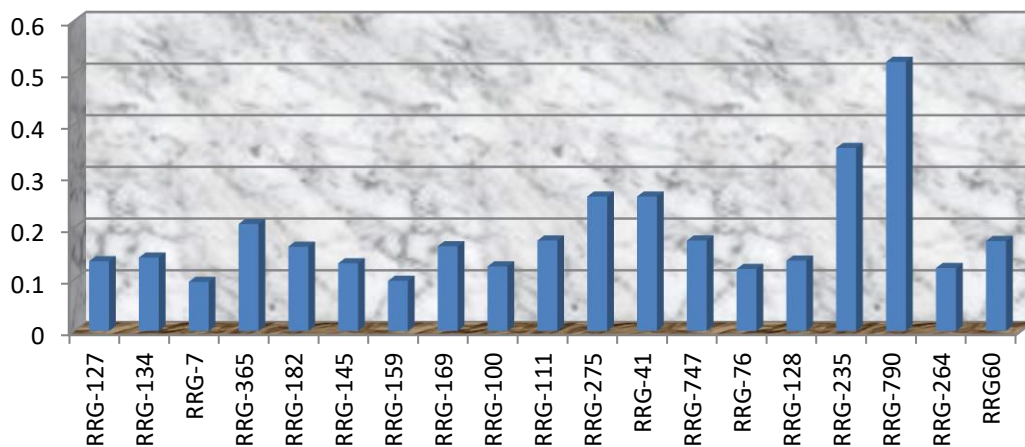


Evenness Index

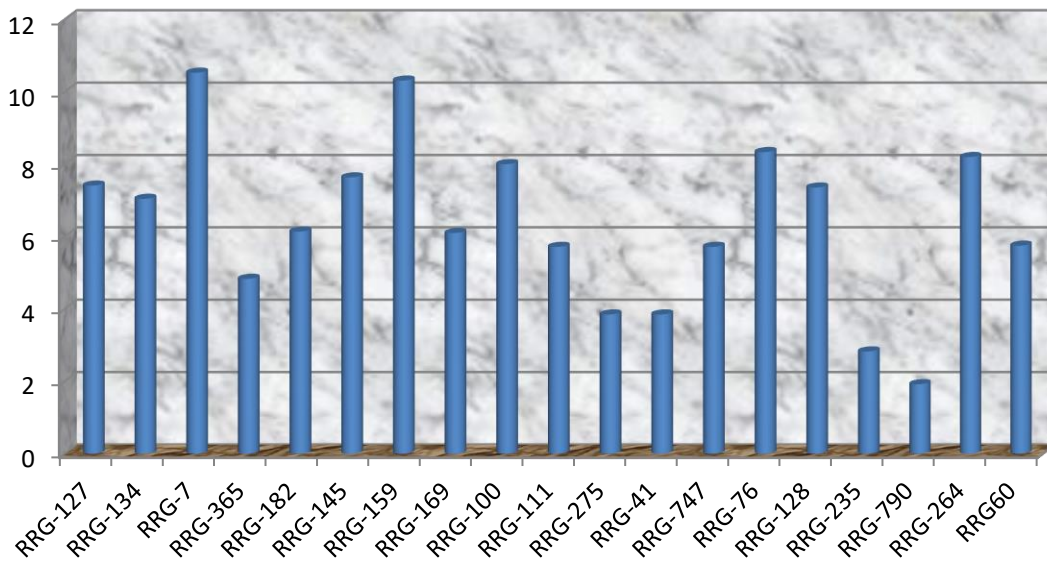




Simpson index



Inverse Simpson index



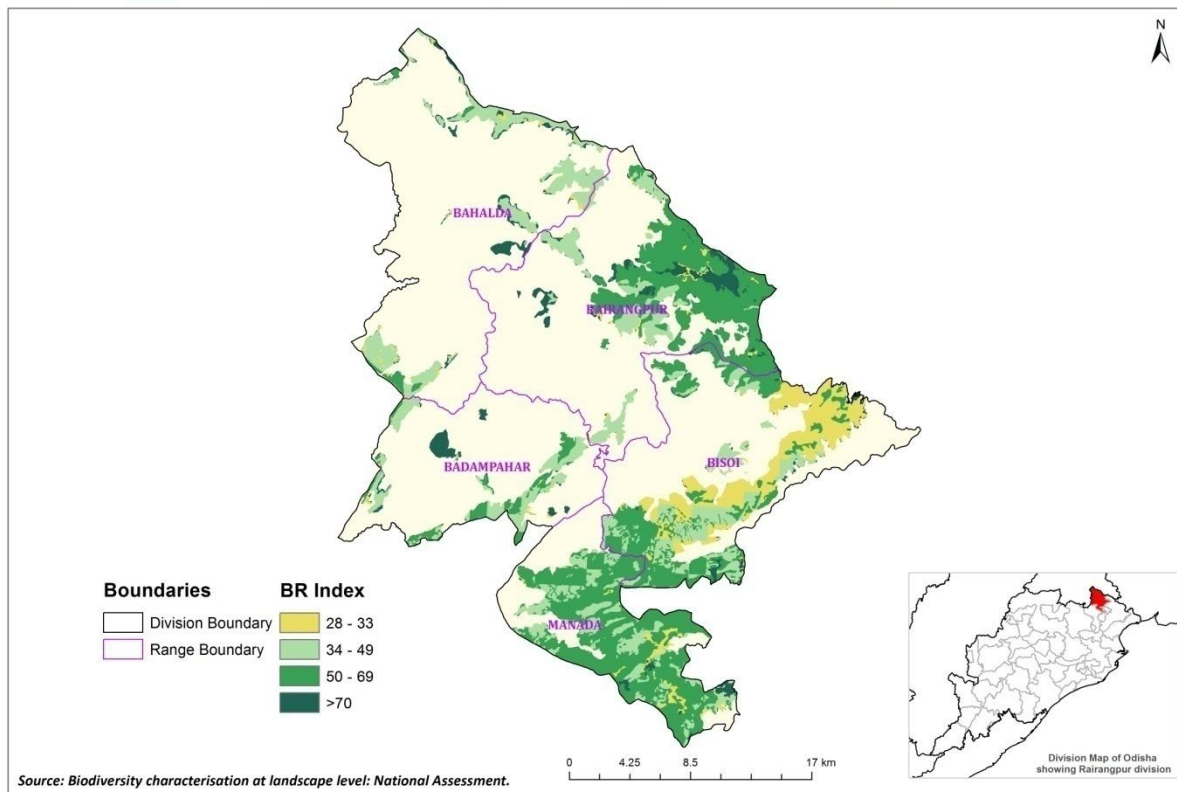


3.3 Status of Biodiversity Conservation in Forests:



Biological Richness Map of Rairangpur Forest Division, Odisha

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3.4 Status of Species prone to over exploitation:

Sal is the Principal Species of the division followed by Asan. Piasal, Kuruma are the major furniture wood available in the forest. These species are over exploited and day by day the forest is transferring from Sal forests to mixed forests. The species subjected to over exploitation in the past are Piasal, Pahadi Sisoo, Kuruma. At present the species facing over exploitation are Sal, Dhaura, Asan and Kendu. It is now time to take steps to check over exploitation of these species and try to regenerate already over exploited species.

3.5 Conservation of Genetic Resource:

At present no steps has been initiated to conserve Genetic Resources in this Division. The Government of **Odisha** declared Simlipal as a wildlife sanctuary in 1979 with an area of 2,200 square kilometers (850 sq mi). Government of India declared Simlipal as a **biosphere reserve** in 1994. UNESCO added this national park to its list of **Biosphere Reserves** in May 2009. The part



of Similipal Bio sphere reserve under Rairangpur Division has been transferred to newly constituted Similipal North Wildlife Division with headquarters at Joshipur. Similipal Tiger Reserve was declared in 1973 and area enhanced to 2750 Sq. kms. in 2007. Bisoi Wildlife Range is coming within the buffer zone of Similipal Tiger Reserve.

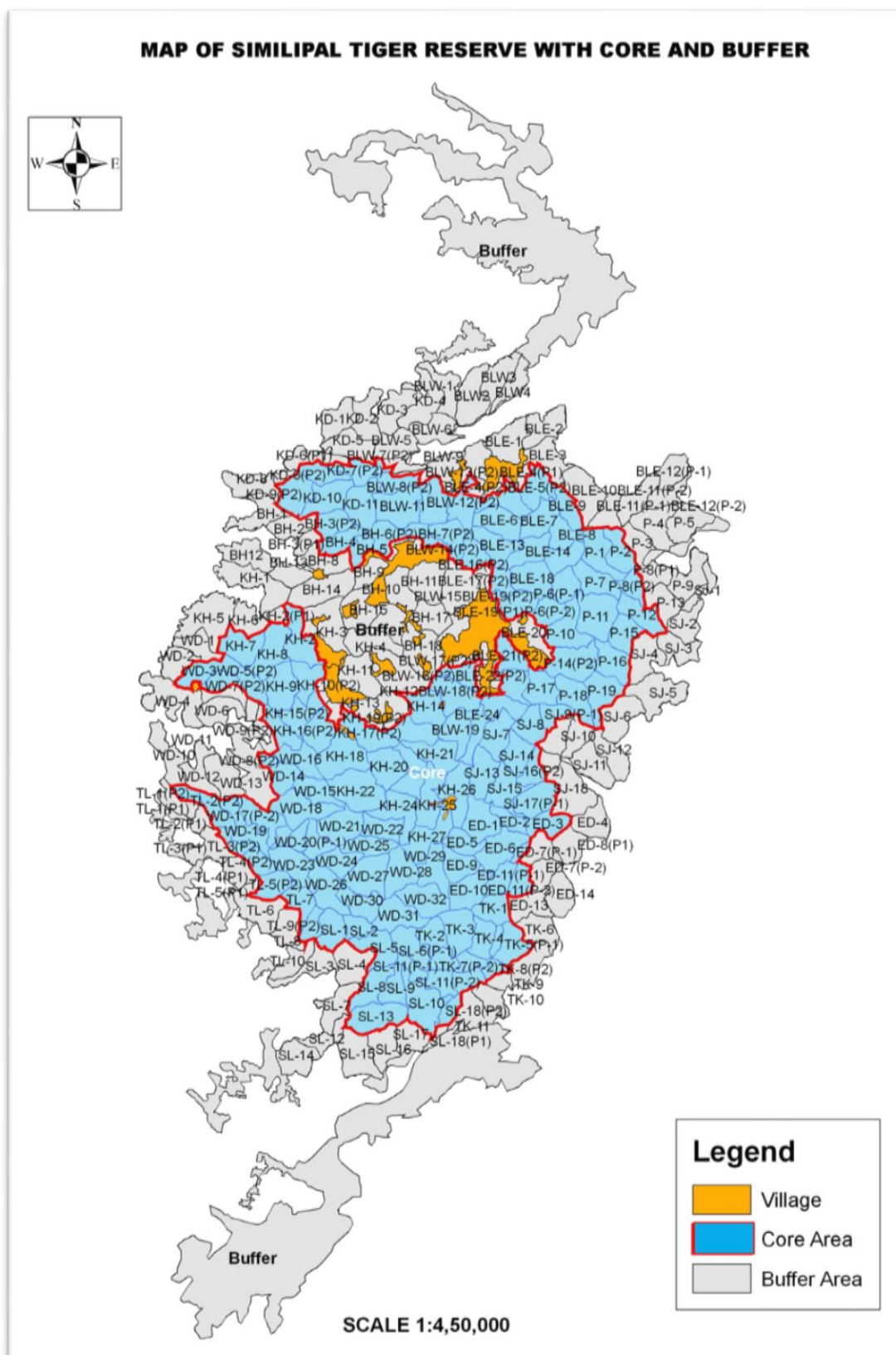
3.6 Fauna and their habitats:

Apart from the tiger, the major mammals are Elephants, leopard, sambar, barking deer, gaur, jungle cat, wild boar, four-horned antelope, giant squirrel common langur etc. . Grey hornbill, Indian pied hornbill and Malabar pied hornbill are also found in the forests included in the buffer zone of Tiger reserve coming within Bisoi WL Range. The Division also has a sizeable population of reptiles, which includes the longest venomous snake, the King cobra and the Tricarinate hill turtle. The forest blocks i.e. Bidhubhandar PRF, Mahubhandar RF, Tuguru RF and Sarali RF harbors most of the wildlife of the division.

The other forest blocks also harbors wildlife such as barking deer, spotted deer, jungle cat, wild boar, four-horned antelope, giant squirrel and common langur, reptiles and Pea fowl.



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3.7 Threats and Challenges to wildlife:

The wildlife is facing greater challenge due to

- (i) Fragmentation of Habitat due to construction / widening of Roads, Transmission lines.
- (ii) Depletion of tree cover / Forest crop density.
- (iii) Scarcity of Water in interior & high altitude Forests in summer.
- (iv) Depletion of Food stock and deterioration of quality Food / Fodder.
- (v) Depletion of Prey base / herbivorous.
- (vi) Annual Fire and loss of Ground Flora.
- (vii) Heavy biotic interference and intrusion by domestic animals (Cattle/ Goat/ Sheep)
- (viii) Illegal hunting by putting nets, electric live wire, etc.

3.7.1 Fragmentation of Habitat due to construction / widening of Roads, Transmission lines.

According to the National Transport Development Policy Committee, the demand for road based transport services has dramatically accelerated following economic liberalization, and has provided for as much as 90% of the total passenger traffic, leaving a meager 10% for rail. Rail and road freight traffic is expected to grow at about 12% and 8% per annum respectively, to achieve a 50% share each in the total freight traffic at the end of 15th plan. Accordingly construction of New Roads / Up gradation of existing road net work exerts pressure on Forest Land. This depletes forest wealth as well as fragments the habitat leaving the animals in isolation. Similarly the transmission lines are being drawn in all rural / urban areas and it passes through forests. Electrocutions of animals are frequently observed.

3.7.2 Depletion of tree cover / Forest crop density.

From satellite imagery study and experience, it is observed that the crop density is more or less is declining and more forest blocks are being managed under Rehabilitation Working Circle. Reasons for such depletion / thinning of over wood resulted in depletion of cover to animals. Due to lack of camouflaging the animals became easy prey to predators.

3.7.3 Scarcity of Water in interior & high altitude Forests in summer:

Now as it is observed, the Forests are more or less confined to Hills / Ridges. Plain Forests are decreasing day by day and are subject to much biotic pressure. Animals are withdrawing from

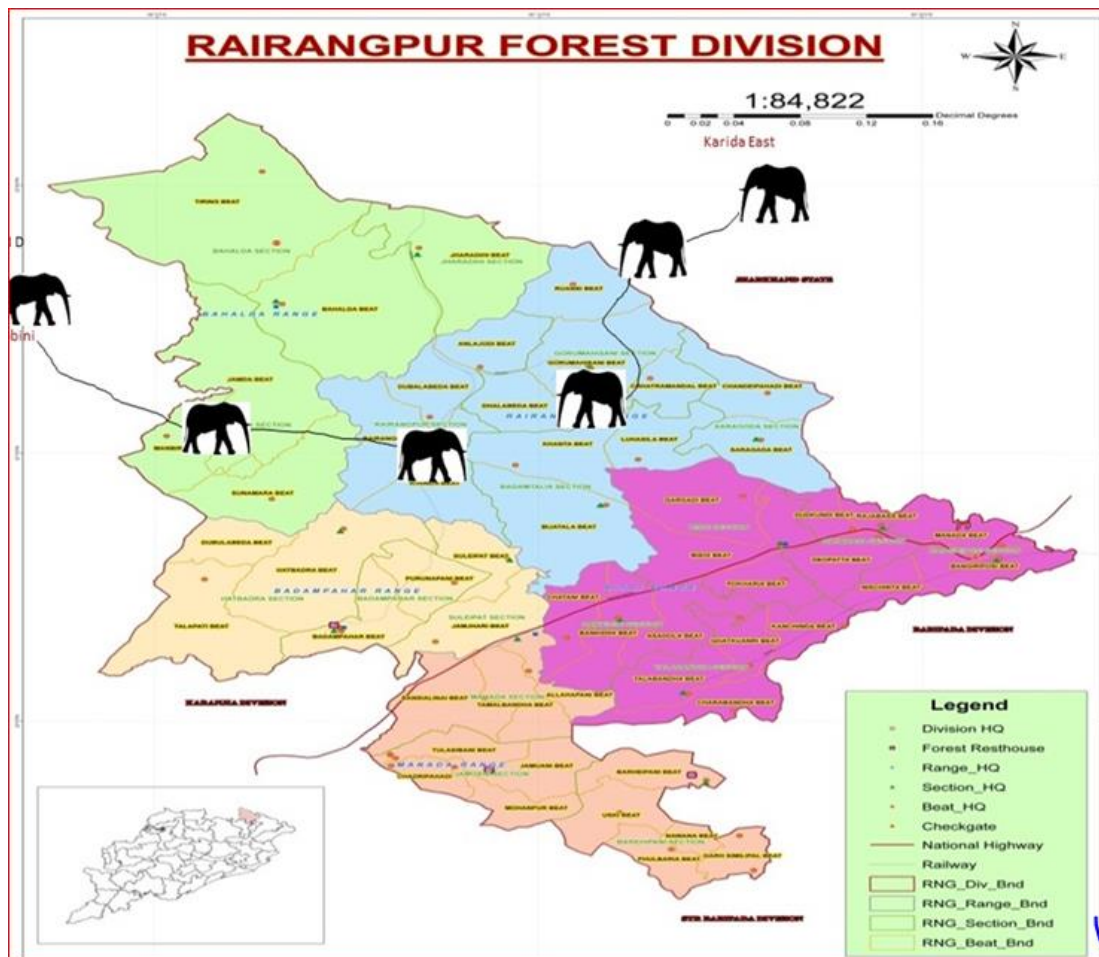


Working Plan of Rairangpur Forest division (2021 to 2031)

forest fringes and concentrating on inaccessible pockets of Forest. Day by Day the rainfall is erratic and number of Rainy days in a year is decreasing. The nalla / Rivulets are drying up and in summer it became dry. The animals face water scarcity. Sometimes, in search of water they come to nearby habitation and endangered their life.

3.7.4 Depletion of Food stock and deterioration of quality Food / Fodder.

The forests of the tract are becoming more dryer due to annual fire, reduced rainfall and reduced rainy days, grazing beyond its carrying capacity, compacting of soil, increased runoff, top soil erosion etc. The plant community is gradually regressing towards thorny, unpalatable, stunted seral stage rather than improving towards climax. In the process the forest lacks quality food / fodder to herbivorous. Due to lack of micro organisms, bears, wild boar etc are facing scarcity of food stock. The movement of Elephant in search of food and water is depicted below.





3.7.5 Depletion of Prey base / herbivorous.

Herbivorous animals are mostly the base prey of all Carnivorous. Due to depletion of Grass lands / quality fodder and poaching of animals, their number / population is in a declining trend. It has affected the population of carnivore's animals. In many forest areas, concentration of prey base is at a threshold limit. The health of the forest is also indicated from presence / abundance of carnivorous animals. It is a common observation in all forest blocks of Rairangpur Division that both prey base and predators are in a rapid declining trend. It is clear signal to all forest managers to act for increase in fodder, water and adequate tree cover for animals.

3.7.6 Annual Fire and loss of Ground Flora.

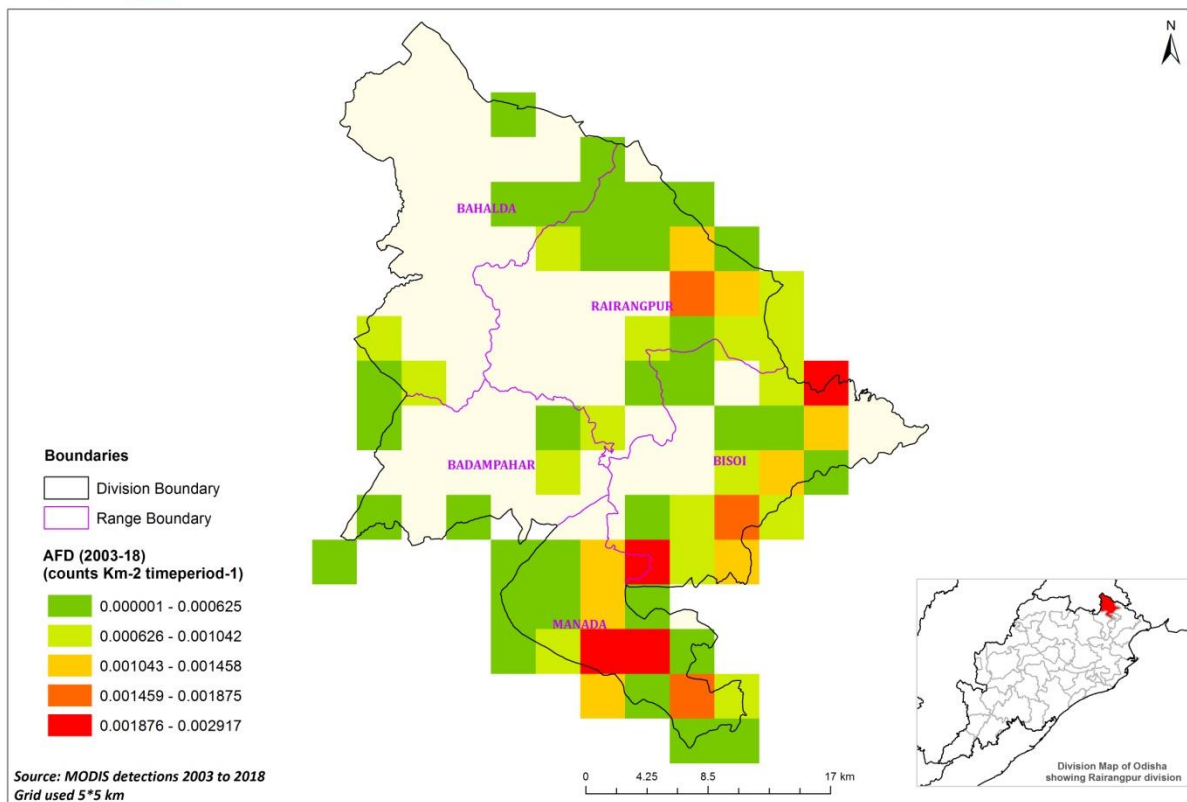
All the forests of Rairangpur Division are of deciduous nature. Annual Fire is a common occurrence which destroyed the ground flora, regeneration, humus layer and affects the living of animals. Though adequate steps are being taken by department, it is felt the need to associate the VSS, general public in an intensive manner to combat fire menace. The Fire Map is given below to have an idea of area prone to annual fire.

3.7.7 Heavy biotic interference and intrusion by domestic animals (Cattle/ Goat/ Sheep)

The forests are freely assessable to the public throughout the year though it is legally prohibited. Lopping of branches, cutting of trees for fodder for cattle, Goat etc is a common phenomenon. It always breaks the tranquility of wild animals. It seriously hampered the breeding, movement and always in a state of disturbed environment. Grazing related problems are increasing.

3.7.8 Illegal hunting by putting nets, electric live wire, etc.

The Forests and agricultural field are intermingling at many places. The villagers / anti social elements are putting Nets (Phasa), Electric live wires in agricultural field to protect their crop from depredation. These phasa sometimes put threat to animals.



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3.8 Protection & Management of Fauna:

In Rairangpur division there is located outside Similipal National Park and Wildlife Sanctuary. However Bisoi Wildlife Range is coming within the Similipal Tiger Reserve. The Protection & Management is in general level in all Ranges except Bisoi Wildlife Range. The following measures are being taken for Protection & Management of Fauna in this Division.

3.8.1 Elephant Corridors in the Division & status:

There are two identified interstate elephant corridors in the Division. These are

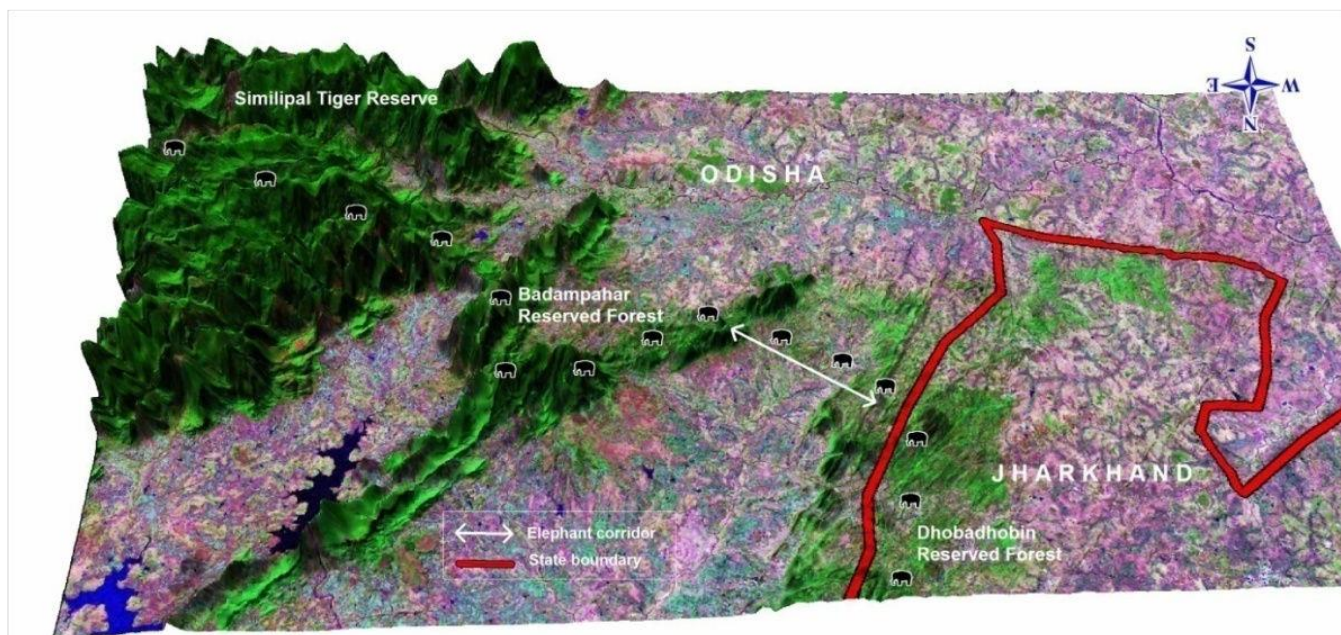
i) Badampahar - Dhobadhobin Corridor:

This corridor connects Badampahar Reserved Forest of Odisha state with Dhobadhobin Reserved Forest of Jharkhand state leading to Haldipokhari Reserved Forest of Chaibasa. Fragmentation of corridor forest due to expansion of human settlement, agriculture fields affect the corridor usage. The corridor comprises of fragmented forest patches i.e.



Budhipat DPF and Basila RF, agriculture fields and human settlements and maintains connectivity between Similipal and South Chaibasa.

Name	Badampahar - Dhobadhobin Corridor
Connectivity	Mayurbhanja Elephant Reserve (Odisha) and Chaibasa (Jharkhand)
Length and Width	Length 11 km and Width 0 – 1km
Legal status of the corridor	Demarcated Protected Forest, village forest, patta lands
Major land use	Forest, agriculture fields and human settlements
Major habitation/ Settlements in Corridor	Jhatisiring, Basaghutu, Tungurusahi, Batisahi, Thuntipani
Forest type	Tropical Dry Deciduous forest
Frequency of Corridor usage by Elephants	Regular
Development activities/ infrastructure	Mines, Stone quarries and crushers, highway, power line



(Map of Badampahar-Dhobadhobin showing the corridor)

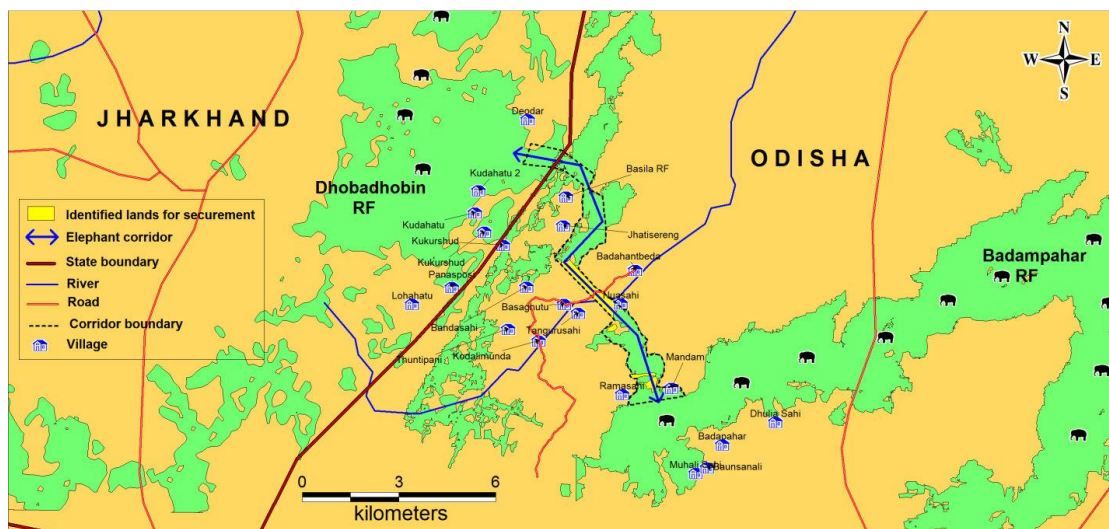


Habitat quality:

A total of 18 plant species were found in sampled area of 0.16 Ha. out of these, eight species were palatable fodder species of elephants. Species observed in the corridor are *Shorea robusta*, *Buchanania lanzan*, *Terminalia tomentosa* and *Madhuca indica*. On inspection it is observed that the corridor vegetation is under immense pressure and has been threatened. The ground cover result shows higher percentage of barren ground (42%), followed by shrub (36%), grass (17%) and herb (5%).

Threats:

1. **Fragmentation:** Expansion of human settlements, agriculture fields, roads (Neunti-Jhaldunguri) has fragmented the corridor between Basila RF and Budhipat DPF.
2. **Expansion of settlements:** Expansion of Basaghtu village and existence of weekly market along the Neuty-Jhaldunguri road passing through the corridor hinders the corridor usage.
3. **Biotic pressure:** Local people of the surrounding villages collect fuel wood, *Shorea robusta* leaves, other NTFPs, felling of big trees as well as livestock grazing. This has deteriorated the Corridor forest.
4. **Highway:** State highway - 49 connecting Jashipur and Rairangpur passes through the corridor fragmenting Budhipat DPF and Badampahar RF.
5. **Mines:** Mining activities (Iron ore and china clay) in Badampahar Reserve Forest affect elephant movement in the corridor.
6. **Encroachment:** Encroachment of corridor forest in Budhipat DPF and Basila Reserve Forest by local people for agriculture and establishment of settlement has further fragmented the corridor forest and reducing the corridor width thereby affecting elephant use.



ii) Badampahar – Kanapat and Karida East Corridor

This corridor connects Badampahar Reserve Forest of Odisha state with Kanapat RF of Odisha and Karida East Reserve Forest of Jharkhand state thereby maintains elephant movement between Similipal WLS and Mosabani Range of Jamshedpur Forest Division. The elephants from Similipal pass through Dhusara Reserve Forest, Teltangia village forest, Dhinkia DPF, Pidhakata forest and Tunguru Reserve Forest. The elephant movement has almost stopped between Badampahar RF to Dhusura RF due to mining in Badampahar RF, Suliapat Dam and Suliapat irrigation canal. Similarly elephant movement between Dhinkia DPF and Dhusura RF has markedly reduced due to human settlements, agriculture fields, construction of irrigation canals and electric sub-station.

Name	Badampahar – Kanapat and Karida East Corridor
Connectivity	Similipal WLS of Odisha and Jamshedpur Forest Division of Jharkhand
Length and Width	Length 34.5 km and Width 0 – 1.5 km
Legal status of the corridor	Reserved Forest, patta lands, revenue land
Major land use	Forest, agriculture fields, human settlements
Major habitation/ Settlements in Corridor	Damabeda, Kuajhari, Jederghutu, Bijatala
Forest type	Tropical Dry Deciduous forest
Frequency of Corridor usage by Elephants	Occasional
Development activities/ infrastructure	State Highway-50, irrigation canal, electric sub-station and irrigation projects, mines

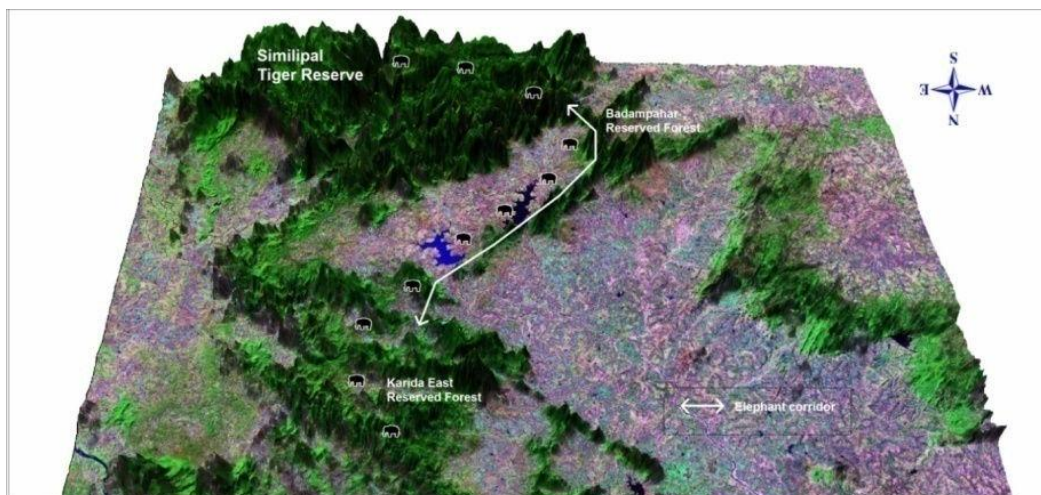


Habitat quality:

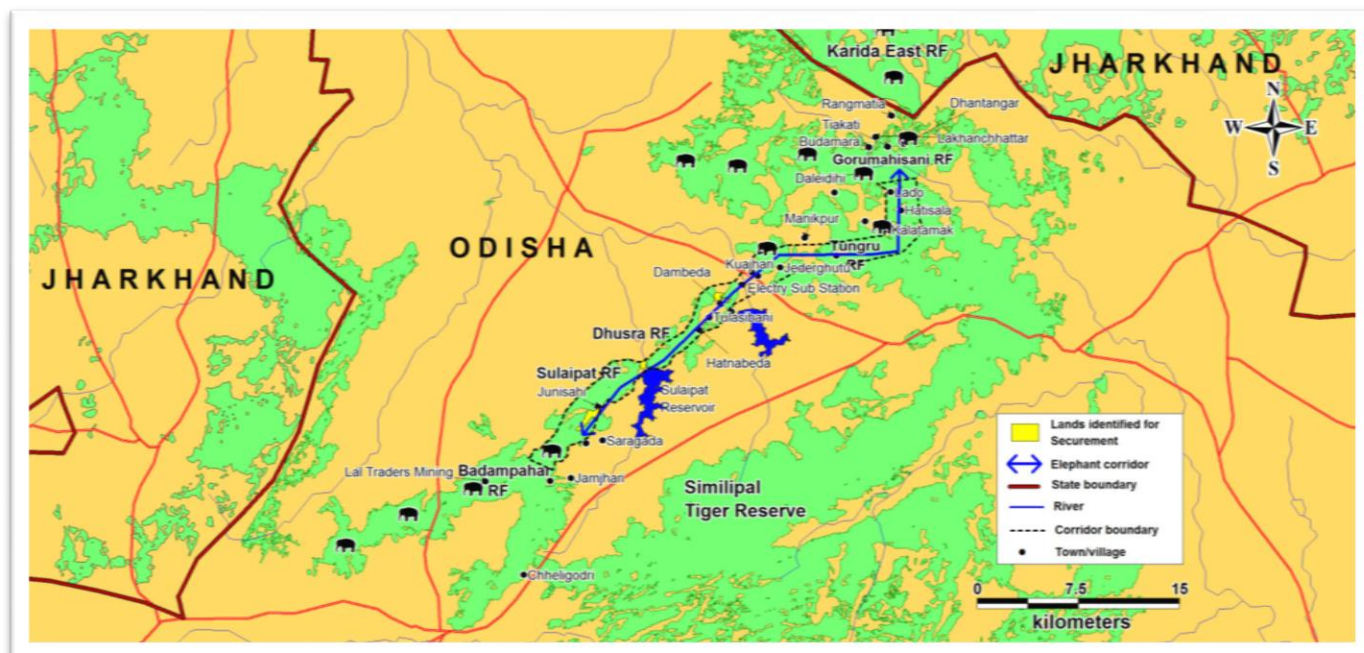
A total of 15 plant species were found in sampled area. Of these Seven species were palatable food species of elephants. Species observed are *Shorea robusta*, *Cleistanthus collinus*, *Buchanania lanzan*, *Diospyros melanoxylon* and *Terminalia tomentosa*. Maximum average GBH was found in Neur followed by *Shorea robusta*, *Syzygium cumini*, *Cleistanthus collinus* and *Terminalia tomentosa*. The ground cover result shows higher percentage of barren ground (57.5%), followed by shrub (26%), grass (11.5%) and herb (5%).

Threats

1. **Irrigation canals:** The cemented surface of the irrigation canals running on either side of the SH-50 and Sulaipat canal are major obstacles to elephant movement through the corridor.
2. **Mines in Badampahar Reserve Forest:** Iron Ore mines in the Badampahar Reserve Forest and corresponding activities such as blasting, heavy vehicular movement have severely affected elephant movement.
3. **Highway and traffic:** Vehicular traffic on State Highway-50 connecting Baripada and Rairangpur passes through the corridor.
4. **Electric sub-station in Corridor:** Construction of an electric sub-station in the corridor near the Bankabal River.
5. **Human settlement and biotic pressure:** Human settlements and agriculture lands of Damabeda, Bijatala, Kuajhari and Jederghutu villages have fragmented the corridor between Dhusura RF and Dinkia DPF.
6. **Slash and burn cultivation** in Lakhanchhat and nearby areas has reduced and degraded the corridor forest.



Map of Badampahar-Kanapat and Karida East showing the corridor



Map of the Badampahar-Kanapat and Karida East corridor area showing the land to be secured.

3.8.2 Management Practices adopted:

A. Deployment of Squad:

In order to strengthen the existing staffs in Ranges, Squads have been deployed under various nomenclatures i.e. Anti Depredation Squad, Elephant trackers, Anti Poaching squad, Fire Fighting Squad, Protection Squad.

B. Creation of Water Body:

In order to improve habitat, besides plantations water body are being created inside the Forest Blocks where the concentration of Animals are good.

C. Public Awareness camps:

For creation of public awareness, Wildlife Week is being celebrated every year with involvement of School Children, VSS members and local NGOs.





CHAPTER-4

MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH & VITALITY:

4.1 Status of Regeneration:

Self regeneration of species in forest is vital for its sustainability and perpetuity. Nature has its own timing of seeding of various species depending upon outbreak of monsoon. The Forest is expected to regenerate itself either in high forest manner or by coppice. When both the mechanism do not fill up the gap, the management aided the natural regeneration by silvicultural practices i.e. Cleaning and planting. With this back ground, it is observed that, the moist Sal forests bears regeneration in high forest manner i.e. from seed origin recruits, seedling and saplings. The forest also supplements through coppicing. In overall situation is satisfactory for moist deciduous low level Sal forests of the division.

In case of dry deciduous Sal forest, the regeneration is badly hampered due to biotic interference, annual fire and removal of more forest growth than required. The management is aiding the Natural regeneration process through Silvicultural cleaning, Soil & Moisture Conservation and planting of saplings. In a bird's eye view, the forest requires intensive care to have good regeneration from seeds. Coppice shoots have a lower rotation period and a lesser diameter growth. The same is supported from Regeneration survey during sample point enumeration.

The procedure followed is as per Para 74 of the National Working Plan Code-2014. As per the guideline the following steps are taken.

- Young plants of tree species up to 10 cm diameter are taken into consideration for assessment of regeneration status of a particular species as practiced in National Forest Inventory by FSI.
- Data collected from the square plots of 3x3m for saplings (2cm to 10 cm collar diameter) and from the square plots of 1x1m for seedlings are used to assess the regeneration status of species in the management unit i.e. compartment/ blocks.
- The phyto-sociological data from plot level enumeration, the regeneration status of the sampled species have been assessed in the following categories as follows.



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Category	Guiding Principle
Good regeneration	If seedlings are more in numbers than the saplings and likewise saplings is more than that of adults.
Fair regeneration	If seedlings are more in numbers than the saplings but the saplings are equal or less than that of adults.
Poor regeneration	if a species survives in only sapling stage, but not as seedlings (though sapling may be less, more or equal to adults).
No regeneration	If a species is absent both in sapling and seedling stage, but present as adult.
New regeneration	If a species has no adults but only sapling and/or seedlings.

The summary of regeneration status inferred from sample survey is furnished at **Table 4.1**

Table No 4.1 Regeneration status of important Forest blocks.

Sl No	Name of Forest Block	Regeneration Status	Reference Sample Point No	Crop Composition
1	Budheirana RF/	Moderate	RRG100	Mixed Sal with Piasal,Chara, Asan, Kendu,Mahul etc
2	Manbir RF	Moderate	RRG273	Mixed sal with Piasal,Kendu, Chara,Karada,Mahul, Siris, Lodha etc
3	Chalapada RF	Moderate	RRG113	Mix Forest with Korada,Kendu,Kusum,Dhaura,Asana & Sunari.
4	Radho DPF	Moderate	RRG326	Mix Forest with associates like Sal, Mai,Dhaura, Asana etc
5	Bankamundi RF	Moderate	RRG38	Mix Sal Forest with Piasal, Kendu,Asana,Dhaura,Karada etc.
6	Bhitaranda DPF	Moderate	RRG59	No tree only Shrub of Eupatorium etc
7	Tiring RF	Moderate	RRG746	Mix sal forest with Kendu, Chara, Dhaura, Gambhari, Dhaman,Simili,Domkurud, Bandhan
8	Tunguru RF Compt. No. 1	Moderate	RRG759	Sal mixed forest dominated with Sal, Dhaura, Asan,Kendu, Mahula etc.



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9	Tunguru RF Compt. No. 3	Scanty	RRG773	Mixed forest with associates like Sal, Asan, Dhaura, Palasi etc.
10	Khanpat RF	Moderate	RRG213	Sal Mix Forest
11	Chahalpada RF	Abudant	RRG234	Sal Mixed Forest
12	Saragoda RF	Moderate	RRG242	Sal Mixed Forest
13	Mahubhandar RF	Moderate	RRG268	Mixed forest with associates Dhaura, Bela, Mai, Teak etc.
14	Bidubhandar PRF	Moderate	RRG74	Mixed forest associated with Char, Dhaura, Jia, Kusum etc.
15	Pidhakata DPF	Moderate	RRG313	Sal mixed forest dominated with Sal species 60% other species are Asan, Dhaura, Kendu etc.
16	Ruansi DPF	Moderate	RRG120	Mixed Sal Forest
17	Dhalabeda RF	Moderate	RRG158	Sal mixed Forest
18	Gorumahisani	Moderate	RRG171	Sal mixed forest
19	Ramgarh Asurghaty RF	Moderate	RRG335	Mix Forest with associates like Sal, Chara, Kendu

On analysis of above data it is observed that the regeneration status is mostly moderate. This also matches with the field observation during field visit.

4.2 Area affected by Forest Fire:

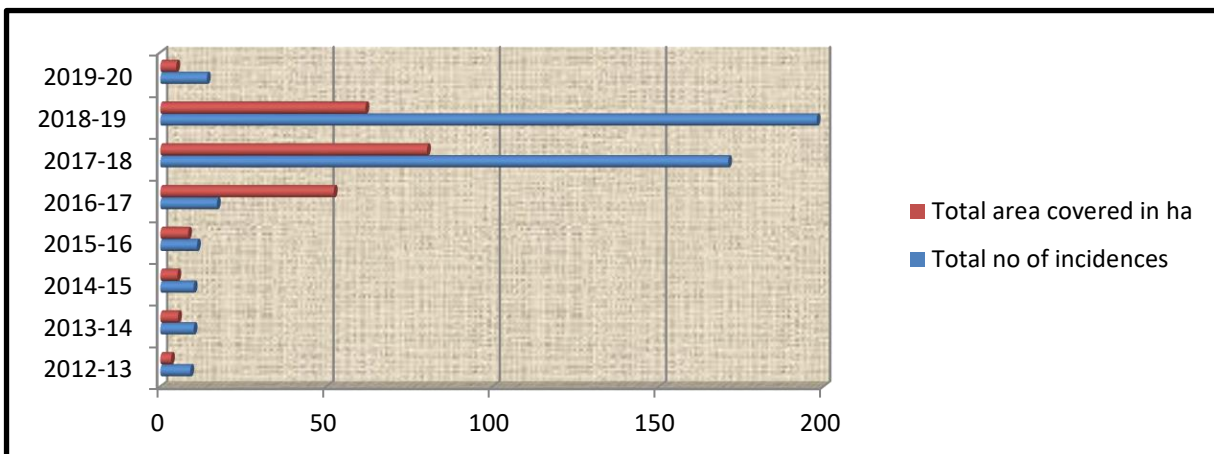
Forest fire is a chronic phenomenon in our Dry Deciduous Forest. During last 8 years the area affected by Fire and extent thereof is furnished at Table No 4.1.

Table No 4.1: Incidence of Forest Fire and area affected in the Division

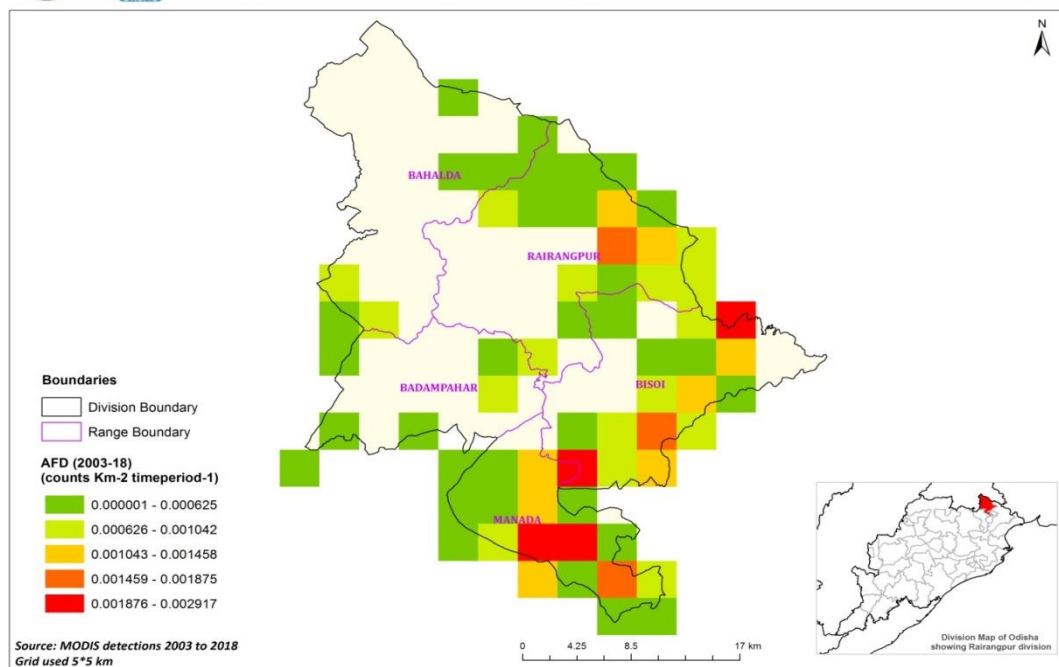
Year	Total no of incidences	Total area covered in ha	Remarks
2012-13	9	3.20	Forest fire was extinguished by the staff with help from local EDC /VSS members and Fire service. NB: fire map attached Separately.
2013-14	10	5.30	
2014-15	10	5.10	
2015-16	11	8.34	
2016-17	17	52.14	
2017-18	171	80.16	
2018-19	198	61.66	
2019-20	14	4.80	
Total	440	220.7	



Working Plan of Rairangpur Forest division (2021 to 2031)

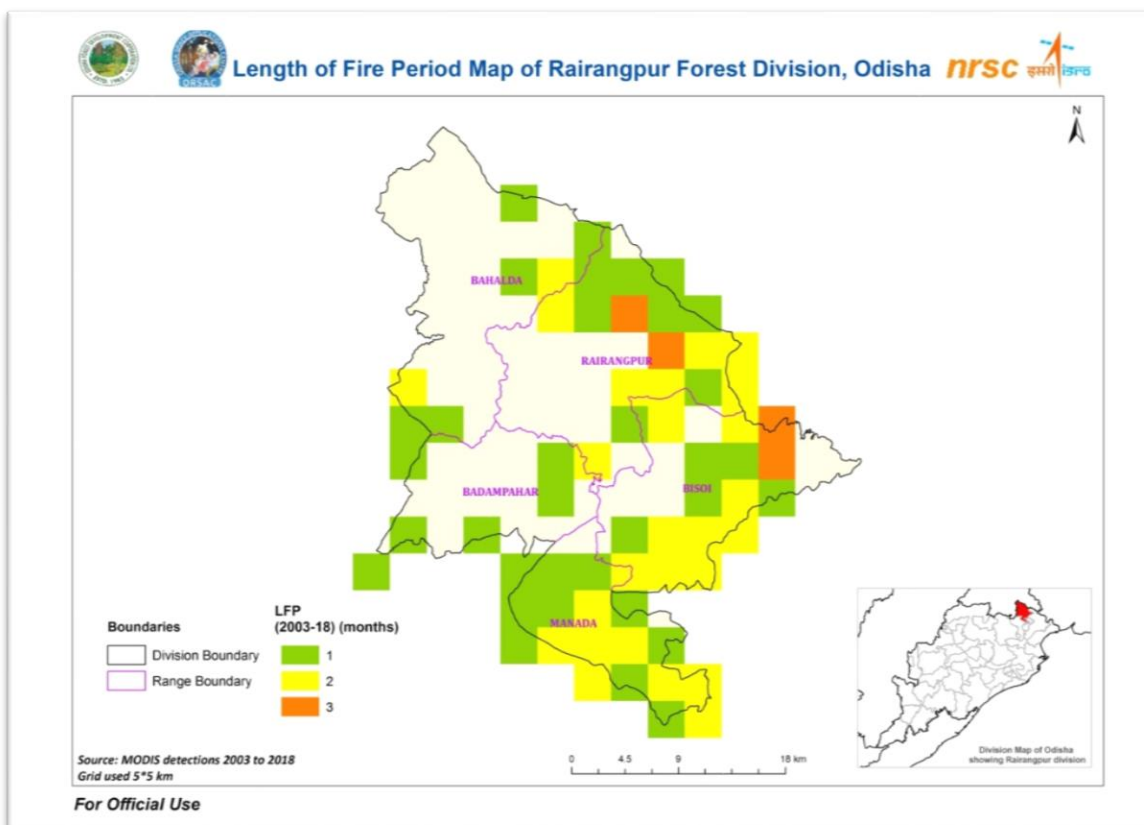
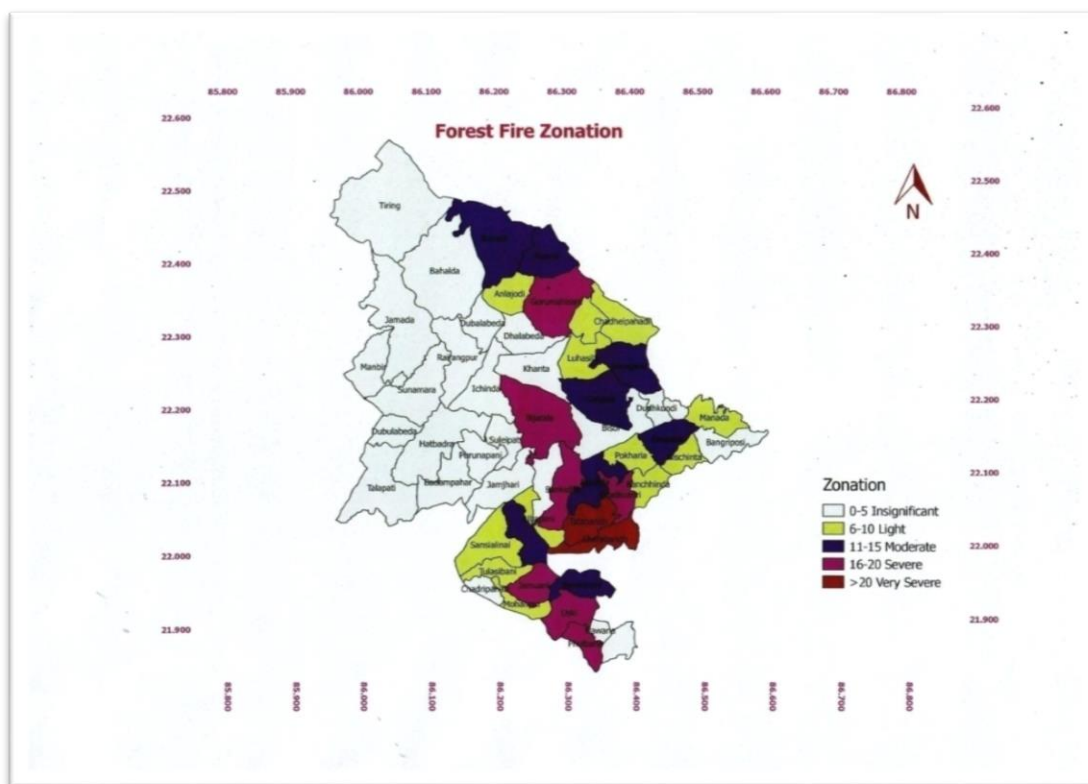


Average Fire Density Map of Rairangpur Forest Division, Odisha





Working Plan of Rairangpur Forest division (2021 to 2031)





4.3 Area damaged by Natural Calamities:

Natural Calamity except fire has not occurred in this division. The effect of cyclonic storm “Phani”, “Hudu hudu” has not caused any remarkable damage to forests and infrastructures of this division.

4.4 Area Protected from Grazing:

No area has been declared closed to grazing. Plantations raised during last three years were closed to grazing.

4.5 Lopping Practices:

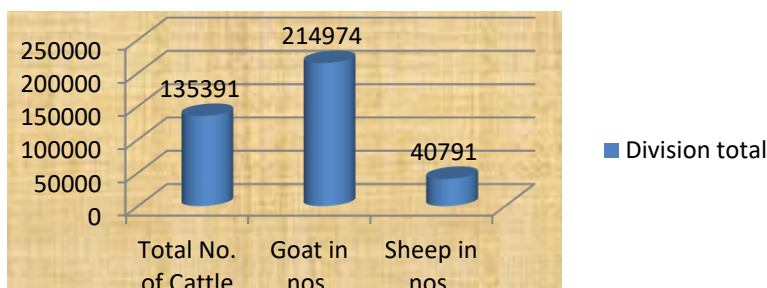
Grazing by Cattle and goats are moderate in the forests of Rairangpur division. Grazing pressure can well be imagined from the cattle population in the division as furnished below Table No 4.2

Table No 4.2: Livestock Resources Statistics As Per Livestock Census-2012 Of Rairangpur Forest Division

Sl No.	Name of CD Block	Total No. of Cattle	COW in nos.		Breed able cattle in nos.	Buffalo in nos.	Goat in nos.	Sheep in nos.
			No. of Indigenous	C.B				
1	Rairangpur	17431	5806	1016	2878	149	24536	5388
2	Bahalda	18738	6222	1127	3780	204	25773	4973
3	Tiring	13185	4212	159	1220	215	20632	5268
4	Jamda	13203	4717	161	1672	151	20778	6508
5	Kusumi	26703	9189	994	4405	364	42939	8041
6	Bijatata	17683	6317	218	1310	154	32957	4374
7	Bisoi	28448	9789	1059	1868	474	47359	6239
	TOTAL	135391	46252	4734	17133	1711	214974	40791

Source:-SDVO Rairangpur as per census 2012

Division total





The goat / Sheep population entirely thrives on forest vegetation and lopping is a favorite practice to feed them. Sisoo, Bija, Sirisa, Bada Chakunda, Kanchan, Barkoli are the favorite forest species usually lopped for fodder.

4.6 Area infested by invasive weed species in Forests:

The natural regeneration is badly hampered due to invasion of weeds in forests. Any open space created by way of felling, immediately the area is occupied by weeds. *Lantana camara*, *Eupatorium*, bana tulasi (*Ocimum tenuiflorum*) are the major weeds noticed in the division. The forest blocks and area invaded by weeds is furnished at Table No 4.3.

Table No 4.3 : Forest Blocks invaded by Weeds.

Sl No	Name of Forest Block	Invading weeds	Extent of Area in Ha (appx.)
1	Badampahar R.F	Lantana Camara, Ocimum tenuiflorum	500.0
2	Dubulabeda R.F	Lantana Camara, Ocimum tenuiflorum	50.0
3	Teltangia DPF	Lantana Camara, Ocimum tenuiflorum	20.0
4	Kanapat RF	Lantana Camara, Ocimum tenuiflorum	10.0
5	Naskaria RF-2	Lantana Camara, Ocimum tenuiflorum	7.0
6	Karanjharandhusra RF	Lantana Camara, Ocimum tenuiflorum	12.0
7	Ramgarh- Asurghaty R.F	Lantana Camara, Ocimum tenuiflorum	500.0
8	Manbir R.F	Lantana Camara, Ocimum tenuiflorum	100.0
9	Khairipal R.F	Lantana Camara, Ocimum tenuiflorum	25.0
10	Budheirana R.F	Lantana Camara, Ocimum tenuiflorum	80.0
11	Chahalapada R.F	Lantana Camara, Ocimum tenuiflorum	50.0
12	Gambharia R.F	Lantana Camara, Ocimum tenuiflorum ,	20.0
13	Tiring R.F	Lantana Camara, Ocimum tenuiflorum	100.0
14	Bankamundi R.F	Lantana Camara, Ocimum tenuiflorum	100.0
15	Bhitaramda D.P.F	Lantana Camara, Ocimum tenuiflorum	100.0
16	Radho D.P.F	Lantana Camara, Ocimum tenuiflorum	100.0
17	Debradihi P.R.F	Lantana Camara, Ocimum tenuiflorum	30.0
18	Sansadam D.P.F	Lantana Camara, Ocimum tenuiflorum	20.0
19	Salei D.P.F	Lantana Camara, Ocimum tenuiflorum	30.0
20	Jari P.F	Lantana Camara, Ocimum tenuiflorum	15.0
21	Khadambeda RF	Lantana Camara, Ocimum tenuiflorum	20.0
22	Bidubhandar PRF	Lantana Camara, Ocimum tenuiflorum	157.0
23	Tunguru RF	Lantana Camara, Ocimum tenuiflorum	127.0
24	Kanapat RF	Lantana Camara, Ocimum tenuiflorum	200.0
25	Tower Hill-I	Lantana Camara, Ocimum tenuiflorum	10.0
	Total		2383.0



The total RF, PRF and DPF area combined comes to 44,132.790 ha, out of which about 2383 ha has been infested with weeds which constitutes 3.99 % of the forest area which lack / poor regeneration, the area under invasive weeds is increasing year after year.

4.7 Incidence of pest & Diseases:

No massive infestation by pests is recorded during last plan period. In dry tract Sal heart rot disease has been noticed.

Parasites like Loranthus- some species of *Loranthus*, in the broad sense, are troublesome parasites. These plants grow strongly on ageing trees particularly somewhere in the middle of old branches. Once established, it steals minerals and water, as well as block sunlight by covering the encroached place. The flowers of *Loranthus europaeus* are small, green, usually have four to six parts and may be either unisexual or bisexual. Other species of a broader *Loranthus* have very large, showy flowers, with blooms in lively colours. The fruits are berries, usually containing a single seed, that are dispersed by birds.

The floral characteristics indicate that it is Ornithophilous in nature and has moderate quantity nectar stored in its perianth tube. The mature buds require external factors like tripping to ensure that they open up. In the absence of this, the buds fall off without opening. Birds help in this process and mature buds eject a cloud of pollens which sticks to the head or beak of the probing bird. The birds seen visiting these flowers are Tickell's flowerpecker, purple-rumped sunbird, purple sunbird and spider.

4.8 Forest degradation & its drivers:

Forest degradation is mainly due to illegal removal of Forest Produce i.e. timber & Fire wood. Due to Biotic pressure & interference like heavy grazing, Ground fire and above all pressure from increasing population which exert pressure on land resulting encroachment. The nature of degradation & its driver are summarized below.

Table No 4.4 Drivers of Forest degradation & remedial measures.

Forest degradation:	Drivers of Degradation.	Remedial measures.
Loss of Tree cover	Collection of Firewood and timber for local consumption. Mining on forest area	To provide alternate fuel, timber substitute. To have strict enforcement of protection & legal action. Progressive Reclamation of Mined out area. Adequate plantation.



Working Plan of Rairangpur Forest division (2021 to 2031)

Loss of Ground Flora	Forest fire.	Regulating Picnic party entering in to Forest / Plantations.Maintaining Fire Lines,Strict vigilance on Forest Fire detection & combating. Taking help of nearby Fire stations / brigades.
	Heavy Grazing.	Regulating Grazing,Practicing Rotational grazing. Development of Grass lands.
Reduction in Forest area.	River Bank erosion.	Planting of Soil binding species on River banks. Resorting to construction of structures to prevent bank erosion in extreme cases of importance.
	Land grabbers / Encroachers.	Appropriate legal action, Motivate the encroachers to resort to Agro Forestry.
Bio diversity.	Loss of Bio diversity.	Introduce / protect less known species.Educate students / villagers importance of Bio Diversity. Control use of pesticides in agriculture. Protect Riverine plant succession.

4.9 Pollution Control and Protection of Environment:

4.9.1 Pollution Related to Tourism:

Jagannath temple, Hanuman Vatika, Indira Gandhi Children's Park, Suleipat Dam (Khadakhai Dam), Brundavan Garden(Now closed For public), Bankbal Dam, Shimlipal National Park, Purunia Shivsambhu Temple, Raghu Nath Jew Math Anladuba, Badampahar Mines and Gorumahisani Mines, Khiching temple etc are some of the important places of tourist interest in this division or nearby. Lakhs of people visit the sites in a year.

Tourist related pollution i.e. Negative impacts from tourism occur when the level of visitor use is greater than the environment's ability to cope with this use within the acceptable limits of change. Uncontrolled conventional tourism poses potential threats to many natural areas around the tract. It can put enormous pressure on an area and lead to impacts such as increased pollution, discharges to water course, natural habitat loss, increased pressure on endangered species and heightened vulnerability to forest fires. It often puts a strain on water resources, and it can force local populations to compete for the use of critical resources.

i. Depletion of Natural Resources.

Tourism development can put pressure on natural resources when it increases consumption in areas where resources are already scarce.



a. Water resources.

Water, and especially fresh water, is one of the most critical natural resources. The tourism industry generally overuses water resources for hotels, swimming pools, golf courses and personal use of water by tourists. This can result in water shortages and degradation of water supplies, as well as generating a greater volume of waste water.

b. Local resources.

Tourism can create great pressure on local resources like energy, food, and other raw materials that may already be in short supply. Greater extraction and transport of these resources exacerbates the physical impacts associated with their exploitation. Because of the seasonal character of the industry, many destinations have ten times more inhabitants in the high season as in the low season.

c. Land degradation.

Important land resources include minerals, fossil fuels, fertile soil, forests, wetland and wildlife. Increased construction of tourism and recreational facilities has increased the pressure on these resources and on scenic landscapes. Direct impact on natural resources, both renewable and nonrenewable, in the provision of tourist facilities can be caused by the use of land for accommodation and other infrastructure provision, and the use of building materials. Forests often suffer negative impacts of tourism in the form of deforestation caused by fuel wood collection and land clearing.

ii. POLLUTION.

Tourism can cause the same forms of pollution as any other industry: air emissions, noise, solid waste and littering, releases of sewage, oil and chemicals, even architectural/visual pollution.

a. Air pollution and noise.

Transport by air, road, and rail is continuously increasing in response to the rising number. One consequence of this increase in air transport is that tourism now accounts for more than 60% of air travel and is therefore responsible for an important share of air emissions. Transport emissions and emissions from energy production and use are linked to acid rain, global warming and photochemical pollution. Air pollution from tourist transportation has impacts on the global level, especially from carbon dioxide (CO₂) emissions related to transportation energy use. And it can contribute to severe local air pollution. Some of these impacts are quite



specific to tourist activities. For example, especially in very hot weather tour buses often leave their motors running for hours while the tourists go out for an excursion because they want to return to a comfortably air-conditioned bus.

Noise pollution from airplanes, cars, and buses, as well as recreational vehicles is an ever-growing problem of modern life. In addition to causing annoyance, stress, and even hearing loss for its humans, it causes distress to wildlife, especially in sensitive areas. For instance, noise generated by vehicles can cause animals to alter their natural activity patterns.

b. Solid waste and littering

In areas with high concentrations of tourist activities and appealing natural attractions, waste disposal is a serious problem and improper disposal can be a major despoiler of the natural environment - rivers, scenic areas and roadsides. Solid waste and littering can degrade the physical appearance of the water and cause the death of animals.

c. Sewage.

Construction of hotels, recreation and other facilities often leads to increased sewage pollution. Wastewater has polluted Rivers surrounding tourist attractions, damaging the flora and fauna. Sewage pollution can threaten the health of humans and animals.

d. Aesthetic Pollution.

Often tourism fails to integrate its structures with the natural features and indigenous architectural of the destination. Large, dominating resorts of disparate design can look out of place in any natural environment and may clash with the indigenous structural design.

A lack of land-use planning and building regulations in many destinations has facilitated sprawling developments along coastlines, valleys and scenic routes. The sprawl includes tourism facilities themselves and supporting infrastructure such as roads, employee housing, parking, service areas, and waste disposal.

iii. Physical Impacts.

Attractive landscape sites of Similipal and its surroundings are characterized by species-rich ecosystems. Typical physical impacts include the degradation of such ecosystems.

An ecosystem is a geographic area including all the living organisms (people, plants, animals, and micro-organisms), their physical surroundings (such as soil, water, and air), and the natural cycles that sustain them. The ecosystems most threatened with degradation are ecologically fragile areas such as wetlands, Sanctuary and grass beds. The threats to and pressures on these ecosystems are often severe because such places are very attractive to both tourists and developers.



Physical impacts are caused not only by tourism-related land clearing and construction, but by continuing tourist activities and long-term changes in local economies and ecologies.

Physical impacts of tourism development can be summarized as follows:

a. Construction activities and infrastructure development.

The development of tourism facilities such as accommodation, water supplies, restaurants and recreation facilities can involve sand mining, beach and sand dune erosion, soil erosion and extensive paving. In addition, road and other related construction can lead to land degradation and loss of wildlife habitats and deterioration of scenery.

b. Deforestation and intensified or unsustainable use of land.

Construction of luxurious resort accommodation and facilities frequently requires clearing forested land. Wetlands are often drained and filled due to lack of more suitable sites for construction of tourism facilities and infrastructure. These activities can cause severe disturbance and erosion of the local ecosystem, even destruction in the long term.

4.9.2 Mining / Industries within the Division:

Badampahar Iron Ore Mines, Gorumahisani Iron Ore Mines and Suleipat Iron Ore Mines are very old Iron Ore Mines of the region. These are mostly controlling the economy of the area. Transportation of iron Ore by road only is a source of Air and water pollution.

4.9.2.1 Regulating Activities:

Considering the importance and fragile nature of the eco system and wildlife many regulations to protect the environment have been in force. These regulations / Notifications are

a) Environment (Protection) Act, 1986

b) Air (Prevention and Control of Pollution) Act, 1981

c) Water (Prevention and Control of Pollution) Act, 1981

The above two acts coupled with EIA Notification 2006 are the basic controlling measures by the Govt. to check Air and Water pollution.

d) Ban on use of polythene of specified thickness.

The Government of Odisha, Forest & Environment Department has issued notification banning use of polythene , thermo cool etc within the municipal limits or as the case may be within the



Municipal Corporation Limits of Bhubaneswar, Cuttack, Berhampur, Rourkela, Sambalpur and Puri, namely:-

- (i) Polythene carry bags of any shape, thickness and size (excluding compostable);
- (ii) Bottled drinking water Polyethylene Terephthalate (PET/PETE) bottles of less than 500 ml. capacity;
- (iii) Single use disposable cutleries made up of thermocol (polystyrene) or plastic such as dish, spoon, cup, plate, glass, fork, bowl, straw, pouch to store liquid and container etc. of any size and shape &
- (iv) Thermocol decorative materials (flowers and the like)

(Note: Compostable plastics shall conform to the Indian Standard: IS 17088:2008. The manufacturers or seller of compostable plastic carry bags shall obtain a certificate from the Central Pollution Control Board before marketing or selling.)

4.9.2.2 Mining, Environment& Bio Diversity:

Rairangpur is a notable mining area of Odisha, comprises iron-ores from Gorumahisani, Badampahar, Sulaipat mines. At present 220.110 Forest land has been diverted under the provisions of Forest Conservation Act, 1980 for mining purpose. Rairangpur acts as a liaison centre between Jamshedpur (Tatanagar) in Jharkhand, Durgapur in West Bengal and the Iron Ore Mines in Gorumahisani, Badampahar and Suleipat. The steel factories of Tata and the surrounding area rely partly on the iron ores extracted from these mines. In addition to freight trains there is also a passenger train from Jamshedpur to Badampahar via Rairangpur.

Rairangpur is surrounded by hills which are rich in iron ore mineral. The first iron ore mines of Asia were in Gorumahisani, Suleipat and Badampahar (mother mines of Tata Steel) are located here. The first ever trial for setting up of a Ferro Vanadium Plant was made by Mayurbhanj Maharaja during pre-independence days. Currently, thousands of tonnes of iron ore are exported out of the state on daily basis.

Due to transportation of Iron Ore from these mines, the environment is affected. Air, water and noise pollution affects the local environment.

The implantation of a mine is a major habitat modification, and smaller perturbations occur on a larger scale than exploitation site, mine-waste residuals contamination of the environment for example. Adverse effects can be observed long after the end of the mine activity. Destruction or drastic modification of the original site and anthropogenic substances release can have major impact on biodiversity in the area. Destruction of the habitat is the main



component of biodiversity losses, but direct poisoning caused by mine-extracted material and indirect poisoning through food and water, can also affect animals, vegetation and microorganisms. Habitat modification such as pH and temperature modification disturb communities in the surrounding area. Endemic species are especially sensitive, since they require very specific environmental conditions. Destruction or slight modification of their habitat put them at the risk of extinction. Habitats can be damaged when there is not enough terrestrial product as well as by non-chemical products, such as large rocks from the mines that are discarded in the surrounding landscape with no concern for impacts on natural habitat.

Concentrations of heavy metals are known to decrease with distance from the mine, and effects on biodiversity tend to follow the same pattern. Impacts can vary greatly depending on mobility and bioavailability of the contaminant: less-mobile molecules will stay inert in the environment while highly mobile molecules will easily move into another compartment or be taken up by organisms. For example, speciation of metals in sediments could modify their bioavailability, and thus their toxicity for aquatic organisms.

Biomagnifications plays an important role in polluted habitats. Mining impacts on biodiversity, assuming that concentration levels are not high enough to directly kill exposed organisms, should be of greater effect to the species on top of the food chain because of this phenomenon.

Adverse mining effects on biodiversity depend a great extent on the nature of the contaminant, the level of concentration at which it can be found in the environment, and the nature of the ecosystem itself. Some species are quite resistant to anthropogenic disturbances, while some others will completely disappear from the contaminated zone. Time alone does not seem to allow the habitat to recover completely from the contamination. Remediation practices take time and in most cases will not enable the recovery of the original diversity present before the mining activity took place. The list of Mining Leases within the Division is at **Annexure-VII.**





CHAPTER-5

CONSERVATION & MAINTENANCE OF SOIL AND WATER RESOURCES:

5.1 Area treated under Soil & Water Conservation Measures:

In the outgoing plan Reserved Forests to an extent of 23451.07 ha was allotted to Rehabilitation Working Circle. All the PRF, DPF and PF were not included for Rehabilitation. PRF, DPF etc comes to 16458.63 ha. Soil & Moisture Conservation work is one of the major components in ANR (Aided Natural Regeneration). During last plan period 6282.25 hectare degraded forest has been treated under various plan schemes. This constitutes about 26.79% of allotted area. The activities under SMC involves Loose Boulder Check Dam (LB CD) with and without wire mesh, Gully plugging, Contour Bonding, Earthen bond, Sub Surface Dyke . The following forest blocks are intensively treated under Soil & Moisture Conservation. These area Badampahar R.F, Sargoda DPF, Dubulabeda RF, Radho DPF, Jhatisiring R.F, Budheirana R.F, Tiring R.F, Khairpal R.F, Bhitaramda DPF, Chahalapada R.F, Bidhubhandar PRF, Tunguru RF, Jari RF, Gorumahisani RF, Naskaria RF, Kanapat RF, Jhatisiring R.F, Dubulabeda RF, Sargoda DPF.

5.2 Duration of Water flow in Selected Seasonal streams:

There are two major rivers i.e. Khadakhai and Bankbal flowing in this tract. Besides these rivers, there are some seasonal nalla. The field staffs have collected the water flow pattern by physical verification & local inquiry. The period of water flow in seasonal nalla is furnished at Table No 5.1 below.



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No: 5.1: Name of Seasonal Streams (Nala / Rivulets)

Sl No	Name of Seasonal Streams.	Forest Blocks involved	Land Mark, If any.	Period of Water flow.	Duration of flow.
1	Galuma	Tirilipi DPF	Tirilipi	July- December	6 month
2	Sarupani	Tirilipi DPF	Tirilipi	July- December	6 month
3	Burubeda Lor	Basila R.F	Basila	July- December	6 month
4	Kanhu	Basila R.F	Basila	July-December	6 month
5	Topetola	Kherna R.F	Angarpada	July-December	6 month
6	Asankacha	Badampahar R.F	Bhitaramda	July- December	6 month
7	Kumbharkacha	Badampahar R.F	-do-	July- December	6 month
8	Ulikacha	Badampahar R.F	Hatisikuli	July- December	6 month
9	Dudhijharan	Badampahar R.F	Dudhijharan	July- December	6 month
10	Kadlibali	Badampahar R.F	Kadlibali	July- December	6 month
11	Tentulisahi	Badampahar R.F	Tentulisahi	July- December	6 month
12	Bakedihi	Hatbadra R.F	Bakedihi	July- December	6 month
13	Sapakata Nala	Jhumkapahadi RF	Jhumkapahadi RF	July to April	10 month
14	Katra Nala	Jari RF to Sarali RF	-	July to January	7 month
15	Bhangatkocha Nala	Jari RF	Ghagardhipa	July to October	4 month
16	Jhingam	Jari RF	Badjari	July to October	4 month
17	Budhijharana	Gorumahisani RF	-	July to October	4 month
18	Sundhal	Gorumahisani RF	Asurghaty water fall	Perennial	
19	Amsahi Nala	Gorumahisani RF	Kukurjharan	July- November	5 month
20	Nabda Nala	Gorumahisani RF	-do-	July- November	5 month
21	Rehdakocha Nala	Gorumahisani RF	Rehdakocha	July- November	5 month
22	Badadara Nala	Gorumahisani RF	Badadara	July- November	5 month
23	Jayantkocha Nala	Gorumahisani RF	Jayantakocha	July- November	5 month
24	Similinali Nala	Ichinda & Kucheibudhi RF	Simlinali	July to April	10 month
25	Ambo Jharana	Tiring	Bageidihi	July- March	9 month
26	Khadkhai River	Bagedihi	Tentala, Dundu, Badanarayani	Perennial	-
27	Jagenkacha Jharana	Bankamundi R.F	Burupalsa	July- December	6 month
28	Bakartandi	Tiring R.F	Raghunathpur	July- December	6 month
29	Lipur Tandi	Bankamundi R.F	Jambani	July- December	6 month
30	Gopikanhai Nala	Bidubhandar PRF	Dantuni village	July- December	6 month
31	Dhana Nala	Bidubhandar PRF	Dantuni & Kitabeda village	July- December	6 month
32	Amba Jharan Nala	Bidubhandar PRF	Cross to Kitabeda village	July- December	6 month
33	Kunal Nala	Bidubhandar PRF	Kitabeda village	July- December	6 month
34	Jodia Khadia sahi Nala	Tunguru RF Compt. No. 3	Kundulia village	July – January	7 month

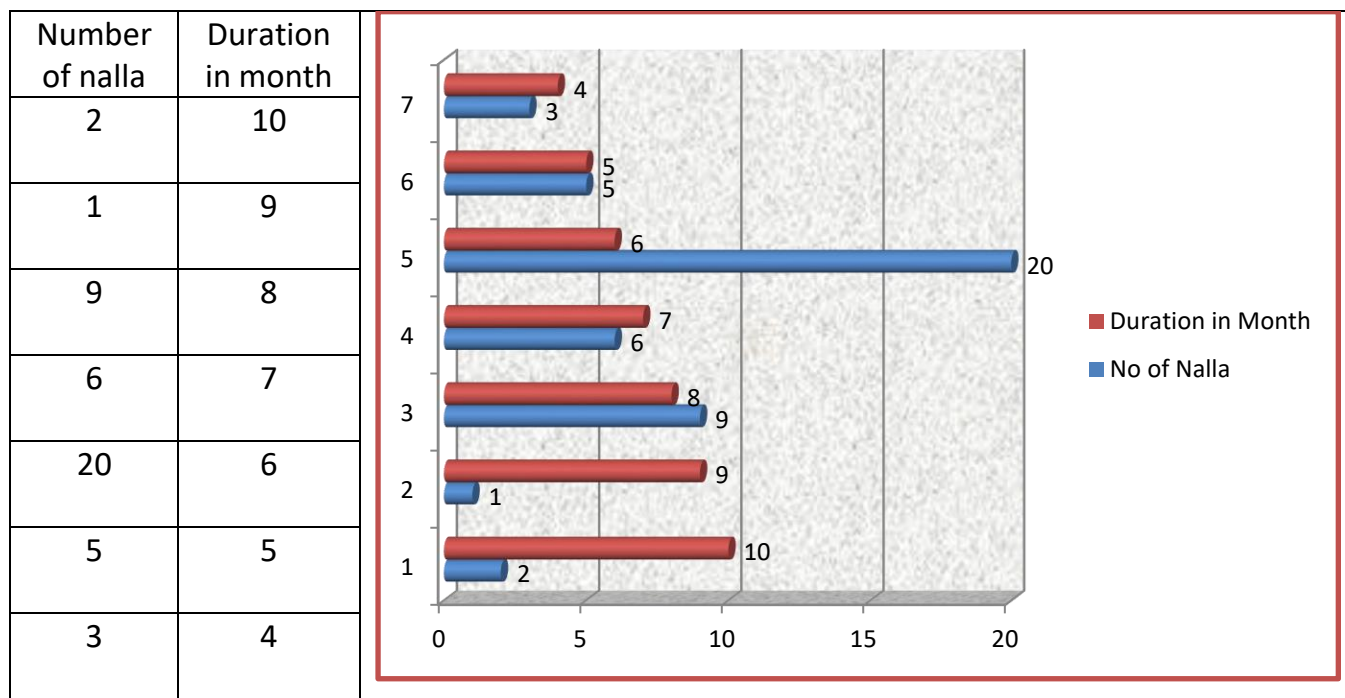


Working Plan of Rairangpur Forest division (2021 to 2031)

Table No: 5.1: Name of Seasonal Streams (Nala / Rivulets)

Sl No	Name of Seasonal Streams.	Forest Blocks involved	Land Mark, If any.	Period of Water flow.	Duration of flow.
35	Ulkacha Nala	Tunguru RF Compt. No. 3	Luhakani village	July – January	7 month
36	Sarjam Kacha Nala	Tunguru RF Compt. No. 3	Madhupur village	July – January	7 month
37	Danga daraha Nala	Tunguru RF Compt. No. 3	Luhabalia village	July – January	7 month
38	Kudarsahi Nala	Mahubhandar RF	Katas village	July – February	8 month
39	Khejurikatas Nala	Mahubhandar RF	Khejurikatas village	July – February	8 month
40	Kaduani Nala	Mahubhandar RF	Kaduani village	July – February	8 month
41	Fatejharana Nala	Tunguru RF, Compt.- 1	Gargadi village	July – January	7 month
42	Chatani pani Nala	Tunguru RF, Compt.- 1	Gargadi village	July – December	6 month
43	Chhadkacha Nala	Tunguru RF, Compt.- 1	Gargadi village	July – February	8 month
44	Chirukacha Nala	Tunguru RF, Compt.- 1	Gargadi village	July – February	8 month
45	Madan Jharna Nala	Tunguru RF, Compt.- 1	Gargadi village	July – February	8 month
46	Keshargadia Nala	Tunguru RF, Compt.- 4	Duarsuni Hatichhad village	July – February	8 month
47	Bandiakacha Nala	Tunguru RF, Compt.- 4	Duarsuni Hatichhad village	July – February	8 month
48	Dudhkundi Nala	Tunguru RF, Compt.- 4	Haridahi village	July – February	8 month

Out of 48 nalla furnished above two are of perennial nature. Rest 46 nalla shows a varied duration as furnished below.





5.3 Wetlands in Forest Areas:

There is no wet land within the Forest area. Outside forest land, there is water bodies created for irrigation purpose. In true since there is no natural wet land in the division. The details of Dams and Waterbodies created which attract birds etc is furnished at table no 5.2 below.

Table 5.2 List of water Body in Rairangpur Division.

Sl No	Name of the Dam / Water body	Location	Latitude	Longitude	Extent of Water body in ha
1	Suleipat dam	Suleipat	N-22° 08' 31.5"	E-86° 14' 10.5"	212.00
2	Bada bandha	Rairangpur	N22°16' 16.6"	E86° 10' 18.5"	5.00
3	Ranibandha	Rairangpur	N22° 13' 3.9"	E86° 08' 43.0"	12.00
4	Nesa Dam	Nesa	N-22° 24' 00"	E 86°08' 40"	166.00
5	Pokhana Dam	Pokhana	N-22° 28' 52.3"	E-86°03' 55.2"	52.00
6	Moronda Dam	Moronda	N-22° 21' 20.3"	E-86°0' 55.0"	10.00
7	Baddalima Dam	Baddalima	N-22° 26' 24.2"	E-86° 04' 08.3"	3.00
8	Bankabal Dam	Bankanal	N22° 11' 3.0"	E 86° 18' 44.0"	770.00

Map of Water body in the District / Division is furnished below.

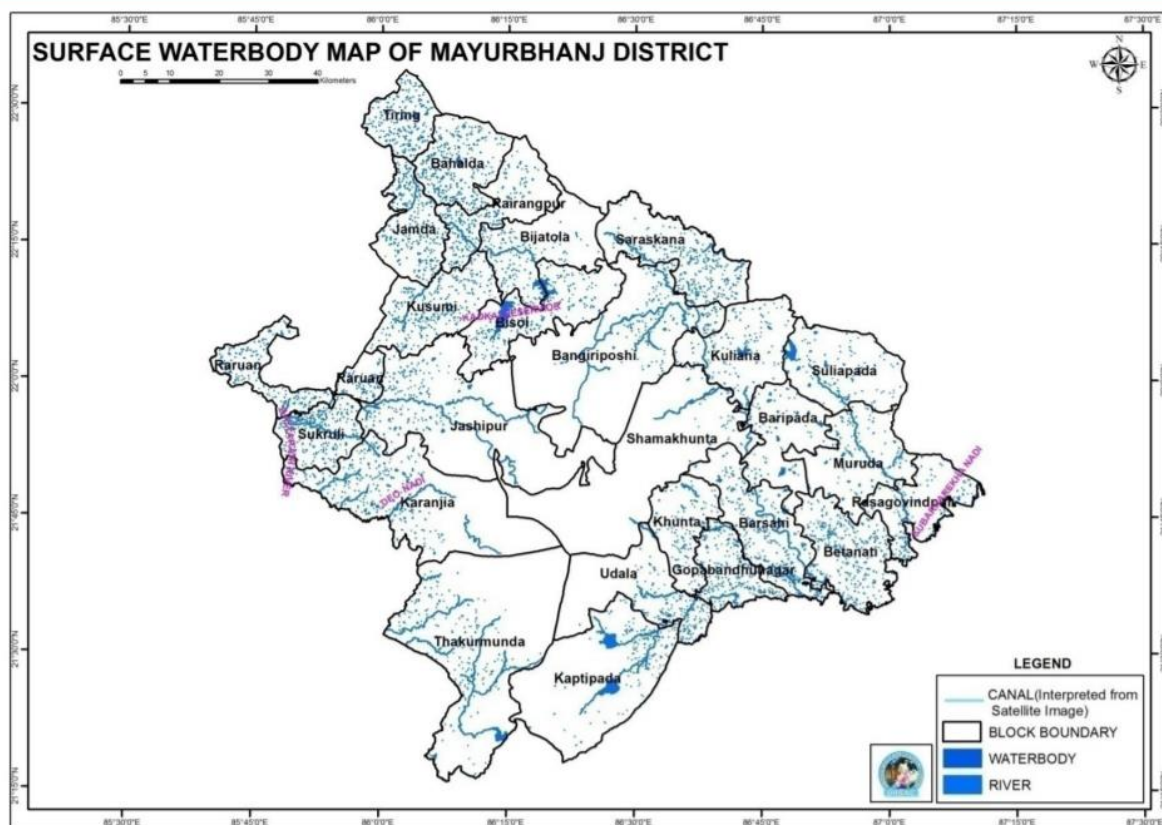


Figure:ii Surface Waterbody Map of Mayurbhanj District



5.4 Water level in the Wells in the vicinity (Up to 5km) of Forest area:

Water level of wells coming within 5km of major forest blocks have been studied in Pre Monsoon, Post monsoon and during Monsoon. The water table recorded is furnished below.

Table No 5.3 Water table of various Locations as recorded from Wells.

Sl No	CD Block	Location	Latitude	Longitude	Water table BGL in M			BGCL In M
					Pre monsoon	Monsoon	Post monsoon	Fluctuation
1	Bisoi	Saraspada	22.191528	86.404972	5.500	2.00	4.470	1.030
2	Bisoi	Sunajodia	22.193528	86.396278	6.100	2.250	5.100	1.000
3	Bisoi	Dudhkundi	22.180836	86.456406	5.100	1.200	1.570	3.530
4	Bisoi	Pundida	22.179458	86.437242	2.000	0.600	0.810	1.190
5	Bisoi	Banpokharia	22.325869	86.620028	4.000	1.250	2.000	2.000
6	Bisoi	Gargadi	22.353242	86.632869	4.000	2.100	3.200	0.800
7	Bisoi	Kunjakacha	22.368364	86.628936	2.000	1.000	1.500	0.500
8	Bisoi	Bahagad	22.220575	86.6603	2.300	0.800	1.000	1.300
9	Bisoi	Rajabasa	22.304767	86.792994	7.000	3.100	5.500	1.500
10	Bangriposi	Dighi	22.178222	86.542528	5.500	2.200	3.500	2.000
11	Bangriposi	Darkantia	22.188194	86.550139	4.100	1.850	3.500	0.600
12	Bangriposi	Baunsabudi	22.174528	86.542444	5.700	2.150	3.770	1.930
13	Bangriposi	Mahulbarei	22.161556	86.533389	2.500	1.100	1.820	0.680
14	Bangriposi	Gohirapal	22.127806	86.472694	4.250	2.000	3.040	1.210
15	Bangriposi	Dosisole	22.133444	86.503361	3.200	1.200	1.440	1.760
16	Bijatala	Sanbantha	22.26639	86.367283	3.150	1.400	1.750	1.400
17	Bijatala	Henselgoda	22.25922	86.394607	4.870	2.100	3.100	1.770
18	Bijatala	Kalataamak	22.238682	86.412657	2.468	1.350	2.100	0.368
19	Bijatala	Tungru	22.242398	86.396503	1.820	0.900	1.500	0.320
20	Bahalda	Pithakutni	22 22 11.5	86 10 41.3	4.000	2.150	3.040	0.960
21	Bahalda	Jagannathpur	22 21 23.9	86 08 57.7	4.000	1.100	1.800	2.200
22	Bahalda	Haldibani	22 23 24.3	86 08 59.4	5.000	2.750	4.500	0.500
23	Bahalda	Burupalsa	22 27 43.9	86 07 08.1	7.000	2.400	4.100	2.900
24	Bahalda	Bagedihi	22 27 55.3	86 06 11.0	7.000	2.500	4.000	3.000
25	Bahalda	Senjogoda	22 22 51.3	86 10 19.9	4.000	1.750	2.910	1.090
26	Bahalda	Ramgarh	22 28 05.5	86 08 57.69	10.000	2.100	3.000	7.000
27	Bahalda	Surda	22 27 25.0	86 11 21.5	11.000	2.000	3.000	8.000
28	Bahalda	Nandabasa	22 27 17.7	86 12 22.8	10.000	1.850	4.000	6.000
29	Bahalda	Asurghaty	22 26 24.1	86 14 06.5	10.000	4.000	6.000	4.000
30	Bahalda	Dubulabeda	22 25 43.8	86 11 38.3	11.000	4.100	8.000	3.000
31	Bahalda	Banadunguri	22 25 26.2	86 11 09.9	11.000	5.200	8.000	3.000
32	Bahalda	Kudarsahi	22 26 25.4	86 13 25.4	10.000	2.900	4.000	6.000



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33	Jamda	Pahadpur	22 15 38.1	86 00 46.4	6.000	1.300	2.500	3.500
34	Jamda	Manbir	22 15 43.2	85 59 31.8	3.000	0.900	2.000	1.000
35	Jamda	Haragoda	22 12 43.2	86 02 01.5	4.000	1.750	2.500	1.500
36	Jamda	Giria	22 13 43.1	86 00 19.9	5.500	1.750	4.000	1.500
37	Tiring	Raghunathpur	22 30 00.2	86 09 42.8	5.000	2.100	4.000	1.000
38	Tiring	Jambani	22 29 31.8	86 05 57.1	5.000	3.000	4.500	0.500
39	Tiring	Naranpur	22 29 15.1	86 04 55.8	5.000	2.800	4.200	0.800
40	Bisoi	Badajodi	22 06 10.2	86 12 33.5	6.000	2.750	4.440	1.560
41	Kusumi	Rayasahi	22 02 33.9	86 02 10.4	5.000	2.150	3.430	1.570
42	Kusumi	Banduda	22 13 33.0	86 01 34.0	4.030	2.000	3.710	0.320
43	Bisoi	Bhudrukala	22 07 58.0	86 13 56.0	5.900	2.300	5.390	0.510
44	Kusumi	Chahalapada	22 15 17.0	86 04 23.0	6.970	3.250	3.920	3.050
45	Kusumi	Dantusahi	22 09 24.0	86 12 40.0	5.670	2.750	3.160	2.510
46	Kusumi	Dhakata	22 10 19.0	86 01 97.0	4.690	2.000	3.310	1.380
47	Kusumi	Netrajharan	22 06 06.7	86 10 18.3	4.940	2.250	3.950	0.990
48	Kusumi	Dubulabeda	22 10 12.0	86 01 10.0	4.390	1.850	2.850	1.540
49	Kusumi	Dudhijharan	22 05 06.3	86 07 50.7	8.170	2.500	4.710	3.460
50	Bisoi	Jagannathpur	22 07 09.3	86 12 19.4	6.850	2.400	3.670	3.180
51	Kusumi	Bhuyanbasa	22 06 49.7	86 11 00.0	5.230	1.900	3.020	2.210
52	Kusumi	Khejuripada	22 08 18.5	86 05 33.2	4.330	1.300	3.400	0.930
53	Kusumi	Pahadpur	22 10 74.0	86 01 90.0	5.070	2.250	3.960	1.110
54	Kusumi	Raipada	22 08 59.0	86 02 80.0	5.940	1.750	3.610	2.330
55	Kusumi	Ralibeda	22 12 89.0	86 00 72.0	3.300	1.500	2.900	0.400
56	Bisoi	Sargoda	22 05 44.3	86 12 25.0	6.910	2.200	4.010	2.900
57	Kusumi	Talapati	22 13 78.0	86 02 76.0	5.000	1.750	3.400	1.600
58	Bisoi	Tiakati	22 07 41.6	86 13 39.8	6.990	3.100	4.870	2.120
59	Kusumi	Tirilipi	22 05 09.0	86 98 58.0	7.780	2.850	1.000	6.780
60	Rairangpur	Dahupani	22.370805	86.316548	1.219	0.600	1.100	0.119
61	Rairangpur	Badjari	22.355215	86.305803	2.256	1.100	1.950	0.306
62	Rairangpur	Besrakocha	22.327418	86.285253	4.999	2.400	4.000	0.999
63	Rairangpur	Haldibani	22.315863	86.223628	4.600	2.300	1.000	3.600
64	Rairangpur	Rehdakocha	22.301173	86.240935	1.210	0.750	1.000	0.210
65	Rairangpur	Gidighaty	22.360539	86.226388	2.520	1.000	0.500	2.020
66	Bahalda	Edelbeda	22.359435	86.207275	0.670	0.200	0.500	0.170
67	Bahalda	Jialda	22.363362	86.186476	2.130	0.600	1.000	1.130
68	Rairangpur	Similinali	22.297582	86.18966	1.676	0.500	1.400	0.276
69	Rairangpur	Chirudhi	22.353555	86.22222	2.340	0.750	1.000	1.340
70	Bijatala	Burudihi	22.259133	86.283333	1.500	0.500	1.100	0.400
71	Bijatala	Sanjharan	22.258211	86.265313	2.400	0.800	1.250	1.150
72	Bijatala	Madansila	22.266855	86.254286	3.960	1.250	2.800	1.160
73	Bijatala	Dhobadhia	22.264361	86.260833	6.096	2.300	0.400	5.696

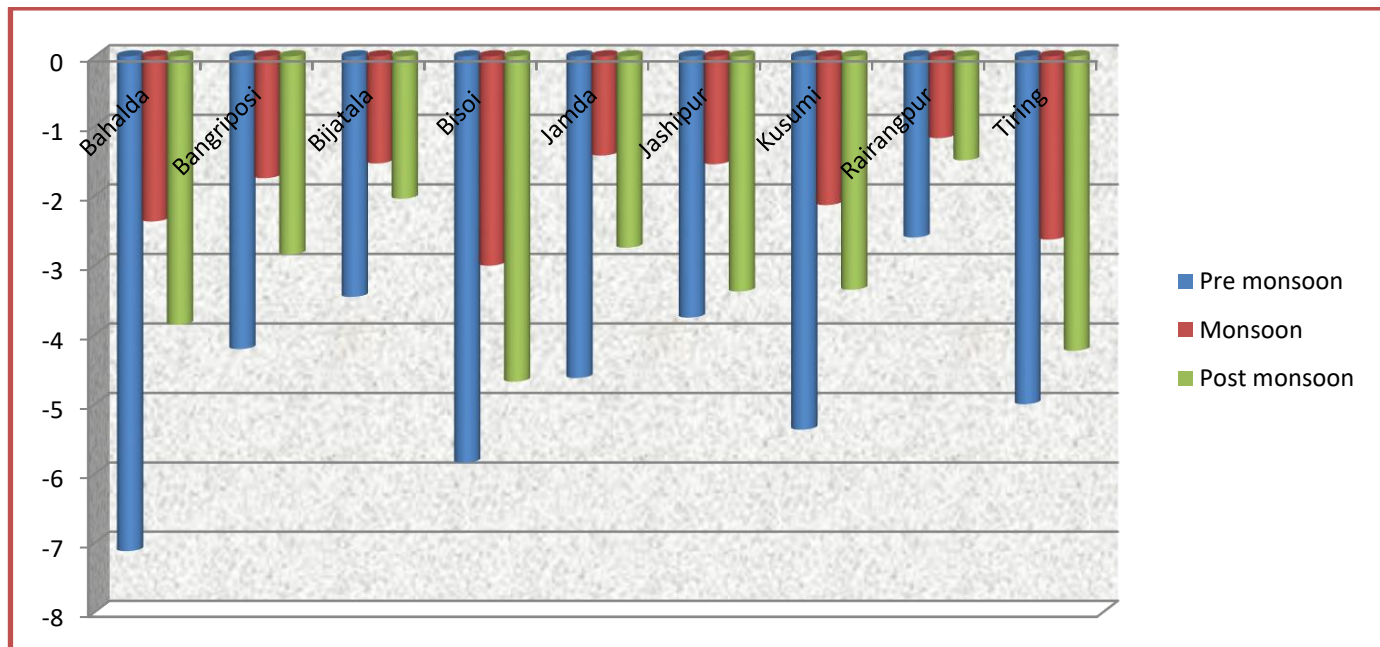


Working Plan of Rairangpur Forest division (2021 to 2031)

74	Bijatala	Balrampur	22.338535	86.361142	0.600	0.200	0.500	0.100
75	Bijatala	Baigankudar	22.272104	86.257317	1.828	0.900	1.250	0.578
76	Bijatala	Khandadera	22.152836	86.23649	7.600	4.000	4.800	2.800
77	Bijatala	Asan sikal	22.16459	86.24631	5.200	2.750	4.000	1.200
78	Bisoi	Asansikhar	22.119225	86.27654	7.000	3.500	4.400	2.600
79	Bisoi	Raikadkacha	22 06 10.2	86 12 33.5	5.000	2.100	4.100	0.900
80	Bisoi	Kesam	22.038867	86.216234	4.800	1.900	1.900	2.900
81	Jashipur	Badsialinai A	21.992715	86.158544	2.100	0.750	1.500	0.600
82	Jashipur	Badsialinai B	21.992715	86.164861	3.040	1.250	2.700	0.340
83	Jashipur	Sansialinai	21.999692	86.167372	4.500	1.750	4.000	0.500
84	Bisoi	Kurkutia	21.987352	86.177461	9.700	4.800	6.500	3.200
85	Jashipur	Tulsibani	22.02933	86.153324	3.040	1.250	2.800	0.240
86	Jashipur	Badjhili	21.96746	86.191251	6.100	2.750	5.900	0.200
87	Bisoi	Dantuni	21.969903	86.430575	2.000	0.900	1.300	0.700
88	Bisoi	Kitabeda	22.131961	86.735294	13.000	8.500	11.700	1.300
89	Bisoi	Edelbeda	22.255839	86.600303	3.000	1.250	2.800	0.200
90	Bisoi	Kuajhari	22.359458	86.528428	7.000	4.350	6.500	0.500
91	Bisoi	Luhakani	22.367794	86.568625	2.500	1.000	2.000	0.500
92	Bisoi	Baneikala	22.315781	86.200411	6.700	4.250	6.200	0.500
93	Bisoi	Gundurua	22.068192	86.207513	6.700	4.000	6.500	0.200
94	Bisoi	Patijhari	22.078508	86.166906	5.400	3.150	5.000	0.400
95	Bisoi	Jamujhari	22.069786	86.204943	9.100	6.500	8.500	0.600
96	Bisoi	Patherkata	22.079915	86.193323	7.010	4.800	6.500	0.510
97	Bisoi	Chaturisahi	22.088277	86.195277	3.400	1.500	2.800	0.600
98	Bisoi	Burudi	22.095522	86.248718	5.200	2.500	4.500	0.700
99	Bisoi	Karanjharan	22.144707	86.258131	5.200	2.500	4.700	0.500
100	Bisoi	Sanbelphadi	22.147179	86.278093	7.010	4.000	6.800	0.210

Average water table position in various blocks is furnished below.

Table No 5.4 Average Water table position in various blocks			
Name of the Block	Water table in M		
	Pre monsoon	Monsoon	Post monsoon
Bahalda	-7.120	-2.373	-3.857
Bangriposi	-4.208	-1.750	-2.845
Bijatala	-3.458	-1.538	-2.046
Bisoi	-5.840	-3.009	-4.677
Jamda	-4.625	-1.425	-2.750
Jashipur	-3.756	-1.550	-3.380
Kusumi	-5.367	-2.137	-3.355
Rairangpur	-2.603	-1.175	-1.494
Tiring	-5.000	-2.633	-4.233



5.5 Status of Aquifers:(Detail analysis from CGWB Report).

5.5.1 Aquifer parameter:

The aquifer parameter of shallow and deep aquifers was determined from the pumping test data conducted during the hydro geological survey and exploratory drilling. Aquifer characteristics of shallow and deeper aquifers are noted below.

a) Shallow Aquifers: Near surface aquifer in which ground water occurs under unconfined (phreatic) condition and is mainly tapped by dug wells for ground water extraction is generally identified as shallow aquifer.

b) Deeper Aquifers: Aquifers, which occur below the phreatic zone and extends down to a greater depth, are termed as deeper aquifers. Ground water in deeper aquifers occurs under semi-confined to confined conditions. Deeper aquifers are tapped by tube/bore wells for ground water extraction.

5.5.2 Depth to water level (Pre & post monsoon):

The depth to water level map for pre and post monsoon periods in 2011 are prepared based on the ground water monitoring data of 77 Nos of National Hydrograph Stations of C.G.W.B. monitored during the month of April and November 2006 are presented. The pre and post



monsoon depth of water levels in the district range varies from 3.54 to 14.50 m below ground level and 1.39 to 8.20 m below ground level respectively. It is observed that during pre monsoon about 75% of the total areas show the water level varying between 5 to 10 m below ground level. During post monsoon nearly 60% of the area has water levels within 2 to 5 m, while the while the rest part has between 0 to 2 and 4 to 6 m below ground levels. In localized part of Muruda, Kaptipada and Thakurmunda the water level is > 5 mt.

5.5.3 Seasonal Fluctuation:

The seasonal fluctuation of water levels with respect to pre and post monsoon periods (2011) varies from nil to 8.60 m. The depth to water levels in different seasons and seasonal fluctuation of water levels are more in central and eastern part, which gradually decreases towards north.

Long term water level trend in last 10 years: Long-term trend analysis (2001-2011) of water levels on dug wells shows that in 35 % of wells there is a rising trend where as the rest shows a falling trend. Both rise and fall in general restricted to 1 m.

5.5.4 Ground Water Resources: As per the ground water resources assessed during 2009, the net ground water resources availability in the district is 148194 ham. 6365 ham of the total ground water is used in domestic and industrial water supply. The existing gross ground water draft for irrigation in net terms is 33963 ham. The Net ground water availability for future irrigation development is 106150 ham. Over all the present level of ground water development is only 27.21 percent in the district with the maximum in Badasahi block viz. 64.65% and minimum in Bijatala block (9.79%). Hence the district as well as all the blocks comes under the white category. Rest part of the tract has water table between 0 to 2 and 4 to 6 m below ground levels. In localized part of Muruda, Kaptipada and Thakurmunda the water level is > 5 mt.

Seasonal Fluctuation: The seasonal fluctuation of water levels with respect to pre and post monsoon periods varies from nil to 8.60 m. The depth to water levels in different seasons and seasonal fluctuation of water levels are more in central and eastern part, which gradually decreases towards north.

Long term water level trend in last 10 years: Long-term trend analysis (2001-2011) of water levels on dug wells shows that in 35 % of wells there is a rising trend where as the rest shows a falling trend. Both rise and fall in general restricted to 1 m.



Ground water Quality: The chemical quality of ground water in the district has been assessed on the basis of chemical analysis of ground water samples collected during groundwater monitoring, Hydrogeological surveys and groundwater exploration. The results of the chemical analysis are presented in Table 5.5.

Table No 5.5: chemical constituents in aquifers Mayurbhanj District.		
Constituent	Shallow aquifer	Deeper aquifer
pH	6.97 – 8.25	6.84 – 8.25
Sp. Conductance (micromohs/cm at 25 C)	53 – 974	92 – 867
TDS (mg/l)	58 – 1430	106 – 429
Calcium (mg/l)	6 – 92	16 – 86
Magnesium (mg/l)	0.6 – 17	3.6 – 22
Sodium (mg/l)	1.6 – 100	3.5 – 168
Potassium (mg/l)	0.4 – 8	<1 --6.4
Bicarbonate (mg/l)	15 – 256	49 – 366
Chloride (mg/l)	7 – 238	5.3 – 85
Sulphate (mg/l)	0.1 – 9	<1 – 82
Nitrate (mg/l)	<0.01 – 53	0.1 – 78
Fluoride (mg/l)	0.08 – 20.3	0.21 – 0.61
Total hardness as calcium carbonate	10 – 245	35 - 285

5.5.3.1 Suitability of Ground Water for Drinking Purpose:

The concentration of major chemical constituents and also the pollutants like fluoride and nitrate content in fresh ground water of shallow and deeper aquifers are well within permissible limit of drinking water specification (Indian Standard 1991). Hence the fresh ground water may be used as safe drinking water source.

5.5.3.2 Suitability of Ground Water for Agricultural Purpose:

Ground water in general is suitable for irrigation purpose. Ground water from shallow and deeper aquifers belongs to C1S1 and C2S1 class of USSL Classification., which indicates that ground water, in general is fit for most type of crops.

5.5.4 Water Conservation and Artificial Recharge:

The scope for artificial recharge exists in hard rock terrain in the district. In most part of the district in Thakurmunda, Karanjia, Jasipur blocks water levels during post monsoon rest between 3 to 5.5 m. bgl and on an average below 4m and during pre- monsoon on an average



the water level rests below 7m depth. The artificial recharge structures like infiltration tank, contour bunding, gully plugging are feasible in the area. In some area in addition to above structures subsurface dykes, may also be constructed. All these structure will be helpful in augmenting ground water resources in those areas resulting mitigation of water scarcity during summer.

5.5.5 Ground Water Related Issues & Problems:

The ground water related issues generally include the water logged area, polluted area and water table depleted area and these are discussed in the following paragraphs.

5.5.5.1 Water logged area:

No area in the district is found to be under water logging condition.

5.5.5.2 Ground water quality problems:

There is no large scale pollution in the district.

5.5.5.3 Water Table Depleted Area:

The long term trend analysis data of water level from the network station of district indicate that no significant water table depleted area is noted in the district as the hydrograph net work stations have shown both rise and fall in water level and these are restricted within 1 m.



Working Plan of Rairangpur Forest division (2021 to 2031)

Plate No.2

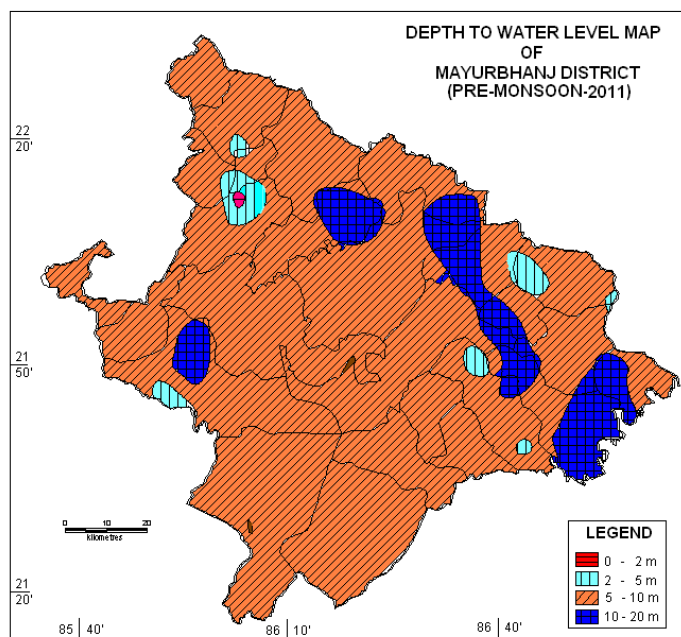
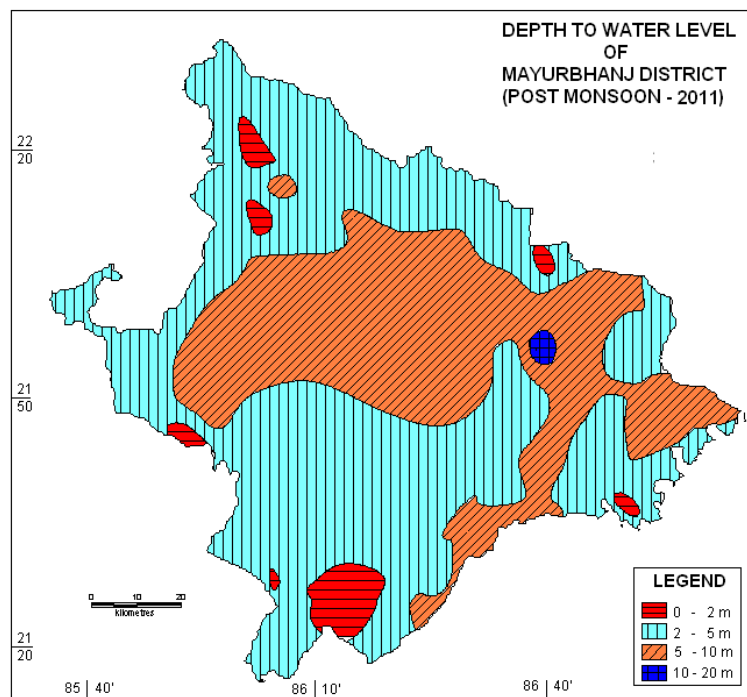


Plate No 3





MAYURBHANJ DISTRICT

Dynamic Ground Water Resources
(As on 31.03.2009)

PLATE - 5

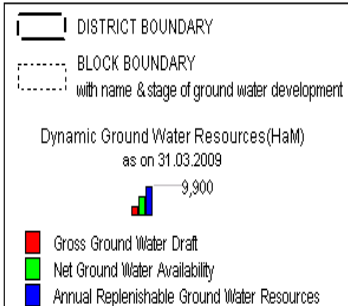
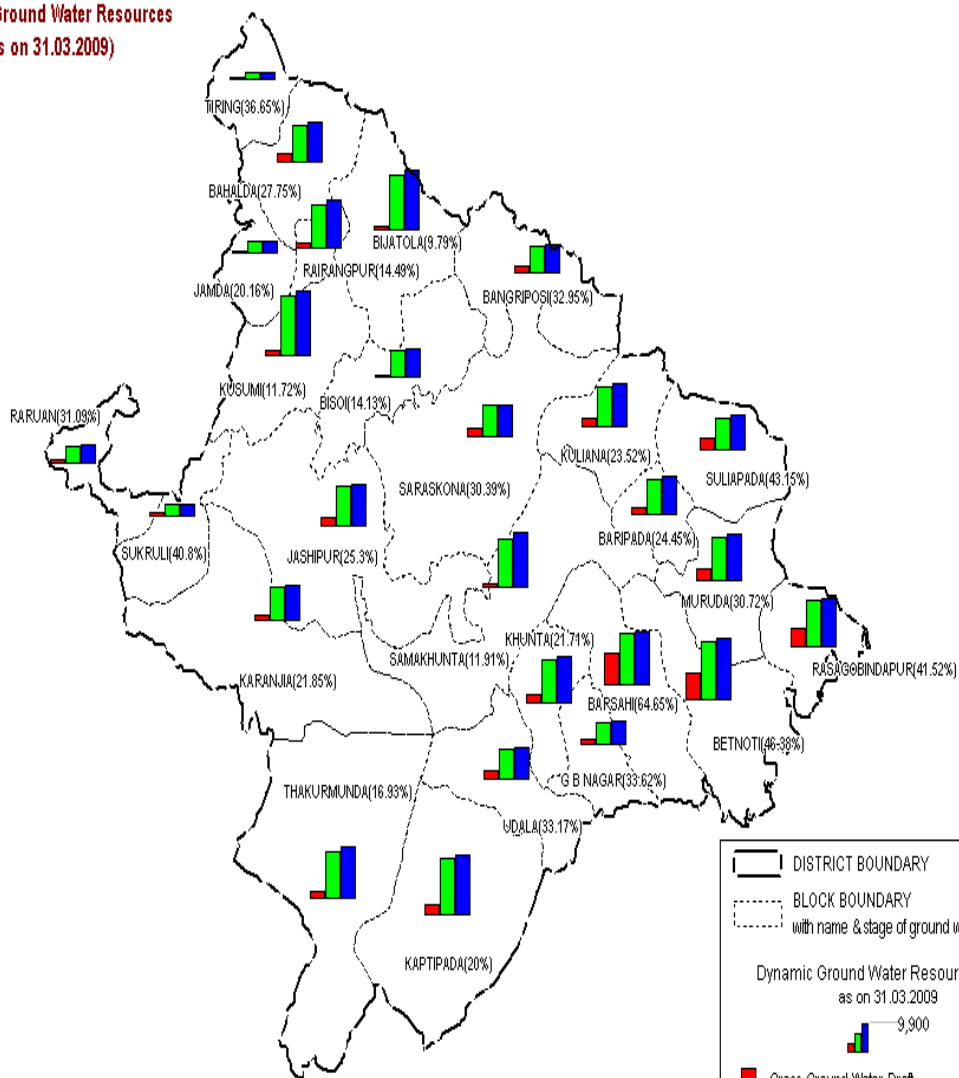
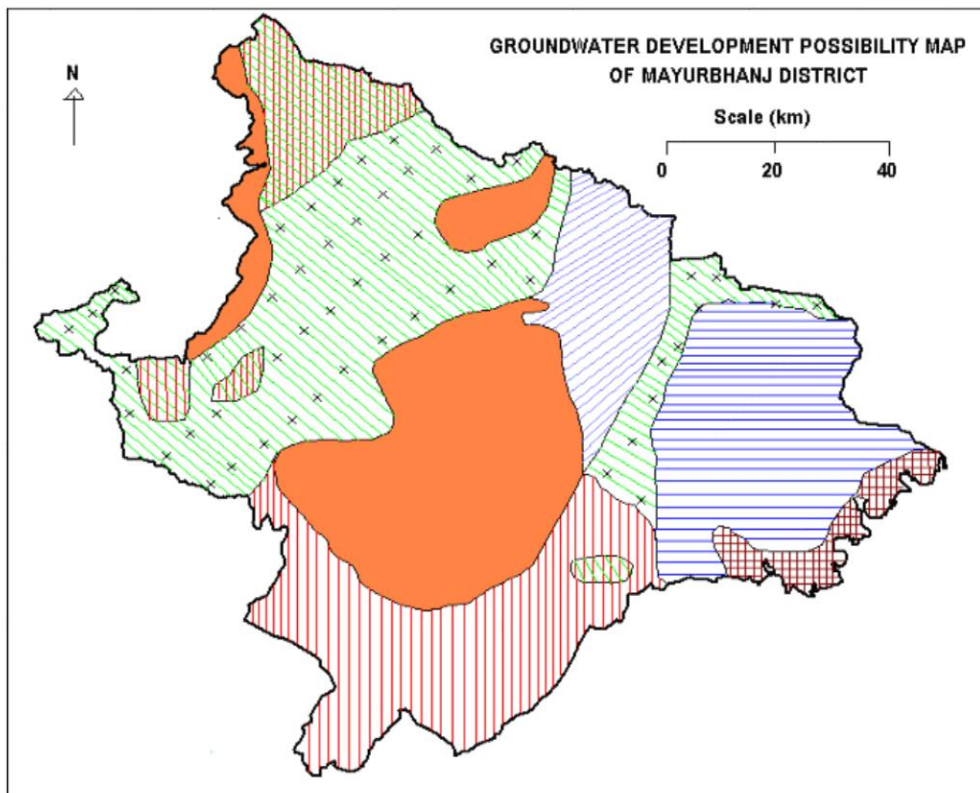




Plate No 6

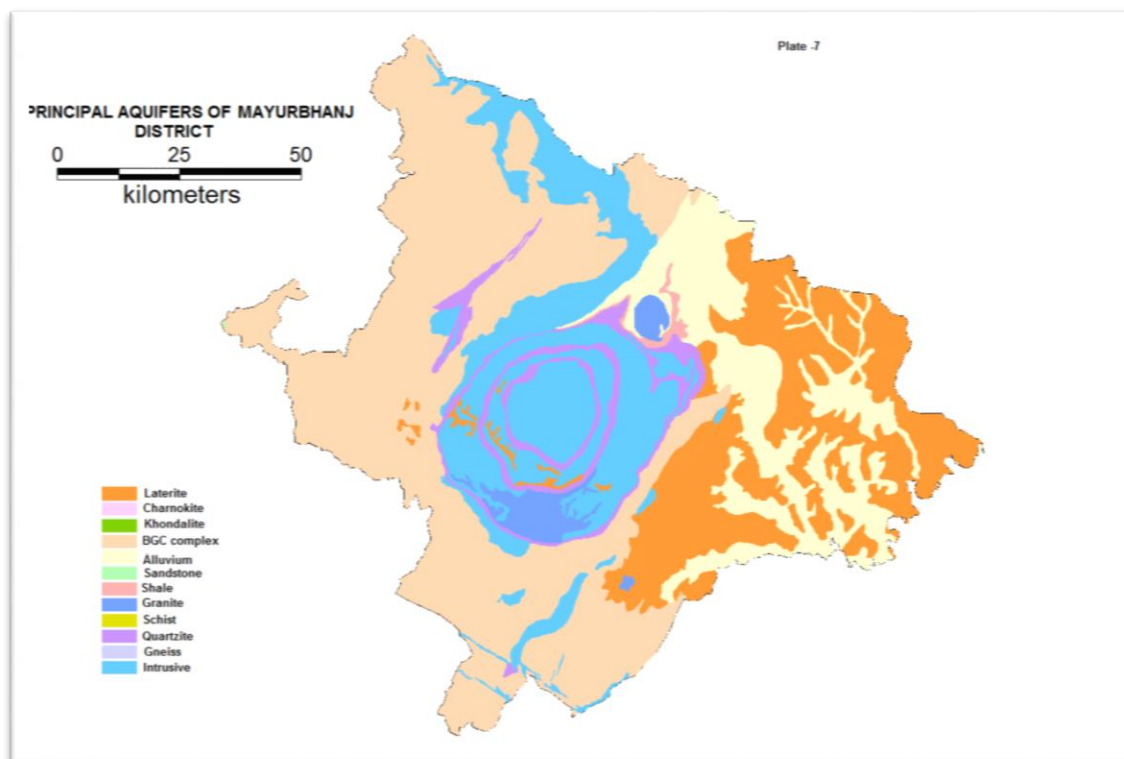
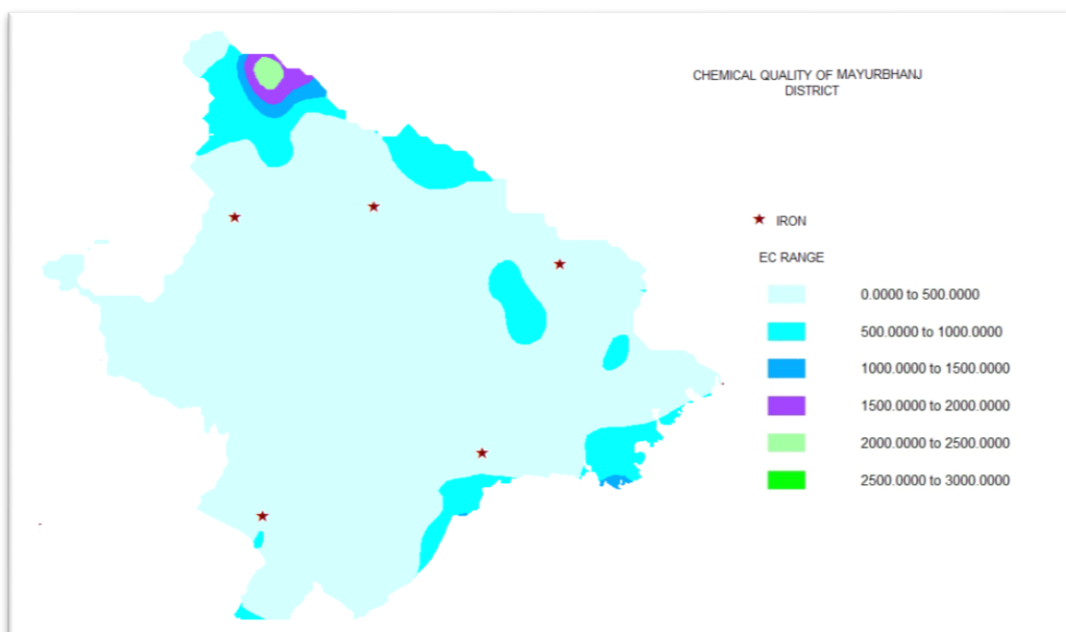


LEGEND

Structure	Design Pump Specification Yield
Dug well	9 -12m deep, 4.5-6m dia, centrifugal pump, 2-3 HP yield, 2.5 lps
Dug well	10-12m deep, 4.5-6m dia, centrifugal/submersible pump, 2 HP yield less than 5 lps.
Medium/Deep tube well	Upto 250m deep, 15cm dia, submersible/turbine pump 5 - 12.5HP, yield 7 - 20 lps.
Bore well	100 - 150m deep, 15cm dia, submersible pump 2 HP, yield less than 5 lps.
Bore well	100 - 150m deep, 15cm dia, submersible pump 2-3 HP, yield less than 10 lps.
Saline/F.P. T.W	Less than 30 -40m, deep, 10 cm dia, submersible/turbine pump 2-5 HP, yield up to 20 lps.
D.W/B.W In pockets (Hilly area)	Dug well 10 -15m deep, 4.5-6m dia, small dia bore well 60m, deep yield less than 1 lps.



Working Plan of Rairangpur Forest division (2021 to 2031)





CHAPTER-6

MAINTENANCE & ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY:

6.1 Growing Stock of Wood:

The Growing stock has been estimated basing on Sample enumeration carried out at 416 Sample points furnished by ORSAC. The field staff enumerated the trees available within 1000 m² taking the Sample points on the centre of the Square of 31.623m side. The collected data has been analyzed. On analysis the Growing stock in each forest block has been computed. Distribution of Sample plots to different density Class is furnished below. Data analysis report has been obtained for 389 points from ORSAC, Bhubaneswar. The details Sample point given by ORSAC is attached as Annexure-VIII.

Table No 6.1 Sample points Distribution Density class wise.

Sl No	Range	No of sample plots under density class				
		D1	D2	D3	D4	Total
1	Badampahar	4	18	33	0	55
2	Bahalda	10	28	32	4	74
3	Bisoi WL	9	32	35	1	77
4	Manada	0	0	4	0	4
5	Rairangpur	20	67	85	7	179
	Total	43	145	189	12	389

Canopy Density Classes are D1 : > 70%, D2 : 40–70% D3 : 10–40%, D4 : <10%

On availability of big size tree, it is found that there is no big tree on 220 sample plots, one large tree on 82 Sample plots & 2-5 large trees on 87 sample plots (Total point analyzed- 389 plot)

The crop density of forest area has been observed after analysis as follows.

Table No 6.2 Stand volume parameters – Rairangpur Division.

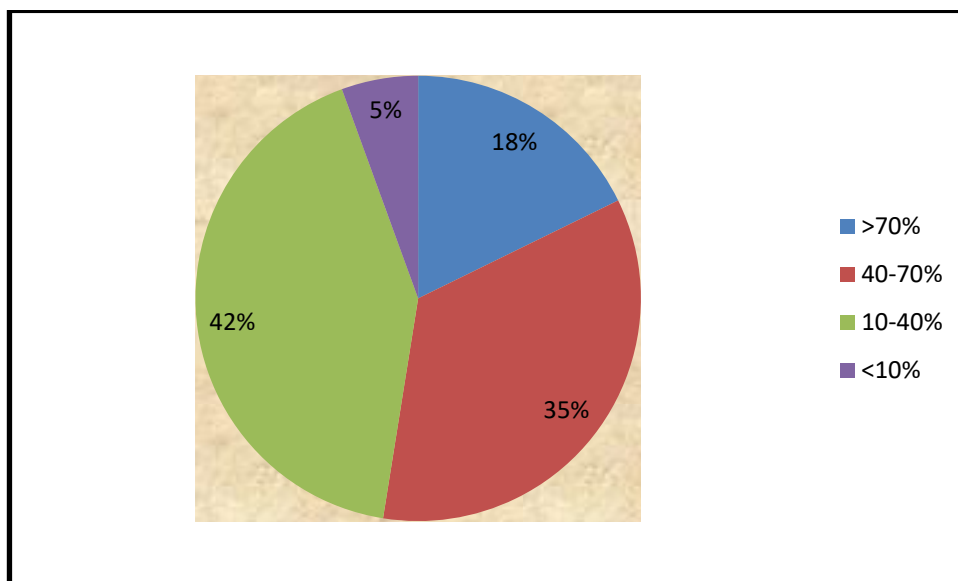
Criteria						
No of trees / ha	Basal Area per ha (M ³)	Volume per Ha (in M ³)	Mean Volume (in M ³)	Standard Error	LB (in M ³)	UB (in M ³)
287.4	9.29	69.49	65.83	0.04	61.03	70.63



Working Plan of Rairangpur Forest division (2021 to 2031)

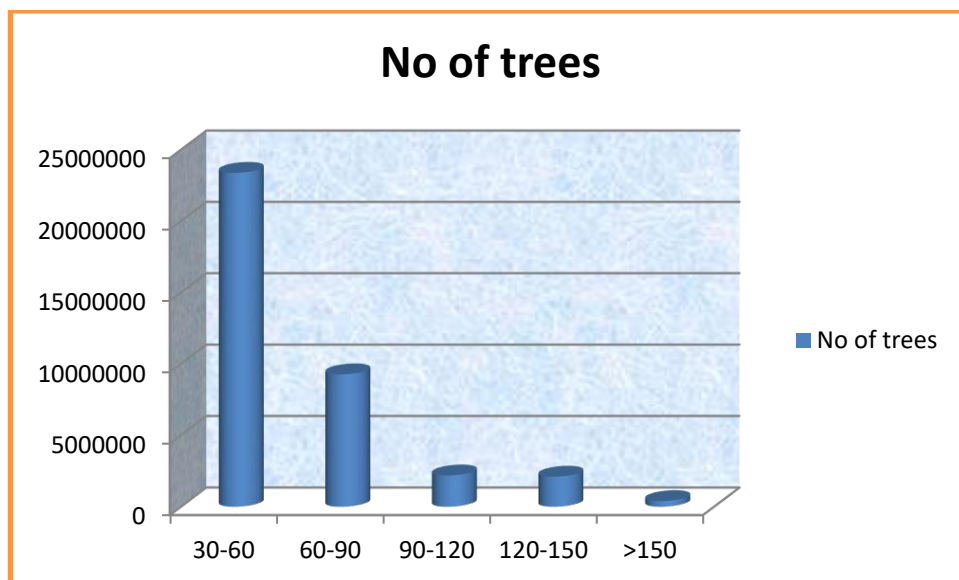
The Overall crop density and area under each density class has been furnished by ORSAC. The details are as given below.

Table no 6.2A Distribution of Forest area vis –a- vis density class.			
Crop Density	Area in ha	Percentage of Forest area	Remark
>70%	13421.87	17.75	Dense Forest
40-70%	26295.09	34.77	Moderately Dense Forest
10-40%	31696.08	41.92	Degraded forest
<10%	4206.72	5.56	Open Forest.
Total	75619.76	100.00	



The Girth Class wise distribution has also been indicated by ORSAC. It is reproduced below.

Table No 6.3 Number of trees in different girth Class as per ORSAC Analysis Report.						
Range	Girth Class in cm					Total
	30-60	60-90	90-120	120-150	>150	
Badampahad	1157361	337822	88779	23093	15876	1622931
Rairangpur	12968169	4998906	1260897	451546	234856	19914374
Bahalda	1263391	866408	78314	24279	8743	2241135
Bisoi WL	4355906	1547007	355496	142087	59092	6459588
Manada	3636681	1507667	402388	1460225	75492	7082453
Total	23381508	9257810	2185874	2101230	394059	37320481
Percentage	62.65	24.81	5.86	5.63	1.06	100.00



The forest area under this working plan excluding VF and Revenue forest comes to 43912.680 ha. Taking the growing stock @69.49Cum / ha the growing stock of the division comes to 30, 51,492.13 cum.i.e. 3 million cum. The number of trees above 30cm GBH @287.4 over 43912.680 ha comes to 1, 26, 20, 504.2 number.

6.2 Growing Stock of Bamboo:

There is no Bamboo in this division. Hence growing stock is treated as nil.

6.3 Increment in Volume of Identified Timber Species:

Field exercise has been conducted to find out the increment of important timber species like Sal, Bija, Asan, Arjun, and Teak. The Age has been ascertained, it's Girth at Breast Height and Top height measured. The data so collected are furnished below.



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Table 6.4 Increment in volume of indentified Timber species

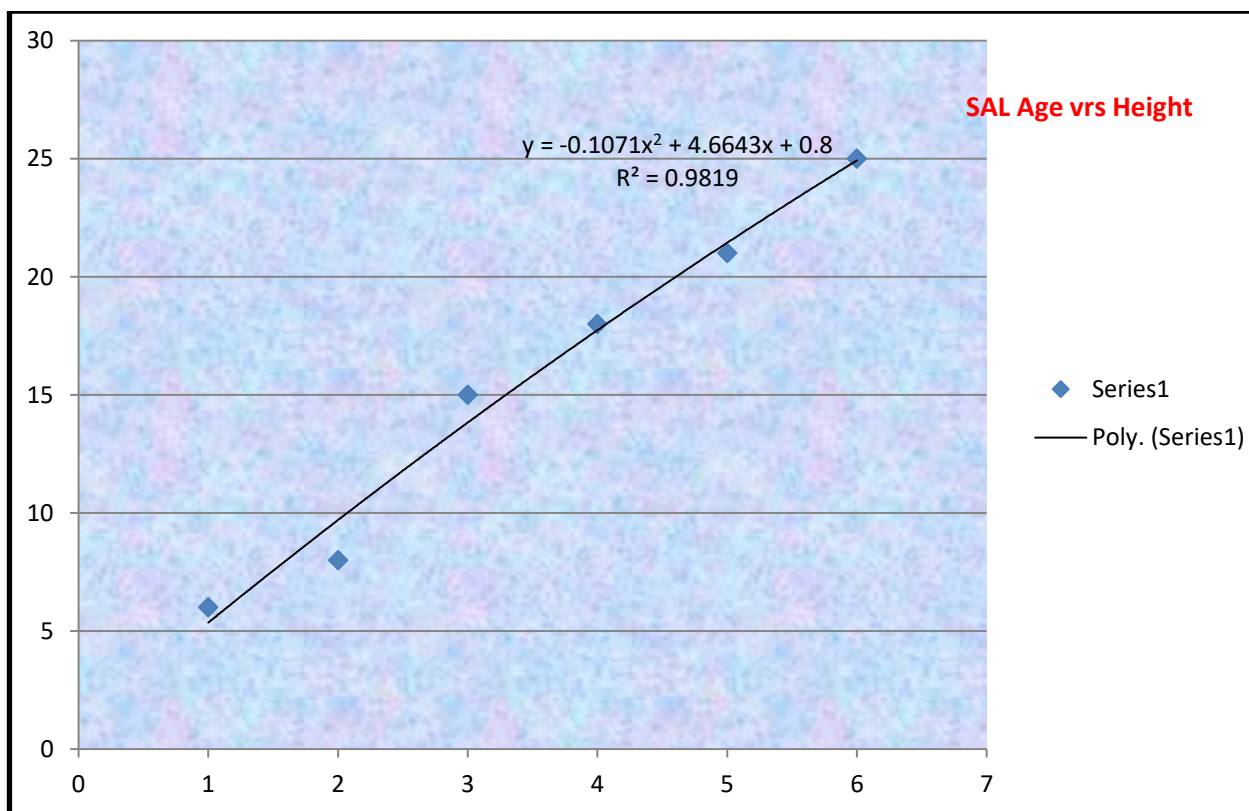
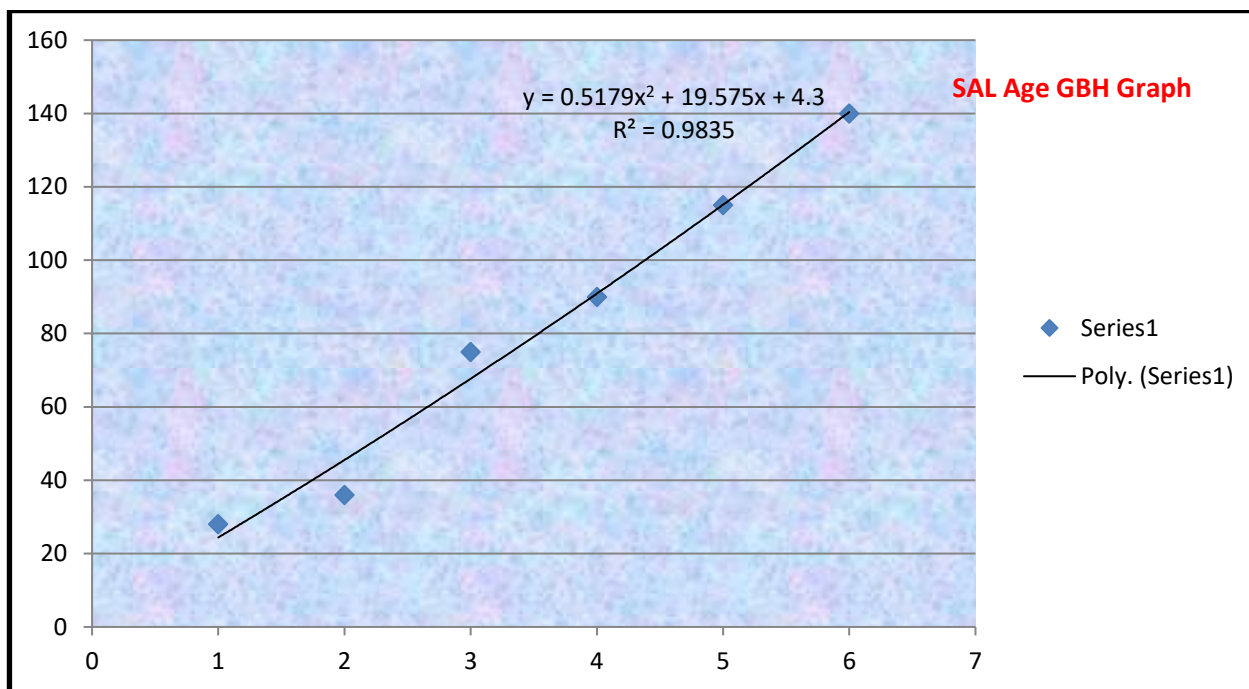
Name of Species	Age	10 yr	20yr	30yr	40yr	50yr	60yr
Sal	GBH in cm	28	36	75	90	115	140
	Height in M.	6.00	8.00	15.00	18.00	21.00	25.00
	Volume in cum	0.02205	0.0486	0.395508	0.683438	1.301836	2.296875
Bija (Piasal)	GBH in cm	40	55	70	85	105	120
	Height in M.	5.00	7.50	10.00	15.00	17.50	23.00
	Volume in cum	0.0375	0.106348	0.229688	0.508008	0.904395	1.5525
Asan	GBH in cm	35	60	90	120	140	160
	Height in M.	9.00	12.00	15.00	17.00	20.0	24.00
	Volume in cum	0.05168	0.2025	0.569531	1.1475	1.8375	2.88
Arjun	GBH in cm	35	65	95	130	150	165
	Height in M.	7.5	9.50	15.00	17.00	19.00	24.00
	Volume in cum	0.043066	0.188145	0.63457	1.346719	2.003906	3.062813
Dhaura	GBH in cm	30	65	105	140	150	160
	Height in M.	7.00	9.50	13.00	14.00	15.00	17.00
	Volume in cum	0.029531	0.188145	0.671836	1.28625	1.582031	2.04
Teak	GBH in cm	25	43	60	92	130	152
	Height in M.	5.5	9.5	15.8	23.5	25.2	30.4
	Volume in cum	0.016113	0.082338	0.266625	0.932363	1.996313	3.29232

The GBH and height have been taken from field observation and calculating the average of number of data. The volume has been calculated from Quarter Girth Formula with 70% of the tree height. The average Annual increment of few important species has been predicted below.

Name of Species	Growth in (10-20 year) in cum					Annual increment predicted in Cum
	10-20 Yr	20-30 Yr	30-40Yr	40-50 Yr	50-60Yr	
Sal	0.02655	0.346908	0.28793	0.618398	0.995039	0.045497
Bija	0.068848	0.12334	0.27832	0.396387	0.648105	0.0303
Asan	0.15082	0.367031	0.577969	0.69	1.0425	0.056566
Arjun	0.145079	0.446425	0.712149	0.657187	1.058907	0.060395
Dhaura	0.158614	0.483691	0.614414	0.295781	0.457969	0.040209
Teak	0.066225	0.184287	0.665738	1.06395	1.296007	0.065524

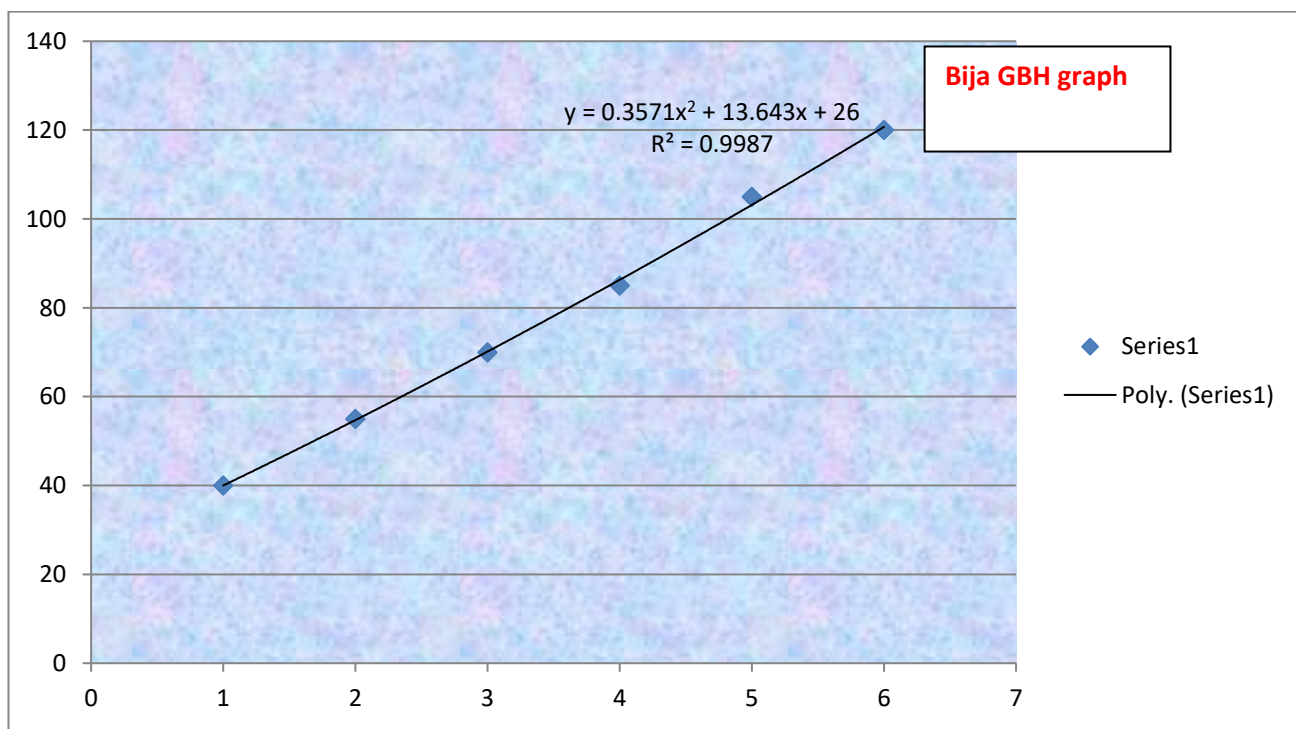
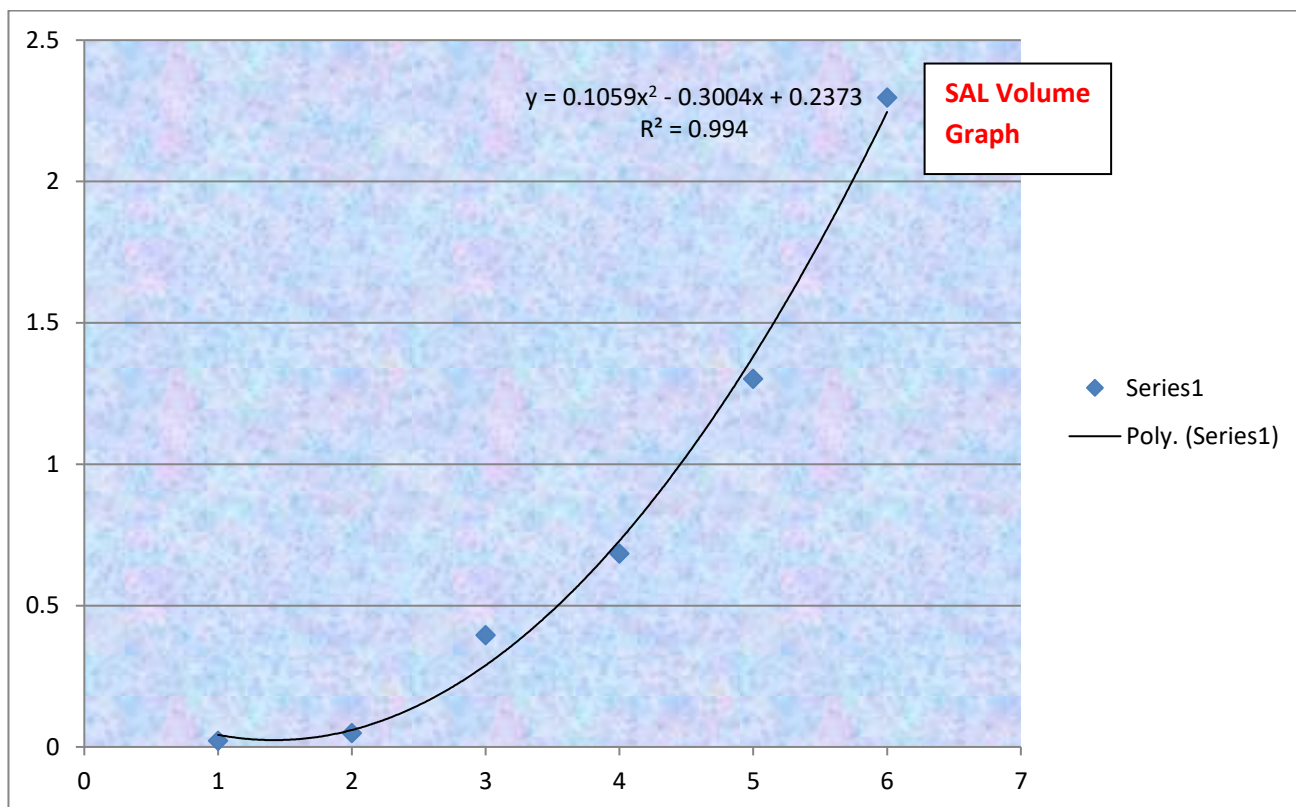


Working Plan of Rairangpur Forest division (2021 to 2031)



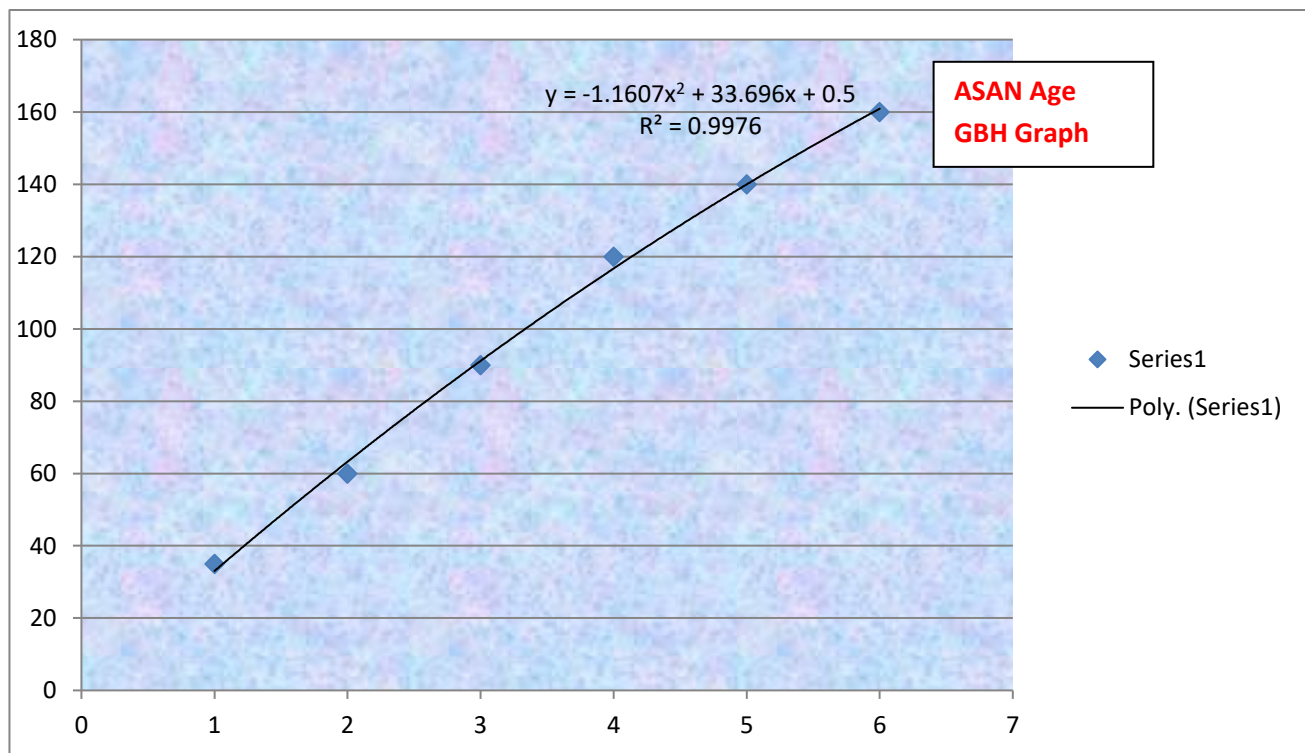
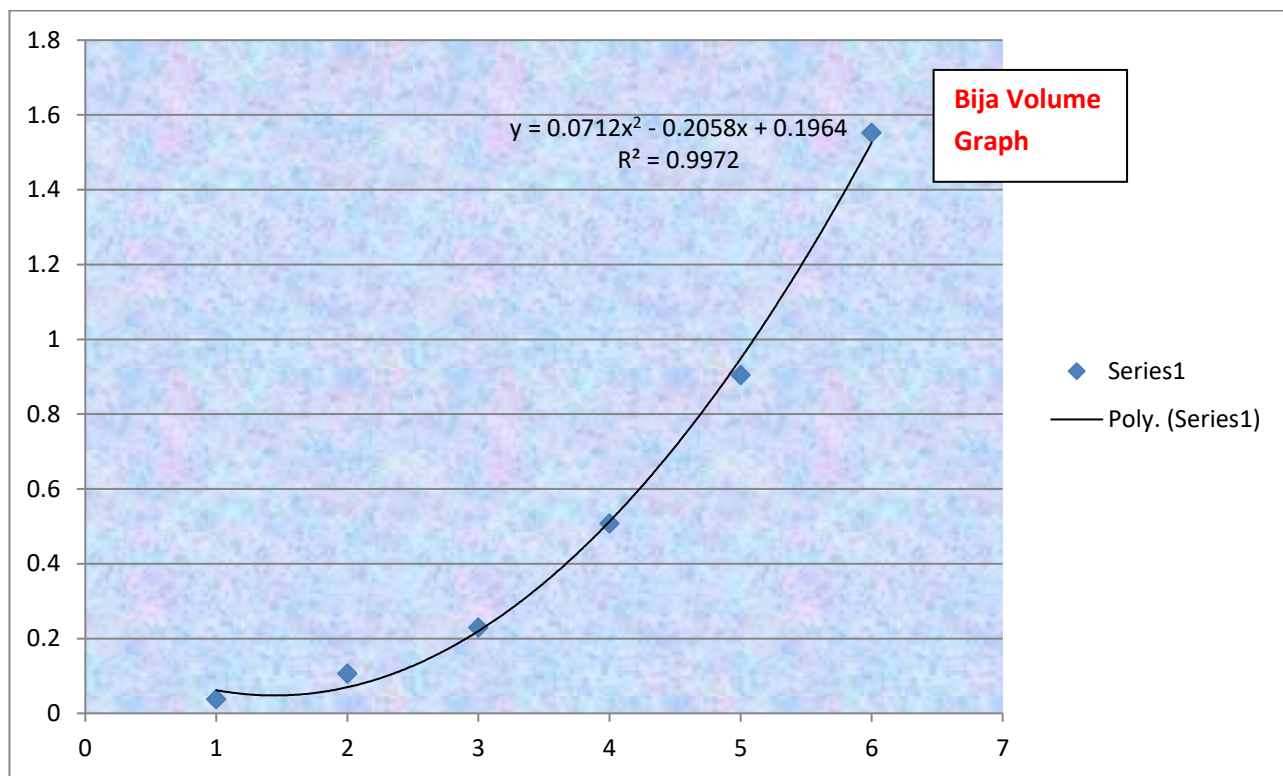


Working Plan of Rairangpur Forest division (2021 to 2031)



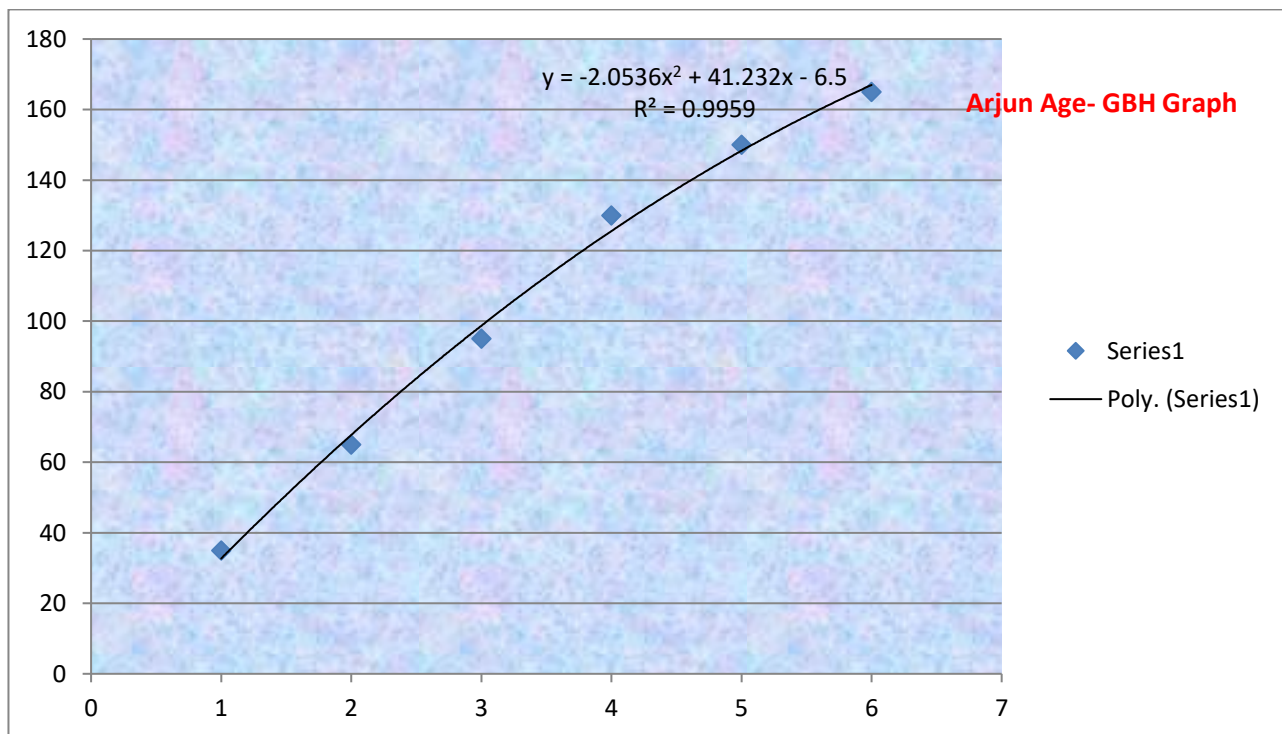
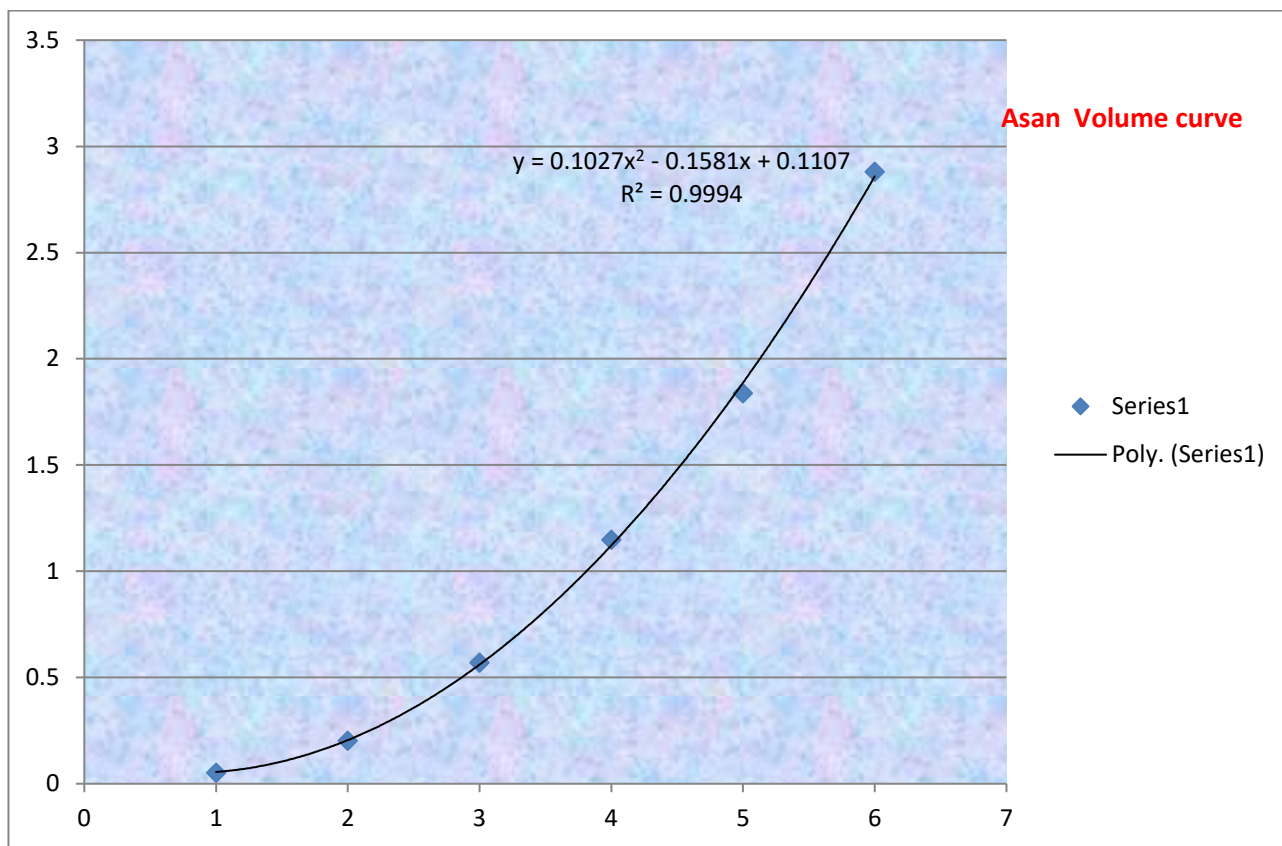


Working Plan of Rairangpur Forest division (2021 to 2031)



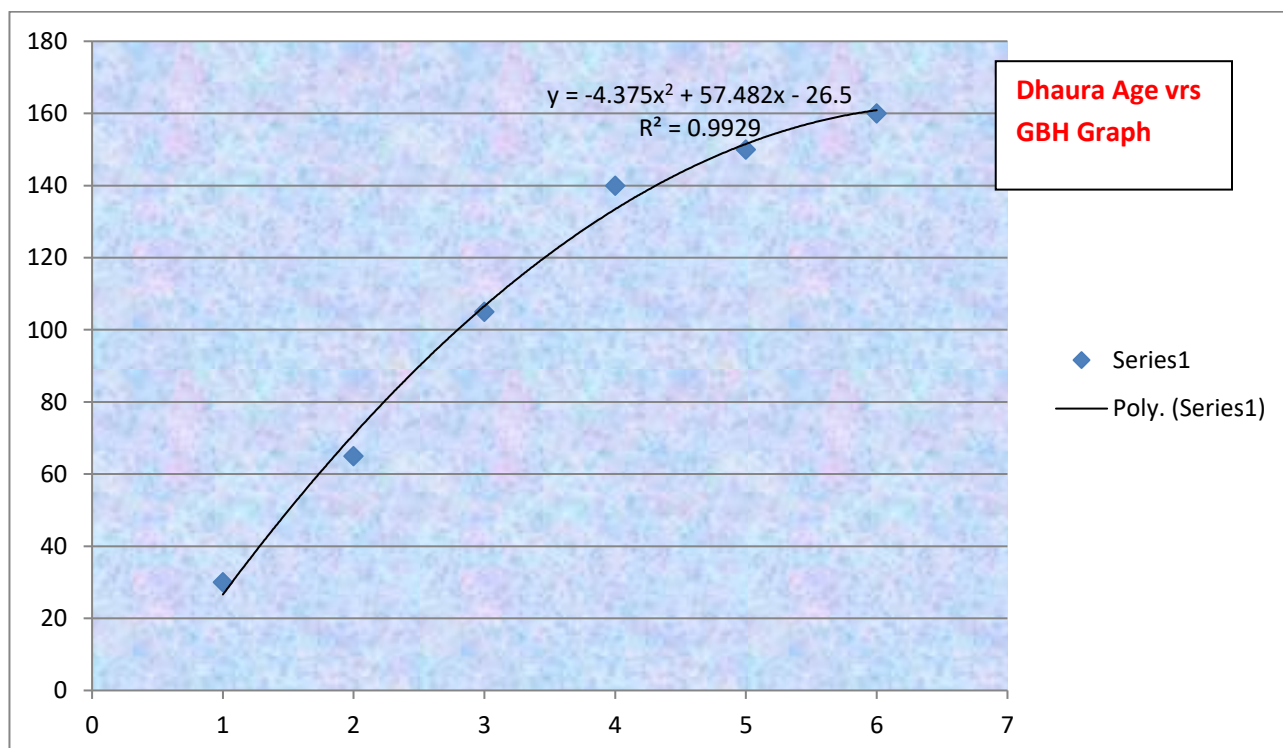
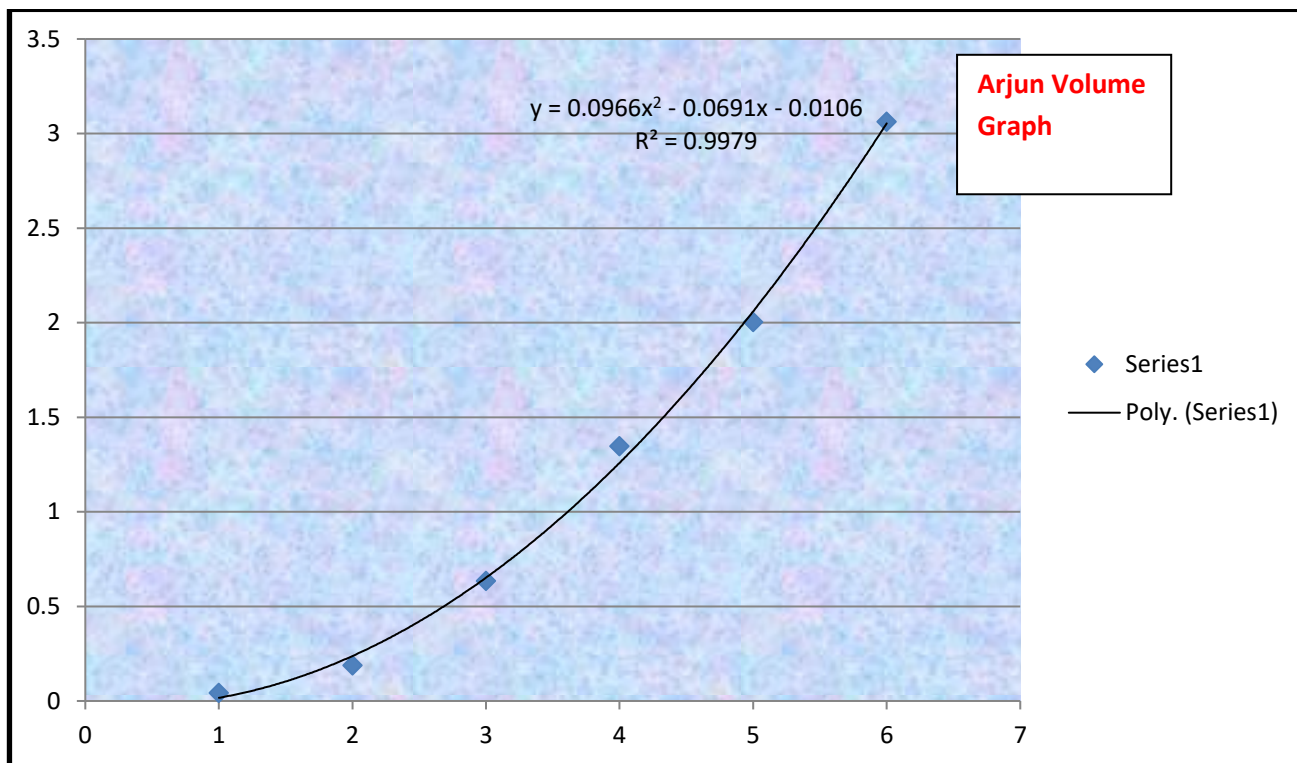


Working Plan of Rairangpur Forest division (2021 to 2031)



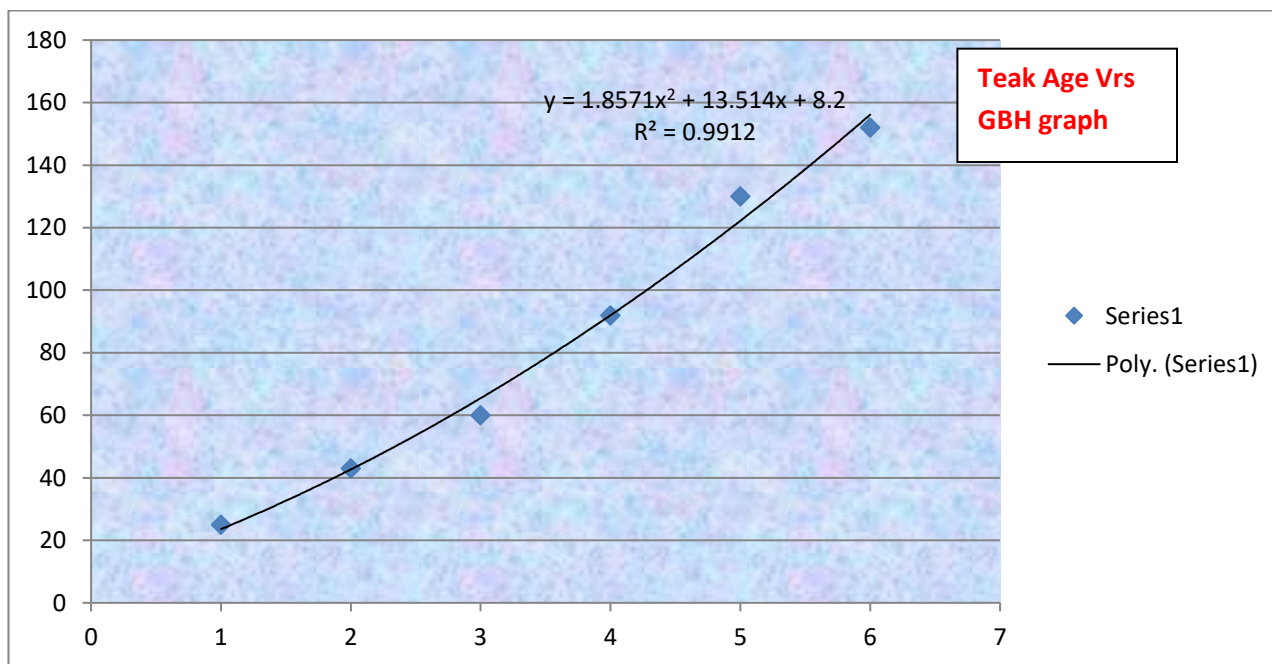
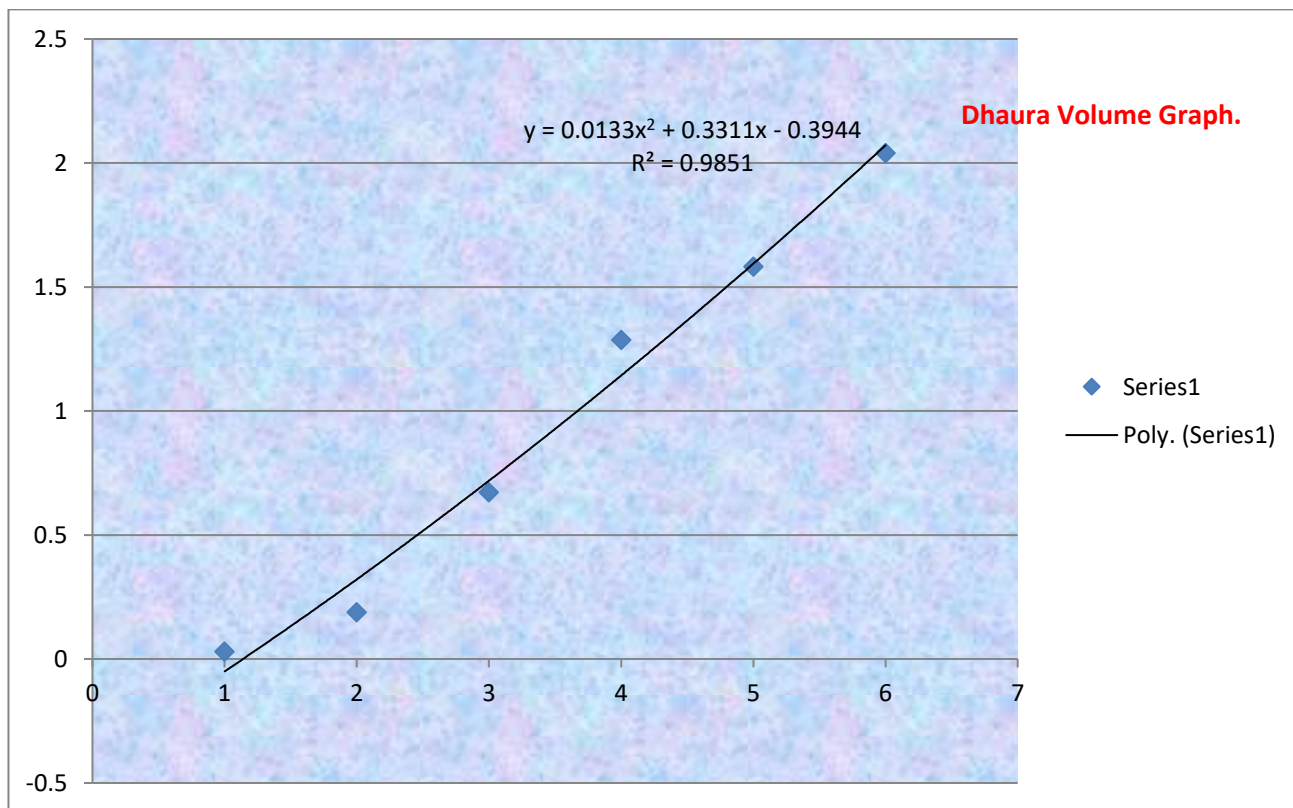


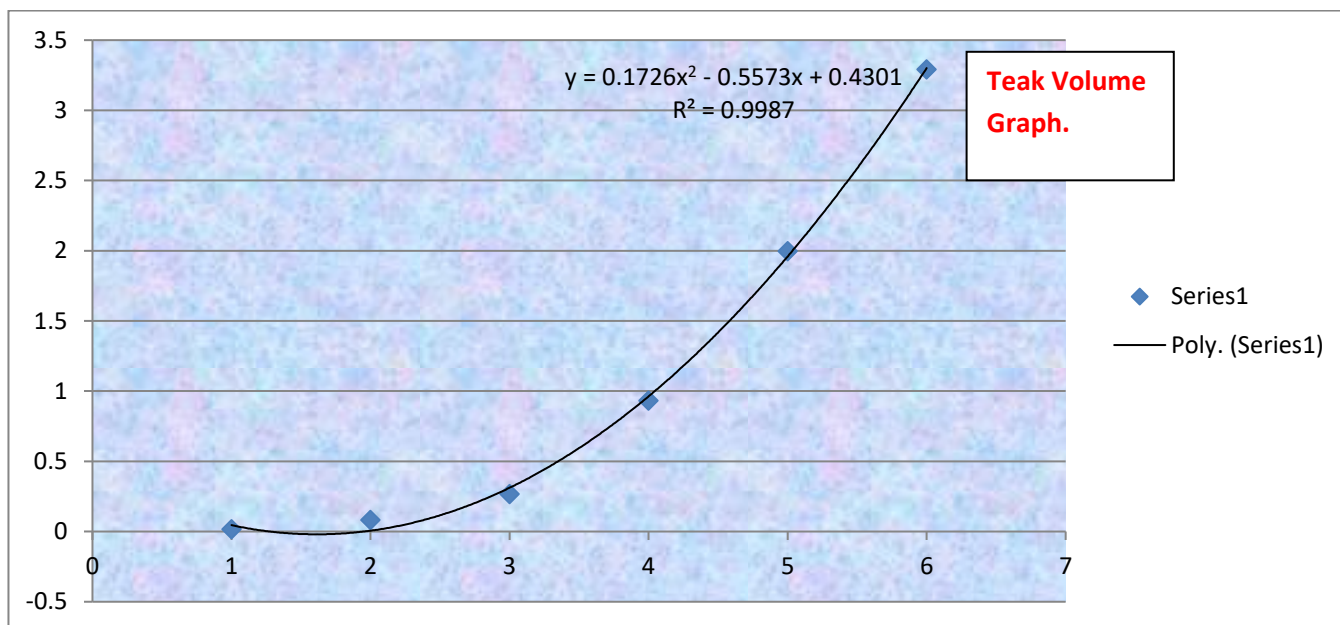
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The species wise Volume equation derived from growth data is furnished below. This gives an general clue to calculate the volume from Graph or Equation.

Table 6.6 Volume equation for important Species of the Division.			
Sl no	Species	Volume Equation.	Remark
1	Sal	$y = 0.105x^2 - 0.300x + 0.237$	X – Age of the tree
2	Piasal (Bija)	$y = 0.071x^2 - 0.205x + 0.196$	
3	Asan	$y = 0.102x^2 - 0.158x + 0.110$	
4	Arjun	$y = 0.096x^2 - 0.069x - 0.010$	
5	Dhaura	$y = 0.013x^2 + 0.331x - 0.394$	
6	Teak	$y = 0.172x^2 - 0.557x + 0.430$	

6.4 Effects towards enhancement of Forest Productivity through Quality Plantation activities:

Enrichment of Forests through silviultural practices and enrichment through Plantation is being practiced many decades ago. Conversion of miscellaneous forest to Teak plantation by Economic plantation is attempted. It is required to improve regeneration by resorting to High forest system than coppice. Diameter growth is required to be attempted. It is observed that Sal is of Quality Class II/III in moist areas where as it is of III/ IV quality Class in a dry low altitude areas. Quality class of IV/ V is seen in higher altitude Sal forests. Improvement of Soil quality by SMC will enhance the quality of Forest coupled with rigid Fire protection.



6.5 Carbon Stock:

For calculation of Carbon Stock due to trees / Herbs / Leaf litters on forest floor, is required to be enumerated as per procedures led out in the National Working Plan Code-2014. No systematic study has been taken up due to funds constraint. The Forest Survey of India has been requested to provide available information on Carbon Stock of Rairangpur Division.

As per thumb Rule & taking Wood Empirical Formula $C_nH_{2n}O_n$, 30 gms of Wood contain 12 gms of carbon. Considering the Ash content i.e. Metals and its oxides in plants 1 % reduction of Carbon may be safely considered.

Hence 30 Tons of Wood may contain (12T-0.3T) 11.70 Ton of Carbon. Hence 1 Ton of Wood (Dry mass) may contain 0.39 Tons of fixed Carbon. For Conversion of mass of Wood from Cum to Ton, the density factors for various species recorded in Tropical forests are furnished below.

Table No 6.7 Density of Wood

Sl No	Species	Wood density	Sl No	Species	Wood density
Tropical Asia					
1	<i>Acacia arabica</i>	0.70 *	31	<i>Amoora aheriana</i>	0.58
2	<i>Acacia catechu</i>	0.88	32	<i>Amoora macrocarpa</i>	0.55
3	<i>Acacia confusa</i>	0.75	33	<i>Amoora spp.</i>	0.6
4	<i>Acacia leucophloea</i>	0.76	34	<i>Anisophyllea zeylanica</i>	0.46 *
5	<i>Acacia richii</i>	0.69	35	<i>Anisoptera aurea</i>	0.53
6	<i>Adina cordifolia</i>	0.58, 0.59 +	36	<i>Anisoptera spp.</i>	0.54
7	<i>Aegle marmelo</i>	0.75	37	<i>Anisoptera thurifera</i>	0.54
8	<i>Agathis dammara</i>	0.41	38	<i>Anogeissus latifolia</i>	0.78, 0.79 +
9	<i>Agathis spp.</i>	0.44	39	<i>Anthocephalus chinensis</i>	0.36, 0.33 +
10	<i>Agathis vitiensis</i>	0.45	40	<i>Antidesma pleuricum</i>	0.59
11	<i>Aglaia diffusa</i>	0.7	41	<i>Aphanamixis cumingiana</i>	0.58
12	<i>Aglaia iloilo</i>	0.53	42	<i>Aphanamixis perrottetiana</i>	0.52
13	<i>Aglaia llanosiana</i>	0.89	43	<i>Araucaria bidwillii</i>	0.43
14	<i>Alangium longiflorum</i>	0.65	44	<i>Artocarpus blancoi</i>	0.43
15	<i>Alangium meyeri</i>	0.63	45	<i>Artocarpus heterophylla</i>	0.6
16	<i>Albizzia amara</i>	0.70 *	46	<i>Artocarpus lakoocha</i>	0.53 *
17	<i>Albizzia falcataria</i>	0.25	47	<i>Artocarpus ovata</i>	0.47
18	<i>Albizzia lebbek</i>	0.55, 0.66 +	48	<i>Artocarpus spp.</i>	0.58



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Table No 6.7 Density of Wood

19	<i>Albizzia odoratissima</i>	0.76	49	<i>Azadirachta indica</i>	0.69
20	<i>Albizzia procera</i>	0.52 *, 0.59 +	50	<i>Azadirachta spp.</i>	0.52
21	<i>Aleurites moluccana</i>	0.25	51	<i>Balanocarpus spp.</i>	0.76
22	<i>Aleurites trisperma</i>	0.43	52	<i>Barringtonia edulis</i>	0.48
23	<i>Alnus japonica</i>	0.43	53	<i>Bauhinia spp.</i>	0.67
24	<i>Alphitonia philippinensis</i>	0.4	54	<i>Beilschmiedia tawa</i>	0.58
25	<i>Alphitonia zizyphoides</i>	0.5	55	<i>Berrya cordifolia</i>	0.78 *
26	<i>Alphonsea arborea</i>	0.69	56	<i>Bischofia javanica</i>	0.54, 0.58, 0.62 +
27	<i>Alseodaphne longipes</i>	0.49	57	<i>Bleasdalea vitiensis</i>	0.43
28	<i>Alstonia macrophylla</i>	0.62	58	<i>Bombax ceiba</i>	0.33
29	<i>Alstonia scholaris</i>	0.36	59	<i>Bombycidendron vidalianum</i>	0.53
30	<i>Alstonia spp.</i>	0.37	60	<i>Boswellia serrata</i>	0.5
31	<i>Bridelia retusa</i>	0.5	91	<i>Cedrela spp.</i>	0.42
32	<i>Bridelia squamosa</i>	0.5	92	<i>Cedrela toona</i>	0.43
33	<i>Buchanania lanzan</i>	0.45	93	<i>Ceiba pentandra</i>	0.23
34	<i>Buchanania latifolia</i>	0.45	94	<i>Celtis luzonica</i>	0.49
35	<i>Bursera serrata</i>	0.59	95	<i>Chisocheton cumingianus</i>	0.52
36	<i>Butea monosperma</i>	0.48	96	<i>Chisocheton pentandrus</i>	0.52
37	<i>Calophyllum blancoi</i>	0.51	97	<i>Chloroxylon swietenia</i>	0.76, 0.79, 0.80 +
38	<i>Calophyllum inophyllum</i>	0.57	98	<i>Chukrassia tabularis</i>	0.57
39	<i>Calophyllum neo-ebudicum</i>	0.5	99	<i>Cinnamomum mercadoi</i>	0.65
40	<i>Calophyllum obliquinervium</i>	0.58	100	<i>Cinnamomum spp.</i>	0.43
41	<i>Calophyllum spp.</i>	0.53	101	<i>Citrus grandis</i>	0.59
42	<i>Calophyllum vitiense</i>	0.5	102	<i>Cleidion speciflorum</i>	0.5
43	<i>Calycarpa arborea</i>	0.53	103	<i>Cleistanthus collinus</i>	0.88
44	<i>Cananga odorata</i>	0.29	104	<i>Cleistocalyx operculatus</i>	0.66
45	<i>Canarium asperum var. asperum</i>	0.50, 0.60 +	105	<i>Cleistocalyx spp.</i>	0.76



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Table No 6.7 Density of Wood

46	<i>Canarium hirsutum forma scabrum</i>	0.4	106	<i>Cochlospermum gossypium + religiosum</i>	0.27
47	<i>Canarium luzonicum</i>	0.51	107	<i>Cocos nucifera</i>	0.5
48	<i>Canarium spp.</i>	0.44	108	<i>Colona serratifolia</i>	0.33
49	<i>Canarium vanikoroense</i>	0.54	109	<i>Combretodendron quadrialatum</i>	0.57
50	<i>Canarium vitiense</i>	0.54	110	<i>Cordia spp.</i>	0.53
51	<i>Canarium vrieseanum forma stenophyllum</i>	0.56	111	<i>Cotylelobium spp.</i>	0.69
52	<i>Canthium monstrosum</i>	0.42	112	<i>Crataeva religiosa</i>	0.53 *
53	<i>Carallia calycina</i>	0.66 *	113	<i>Cratoxylon arborescens</i>	0.4
54	<i>Cassia fistula</i>	0.71	114	<i>Cryptocarya spp.</i>	0.59
55	<i>Cassia javanica</i>	0.69	115	<i>Cubilia cubili</i>	0.49
56	<i>Cassia spectabilis</i>	0.48	116	<i>Cullenia excelsa</i>	0.53
55	<i>Castanopsis philippensis</i>	0.51	117	<i>Cynometra insularis</i>	0.76, 0.91 +
56	<i>Casuarina equisetifolia</i>	0.83	118	<i>Cynometra ramiflora</i>	0.7
57	<i>Casuarina nodiflora</i>	0.85	119	<i>Cynometra spp.</i>	0.8
58	<i>Cedrela odorata</i>	0.38	120	<i>Dacrycarpus imbricatus</i>	0.45, 0.47 +
59					
60	<i>Dacrydium elatum</i>	0.48	151	<i>Dipterocarpus gracilis</i>	0.61
61	<i>Dacrydium nausoriensis</i>	0.52	152	<i>Dipterocarpus grandiflorus</i>	0.62
62	<i>Dacrydium nidulum</i>	0.52	153	<i>Dipterocarpus kerrii</i>	0.56
63	<i>Dacrydium spp.</i>	0.46	154	<i>Dipterocarpus kunstlerii</i>	0.57
64	<i>Dacryodes spp.</i>	0.61	155	<i>Dipterocarpus spp.</i>	0.61
65	<i>Dalbergia latifolia</i>	0.75	156	<i>Dipterocarpus warburgii</i>	0.52
66	<i>Dalbergia paniculata</i>	0.64	157	<i>Dracontomelon dao</i>	0.52
67	<i>Decussocarpus philippinensis</i>	0.5	158	<i>Dracontomelon edule</i>	0.46
68	<i>Decussocarpus vitiensis</i>	0.37	159	<i>Dracontomelon spp.</i>	0.5
69	<i>Degeneria vitiensis</i>	0.35	160	<i>Dryobalanops spp.</i>	0.61



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Table No 6.7 Density of Wood

70	<i>Dehaasia triandra</i>	0.64	161	<i>Drypetes bordenii</i>	0.75
71	<i>Dialium spp.</i>	0.8	162	<i>Durio spp.</i>	0.53
72	<i>Dillenia luzoniensis</i>	0.69	163	<i>Durio zibethinus</i>	0.44, 0.53 +
73	<i>Dillenia megalantha</i>	0.69	164	<i>Dyera costulata</i>	0.36
74	<i>Dillenia pentagyna</i>	0.53	165	<i>Dysoxylum altissimum</i>	0.42
75	<i>Dillenia philippinensis</i>	0.61	166	<i>Dysoxylum decandrum</i>	0.51
76	<i>Dillenia spp.</i>	0.59	167	<i>Dysoxylum euphlebiun</i>	0.63
77	<i>Diospyros embryopteris</i>	0.63 *	168	<i>Dysoxylum quercifolium</i>	0.49
78	<i>Diospyros inclusa</i>	0.68	169	<i>Dysoxylum richii</i>	0.49
79	<i>Diospyros melanoxylon</i>	0.68	170	<i>Elaeocarpus serratus</i>	0.40 *
80	<i>Diospyros mindanaensis</i>	0.69	171	<i>Embllica officinalis</i>	0.8
81	<i>Diospyros nitida</i>	0.71	172	<i>Endiandra laxiflora</i>	0.54
82	<i>Diospyros philippensis</i>	0.81	173	<i>Endospermum macrophyllum</i>	0.4
83	<i>Diospyros pilosanthera</i>	0.8	174	<i>Endospermum peltatum</i>	0.31
84	<i>Diospyros poncei</i>	0.81	175	<i>Endospermum spp.</i>	0.38
85	<i>Diospyros pyrrhocarpa</i>	0.6	176	<i>Enterolobium cyclocarpum</i>	0.35
86	<i>Diospyros spp.</i>	0.7	177	<i>Epicharis cumingiana</i>	0.73
87	<i>Diplodiscus paniculatus</i>	0.63	178	<i>Erythrina fusca</i>	0.25
88	<i>Dipterocarpus caudatus</i>	0.61	179	<i>Erythrina suberosa</i>	0.32
89	<i>Dipterocarpus euryrchus</i>	0.56	180	<i>Erythrina subumbrans</i>	0.24
90					
91	<i>Erythrophloeum densiflorum</i>	0.65	211	<i>Heritiera sylvatica</i>	0.77
92	<i>Eucalyptus citriodora</i>	0.64	212	<i>Hevea brasiliensis</i>	0.53
93	<i>Eucalyptus deglupta</i>	0.34	213	<i>Hibiscus tiliaceus</i>	0.57
94	<i>Eugenia spp.</i>	0.65	214	<i>Homalanthus populneus</i>	0.38
95	<i>Fagraea gracilipes</i>	0.84	215	<i>Homalium spp.</i>	0.76
96	<i>Fagraea spp.</i>	0.73	216	<i>Hopea acuminata</i>	0.62
97	<i>Ficus benjamina</i>	0.65	217	<i>Hopea foxworthyi</i>	0.64
98	<i>Ficus botryocarpa</i>	0.43	218	<i>Hopea plagata</i>	0.88
99	<i>Ficus minahassae</i>	0.42	219	<i>Hopea spp.</i>	0.64



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Table No 6.7 Density of Wood

100	<i>Ficus spp.</i>	0.39	220	<i>Intsia bijuga</i>	0.61, 0.68, 0.74
101	<i>Ficus variegata</i>	0.28	221	<i>Intsia palembanica</i>	0.68
102	<i>Ganua obovatifolia</i>	0.59	222	<i>Kayea garciae</i>	0.53
103	<i>Garcinia myrtifolia</i>	0.65	223	<i>Kingiodendron alternifolium</i>	0.48
104	<i>Garcinia spp.</i>	0.75	224	<i>Kleinhovia hospita</i>	0.36
105	<i>Gardenia latifolia</i>	0.64	225	<i>Knema spp.</i>	0.53
106	<i>Gardenia turgida</i>	0.64	226	<i>Koompassia excelsa</i>	0.63
107	<i>Garuga pinnata</i>	0.51	227	<i>Koompassia malaccensis</i>	0.72
108	<i>Gluta spp.</i>	0.63	228	<i>Koordersiodendron pinnatum</i>	0.65, 0.69 +
109	<i>Gmelina arborea</i>	0.41, 0.45 +	229	<i>Kydia calycina</i>	0.72
110	<i>Gmelina vitiensis</i>	0.54	230	<i>Lagerstroemia parviflora</i>	0.62
111	<i>Gonocaryum calleryanum</i>	0.64	231	<i>Lagerstroemia piriformis</i>	0.5
112	<i>Gonystylus bancanus</i>	0.52	232	<i>Lagerstroemia speciosa</i>	0.53
113	<i>Gonystylus macrophyllus</i>	0.52	233	<i>Lagerstroemia spp.</i>	0.55
114	<i>Gonystylus punctatus</i>	0.57	234	<i>Lansea coromandelica</i>	0.54
115	<i>Grewia multiflora</i>	0.46	235	<i>Lansea grandis</i>	0.5
116	<i>Grewia tiliaefolia</i>	0.68	236	<i>Leucaena leucocephala</i>	0.64
117	<i>Hardwickia binata</i>	0.73	237	<i>Litchi chinensis var. philippinensis</i>	0.88
118	<i>Harpullia arborea</i>	0.62	238	<i>Lithocarpus celebica</i>	0.68
119	<i>Heritiera ornithocephala</i>	0.68	239	<i>Lithocarpus llanosii</i>	0.63
120	<i>Heritiera spp.</i>	0.56	240	<i>Lithocarpus soleriana</i>	0.63
121					
122	<i>Litsea garciae</i>	0.34	271	<i>Milliusa velutina</i>	0.63
123	<i>Litsea leytenensis</i>	0.35	272	<i>Mimusops elengi</i>	0.72 *
124	<i>Litsea perrottetii</i>	0.45	273	<i>Mitragyna parviflora</i>	0.56
125	<i>Litsea spp.</i>	0.4	274	<i>Myristica castaneifolia</i>	0.49
126	<i>Lophopetalum spp.</i>	0.46	275	<i>Myristica chartacea</i>	0.49
127	<i>Macaranga bicolor</i>	0.29	276	<i>Myristica gillespieana</i>	0.49
128	<i>Macaranga denticulata</i>	0.53	277	<i>Myristica spp.</i>	0.53
129	<i>Madhuca fulva</i>	0.53	278	<i>Neesia spp.</i>	0.53



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 6.7 Density of Wood

130	<i>Madhuca longifolia</i> <i>var. latifolia</i>	0.74	279	<i>Neonauclea bernardoi</i>	0.62
131	<i>Madhuca</i> <i>oblongifolia</i>	0.53	280	<i>Neotrewia cumingii</i>	0.55
132	<i>Mallotus</i> <i>multiglandulosus</i>	0.42	281	<i>Ochna foxworthyi</i>	0.86
133	<i>Mallotus philippensis</i>	0.64	282	<i>Ochroma pyramidale</i>	0.3
134	<i>Mangifera altissima</i>	0.55	283	<i>Octomeles sumatrana</i>	0.27, 0.32 +
135	<i>Mangifera indica</i>	0.52, 0.59 +	284	<i>Oroxylon indicum</i>	0.32
136	<i>Mangifera merrillii</i>	0.52	285	<i>Ougenia dalbergioides</i>	0.7
137	<i>Mangifera spp.</i>	0.52	286	<i>Palaquium fidjiense</i>	0.48
138	<i>Maniltoa grandiflora</i>	0.76	287	<i>Palaquium hornei</i>	0.7
139	<i>Maniltoa minor</i>	0.76	288	<i>Palaquium</i> <i>lanceolatum</i>	0.55
140	<i>Mastixia</i> <i>philippinensis</i>	0.47	289	<i>Palaquium luzoniense</i>	0.45
141	<i>Melanorrhoea spp.</i>	0.63	290	<i>Palaquium philippense</i>	0.41
142	<i>Melia dubia</i>	0.4	291	<i>Palaquium spp.</i>	0.55
143	<i>Melicope triphylla</i>	0.37	292	<i>Palaquium</i> <i>tenuipetiolatum</i>	0.5
144	<i>Meliosma</i> <i>macrophylla</i>	0.27	293	<i>Palaquium vitilevuense</i>	0.48
145	<i>Melochia umbellata</i>	0.25	294	<i>Pangium edule</i>	0.5
146	<i>Mesua ferrea</i>	0.83, 0.85 +	295	<i>Parashorea</i> <i>malaanonan</i>	0.51
147	<i>Metrosideros collina</i>	0.70, 0.76 +	296	<i>Parashorea spp.</i>	0.44
148	<i>Michelia platyphylla</i>	0.51	297	<i>Parashorea stellata</i>	0.59
149	<i>Michelia spp.</i>	0.43	298	<i>Paratrophis glabra</i>	0.77
150	<i>Microcos stylocarpa</i>	0.4	299	<i>Parinari corymbosa</i>	0.76
151	<i>Micromelum</i> <i>compressum</i>	0.64	300	<i>Parinari insularum</i>	0.65
152					
153	<i>Parinari spp.</i>	0.68	331	<i>Salmaalina malabarica</i>	0.32, 0.33 +
154	<i>Parkia roxburghii</i>	0.34	332	<i>Samanea saman</i>	0.45, 0.46 4
155	<i>Payena spp.</i>	0.55	333	<i>Sandoricum koetjape</i>	0.44
156	<i>Peltophorum</i> <i>pterocarpum</i>	0.62	334	<i>Sandoricum vidalii</i>	0.43
157	<i>Pentace spp.</i>	0.56	335	<i>Sapindus saponaria</i>	0.58
158	<i>Phaeanthus</i> <i>ebracteolatus</i>	0.56	336	<i>Sapium luzonicum</i>	0.4
159	<i>Phyllocladus</i>	0.53	337	<i>Schleichera oleosa</i>	0.96



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 6.7 Density of Wood

	<i>hypophyllus</i>				
160	<i>Pinus caribaea</i>	0.48	338	<i>Schrebera swietenoides</i>	0.82
161	<i>Pinus insularis</i>	0.47, 0.48 +	339	<i>Semicarpus anacardium</i>	0.64
162	<i>Pinus merkusii</i>	0.54	340	<i>Serialbizia acle</i>	0.57
163	<i>Pisonia umbellifera</i>	0.21	341	<i>Serianthes melanesica</i>	0.48
164	<i>Pittosporum pentandrum</i>	0.51	342	<i>Sesbania grandiflora</i>	0.4
165	<i>Planchonella vitiensis</i>	0.77	343	<i>Shorea agsaboensis</i>	0.35
166	<i>Planchonia spectabilis</i>	0.58	344	<i>Shorea almon</i>	0.42
167	<i>Planchonia spp.</i>	0.59	345	<i>Shorea assamica forma philippinensis</i>	0.41
168	<i>Podocarpus neriifolius</i>	0.52	346	<i>Shorea astylosa</i>	0.73
169	<i>Podocarpus spp.</i>	0.43	347	<i>Shorea ciliata</i>	0.75
170	<i>Polyalthia flava</i>	0.51	348	<i>Shorea contorta</i>	0.44
171	<i>Polyscias nodosa</i>	0.38	349	<i>Shorea gisok</i>	0.76
172	<i>Pometia pinnata forma pinnata</i>	0.58	350	<i>Shorea guiso</i>	0.68
173	<i>Pometia spp.</i>	0.54	351	<i>Shorea hopeifolia</i>	0.44
174	<i>Pouteria villamilii</i>	0.47	352	<i>Shorea malibato</i>	0.78
175	<i>Premna tomentosa</i>	0.96	353	<i>Shorea negrosensis</i>	0.44
176	<i>Pterocarpus indicus</i>	0.52	354	<i>Shorea palosapis</i>	0.39
177	<i>Pterocarpus marsupium</i>	0.67	355	<i>Shorea plagata</i>	0.7
178	<i>Pterocymbium macrorater</i>	0.47	356	<i>Shorea polita</i>	0.47
179	<i>Pterocymbium tinctorium</i>	0.28	357	<i>Shorea polysperma</i>	0.47
180	<i>Pygeum vulgare</i>	0.57	358	<i>Shorea robusta</i>	0.72
181	<i>Quercus spp.</i>	0.7	359	<i>Shorea spp. balau group</i>	0.7
182	<i>Radermachera pinnata</i>	0.51	360	<i>Shorea spp. dark red meranti</i>	0.55
183					
184	<i>Shorea spp. light red meranti</i>	0.4	391	<i>Terminalia chebula</i>	0.96
185	<i>Shorea spp. white meranti</i>	0.48	392	<i>Terminalia citrina</i>	0.71



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 6.7 Density of Wood

186	<i>Shorea spp. yellow meranti</i>	0.46	393	<i>Terminalia copelandii</i>	0.46
187	<i>Shorea virescens</i>	0.42	394	<i>Terminalia foetidissima</i>	0.55
188	<i>Sloanea javanica</i>	0.53	395	<i>Terminalia microcarpa</i>	0.53
189	<i>Soymida febrifuga</i>	0.97	396	<i>Terminalia nitens</i>	0.58
190	<i>Spathodea campanulata</i>	0.25	397	<i>Terminalia pterocarpa</i>	0.48
191	<i>Stemonurus luzoniensis</i>	0.37	398	<i>Terminalia tomentosa</i>	0.73, 0.76, 0.77 +
192	<i>Sterculia ceramica</i>	0.27	399	<i>Ternstroemia megacarpa</i>	0.53
193	<i>Sterculia foetida</i>	0.47 *	400	<i>Tetrameles nudiflora</i>	0.3
194	<i>Sterculia urens</i>	0.67	401	<i>Tetramerista glabra</i>	0.61
195	<i>Sterculia vitiensis</i>	0.31	402	<i>Thespesia populnea</i>	0.52
196	<i>Stereospermum suaveolens</i>	0.62	403	<i>Toona calantas</i>	0.29
197	<i>Strombosia philippinensis</i>	0.71	404	<i>Trema orientalis</i>	0.31
198	<i>Strychnos potatorum</i>	0.88	405	<i>Trichospermum richii</i>	0.32
199	<i>Swietenia macrophylla</i>	0.49, 0.53 +	406	<i>Tristania decorticata</i>	0.91
200	<i>Swintonia foxworthyi</i>	0.62	407	<i>Tristania micrantha</i>	0.89
201	<i>Swintonia spp.</i>	0.61	408	<i>Tristania spp.</i>	0.8
202	<i>Sycopsis dunni</i>	0.63	409	<i>Turpinia ovalifolia</i>	0.36
203	<i>Syzygium cumini</i>	0.7	410	<i>Vateria indica</i>	0.47 *
204	<i>Syzygium luzoniense</i>	0.63	411	<i>Vatica mangachapoi</i>	0.65
205	<i>Syzygium nitidum</i>	0.74	412	<i>Vatica obscura</i>	1.04 *
206	<i>Syzygium simile</i>	0.56	413	<i>Vatica pachyphylla</i>	0.78
207	<i>Syzygium spp.</i>	0.69, 0.76 +	414	<i>Vatica spp.</i>	0.69
208	<i>Tamarindus indica</i>	0.75	415	<i>Vitex parviflora</i>	0.7
209	<i>Tectona grandis</i>	0.50, 0.55 +	416	<i>Vitex peduncularis</i>	0.96
210	<i>Teijsmanniodendron ahernianum</i>	0.9	417	<i>Vitex spp.</i>	0.65
211	<i>Terminalia arjuna</i>	0.68	418	<i>Vitex turczaninowii</i>	0.49
212	<i>Terminalia belerica</i>	0.72	419	<i>Wallaceodendron celebicum</i>	0.55, 0.57 +
213	<i>Terminalia catappa</i>	0.52	420	<i>Weinmannia luzoniensis</i>	0.49
214					
215	<i>Wrightia tinctoria</i>	0.75	425	<i>Zanthoxylum rhetsa</i>	0.33



Table No 6.7 Density of Wood

216	<i>Xanthophyllum excelsum</i>	0.63	426	<i>Zizyphus spp.</i>	0.76
217	<i>Xanthostemon verdugonianus</i>	1.04	427	<i>Zizyphus talanai</i>	0.53
218	<i>Xylia xylocarpa</i>	0.73, 0.81 +	428	<i>Zizyphus xylopyra</i>	0.85

6.6 Carbon Sequestration& Mitigation:

6.6.1 Carbon sequestration:

Carbon sequestration is the process involved in carbon capture and the long-term storage of atmospheric carbon dioxide or other forms of carbon to mitigate or defer global warming. It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels.

Carbon dioxide (CO₂) is naturally captured from the atmosphere through biological, chemical, and physical processes.

Carbon dioxide may be captured as a pure by-product in processes related to petroleum refining or from flue gases from power generation. CO₂ sequestration includes the storage part of carbon capture and storage, which refers to large-scale, artificial capture and sequestration of industrially produced CO₂ using subsurface saline aquifers, reservoirs, ocean water, aging oil fields, or other carbon sinks.

Increasing yields and efficiency generally reduces emissions as well, since more food results from the same or less effort. Techniques include more accurate use of fertilizers, less soil disturbance, better irrigation, and crop strains bred for locally beneficial traits and increased yields.

Replacing more energy intensive farming operations can also reduce emissions. Reduced or no-till farming requires less machine use and burns correspondingly less fuel per acre. However, no-till usually increases use of weed-control chemicals and the residue now left on the soil surface is more likely to release its CO₂ to the atmosphere as it decays, reducing the net carbon reduction.

In practice, most farming operations that incorporate post-harvest crop residues, wastes and byproducts back into the soil provide a carbon storage benefit. This is particularly the case for Practices such as field burning of stubble – rather than releasing almost all of the stored CO₂ to the atmosphere; tillage incorporates the biomass back into the soil.



Carbon Sequestration as it relates to Forestry, the following steps are suggested:

- Planting of Species of long rotation period in order to enhance carbon storage for a longer period.
- The crop should not be harvested if the bio mass growth is faster i.e. first growing species to be favoured to slow growing species. When growth is retired the species may be harvested.
- The timber should be utilized in structures / house hold articles than use as fuel.
- Leaf litters, Twigs may be allowed to convert to compost and goes back to soil than use as fuel which immediately releases CO₂ to atmosphere.
- Steps to be taken to improve soil organic content than losing carbon to atmosphere as CO₂.

Enhancing carbon removal:

All crops absorb CO₂ during growth and release it after harvest. The goal of agricultural carbon removal is to use the crop and its relation to the carbon cycle to permanently sequester carbon within the soil. This is done by selecting farming methods that return biomass to the soil and enhance the conditions in which the carbon within the plants will be reduced to its elemental nature and stored in a stable state. Methods for accomplishing this include:

- Use cover crops such as grasses and weeds as temporary cover between planting seasons
- Concentrate livestock in small paddocks for days at a time so they graze lightly but evenly. This encourages roots to grow deeper into the soil. Stock also till the soil with their hooves, grinding old grass and manures into the soil.
- Cover bare paddocks with hay or dead vegetation. This protects soil from the sun and allows the soil to hold more water and be more attractive to carbon-capturing microbes.
- Restore degraded land, which slows carbon release while returning the land to agriculture or other use.

Agricultural sequestration practices may have positive effects on soil, air, and water quality, be beneficial to wildlife, and expand food production. On degraded croplands, an increase of 1 ton of soil carbon pool may increase crop yield by 20 to 40 kilograms per hectare of wheat, 10 to 20 kg/ ha for maize, and 0.5 to 1 kg/ha for cowpeas.

The effects of soil sequestration can be reversed. If the soil is disrupted or tillage practices are abandoned, the soil becomes a net source of greenhouse gases. Typically after 15 to 30 years of sequestration, soil becomes saturated and ceases to absorb carbon. This implies that there is a global limit to the amount of carbon that soil can hold.



Many factors affect the costs of carbon sequestration including soil quality, transaction costs and various externalities such as leakage and unforeseen environmental damage. Because reduction of atmospheric CO₂ is a long-term concern, farmers can be reluctant to adopt more expensive agricultural techniques when there is not a clear crop, soil, or economic benefit.

6.6.2 Forest Type Wise Carbon Stock:

Table No 6.8 Forest type wise Carbon Stock of Rairangapur Division.							
Forest Type	Name of Forest blocks under the type.	Area in Ha	Growing Stock in Cum per ha	Total Growing Stock (in 10 ³ Cum	Density T/ Cum	Total Carbon in 10 ³ ton	CO ₂ Equivalent in Ton 10 ³
3C/C _{2e(ii)} – Moist Peninsular Low level Sal	Tulsibani RF, Khadambada RF, Mahubhandar RF, Tunguru RF, Badampahar RF, Basila RF, Badra RF, Dublabeda RF, Jhatisiring RF, Kherna Rf and Bidhubhandar PRF	19740.61	70.63	1394.78	0.75	407.83	1495.37
5B/C _{1c} – Dry Peninsular Sal	Jari RF, Gorumahisani RF, Sarali, RF, Kanapat RF, Budheirana RF, Ramgarh RF, Asurghaty RF, Chahalapada RF Dahupani, DPF, Bhitaramda DPF, Tirilipi DPF, RadhoDPF etc.	24392.18	65.83	1657.37	0.70	438.37	1607.34
	Total	44132.79		3052.15		846.2	3102.71

The Carbon stock in Rairangpur division has been estimated to be 846.2 x10³ Ton which is equivalent to 3102.71 x10³ tons of Carbon Dioxide.



6.6.3 Mitigation Measures:

It is a common knowledge that Green House Gases are the cause of Global Warming. The entire world is greatly concerned to increase of GHG specially the CO₂. Photosynthesis is the simplest method to reduce the GHG in the atmosphere. The mitigation measures that can be practiced by a Forester are

- Increase tree cover by woody vegetation on Blank Areas.
- Enrich the existing forest by plantation and crop density may be maintained above 70%
- Allow Ground Flora to cover the Forest Floor.
- Long term Rotation to be adopted than a short term rotation.
- Reduce Forest Fire and release of CO₂.
- Allow a good humus cover to retain soil fertility and vigour.
- Reduce Fire wood consumption in rural areas through improved Chulla / Fire Place.
- Increase life of wooden materials through seasoning & treatment.





CHAPTER-7

OPTIMIZATION OF FOREST RESOURCE UTILIZATION:

7.1 Recorded Removal of Timber:

In the outgoing plan there is no Coupe working as forests blocks were allotted either to Rehabilitation Working circle or plantation working Circle. From records it is revealed that neither timber nor any firewood been removed from the forest in legal manner.

7.2 Recorded Removal of Fuel wood:

No firewood removed from forest during outgoing plan period and thereafter.

7.3 Recorded Removal of Bamboo / Rattans:

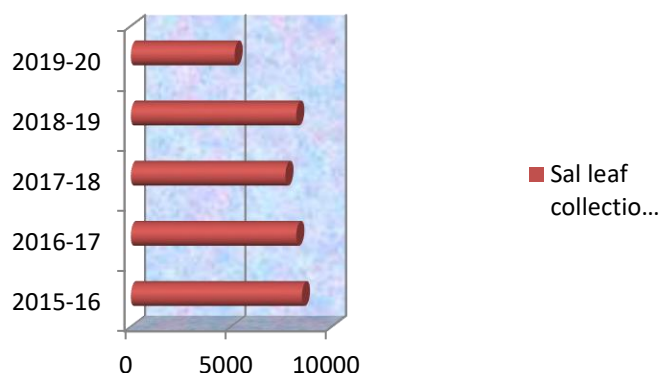
There is no bamboo cane in the forests of Rairangpur division.

7.4 Recorded removal of locally important NTFPs including MAPs:

Most of the available NTFP & MAP are now collected by the registered collectors under Gram panchyat jurisdiction. Records of removal of NTFP except Sal leaf are not available. Kenduleaf is also produced in this tract. Sal leaf collection target / achievement & royalty collected by the Division are furnished in Table No 7.1 below.

Sl No	Year	Sal Leaf Collection	
		Achievement in Qts	Royalty
1	2015-16	8517	7,07,892.00
2	2016-17	8235	6,39,840.00
3	2017-18	7697	6,65,038.00
4	2018-19	8235	7,62,820.00
5	2019-20	5170	No Royalty

Sal leaf collection in Qts

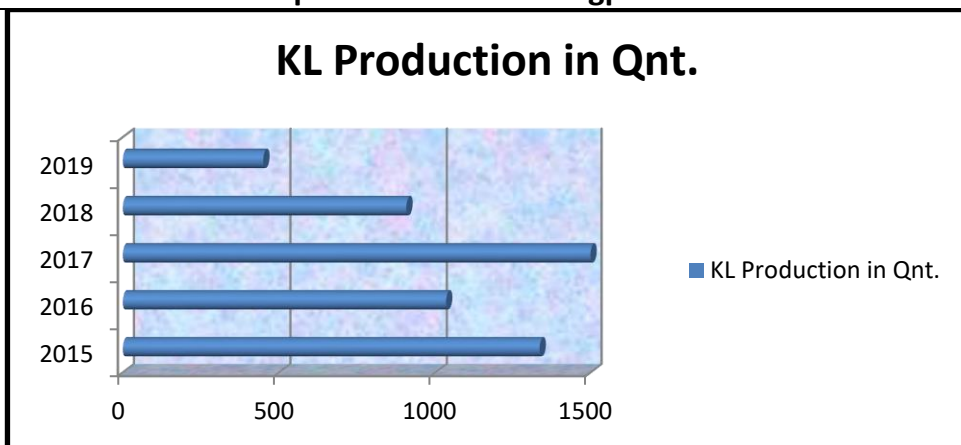


Kendu Leaf Collection & trading is being taken up by Department & OFDC Ltd. The production of last five years are as follows.



Table No 7.2 Kendu leaf production in Rairangpur

Sl No	Year	Production in Qnt.
1	2015	1335.60
2	2016	1033.20
3	2017	1500.00
4	2018	906.00
5	2019	448.80



7.5 Demand & Supply of Timber and important Non- Timber Forest Produce:

No systematic survey has been taken up to assess the demand of timber & firewood in the division. The total number of House hold in the division as per 2011 census is 174302. Due to urbanization, Ujjala Yojana of Govt. of India, about 40% house hold is using alternate source of energy for cooking purpose. The balance house hold i.e. 1, 04,581 are depending on Fuel wood. The minimum use of Firewood per house hold per month is 1.00 quintal. Hence for a year at least $104581 \times 12 = 125497.2$ Ton or say 1.25 lakh Tons of fuel wood is required annually.

In case of Timber, after use on Plywood, Molded furniture dependency on timber has been greatly reduced. Considering 10% of Family constructing new houses for residential / commercial purpose at least 17430 houses is being constructed every year. Considering minimum use of 5 cum of timber for house construction a minimum use of 87150 cum timber is required. Supply from Forest is zero against demand of 57150 Cum of Timber and 1.25 Lakh Tons of Fires wood. The requirement is partly fulfilled through saling of timber and fire wood by OFDC Ltd. There is acute shortage of timber / fire wood in the division.

7.5.1 Timber / Firewood depot:

There is one Timber / Firewood depot at Rairangpur managed by OFDC Ltd.

The quantum sold to public is furnished in Table No 7.3.



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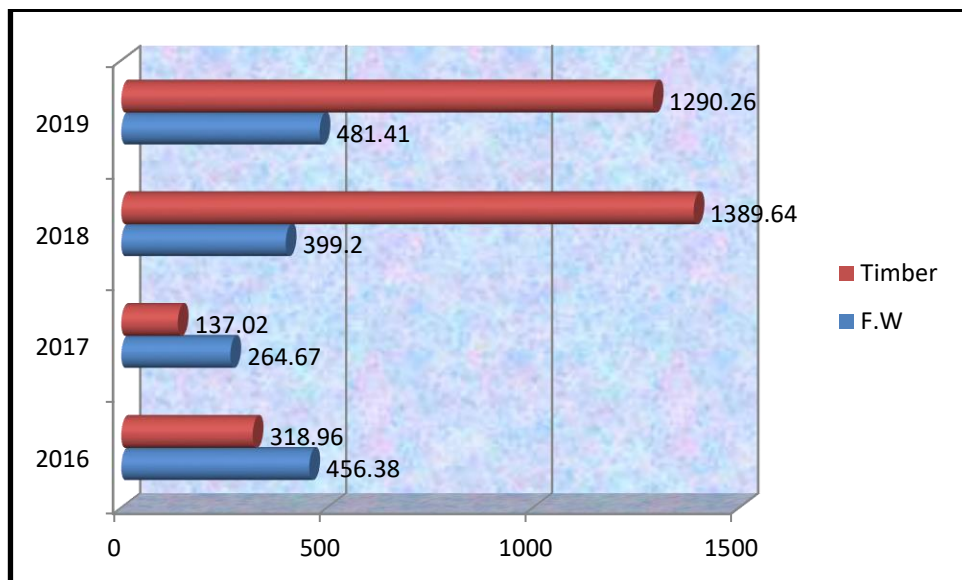
Table No 7.3 Forest Produce sold in Depot.

Name of Depot.	Item sold	Unit	2016	2017	2018	2019
OFDC Ltd	Round Timber	Cum	305.61	137.02	1388.55	1282.79
	Sawn Timber	Cum	13.35	0	1.09	7.47
	Total Timber	Cum	318.96	137.02	1389.64	1290.26
	Fire wood	Ton	0	4.90	119.4	456.3

There are also private depots in the division. These are given at Table no 7.4

Table No 7.4 Prive Fire wood depot and Total F.W. sold in Division.

Name & address of Depot	Fire wood in Ton				Remark
	2016	2017	2018	2019	
M/s Chandan Pattnaik, Rairangpur	120.7				Licenced cancelled
M/sSahiram Mohanta, Nuagaon	335.68	259.77	241.0	0	Licenced cancelled
M/s Manu Enterprises, Thakuranibeda,			38.80	25.11	operative
Total (Pvt)	456.38	259.77	279.8	25.11	
Total OFDC Ltd	0	4.90	119.4	456.3	
G. Total (F.W.)	456.38	264.67	399.2	481.41	



7.5.2 Saw Mill:

There is no licensed Saw Mill in the Division.



7.6 Import & Export of Wood & Wood Products:

There is no record of import or export of timber from Rairangpur division. The General sale value of Timber as per OFDC Ltd rate is furnished at Annexure-IX. The sale value of F.W. in the Depot is furnished at table No 7.5

Table No 7.5 Sale value of Firewood Per Qtls.				
Sl No	Name of FW Depot	Rate per Qtls (Billets)		
		In Rs		
		2017	2018	2019
1	OFDC Ltd. Badampahar Depot	275.00	300.00	325.00

7.7 Import & Export of NTFPs:

Non-timber forest products available inside forest area can be classified under various heads. (a) Fiber and flosses; (b) grass, bamboo and canes; (c) edible MFPs; (d) essential oil including those from grasses; (e) medicinal plants; (f) tans and dyes; (g) gums and resins; (h) leaves, fruits and seeds. Some of these are very useful to the local population for meeting their subsistence consumption need while other is of commercial importance. The ethno botanical resources not only provide the three basic needs of life, i.e. food, shelter and clothing but also strengthen the economic status of the forest dwellers. These resources provide incentives to rural poor for maintaining the sustainability of forest ecosystem and help to preserve biological diversity and traditional knowledge. The important NTFP's are sal leaf, tasar, myrobolans, honey, wax, resin, mahua flowers, mahula seeds, kusum seeds, sal seeds, sunari bark, siali fibre, lac, tamarind and different types of other fruits and seeds. It is noted that except a few, most of the NTFPs are restricted to a particular season and they are not common to all seasons. Normally, the tribal women along with their children collect the NTFPs in different pockets of Mayurbhanj district. Trading of the MFP items is generally done at Gurguria (near Jashipur), Jashipur, Kendumundi, Thakurmunda, Sarat, Karanjia and Udala weekly market. Apart from local consumption, NTFPs are exported to different parts of India. There are a large number of medicinal fruits, seeds, roots and barks that are collected and exported. The quantity of non-timber forest products collected by the tribals depends upon several factors. The economic status remains one of the important criteria. The very poor and poor tribals with small land holdings collect maximum quantity of NTFPs i.e. 28% and 22% respectively and sell a large quantity of the product in the market. The medium collects only 9% and higher income group (2%) rarely depend upon NTFPs. Most of the non timber forest products are transported away



from the area due to lack of processing facilities locally, resulting in loss of value that could have been added to them by village and cottage industries.

7.6 NTFP items collected and send to outside the State.

Sl No	Local name	Botanical name	Family	Parts usually collected.
1	Aonla	<i>Phyllanthus emblica</i>	Euphorbiaceae	Fruits
2	Bahada	<i>Terminalia bellirica</i>	Combretaceae	Fruits
3	Bhuineema	<i>Andrographis paniculata</i>	Acanthaceae	Whole plant
4	Char	<i>Buchanania lanzan</i>	Anacardiaceae	Seeds
5	Datepalm	<i>Pheonix sylvestris</i>	Palmae	Leaves
6	Dhatki	<i>Woodfordia fruticosa</i>	Lythraceae	flower
7	Harida	<i>Terminalia chebula</i>	Combretaceae	Fruits
8	Kochila	<i>Strychnos nux- vomica</i>	Loganiaceae	Fruits
9	Mahula	<i>Madhuca indica</i>	Sapotaceae	Flowers
10	Sal	<i>Shorea robusta</i>	Dipterocarpaceae	Leaf
11	Siali	<i>Bauhinia vahlii</i>	Caesalpiniaceae	Leaf / fiber
12	Tentuli	<i>Tamarindus indica</i>	Caesalpiniaceae	Fruits

These NTFP items are mostly collected in Bisoi, Manada Range in forest near to Similipal Hill range. It has also a good local market. The rate is usually fixed by Price fixation Committee in each block. The market price is mainly controlled by demand & supply. The market rate of some NTFP is furnished below.

Table 7.7 Value of NTFP

Sl No	Name of product	Unit	Sale Price in Rs	Source of information.
1	Mahula	Per Kg	50/-	Weekly Market
2	Kochola	Per Kg	19/-	
3	Char	Per Kg	120/-	
4	Kusuma	Per Kg	15/-	
6	M. Kendu	Per Kg	12/-	
7	Anantamula	Per Kg	90/-	
8	Fenfena	Per Kg	300/-	
9	Dombhurulu	Per Kg	15/-	
10	Piasal	Per Kg	18/-	
11	Sal Leaf	Per Kg	30/-	



Table 7.7 Value of NTFP

Sl No	Name of product	Unit	Sale Price in Rs	Source of information.
12	Patalgarula	Per Kg	40/-	
13	Ramdantuni	Per Kg	80/-	
14	Tentuli	Per Kg	30/-	
15	Gaichira	Per Kg	800/-	
16	Ratna	Per Kg	15/-	
17	Anla	Per Kg	90/-	
18	Harida	Per Kg	8/-	
19	Bahada	Per Kg	12/-	
20	Resin	Per k.g	100	
21	Honey	Per ltr	400/-	

Most of NTFP items are marketed within the State and outside the State. There is no record of export / import of NTFP in this division. The Pricing Committee Rate for Rairangpur Block is at **Annexure-X**.

7.8 Removal of Fodder:

Grazing in forests is a common sight. Rearing of Goat is extensively adopted in villages. They usually feed on forests. The ground floor of forest is highly disturbed and there is lack of grasses for herbivorous in forest. There is also lopping of trees for feeding to goats. It has a very adverse effect on plant growth. Physically there is no removal of fodders for cattle / domestic animals by removal by way of grazing are rampant.

7.9 Valuation of Products:

As per the NTFP Policy 2002, most of the NTFP items are being regulated by Gram Panchyat. There are no records on collection of NTFP in various Panchyat / Blocks. It is not practically possible to quantify the products being collected and its valuation, effect on family income of this division. The NTFP Policy is attached as **Annexure-XI**





CHAPTER-8

MAINTENANCE & ENHANCEMENT OF SOCIAL, ECONOMIC, CULTURAL AND SPIRITUAL BENEFITS

8.1 Number of JFM Committees and areas protected by them:

The process of Joint Forest Management initiated during Social Forestry Project in 1985. Under Social Forestry Project, The Village Forest so created assigned to Village Forest Committee for its management under Village Forest Rule -1985. Subsequently Forest Protection Committee was constituted under Resolution 1988 and protection of forest fringe area was assigned. Afterwards a comprehensive JFM Resolution came up during 1993 with elaborated provisions. Vana Samrakshyana Samiti – VSS developed / Constituted under the provisions of Resolution. Afterwards Forest Development Agency (FDA) – a common forum of VSS developed under National Afforestation Program (NAP) from 2002 onwards. There after OFSDP sector operated in 11 divisions with full scale participatory approach from 2006. With a view to consolidate all developments in joint forest management and address legal matters those came up in the management process, JFM Resolution 2011 formulated (**Annexure-XII**). Subsequently amendment has been made to provisions of JFM Resolution 2011 vide Notification No 9182/F&E dated 1st June 2015 and 2019 (copy at **Annexure-XIIa and XIIb**)

8.1.1 VSS (Vana Surakshya Samiti) Constituted.

In Rairangpur Division there are 265 VSS in operation. The Range wise list of VSS, Area assigned etc are furnished at Table No 8.1 (A, B, C, D& E)



Working Plan of Rairangpur Forest division (2021 to 2031)

Table no 8.1 (A): List of VSS Rairangpur Division.

SI No	Name of VSS	Name of village	Forest are allotted in ha				
			RF	PRF	DPF	Other forest	Total Area
Range: Badampahad							
1	Edelbeda	Edelbeda	100				100
2	Chahalapada	Chahalapada	103.1				103.1
3	Dubulabeda	Dubulabeda	200				200
4	Uperbeda	Uperbeda	100				100
5	Khejuripada	Khejuripada	146.2				146.2
6	Bakedihi	Bakedihi	30				30
7	Angarpada	Angarpada	50				50
8	Bhalupahadi	Bhalupahadi	50				50
9	Basila	Basila				15	15
10	Banduda	Banduda	50				50
11	Pahadpur–II	Pahadpur				100	100
12	Ralibeda	Ralibeda				50	50
13	Dhakata	Dhakata				50	50
14	Talapati	Talapati				100	100
15	Sanhatnabeda	Sanhatnabeda			100		100
16	Tirilipi	Tirilipi			100		100
17	Rayasahi	Rayasahi				100	100
18	Thuntipani	Thuntipani				198	198
19	Badhatnabeda	Badhatnabeda				161	161
20	Jhipabandh	Jhipabandh				100	100
21	Barisaghutu	Barisaghutu				100	100
22	Raipada	Raipada			93.55		93.55
23	Chaunradihi	Chaunradihi	128				128
24	Badjaidhanposi	Badjaidhanposi				30	30
25	Kantasola	Kantasola	150				150
26	Dhirigoda	Dhirigoda	84				84
27	Bagdega	Bagdega				50	50
28	Dudhijharan	Dudhijharan	141.2				141.2
29	Kasiabeda	Kasiabeda	50				50
30	Kitachua	Kitachua	100				100
31	Dhangdimuta	Dhangdimuta	60				60
32	Pahadpur-I	Pahadpur				50	50
33	Hatisikuli	Hatisikuli	100				100
34	Bhuyanbasa	Bhuyanbasa	150				150



Working Plan of Rairangpur Forest division (2021 to 2031)

35	Netrajharan	Netrajharan	50				50
36	Bhagabandi	Bhagabandi				50	50
37	Nuasahi	Nuasahi				30	30
38	Bhitaramda	Bhitaramda	200				200
39	Dantusahi	Dantusahi			80.66		80.66
40	Tiakati	Tiakati	100				100
41	Bhudrukala	Bhudrukala	50				50
42	Jagannathpur	Jagannathpur	100				100
43	Sarupani	Sarupani	50				50
44	Ukam	Ukam			57		57
45	Sargoda	Sargoda				50	50
46	Jamjhari	Jamjhari	150				150
47	Chaturisahi	Chaturisahi	50				50
48	Patijhari	Patijhari	100				100
49	Patharkata	Patharkata	130				130
50	Gunduria	Gunduria			20		20
51	Baneikala	Baneikala			46.91		46.91
52	Badajodi	Badajodi	200				200
53	Mangulisahi	Dhakata				50	50
54	Changbharia	Changbharia				50	50
55	Timtima	Timtima	50			-	50
56	Dhangdimuta D&S	Dhangdimuta	60			-	60
57	Purunapani	Purunapani	50			-	50
58	Baliapat	Dhangdimuta	50			-	50
59	Chuapani	Chuapani	50			-	50
60	Kathbharia	Kathbharia				30	30
61	Jhatisiring	Jhatisiring	50			-	50
62	Suliduma	Suliduma				30	30
	Total		3282.5		498.12	1394	5174.62



Working Plan of Rairangpur Forest division (2021 to 2031)

Table no 8.1 (B): List of VSS Rairangpur Division.

SI No	Name of VSS	Name of village	Forest are allotted in ha				Total Area
			RF	PRF	DPF	Other forest	
Range Rairangpur							
1	Similinali	Similinali	100				100
2	Dublabeda	Dublabeda	50				50
3	Anandpur	Anandpur	24.28				24.28
4	Kantabani	Kantabani	50				50
5	Jialada	Jialada	100				100
6	Dakadiha	Dakadiha	50				50
7	Edelbeda	Edelbeda	200				200
8	Gidhighaty	Gidhighaty	200				200
9	Chirudihi	Chirudihi	113.28				113.28
10	Kumbhirmundi	Kumbhirmundi	200				200
11	Sanchampauda	Sanchampauda	75.66				75.66
12	Bikrampur	Bikrampur	100				100
13	Jampani	Jampani	80				80
14	Pandupani &Tulasibani	Pandupani &Tulasibani	200				200
15	Jayantapur	Jayantapur	200				200
16	Haldibani	Haldibani	96				96
17	Rehedakacha	Rehedakacha	50				50
18	Rakhasahi	Rakhasahi	50				50
19	Badadara	Badadara	100				100
20	Belpahadi	Belpahadi	100				100
21	Chidkubadi	Chidkubadi	200				200
22	Mankadgoda	Mankadgoda	200				200
23	Baliabadi	Baliabadi	100				100
24	Dangapani	Dangapani	200				200
25	Suriagoda	Suriagoda	200				200
26	Jhullan	Jhullan	200				200
27	Jarkani	Jarkani	100				100
28	Dahupani	Dahupani	200				200
29	Kahutaka	Kahutaka	200				200
30	Kusumghaty	Kusumghaty	200				200
31	Kendumundi/Ladbani	Kendumundi/Ladbani	200				200
32	Badjari	Badjari	100				100



Working Plan of Rairangpur Forest division (2021 to 2031)

Table no 8.1 (B): List of VSS Rairangpur Division.

33	Ganeshdahi	Ganeshdahi	200				200
34	Dhobadiha	Dhobadiha	100				100
35	Sanjharan	Sanjharan	100				100
36	Badjaran	. Badjaran	100				100
37	Baigankudar	Baigankudar	100				100
38	Madansila	Madansila	70				70
39	Burudihi	Burudihi	100				100
40	Ramchandrapur	Ramchandrapur	85.6				85.6
41	Khandadera	Khandadera	100				100
42	Burudihi	Burudihi	100				100
43	Hatnabeda	Hatnabeda	100				100
44	Kalimati	Kalimati	100				100
45	Karakachia	Karakachia	100				100
46	Dambeda	Dambeda	50				50
47	Karanjharan	Karanjharan	72				72
48	Khodiasole	Khodiasole	30				30
49	Asansikal	Asansikal	50				50
50	Sanbelpahadi	Sanbelpahadi	42				42
51	Jodachua	Jodachua	100				100
52	Bhalkichua	Bhalkichua	100				100
53	Balrampur	Balrampur	100				100
54	Besrakacha	Besrakacha	100				100
55	Baliam	Baliam	100				100
56	Jumukapahadi	Jumukapahadi	70.4				70.4
57	Balrampur	Balrampur	73.5				73.5
58	Khejurikuali	Khejurikuali	200				200
59	Phulbaria	Phulbaria	100				100
60	Kitabeda	Kitabeda	100				100
	Total		6882.72				6882.72



Working Plan of Rairangpur Forest division (2021 to 2031)

Table no 8.1 (C): List of VSS Rairangpur Division.

SI No	Name of VSS	Name of village	Forest are allotted in ha				
			RF	PRF	DPF	Other forest	Total Area
Range Bahalda							
1	Banadunguri	Banadunguri			150		150
2	Bheleidihi	Bheleidihi			100		100
3	Bhitarmda	Bhitarmda			120		120
4	Sapghera	Sapghera	150				150
5	Asurghaty	Asurghaty	100				100
6	Ramgarh	Ramgarh	150				150
7	Budhigoda	Budhigoda			150		150
8	Kuldiha/ Bhalupani	Kuldiha/ Bhalupani	100				100
9	Suruda	Suruda	51.76				51.76
10	Nandabasa	Nandabasa	104.2		44.66		148.86
11	Dubulabeda	Dubulabeda					
12	Kudarsahi	Kudarsahi	51.05				51.05
13	Dumatandi	Dumatandi	100		100		200
14	Deoraidihi	Deoraidihi					
15	Urgumgoda	Urgumgoda	100				100
16	Chahalapada	Chahalapada	100				100
17	Burupalsa	Burupalsa	100				100
18	Tupaghutu	Tupaghutu	100				100
19	Senjogoda/ Dolsara	Senjogoda/ Dolsara	150		70		220
20	Tangarjoda	Tangarjoda					
21	Jagannathpur	Jagannathpur	100				100
22	Kantasola	Kantasola	25				25
23	Mahuldiha/Satp uri / Chengjoda	Mahuldiha/Satp uri	50				50
24	Gitilata	Gitilata	100				100
25	Jambani	Jambani	100				100
26	Bagedihi	Bagedihi	80				80
27	Pahadpur (A)	Pahadpur (A)	95.3				95.3
28	Naranpur	Naranpur	100				100
29	Bhursa	Bhursa	100				100
30	Charakdihi	Charakdihi	33				33



Working Plan of Rairangpur Forest division (2021 to 2031)

Table no 8.1 (C): List of VSS Rairangpur Division.

31	Sanagobara	Sanagobara	100				100
32	Changua	Changua	50				50
33	Bhaludihi	Bhaludihi	150				150
34	Badsiajung	Badsiajung	25				25
35	Purnapani	Purnapani	45				45
36	Debradihi	Debradihi	800				800
37	Bramahnbose	Bramahnbose	25				25
38	Pithakutni	Pithakutni	50.75				50.75
39	Raghunathpur	Raghunathpur	70.53				70.53
40	Sanakumrum	Sanakumrum	100				100
41	Bargidihi	Bargidihi	50				50
42	Dojarsahi/ Burudihi	Dojarsahi/ Burudihi	50				50
43	Haldibani	Haldibani	70				70
44	Tendra	Tendra	100				100
45	Hargoda	Hargoda	100				100
46	Jatapani	Jatapani	150				150
47	Sunamara	Sunamara	100				100
48	Pahadpur (B)	Pahadpur (B)	100				100
49	Bhadusahi	Bhadusahi	100				100
50	Hill block Tendra	Hill block Tendra	100				100
51	Giria	Giria	75				75
52	Manbir	Manbir	100				100
53	Tarana	Tarana	100				100
54	Manbir Talasahi	Manbir	100				100
55	Bad Narayani	Bad Narayani				40	40
56	Pokharia	Pokharia			30		30
57	Sansadam	Sansadam			25		25
58	Damadihi	Damadihi	25				25
59	Dipasahi	Pahadpur	60.6				60.6
60	Pandhada	Pandhada				58.4	58.4
61	Mugdi	Mugdi	50				50
62	Mankdihi	Mankdihi			44.3		44.3
63	Bhalugoda	Bhalugoda			114		114
64	Bhitaramda	Bhitaramda			65.5		65.5
65	Bhaludihi	Bhaludihi	150				150
66	Rangamatia	Rangamatia			126		126



Working Plan of Rairangpur Forest division (2021 to 2031)

Table no 8.1 (C): List of VSS Rairangpur Division.

67	Rutughutu	Rutughutu			20		20
68	Sagjodi	Sagjodi			75.5		75.5
69	Kasigoda	Kasigoda	30				30
70	Lalkagoda	Lalkagoda			50		50
71	Mangaldihi	Mangaldihi	30				30
72	Sosogoda	Sosogoda	20				20
73	Khairipal	Khairipal	40				40
74	Matiali	Matiali	60				60
	Total		5317.19		1284.96	98.4	6700.55



Working Plan of Rairangpur Forest division (2021 to 2031)

Table no 8.1 (D): List of VSS Rairangpur Division.

Sl No	Name of VSS	Name of village	Forest are allotted in ha				
			RF	PRF	DPF	Other forest	Total Area
Range: Bisoi WL Range							
1	Rajabasa VSS	Rajabasa		200			200
2	Dudkundi VSS	Dudkundi	200				200
3	Pundidah VSS	Pundidah	200				200
4	Mahulabarei VSS	Mahulabarei		200			200
5	Kasiabeda VSS	Kasiabeda		200			200
6	Dighi VSS	Dhigi		200			200
7	Baunsabudi VSS	Baunsabudi		200			200
8	Darkanita VSS	Darkanita		75			75
9	Deopatta VSS	Deopatta		200			200
10	Patharkham VSS	Patharkham		200			200
11	Bangriposi VSS	Bangriposi		150			150
12	Pindargodia VSS	Pindargodia		200			200
13	Bhalagodia VSS	Bhalagodia		200			200
14	Gohirapal VSS	Gohirapal		200			200
15	Dasisole VSS	Dasisole		200			200
16	Chuapani VSS	Chuapani		100			100
17	Sunajodia VSS	Sunajodia	200				200
18	Saraspada VSS	Saraspada	200				200
19	Jodia VSS	Jodia	200				200
20	Gargadi VSS	Gargadi	200				200
21	Banapokharia VSS	Banapokharia	40				40
22	Phuljhara VSS	Phuljhara	150				150
23	Paunsia VSS	Paunsia	200				200
24	Kunjakacha VSS	Kunjakacha	200				200
25	Manikpur VSS	Manikpur	200				200
26	Bahagad VSS	Bahagad	200				200
27	Khejurikatas VSS	Khejurikatas	200				200
28	Katas VSS	Katas	200				200
29	Asanbani VSS	Asanbani					
30	Kaduani VSS	Kaduani	48				48
31	Mahubhandar VSS	Mahubhandar	200				200
32	Tandipani VSS	Tandipani	150				150
33	Madheikacha VSS	Madheikacha	100				100
34	Kumbhirdubi VSS	Kumbhirdubi	100				100



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Table no 8.1 (D): List of VSS Rairangpur Division.

35	Betjharan VSS	Betjharan	100				100
36	Bhadupani VSS	Bhadupani	200				200
37	Bhalujudi VSS	Bhalujudi	50				50
38	Pahadpur VSS	Pahadpur	100				100
39	Budamara VSS	Budamara	100				100
40	Lakhanchhatra VSS	Lakhanchhatra	100				100
41	Gobindapur VSS	Gobindapur	100				100
42	Heselgoda VSS	Heselgoda	100				100
43	Sanbantha VSS	Sanbantha	94.65				94.65
44	Tungru VSS	Tungru	100				100
45	Kalataamak VSS	Kalataamak	151.13				151.13
	Total		4383.78	2525			6908.78



Working Plan of Rairangpur Forest division (2021 to 2031)

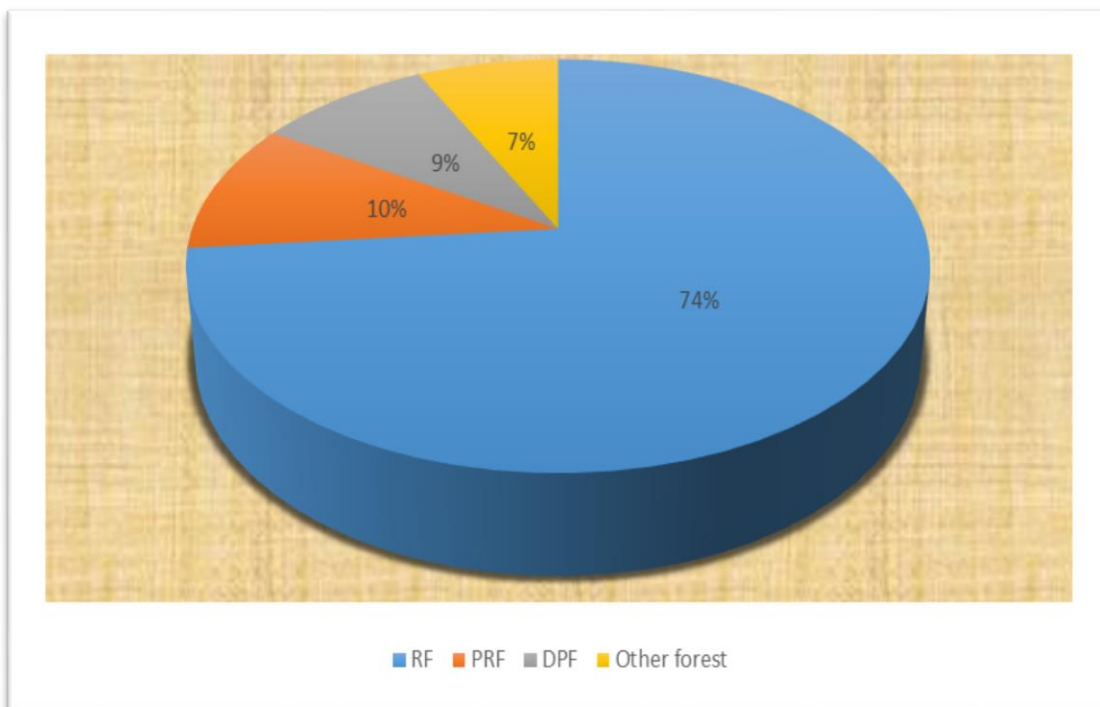
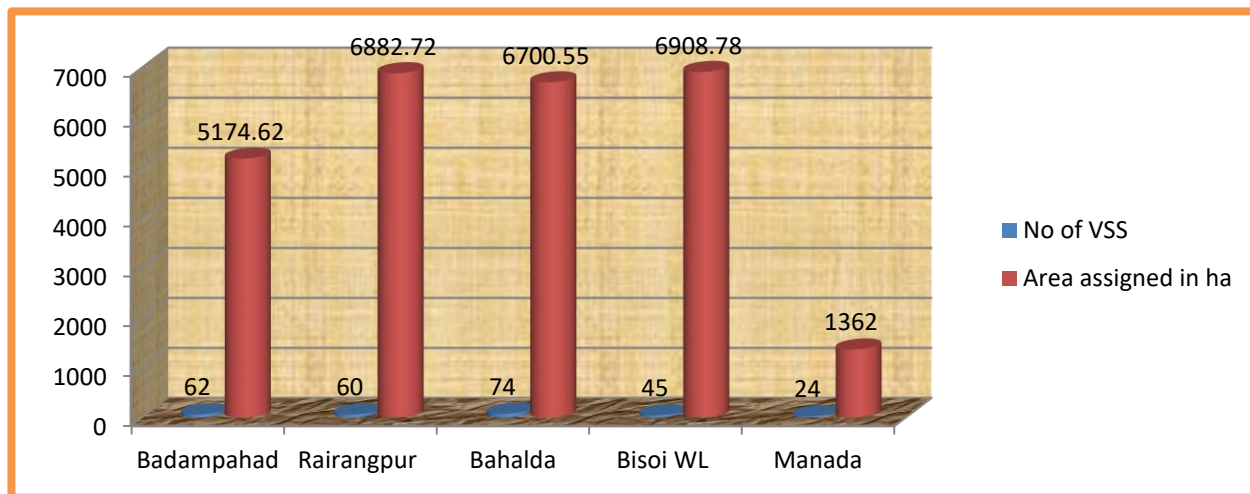
Table no 8.1 (E): List of VSS Rairangpur Division.

Sl No	Name of VSS	Name of village	Forest are allotted in ha				
			RF	PRF	DPF	Other forest	Total Area
Range:Manada							
1	Asansikhar	Asansikhar			32		32
2	Chatani	Chatani				50	50
3	Dhana	Dhana				40	40
4	Budhikhamari	Budhikhamari				50	50
5	Banki	Banki			20		20
6	Jederghutu	Jederghutu			50		50
7	Edelbeda	Edelbeda			25		25
8	Bandhagaon	Bandhagaon			25		25
9	Luhakani	Luhakani			200		200
10	Kalajhari	Kalajhari			48		48
11	Kuajhari	Kuajhari			80		80
12	Jamda	Jamda			100		100
13	Amdabeda	Amdabeda			50		50
14	Dantuni	Dantuni		110			110
15	Kitabeda	Kitabeda		143			143
16	Raikalkocha	Raikalkocha				40	40
17	Alhapani	Alhapani				30	30
18	Kesam	Kesam				30	30
19	Kurkutia	Kurkutia				34	34
20	Bad Sialinai-A	Bad Sialinai-A				35	35
21	Bad Sialinai-B	Bad Sialinai-B				30	30
22	Sansialinai	Sansialinai				72	72
23	Tulasibani	Tulasibani				36	36
24	Badjhilli	Badjhilli				32	32
	Total			253	630	479	1362

Sl No	Range	No of VSS	Forest are allotted in ha				
			RF	PRF	DPF	Other Forest	Total Area
1	Badampahad	62	3282.500		498.120	1394.00	5174.620
2	Rairangpur	60	6882.720				6882.720
3	Bahalda	74	5317.190		1284.960	98.40	6700.550
4	Bisoi WL	45	4383.780	2778.00			7161.78
5	Manada	24		0	630.000	479.00	1109.00
Division Total.		265	19866.19	2778.0	2413.080	1971.40	27028.670
Percentage			73.50	10.28	8.93	7.29	100.00



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8.1.2 Functioning of Village Forest Committee (VFC).

Plantations have been raised in this division during Social Forestry Project during 1985 onwards till 1995 which has been declared as village forest under section 30 of the Odisha Forest Act, 1972. The detail list of Village forest is furnished below. All total there are 39 VFC and Village Forest under their management is 286.204 ha.

Table No 8.3 VFC in Rairangpur Division.			
Sl No	Range	Name of VFC	Area Village Forest.
1	Badampahar	Gopalpur	3.408
2	Badampahar	Kaduani	8.440
3	Badampahar	Chingudipokhari	16.600
4	Badampahar	Bakedihi	2.240
5	Badampahar	Chulibhanga	12.460
6	Badampahar	Chahalapada	5.000
7	Badampahar	Chhanua	5.000
8	Badampahar	Dalki	5.000
9	Badampahar	Kasiabeda	25.000
10	Badampahar	Tirilidihi	10.000
11	Badampahar	Jhipabandh	7.672
12	Badampahar	Pechadara	13.356
13	Badampahar	Pandugandi	15.000
14	Badampahar	Dova	15.000
15	Badampahar	Ghodadega	10.000
16	Badampahar	Bargimora	10.000
	Range Total		164.176
17	Rairangpur	Kalarda	2.08
18	Rairangpur	Sjukala	0.16
19	Rairangpur	Haldibani	5
20	Rairangpur	Neuti	7
	Range Total		14.24
21	Bahalda	Gambharia	2.8
22	Bahalda	Bhadusahi	1.408
23	Bahalda	Gudta	3.8
24	Bahalda	Jaritandi	1.54
25	Bahalda	Chadri	9.916
26	Bahalda	Surda	1.112
27	Bahalda	Asana	5
28	Bahalda	Kumbhirmundi	5
29	Bahalda	Dubulabeda	8.8



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 8.3 VFC in Rairangpur Division.			
30	Bahalda	Bhaleidihi	3.96
31	Bahalda	Kainpur	20
32	Bahalda	Jashipur	9.948
33	Bahalda	Jhadgaon	1.1
34	Bahalda	Gayalkata	0.28
35	Bahalda	Kuldiha	7.088
36	Bahalda	Brahmanbose	0.572
37	Bahalda	Pasna	9
38	Bahalda	Tarana	15
	Range Total		106.324
39	Manada	Dhana	1.464
	Range total		1.464
	Divi. Total		286.204

Table No 8.3A Abstract of VFC Rairangpur Division.		
Range	No of VFC	VF Area created.
Badampahar	16	164.176
Rairangpur	4	14.24
Bahalda	18	106.324
Manada	1	1.464
Divi. Total	39	286.204

8.1.3 Total JFM (VSS & VFC) functioning in the Division:

The total number of JFM Committee functioning is (265+39) 304 numbers. The range wise position is given below.

Table No 8.4 Abstract of JFM in Rairangpur Division.						
Range	No of VSS	Area in Ha	No of VFC	Area in ha	Total JFM	Total Area.
Badampahad	62	5174.62	16	164.176	78	5338.796
Rairangpur	60	6882.72	4	14.24	64	6896.96
Bahalda	74	7286.66	18	106.324	92	7392.984
Bisoi WL	45	6801.85			45	6801.85
Manada	24	1362	1	1.464	25	1363.464
Division Total.	265	27507.85	39	286.204	304	27794.05



8.2 Status of empowerment of JFMCs:

The empowerment of JFMC is at a medium to higher level. The Villagers are taking interest in Protection & Management of Forest assigned to them. Under National Afforestation Program, the involvement of VSS is of Participation level-V i.e.

- i) They resolve what operation to be taken up along with work program.
- ii) They prepare the Micro plan and work accordingly.
- iii) Funds directly transferred from MoEF&CC to FDA at Division Level. There after it is transferred to VSS account.
- iv) They withdraw and furnish account directly to the Secretary of FDA i.e. Divisional Forest Officer.
- v) The account is audited by Chartered Accountant & passed by the General Body of the VSS.
- vi) Training camps being organized to disseminate knowledge to VSS on forest management and allow them to become technically sound to manage plantations / Forest/ wildlife etc

The VSS functions as an independent decision taking body.

In case VFC, the functioning requires augmentation to come over to a participation level of IV / V.

8.2.1 Odisha Forestry sector Development Project Phase-II

Odisha Forestry Sector Development Project **Phase-II** is an externally aided project with the financial assistance of Japan International Cooperation Agency (JICA) being implemented since 2017. OFSDP-II will cover 1200 Vana Surakshya Samitis (VSSs) from 50 Field Management Units (Forest Ranges) from 12 Territorial Divisions in 10 Districts of Odisha and 2 Wildlife Divisions in phases (300 VSSs in first Batch, 400 VSSs in second Batch, 350 VSSs in third Batch and 150 VSSs in fourth Batch). This project will be implemented for 10 years starting from 2017-18 to 2026-27. Odisha Forestry Sector Development Project-II is to enhance forest ecosystem along with sustainable livelihood of local people by improving sustainable forest management, sustainable biodiversity conservation and community development, thereby contributing to harmonization between environmental conservation and socio-economic development in the Project area in Odisha.



Rairangpur Divisional Management Unit will cover 100 Vana Surakshya Samities(VSS) from 5 Field Management Unit (FMU)(Forest Ranges) such as Badampahar, Bahalda, Bisoi, Manada & Rairangpur . All 100 VSS are categorized in two batches i.e Batch-I covering Badampahar-20 nos & Bahalda-20 nos VSS and Batch-II covering Badampahar-6 nos, Bisoi-19 nos, Manada-14 nos & Rairangpur -21 nos VSS are taken under OFSDP-II. In Batch-I it is covered 4025.13 Ha areas and in Batch-II it is 5120.06 Ha area.

Project Goal

The envisaged approach to achieve the overall goal in a sustained manner under the project includes restoration of degraded forests and augmentation of forest resources through people's participation; securing sustainable forest management by improving community participation; capacity building of community organizations and other stakeholders; conservation and scientific management of the biodiversity; promote Alternative Income Generation Activities, promotion to inter-sectoral convergence for better livelihood and improvement of income of the targeted forest dependent communities. The households living in the project villages are largely from Schedule Tribe and Schedule caste Category and highly dependent on forest for their livelihood. Under the above circumstances, project has a mandate to enhance and strengthen livelihood of forest fringe communities, who are largely depend upon forest.

Project Approach

a) Micro Plan

To be developed as a Community Development Plan by Strengthening convergence, Selection of village, formation of VSS, formation of Women Working Group , formation Executive Committee (EC), Formation of Working Group.

b) IGA Support to Self Help Groups (SHGs)

Enhanced Support for cluster business development and partnership ecosystem

c) Cluster development:

The cluster development approach of LRC aims to support the trajectory growth of the SHGs. It will not only achieve the scale, but will help in leveraging support services and make the value addition efforts sustainable.



d) Economies of scale:

This approach is expected to achieve the required volume through aggregation, which will not only make the primary producer a player in the value chain, but also give an edge to add value and negotiate at a higher and remunerative market.

e) Pro-poor Value Chain Maximization:

This approach will strive maximize value chain of products across sectors, keeping SHGs and its members in the centre so that the primary producer gain from the value chain maximization.

8.2.2 Gender Mainstreaming Creating Models for CMRV

Community Based Measurement, Reporting, Verification, system for Sustainable Forest Management for Odisha.

Project Objective

- Restore degraded forest and augment forest resources
- Secure sustainable forest management by improving forest administration, community organizations and other stakeholders
- Conservation and scientific management of the biodiversity
- Promoting inter-sectoral convergence
- Improve income of target forest dependents and their livelihood options.
- To promote vibrant product clusters.
- To promote pro-poor value chain maximization.
- To facilitate Collective marketing and processing.
- To build the capacity of the stakeholders.
- To manage funds mandated under OFSDP-II and provide Business Development Services including R&D.

Project Strategy

The duration of the Project is 10 years, starting from 2017-18 to 2026-27 in consideration of capabilities of stakeholders and time required to conduct activities in sustainable manners. 10 years comprises of (i) Preparation Period, (ii) Implementation Period, and (iii) Phase-out Period.

Sustainable Forest Management

Sustainable forest management in JFM mode includes Assisted Natural Regeneration (ANR), Block Plantation, Soil and Moisture Conservation measures and Fire Protection measures. Under non JFM mode, the works proposed are consolidation and demarcation of forest



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boundaries, construction of High Tech Nurseries and ex- situ SMC works. In order to improve the tree cover outside the forest area, Farm-forestry activities will be taken up over 10000 Ha of land and 10000 beneficiaries selected through the VSS within their village area.

Components / Sub-Component	Scope
JFM Mode Site Specific Plan (SSP) & Monitoring. (Badampahar-26 nos, Bahalda-20 nos, Bisoi-19 nos, Manada-14 nos & Rairangpur-21 nos)	100 VSS
Drainage Line Treatment (Ex-situ SMC Work)	125 ha.
Assisted Natural Regeneration (ANR) {ANR without gap-1539 ha & ANR (200)-3787 ha}}	5326 ha.
Block Plantation (Block other-47 ha, Block NTFP-90 & Block Fodder Fuel- 63 ha)	200 ha.
Fire Protection	140 km.
Non-JFM Mode Consolidation and Demarcation of Forest Boundaries Work	158.9 km.
Non-JFM Drainage Line Treatment (DLT) (Ex-situ SMC work)	62 ha.
Farm Forestry	80 ha.

Infrastructure Developed:-

DMU & FMU Building: - Divisional Management Unit Building – 1 No, & Field Management unit Building – 5 Nos.



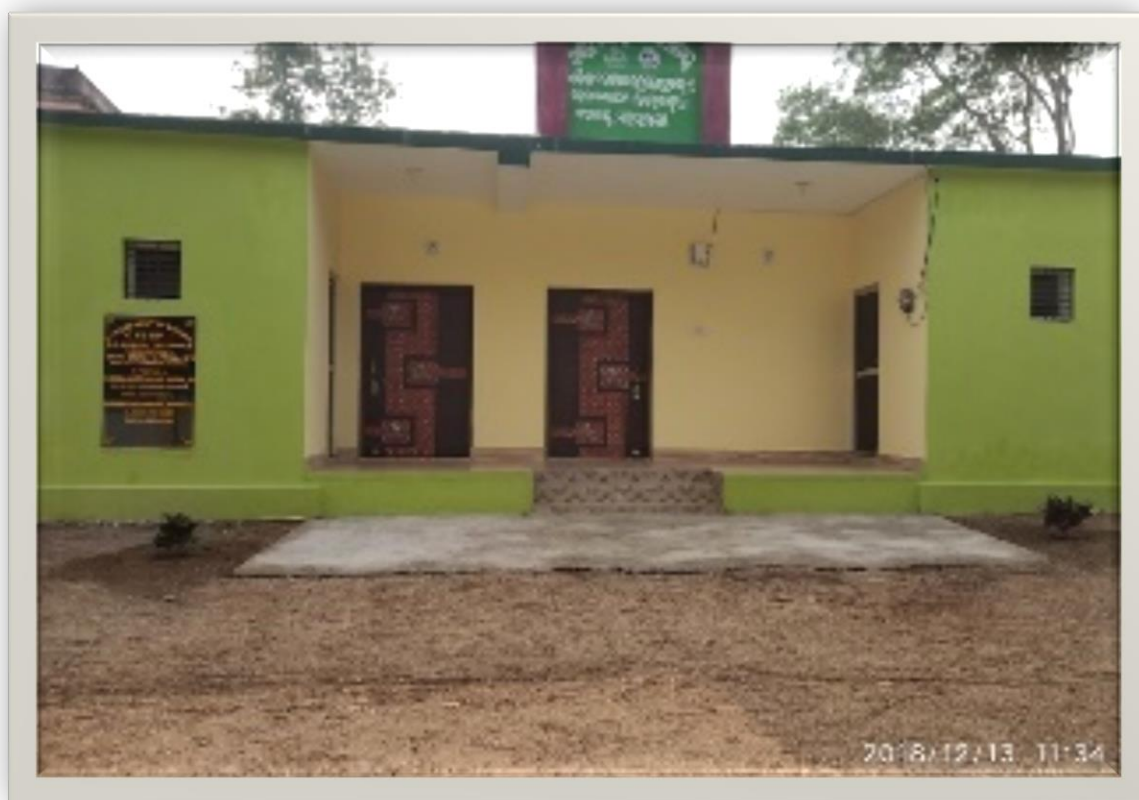


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VSS Building cum IGA Facilitation Centre:-

Total 40 nos VSS building cum IGA Facilitation centre have been constructed in 40 different villages. Construction of 60 nos VSS building cum IGA Facilitation centre are in progress for 60 different villages (VSS).



Survey Demarcation & Pillar Posting of JFM Area:

Under Aama Jyngal Yojajna, demarcation of Area in 100 no VSS in 5 FMU (Field Management Unit) have been surveyed and pillars posted.





Community Mobilisation:



PRA Exercise:

For preparation of Micro Plan for VSS under AJY, PRA Exercise have been completed for all 100 nos VSS.





Training & Capacity Building:

Training as an integral part of AJY, 168 training camps have been conducted for different target group of the division.



Production of QPM (Quality Planting Materials) in VSS



8.3 Labour welfare:

For uplift of labours, occasional health camps, Skill up-gradation training camps are being conducted by the department. No such camps have been organized within last five years. Now LPG connection, Gas Stove, LED bulb and water filter are being distributed in various villages of the division. The range wise distribution is furnished below.



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Table No 8.5 Supply Of LPG, Unnat Chullah & Solar Light System.

Year	Scheme	Activity	Quantity	Location
2015-16	1283-Similipal Tiger Reserve	Provision of alternate Bio-Mass (Smokeless Chullah)	56	Bisoi Range Talabandha & Beguniabandh
			56	Manada Range Dumurdiha
			112	
2016-17	01-State Plan Dist. Sector	Unnat Chullah	4	Chadeipahadi of Rairangpur Range
			4	Darkantia of Bisoi Range
			4	Kesam of Manada Range
			4	Dhakata of Badampahar Range
			4	Sunamora of Bahalda Range
			20	
2017-18	1282-Similipal Biosphere Reserve	Solar Light	2	Podagad & Salghati of Manada Range
	1282-Flexi Fund	Solar Light	2	Sanjhili & Budamora of Manada Range
	1283-Similipal Tiger Reserve	Solar Light System	11	Kundagarh, Pedagarh, Sanjhili, Chadripahadi, Tamalbandh, Kesam, Uski, Tulsibani of Manada Range
2018-19	1282-Similipal Biosphere Reserve	Solar Light System	5	Salghati, Hatibari of Bisoi Range
			4	Bhitaramda of Badampahar Range
			32	Patharkata, Jamjhari, Timtima, Patijhari, Chauradihi, Suleipat, Kantasole, Betjharan of Badampahar Range
			32	Jhumkapahdi, Dalki, Khejuria, Chadeipahadi, Sargoda, Luhasila of Rairangpur Range
2019-20	1282-Similipal Biosphere Reserve	Supply of Solar Home Light System	32	Kasipent, Khadighat, Talbandh, Asadola, Asansikad, Talbandh, Dantiakocha of Bisoi Range
			31	Mayurbeka, Jamuani, Garhsimilipal, Barehipani, Rajpal, Haldia, Kolha of Manada Range
2019-20	1282-Similipal Biosphere Reserve	Supply of Solar Home Light System	2	Rajpal



Table No 8.5 Supply Of LPG, Unnat Chullah & Solar Light System.

		Supply of LPG Cooking Gas unit	762	Gargadihi, Manikpur, Badsialinai, Tulsibani, Sansialinai, Allhapani, Cadripahadi (A), Kesam, Tamalbandh, Mayurbeka, Bankati, Dumurdihi, Badjhili, Sanjhili, Kundagarh each 48nos. Bhadusole-42 nos. Total-762 Nos.
			48	Kunjakocha
			810	
	CAMP APO 2019-20 (Wildlife) Wildlife Management	Distribution of fuel saving Unnat Chullah	444	Rairangpur Supply to villagers VSS etc.
			444	Bahalda Supply to villagers VSS etc..
			445	Bisoi Supply to villagers VSS etc..
			444	Badampahar Supply to villagers VSS etc..
			445	Manada Supply to villagers VSS etc..
			2222	
	Green India Mission	Supply of LPG Cooking Gas unit	155	Sunamora VSS-26, Jatapani VSS-26, Sagjodi VSS-26, Tenndrahill VSS-26, Edelbeda VSS-26, Uperbeda VSS-25 Total-155 of Bahalda Range

8.3.1 Abstract of materials provided:

Table No 8.6 Abstract of Welfare Scheme.

Year	Smokeless / Unnat Chulla	Solar Light	LPG Unit	Scheme
2015-16	112	0	0	Similipal Tiger Reserve
2016-17	20	4	0	State Plan Dist. Sector / Similipal Biosphere Reserve
2017-18		11	9	Similipal Biosphere Reserve
2018-19		127		Similipal Biosphere Reserve
2019-20	2222	2	965	CAMP APO 2019-20 (Wildlife) Wildlife Management / Similipal Biosphere Reserve



8.3.2 Socio Economic Study:

No Socio Economic study has been conducted by the Forest department to ascertain economic status of villages and effect of Forest on improvement of Socio Economic status. The Economic study conducted in the State during 2014-15 by Planning & Coordination Department is at **Annexure-XIII**.

8.4 Use of indigenous knowledge:

The people in Odisha were more traditional in nature believing the faith and practices of their local communities. They happened to manage their livelihood through agriculture and maintained an indigenous life with their own knowledge system. They used to maintain the long-standing traditions from their ancestors and spread the knowledge in different spheres of livelihood. Such socially generated knowledge is popularly called as local knowledge. The on-going practice of using such knowledge for indigenous communities established the belief that such knowledge used in traditional manner was fruitful for the people. In course of time such personalized knowledge took the shape of Indigenous Knowledge (IK) which was confined to a particular community and locality and specific knowledge seekers find the effective use of such traditional knowledge for indigenous people and are interested to preserve the knowledge for the communities. It is an established fact that India has long and strong racial, cultural and ethnic groups that generate a traditional knowledge system for its people.

The ethnic minorities, rural and tribal populations, women and other disadvantaged communities in India who are deprived of economic, political and social benefits are more dependable upon such knowledge system for their livelihood. With the modernization of the present society, the needs of those disadvantaged populations were brought to the limelight and their knowledge system was given the importance. Similar phenomenon is gaining ground in other countries in the world where the local knowledge of the communities are treated as the real knowledge for survival. The concept of indigenous knowledge gained its worldwide recognition through the United Nations Conference on Environment and Education in 1992, World Conservation Strategy of International Union and Conservation of Natural Resources in 1980, Brundtland Commission, and World Commission on Environment and Development, 1987. These events recognized the existence of indigenous knowledge in every country, society, culture. Since India has a long history and much enriched culture there is abundant reservoir of indigenous knowledge in every part of the country. Similarly Odisha is a historical land having enriched cultural heritage which has varied communities and immense resources.



Its flora and fauna are vast and varied in nature. The State has a large number of tribal communities who appear to live on their own knowledge system.

8.4.1 Concept and Definitions of Indigenous Knowledge:

The term indigenous knowledge has different connotations such as, traditional knowledge, local knowledge, community knowledge, rural people's knowledge, farmer's knowledge. Although the concept has different forms the meaning appears to be synonymous. Indigenous knowledge is the traditional knowledge of the local community existing within and developed around the specific conditions of women and men indigenous to a particular geographical area. The concept and expansion of its scope in that the term indigenous knowledge is not confined to tribal groups or the original inhabitants of an area. It is not confined to the rural people rather any community possessing indigenous knowledge- rural or urban, settled or nomadic, original inhabitants and migrants. Indigenous knowledge is referred to not only to the knowledge of indigenous people but also the intellectual property of other communities. There are many facets involved in the indigenous knowledge such as, information of the communities, beliefs on religious faiths, tools of using in agriculture, materials in house construction work, experimentation in farming and healthcare, natural resources in flora and fauna, human resources and expertise in skilled artisans, education and learning and communication of information.

Indigenous knowledge is found in people's memories and activities and is expressed in the form of stories, songs, folklores, proverbs, dance myths, cultural values, beliefs, rituals, community laws, local language and taxonomy, agricultural practices, equipments, materials, plant species, and animal breeds. Significance of Indigenous Knowledge Indigenous knowledge is primarily inherited from the ancestors through generations of the community. Such knowledge stands as the main source of utilization and management of resources. It is not only a self centered knowledge but a collecting knowledge, the collection of phenomena and experiences which the older people also. Such knowledge is confined to few people who shared influenced others in a restricted manner. In a particular tribal society Jani is the master of all religious ideas and practices. Other people are imparted to know the religious ideas and practices by Jani which is ultimately used for individual welfare of the common people. The knowledge with personal perseverance of Jani is self centred. On the other hand that common knowledge is about the general livelihood pattern of that community which is more or less to all in the society. Those are very practical knowledge which is primarily earned his livelihood. The making of household artifacts, knowledge about cultivation, health care etc. are major arena of the indigenous knowledge development. Indigenous Knowledge is primarily referred



to the long standing traditions, belief and practices of certain regional, local and indigenous communities. The people in older times were more spiritual, religious, God- fearing and believing in virtuous livelihood. They believed that their living will be happy and prosperous if they work in a systematic manner with certain beliefs and practices. Such beliefs of a locality bear fruits for their existence. Indigenous Traditional Knowledge is developed and adopted continuously to a changing environment and passed on from generation to generation. The livelihood of rural population mainly depends on certain experience based knowledge which is essential for their survival. Such knowledge system has embraced many areas of the people activities such as health, education, agriculture, animal husbandry, handicrafts, religion, culture and tradition of a local community. The people in those days used to practice such knowledge for sustainable development. The knowledge is basically used to cure diseases of human as well as animal and to develop nutrition, to bring out better agricultural systems in farming, to improve the arts and craft, and to maintain the religious practices and astrological beliefs. Indigenous knowledge is embedded in community practices, institutions, relationships and rituals. It provides the basis for problem solving strategies for the communities.

8.4.2 Sources of Indigenous Traditional Knowledge:

The sources of the traditional knowledge mainly derived from the human experiences, beliefs and practices which are collected from several sources. There are also semi-recorded information such as manuscripts, photographs, and folk literature and grey literature. Ancient people had developed the Vedas, Puranas, religious books, grey literature, ethno-botanical texts and archaeological deposits which were the sources of knowledge for those people. Those sources give detail account of the life of the ancient people and the method of living in a prosperous way. Again those sources also give information about biotechniques, medicinal knowledge, breeding techniques, agricultural farming systems, healthcare techniques, religious and astrological guidelines and cultural artifacts. Some of the indigenous traditional knowledge are available in written form in primary, secondary and tertiary sources of information. But most of the indigenous traditional knowledge are undocumented and are available orally or in memory of the group of the community of a region or area. Indigenous Traditional Knowledge in this region is widely scatted and fragile and there is a need to integrate those distributed sources of information in concrete form. Although religious books which give a lot of information about indigenous traditional knowledge are least used in present time. There is greater need to accumulate and acquire to collect information and make documentation of such knowledge. While tribal communities frequently use such knowledge which is essential to



trace the sources of information of indigenous traditional knowledge among tribal communities.

8.4.3 Documenting the Indigenous Knowledge:

The origin of indigenous knowledge can be traced back to the ancient period. People used such knowledge from generation to generation for their livelihood in an unaccounted manner. There are no such written documents for recording and dissemination of such knowledge. Such knowledge system is essential for development. It must be gathered and documented for a particular community. Collection and storage of indigenous knowledge should be supplemented with adequate dissemination and exchange among interested parties. A systematic approach requires to be taken up to document such knowledge in Rairangpur area / area adjacent to Similipal hill range.

8.5 Extent of Cultural / Sacred groves:

There are many sacred groves in this locality. A Comprehensive study has been made by field staff and list of Sacred Groves have been enlisted below.

Table No 8.5 (A) List of sacred Groves Rairangpur Division.

Range: Badampahad					
Sl.No.	Name of Sacred Groove & Address	CD Block	Latitude	Longitude	Area in Ha.
1	Badamkuradihi, At-Badamkuradihi Po-Hatbadra, Dist- Mayurbhanj	Kusumi	22° 11' 28.1''	86° 09' 1.3''	0.024
2	Satpautia, At-Satpautia, Po- Hatbadra Dist- Mayurbhanj.	Kusumi	22° 10' 06.2''	86° 08' 21.6''	0.141
3	Jodapokhari, At-Jodapokhari Po-Hatbadra, Dist- Mayurbhanj	Kusumi	22° 09' 04.1''	86° 07' 32.6''	0.291
4	Rayasahi, At-Rayasahi, Po- Jhipabandh, Dist- Mayurbhanj	Kusumi	22° 02' 55.9''	86° 02' 06.3''	0.141
5	Bhuyanbasa, At-Bhuyanbasa Po-Purunapani, Dist- Mayurbhanj	Kusumi	22° 06' 48.3''	86° 11' 02.4''	0.651
6	Pahadpur, At-Pahadpur, Po-Dova Dist- Mayurbhanj	Kusumi	22° 08' 50.2''	86° 01' 43.5''	0.02
7	Chuapani, At-Chuapani, Po- Chuapani Dist- Mayurbhanj	Kusumi	22° 08' 24.7''	86° 11' 03.6''	0.182
8	Keshargadia, At-Keshargadia Po-Dalki, Dist- Mayurbhanj	Kusumi	22° 09' 45.4''	86° 11' 22.2''	0.02



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Table No 8.5 (A) List of sacred Groves Rairangpur Division.

9	Dalki, At-Dalki, Po-Dalki Dist- Mayurbhanj	Kusumi	22° 09' 15.7''	86° 11' 30.7''	0.161
10	Kitachua, At-Kitachua, Po- Pandugandi Dist- Mayurbhanj	Kusumi	22° 03' 54.6''	86° 05' 02.2''	0.028
11	Jagannathpur, At-Jagannathpur Po-Baneikala, Dist- Mayurbhanj	Bisoi	22° 07' 22.0''	86° 12' 53.1''	0.50
12	Chaunradihi, At-Badam, Po- Talakhpokhari, Dist- Mayurbhanj	Kusumi	22° 05' 32.9''	86° 09' 01.7''	0.60
13	Gobindpur, At-Gobindpur, Po- Padhia Dist- Mayurbhanj	Kusumi	22° 05' 43.5''	86° 04' 00.9''	0.515
14	Suliduma, At-Suliduma, Po- Chuapani Dist- Mayurbhanj	Kusumi	22° 09' 16.3''	86° 10' 51.1''	0.70
15	Edelbeda, At-Edelbeda, Po- Uperbeda Dist- Mayurbhanj	Kusumi	22° 11' 15.1''	86° 03' 14.5''	1.0
16	Gopalpur, At-Gopalpur, Po- Hatbadra Dist- Mayurbhanj	Kusumi	22° 11' 45.1''	86° 06' 57.3''	0.10
17	Burudihi , At-Burudihi, Po- Badampahar, Dist- Mayurbhanj .	Kusumi	22° 05' 55.9''	86° 05' 32.6''	0.30
18	Dhakata, At-Dhakata Po-Basila Dist- Mayurbhanj	Kusumi	22° 06' 40.9''	86° 00' 59.1''	2.70
19	Dhakata, At-Dhakata Po-Basila Dist- Mayurbhanj	Kusumi	22° 06' 40.9''	86° 00' 59.1''	2.70
20	Andiadukra, At-Andiadukra, Po- Jorda Dist- Mayurbhanj,	Kusumi	22° 09' 10.9''	86° 05' 47.8''	0.20
21	Solakudar, At-Solakudar, Po- Jorda , Dist- Mayurbhanj	Kusumi	22° 08' 22.8''	86° 03' 38.1''	0.40
22	Patharkata, At-Patharkata, Po-Bisoi Dist- Mayurbhanj	Bisoi	22° 05' 16.9''	86° 11' 48.2''	0.40
23	Bhitaramda, At-Bhitaramda, Po- Asana, Dist- Mayurbhanj	Bisoi	22° 07' 00.6''	86° 12' 08.7''	0.30
Total Area					12.074



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Table No 8.5 (B) List of sacred Groves Rairangpur Division.

Sl.No	Name of Sacred Groove & Address	CD Block	Latitude	Longitude	Area in Ha.
	Range: Rairangpur				
1	Ranipal At-Ranipal P.o-Purunapani	Rairangpur	N22° 16' 57.7	E86° 09 0.28	0.5
2	Baliyam At-Baliyam P.o-Saragoda	Bijatata	N22° 15 45.8	E86° 22 27.2	0.09
3	Budamara At-Budamra P.o-Chadheipahadi	Bijatata	N22° 18 4.01	E86° 23 10.4	0.10
4	Baduakocha At-Baduakocha P.o-Saragoda	Bijatata	N22° 15 20.9	E86° 21 23.9	0.90
5	Dahupani At-Dahupani P.o-Sudarsanpur	Rairangpur	N22° 22 21.9	E86° 18 12.3	0.50
6	Kusumghati At-Kusumghati	Rairangpur	N22° 12 7.7	E86° 17 11.6	0.08
7	Niranjan At-Niranjan P.o-Niranjan	Rairangpur	N22° 18 16.5	E86° 12 3.1	0.04
8	Bijatata At-Bijatata P.o-Bijatata	Bijatata	N22° 12 49.7	E86° 17 17.1	0.20
9	Sitaldihi At-Sitaldihi P.o-Judia	Bijatata	N22° 15 43.2	E86° 15 48.5	0.05
10	Bhadupani At-Bhadupani P.o-Bhadupani	Bijatata	N22° 17 40.6	E86° 22 28.5	0.10
11	Teltangia At-Teltangia P.o-Bijatata	Bijatata	N22° 11 4.5	E86° 18 16.8	0.3
12	Ramchandrapur At/Po-Ramchandrapur	Bijatata	N22° 15 10.5	E86° 15 6.6	0.4
13	Sanbantha At-Sanbantha P.o-Saragoda	Bijatata	N22° 15 53.6	E86° 21 51.3	0.1
14	Saranda At-Saranda P.o-Saragoda	Bijatata	N22° 16 0.06	E86° 23 26.9	0.6
15	Belpahadi At-Belpahadi P.oRaihari	Rairangpur	N22° 16 23.7	E86° 14 14.0	0.8
16	Chidkubadi At-Chidkubadi P.o-Mahadebdihi	Bijatata	N22° 25 32.0	E86° 15 53.1	0.4
17	Bhalujodi At-Bhalujodi P.o-Ambadiha	Bijatata	N22° 14 25.8	E86° 17 18.9	0.06
18	Jodapokhari At-Jodapokhari P.o-Bijatata	Bijatata	N22° 12 36.1	E86° 16 23.5	0.08
19	Pahadpur At-Pahadpur P.o-Chadheipahadi	Rairangpur	N22° 18 25.0	E86° 22 27.2	0.05
20	Dangapani At-Dnagapani P.o-Mahadebdihi	Rairangpur	N22° 24 13.5	E86° 15 03.2	0.06
	Total Area:				5.41



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Table No 8.5 (C) List of sacred Groves Rairangpur Division.

Sl.No	Name of Sacred Groove & Address	CD Block	Latitude	Longitude	Area in Ha.
	Range: Bahalda				
1	Kainpur, At- Kainpur, P.O- Jamda,Dist- Mayurbhanj	Jamda	N22° 19 59.5	E86° 07 27.0	2.80
2	Gitilata, At- Gidilata, P.O- Changua,Dist- Mayurbhanj	Tiring	N22° 32 3.60	E86° 02 44.1	1.5
3	Bahalda, At- Bahalda, P.O- Bahalda,Dist- Mayurbhanj	Bahalda	N22° 22 36.8	E86° 04 40.0	1.8
4	Soso, At- Soso, P.O- Soso Dist- Mayurbhanj	Bahalda	N22° 21 59.7	E86° 07 08.6	1.62
5	Sunamora, At- Sunamora P.O- Khairpal,Dist- Mayurbhanj	Jamda	N22° 12 32.6	E86° 04 23.0	1.57
6	Kaduani, At- Kaduani, P.O- Gambharia, Dist- Mayurbhanj	Bahalda	N22° 19 59.5	E86° 07 27.7	0.38
7	Jagannathpur, At- Jagannathpur P.O- Gambharia,Dist- Mayurbhanj	Bahalda	N22° 21 29.39	E86° 09 19.24	0.1
8	Pandhada At- Pandhada, P.O Bhogabandi, Dist- Mayurbhanj	Bahalda	N22° 25 26.7	E86° 02 37.1	2.0
9	Jatapani ,At- Jatapani, P.O- Khairpal,Dist- Mayurbhanj	Jamda	N22° 13 56.7	E86° 04 03.9	1.26
10	Burupalsa, At- Burupalsa P.O- Bad Palsa, Dist- Mayurbhanj	Bahalda	N22° 27 54.2	E86° 09 03.9	1.85
11	Bagdega, At- Bagdega, P.O- Bahalda, Dist- Mayurbhanj	Bahalda	N22° 23 44.46	E86° 05 03.63	1.0
12	Sansiajung, At- Sansiajung P.O- Changua, Dist- Mayurbhanj	Tiring	N22° 32 20.9	E86° 03 26.9	2.3
13	Dumadihi, At- Dumadihi, P.O- Gambharia, Dist- Mayurbhanj	Bahalda	N22° 15 0.24	E86° 06 14.3	1.0
14	Basantpur, At- Basantpur P.O- Hensda, Dist- Mayurbhanj	Jamda	N22° 12 29.9	E86° 06 28.4	1.5
15	Changua, At- Changua, P.O- Changua,Dist- Mayurbhanj	Tiring	N22° 31 01.6	E86° 01 56.3	0.1
16	Badkedam, At- Badkedam, P.O- Badkedam, Dist- Mayurbhanj	Bahalda	N22° 27 54.2	E86° 09 23.0	1.65
17	Bednarayani, At- Bednarayani, P.O-Lupung,Dist- Mayurbhanj	Tiring	N22° 26 16.1	E86° 00 36.1	0.2
18	Budhigoda, At- Budhigoda,PO Surda- jashipur, Dist- Mayurbhanj	Bahalda	N22° 26 18.6	E86° 12 59.3	0.72



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Table No 8.5 (C) List of sacred Groves Rairangpur Division.

19	Ramgarh, At- Ramgarh P.o- Badkedam, Dist- Mayurbhanj	Bahalda	N22° 27 54.2	E86° 09 03.9	2.3
20	Nandabasa, At- Nandabasa, P.o- Surda- Jashipur, Dist- Mayurbhanj	Bahalda	N22° 27 16.1	E86° 12 31.2	0.4
21	Bhursa, At- Bhursa, P.o-Gambharia, Dist- Mayurbhanj	Bahalda	N22° 21 23.29	E86° 08 11.74	0.1
22	Hensda, At- Hensda, P.o- Hensda Dist- Mayurbhanj	Jamda	N22° 11 45.1	E86° 06 07.2	1.5
23	Patambada, At- Patambada P.o- Bad Palsa, Dist- Mayurbhanj	Bahalda	N22° 27 30.3	E86° 08 49.2	0.76
Total:					28.41

Table No 8.5 (D) List of sacred Groves Rairangpur Division.

Sl.No.	Name of Sacred Groove & Address	CD Block	Latitude	Longitude	Area in Ha.
Range: Bisoi WL					
1	Paunsia, At- Paunsia, P.O- Manikpur, Dist- Mayurbhanj	<i>Bijatata</i>	22° 13' 38.3"	086° 21' 32.7"	0.0625
2	Sunajodia, At/P.O- Sunajodia, Dist- Mayurbhanj	<i>Bisoi</i>	22° 11' 48.2"	086° 23' 54.2"	0.0615
3	At- Deopatta, Khadambada, Dist- Mayurbhanj	<i>Bisoi</i>	22° 10' 23.2"	086° 27' 48.9"	0.0535
4	At- Bholagadia,,P.O- Bangriposi, Dist- Mayurbhanj	<i>Bangriposi</i>	22° 07' 11.8"	086° 27' 29.3"	0.0425
5	At- Mohulabarei,P.O- Bangriposi, Dist- Mayurbhanj	<i>Bangriposi</i>	22° 09' 22.9"	086° 32' 24.1"	0.0610
6	At- Gardagi, P.O- Sunajodia, Dist- Mayurbhanj	<i>Bisoi</i>	22° 12' 34.1"	086° 22' 09.1"	0.0435
7	At- Dosisole, P.O- Bangriposi, Dist- mayurbhanj	<i>Bangriposi</i>	22° 08' 05.7"	086° 31' 13.8"	0.0732
8	At- Rajabasa, P.O- Khadambada, Dist- Mayurbhanj	<i>Bisoi</i>	22° 10' 48.0"	086° 26' 05.7"	0.0454
9	At- Kitabada,,P.O- Khadambada, Dist- Mayurbhanj	<i>Bisoi</i>	22° 09' 12.8"	086° 26' 43.7"	0.0415
10	At- Saraspada, P.O- Sunajodia, Dist- Mayurbhanj	<i>Bisoi</i>	22° 11' 32.5"	086° 24' 13.9"	0.0435
11	At- Pundidah, P.O- Khadambada, Dist- Mayurbhanj	<i>Bisoi</i>	22° 10' 52.1"	086° 25' 20.1"	0.0535
12	At- Dudkundi, P.O- Khadambada, Dist- Mayurbhanj	<i>Bisoi</i>	22° 10' 55.6"	086° 27' 24.8"	0.055
Total					0.6366



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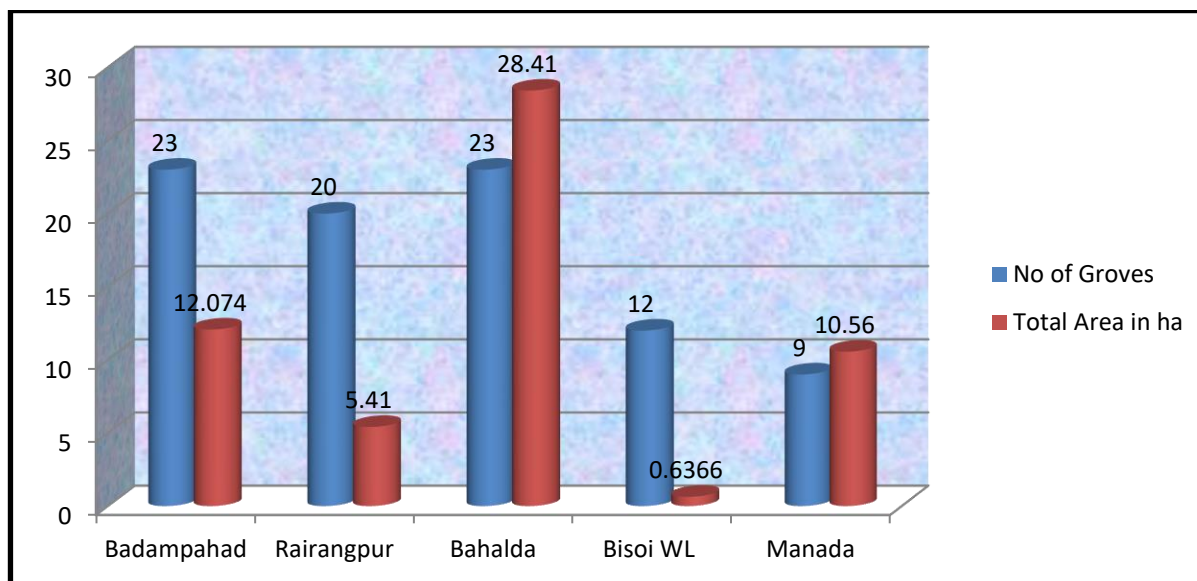
Table No 8.5 (E) List of sacred Groves Rairangpur Division.

S. No.	Name of Sacred Grove & address	CD Block	Latitude	Longitude	Area in ha
	Range: Manada				
1	Alhapani, At-Alhapani, Po-Manada, Dist- Mayurbhanj	<i>Bisoi</i>	22° 03' 01.2"	086° 14' 32.0"	1.58
2	Andharjhari, At- Andharjhari, Po-Manada, Dist- Mayurbhanj	<i>Bisoi</i>	22° 02' 50.7"	086° 14' 32.0"	3.05
3	Chadripahadi, At- Chadripahadi, Po-Manada, Dist- Mayurbhanj	<i>Bisoi</i>	22° 02' 33.3"	086° 14' 24.9"	0.34
4	Budamara, At- Budamara, PO-San Jambila, Dist- Mayurbhanj	<i>Bisoi</i>	22° 03' 12.8"	086° 12' 31.5"	0.14
5	Radhanagar, At- Radhanagar, PO- Manada Dist- Mayurbhanj	<i>Bisoi</i>	22° 03' 58.9"	086° 13' 26.6"	0.54
6	Tamalbandh, At- Tamalbandh, Po-Bad Nalua, Dist- Mayurbhanj	<i>Bisoi</i>	22° 01' 23.5"	086° 12' 32.0"	0.87
7	Teleighutu, At- Teleighutu, Po-Bad Nalua Dist- Mayurbhanj	<i>Bisoi</i>	22° 01' 59.6"	086° 11' 53.8"	3.09
8	Patbila, At- Patbila, Po-San Jambila, Dist- Mayurbhanj	<i>Bisoi</i>	22° 03' 16.8"	086° 11' 56.3"	0.60
9	Sansialinai, At- Sansialinai, Po-Durdura Dist- Mayurbhanj	<i>Jashipur</i>	22° 59' 03.3"	086° 10' 15.4"	0.35
	Total:				10.56

8.5.1 Abstract of Sacred Groves:

Table No 8.6 Abstract of sacred Groves Rairangpur Division.

Sl No	Range	No of Groves	Total Area in ha
1	Badampahad	23	12.074
2	Rairangpur	20	5.41
3	Bahalda	23	28.41
4	Bisoi WL	12.	0.6366
5	Manada	9	10.56
	Division Total	87	57.0906



8.5.2 Eco-floristic studies on Sacred Groves of Bamanghaty subdivision:

Sacred groves are patches of vegetation of varying sizes, conserved on the basis of religious beliefs of the community. These sacred groves represent climax vegetation having rich floral diversity and are treasure houses of many rare and endemic plant species. An eco-floristic survey was conducted in 66 different sacred groves of Bamanghaty subdivision in Mayurbhanj

District and documented as many as 357 species belong to 101 genera under 63 families.

According to the local people, eighty five percentages of the groves had a lush forest cover earlier and now becoming just merely a sacred place. These sacred groves harbor many rare, endemic and threatened taxa as well as repository of several medicinal plants and can be regarded as the remnant of the primary forest left untouched by the local inhabitants and protected by them due to the consideration that the deities reside in these forests patches. Major reason behind the threat status is over exploitation/extraction in the case of *Pterocarpus marsupium*, *Saraca asoca*, *Garcinia xanthochymus*, *Gloriosa superba*, *Hemidesmus indicus*, *Rauvolfia serpentina*, *Operculina turpethum* and *Aristolochia indica*. Now a days expansion of agriculture, urbanisation, grazing by cattle, changing in values and population pressure are the main causes for the depletion and degradation of the sacred groves.



8.5.3 Strategies for sustainable management of sacred groves:

In order to conserve them and to form a biological continuation following strategies are suggested.

- Specific biodiversity conservation corps should be formed and they should be trained to document the biodiversity of the sacred groves in People Biodiversity Register.
- Mobilization and group formation with the support of the respective panchayat, panchayat level sacred groves conservation committee should be formed.
- Besides, groves specific sacred grove management committee should be formed involving representatives of all the stakeholders.
- Technical support to local communities is essential for the sustainable management of sacred groves.
- Strategies and action for ex-situ conservation, operational procedures for multiplication of native wild plants of sacred groves and planting through vegetative propagation and micro-propagation need to be developed.
- Local communities should be trained to raise nurseries of rare, endemic and threatened taxa of sacred grove and shall be planted in the restoration of degraded lands.
- If sacred groves need to be protected, village communities should be provided with alternatives for fulfilling fuel and fodder to asset households that are currently depending on sacred groves.

8.6 Eco-tourism areas and activities:

After second time reorganization of division during 2019, there is no designated Eco tourism area within the divisions Barehipani and Jamuani eco-tourism complexes have been included in Similipal North Division. However, there are still a few potential sites which can be developed into good eco-tourism sites viz- Suleipat Dam, Nesa Dam.

8.7 Social Customs (As relates to Forests):

Mayurbhanj is home to a number of tribal communities. Each community has distinct features. Each community has common ancestry, language and culture. The members of a community are related to one another through family, marriage and kinship. The communities are organized in certain characteristically organized social groups. The life-style, beliefs and values of the communities differ. Some of these tribes of the district like Santals and Saoras have developed their own scripts. Each community has its unique settlement pattern and house type, which varies from scattered settlements to arranged patterns. The food and drinking



habits of the tribal communities are almost alike, but the methods of preparation of food vary.

Santal: In Mayurbhanj, the Santals are the most predominant tribal community. The Santals in the district account for 75.27% of the total Santal population of the state and 45.32% of the tribals in the district. The Santals speak Santali language. It was a spoken language till very recently when its own script was developed which belongs to the Munda group of the Austro-Asiatic sub-group. Over time, because of frequent interaction with the Oriyas, the Santals can speak and understand Oriya. The Santal economy is mainly based on agriculture. Collecting, hunting and fishing are subsidiary occupations. In the past, the Santals were nomadic in habits and used to wander to places in search of agricultural land. But now they have taken to settled agriculture and have their permanent place of residence. The Santal villages consist of a number of households along a long street with rows of dwellings. The Santals sense of sanitation and hygiene are worth emulating. The Santal women keep their houses neat and clean. The women paint the walls of their houses with different colours.

Kolha: Kolha is one of the major tribal communities of the district constituting 17.5% of its tribal population. Kolha community is one of the largest communities in the state. Their families are nuclear in composition and monogamy is their common practice with the rare occurrence of polygamous families. Since Kolhas are in contact with Hindu culture, most of their villages have people from other castes also. They follow a linear pattern of settlement with two rows of houses facing each other along a common road. Earlier, the Kolhas subsisted on hunting and collecting, but their gradual contact with other communities led them to take to cultivation and adopt plain-land wet agriculture. Rice is their staple food. But the lack of agricultural land is forcing them to engage themselves as daily laborers. This has further jeopardized the traditional agricultural economy of the Kolhas. Though life is individual centric, communal labour still plays a role in agriculture. Labour groups comprising some members of the community carry on agricultural operations together for a share in the crops. Hunting is no more considered a means of subsistence. But communal hunting in which all the people of a village participate is being practiced as a symbol of social integrity. The Kolhas observe social functions very elaborately and spend lavishly in entertaining their fellow villagers. They practice monogamy. Religion pervades every walk of a Kolha's life. They are ardent believers in supernatural beings. The Kolhas are lovers of art and the walls of their houses are decorated with artistic drawings.

Bhumija: Another important community in the district is the Bhumijas constituting 12.29% of the district's tribal population. The Bhumijas mingle with the Hindus. They live in villages with the Hindus, other castes and tribes. Their families are of nuclear type. The common practice in



marriage is negotiation and payment of bride price. They practice both child and adult marriages. Polygamy is sometimes seen among the wealthier families. They sacrifice animals to satisfy deities. They have adopted some Hindu practices in their tribal religious beliefs and faiths. They revere the Sun. Now cultivation is the main occupation of the Bhumijas and it is supplemented by wage-earning, collection of forest produce and hunting. They grow only one crop-paddy. They also grow Rabi crops and vegetables in their kitchen garden. Rice is their staple food. They have given up dancing and singing. The young girls are fond of ornaments.

Bathudi: Bathudis like Bhuyans, Saunti and Lodha are Aryan language speaking communities. They do not have their own language and speak odia. Bathudi is a highly Hinduised tribe. They are found in Karanjia and Kaptipada areas. They live in villages of mixed population of other tribes and Hindu castes. They, of course, have their separate occupations. The Bathudis are more literate than other tribal communities. They follow the religious beliefs and practices of the Hindus. Mainly adult marriages are held after negotiations. Marriage is a costly affair among the Bathudis. The main occupation of the Bathudis is settled agriculture, wage-earning and petty business.

Bhuiyan: Bhuiyan is one of the primitive and important tribes of Odisha. Bhuiyans constitute 4.60% of the tribal population of Mayurbhanj. The cultural development of the Bhuiyans is not homogeneous. There are both backward as well as thoroughly Hinduised. As a whole, it is an acculturated tribe. They have no dialects of their own and speak Oriya. They have nuclear families. The Bhuiyans perform rituals at every stage of the life cycle starting with conception till death. They also observe public feasts and festivals round the year. The Bhuiyans practice both child and adult marriage. There are different marriage practices. They consult Rauri (a spiritual doctor) at the time of illness. Bhuiyan hamlets or villages are located on a plateau land on hill top or on the hill slopes in the middle of forests. Houses in Bhuiyan villages do not follow any pattern. These villages are not accessible in all seasons of the year. Bhuiyans eat mahua liquor. Rice is their staple food. Bhuiyans believe in the existence of a number of deities, who influence their lives. These deities are presumed to live in the village or nearby spring. The Bhuiyans earn their livelihood with both permanent and shifting cultivation. They also collect minor forest produce and take to hunting, fishing and wage earning. They also take to petty trade and commerce. Both men and women work to earn livelihood.

Sounti: Another community is Sounti which comprises 1.96 % of the tribal population in the district. The Sounti is a tribe of recent origin and consist of outcaste Odias. They usually go for adult marriage, though child and widow marriage is allowed. Monogamy is the practice though



polygamy is also permitted. There are no restrictions imposed on pregnant women. The women do normal work during their pregnancy. The religious faith and beliefs of the Sountis are same as those of the Hindus and they observe the Odia festivals. There is hardly any exclusive Sounti village. They mostly live in the midst of Hindus and other tribes. Most of the Sountis are landless and they depend on wage work. The land-owners amongst them do cultivation.

Gonds: The Gonds are a significant tribe speaking Gondi. They constitute 1.97% of the tribal population. It is a warrior tribe. The Gonds of Mayurbhanj are acculturated into the Hindu society. They live in villages inhabited by other castes and tribes. Usually marriages are arranged by parents. Their religion is a mix of tribal and Hindu beliefs. Belief in witchcraft and magic is very strong among the Gonds. The main occupation of the Gonds is cultivation and agricultural labour. They also collect minor forest produce to supplement their income. Nowadays, they do little hunting. They have also given up dancing and singing they look healthy but suffer from malaria, scabies, tuberculosis and digestive tract diseases. The Gonds have caste panchayats, which settle intra and inter-tribe disputes. Hill-Kharias: Hill-Kharias population size is very small are still in a pre-agricultural level of economy and survive through hunting, fishing, food gathering and incipient agriculture. They are mainly found in Jashipur and Karanjia blocks besides in a few villages of Morada block of the district. Other Communities: The other tribal communities in the district are less in number. The ST communities are now multilingual, speaking Aryan, Dravidian, Munda or Austric. The Kissam Koya and Oraon belonging to Dravidian-language-speaking clan are few in number in this district. Their language and literature are less influential. The tribal language is generally oral but development of four tribal scripts may help development of tribal literature. Those languages are Alchiki (The Script of Santali language), Soradam, Sompeom (The Script of Saora language) and Kulipi (The Script of Kondh language). From phonetic point of view, 'Alchiki' is scientific.

The religion of the tribes is an admixture of animism, animalism, nature-worship, fetishism, shamanism, anthropomorphism and ancestor worship. Religious beliefs and practices aim at ensuring personal security and happiness as well as community well-being and group solidarity. Their religious performances include life-crisis rites, cyclic community rites, ancestral and totemic rites and observance of taboos. Besides these, the tribals also resort to various types of traditional practices and if it does not yield any result, the next recourse is prayer to the supernatural force. The tribes of Mayurbhanj do believe in many gods and goddesses like their non-tribal counterparts. They believe in various deities, ghosts and spirits residing in the hills, forests and streams, and the ancestral spirits guiding every aspects of their life. Mother Ambika



is the presiding deity of Mayurbhanj district. However, history is silent about this 'Santipith' due to non-availability of evidences. The legend says that the backside of the Ambika Temple was a high land, which was known as 'Baga Samal Fort' and it was the fort of the Bhuiyan kings who ruled over it. The presiding goddess of the Bhuyan Clan was mother Ambika. Different tribal clans worship the sun god with different names. They believe that sun is omnipotent and is the creator and father of the universe. Earth is the mother. Mother earth is the female and the Sun God is the male and all others are their off springs. The Santals name him as 'Thakur Jew'. The Mankadia and Oraon worship him as 'Bhagaban'. They are unilineal descent groups whose members trace their origin back to some common mythical ancestor. There is no totemic worship. They all are regarded as brothers and sisters and marriage between them is taboo. But nowadays, marriage is allowed between clan members. The Ho, Munda and above all some Santalese worship the all powerful Sun God as 'Singabonga' and Kolha as 'Maranburu'. Similarly they used to worship the mother Earth as 'Dharitree Maa', 'Basumata', 'Bhumidevata', 'Basuri Thakurani', 'Basuti Mata' etc. In some tribal communities, the religious beliefs and faiths are patterned after those of their Hindu neighbors. Bhuiyan, Bathudi and Bhumija having belief in Hinduism do worship 'Kali', 'Kichakeshwari' and other Hindu gods. Under the impact of modernisation, the tribes of Mayurbhanj are gradually losing faith in the power of spirits and deities, and as such, some annual festivals are not observed any more. Despite the fact that their lifestyle has changed due to the impact of modernity, the tribals still mostly stick to tradition and maintain their cultural identity. The tribes believe in ghosts & witches. Like other Adivasis, the Lodha not only worship 'Bhagaban' Sheetala but they believe in witchery and sorcery to protect themselves from the curse of ghosts, witches and other incorporeal beings. The Adivasis here consider the trip to Damodar and immersion in the river Ganga, a very holy ritual. They celebrate different festivals which are linked to agricultural operations, social life and religious beliefs & customs. Celebrations are organized either in group or individually.

Ersim is a Paddy sowing festival. The Santals, Mahali, Bhumija and Lodha celebrate this festival on the day of 'Akshyatrutiya' to worship mother earth with religious fervour and enthusiasm.

Harialism is an agriculture based festival like Ersim, which is celebrated with splendor and dignity when the land looks green with swaying paddy saplings and the cultivator's joy knows no bounds.

Jamtala Bonga is a Jantal festival which is celebrated when the paddy hangs down ward and when there is threat to the crop due to scanty rainfall. In some pockets, this festival is



celebrated as 'Ashadhi' or 'Bihuda' Parva. In this festival, the Bhuyan community invites the rain god with religious zeal. So also the Lodhas pray for bumper production.

Karama Parva is a festival celebrated in the month of 'Ashwina' or 'Kartika' and the auspicious day is fixed by the 'Dehuri', the priest. A 'Karam Bough' is planted on the altar in the middle of village.

Makar Parva is the prime festival of Mayurbhanj district and is celebrated by Adivasis and non-Adivasis alike in the Odia month of 'Pausha' and English month of 'January' when the paddy reaping is half done and the mind is free from all cares and anxieties. Irrespective of caste, colour, creed and age, all participate in the religious festival with eagerness.

Tusubhashani or immersion of Tusu idols in the holy pond is another attraction of Makar festival. The spinsters of Mohanta community worship the Tusu deity and immerse it in the holy pond singing the 'Tusu Song'.

8.8 Status of Compliance of Forest Right Act (FRA):

The Forest Rights Act and Rules has been meticulously implemented in the division. Till end of February, 2020 the position as relates to Rairangpur division is as follows (table No 8.7).

Table No 8.7 Implementation of Forest Right Act, 2006

Sl. No	Description	Individual	Community
1	Name of the Dist./Sub-Division	Mayurbhanj/Bamanghaty	
2	No. of village in the District	3966	
		Individual	Community
2(A)	No. of villages fully covered so far (Total)	231	-
3	No. of Gram Sabha meeting held	753	-
4	No. of Gram Sabha meeting held subsequently	1649	-
5	No. of FRCs constituted by Gram Sabha	753	-
6	No. of claims received by FRCs	10865	-
7	No. of claims verified by FRCs & sent to Gram Sabha	9083	-
GRAM SABHA LEVEL			
8	No. of claims approved by Gram Sabha & sent to SDLC	9083	-
9	Area involved (in acres)✓	5538.39	-
10	No. of families	9083	-



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11	No. of claims rejected by Gram Sabha	2134	-
12	No. of claims remanded to FRCs	0	-
12(A)	No. of Gram Sabha confirming completion of recognition on claims so far (Total)	211	-
SUB-DIVISIONAL COMMITTEE LEVEL			
13	No. of claims approved by SDLC (Sub-Division wise) & sent to DLC	7003	-
14	Area involved (in acres)	4062.76	-
15	No. of families	7003	-
16	No. of claims rejected by SDLC	67	-
17	No. of claims remanded to Gram Sabha	0	-
17(A)	No. of Sub-Division confirming completion of Recognition on claims so far (Total)	0	-
DISTRICT LEVEL COMMITTEE LEVEL			
18	No. of claims approved by DLC for title	703	-
19	Area involved (in acres)	4062.76	-
20	No. of families	7003	-
21	No. of claims rejected by DLC	0	-
22	No. of claims remanded by SDLC	0	-
23	No. of certificate of titles distributed	6814	-
24	Area in acres	3937.13	-
25	No. of certificate of titles distributed to PTG	-	-
26	Area in acres	-	-
27	No. of claims uploaded in Web Site (MOTA)	-	-
N.B.- ALL CLAIMS SETTLED IN FAVOUR OF SCHIDULED TRIBE			

Besides the individual claims, forest area has been provided under FRA for community development. The details of area provided is furnished at **Table No 8.8**



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Table No 8.8 Land Diverted for Non Forestry Purpose under FRA,2006

SL. No.	Year	Name of the Project	Name of the Tahasil	Area Diverted in Ha.	Status of Forest Land	Remarks
1	2	3	4	5	6	7
1	2016	Nil	Nil	Nil	Nil	Nil
2	2017	Nil	Nil	Nil	Nil	Nil
3	2018	Construction of road from Gunduria to Bhitaramda under PMGSY Package No .OR-21-521	Bisoi	0.25	R.F	Nil
		Construction of road from NH-6 to Hatichhad under PMGSY Package No.OR-21-ADB-16	Bisoi	0.96	R.F	Nil
		Construction of road with ghat cutting and side Masonry drain from Kalsibhanga to Gordapani village.	Rairangpur	0.616	R.F	Nil
4	2019	Nil	Nil	Nil	Nil	Nil
Total area divered under FRA -				1.826		

8.8.1 Area Diverted under Forest (Conservation) Act, 1980.

For mining purpose 559.74 ha of forest land has been diverted under F.C Act 1980 by Govt. of India, Ministry of Environment & Forests. Area allowed for Non forest Use under Forest (Conservation) Act, 1980 is furnished below.

Table No : 8.9 Area allowed for Non forest Use

Sl no.	Name of Mines	Area diverted for mining purpose	G.O.I. order & Date
1	Badampahar Iron Ore Mines M/s Lal Traders and Agency	129.61 Ha	MoEF no.8-11/2004 FC dt.14.06.2007,MoEF no.8-41/2004 FC dt.27.07.2009.
2	Gorumahisani Iron Ore Mines M/s Ghanshyam Mishra	90.50 Ha	MoEF no.8-4/2003 FC dt..13.07.2005,.MoEF no.8-41/2003 FC dt..13.09.2006.
3	Suleipat Iron Ore Mines M/S B.C. Dogra	360.90 Ha.	Stage I order from G.O.I F. no.8-47/2005-F.C (pt.-I) Govt. of India Ministry of Environment & Forests (F.C Division) dt.23.05.2014.



8.9 Other Rights and Concessions:

Besides various rights & concessions given under Joint Forest Management Resolution, Forest Rights Act, 2006 and Reserved Forest Notifications, there is no other rights & concessions allowed in favour of people of this division.

8.10 Dependency of Local People on NTFPs:

The important NTFP collected from forests of Rairangpur division are Sal leaf, Siali Leaf, Siali fiber, Myrobalance (Harida, Bahada and Aonla), Haney, Dhatki, Mahula, Kochla, Kendu etc. The collection is decreasing year after year as it is not remunerative due to poor abundance. On an average NTFP contributes up to 20% of tribal people's income in this region.

8.11 Other aspects:

Tribal Culture is strongly associated with sacred groves of the region. Due to various reasons, the limits of sacred groves are shrinking day by day. Steps should be initiated to protect and develop these groves through people's participation.





CHAPTER-9

Adequacy of Policy, Legal and Institutional Framework

9.1 Existing policy and legal framework and their compliance:

For management of Forests, regulation of forest produce, protection of Wildlife, For collection & use of NTFP various Acts, Rules and Regulation, policy have been framed by the Central Government and State Government. These are

- i) The Odisha Forest Act, 1972 and rules thereof;
- ii) The Wildlife (Protection) Act, 1972 and Rules thereof;
- iii) The Environment (Protection) Act, 1986 and Rule 1986,
- iv) The Air (Prevention & Control of Pollution) Act, 1981,
- v) The Water (Prevention & Control of Pollution) Act, 1981
- vi) The Forest (Conservation) Act, 1980 & Rules.
- vii) The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 & Rules,
- viii) EIA, Notification, 2006
- ix) NTFP Collection Policy-2000
- x) Orissa Gram Panchayats (Minor Forest Produce Administration) Rules 2002,
- xi) The Orissa Kendu Leaves (Control of Trade) Act, 1961 and Rules.

These rules and regulations are duly being implemented by the Forest Department for better management of Forests.

9.2 Status of approved working plan and compliance:

9.2.1 Past Working Plan:

The Rairangpur Division came to existence after reorganization during 2003. The Social Forestry Project Division, Rairangpur was transformed to Rairangpur Teritorial Division with forests of part of Karanjia Division. Previously the forest of Karanjia Division & Baripada Division were combinedly managed under prescriptions of One Working plan. The past working Plans and its period are furnished below.



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Table No 9.1 Past working Plan relating to Rairangpur Forests.

Sl No	Working plan	Period	Remark
1	Working Plan By, Sri B.M. Dasgupta,	1947-48 to 1966-67	
2	Working Plan by Sri S.Jee, IFS.	1953-54 to 1972-73	
3	Working plan, By Sri R.Mishra, IFS	1973-74 to 1992-93	
4	Working Plan by, Sri AOF Bakhla, IFS.	1996-97 to 2015-16	

9.2.2 Details of Revised Plan:

This revised plan comprises the entire area of the Division. All reserved Forests, DPF, PRF, PF and VF covering 44418.994 ha. On event of its approval it will be for the period from 2021-22 to 2030-31 (For 10 years). In course of preparation of Plan modern techniques has been adopted to estimate the Growing Stock, Carbon sequestration and Crop density. The village forests of the erstwhile Social Forestry Project have been included in this plan to have a better management of forests created under participatory approach.

9.3 Number of forest offences:

The Forest Offences are mainly classified into three category i.e.

- (i) For Violation of the Odisha Forest Act, 1972 & Rules framed thereof.
- (ii) For Violation of the Wildlife (Protection) Act, 1972 & Rules framed thereof.
- (iii) For the Forest (Conservation) Act, 1980.

9.3.1 Forest Offence for Violation of the Odisha Forest Act, 1972 & Rules framed thereof.

The most of the cases booked in the division are under Odisha Forest Act, 1972 & Rules thereof. The number of cases booked / disposed up and balance cases pending for disposal are as furnished at Table No 9.2

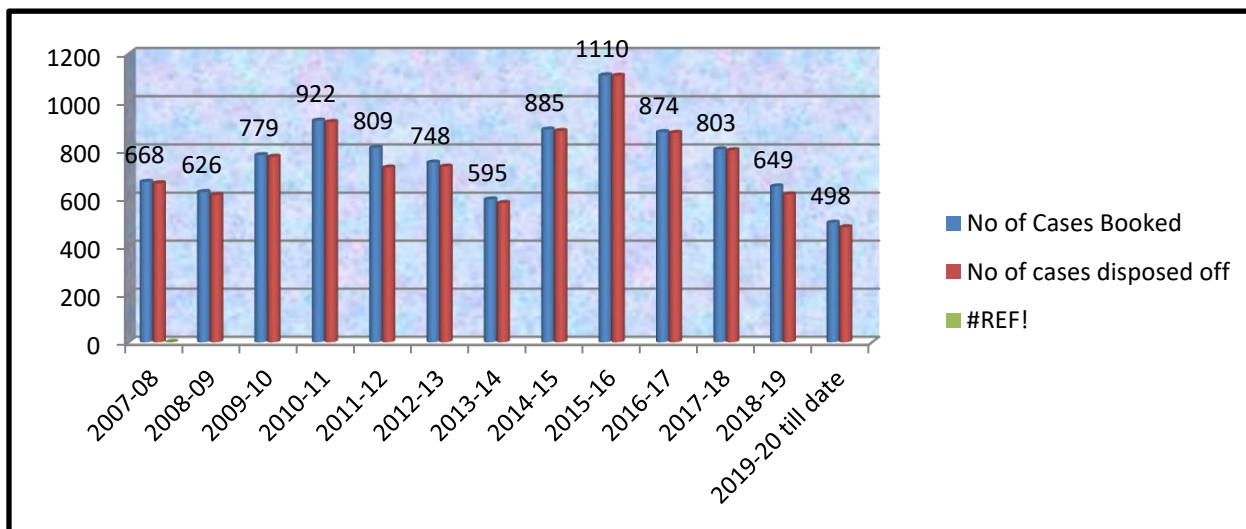


Working Plan of Rairangpur Forest division (2021 to 2031)

Table No: 9.2 Cases Booked under OFA,1972 and Status

Year	No. of cases booked			No. of cases disposed			Balance		
	OR	UD	Total	OR	UD	Total	OR	UD	Total
1	2	3	4	5	6	7	8	9	10
2007-08	531	137	668	525	137	662	6	-	6
2008-09	518	108	626	509	104	613	9	4	13
2009-10	646	133	779	643	129	772	3	4	7
2010-11	820	102	922	817	99	916	3	3	6
2011-12	722	87	809	717	77	727	5	10	15
2012-13	697	51	748	683	48	731	14	3	17
2013-14	517	78	595	514	66	580	3	12	15
2014-15	777	108	885	775	104	879	2	4	6
2015-16	1036	74	1110	1034	74	1108	2	-	2
2016-17	839	35	874	838	33	871	1	2	3
2017-18	777	26	803	776	23	799	1	3	4
2018-19	632	17	649	616	-	616	16	17	33
2019-20 till date	482	16	498	479	-	479	3	16	19
TOTAL	8994	972	9966	8926	894	9753	68	78	146

NB: Number of cases remained undisposed is very less which constitutes about 1.46% of cases booked.

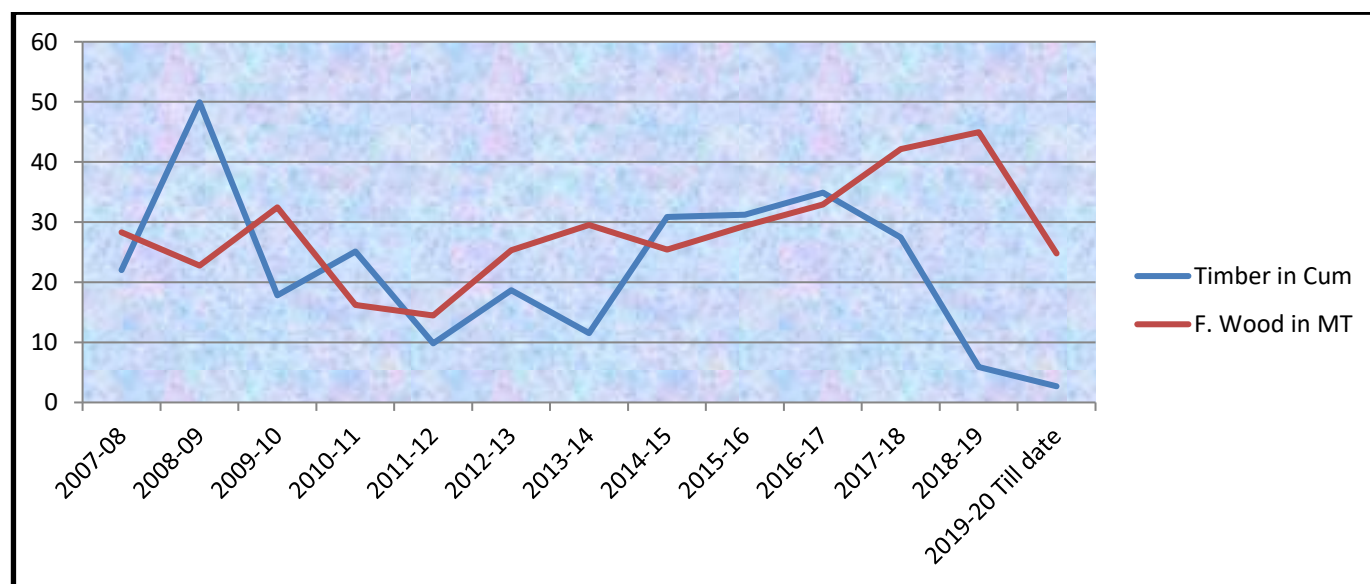




9.3.2 Number of cases booked / quantum of Forest Produce involved:

The quantum of various forest produce seized and compounding fees realized is furnished below at **Table No 9.3**

Year	Total Cases (OR+UD)	Quantum of Forest Produce Seized / involved			Compounding Fees Realized	Sale value obtained on disposal.	G. Total
		Timber in Cum	FW in MT	Others			
2007-08	668	22.017	28.29	-	73750	-	73750
2008-09	626	49.9348	22.771	-	66300	-	66300
2009-10	779	17.8349	32.445	-	98850	-	98850
2010-11	922	25.0999	16.232	-	122550	-	122550
2011-12	809	9.8207	14.468	-	146500	-	146500
2012-13	748	18.6451	25.305	-	127300	-	127300
2013-14	595	11.5516	29.515	-	123000	-	123000
2014-15	885	30.8836	25.445	-	320670	-	320670
2015-16	1110	31.2495	29.385	-	435100	-	435100
2016-17	874	34.912	32.949	-	435100	-	435100
2017-18	803	27.4705	42.16	-	444900	-	444900
2018-19	649	5.89	44.962	-	370200	-	370200
2019-20 Till date	498	2.6901	24.775	-	248200	-	248200
Total	9966	288	368.702	-	3012420	-	3012420





From the above facts, it is revealed that the disposals of booked cases are at a good position. Similarly, it is observed that the smuggling of Timber and Firewood is in a declined trend which is attributed to

- (i) Decreasing dependency on Timber and Firewood due to alternatives available at affordable price.
- (ii) Involvement of VSS in protection & management of forests is also factor in reduced forest cases.
- (iii) Decrease in availability quality timber in forest fringes.
- (iv) People are earning their lively hood by engaging in other activities than depending on Forest Produce.

9.3.3 Number of Cases sends to court / To Authorized Officer & disposal position:

Numbers of Cases send to court / To Authorized Officer & disposal position is furnished at **Table No 9.4**

Table No 9.4 Number of Cases send to court / To Authorized Officer & disposal position					
Year	Number of OR Cases	Cases send to		Disposal Position	
		Judicial Court	Authorized Court	Judicial Court	Authorized Court
2007-08	531	21	8	21	8
2008-09	518	15	6	15	6
2009-10	646	16	4	16	4
2010-11	820	14	7	14	7
2011-12	722	27	3	27	3
2012-13	697	22	8	22	8
2013-14	517	47	9	47	9
2014-15	777	28	7	28	7
2015-16	1036	29	7	29	7
2016-17	839	23	8	23	8
2017-18	777	19	3	19	3
2018-19	574	12	12	-	1
2019-20	590	02	02	-	-
Total	9044	275	84	261	71

9.3.4 Forest Offence for Violation of the Wildlife (Protection) Act,1972& Rules thereof.

The number of cases involved in violation of Wildlife Protection Act, 1972 & Rules thereof and its disposal Is furnished in Table No 9.5



Table No 9.5 No. of Wildlife case booked from 2008-09 to 2018-19 (as on 31.01.2020)					
Sl No.	Year	No. of Wildlife case Booked		No. of cases forwarded	No. of cases dropped
		OR	UD		
1	2008-09	1	3	1	3
2	2009-10	1	-	1	-
3	2010-11	1	-	1	-
4	2011-12	3	-	3	-
5	2012-13	7	2	7	2
6	2013-14	7	15	7	15
7	2014-15	4	8	4	8
8	2015-16	7	11	7	11
9	2016-17	10	3	10	3
10	2017-18	3	4	3	4
11	2018-19	-	4	-	4
12	2019-20 (as on 31.01.2020)	-	1	-	1

(NB: There are number of UD cases involving Wildlife and have been dropped after inquiry by DFO, Rairangpur / Asst. Conservator of Forests, Rairangpur.)

9.3.5 Cases booked for Violation of Forest (Conservation) Act, 1980

There is no case of violation under Forest (Conservation) Act, 1980.

9.4 Status of research and development:

No research activities have been taken up by this Division.

9.5 Human resource capacity building efforts:

For Human Resource Capacity Building, circle level training camps have been organized under CAMPATO improve working skill. Training on following subject matter is being conducted under various training program for Foresters, Deputy Range Officer & Range Officers.

- On Forest (Conservation) Act, 1980 and various amendments & guidelines issued by MoEF& CC, New Delhi.
- Joint Forest Management Resolution, 2011, 2015, 2019 & various stages of Development of Participatory Forest management since 1985.
- Forest Rights Act, 2006 its implication& procedure involved for settlement of Rights.



Working Plan of Rairangpur Forest division (2021 to 2031)

- iv. National Working Plan Code 2014, various techniques developed for tree enumeration, growing stock estimation, Carbon sequestration, Study of Regeneration Status. REED⁺ etc.

Besides short duration training course, workshops, symposium, the Foresters & Forest Guards are undergoing training at Forest Training institutes at Angul, Champua and Bhubaneswar. Various training camps organized during 2019 is furnished at **Table No 9.6**

Table No.9.6 Human Resource Development Programme(Staff/VSS)						
Sl No	Year	Name of Training Programme	Duration	Participants	Number of Participants	Remark
1	2019	Orientation on OFSDP-II and sensitization on Roles and Responsibilities of various Stakeholders	1 day	VSS Member, Member Secretaries, Animators, President, Field Staffs	64	-
2	2019	Orientation to Animators on OFSDP-II & their Roles and Responsibilities	1 day		148	2 nos. training
3	2019	Orientation on Survey & Demarcation of Assigned and treatment Area and Consolidation and Demarcation of Forest boundaries	1 day		48	-
4	2019	Training on Book keeping & Financial Management for the nominated EC members of each VSS	1 day		118	2 nos. training
5	2019	Training on PRA Exercise and on preparation of Micro Plan	1 day		48	-
6	2019	Training on PRA Exercise and on preparation of Micro Plan for Working Group, Women Working Group and Animators	1 day		895	13 nos. training
7	2019	Orientation on implementation of soil & moisture Conservations measures, raising of Nurseries & Plantation under JFM & Non JFM mode	1 day		308	-
8	2019	Forest Protection & Management, Fire line treatment etc.	1 day		236	-

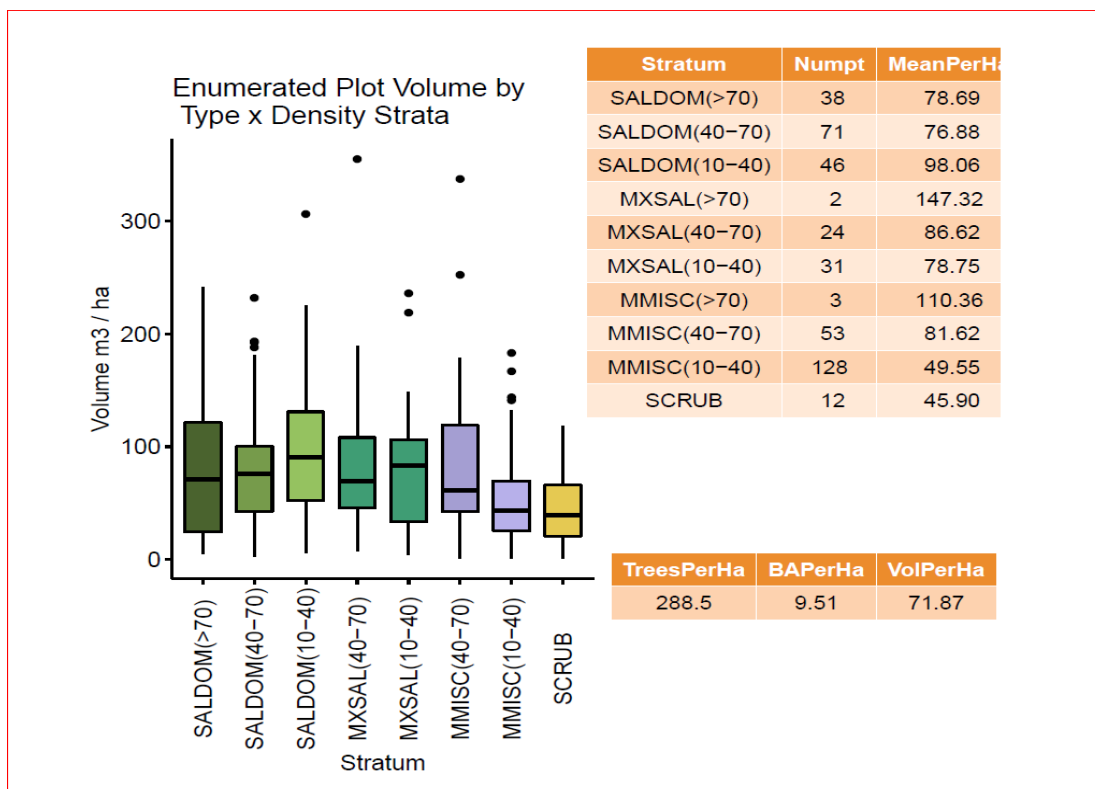


Table No.9.6 Human Resource Development Programme(Staff/VSS)

9	2019	Environmental & Social Consolidation Management & Monitoring	1 day		26	-
10	2019	2nd Preparatory Workshop on CMRV & REDD Plus readiness	1 day		54	-
11	2019	Workshops on Inter-Sectorial Convergence at DMU level	1 day		40	-
12	2019	Orientation to conduct survey on Impact of use of alternate source of fuel	1 day		52	-
Total			12 days		2037	

9.6 Forest Resource Accounting:

During Last Plan Period, no systematic approach has been developed and adopted for accounting Forest Resource of the Division. For preparation of working plan tree enumeration was done basing on sample point method. The enumeration data was uploaded on specific web site. On analysis of the data various parameter have been calculated. The inference after analysis is given below.



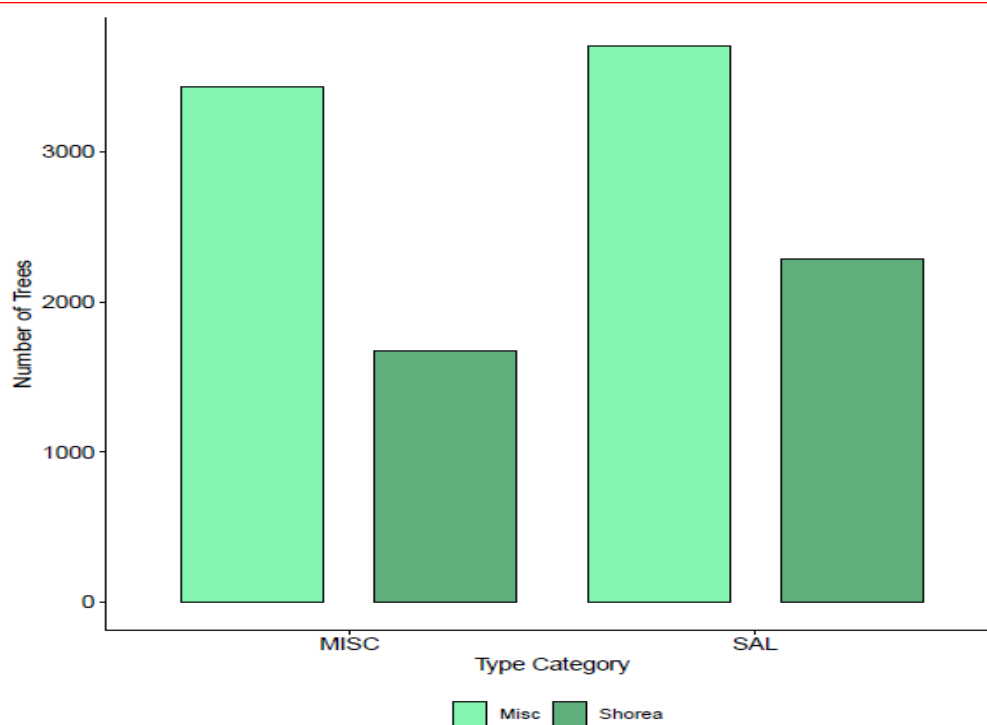
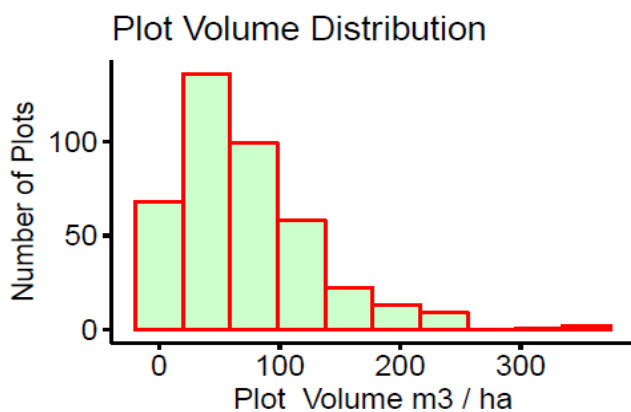


Figure 3: Type wise Number of trees from Inventory plots

9.7 Budgetary allocations to the forestry sector:

Budgetary allocation under different budget sub head is furnished below (Table No 9.7) which gives an indication about investment of resources in forestry sector.



Table No 9.7 Budgetary Allocations for Rairangpur Forest Division.

Year	Allotment in Lakh Rs					
	State Plan	Central Plan	FDA	CAMPA	Others	Total
2007-08	79.57340	16.32000	2.61989	0.00000	57.98400	156.50
2008-09	73.33700	26.19000	0.10000	0.00000	3.39920	103.03
2009-10	38.81460	11.35600	14.41429	0.00000	69.35000	133.93
2010-11	90.76691	5.20000	0.30000	240.70000	114.03691	451.00
2011-12	113.09220	3.10000	2.31180	117.73000	29.67000	265.90
2012-13	179.05977	35.70000	1.30581	206.08000	77.42000	499.57
2013-14	36.08414	6.44000	0.00000	264.21000	284.08511	590.82
2014-15	63.53568	2.83000	4.70588	404.36000	15.27855	490.71
2015-16	103.16020	4.49630	32.29518	448.92310	19.89927	608.77
2016-17	197.70706	0	7.07937	540.25878	93.41674	838.46
2017-18	277.73184	0	10.91231	290.73600	113.65810	693.04
2018-19	452.22248	0	18.42962	405.01500	0.00000	875.67
2019-20	111.03374	0	0.00000	303.99000	39.20000	454.22

9.8 Existence of monitoring, assessment and reporting mechanism:

For monitoring the implementation of various programs and assessment of success rate, standard monitoring mechanism has been developed in the Forest department. Online transmission of progress report, pay bills & payments, payment of wages to labour through Bank accounts are being implemented. All payments pertaining to CAMPA, MGNREGS, and FDA are 100% through bank accounts.

9.9 Public awareness and education:

Public awareness on various Forest & Environment matters is regularly being conducted by the division. World Wet lands Day, World Forestry day, Earth Day, World Environment Day, Elephant Day, Vanamahotsava week, Mass tree Planting Program, Wildlife Week are being celebrated at Division Level & Range Level. The usual features associated are

- Essay, Drawing, Debate, Paragraph writing Competitions being conducted involving School Children, Eco-clubs etc.
- Awareness through Rally, Nature camps etc are being conducted.
- Eco clubs are being promoted and various leaflets distributed among school children.
- Display of hoardings at public places to educate people,
- Conducting Meetings followed by Tree Planting Program,



- VSS members / NGO are motivated against Forest Fire.

Some of the events taken up by this division is furnished below (Table No 9.8)

Table No 9.8: Public Awareness Camps.		
Year	Days of Importance	Place
2014-15	Fire Awareness camp	Gargadi, Bangriposi&Talbandh
2015-16	Fire Awareness camp	Mahubhandar, Ghatkuanri
2016-17	Fire Awareness camp	Talbandh
2017-18	AkhandaShikar& Fire Awareness raily& camp	Bangriposi, Ghatkuanri& Asana
2018-19	AkhandaShikar& Fire Awareness raily& camp	Bankidihi , Ghatkuanri&Talbandh

9.10 Adequate manpower in forest division:

The Sanction cadre strength of Rairangpur Division is 104. As on 30.04.2020 the staff in position is as furnished in Table No 9.9

Table No 9.9 Sanctioned Cadre Strength and Present Position. (As on 30.04.2020)				
Sl No	Name of Cadre	Sanctioned Strength	Persons in Position	Vacancy
1	Divisional Forest Officer	1	1	-
2	Asst. Conservator of Forests	2	1	1
3	Forest Ranger	6	4	2
4	Deputy Ranger	4	4	-
5	Forester	21	24	-
6	Forest Guard	49	48	1
7	Head Clerk	1	-	1
8	Junior Stenographer	1	1	-
9	Junior Account	5	3	2
10	Junior Clerk	6	4	2
11	Jeep Driver	1	1	-
12	Amin	1	-	1
13	Office Peon	2	2	-
14	Choukidar	2	2	-
15	Sweeper	1	1	-
16	Watcher	1	-	1
	TOTAL	104	93	11



Form the above table it is seen that Staff position is good.

The division has been constituted since 1st October, 2003. The Divisional Forest Officers and their period on incumbency is furnished at **Annexure-XIV**

Besides the regular staff, there are protection squads, fire fighting squads, elephant trackers to assist the regular staff in the field. Considering the workload, various schemes under implementation, it is felt that more ministerial and technical staffs at grass root level (Forest Guards and Foresters) are required to be deployed for better management of forest & wildlife. It is also felt to have full-fledged computer cell and GIS Cell to monitor the work, prepare maps and study the growth of plantations through satellite imagery.





CHAPTER-10

Five Year Plans

10. Five Year Plans:

From 1947 to 2017, the Indian economy was premised on the concept of planning. This was carried through the **Five-Year Plans**, developed, executed, and monitored by the Planning Commission (1951-2014) and the NITI Aayog (2015-2017). With the prime minister as the ex-officio chairman, the commission has a nominated deputy chairman, who holds the rank of a cabinet minister. The Twelfth Plan completed its term in March 2017. Prior to the Fourth Plan, the allocation of state resources was based on schematic patterns rather than a transparent and objective mechanism, which led to the adoption of the Gadgil formula in 1969. Revised versions of the formula have been used since then to determine the allocation of central assistance for state plans. The new government elected in 2014, has announced the dissolution of the Planning Commission, and its replacement by a think tank called the NITI Aayog (an acronym for National Institution for Transforming India).

10.1 First Five year Plan: (1951-1956)

The First Five-Year Plan was one of the most important, because it had a great role in the launching of Indian development after Independence. Thus, it strongly supported agriculture production and also launched the industrialization of the country (but less than the Second Plan, which focused on heavy industries). It built a particular system of mixed economy, with a great role for the public sector (with an emerging welfare state), as well as a growing private sector.

The first Indian Prime Minister, Jawaharlal Nehru, presented the First Five-Year Plan to the Parliament of India and needed urgent attention. The First Five-year Plan was launched in 1951 which mainly focused in development of the primary sector. The First Five-Year Plan was based on the Harrod–Domar model with few modifications.

The total planned budget of Rs.2069 crore (2378 crore later) was allocated to seven broad areas:

- i. Irrigation and energy (27.2%),
- ii. Agriculture and community development (17.4%),
- iii. Transport and communications (24%),
- iv. Industry (8.4%),



- v. Social services (16.6%),
- vi. Rehabilitation of landless farmers (4.1%),
- vii. Other sectors and services (2.5%).

The most important feature of this phase was active role of state in all economic sectors. Such a role was justified at that time because immediately after independence, India was facing basic problems—deficiency of capital and low capacity to save.

The target growth rate was 2.1% annual gross domestic product (GDP) growth; the achieved growth rate was 3.6% the net domestic product went up by 15%. The monsoon was good and there were relatively high crop yields, boosting exchange reserves and the per capita income, which increased by 8%. National income increased more than the per capita income due to rapid population growth. Many irrigation projects were initiated during this period, including the Bhakra, Hirakud, Mettur Dam and Damodar Valley dams. The World Health Organization (WHO), with the Indian government, addressed children's health and reduced infant mortality, indirectly contributing to population growth.

At the end of the plan period in 1956, five Indian Institutes of Technology (IITs) were started as major technical institutions. The University Grants Commission (UGC) was set up to take care of funding and take measures to strengthen the higher education in the country. Contracts were signed to start five steel plants, which came into existence in the middle of the Second Five-Year Plan. The plan was quasi-successful for the government.

10.2 Second Five Year Plan: (1956-1961)

The Second Plan focused on the development of the public sector and "rapid Industrialization". The plan followed the Mahalanobis model, an economic development model developed by the Indian statistician Prasanta Chandra Mahalanobis in 1953. The plan attempted to determine the optimal allocation of investment between productive sectors in order to maximize long-run economic growth. It used the prevalent state-of-the-art techniques of operations research and optimization as well as the novel applications of statistical models developed at the Indian Statistical Institute. The plan assumed a closed economy in which the main trading activity would be centered on importing capital goods.

Hydroelectric power projects and five steel plants at Bhilai, Durgapur, and Rourkela were established with the help of Russia, Britain (the U.K) and West Germany respectively. Coal production was increased. More railway lines were added in the north east.



The Tata Institute of Fundamental Research and Atomic Energy Commission of India were established as research institutes. In 1957, a talent search and scholarship program was begun to find talented young students to train for work in nuclear power.

The total amount allocated under the Second Five-Year Plan in India was Rs.48 billion. This amount was allocated among various sectors: power and irrigation, social services, communications and transport, and miscellaneous. The second plan was a period of rising prices. The country also faced foreign exchange crisis. The rapid growth in population slowed down the growth in the per capita income.

The target growth rate was 4.5% and the actual growth rate was 4.27%.

The plan was criticized by classical liberal economist B.R. Shenoy who noted that the plan's "dependence on deficit financing to promote heavy industrialization was a recipe for trouble". Shenoy argued that state control of the economy would undermine a young democracy. India faced an external payments crisis in 1957, which is viewed as confirmation of Shenoy's argument.

10.3 Third Five Year Plan (1961-1966)

The Third Five-year Plan stressed agriculture and improvement in the production of wheat, but the brief Sino-Indian War of 1962 exposed weaknesses in the economy and shifted the focus towards the defense industry and the Indian Army. In 1965–1966, India fought a War with Pakistan. There was also a severe drought in 1965. The war led to inflation and the priority was shifted to price stabilization. The construction of dams continued. Many cement and fertilizer plants were also built. Punjab began producing an abundance of wheat.

Many primary schools were started in rural areas. In an effort to bring democracy to the grass-root level, Panchayat elections were started and the states were given more development responsibilities.

State electricity boards and state secondary education boards were formed. States were made responsible for secondary and higher education. State road transportation corporations were formed and local road building became a state responsibility.

The target growth rate was 5.6%, but the actual growth rate was 2.4%.

10.4 Plan Holiday (1966-1969)

Due to miserable failure of the Third Plan the government was forced to declare "plan holidays" (from 1966–67, 1967–68, and 1968–69). Three annual plans were drawn during this



intervening period. During 1966–67 there was again the problem of drought. Equal priority was given to agriculture, its allied activities, and industrial sector. The government of India declared "Devaluation of Rupee" to increase the exports of the country. The main reasons for plan holidays were the war, lack of resources and increase in inflation.

10.5 Fourth Five Year Plan (1969-1974):

At this time Indira Gandhi was the prime minister. The government nationalised 14 major Indian banks and the Green Revolution in India advanced agriculture. In addition, the situation in East Pakistan (now Bangladesh) was becoming dire as the Indo-Pakistan War of 1971 and Bangladesh Liberation War took funds earmarked for industrial development. India also performed the Smiling Buddha underground nuclear test (Pokhran-1) in Rajasthan on May 18, 1974, partially in response to the United States deployment of the Seventh Fleet in the Bay of Bengal. The fleet had been deployed to warn India against attacking West Pakistan and extending the war. The target growth rate was 5.6%, but the actual growth rate was 3.3%.

10.6 Fifth Five Year Plan (1974-1978)

The Fifth Five-Year Plan laid stress on employment, poverty alleviation and justice. The plan also focused on self-reliance in agricultural production and defense. In 1978 the newly elected Morarji Desai government rejected the plan. The Electricity Supply Act was amended in 1975, which enabled the central government to enter into power generation and transmission.

The Indian national highway system was introduced and many roads were widened to accommodate the increasing traffic. Tourism also expanded. The twenty-point programme was launched in 1975. It was followed from 1974 to 1979.

The Minimum Needs Programme (MNP) was introduced in the first year of the Fifth Five-Year Plan (1974–78). The objective of the programme is to provide certain basic minimum needs and thereby improve the living standards of the people. It is prepared and launched by D.P.Dhar. The target growth rate was 4.4% and the actual growth rate was 4.8%.

10.7 Rolling Plan (1978-1980):

The Janata Party government rejected the Fifth Five-Year Plan and introduced a new Sixth Five-Year Plan (1978–1980). This plan was again rejected by the Indian National Congress government in 1980 and a new Sixth Plan was made. The Rolling Plan consisted of three kinds of plans that were proposed. The First Plan was for the present year which comprised the annual budget and the Second was a plan for a fixed number of years, which may be 3, 4 or 5 years. The Second Plan kept changing as per the requirements of the Indian economy. The Third



Plan was a perspective plan for long terms i.e. for 10, 15 or 20 years. Hence there was no fixation of dates for the commencement and termination of the plan in the rolling plans. The main advantage of the rolling plans was that they were flexible and were able to overcome the rigidity of fixed Five-Year Plans by mending targets, the object of the exercise, projections and allocations as per the changing conditions in the country's economy. The main disadvantage of this plan was that if the targets were revised each year, it became difficult to achieve the targets laid down in the five-year period and it turned out to be a complex plan. Also, the frequent revisions resulted in the lack of stability in the economy.

10.8 Sixth five year Plan (1980-1985):

The Sixth Five-Year Plan marked the beginning of economic liberalization. Price controls were eliminated and ration shops were closed. This led to an increase in food prices and an increase in the cost of living. This was the end of Nehruvian socialism. The National Bank for Agriculture and Rural Development was established for development of rural areas on 12 July 1982 by recommendation of the Shivaraman Committee. Family planning was also expanded in order to prevent overpopulation. More prosperous areas of India adopted family planning more rapidly than less prosperous areas, which continued to have a high birth rate. Military Five-Year Plans became coterminous with Planning Commission's plans from this plan onwards.

The Sixth Five-Year Plan was a great success to the Indian economy. The target growth rate was 5.2% and the actual growth rate was 5.7%.

10.9 Seventh Five Year Plan (1985-1990)

The Seventh Five-Year Plan was led by the Congress Party with Rajiv Gandhi as the prime minister. The plan laid stress on improving the productivity level of industries by upgrading of technology.

The main objectives of the Seventh Five-Year Plan were to establish growth in areas of increasing economic productivity, production of food grains, and generating employment through "Social Justice".

As an outcome of the Sixth Five-Year Plan, there had been steady growth in agriculture, controls on the rate of inflation, and favourable balance of payments which had provided a strong base for the Seventh Five-Year Plan to build on the need for further economic growth. The Seventh Plan had strived towards socialism and energy production at large. The thrust areas of the Seventh Five-Year Plan were: social justice, removal of oppression of the weak, using modern technology, agricultural development, anti-poverty programmes, full supply of



food, clothing, and shelter, increasing productivity of small- and large-scale farmers, and making India an independent economy.

Based on a 15-year period of striving towards steady growth, the Seventh Plan was focused on achieving the prerequisites of self-sustaining growth by the year 2000. The plan expected the labour force to grow by 39 million people and employment was expected to grow at the rate of 4% per year.

Under the Seventh Five-Year Plan, India strove to bring about a self-sustained economy in the country with valuable contributions from voluntary agencies and the general populace.

The target growth rate was 5.0% and the actual growth rate was 6.01% and the growth rate of per capita income was 3.7%.

10.10 Annual Plan (1990-1992)

The Eighth Plan could not take off in 1990 due to the fast changing economic situation at the centre and the years 1990–91 and 1991–92 were treated as Annual Plans. The Eighth Plan was finally formulated for the period 1992–1997.

10.11 Eighth Five Year Plan (1992-97)

1989–91 was a period of economic instability in India and hence no Five-Year Plan was implemented. Between 1990 and 1992, there were only Annual Plans. In 1991, India faced a crisis in foreign exchange (forex) reserves, left with reserves of only about US\$1 billion. Thus, under pressure, the country took the risk of reforming the socialist economy. P.V. Narasimha Rao was the ninth prime minister of the Republic of India and head of Congress Party, and led one of the most important administrations in India's modern history, overseeing a major economic transformation and several incidents affecting national security. At that time Dr. Manmohan Singh (later prime minister of India) launched India's free market reforms that brought the nearly bankrupt nation back from the edge. It was the beginning of liberalization, privatization and globalization (LPG) in India.

Modernization of industries was a major highlight of the Eighth Plan. Under this plan, the gradual opening of the Indian economy was undertaken to correct the burgeoning deficit and foreign debt. Meanwhile, India became a member of the World Trade Organization on 1 January 1995. The major objectives included, controlling population growth, poverty reduction, employment generation, strengthening the infrastructure, institutional building, tourism management, human resource development, involvement of Panchayati raj, Nagar Palikas, NGOs, decentralization and people's participation.



Energy was given priority with 26.6% of the outlay.

The target growth rate was 5.6% and the actual growth rate was 6.8%.

To achieve the target of an average of 5.6% per annum, investment of 23.2% of the gross domestic product was required. The incremental capital ratio is 4.1. The saving for investment was to come from domestic sources and foreign sources, with the rate of domestic saving at 21.6% of gross domestic production and of foreign saving at 1.6% of gross domestic production.

10.12 Ninth Five year Plan (1997-2002)

The Ninth Five-Year Plan came after 50 years of Indian Independence. Atal Bihari Vajpayee was the prime minister of India during the Ninth Plan. The Ninth Plan tried primarily to use the latent and unexplored economic potential of the country to promote economic and social growth. It offered strong support to the social spheres of the country in an effort to achieve the complete elimination of poverty. The satisfactory implementation of the Eighth Five-Year Plan also ensured the states' ability to proceed on the path of faster development. The Ninth Five-Year Plan also saw joint efforts from the public and the private sectors in ensuring economic development of the country. In addition, the Ninth Five-Year Plan saw contributions towards development from the general public as well as governmental agencies in both the rural and urban areas of the country. New implementation measures in the form of Special Action Plans (SAPs) were evolved during the Ninth Plan to fulfill targets within the stipulated time with adequate resources. The SAPs covered the areas of social infrastructure, agriculture, information technology and Water policy.

Budget

The Ninth Five-Year Plan had a total public sector plan outlay of 859,200 crore (US\$120 billion). The Ninth Five-Year Plan also saw a hike of 48% in terms of plan expenditure and 33% in terms of the plan outlay in comparison to that of the Eighth Five-Year Plan. In the total outlay, the share of the center was approximately 57% while it was 43% for the states and the union territories.

The Ninth Five-Year Plan focused on the relationship between the rapid economic growth and the quality of life for the people of the country. The prime focus of this plan was to increase growth in the country with an emphasis on social justice and equity. The Ninth Five-Year Plan placed considerable importance on combining growth oriented policies with the mission of achieving the desired objective of improving policies which would work towards the



improvement of the poor in the country. The Ninth Plan also aimed at correcting the historical inequalities which were still prevalent in the society.

Objectives

The main objective of the Ninth Five-Year Plan was to correct historical inequalities and increase the economic growth in the country. Other aspects which constituted the Ninth Five-Year Plan were:

- Population control.
- Generating employment by giving priority to agriculture and rural development.
- Reduction of poverty.
- Ensuring proper availability of food and water for the poor.
- Availability of primary health care facilities and other basic necessities.
- Primary education to all children in the country.
- Empowering the socially disadvantaged classes like Scheduled castes, Scheduled tribes and other backward classes.
- Developing self-reliance in terms of agriculture.
- Acceleration in the growth rate of the economy with the help of stable prices.

Strategies

- Structural transformations and developments in the Indian economy.
- New initiatives and initiation of corrective steps to meet the challenges in the economy of the country.
- Efficient use of scarce resources to ensure rapid growth.
- Combination of public and private support to increase employment.
- Enhancing high rates of export to achieve self-reliance.
- Providing services like electricity, telecommunication, railways etc.
- Special plans to empower the socially disadvantaged classes of the country.
- Involvement and participation of Panchayati Raj institutions/bodies and Nagar Palikas in the development process.

Performance

- The Ninth Five-Year Plan achieved a GDP growth rate of 5.4% against a target of 6.5%
- The agriculture industry grew at a rate of 2.1% against the target of 4.2%
- The industrial growth in the country was 4.5% which was higher than that of the target of 3%
- The service industry had a growth rate of 7.8%.
- An average annual growth rate of 6.7% was reached.



The Ninth Five-Year Plan looks through the past weaknesses in order to frame the new measures for the overall socio-economic development of the country. However, for a well-planned economy of any country, there should be a combined participation of the governmental agencies along with the general population of that nation. A combined effort of public, private, and all levels of government is essential for ensuring the growth of India's economy.

The target growth was 7.1% and the actual growth was 6.8%.

10.12 Tenth Five year Plan (2002-2007)

The main objectives of the Tenth Five-Year Plan:

- Attain 8% GDP growth per year.
- Reduction of poverty rate by 5% by 2007.
- Providing gainful and high-quality employment at least to the addition to the labour force.
- Reduction in gender gaps in literacy and wage rates by at least 50% by 2007.
- 20-point program was introduced.
- Target growth: 8.1% – growth achieved: 7.7%.
- The Tenth Plan was expected to follow a regional approach rather than sectoral approach to bring down regional inequalities.
- Expenditure of 43,825 crore (US\$6.1 billion) for tenth five years.

Out of total plan outlay, 921,291 crore (US\$130 billion) (57.9%) was for central government and 691,009 crore (US\$97 billion) (42.1%) was for states and union territories.

10.13 Eleventh Five year Plan (2007-2012)

- It was in the period of Manmohan Singh as a prime minister.
- It aimed to increase the enrolment in higher education of 18–23 years of age group by 2011–12.
- It focused on distant education, convergence of formal, non-formal, distant and IT education institutions.
- Rapid and inclusive growth (poverty reduction).
- Emphasis on social sector and delivery of service therein.
- Empowerment through education and skill development.
- Reduction of gender inequality.



- Environmental sustainability.
- To increase the growth rate in agriculture, industry and services to 4%, 10% and 9% respectively.
- Reduce total fertility rate to 2.1.
- Provide clean drinking water for all by 2009.
- Increase agriculture growth to 4%.

10.14 Twelveth Five year Plan (2012-2017)

The Twelfth Five-Year Plan of the Government of India has been decided to achieve a growth rate of 8.2% but the National Development Council (NDC) on 27 December 2012 approved a growth rate of 8% for the Twelfth Plan.

With the deteriorating global situation, the Deputy Chairman of the Planning Commission Montek Singh Ahluwalia has said that achieving an average growth rate of 9 percent in the next five years is not possible. The Final growth target has been set at 8% by the endorsement of the plan at the National Development Council meeting held in New Delhi.

The objectives of the Twelfth Five-Year Plan were:

- To create 50 million new work opportunities in the non farm sector.
- To remove gender and social gap in school enrolment.
- To enhance access to higher education.
- To reduce malnutrition among children aged 0–3 years.
- To provide electricity to all villages.
- To ensure that 50% of the rural population have accesses to proper drinking water.
- **To increase green cover by 1 million hectare every year.**
- To provide access to banking services to 90% of households.





CHAPTER-11

Past System of Management

11.1 General history of the Forests:

Prior to 1885 some timber leases of matured and exploitable Sal trees only had been given from Plain Forests of Mayurbhanja District / Similipal Forests. It caused more damaged to the forest than it gave revenue. The lease expired on 1885-86 and Mr. C.C.Hart described the expiry of lease as “fortunate ending”

11.1.1 Working from 1885-86 to 1904-05:

It appears that exploitation was done departmentally and round timber were floated down the Budhabalanga and also transported in carts to Balasore for Sale in Depots maintained by State. By this time outside market for Mayurbhanja timber got established due to railways. Leasing out of several coupes in west Similipal Hills to traders at concessional rates during 1904-05 for working on selection pattern and leasing of five coupes on plains (one kept for tenants) resulted due to this reason. The objective was to exploit Sal trees of girth above 6’ at breast height in selection system which would otherwise became unsound and plain forests under coppice system to check unregulated felling in these forests. For Selection Coupes the rate of Royalty was Rs 7.06 per cum. This low rate was kept to encourage lessee to construct roads for extraction inside the forests.

First systematic exploitation of Similipal Reserve was taken up through contractors find its place in AAR 1906-07 (Annual Administrative Report 1906-07). The exploitation was carried out as per Working Plan Report of Mr. C.C. Hart. Eight Contractors in West Similipal Working Circle and four in East Similipal Working Circle were allowed. Subsequently M/s B. Barooah & Co was added to make it thirteen in 1906-07. The timber extraction is summarized as below.

Table No 11.1 Past timber working (1905-06 & 1906-07)

Year	Timber Exploited	Royalty	Kurias exported	Royalti	Timber in Stack.
1905-06	N.A	39649-13-10	---	---	--
1906-07	5021.6 cum	43708-9-0	7227	8241-12-3	5240.0 Cum at Jashipur and Manada Depot.



System of work under leases up to 1916 and their result.

The Leases from 1904-05 to 1916 were based on the working plan Report of Mr. C.C.Hart. The principles laid down for exploitations were

- I. Selection –cum- Improvement Felling of Sal trees above 6' Girth which was likely to deteriorate otherwise in Hill Reserve.
- II. Coppice felling in plains to check unregulated fellings in plain forests.

M/s B. Barhooah & Co was entitled to remove all trees of 6' Girth and above at breast height in all leases granted for 10 years. The following restrictions were also prescribed for regulating felling. These species are not to be removed / harvested.

1. All Kusk, Kasafala, Kochila, Bahara, Simili, Far and Asana.
2. All edible fruit bearing trees viz Mahula, Chara, Kendu etc
3. Bamboo Clumps.
4. All trees on or along bank of streams and nallahs.
5. All other trees which were 6' in Girth at Breast Height with bark except marked by Forest department.

Out Turn:

Anticipated Annual out turn: 1,00,000 cft.

Though the result of the lease was considered as very satisfactory at that time, the defects were noticed.

- i) Details of exploitation, its sequence were not marked in the Working Plan Report by Mr. C.C.Hart.
- ii) Marking has no Silvicultural consideration except the Girth at Breast Height, trees on Nallaha / stream banks.
- iii) Neither any previous enumeration was done nor was any yield prescribed.
- iv) No silvicultural operation was prescribed or appears to be taken up.

Therefore the increase in revenue was the only criteria for satisfaction of lease and subsequently the lease was extended for 30 years i.e. 1946.



Execution System of Exploitation of 30 years Lease:

The history of lease in favour of M/s B. Barooah & Co (Renamed as Barhooah Timber Company Ltd in 1919) from 1916- to 1946 is the most significant part of the Forest management of Mayurbhanj during the pre- independent period. The salient points of Lease are given below.

- The lease covered whole Similipal forest
- East Similipal Range was relinquished later “**on mutual consent**”.
- The lease was for species Sal only.
- Stipulated annual outturn is 3.00 lakh cft with maximum 5 lakh ft converted Sal timber for export which was increased latter to 8.00 lakh cft.
- Exploitable GBH reduced to 5’
- Exploitation in N.W. and three Similipal Ranges were heavy due to the increased annual out turn.
- By 1939 both W and N Ranges were worked and exploitation in the ranges was behind the Schedule due to inaccessibility of the area.
- To cover the stipulated quantity exploitable girth at Breast Height was reduced from 5’ to 4 & ½’ in N. W Ranges.
- The company was always ahead of schedule for their perfect organization of sawing and transportation.
- Division of whole Similipal Reserve in to four ranges i.e. East, West, North and South ranges. Division of each range boundary to permanent line was not made permanent.

Results:

The following results of this lease can be easily distinguished.

- The period of lease was the period of ruthless exploitation of the Similipal Forest. The World War-II is within this period when there is a great demand for timber for railway line and ship construction.
- Reduction of exploitable Girth from 5’ to 4 & ½ ‘ in 1939 allowed exploitation of young crop on one hand and reworking of previously worked out coupes in N & W Range is in bad management practice.
- In view of the concessions under above two criteria, the company / lease holder agreed to do improvement felling and climber cuttings. In the name of improvement felling trees below 4 & ½’ GBH were also exploited and the climber cutting which should have given the priority was given a very low priority.



- An annual outturn of 8.00 lakh cft from lease area (3 of Similipal Reserve Area 836.48 Sq. Miles) 4,01,684 Acre is calculated to be 2cft / acre/ annum. Though it looks moderate this includes blank areas, savana land, River and nalla beds, plateau above 2800' and un- productive area where either no marking was done or there was no exploitable trees. The actual area from which timber was extracted was much less than the gross area and thus the exploitation was extremely heavy.
- Before operation of lease the crop was congested with preponderance with trees of higher girth class and defective trees. This was because of no proper working and for this reason no normal increment to trees added.
- When the lease objectives were to extract salable sawn timbers only which was in form of railway sleepers at that period, extraction of 8.00 lakh cft sawn sizes may be equivalent to about 10 to 12 lakh cft round timber.
- Felling was not controlled and regulated by any systematic plan. The result was haphazard felling all over the area. The area couldn't afford as a sustained yield basis without control over the yield and method of working.
- After 1920 these forest were worked under coppice with standard system with a rotation of as low as 15 years. The defect of the system of extraction and its ill effect was not recognized and therefore no attempt was made to correct the system and check deterioration.

11.1.2 Working plan By Sri B.M. Dasgupta: (1947-48 to 1952-53)

The Past System of Treatment of Panchpir and Bamanghati forests are not available. Based on Scanty records available, it has been pointed out in JEE's Plan that large area of Badampahar Reserved Forests was jumped in past and latter worked for large sized timbers. In lease of B. Barooah & Co of Badampahar Reserved Forests and in lease of B. Barooah, Sri R.D. Nadal and Sri S.S. Das of forests of Thakurmunda, Rairangpur, Baripada, Karanjia and parganas, all big trees above 4' girth were exploited. Other forests of Bamanghati sub division were also similarly worked.

Result:

Mr. R.C. Ramsay, political agent of Odisha Foundary States reported (1920-21) that the State would soon face with a longer period where there will be no Sal of mercantile size and the forest also contained as enormous number of state headed hollow badly grown trees dry rot in common and value less young trees. This report reflected the result of working during the lease period.



Mr. Gasguta's comment that the lease land experience exploitation of mature sal trees and steady encroachments of miscellaneous species could not be studied quantitatively and it was matter of observation only. Since felling was continued only to Sal trees and removal of miscellaneous species in proportion could not be ruled out.

After completion of Dasgupta's Plan 10% enumeration of available crop was conducted. The result is reproduced below.

Table No 11.2 Ratio between Sal / Non Sal after harvesting.			
Coupe Selected for enumeration	Criteria for enumeration	Availability of number of trees / Acre Sal	Availability of number of trees / Acre Non Sal
C.C- I	Trees above 5' GBH	0.367	0.917
G.C.-II	Above 4 ½ ' up to 5' GBH	0.729	1.027
G.C-III	Between 3' to 4½' GBH	7.180	5.570
G.C. -I,II & III	Sal Ratio	1:2:20	
	Non sal ratio	1:1:6	
	Sal Non sal taken together	1:2:3	

11.1.3 Working plan By Sri Shree pal Jee, IFS (1953-54 to 1972-73):

After merger of Mayurbhanj Ex-state in the year 1949, it was felt that Working Plan of Similipal Forest prepared by Sri Dasgupta was having inadequate provisions to meet silvicultural requirements of forests. Further the reserved forests in plains being worked out under sketchy schemes were only tabular statements of felling was required to be covered under a comprehensive plan consistent with the Govt. Policy and management. Hence this Plan was prepared by Sri S. Jee, IFS for Reserved forests of Mayurbhanj District for a period of 20 years i.e. from 1953-54 to 1972-73.

The Plan prescribed five Working circles namely

- 1) Selection Working circle (SWC),
- 2) Improvement Working circle (IWC),
- 3) Coppice Working Circle (CWC),
- 4) Bamboo Working Circle (BWC) &
- 5) Protection Working Circle (PWC)



Selection WC:

All valuable high forests situated in Similipal Hills, Natto and Satkosia Blocks and Part of Badampahad Blocks were included in “**Selection Working Circle**”. Twelve felling Series were formed. The silvicultural system adopted was **Selection – cum- Improvement** with a felling cycle of 20 years. Yield was regulated by area with retention percentage of 33% of exploitable trees. Thus two trees out of three available exploitable trees were to be removed. The exploitable Girth at Brest Height (GBH) as fixed in the Sri S. JEE Plan is furnished below.

Table No 11.3 Exploitable Girth prescribed in Jee’s Plan. (SWC)		
Species	Exploitable GBH for all FS except Natto, Stkosia and Jashipur.	Exploitable GBH for Natto, Stkosia and Jashipur.
A. Principal Species		
Sal	5’	3’6”
Piasal, Koim	6’	4’
Banakhira, Gambhari	6’	3’6”
Champa	7’	3’
Pangan	3’	3’
Sisoo	4’	3’
Nageswar	5’	3’
B. Usefull Species		
Asan	5’6”	3’6”
Gudi Koim	6’	6’
Jamu	5’	3’6”
Simuli	6’	4’
Toon	6’	3’
Chhachinam, Charala, Bhurtudam, Pani Gambhari	6’	3’
Sidham Sal, Salai,, Nimili, Kadam	5’	3’
C. Others (inferior Species)		
Mahul	5’	3’6”
Dhaw	5’	2’6”
All others	5’	3’

Improvement Working circle

All good quality plain Sal Forest of Karanjia, Kendumundi and Thakurmunda Ranges were put in this Working Circle. Light improvement felling was prescribed with 30 years felling Cycle. Three Felling Series were prescribed with “**Selection –Cum – Improvement System**” for future



working for conversion to uniform system. Choice of Species with exploitable girth as prescribed is given below.

Table No 11.4 Exploitable Girth (Improvement WC)	
Species	Exploitable Girth (GBH)
Principla Species	
Sal	5'
Piasal	5'
Banakhira	5'
Gambhari	3'6"
Sisoo	3'6"
Pangon	3'
Useful Species	
Asan	5'
Inferior Species	
All other Species	5'

Coppice WC:

All the remaining forest areas except Sabai Plantations in Jamsola Compartment-I, Bamboo Plantation areas, areas with poor growth and included in Protection WC were assigned to Coppice Working Circle. Total 88 Felling Series were constituted with a rotation period of 40 years. The yield is regulated by Area only. Retention of 10 trees per acre of Sal, Piasal, Sisoo and Gambhari along with all edible fruit bearing species like Mango, Mahul, and Char numbering to five per Acre was prescribed. Thus total retention is up to maximum 25 trees per acre.

Bamboo WC:

All Bamboo bearing forests and Bamboo plantation area allotted to Bamboo Working Circle. A cutting Cycle of 3 years was suggested with clump selection basis.

Protection WC:

Forest having no bamboo, Mining areas, Poor growth forest blocks and Sabai Grass plantations were included in Protection WC. Protection against grazing, illicit felling was prescribed.



11.1.3.1 Result of Sri S. Jee Plan:

In fact the Working Plan by Sri S.JEE, IFS was the first comprehensive plan for management of all Reserved Forests of Mayurbhanj district. Result of prescriptions working Circle wise is discussed below.

Selection WC

- 1) Exploitable girth prescribed for Natto, Satkosia and Jashipur Felling Series was on lower side and no retention was prescribed. As a result heavy marking was taken up with revenue earning intension / trend.
- 2) The 33% retention percentage prescribed in other F.S. is also in a lower side. It would have been better if it was minimum 50%.
- 3) Though the prescriptions were to have a better managed forest, the interpretation was of revenue oriented only.
- 4) After timber working Subsidiary Silvicultural Operation was neglected as the produce obtained from such operation is found uneconomical.
- 5) No attention was given to Wildlife management aspect.

Improvement WC:

- 1) The objective was to improve the crop through set of Silvicultural practices by way of removing dead / defective / suppressed trees. In fact the prescription was interpreted as a new relaxed marking rules and heavy exploitation took place.
- 2) In practice there was no difference in between Selection System and Improvement system.
- 3) Cyclone occurred in 1971 and lot of damage was caused to the standing crop.
- 4) After end of plan period, the crop was found in a degraded stage than where it has started. It may be due to poor Subsidiary silvicultural operation and lack of established regeneration.
- 5) No steps taken to protect forests / regeneration against grazing and encroachment. It had a very adverse effect on Forest.

Coppice WC:

- 1) The Author of the Plan Sri S. JEE, IFS realized that the rotation Felling Cycle should be 60 years but ultimately prescribed a felling cycle / rotation of 40 years. Due to lack of adequate protection measures against grazing, illicit felling, protection to standards etc,



the desired establishment of regeneration out of coppice shoots in the forest not noticed as expected.

2) The yield consideration was not proper.

Bamboo WC:

The Cutting cycle of three years found to be too early harvesting practices and adequate time for establishing the regeneration (Culms). Heavy browsing / lopping of branches for fodders resulted in denudation of Bamboo clumps.

Protection WC:

In practice no protection could be provided to the forests assigned to this Working Circle except Sabai Plantation of Jamsola Block.

Conclusion:

The S. JEE's Plan though considered the forest on a wholistic view and aimed at improving the forest including Bamboo and Sabai Grass plantation, due to various reasons, the desired result is not obtained. The very good crop monumental to the region was ruthlessly harvested. Further Wildlife Conservation and related matters not addressed in the plan as desired.

11.1.4 Working Plan By Sri R. Mishra, IFS (1973-74 to 1992-93)

On expiry of JEE's Plan forests of Baripada Division and Karanjia Division were managed by separate plans for two separate division. The Working Plan for Baripada Division was prepared by Sri S. Bose, IFS and for Karanjia Division by Sri R Mishra, IFS for a period of 20 years. The present Rairangpur Division is carved out from Karanjia Division. Hence it will be appropriate to discuss the Sri R. Mishra Plan for deriving the conclusion on future management practices.

11.1.4.1 General outline of the Sri R. Mishra, IFS Plan:

The basic objectives of this plan were to maintain and improve the forest cover. Maximum production consistent with the objectives was taken as future yield. Five Working circles were constituted to regulate various working. These are

- i) Selection Working Circle,
- ii) Sal Conversion Working Circle,
- iii) Coppice Working Circle,
- iv) Rehabilitation Working Circle,



v) Plantation Working Circle,

All the forests of Karanjia Division those were worked under Selection WC of last plan were to Selection WC of this plan also except (i) seven compartments included in Project Tiger core area – to be managed under Wildlife management Plan. (ii) Satkosia –Compartment no 6 in Coppice WC, (iii) Satkosai-I and Nodda block were assigned to Selection WC. The total area under Selection WC was 1256 Sq. Km.

Areas assigned to Improvement WC of last plan were assigned to Sal Conversion WC with an aim to manage under conversion to uniform system. The area assigned to this WC was 135 Sq. Km.

Area worked under Coppice system in last plan were assigned to the same WC i.e. Coppice WC. The area assigned to this WC was 222 Sq. Km.

Areas with Sal rooted waste and previously worked under Coppice System were assigned to Rehabilitation WC. Total area assigned to RWC was 105 Sq. Km

Area having no substantial growth and large blank areas were put to Plantation WC. The area assigned was 67 Sq. Km.

11.1.4.2 Prescriptions & Result of Working.

a) Selection WC:

The silvicultural System prescribed for this Working Circle was Selection cum Improvement. 13 Felling Series with 20 years felling cycle were constituted to facilitate smooth working. Retention of Sound Sal trees above exploitable girth was fixed to 25% for Gurguria, Kaliani, Jamuna, Dudhiani, Kendumundi and Ankurbasa FS. In case of Jamuni, Bareipani and Champajharan FS 33% of Sal trees above exploitable Girth was prescribed. 50% of Sal trees above Exploitable GBH were prescribed for Talabandha and Kusuktola F.S. The exploitable Girth Prescribed for various Species is given below.



Table No 11.5 Exploitable Girth Prescribed for various Species

Sl No	Species	Exploitable GBH in cm for all except Satlodia and Jashipur FS.	Exploitable GBH in cm for Satlodia and Jashipur FS.
A.Principal Species			
1	Sal, Piasal	150, 180	90,120
2	Sisoo	120	120
3	Champa	270	90
B. Useful Species.			
4	Banbhira	180	120
5	Panjan	105	90
6	Gambhar	180	120
7	Nageswar	150	90
8	Koim	180	120
9	Asan	165	120
10	Toon	180	90
11	Sidha	150	90
12	Simil	180	90
13	Salai , Kadam	150	90
14	Chachina	180	90
C.Inferior Species.			
15	Mango, Godikoim	180	90
16	Charla, Bhukundi	180	90
17	Mahul, Jamu, Dhaura	150	120
18	All Others	150	90

Provisions were kept for protection against grazing, fire and special provisions for frost affected area.

b) Sal Conversion WC.

Three felling Series were constituted i.e. One for each Range namely Karanjia, Kendumunda and Thakurmunda. The area of each Felling series was divided to six periodic blocks of 20 years each. The conversion period was fixed to 120 years. Yield in PB-I is regulated by area only.

Method of Exploitation:

Clear felling with retention of Advance Growth with 60cm gbh and retention of 10 best tree per hectare of Sal and Piasal between 60-90cm girth.



Subsidiary Silvicultural operation:

Cleaning & Climber cutting in the year following the main felling. First thinning was prescribed on 10th year after main felling and subsidiary Silvicultural operation taken up. Light Crown thinning was prescribed in PB-II area. For other PB, 'C' grade thinning was prescribed. In rest of the periodic blocks controlled grazing was allowed.

c. Coppice WC:

The Silvicultural system prescribed was "Coppice with Standard" on 60year Rotation in 13 those are in hilly area. On rest 5 FS in plain; the rotation was fixed at 40 years. Yield was regulated by area. 25 number of Standard within Girth Class 30cm- 60cm was required to be retained. Retention of fruit bearing species maximum 10 numbers per hectare was suggested in addition to the prescribed standard. Standard trees so retained should be well evenly distributed all over the area. In case of hill slopes, instead of clear felling selection marking above 90cm GBH was prescribed. Sal, Piasal, Sisoo, Gambhar and Panjam were considered as principal species, Barkhira, Asan, Koim, Karada, Sidha and Dhaw were considered as secondary Species and rest were considered as inferior species. Fruit bearing species were considered as protected species. Climber cutting, Cleaning, Soil Working, Sowing & Planting and closure to grazing, fire protection was prescribed along with the subsidiary operation. Thinning was prescribed on 10th year, 20th year and 30th year for forests with 60 year rotation period.

Rahabilitation WC:

The area assigned to Rehabilitation was aimed to improve through Aided Natural Regeneration. Five Treatment Series with 20 year cycle was constituted. The activities recommended were Silvicultural Cleaning with fencing, removal of Dead trees, thinning in congested patches and climber cutting. Protection against grazing, fire was also prescribed.

Plantation WC:

Existing Plantation and fresh blank areas were included in this Working Circle. It was proposed to plant Eucalyptus hybrid, Acacia and Bamboo mixed with other indigenous species. 15 year rotation was prescribed. Thinning in 8th Year was also suggested.



Result Analysis:

Selection WC:

Permissible exploitation prescribed i.e. 75% of available trees in 4 FS, 66% in 3FS and 50% in 2 FS was considered to be very high with the existing crop condition. On interpretation of average diameter of Approach class the value of (i) Smith's Formula was taken as 2 against 40 years. This resulted in high removal percentage of available trees for removal. The regeneration expected to follow was not come up as desired.

Sal Conversion WC:

The result of Sal Conversion through Coppicing with Reserve was proved to be detrimental to Forest Cover.

- i) For Sal Forests of Thakurmunda, Kendumundi and Karanjia situated on gentle slopes were of Quality Class II to IV with average Quality Class-III. These forests were in Improvement WC in the S. JEE's Plan. It would have been wiser if it was managed under Selection System than Conversion System.
- ii) The reason given for adopting conversion to uniform system i.e. increase in demand for poles etc are just not convincing for adopting conversion to uniform system.
- iii) The worked out coupes suffered a lot and instead of a uniform crop, the areas needed rehabilitation and plantation to restock the forest.
- iv) The objectives of Working Circle to convert the forest to even age forest and to attain normal forest as fast as possible have miserably failed.

Coppice WC:

The system had failed because the Standard trees retained were subsequently removed by people illegally and area which consists small scattered blocks could not be protected from biotic interference. As a result, the system failed miserably. The crop was degraded to such an extent that rehabilitation measures with strict protection can only improve the situation.

Rehabilitation WC:

The prescriptions of the plan were just not followed either due to financial or field constraints. Attempts so far made were remained half hearted, fragmented and not oriented towards result of improvement. The area remained as degraded as before and to be included for rehabilitation.



Plantation WC:

Successful plantations of Eucalyptus hybrid and Acacia were raised in most of the area included in the Working Circle. The Rotation period of 15 years was found to be in a higher side as the intention is of biomass production. Schedule of thinning and harvesting was not followed. The harvesting Schedule was required to be implemented.

In an over view, the prescriptions of Sri R. Mishra's plan ended with further degradation of forests than it improved the loi.

11.1.5 Working plan By Sri A.O.F Bakhla, IFS (1996-97 to 2015-16):

The outgoing plan is by Sri A.O.F.Bakhla, IFS which will be followed by this plan after approval. The plan was for Karanjia Division which was subsequently reorganized to give birth to Rairangpur Division. The portion of this outgoing plan which is applicable to this division will be only discussed.

The most of the forests coming under Rairangpur Division were previously under Selection WC, Improvement WC and Coppice WC. After considering the crop condition and regeneration status, the forests of Rairangpur Division was assigned to two Working Circle i.e.

- i) Rehabilitation WC and
- ii) Plantation WC.
- iii) Wildlife WC (Overlapping)

All Reserved Forests of the Division were included in the plan. No DPF, PRF or PF were included for comprehensive management. The Village Forests as declared u/s 30 of the Odisha Forest act, 1972 were not declared then.

The area assigned to different Working Circles are as follows.

The outgoing plan prescribed three working circle for the division i.e. Rehabilitation Working Circle, Plantation Working Circle and Wildlife (Overlapping) Working Circle. The Reserved forest Blocks were only considered for management. The area distribution to different working circle is as given in Table No 11.6.



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 11.6 Area Allotment to Different Working circle as per Outgoing Plan.

Name of the Range	Sl No	Category of forest	Total area under management	Name of the Working Circle and area allotted in ha.		
				RWC	PWC	WL (O) WC
Badampahar	1	Badampahar RF	2746.48	2746.48	0	2746.48
	2	Basila RF	220.54	220.54	0	220.54
	3	Dubulabeda RF	498.16	498.16	0	498.16
	4	Jhatisiring RF	28.32	28.32	0	28.32
Rairangpur	5	Jari RF	2982.00	2982.00	0	2982.00
	6	Jhumkapahadi RF	70.40	70.40	0	70.40
	7	Gorumahisani RF	2462.40	2462.40	0	2462.40
	8	Dumurikudar RF	34.40	34.40	0	34.40
	9	Brahamani RF	763.28	763.28	0	763.28
Bahalda	10	Manbir RF	656.52	656.52	0	656.52
	11	Budheirana RF	1376.34	1376.34	0	1376.34
	12	Ramgarh Asurghaty RF	907.06	907.06	0	907.06
	13	Debradihi	45.08	45.08	0	45.08
Bisoi(WL)	14	Tunguru RF	3656.80	3656.80	0	3656.80
	15	Mahubhandar RF	1048.78	1048.78	0	1048.78
	16	Kanapat RF	3640.40	3640.40	0	3640.40
	17	Sarali RF	2028.90	2028.90	0	2028.90
	18	Tower-I&II RF	201.19	201.19	0	201.19
Manada	19	Tulasibani RF	3.50	3.50	0	3.50
	20	Khadambeda RF	80.52	80.52	0	80.52
		TOTAL	23451.07	23451.07	0	23451.07
Badampahar	21	Kherna RF	495.72	-	495.72	495.72
	22	Hat Badra RF	90.54	-	90.54	90.54
Rairangpur	23	Sargoda RF	106.78	-	106.78	106.78
	24	Karanjharan Dhusura RF	540.60	-	540.60	540.60
	25	Hatibari RF	85.60	-	85.60	85.60
	26	Naskaria RF	96.0	-	96.0	96.0
	27	Kucheibudhi RF	211.52	-	211.52	211.52
	28	Ichinda RF	64.14	-	64.14	64.14
Bahalda	29	Chahalapada RF	620.80	-	620.80	620.80
	30	Gambharia RF	455.26	-	455.26	455.26
	31	Tiring RF	766.44	-	766.44	766.44
	32	Bankamundi RF	433.30	-	433.30	433.30
		Total	3966.70		3966.70	3966.70
		G. Total	27417.77	23451.07	3966.70	27417.77
		Percentage		85.53	14.47	100.00



11.2 Past system of Management and their results:

The outgoing plan is by Sri A.O.F.Bakhla, IFS which will be followed by this plan after approval. The plan was for Karanjia Division which was subsequently reorganized to give birth to Rairangpur Division. The portion of this outgoing plan which is applicable to this division will be only discussed.

The most of the forests coming under Rairangpur Division were previously under Selection WC, Improvement WC and Coppice WC. After considering the crop condition and regeneration status, the forests of Rairangpur Division was assigned to three Working Circle i.e.

- i) Rehabilitation WC (Area- 23451.07 ha)
- ii) Plantation WC. (Area- 3966.70 ha)
- iii) Wildlife WC (Overlapping) (Area -27417.77 ha)

A. Rehabilitation Working Circle:

The Rehabilitation WC was constituted with objectives such as

- a. To re-stock the degraded forests quickly by inducing natural regeneration, supplement through artificial regeneration,
- b. To increase the productivity of the forest through various silvicultural methods.
- c. To cover the forest land with indigenous species to meet local demand and high biomass production per hectare per year
- d. To enhance moisture regime through Soil & Moisture Conservation, Checking of accelerated soil erosion.
- e. To regulate the surface water runoff for enhance percolation and water availability down the stream.
- f. To partner with the local community in protection and management of the forests.
- g. To restore and improve the microclimate and micro edaphic condition.
- h. To increase the biodiversity and heterogeneity in the forest crop by encouraging natural regeneration.
- i. Reduce the biotic pressure, grazing and forest fire so as to give a favourable condition to establish the natural regeneration of both seed & coppice origin.
- j. To meet bonafide requirement of people for household articles, building materials.
- k. To enhance growing of palatable fodder to animals both wild & domestic.
- l. Suppression & eradication of obnoxious weeds and improve the habitat quality.



Within the above objectives the area allotted were assigned to --- treatment series (Felling series) with a treatment cycle of 20 years which is coterminous with the plan period.

The prescription includes Silvicultural Cleaning with Gap planting, Soil & Moisture Conservation, Fencing, Protection against Fire, Grazing and illicit felling.

Achievement:

Out of 23451.07 ha allotted for treatment, 6282.25 ha degraded forest has been achieved during the plan period. The achievement is only 26.79% of the target. The activities undertaken in the assigned / taken up area were gap planting, Soil & Moisture conservation, Silvicultural Cleaning and eradication of weeds. The reason for not achieving the target is assigned to "Paucity of Funds".

B. Plantation Working Circle:

The area allotted to this working Circle is 3966.70 ha. The area is sub divided to three planting Series i.e. Kherna Series, Tiring series and hatibari Planting Series. Area allotted to each series is as follows.

Table No 11.7 Area allotted to Plantation Working circle		
Sl No	Name of Planting Series	Area allotted in Ha
1	Kherna	586.26
2	Tiring	2382.58
3	Hatibari	997.86
	Total	3966.77

The special objectives of the management of the Plantation Working Circle are as follows:-

- To reforest the barren land and depleted areas with suitable indigenous species to meet the local need of timber, firewood, MFP, fodders, industries etc. with participation of local people.
- To check the soil erosion on barren hills through effective soil and water conservation measures along with plantation.

Rotation & Harvestable Girth

In the outgoing plan it is suggested a 15 years rotation Cycle for Eucalyptus hybrid and 12 years for Acacia auriculiformis and San-Chakunda.



Table 11.8 Age and exploitable girth of Species as suggested

Sl No	Species	Exploitable Girth in cm	Age of attaining exploitable girth.	Remark
1	Acacia auriculiformis	60	12 years	The purpose of Exploitation is to get firewood, small timber and pulp for industry.
2	Eucalyptus hybrid	75	15 years	
3	San-Chakunda (Cassia siamia)	60	12 years	
4	Sisoo (D. Sisoo)	145	60 years	

26

Achievements:

Out of 3966.70 ha proposed for plantation during the plan period, 1731.20 ha was achieved which is 43.64% of the target. The species planted are Teak, Sisso, Chhatian, Acacia, Eucalyptus, Simaruba, Chakunda, Krushnachuda, Bamboos etc. The Survival percentage is about 60%-70% in general. Due to plantations being taken up, the forest cover in quality and density has improved. Plantations have encouraged Soil & Moisture conservation and people's participation. No harvesting of Plantation has been taken up during plan period.

Reasons for not achieving the target:

During the plan period 2235.50 Ha. area could not be planted as this area under P.W.C. was observed to have adequate regeneration, which had come up naturally and was required protection properly to facilitate natural growing instead of covering the area by planting. Such areas were specially attended to protect from fire and biotic interference, adequate no. of soil and moisture conservation measures were also taken up in those areas for retention of natural rain water in the area to facilitate numbers and growth of the naturally grown species. Such areas were dealt by involving the local villagers under JFM mode.

C. Wildlife (Overlapping) Working circle:

This is an overlapping Working Circle. The entire area has been assigned to this Working Circle. The objectives of this Working Circle are

- i) Conservation, preservation and protection of the wildlife habitat and biodiversity.
- ii) Socio-Economic developments of local community are stressed upon.
- iii) Adequate protection of Water holes and creation of Check dams.
- iv) Natural Salt licks identified.



- v) Enrichment planting of favorable species of wildlife & planting of grasses.
- vi) Strict protection against fire, grazing, illicit felling & poaching.
- vii) Maximum importance on improvement of floral composition and density.
- viii) Soil & Water conservation measures taken up.
- ix) Involvement of Wildlife Protection Committee stressed.
- x) Implementation of Tourism and Publicity.
- xi) Scientific Study and wildlife Census.

Achievement:

The objectives of management of forest having rich wildlife potential are mainly concentrated on protection and its conservation. Further, this includes areas like Mayurbhanj Elephant Reserve, Elephant Corridor passages and Tiger Corridor.

During the current plan (1996-97 to 2015-16) it is experienced gradual rise of Man-elephant conflict, attack of wild bear on human being, death of wild lives and death of human beings crop damage by elephants, wild boars and poaching of animals etc.

Due to biotic pressure mining and other development activities the wild lives are disturbed, their corridor is fragmented. The activities taken up in Elephant Corridor and water bodies excavated to improve wildlife habitat and to reduce wildlife depredation are detailed below.



1. Creation of Water body.

Table 11.9 Creation of Water Body			
Scheme / Year	Sl No	Location	Amount Spent in Lakh Rs
CAMPA-APO- 2009-10	1	Kashiabeda Badampahar Range	1.25
CAMPA-APO- 20010-11	2	Baliapat Badampahar Range	2.00
General-2010-11	3	Gagardipha – 1 no. Rairangpur Range	4.00
	4	Bhalugodia- (Kanapat- 1 no.) Rairangpur Range	4.00
	5	Dubulabeda Badampahar Range	4.00
CAMPA-APO-2011-12	6	Bhejidihi, Rairangpur Range	1.50
	7	Baliyam, Rairangpur Range	1.50
	8	Manbir R.F. Bahalda Range	1.50
	9	Budheirana R.F. Bahalda Range	1.50
	10	Kashiabeda, Badampahar Range	4.95
CAMPA-APO-2012-13	11	Tiring, Tiring R.F.	2.50
	12	Jatapani, Budheirana R.F.	2.50
	13	Kadapani, Bisoi	2.50
	14	Sanbalichua, Bisoi	2.50
	15	Badjhili (Manada)	2.50
	16	Saranda (Rairangpur)	2.50
	17	Pahadpur (Rairangpur)	2.50
	18	Burupalsa (Badampahar)	2.50
	19	Dubualabeda (Badampahar)	2.50
	20	Chahalapada (Badampahar)	2.50
	21	Chahalapada (Badampahar)	4.00
General-2012-13	22	Kuali, Rairangpur Range	4.00
	23	Chahalapada (Badampahar Range)	2.50
	24	Jhipabandh (Badampahar Range)	2.50
	25	Hatisikuli (Badampahar Range)	2.50
	26	Chuakankar (Bisoi Range)	3.00
CAMPA-APO-2013-14	27	Tirilipi, Ralibeda D.P.F.	2.50
	28	Rayasahi, Tirilipi D.P.F.	2.50
	29	Kitachua, Badampahar R.F.	2.50
	30	Gargadi (Bisoi)	2.50
	31	Raikadkocha (Bisoi)	2.50
	32	Bankamundi (Bahalda)	2.50
	33	Banduda (Badampahar)	2.50
	34	Dhakata (Badampahar)	2.50
	35	Tamalbandh (Manada)	2.50
	36	Judia (Rairangpur- 2 nos.)	5.00



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Table 11.9 Creation of Water Body

	37	Edelbeda (Rairangpur)	2.50
	38	Bhursa (Bahalda)	2.50
	39	Kherna (Badampahar)	2.50
	40	Hikeisahi (Rairangpur)	2.50
	41	Jodachua (Rairangpur)	2.50
	42	Badkedam (Bahalda)	2.50
	43	Brundeiposhi (Manada)	2.50
	44	Badsiajung (Bahalda)	2.50
	45	Palagoda khadasahi (Manada)	2.50
	46	Chadripahadi (Manada)	2.50
	47	Bad sialinai (Manada)	2.50
	48	Padagarh (Manada)	2.50
	49	Sagjodi (Manada)	2.50
	50	Majhipokhari (Bisoi)	2.50
	51	Dudkundi (Bisoi)	2.50
CAMPA-APO-2013-14	52	Baunsabudi (Bisoi)	2.50
	53	Ghatkuanri (Bisoi)	2.50
	54	Mathura kherai (Bisoi) Wild life	5.00
General-2013-14	55	Uperbeda (Badampahar)	2.50
General-2014-15	56	Basaghutu (Badampahar)	2.50

2. Elephant Trench & Solar Fencing:

Table 11.10 Elephant Trench & Solar fencing

Year	Name of the site	Scheme	Length of E. Trench in M	Length of Solar Fencing in M	Amount spent in lakh Rs
1	2	3			4
2012-13	Elephant proof Trench at Dubulabeda RF of Badamaphar Range	02- Wild Life	680	0	3.50
	Solar fencing at Edelbeda in Badamaphar Range	02- Wild Life		3334	3.00
	Solar Fencing at Pahadpur in Badampahar R.F.	Site specific conservation plan.		2400	1.27
2014-15	Solar Fencing at Giria Manbir RF, Bahalda Range.	CAMPA-APO-2013-14		3340	5.00



Result of Prescriptions:

RehabilitationWC:

- a. Qualitative coppice grew up after malformed and defective stumps and unwanted coppice shoots removed.
- b. Useful coppicing developed from malformed shoots
- c. Less fire hazard in Silvicultural operation implemented areas in forest blocks.
- d. Fire hazard reduced with the involvement of VSS in the areas where Silvicultural operation was taken up.
- e. More natural regeneration of species like Terminalia alata, Anogeissus latifolia, Lagerstomia parviflora, Madhuka indica, Boswellia serrata, Odina wodier and Diospyros melanoxylon species observed as the Rehabilitation area was protected from fire hazard and biotic interference.
- f. The area developed remarkably after implementation of soil and moisture conservation in the form of gully plugging, LBCD, half-moon trench, contour trench etc.

Plantation WC:

The plantation raised during the outgoing plan period is over 1731.20 ha. The species planted are of mixed species i.e. of fuel wood, timber and NTFP in nature. The growth pattern is not as expected. Plantations raised after reorganization have not achieved harvestable stage.

11.2.1 Management under Annual Working Scheme:

The outgoing plan expired on 31st March, 2016. The working was continued under annual working Scheme. The prescriptions under different Working Circle of previous plan were extended and Annual Working Scheme was prepared accordingly. In the previous plan RWC, PWC were the independent WC. Subsequently area under improvement is suggested in Annual Working Scheme. The target & achievement under annual working Schemes are furnished below.



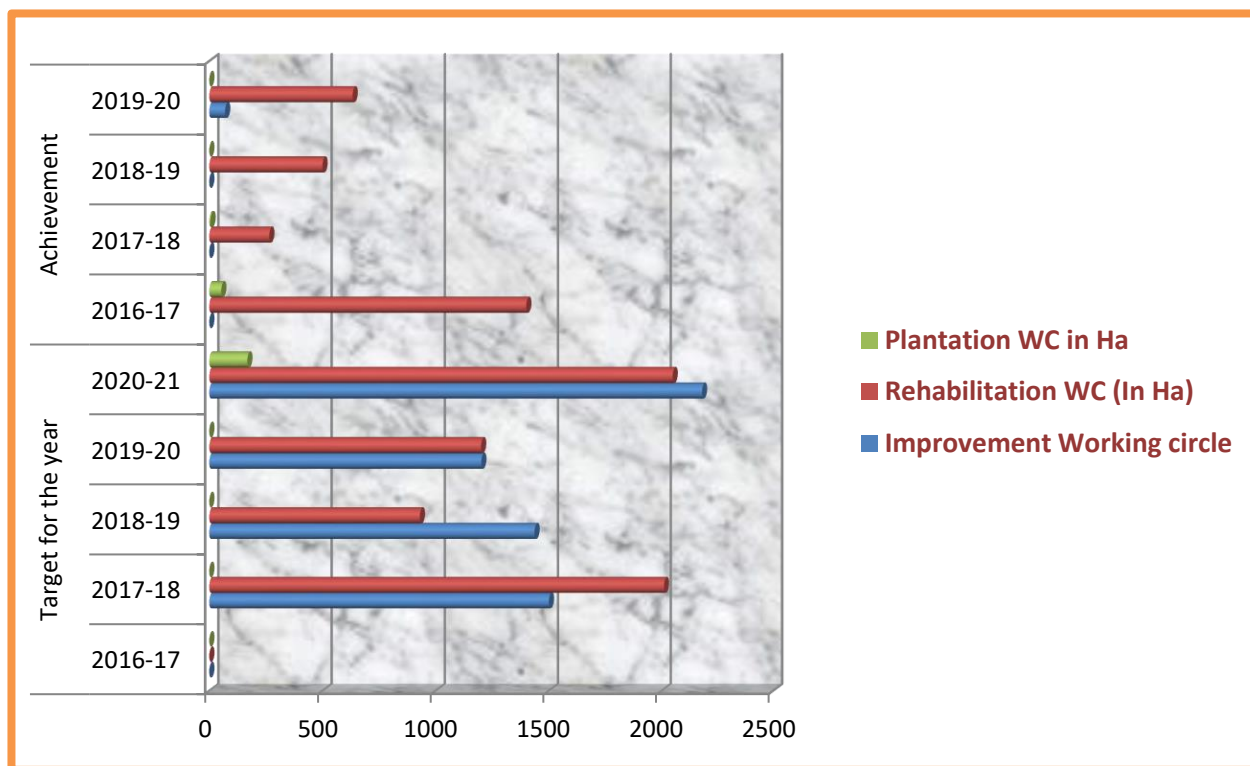
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Table 11.11 Year wise Target & Achievement Report

SI No	Activities approved (Annual Scheme)	Target for the year					Achievement				
		2016-17	2017-18	2018-19	2019-20	2020-21	2016-17	2017-18	2018-19	2019-20	2020-21
1	Improvement Working circle	0	1500	1436.60	1201.40	2181.00	0	0	0	70.00	Implementation is in Progress
2	Rehabilitation WC (In Ha)	0	2010	930.00	1200.60	2048.99	1400	265.0	500.00	633.00	
3	Plantation WC in Ha	0	0	0	0	168.056	53.0	5.50	0	0	
4	NTFP WC	0	0	0	0	0	0	0	0	0	
5	JFM (O) WC	0	0	0	0	0	0	0	0	0	
6	WL (O) WC	0	0	0	0	0	0	0	0	0	

The achievement with respect to target is comparatively low.

It is felt that intensive work is required to improve the forest health.

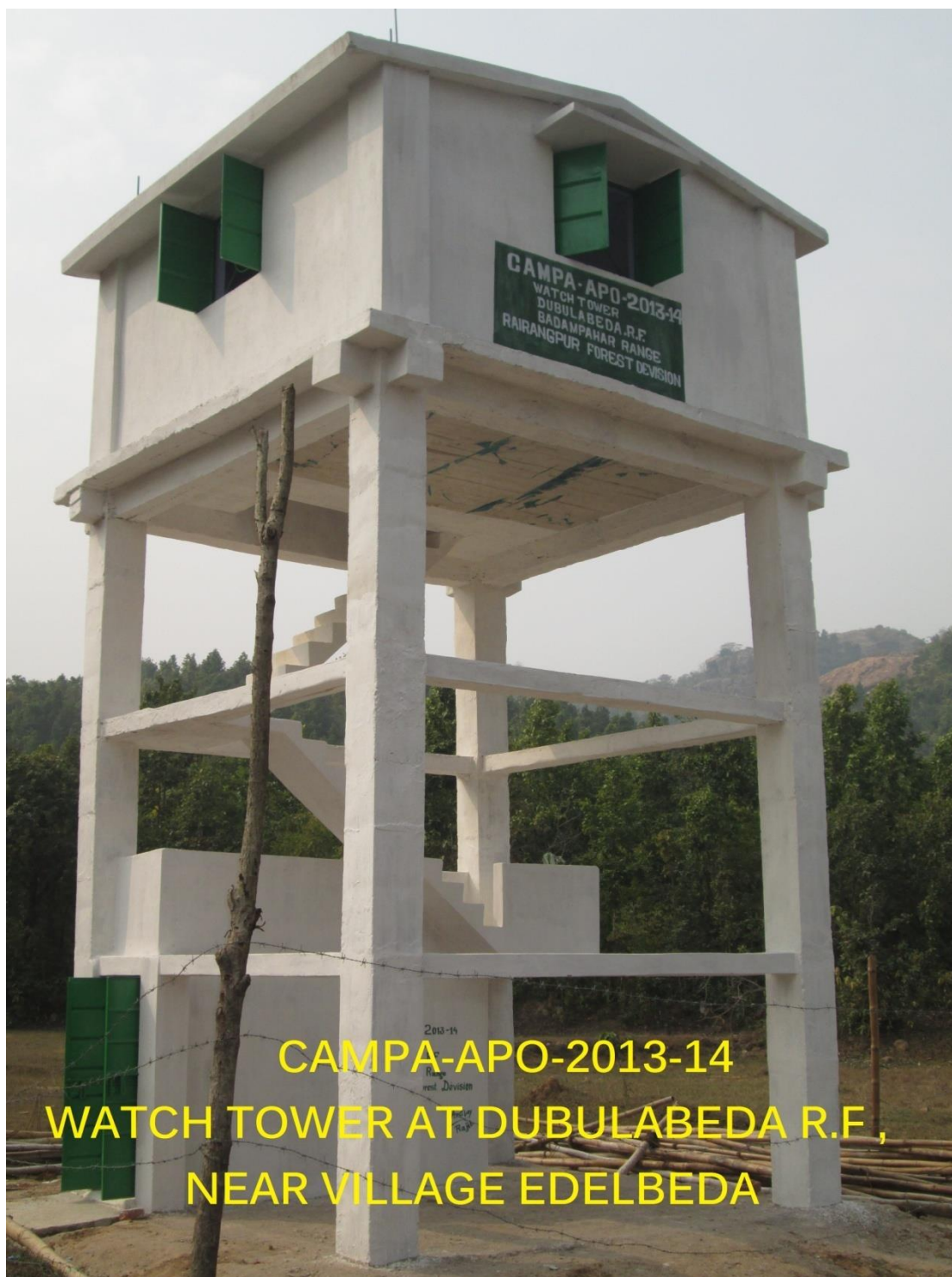




11.3 Special works of improvement undertaken:

After creation of Division during 2003, stress was given on creation of infrastructure for Division Office, Range Office and Staffs. For wildlife management point of view Watch Towers at Suleipat and Dubulabeda R.F Near Edelbeda have been constructed. A Mega Nursery at Dumadihi has been developed with modern technique facilities.





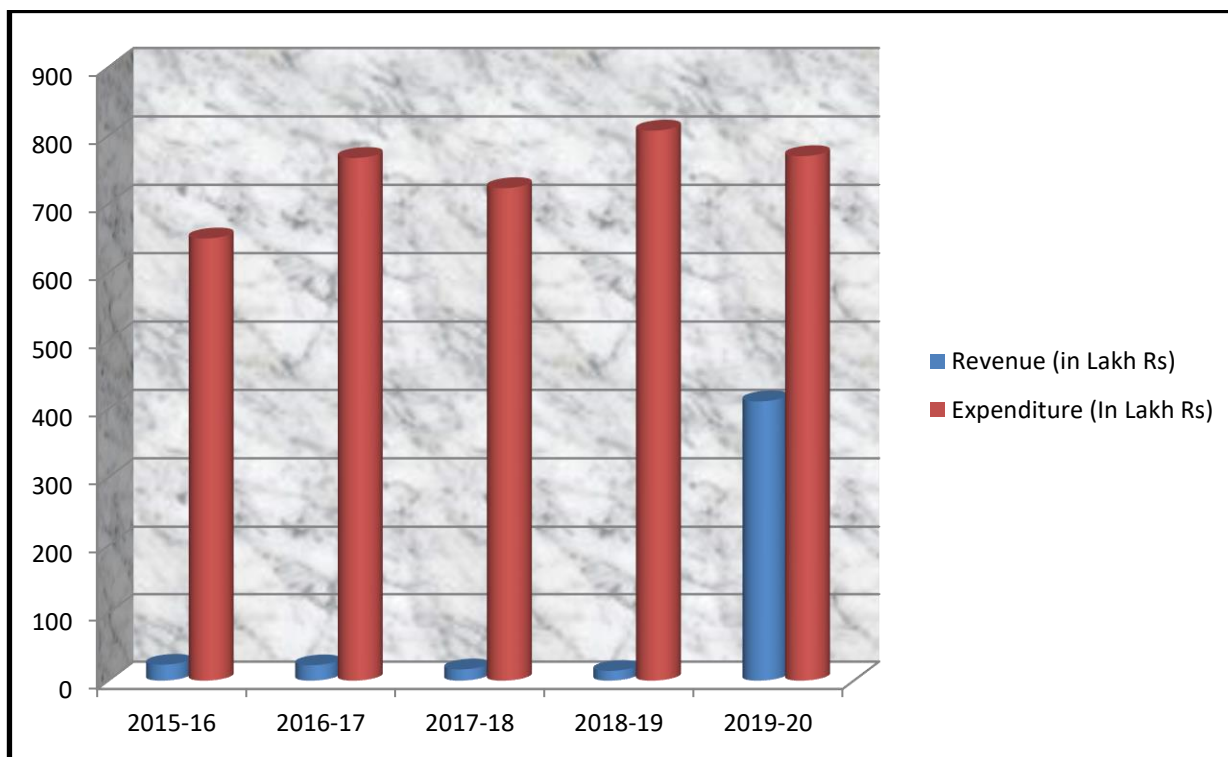


11.4 Past yield, Revenue and Expenditure:

As there was no Coupe working in the division during last plan period, the yield of Timber and Fire wood is nil. The revenue and expenditure during last five years are furnished below to provide an indication of expenditure level in the division.

Table 11.12 Revenue & Expenditure of Rairangpur Division.

Year	Revenue (in Lakh Rs)	Expenditure (In Lakh Rs)	Revenue / Expenditure ratio
2015-16	23.65	649.61	1:27.47
2016-17	22.84	767.35	1:33.60
2017-18	16.68	723.22	1:43.36
2018-19	14.51	807.33	1:55.64
2019-20	411.42	770.01	1:1.87



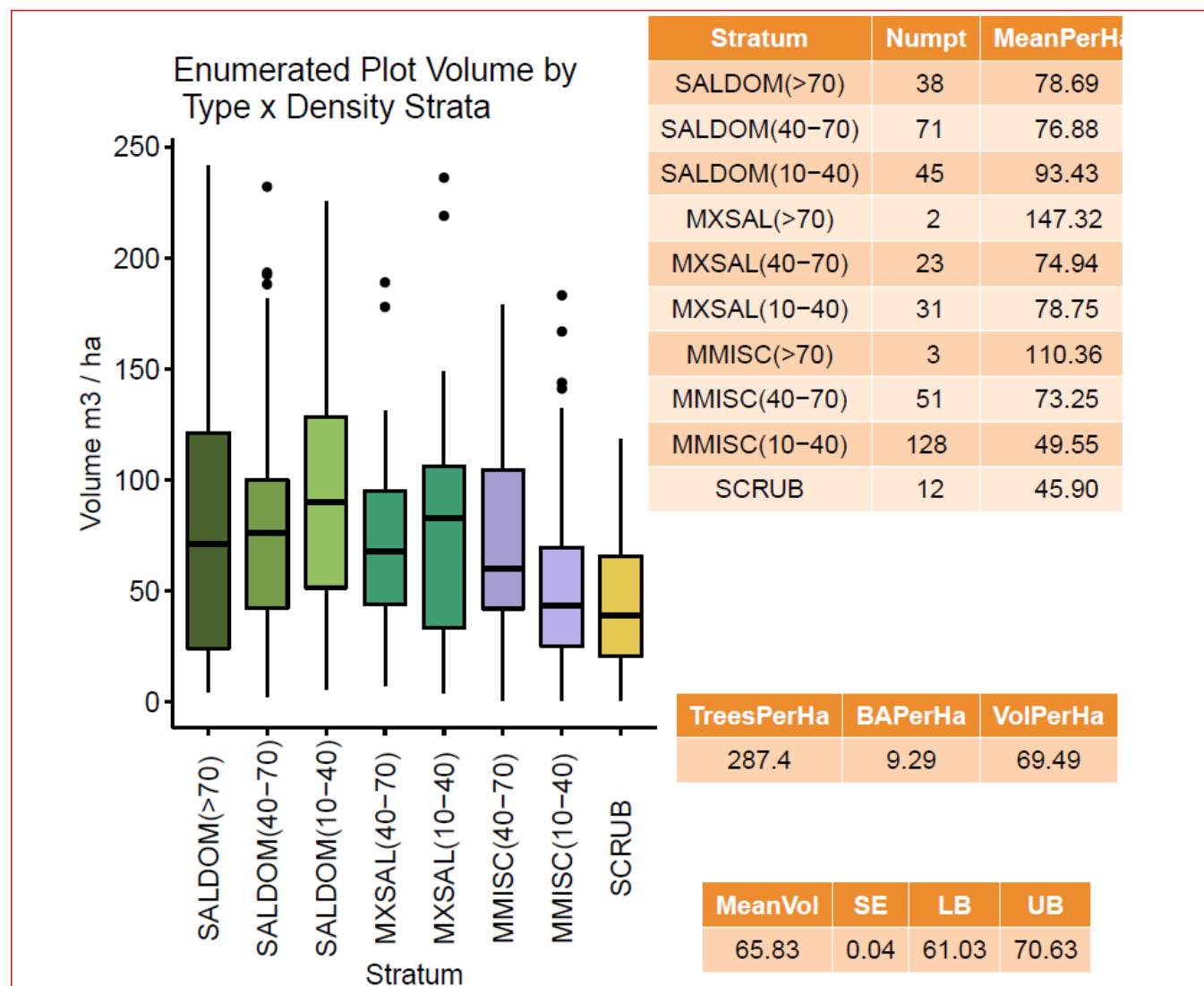


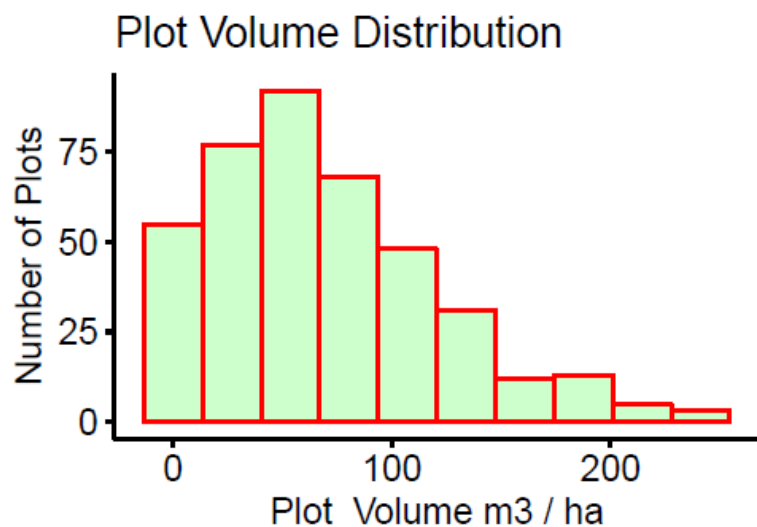
CHAPTER-12

STATISTICS OF GROWTH AND YIELD

12.1 Statistics of Forest Carbon Stock:

During Working Plan preparatory phase enumeration of trees on Sample point basis was conducted. The data has been analyzed through various modeling by Odisha Space Application Centre, Bhubaneswar. The growing stock has been assessed. The relevant portion is furnished below to indicate the growing stock position in Rairangpur Division.





Econsp	Mean	SE
Ano lat	7.81	0.11
Misc	24.23	0.05
Sho rob	16.84	0.08
Ter tom	14.93	0.09
Dio mel	2.02	0.15

The crop density of forest area has been observed after analysis as follows.

Table No 12.1 Stand volume parameters – Rairangpur Division.						
Criteria						
No of trees / ha	Basal Area per ha (M³)	Volume per Ha (in M³)	Mean Volume (in M³)	Standard Error	LB (in M³)	UB (in M³)
287.4	9.29	69.49	65.83	0.04	61.03	70.63

The Overall crop density and area under each density class has been furnished by ORSAC. The details are as given below.

Table No 12.2 Distribution of Forest area vis – vis density class.			
Crop Density	Area in ha	Percentage of Forest area	Remark
>70%	13421.87	17.75	Dense Forest
40-70%	26295.09	34.77	Moderatly Dense Forest
10-40%	31696.08	41.92	Degraded forest
<10%	4206.72	5.56	Open Forest.
Total	75619.76	100.00	



The Girth Class wise distribution has also been indicated by ORSAC. It is reproduced below.

Table No 12.3 Number of trees in different girth Class as per ORSAC Analysis Report.

Range	Girth Class in cm					
	30-60	60-90	90-120	120-150	>150	Total
Badampahad	1157361	337822	88779	23093	15876	1622931
Rairangpur	12968169	4998906	1260897	451546	234856	19914374
Bahalda	1263391	866408	78314	24279	8743	2241135
Bisoi WL	4355906	1547007	355496	142087	59092	6459588
Manada	3636681	1507667	402388	1460225	75492	7082453
Total	23381508	9257810	2185874	2101230	394059	37320481
Percentage	62.65	24.81	5.86	5.63	1.06	100.00

From the obtained data it is very clear that the forest is in a path of degradation. The young trees mostly of coppice origin is attaining a growth up to 90cm GBH in 25% cases beyond 90 cm GBH, only 15% trees grow and attain a girth class of 150cm. Exploitable Trees are not available in any of the forest blocks except those in Manada Range.

12.2 Annual Increment:

From various growth data volume equation for some important species has been derived, this is quite close to ground reality. The increment varies in different age classes. The higher increment is recorded in two phases of the trees. One during young phase i.e. within 20 years and then 40- 50 years when it responded to thinning process and put diameter growth.

Table 12.4: Volume Calculated and Average Annual Increment

Name of Species	Growth in (10-20 year) in cum					Annual increment predicted in Cum
	10-20 Yr	20-30 Yr	30-40Yr	40-50 Yr	50-60Yr	
Sal	0.02655	0.346908	0.28793	0.618398	0.995039	0.045497
Bija	0.068848	0.12334	0.27832	0.396387	0.648105	0.0303
Asan	0.15082	0.367031	0.577969	0.69	1.0425	0.056566
Arjun	0.145079	0.446425	0.712149	0.657187	1.058907	0.060395
Dhaura	0.158614	0.483691	0.614414	0.295781	0.457969	0.040209
Teak	0.066225	0.184287	0.665738	1.06395	1.296007	0.065524

The Forest is the greatest Carbon sink. It is associated with bio mass production and retention over a long period. No systematic carbon sequestration has been assessed, an attempt has been made to predict the carbon stock of Rairangpur Division.



The available Biomass over one hectare of Forest is projected at 65.83cum (Leaves / braches etc not included)

The forest area (RF/ DFP/ PRF / PF) of the Division is 43932.79 ha. The total Growing Stock of the division is projected at 2892096 cum or say 28.92 lakh Cum. Taking average wood density at 0.7 T/ cum and 30 ton of Bio Mass contains 11.7 T carbon, the forest of Rairangpur may contain 7.90 lakh Tons of carbon. All steps will be initiated to induce growth through silvicultural operation to enhance the carbon sink to grow 3-4% every year.

12.2.1 Forest Block Wise Carbon Stock:

There are Reserved Forests, DPF, PRF and PF in the division. The total area under natural forest is 44132.79 ha. The carbon Stock of each Forest block is furnished below.

Table No 12.5 Forest Block Wise Carbon Stock Rairangpur Division.							
Sl No	Name of Forest	Area in ha	Growing Stck in Cum / ha	Wood Density	Growing Stock in 10 ³ Ton	Carbon Equivalent in 10 ³ T	Carbon Dioxide Equivalent in 10 ³ T
1	Badampahar (part)	2746.48	70.63	0.75	145.49	56.74	208.05
2	Basila	220.54	70.63	0.75	11.68	4.56	16.71
3	Hat Badra	90.54	70.63	0.75	4.80	1.87	6.86
4	Dublabeda	498.16	70.63	0.75	26.39	10.29	37.74
5	Jhatisiring	28.32	70.63	0.75	1.50	0.59	2.15
6	Kherna	495.72	70.63	0.75	26.26	10.24	37.55
7	Brahmani	763.28	65.83	0.70	35.17	13.72	50.30
8	Gorumahisani	2462.40	65.83	0.70	113.47	44.25	162.26
9	Ichinda	64.14	65.83	0.70	2.96	1.15	4.23
10	Hatibari	85.60	65.83	0.70	3.94	1.54	5.64
11	Jari	2982.00	65.83	0.70	137.41	53.59	196.50
12	Jhumukapahadi	70.40	65.83	0.70	3.24	1.27	4.64
13	Karan Jharan Dhasra	540.60	65.83	0.70	24.91	9.72	35.62
14	Kucheibudhi	211.52	65.83	0.70	9.75	3.80	13.94
15	Naskaria	96.00	65.83	0.70	4.42	1.73	6.33
16	Dumurikudar	34.40	65.83	0.70	1.59	0.62	2.27
17	Tiring	766.44	65.83	0.70	35.32	13.77	50.51
18	Bankmundi	433.30	65.83	0.70	19.97	7.79	28.55
19	Ramgarh	907.06	65.83	0.70	41.80	16.30	59.77



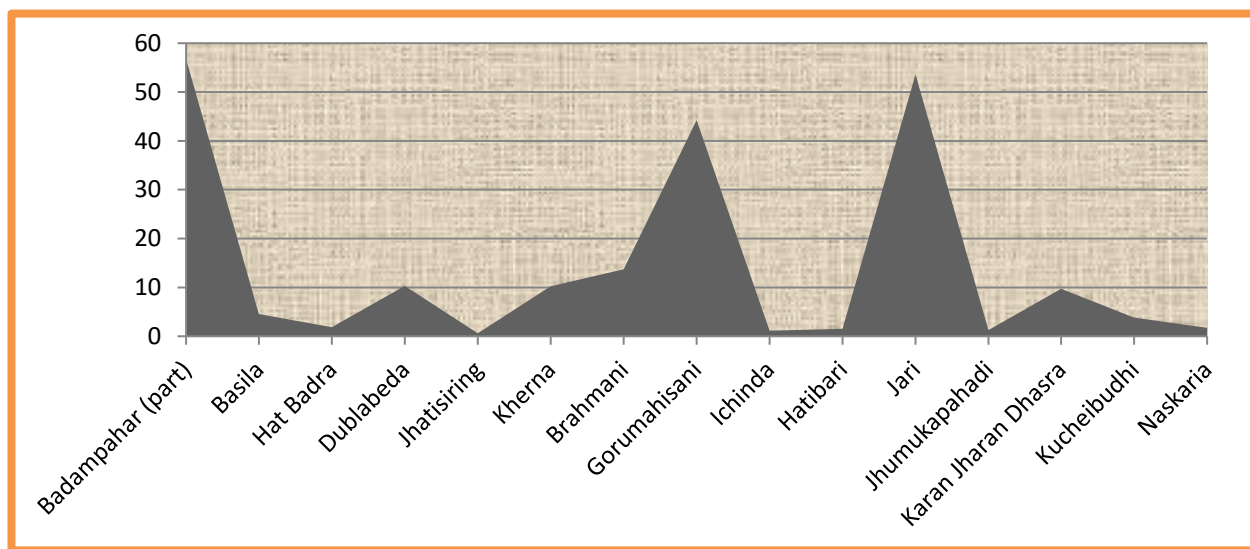
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	Asurghaty						
20	Chahalapada	620.80	65.83	0.70	28.61	11.16	40.91
21	Debradihi	45.08	65.83	0.70	2.08	0.81	2.97
22	Gambharia	455.26	65.83	0.70	20.98	8.18	30.00
23	Manbir	656.52	65.83	0.70	30.25	11.80	43.26
24	Budheirana	1376.34	65.83	0.70	63.42	24.74	90.70
25	Khairpal	56.39	65.83	0.70	2.60	1.01	3.72
26	Sargoda	106.78	65.83	0.70	4.92	1.92	7.04
27	Mahubhandar	1048.78	70.63	0.75	55.56	21.67	79.45
28	Tunguru	3656.80	70.63	0.75	193.71	75.55	277.01
29	Kanapat	3640.40	65.83	0.70	167.75	65.42	239.89
30	Sarali	2028.90	65.83	0.70	93.49	36.46	133.70
31	Tower –I	187.84	65.83	0.70	8.66	3.38	12.38
32	Tower –II	13.35	65.83	0.70	0.62	0.24	0.88
33	Tualsibani	3.50	70.63	0.75	0.19	0.07	0.27
34	Khadambeda	80.52	70.63	0.75	4.27	1.66	6.10
35	Bidhubhandar PRF	10871.25	70.63	0.75	575.88	224.59	823.50
36	Baneikala	52.22	65.83	0.70	2.41	0.94	3.44
37	Dubulabeda	34.90	65.83	0.70	1.61	0.63	2.30
38	Gundurua	20.72	65.83	0.70	0.95	0.37	1.37
39	Hatnabeda	81.95	65.83	0.70	3.78	1.47	5.40
40	Jaydhanposi	8.92	65.83	0.70	0.41	0.16	0.59
41	Jhatisiring	77.19	65.83	0.70	3.56	1.39	5.09
42	Patijhari	26.81	65.83	0.70	1.24	0.48	1.77
43	Tirilipi	380.00	65.83	0.70	17.51	6.83	25.04
44	Ukam-I	57.16	65.83	0.70	2.63	1.03	3.77
45	Sargoda –II	91.49	65.83	0.70	4.22	1.64	6.03
43	Anandpur	24.28	65.83	0.70	1.12	0.44	1.60
47	Badjari	47.69	65.83	0.70	2.20	0.86	3.14
48	Betjharan – I	118.55	65.83	0.70	5.46	2.13	7.81
49	Betjharan – II	85.36	65.83	0.70	3.93	1.53	5.62
50	Betjharan – III	32.74	65.83	0.70	1.51	0.59	2.16
51	Belpahari – VI	22.96	65.83	0.70	1.06	0.41	1.51
52	Balarampur	120.80	65.83	0.70	5.57	2.17	7.96
53	Dahupani	1328.14	65.83	0.70	61.20	23.87	87.52
54	Gorumahisani	20.13	65.83	0.70	0.93	0.36	1.33
55	Jhumkapahadi	21.85	65.83	0.70	1.01	0.39	1.44
56	Juapahadi	41.98	65.83	0.70	1.93	0.75	2.77



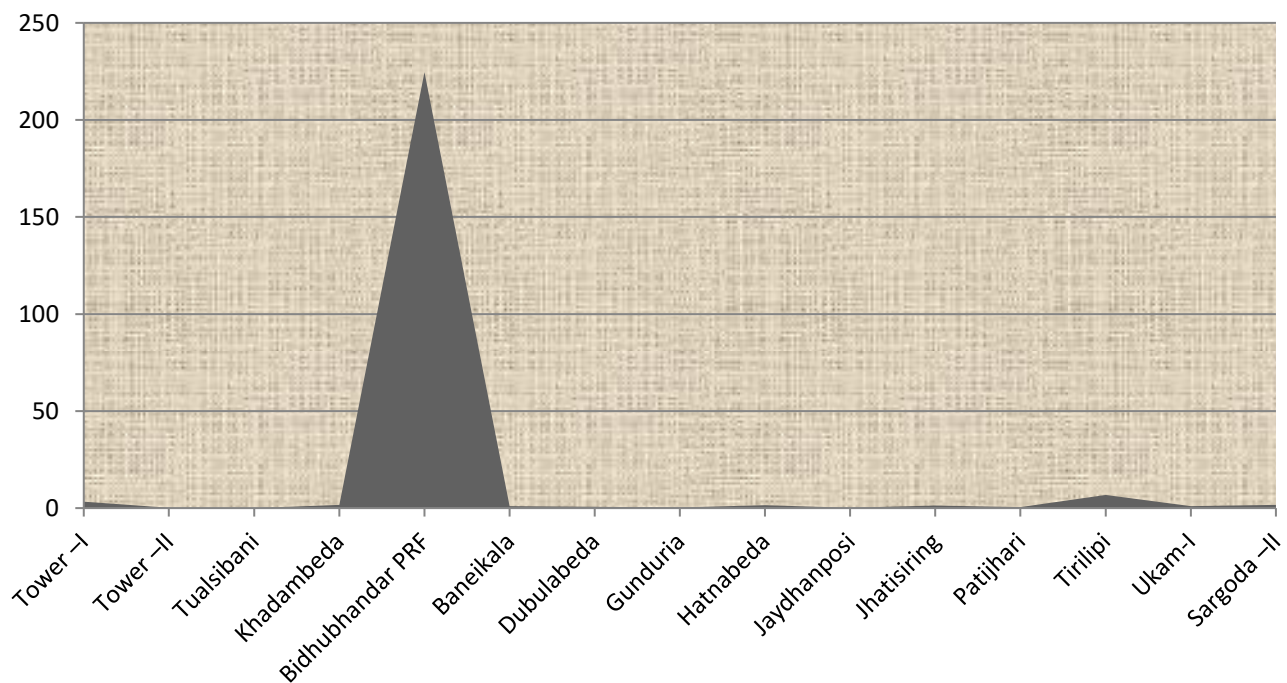
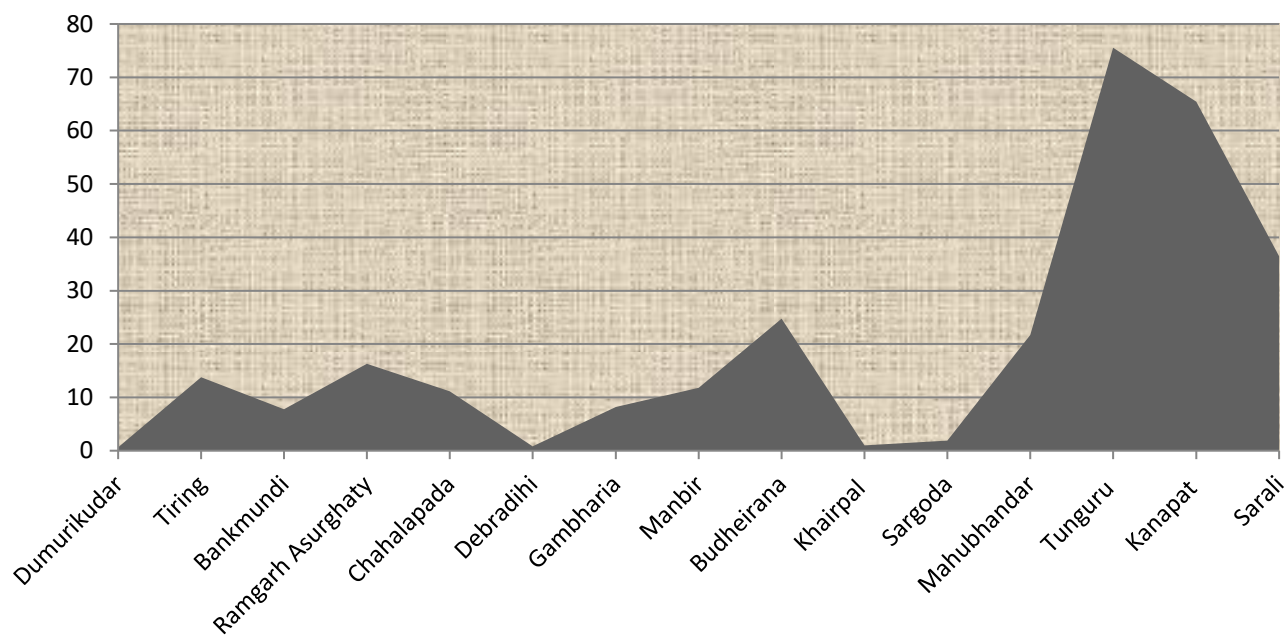
Working Plan of Rairangpur Forest division (2021 to 2031)

57	Kalataamak	29.95	65.83	0.70	1.38	0.54	1.97
58	Kucheibudi	38.10	65.83	0.70	1.76	0.68	2.51
59	Radho	505.86	65.83	0.70	23.31	9.09	33.33
60	Saragada	124.44	65.83	0.70	5.73	2.24	8.20
61	Merudihi	114.49	65.83	0.70	5.28	2.06	7.54
62	Bhatgoda	20.24	65.83	0.70	0.93	0.36	1.33
63	Bahalda	25.49	65.83	0.70	1.17	0.46	1.68
64	Bhitaramda	1060.62	65.83	0.70	48.87	19.06	69.89
65	Dumadihi	36.73	65.83	0.70	1.69	0.66	2.42
66	Jadunathpur	20.23	65.83	0.70	0.93	0.36	1.33
67	Rutughutu	20.49	65.83	0.70	0.94	0.37	1.35
68	Sansadam	60.70	65.83	0.70	2.80	1.09	4.00
69	Salei	60.70	65.83	0.70	2.80	1.09	4.00
70	Dhenkia	384.34	65.83	0.70	17.71	6.91	25.33
71	Ektali	3.79	65.83	0.70	0.17	0.07	0.25
72	Jamda-V	15.52	65.83	0.70	0.72	0.28	1.02
73	Pidhakata	335.20	65.83	0.70	15.45	6.02	22.09
74	Asansikal	34.65	65.83	0.70	1.60	0.62	2.28
75	Hatichhad PF	200.00	65.83	0.70	9.22	3.59	13.18
	Divisional Total	44132.79			2169.73	846.19	3102.71



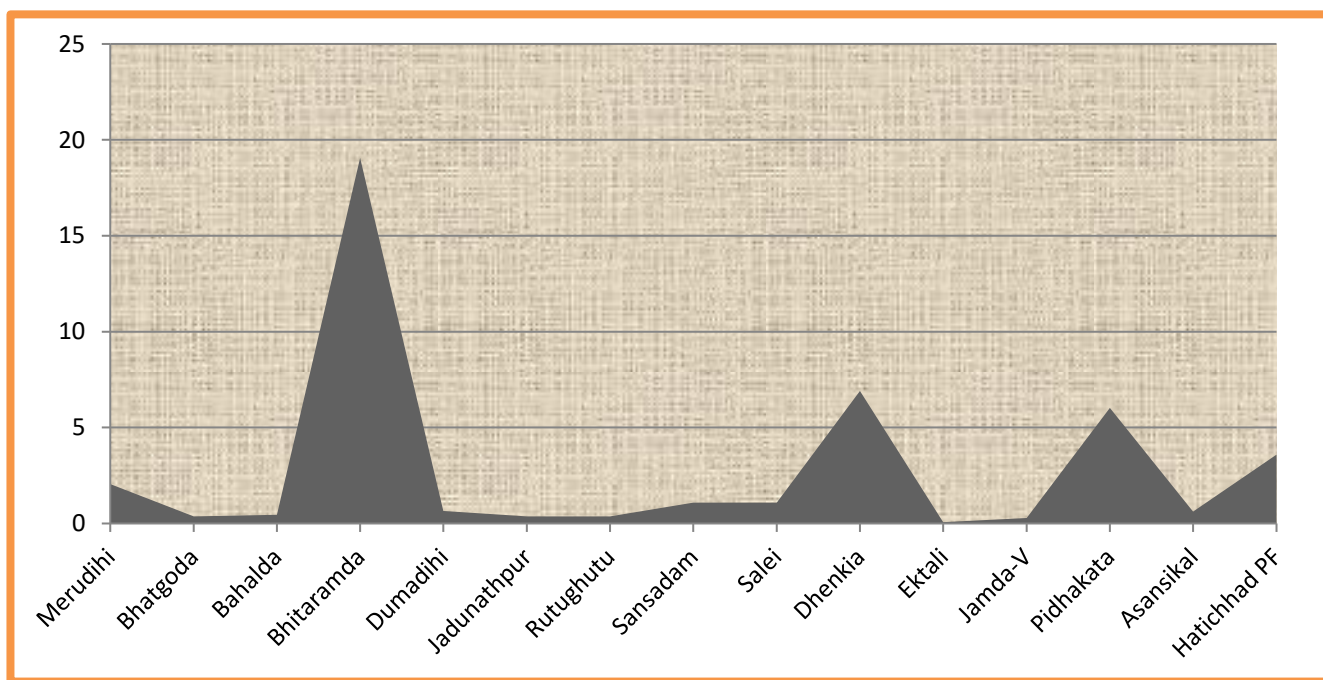
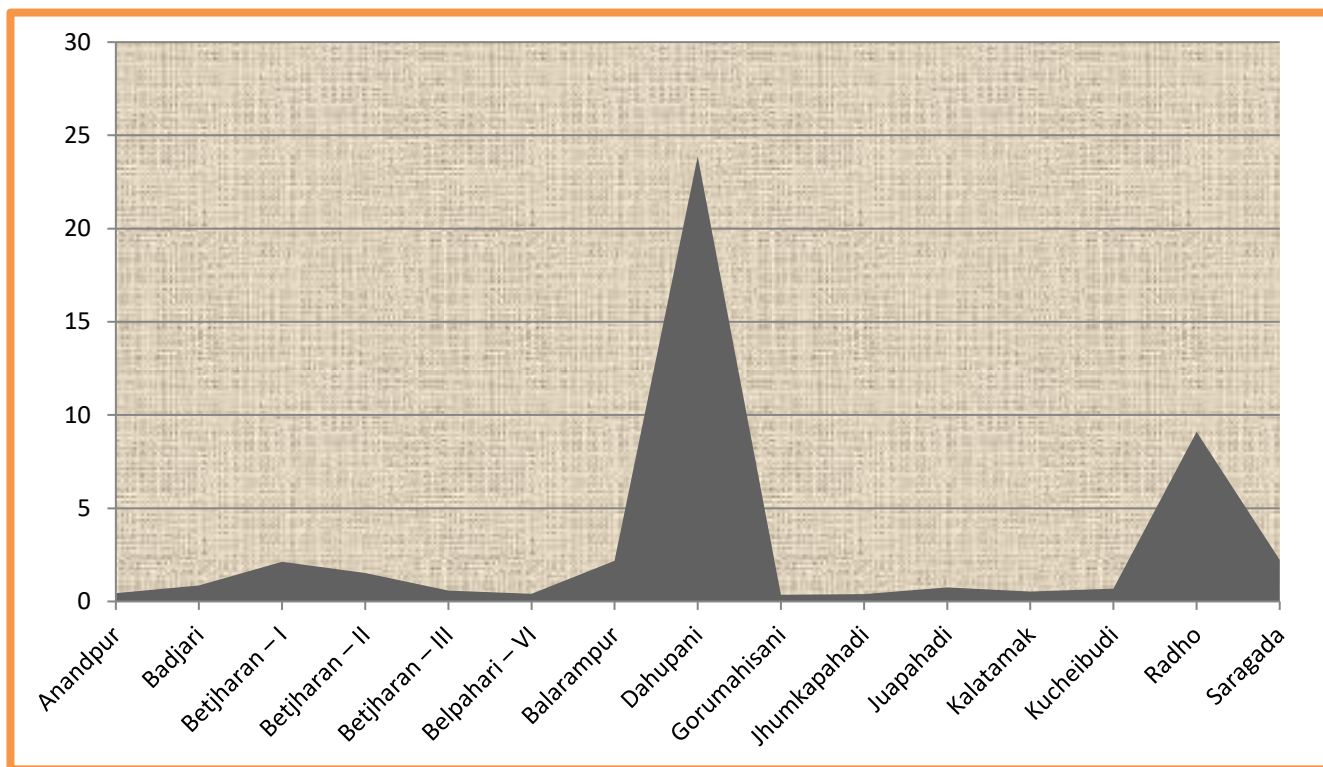


Working Plan of Rairangpur Forest division (2021 to 2031)

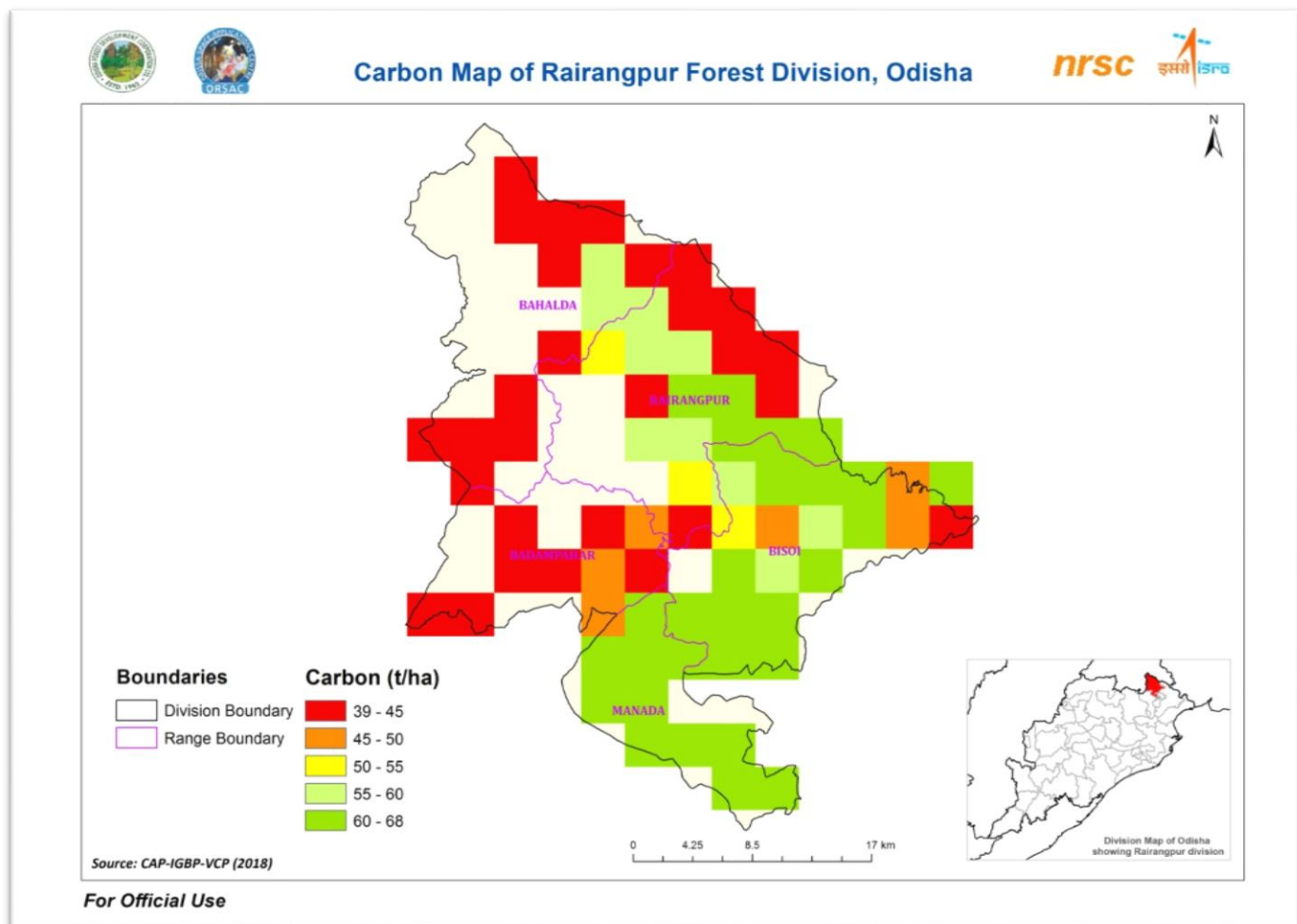




Working Plan of Rairangpur Forest division (2021 to 2031)



The total CO₂ in the forests of Rairangpur Division is calculated to be 3102.71×10^3 ton. It shall be our endeavor to increase the Carbon Sequestration to 2-3% annually.



12.2.2 Carbon Stock (For TOF Plantations)

Plantations have been raised outside the Forest area. The plantations are in good growing condition. It is also contributing to Sequestration of carbon and act as carbon sink.

It is felt necessary to calculate the carbon stock in TOF created / maintained by the department. It is furnished below in Table No 12.6



Working Plan of Rairangpur Forest division (2021 to 2031)

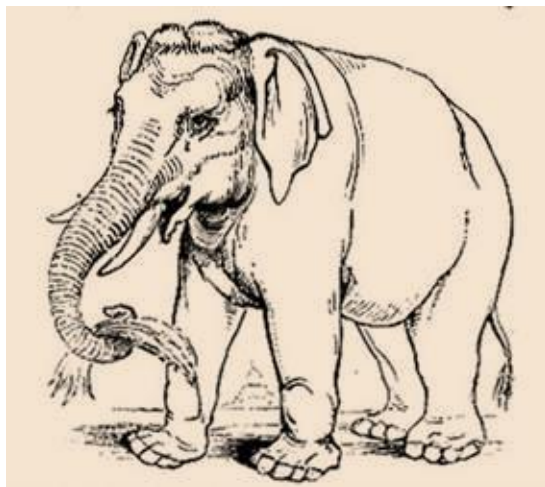
Table No 12.6 Carbon Stock in TOF Plantations

Sl No	Name of Forest	Area in ha	Growing Stck in Cum / ha	Wood Density	Growing Stock in 10 ³ Ton	Carbon Equivalent in 10 ³ T	Carbon Dioxide Equivalent in 10 ³ T
1	Timitma	20	50	0.75	0.75	0.293	1.073
2	Suliduma	20	55	0.75	0.83	0.322	1.180
3	Badhatnabeda Revenue Land	20	50	0.75	0.75	0.293	1.073
4	Badhatnabeda	5	45	0.75	0.17	0.066	0.241
5	Badhatnabeda	10	45	0.75	0.34	0.132	0.483
6	Gobindpur	10	45	0.75	0.34	0.132	0.483
7	Bhandan Bald Hill	5	40	0.75	0.15	0.059	0.215
8	Badbaikala	10	50	0.75	0.38	0.146	0.536
9	Dahanimari	10	55	0.75	0.41	0.161	0.590
10	Mahuldiha	20	55	0.75	0.83	0.322	1.180
11	Gayalkota	15	40	0.75	0.45	0.176	0.644
12	Bad Narayani	15	40	0.75	0.45	0.176	0.644
13	Maghua	10	45	0.75	0.34	0.132	0.483
14	Arenue Plantation 281.5 RKM equivalent to	43.98	40	0.75	1.32	0.515	1.887
15	Total Carbon sink (TOF)					2.920	10.708
16	Total of Forest Blocks					846.19	3102.7
17	G. Total of Division.					849.110	3113.418





THE END OF PART-I





WORKING PLAN

RAIRANGPUR FOREST DIVISION

PART-II



BY

DR. ARUN KUMAR MISHRA, IFS

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CHAPTER- 13

BASIS OF PROPOSALS

13.1: Objectives of Management:

The objectives of this working plan is to provide a basic approach for sustainable management of forests and preserve its biodiversity in light of the National Forest Policy, encompassing the ecological (environmental), economic (production) and social (including cultural) dimensions. The objectives for attaining this goal include conservation of forests and reducing forest degradation, maintenance and enhancement of ecosystem services, Promoting Sustainable Livelihood through eco-tourism, enhancement of forest productivity together with establishment of regeneration to improve forest health and vitality as per ecological and silvicultural requirements of the species, progressively increasing the growing stock and carbon sequestration potential, maintenance of biological diversity, sustainable yield of forest produce, prevention of soil erosion and stabilization of the terrain; improvement and regulation of hydrological regime; people's involvement in planning and management of forests, fulfilling socio-economic and livelihood needs of the people. The sector wise objectives are precisely enumerated in following paragraphs.

13.1(I): Dynamics of Forests and Stands:

Forest is a living dynamic entity and changes its species composition, growth pattern, bio diversity in passage of time. This plan aims at

- To enhance species composition towards a Climatic Climax species of more important and of valuable species.
- To ensure Annual Biomass Production is sustainable throughout the plan period so as to ensure a specific quantum of carbon sequestration.
- To enhance Bio Diversity of a Forest through various management practices & proper documentation.
- To ensure sustainable & dependable production of timber / fuel wood and other available forest produce.
- To enhance availability of NTFP species through conservation, natural regeneration and follow a systematic sustainable harvesting practices.
- To provide an improved & conducive habitat for peaceful living of wild animals.



13.1(II): Forests and Soil:

The Forests and soil condition and its fertility are like two sides of a coin. Forest enriches the soil organic content and as the soil marches forward, the forest luxuriance also marches forward. When the soil is degraded for many reasons, gradually the forest condition & vegetation is degraded. The soil condition & forest covers moves hand in hand. In order to keep the soil health high this plan sets the following objectives to be achieved.

- To follow appropriate management practices to protect the soil against erosion.
- To protect the hill slopes and Forest floor against erosion and restore the humus in forest floor.
- To Protect River banks against erosion and enhance the life of dams & reservoirs.
- To protect forests against drivers of forest degradation with special importance to Soil Conservation.
- To check soil erosion in forest floor – Sheet erosion, Rill erosion, Splash erosion, Gully and Ravine formation.
- To maintain Soil cover of any form – mostly of woody vegetative / grass cover in forests i.e. enriched undergrowth.
- To maintain adequate humus layer on forest floor.
- To reduce the grazing pressure on forest.

13.1(III): Forests and Water.

The forests are the store house of water. All the rivulets / springs are originating from forests. The flow of water in springs and rivulets depends upon water holding capacity of Forest floor. Recharge of ground water table mostly depends upon runoff time, conditions for percolation of surface water. Reduced time of collection of runoff water enhances the flood menace in rivers. Availability of surface water also decides the carrying capacity of wildlife of any forest. The composition of forests mostly depends on water regime of forest floor. The objectives set out for this plan are

- To protect and maintain thick vegetation on the catchment of rivers, springs and rivulets.
- To treat the catchment area of water body within the forest block or outside to enhance water holding capacity and enhance flow of water in Rivers, Springs and Rivulets.
- To create new water body within the forest blocks and preserves the existing wet land inside the forests and outside.



- To ensure flow of water in springs / rivulets – especially River Khadakhai and Bankabala and its tributaries.
- To create water body to impound the running waters & enhance utilization of water to a greater extent.

13.1(IV): Forest Biodiversity:

The biodiversity has been affected due to Species oriented management in previous working plans. The natural forests of importance with rich in Bio- Diversity are those which are close to Similipal National Park / Similipal Tiger Reserve. The vegetation is of mixed dry deciduous & moist deciduous species. The rich floral diversity is seen in Bidhubhandar PRF, Mahubhandar RF, Tunguru RF etc. which need to be protected and enriched. This plan aims

- To preserve bio diversity of natural forests,
- To take appropriate steps to prepare Peoples Bio- Diversity Register (PBR) of the locality.
- To prevent mono culture practices in plantations only based on economic consideration.
- To encourage natural regeneration in forest blocks.
- To inculcate Concept of Bio- Diversity park among the staff / villagers.

13.1(V): Climate and Forests:

The relation between climate and forests is complementary to each other. The climate influences the forest composition and forest ameliorates the climate of an area in a larger context. During recent past, loss of forests has its effect on climate and a change in climatic behaviour is being experienced. Extreme climatic conditions viz- erratic monsoon with high rainfall, low rainfall, draught, Cyclonic storm, merging of seasons to summer and rain only are frequently experienced. Duration of other seasons like Autumn, Dew, Winter and Spring has been marginalized and sometimes not felt. In order to combat climate change the following objectives have been outlined for this plan. These are

- To improve the crop density of forest vegetations.
- To increase tree cover outside the conventional forest land i.e. TOF.
- To reduce emission of Green House Gases at source through public cooperation and create new carbon sink through Farm Forestry.



- To bring Village Woodlots of erstwhile **Social Forestry Project** to the management fold and **enhance forest cover & carbon sequestration**.
- To reduce fuel wood dependency by introducing alternate / renewable source of energy through VSS / EDC constituted under JFM Resolution.
- To enhance Solar Energy Generation & Utilization than conventional energy i.e. fossil fuels, Petroleum etc.

13.1(VI): Socioeconomic Considerations and generation of forest based employment opportunities and livelihood options:

Forest Management is not confined to departmental personals only. It has encompassed community participatory management practices since 1985 and more effectively thereafter. JFM resolution - 1993 has brought revolutionary changes in participatory Forest Management which has been further fortified in JFM Resolution 2011. This resolution (2011) provided a wider scope for participatory forest management, encompassing the Revenue Forests for joint management with villagers. The Committee is designated as **Vana Surakshya Samiti (VSS)** for forests and **Eco- Development Committee (EDC)** for Sanctuary, National Park and other Protected Areas. Both VSS and EDC are actively involved in management of Eco- Tourism, Nature Camps and Tourist Resorts/ barracks/ Complexes. The Panchyat Raj Institutions (PRI) is also involved in the process of Joint Forest Management in accordance with the JFM Resolution 2011. The objectives intended to be fulfilled / achieved in this plan are as follows.

- To involve more and more number of VSS in forest management for assigned Forest Fringe areas.
- To enhance / support various forests based livelihood and employment opportunity.
- To strengthen usufruct sharing mechanism for interim / final harvested forest produce from the assigned area.
- To arrange Skill development training camps for VSS on Value addition to NTFP and other Forest Produce.
- To support the VSS to change from traditional fuel wood use to renewable energy resources.
- To protect traditional knowledge / cultural practices and help in documentation of traditional knowledge related to Forest, NTFP and Forest based medicinal practices.
- Strengthening of Village Forest Management through VFC (Village Forest Committee) constituted during erstwhile Social Forestry Project (1985-2003)



13.1(VII): Tools for integrated development:

For overall development of Forest resources / TOF in the division dovetailing of various developmental schemes, make use of modern technology in forest management, Nursery raising, tissue culture etc are required to be implemented / use by Forest personnel. The department is to work hand in hand with the District Administration. Development in Veterinary & Animal Husbandry Sector, Soil Conservation and Water Resource Department are to be integrated with forest activities to make it more scientific, effective and more acceptable for the developing situation. This plan aims

- To develop Forest resources through various Schemes like MGNREGA, OMBARDC, GIM and NAP etc.
- To improve Planting stock through Tissue Culture, other Vegetative Propagation and root trainer nursery including Hi-tech. Nurseries including hi-tech nurseries.
- To identify and protect plus trees and create improved genetic pool.
- To imbibe knowledge on first growing technology in Agriculture / soil conservation to improve forest growing stock.
- To use Satellite related output for forest management with the help of ORSAC, National Institutes of Remote Sensing & Space Application / Forest Research Institute etc.
- Digitization of all forest blocks under administrative control of Forest department and Revenue department by using DGPS survey.
- To introduce management practices in all revenue forest areas through working schemes.

13.1(VIII): Performance Indicators for different objectives of management (PI):

In order to assess the performance on above outlined broad objectives, a set of performance indicators (PI) has been indicated below. It is required to evaluate / assess the performance in a periodical basis. First year of the Plan (2021-22) may be taken as base value and subsequent results may be compared to evaluate the achievements. The measurable / assessable parameters / attributes are furnished in **Table No 13.1** below.



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 13.1: Performance Indicators for different objectives of management.

SI No	Objectives	Parameters to be assessed.	Frequency	Remark
1	Dynamics of Forests and Stands.	Species composition	1 st Yr, 6 th Yr & 10 Yr	Sample Survey Method.
		Annual Biomass Production		Basal area Method. (M ² / Ha)
		Bio Diversity of a Forest		Bio Diversity Index – Sample Survey
		Sustainable & dependable production of timber / fuel wood		Annual Production Cum Per annum / MT PA
		Area under Manmade Forest / Plantation.		Interpretation of Satellite Imagery.
2	Forests and Soil:	Soil Erosion	1 st Yr, 6 th Yr & 10 Yr	Interpretation of Satellite Imagery / Local Observation / measurement of silt in water body.
		Create & maintain Wind Break		Analysis of Runoff Water & Local observation.
		Gully and ravine formation / Silt in Run Off		Study of Soil Profile
		Humus layer on forest floor		Random assessment in a particular Forest Block in Nov-Dec.
		Grazing pressure on forest		
3	Forests and Water.	Thick vegetation at the origin of rivers, springs and rivulets	1 st Yr, 6 th Yr & 10 Yr	Interpretation of Satellite Imagery / Local Observation
		Flow of water in Rivers, springs and rivulets.		Observation – Recording the quantum of flow of water and Period of Flow.
		Utilization of rain water flowing out of forests		Local observation.
4	Forest Biodiversity	Bio- Diversity Register	1 st Yr, 6 th Yr & 10 Yr	At least one Bio- Diversity Register to be prepared in each range & compare
		Natural regeneration in forest blocks Especially in Blocks adjacent to Similipal national Park & Sanctuary.		Regeneration Survey
5	Climate and Forests	Crop density of forest vegetations.	1 st Yr, 6 th Yr & 10 Yr	FSI Report on Forest cover
		Tree Outside the Forest.		
		Fuel wood dependency and changing over to alternate / renewable source of energy.		Participatory Rural Appraisal. Economic survey Report
6	Socioeconomic Considerations	Forests based livelihood and employment opportunity.	1 st Yr, 6 th Yr & 10 Yr	Survey on Self employment on Forest Produce/ Value addition.



Table No 13.1: Performance Indicators for different objectives of management.

	and generation of forest based employment opportunities and livelihood options	usufruct sharing mechanism for interim / final harvested forest produce	Annual	Records of Forest produce harvest in JFM area & distribution-Manner / Conflict if any.
		Skill development training camps for VSS on Value addition to NTFP	Annual	Survey on Self employment on Forest Produce/ Value addition.
		documentation of traditional knowledge related to Forest	1 st Yr, 6 th Yr & 10 Yr	Documentation and analysis.
7	Tool for integrated development:	To develop Forest resources through various Schemes like MGNREGA, OMBADC, GIM	Annual	Funds flow from other agencies.
		To improve Planting stock through Tissue Culture, other vegetative propagation		Plantation / Nursery through modern techniques.
		Identify and protect plus trees and create improve genetic pool.		Creation of Genetic Pool
		First growing technology in Agriculture / soil conservation to improve forest growing stock.	Annual	Application of Modern technology & Result evaluation.
		Use Satellite related output for forest management		Self assessment.

13.2: Method of treatment to be adopted:

The forests of Rairangpur Division are broadly categorized in to six categories i.e.

- Moist Sal Forest having luxuriant growth.
- Dry Sal forests – in a path of degradation.
- Forests having NTFP at a moderate scale.
- Plantations raised (Mixed Crop)
- Degraded forests assigned to VSS for Protection, Enrichment & Management.
- Village Forests of erstwhile Social Forestry Project.

Basing on the characteristics / crop density, the treatment to crop is described below.

13.2.1 Natural vegetations having Crop Density > 40%

Natural Vegetation having good Sal and previously managed under Selection system and in the outgoing plan managed under Rehabilitation WC and the Crop Density is above 40%. Sufficient trees are not available in the harvestable class and just below the harvestable class. Natural



regeneration of Sal is quite good but requires silvicultural treatment to establish. Some measures to expedite diameter growth so as to make a forest with all age class / girth class. These forests are proposed to be managed under **“Improvement Working Circle”**.

13.2.2 Natural vegetations having Crop Density <40%.

Most of the Sal forests having crop density less than 40% and crop with skewed distribution i.e. higher trees in lower girth class then abruptly fall in number of trees in higher girth classes. The open areas have been infested with heavy weed growth and ground flora is inadequate to absent. These areas were under Rehabilitation WC, but could not be treated as per prescriptions. Attempt has been made to enrich crop through planting. These forests are proposed to be managed under **“Rehabilitation Working Circle”**.

13.2.3 Plantations Raised within Forest Blocks:

Plantations raised in the Forest area to fill up the permanent gaps created due to either previous working or biotic interference. The species planted are mostly of timber and fuel wood species. The crop is not so established for a harvest of short rotation during this plan period. The area planted up will be managed as the prescription applicable to the forest block as a whole with special treatment like thinning. These plantations are not assigned to any working circle other than Forest Block allotted to for treatment i.e. **“Rehabilitation WC”** or **“Improvement WC”**

13.2.4 Social Forestry Project Plantations (Village Forest):

During Social Forestry Project, Many Village Woodlots were created with participatory approach (1985-2003). More than 30 years have passed. It is felt necessary to bring all such plantations declared as Village Forest as per Odisha Forest Act, 1972. These forests will be managed under **“Plantation Working Circle”**. In RF / PRF there are blank patches created during last plan period are to be managed under this prescriptions i.e. through **“Plantation Working Circle”**.

13.2.5 Management of Non Timber Forest Produce:

Mayurbhanja district is rich in NTFP items. Being a tribal district, varieties of NTFP are available. In Rairangpur Division, abundance of NTFP is very limited. Only Sal leaf, Kendu Leaf, Honey, Sal Resin, Siali Fiber, Siali Leaf are available to a fair to moderate level. As NTFP contributes a lively



hood support to tribal economy, its conservation, propagation and enhancement is required. Hence NTFP will be managed through **“NTFP (Overlapping) Working Circle”**.

13.2.6 Management of Wildlife:

Wildlife is an inseparable part from Forest Management. All Forest blocks of Bisoi WL Range is also included in the Buffer Zone of Similipal Tiger Reserve. There are two accepted Elephant Corridor viz- Badampahad – Karida & Badampahad - Dhobadhobin in the division. Division is also a part of Mayurbhanja Elephant Reserve. There is Movement of Elephant within the Division. For management of Wildlife an **Overlapping Working Circle** will be constituted and the problems related to wildlife management will be addressed suitably.

13.2.7 Participatory Forest Management:

Forest fringe villages have been assigned with responsibility of Protection & Management of Forests and Wildlife under provisions of Joint Forest Management Resolution -2011 and subsequent amendment -2015 and 2019. Similarly Village Forests created under SIDA Assisted Social Forestry Project is being managed by Village Forest Committee constituted under provisions of Village Forest Rule-1985. These forests will be managed under Participatory Forest Management in JFM Mode. These forests except those of SIDA Assisted Social forestry plantations will be considered & managed under **JFM (Overlapping) working Circle**

13.2.8 Management of Forest Resource outside the Forest area:

Tree Outside the forest (TOF) has been enriched through various plantation programs under different schemes (State plan, Central Plan, Special Schemes). Road side Plantations / Avenue Plantations have been created for aesthetic value. There is a high level meeting / discussion to constitute a Working Circle namely **“Development Working Circle”** on 13.02.2019. After discussion / deliberations, it is decided to constitute a working Circle to manage Forest Resource outside the Forest area vide letter no 3628/ 11F (SFM)-15 / 2018 dated 26.02.2019. **(Annexure-XV)**. This working circle will comprise the forests created outside the forest area including Avenue Plantations, other plantations of first growing species, other need based plantations like Fuel wood and Fodder Plantations, National Afforestation Program i.e. Plantations taken up under FDA Program, Plantation taken under MGNREGS etc. Regulating guidelines for TOF management will be embodied in the **TOF Working Circle**.



13.3: Constitution of Working Circles.

With the guiding factors as stated above and taken in to consideration it is felt to have the following Working Circles for scientific management of available forest resources of the Division.

- i) Improvement Working Circle – **(Area- 21948.980 ha)**
- ii) Rehabilitation Working Circle –(Area assigned – **20558.100 Ha)**
- iii) Plantation Working Circle-(Area assigned- **1691.804Ha)**
- iv) Wildlife (Overlapping) Working Circle- (Area assigned – **43912.680 Ha)**
- v) Non Timber Forest Produce (Overlapping) Working Circle- (Area assigned- **43912.680 Ha).**
- vi) Joint Forest Management (Overlapping) Working Circle.(Area assigned – **25343.474 ha)**
- vii) TOF Working Circle (Area assigned -**290.0 ha and 281.50 RKM avenue plantation.**)

Forest Block wise area allotted to various working circle is furnished below and at **(Annexure-XVI)**. The range wise area allotted is given at Table No: 13.2and abstract at Table No 13.3. The **Divisional Area Statement & Crop Density** is at **Annexure XVII**.

The abstract of Area taken for management purpose is furnished below.

Sl No	Category of Forest	Area taken for Management in Ha	Area taken for Management in Outgoing Plan in ha
1	Reserved Forest	27474.16	27417.7
2	PRF	10871.25	0
3	DPF	5587.38	0
4	Village Forest	286.204	0
5	Protected Forest	200.00	0
6	Total	44418.99	27417.7

(NB: Khairpal RF of Bahalda Range was not included in the outgoing plan. This is included in this plan. RF Tower –I and Tower-II were taken as one combindly, now considered as two RF units.

Table No: 13.2 Forest Area Allotted to various Working Circle.

Sl No	Name of Forest Block	Comp no	Area in ha	Area diverted under		Area available for Management in ha	Area allotted In Ha					
				FC Act 1980	FRA		Imp. WC	RWC	Plantation WC	NTFP (O) WC	WL(O) WC	JFM(O) WC
Reserved Forests.												
A. Badampahar Range												
1	Badampahar (part)	1b	202.160			202.160		202.160		202.160	202.160	150.000
		6b	460.800	129.61	0	331.190		331.190		331.190	331.190	300.000
		1a	338.000			338.000		338.000		338.000	338.000	300.000
		3	209.600			209.600		209.600		209.600	209.600	200.000
		5	284.160			284.160		284.160		284.160	284.160	250.000
		6a	128.000			128.000		128.000		128.000	128.000	128.000
		2a	217.600			217.600		217.600		217.600	217.600	217.600
		4	296.960			296.960		296.960		296.960	296.960	253.700
		9b	391.600			391.600		391.600		391.600	391.600	385.000
		2b	217.600			217.600		217.600		217.600	217.600	204.000
		S. Total	2746.480	129.61	0	2616.870	0.000	2616.870	0.000	2616.870	2616.870	2388.300
2	Basila		220.540			220.540		220.540		220.540	65.000	
3	Hat Badra		90.540			90.540		40.540	50.000	90.540	90.540	56.520
4	Dublabeda		498.160			498.160	498.160			498.160	498.160	498.160
5	Jhatisiring		28.320			28.320		28.320		28.320	28.320	28.320
6	Kherna		495.720			495.720		395.720	100.000	495.720	495.720	246.200
	Range Total	Range Total	4079.760	129.610	0.000	3950.150	498.160	3301.990	150.000	3950.150	3950.150	3282.500
B. Rairangpur Range												
7	Brahmani	1	373.760			373.760		373.760		373.760	373.760	373.760
		2	389.520			389.520		389.520		389.520	389.520	389.520
	S. Total		763.280	0.000	0.000	763.280	0.000	763.280	0.000	763.280	763.280	763.280



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No: 13.2 Forest Area Allotted to various Working Circle.

Sl No	Name of Forest Block	Comp no	Area in ha	Area diverted under		Area available for Management in ha	Area allotted In Ha					
				FC Act 1980	FRA		Imp. WC	RWC	Plantation WC	NTPF (O) WC	WL(O) WC	JFM(O) WC
8	Gorumahisani	1	270.800			270.800		250.800	20.000	270.800	270.800	181.780
		2	780.000			780.000		760.000	20.000	780.000	780.000	740.000
		3	626.000			626.000		606.000	20.000	626.000	626.000	626.000
		4	149.600			149.600		129.600	20.000	149.600	149.600	149.600
		5	249.600			249.600		229.600	20.000	249.600	249.600	225.000
		6	386.400	90.500	0.000	295.900		295.900		295.900	295.900	280.000
		S.Total	2462.400	90.500	0.000	2371.900	0.000	2271.900	100.000	2371.900	2371.900	2202.380
9	Ichinda		64.140			64.140		54.140	10.000	64.140	64.140	64.140
10	Hatibari		85.600			85.600			85.600	85.600	85.600	85.600
		S. Total	149.740	0.000	0.000	149.740	0.000	54.140	95.600	149.740	149.740	149.740
11	Jari	1	533.600			533.600		533.600		533.600	533.600	533.600
		2	816.000			816.000		766.000	50.000	816.000	816.000	816.000
		3	330.800			330.800		330.800		330.800	330.800	190.000
		4	826.800			826.800		826.800		826.800	826.800	800.000
		5	474.800			474.800		474.800		474.800	474.800	474.800
		S.Total	2982.000			2982.000	0.000	2932.000	50.000	2982.000	2982.000	2814.400
12	Jhumukapahadi		70.400			70.400		70.400		70.400	70.400	70.400
13	Karan JharanDhasra		540.600			540.600		540.600		540.600	540.600	540.600
14	Kucheibudhi		211.520			211.520		151.520	60.000	211.52	211.52	211.52
15	Naskaria		96.000			96.000		46.000	50.000	96.00	96.00	96.00
16	Dumurikudar		34.400			34.400		34.400		34.400	34.400	34.400
		S. Total	952.920	0.000	0.000	952.920	0.000	842.920	110.000	952.920	952.920	952.920
	Range total		7310.340	90.500	0.000	7219.840	0.000	6864.240	355.600	7219.840	7219.840	6882.720



Working Plan of Rairangpur Forest division (2021 to 2031)

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Sl No	Name of Forest Block	Comp no	Area in ha	Area diverted under		Area available for Management in ha	Area allotted In Ha					
				FC Act 1980	FRA		Imp. WC	RWC	Plantation WC	NTFP (O) WC	WL(O) WC	JFM(O) WC
C. Bahalda Range												
17	Tiring	1	400.000			400.000		400.000		400	400	400.00
		2	366.440			366.440		206.440	160.000	366.44	366.44	366.44
		S.Total	766.440	0.000	0.000	766.440	0.000	606.440	160.000	766.440	766.440	766.440
18	Bankmundi		433.300			433.300		433.300		433.3	433.3	433.3
19	RamgarhAsurghaty		907.060			907.060		857.060	50.000	907.06	907.06	907.06
20	Chahalapada		620.800			620.800		570.800	50.000	620.8	620.8	620.80
21	Debradihi		45.080			45.080		45.080		45.08	45.08	45.08
22	Gambharia		455.260			455.260		155.260	300.000	455.26	455.26	455.26
23	Manbir		656.520			656.520		631.520	25.000	656.52	656.52	656.52
		S. Total	3118.020	0.000	0.000	3118.020	0.000	2693.020	425.000	3118.020	3118.020	3118.020
24	Budheirana	1	1150.000			1150.000		1000.000	150.000	1150.0	1150.0	1150.0
		2	226.340			226.340		226.340		226.34	226.34	226.34
		S.Total	1376.340	0.000	0.000	1376.340	0.000	1226.340	150.000	1376.340	1376.340	1376.340
25	Khairpal		56.390			56.390		56.390		56.39	56.39	56.39
	Range Total		5317.190	0.000	0.000	5317.190	0.000	4582.190	735.000	5317.190	5317.190	5317.190
D. Bisoi(WL) Range												
26	Mahubhandar		1048.780			1048.780	1048.780			1048.780	1048.780	848.000
27	Tunguru	1	610.000			610.000	610.000			610.000	610.000	450.000
		2	1224.400			1224.400	1224.400			1224.400	1224.400	750.000
		3	445.600			445.600	445.600			445.600	445.600	230.000
		4	465.200			465.200	465.200			465.200	465.200	250.000
		5	911.600			911.600	911.600			911.600	911.600	404.000
		S.Total	3656.800	0.000	0.000	3656.800	3656.800	0.000	0.000	3656.800	3656.800	2084.000



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No: 13.2 Forest Area Allotted to various Working Circle.

Sl No	Name of Forest Block	Comp no	Area in ha	Area diverted under		Area available for Management in ha	Area allotted In Ha					
				FC Act 1980	FRA		Imp. WC	RWC	Plantation WC	NTPF (O) WC	WL(O) WC	JFM(O) WC
28	Kanapat	1	652.000			652.000	652.000			652.000	652.000	100.000
		2	578.400			578.400	578.400			578.400	578.400	150.000
		3	757.600			757.600	757.600			757.600	757.600	170.000
		4	851.200			851.200	851.200			851.200	851.200	200.000
		5	801.200			801.200	801.200			801.200	801.200	225.000
		S.Total	3640.400	0.000	0.000	3640.400	3640.400	0.000	0.000	3640.400	3640.400	845.000
29	Sarali	1	742.400			742.400	742.400			742.400	742.400	100.000
		2	358.500			358.500	358.500			358.500	358.500	125.000
		3	519.200			519.200	519.200			519.200	519.200	150.000
		4	408.800			408.800	408.800			408.800	408.800	125.000
		S.Total	2028.900	0.000	0.000	2028.900	2028.900	0.000	0.000	2028.900	2028.900	500.000
30	Tower –I	1	187.840			187.840	187.840			187.840	187.840	0.000
31	Tower –II		13.350			13.350	13.350			13.350	13.350	0.000
32	Sargoda		106.780			106.780		106.780		106.780	106.780	106.780
		S Total	307.970	0.000	0.000	307.970	201.190	106.780	0.000	307.970	307.970	106.780
	Range Total		10682.850	0.000	0.000	10682.850	10576.070	106.780	0.000	10682.850	10682.850	4383.780
E. Manada Range												
33	Tualsibani		3.500			3.500	3.5			3.5	3.5	0
34	Khadambada		80.520			80.520		80.52		80.52	80.52	0
	Range total		84.020	0.000	0.000	84.020	3.500	80.520	0.000	84.020	84.020	0.000
	Divi. Total		27474.160	220.110	0.000	27254.050	11077.730	14935.720	1240.600	27254.050	27254.050	19866.19
Proposed Reserved Forest												
Bisoil WL Range												
1	Bidhubhandar PRF		10871.25	0	0	10871.25	10871.25	0	0	10871.25	10871.25	2778.00
	Divi. Total		10871.25	0	0	10871.25	10871.25	0.00	0.00	10871.25	10871.25	2778.00



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No: 13.2 Forest Area Allotted to various Working Circle.

Sl No	Name of Forest Block	Comp no	Area in ha	Area diverted under		Area available for Management in ha	Area allotted In Ha					
				FC Act 1980	FRA		Imp. WC	RWC	Plantation WC	NTFP (O) WC	WL(O) WC	JFM(O) WC
DPF (Demarcated Protected Forest)												
A. Badampahar Range												
1	Baneikala		52.220			52.220		52.220		52.220	52.220	46.910
2	Gundurua		20.720			20.720		20.720		20.720	20.720	20.000
3	Hatnabeda		81.950			81.950		81.950		81.950	81.950	81.950
4	Jaydhanposi		8.920			8.920		8.920		8.920	8.920	0.000
5	Jhatisiring		77.190			77.190		77.190		77.190	77.190	77.190
6	Patijhari		26.810			26.810		26.810		26.810	26.810	0.000
7	Ukam-I		57.160			57.160		57.160		57.160	57.160	57.160
8	Sargoda –II		91.490			91.490		91.490		91.490	91.490	0.000
9	Dubulabeda		34.900			34.900		34.900		34.900	34.900	0.000
10	Tirilipi		380.000			380.000		380.000		380.000	380.000	295.250
	Range Total		831.360	0	0	831.360	0	831.360	0	831.360	831.360	498.12
B. Rairangpur Range												
11	Anandpur		24.280			24.280		24.280		24.280	24.280	0.00
12	Badjari		47.690			47.690		47.690		47.690	47.690	0.000
13	Betjharan – I		118.550			118.550		113.550	5.000	118.550	118.550	0.000
14	Betjharan – II		85.360			85.360		85.360		85.360	85.360	0.000
15	Betjharan – III		32.740			32.740		32.740		32.740	32.740	0.000
16	Belpahari – VI		22.960			22.960		22.960		22.960	22.960	0.000
17	Balarampur		120.800			120.800		115.800	5.000	120.800	120.800	0.00
18	Gorumahisani		20.130			20.130		20.130		20.130	20.130	0.000
19	Jhumkapahadi		21.850			21.850		21.850		21.850	21.850	0.000
20	Juapahadi		41.980			41.980		41.980		41.980	41.980	0.000
21	Kalatamak		29.950			29.950		24.950	5.000	29.950	29.950	0.000
22	Kucheibudi		38.100			38.100		38.100		38.100	38.100	0.000



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No: 13.2 Forest Area Allotted to various Working Circle.

Sl No	Name of Forest Block	Comp no	Area in ha	Area diverted under		Area available for Management in ha	Area allotted In Ha					
				FC Act 1980	FRA		Imp. WC	RWC	Plantation WC	NTPF (O) WC	WL(O) WC	JFM(O) WC
23	Radho		505.860			505.860		495.860	10.000	505.860	505.860	0.00
24	Merudihi		114.490			114.490		114.490		114.490	114.490	0.000
25	Dahupani		1328.140			1328.140		1328.140		1328.140	1328.140	0.00
26	Saragada		124.440			124.440		124.440		124.440	124.440	0.000
27	Bhatgoda		20.240			20.240		20.240		20.240	20.240	0.000
	Range Total		2697.560	0	0	2697.560	0.0	2672.560	25.000	2697.560	2697.560	0.00
C. Bahalda Range												
28	Bahalda		25.490			25.490		25.490		25.490	25.490	25.490
29	Bhitaramda		1060.620			1060.620		970.620	90.000	1060.620	1060.620	1060.620
30	Dumadihi		36.730			36.730		36.730		36.730	36.730	36.730
31	Sansadam		60.700			60.700		60.700		60.700	60.700	60.700
32	Jadunathpur		20.230			20.230		20.230		20.230	20.230	20.230
33	Rutughutu		20.490			20.490		10.490	10.000	20.490	20.490	20.490
34	Salei		60.700			60.700		60.700		60.700	60.700	60.700
	Range Total		1284.960	0	0	1284.960		1184.960	100.000	1284.960	1284.960	1284.960
D. Bisoi WL range												
35	Asansikal		34.65	0	0	34.65	0	34.65		34.65	34.65	00
	Range Total		34.65	0	0	34.65	0	34.65		34.65	34.65	00.0
E. Manada Range												
36	Dhenkia		384.34			384.34		374.340	10.000	384.34	384.34	384.34
37	Ektali		3.79			3.79		3.790		3.79	3.79	0
38	Jamda-V		15.52			15.52		15.520		15.52	15.52	15.52
39	Pidhakata		335.2			335.2		305.200	30.000	335.2	335.2	230.14
	Range Total		738.85	0	0	738.85	0	698.850	40.000	738.85	738.85	630.0
	Divi. Total		5587.38	0	0	5587.38	0	5422.38	165.00	5587.38	5587.38	2413.08



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No: 13.2 Forest Area Allotted to various Working Circle.

Sl No	Name of Forest Block	Comp no	Area in ha	Area diverted under		Area available for Management in ha	Area allotted In Ha					
				FC Act 1980	FRA		Imp. WC	RWC	Plantation WC	NTFP (O) WC	WL(O) WC	JFM(O) WC
Protected Forest (PF)												
Bisoi WL Range												
1	Hatichhad PF		200.00	0.00	0.00	200.00		200.00		200.00	200.00	0.00
Village Forest												
A. Badampahar												
1	Gopalpur		3.408			3.408			3.408			3.408
2	Kaduani		8.440			8.440			8.440			8.440
3	Chingudipokhari		16.600			16.600			16.600			16.600
4	Bakedihi		2.240			2.240			2.240			2.240
5	Chulibhanga		12.460			12.460			12.460			12.460
6	Chahalapada		5.000			5.000			5.000			5.000
7	Chhanua		5.000			5.000			5.000			5.000
8	Dalki		5.000			5.000			5.000			5.000
9	Kasiabeda		25.000			25.000			25.000			25.000
10	Tirilidihi		10.000			10.000			10.000			10.000
11	Jhipabandh		7.672			7.672			7.672			7.672
12	Pechadara		13.356			13.356			13.356			13.356
13	Pandugandi		15.000			15.000			15.000			15.000
14	Dova		15.000			15.000			15.000			15.000
15	Ghodadega		10.000			10.000			10.000			10.000
16	Bargimora		10.000			10.000			10.000			10.000
	Range total		164.176	0	0	164.176	0	0	164.176	0	0	164.176
B. Rrairangpur Range												
17	Kalarda		2.080			2.080			2.080			2.080
18	Sijukala		0.160			0.160			0.160			0.160
19	Haldibani		5.000			5.000			5.000			5.000
20	Neuti		7.000			7.000			7.000			7.000
	Range total		14.240	0	0	14.240	0	0	14.240	0	0	14.240



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				FC Act 1980	FRA		Imp. WC	RWC	Plantation WC	NTFP (O) WC	WL(O) WC	JFM(O) WC
C. Bahalda Range												
21	Gambharia		2.800			2.800			2.800			2.800
22	Bhadusahi		1.408			1.408			1.408			1.408
23	Gudta		3.800			3.800			3.800			3.800
24	Jaritandi		1.540			1.540			1.540			1.540
25	Chadri		9.916			9.916			9.916			9.916
26	Surda		1.112			1.112			1.112			1.112
27	Asana		5.000			5.000			5.000			5.000
28	Kumbhirmundi		5.000			5.000			5.000			5.000
29	Dubulabeda		8.800			8.800			8.800			8.800
30	Bhaleidihi		3.960			3.960			3.960			3.960
31	Kainpur		20.000			20.000			20.000			20.000
32	Jashipur		9.948			9.948			9.948			9.948
33	Jhadgaon		1.100			1.100			1.100			1.100
34	Gayalkata		0.280			0.280			0.280			0.280
35	Kuldiha		7.088			7.088			7.088			7.088
36	Brahmanbose		0.572			0.572			0.572			0.572
37	Pasna		9.000			9.000			9.000			9.000
38	Tarana		15.000			15.000			15.000			15.000
	Range total		106.324	0	0	106.324	0	0	106.324	0	0	106.324
D. Manada Range												
39	Dhana		1.464			1.464			1.464			1.464
	Range total		1.464			1.464	0	0	1.464	0	0	1.464
	Divosion Total		286.204	0.000	0.000	286.204	0.000	0.000	286.204	0.000	0.000	286.204
G.Total (WC Wise)			44418.99	220.11	0	44198.88	21948.98	20558.1	1691.804	43912.68	43912.68	25343.474

Table No 13.3 ABSTRACT OF AREA ALLOTTED TO WORKING CIRCLE							
Range	Area under management	Imp. WC	RWC	Plantation WC	NTPF (O) WC	WL(O) WC	JFM(O) WC
For RF							
Badampahad	3950.150	498.160	3301.990	150.000	3950.150	3950.150	3282.500
Rairangpur	7219.840	0.000	6864.240	355.600	7219.840	7219.840	6882.720
Bahalda	5317.190	0.000	4582.190	735.000	5317.190	5317.190	5317.190
Bisoi WL	10682.850	10576.070	106.780	0.000	10682.850	10682.850	4383.780
Manada	84.020	3.500	80.520	0.000	84.020	84.020	0.000
Total RF	27254.05	11077.73	14935.72	1240.6	27254.05	27254.05	19866.19
For DPF							
Badampahad	831.360	0	831.360	0	831.360	831.360	498.12
Rairangpur	2697.560	0.0	2672.560	25.000	2697.560	2697.560	0.00
Bahalda	1284.960		1184.960	100.000	1284.960	1284.960	1284.960
Bisoi WL	34.65	0	34.65		34.65	34.65	00.0
Manada	738.85	0	698.850	40.000	738.85	738.85	630.0
Total DPF	5587.38	0	5422.38	165	5587.38	5587.38	2413.08
For PRF							
Badampahad	0	0	0	0	0	0	0
Rairangpur	0	0	0	0	0	0	0
Bahalda	0	0	0	0	0	0	0
Bisoi WL	10871.25	10871.25	0	0	10871.25	10871.25	2778.0
Manada	0	0	0	0	0	0	0
Total PRF	10871.25	10871.25	0	0	10871.25	10871.25	2778.0
For PF							
Badampahad	0	0	0	0	0	0	0
Rairangpur	0	0	0	0	0	0	0
Bahalda	0	0	0	0	0	0	0
Bisoi WL	200.0		200.0		200.0	200.0	0.0
Manada	0	0	0	0	0	0	0
Total PF	200.0	0.0	200.0	0.0	200.0	200.0	0.0
For VF							
Badampahad	164.176	0	0	164.176	0	0	164.176
Rairangpur	14.240	0	0	14.240	0	0	14.240
Bahalda	106.324	0	0	106.324	0	0	106.324
Bisoi WL	0.000	0	0	0.000	0	0	0.000
Manada	1.464	0	0	1.464	0	0	1.464
Total VF	286.204	0	0	286.204	0	0	286.204
Consolidated Total	44198.88	21948.98	20558.1	1691.804	43912.68	43912.68	25343.474



13.4: Period of Working Plan and necessity for intermediate revision.

The period of this working Plan is **from 1st April'2021 to 31st March 2031**. The implementation and probable impact of various prescriptions may be reviewed after five years of working, if it is so required.





CHAPTER-14

IMPROVEMENT WORKING CIRCLE (IWC)

14.1 Improvement Working Circle:

The Forest Block having moderate to dense crop density and previously under Rehabilitation Working Circle have improved its crown density are included in this Working circle. On analysis of sample point data, it is observed that trees of harvestable Girth Class and just below it are not compatible for harvesting trees above exploitable girth. Some of the Forests are adjacent to and included in the Similipal Tiger Reserve buffer zone. Such forests require further improvement to sustain an economic harvest of trees in future. It is felt to manage such forests under "Improvement Working Circle" to enhance the qualitative and quantitative improvement of tree cover. Hence this "Improvement Working Circle" has been prescribed. The total area assigned to this Working Circle is **21948.98 ha**.

14.2 General Constitution:

The forest blocks having crop density just above 40%, Non abundance of trees in higher Girth Class i.e. above 120 cm and establishment of Regeneration becoming difficult and challenging are prescribed to be managed under **Improvement Working Circle** where thrust is given on improvement of crop, enhancement of diameter and creation of a forest with all age class evenly distributed. The following forest blocks are assigned to this Working circle.

Table No 14.1 Area allotted to IWC (In Ha)

Name of Range	SI No	Name of Forest Block	Comp. No	Total area of the Comp.	Area assigned to IWC
Badampahar Range	1	Dublabeda RF		498.160	498.160
Bisoi WL Range	2	Mahubhandar RF		1048.780	1048.780
	3	Tunguru RF	1	610.000	610.000
			2	1224.400	1224.400
			3	445.600	445.600
			4	465.200	465.200
			5	911.600	911.600
			Block Total	3656.800	3656.800
	4	Kanapat RF	1	652.000	652.000
			2	578.400	578.400
			3	757.600	757.600



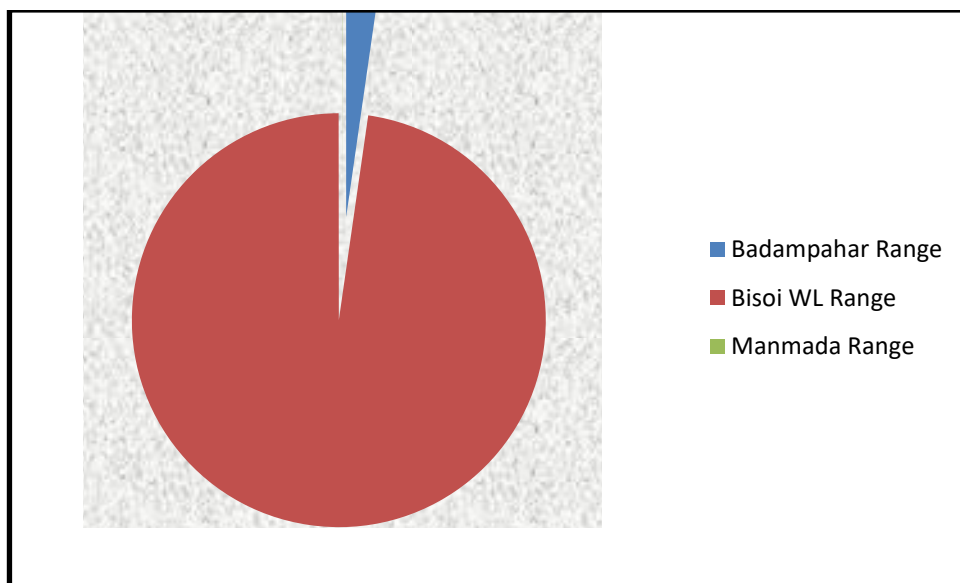
Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 14.1 Area allotted to IWC (In Ha)

			4	851.200	851.200
			5	801.200	801.200
			Block Total	3640.400	3640.400
	5	Sarali RF	1	742.400	742.400
			2	358.500	358.500
			3	519.200	519.200
			4	408.800	408.800
			Block Total	2028.900	2028.900
	6	Tower –I RF		187.840	187.840
	7	Tower –II RF		13.350	13.350
Manada Range	8	Tualsibani RF		3.500	3.500
Bisoi WL Range	9	Bidhubhandar PRF		10871.25	10871.25
		Total (IWC)		21948.980	21948.980

Range wise Abstract.

Range	Area in Ha
1. Badampahar Range	498.160
2. Bisoi WL Range	21447.32
3. Manada Range	3.50
Total	21948.980





14.3 General Characteristics of Vegetation:

The forests included in this Working Circle are moist peninsular low level Sal Forest. Sal is the principal species and constitutes about 90-95%. Rest of the crop are Asan, Piasal, Jamun Mango etc. Most of the areas are hilly and inaccessible. The site quality is Sal –III in an average. The top height is 70' and above. In some pockets congested Sal / advance growth is note worthy. Regeneration is quite good. Occasional Fire and biotic interference is affecting its development.

14.4 Treatment Series / Treatment Section and JFM Area.

The area allotted to this Working Circle is proposed to treat for improvement in 12 (Twelve) Improvement Series as described below.

Table No 14.2 List of Improvement Series. (Rairangpur Division)

Sl No	Name of Improvement Series.	Range	Name of Forest block	Comp. No	Area assigned to IWC.	Total area
1	Dublabeda Imp. Series (DIS)	Badampahad	Dublabeda RF		498.160	501.660
		Manada	Tualsibani RF		3.500	
2	Mahubhandar Imp. Series (MIS)	Bisoi WL	Mahubhandar RF		1048.780	1048.780
3	Tunguru Imp. Series (TIS)	Bisoi WL	Tunguru RF	1	610.000	1834.40
				2	1224.400	
4	Sunajodia Imp. Series (SIS)	Bisoi WL	Tunguru RF	3	445.600	1822.40
				4	465.200	
				5	911.600	
5	Kanapat Imp. Series (KIS)	Bisoi WL	Kanapat RF	1	652.000	1988.00
				2	578.400	
				3	757.600	
6	Badabantha Imp. Series (BIS)	Bisoi WL	Kanapat RF	4	851.200	1652.40
				5	801.200	
7	Sarali Imp. Series (Sr. IS)	Bisoi WL	Sarali RF	1	742.400	1100.90
				2	358.500	
8	Guddamura Imp. Series (GIS)	Bisoi WL	Sarali RF	3	519.200	1129.19
				4	408.800	
			Tower –I RF	1	187.840	
			Tower –II RF	2	13.350	
9	Bidhubhandar Imp. Series (Bn.IS)	Bisoi WL	Bidhubhandar PRF	A	2800.00	2800.00



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Table No 14.2 List of Improvement Series. (Rairangpur Division)

10	Budhabalanga Imp. Series (Bg. IS)	Bisoi WL	Bidhubhandar PRF	B	2950.00	2950.00
11	Sanakacha Imp. Series (Sk. IS)	Bisoi WL	Bidhubhandar PRF	C	2500.00	2500.00
12	Rajabasa Imp. Series (RIS)	Bisoi WL	Bidhubhandar PRF	D	2621.25	2621.25
	12Series				21948.980	21948.980

14.5 Blocks, Compartments and JFM Area:

In total eight Reserved Forests and one PRF has been assigned to this Working Circle for improvement. The forests have also been assigned to Vana Surakshya Samiti (VSS) for management & improvement of crop. The area assigned to various VSS has been indicated below. (Table No 14.3).

Table No 14.3 Area allotted to IWC / VSS (In Ha)

Name of Range	Sl No	Name of Forest Block	Comp. No	Total area of the Comp.	Area assigned to IWC	Area assigned to VSS
Badampahar Range	1	Dublabeda RF		498.160	498.160	498.160
	2	Mahubhandar RF		1048.780	1048.780	848.000
Bisoi WL Range	3	Tunguru RF	1	610.000	610.000	450.000
			2	1224.400	1224.400	750.000
			3	445.600	445.600	230.000
			4	465.200	465.200	250.000
			5	911.600	911.600	404.000
			Block Total	3656.800	3656.800	2084.000
	4	Kanapat RF	1	652.000	652.000	100.000
			2	578.400	578.400	150.000
			3	757.600	757.600	170.000
			4	851.200	851.200	200.000
			5	801.200	801.200	225.000
			Block Total	3640.400	3640.400	845.000
	5	Sarali RF	1	742.400	742.400	100.000
			2	358.500	358.500	125.000
			3	519.200	519.200	150.000
			4	408.800	408.800	125.000
			Block Total	2028.900	2028.900	500.000



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	6	Tower –I RF		187.840	187.840	0.000
	7	Tower –II RF		13.350	13.350	0.000
Manada Range	8	Tualsibani RF		3.500	3.5	0
Bisoi WL Range	9	Bidhubhandar PRF		10871.25	10871.25	2778.00
		Total (IWC)		21948.980	21948.980	7553.16

14.6 Special Objectives of Management:

The objectives of this Working Circle are in accordance with the overall objectives of the forest management. The special objectives outlined for this working Circle are as follows.

- i) To improve the crop through Silvicultural practices so as to allow the pole crops develop to tree crop with rapid diameter growth.
- ii) To improve the crop density, check Soil erosion through Soil & Moisture Conservation practices.
- iii) To allow establishment of Natural Regeneration and encourage regeneration through **“High Forest System”**.
- iv) To improve habitat for safe movement of wild animals.
- v) To protect against all biotic interference.
- vi) To protect & improve catchment area of River Budhabalanga and its tributaries.

14.6.1 Analysis of the crop:

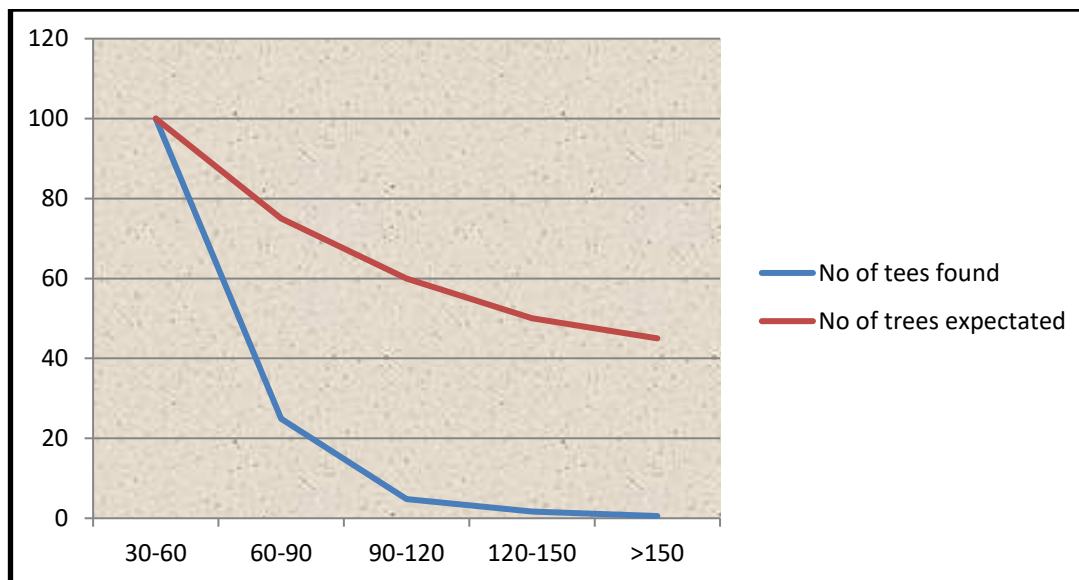
The ORSAC reports for Bidhubhandar PRF is analysed here for better appreciation of crop composition.

Criteria	Girth Class in cm				
	30-60	60-90	90-120	120-150	>150
Trees in different G. Class	1148827	285986	55224	19584	6374
% of trees passing to next G. Class	100	24.89	4.81	1.70	0.55
Volume of Growing stock in different G. Class	98140	88224	33075	26241	16624
% of Growing Stock in different G. Class	37.41	33.63	12.61	10.00	6.34

From the above it is observed that out of 100 trees in 30-60cm Girth Class, 24.89 trees only pass to next Girth Class. Out of 100 trees in 30-60cm class 4.81% pass to 90-120 cm class, 1.70



% passes to 120-150 cm and 0.55 % to 150 cm above Girth class. That indicates threat perception to the crop from established regeneration to utilizable Girth Class. The graph furnished below indicates the reality and expectation.



14.6.2 Silvicultural System

The crop is mostly of young poles. No harvest is expected from this Working Circle. It is to recover the forest from effects of over exploitation during past era. The Silvicultural System **“Stand Improvement through Natural regeneration with intensive Soil & Moisture Conservation”** will be adopted.

14.6.3 Rotation Period:

The crop is mostly Sal. To reach an exploitable Girth above 150 cm or so, considering the present Soil Productivity and soil moisture regime a Rotation period of 100 years is predicted. As no harvest is expected from this working circle, no rotation period is prescribed in this plan.

14.6.4 Harvestable Diameters:

No harvest is prescribed in this working circle. In course of improvement only dead trees are likely to be removed in case of extreme climate and natural calamities, if so warranted. No harvestable diameter is prescribed for this working circle.



14.6.5 Reduced Factors and reduced areas:

No yield is prescribed. Hence no reduction factor / reduced area are prescribed.

14.6.6 Treatment Cycle:

The assigned area is to be treated for improvement. A treatment Cycle of 10 years is prescribed. The period is co-terminus with the plan period.

14.6.7 Division into Treatment Sections.

For intensive management / treatment for better response, the area has been divided in to ten sections (coterminous with the plan period). The sections / area assigned to each year for treatment is furnished below.

i. Dublabeda Imp. Series (DIS);

Table No. 14.4a Dublabeda Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Dublabeda Imp. Series (DIS)	Badampahad	DIS-I	2021-22	Dublabeda RF	---	50.00	50.00
		DIS-II	2022-23	Dublabeda RF	---	50.00	50.00
		DIS-III	2023-24	Dublabeda RF	---	50.00	50.00
		DIS-IV	2024-25	Dublabeda RF	---	50.00	50.00
		DIS-V	2025-26	Dublabeda RF	---	50.00	50.00
		DIS-VI	2026-27	Dublabeda RF	---	50.00	50.00
		DIS-VII	2027-28	Dublabeda RF	---	50.00	50.00
		DIS-VIII	2028-29	Dublabeda RF	---	50.00	50.00
		DIS-IX	2029-30	Dublabeda RF	---	48.16	51.66
				Tualsibani RF	---	3.50	
		DIS-X	2030-31	Dublabeda RF	---	50.00	50.00
			Total			501.66	501.66



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ii. Mahubhandar Imp. Series (MIS);

Table No. 14.4b Mahubhandar Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Mahubhandar Imp. Series (MIS)	Bisoi WL	MIS-I	2021-22	Mahubhandar RF	--	105.00	105.00
		MIS-II	2022-23			105.00	105.00
		MIS-III	2023-24		--	105.00	105.00
		MIS-IV	2024-25			105.00	105.00
		MIS-V	2025-26		--	105.00	105.00
		MIS-VI	2026-27			105.00	105.00
		MIS-VII	2027-28		--	105.00	105.00
		MIS-VIII	2028-29			105.00	105.00
		MIS-IX	2029-30		--	103.78	103.78
		MIS-X	2030-31		--	105.00	105.00
		Total				1048.78	1048.78

iii. Tunguru Imp. Series (TIS);

Table No. 14.4c Tunguru Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Tunguru Imp. Series (TIS)	Bisoi WL	TIS-I	2021-22	Tunguru RF	1(2 nd Part)	205.00	205.00
		TIS-II	2022-23		1 (3 rd Part)	205.00	205.00
		TIS-III	2023-24		2(1 ST Part)	175.0	175.0
		TIS-IV	2024-25		2(2 nd part)	175.0	175.0
		TIS-V	2025-26		2(3 rd P)	175.0	175.0
		TIS-VI	2026-27		2(4 th P)	175.0	175.0
		TIS-VII	2027-28		2(5 th P)	175.0	175.0
		TIS-VIII	2028-29		2(6 th P)	175.0	175.0
		TIS-IX	2029-30		2(Balance)	174.40	174.40
		TIS-X	2030-31		1 (1 st Part)	200.00	200.00
	Total					1834.40	1834.40



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iv. Sunajodia Imp. Series (SIS);

Table No. 14.4d Sunajodia Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Sunajodia Imp. Series (SIS)	Bisoi WL	SIS-I	2021-22	Tunguru RF	3(2 nd P)	150.0	150.0
		SIS-II	2022-23		3(Balance)	145.60	145.60
		SIS-III	2023-24		4(1 st P)	155.00	155.00
		SIS-IV	2024-25		4(2 nd P)	155.00	155.00
		SIS-V	2025-26		4(Balance)	155.20	155.20
		SIS-VI	2026-27		5(1 st P)	225.00	225.00
		SIS-VII	2027-28		5(2 nd P)	230.00	230.00
		SIS-VIII	2028-29		5(3 rd P)	225.00	225.00
		SIS-IX	2029-30		5 Balance)	231.60	231.60
		SIS-X	2030-31		3 (1 st P)	150.0	150.0
				Total		1822.40	1822.40

v. Kanapat Imp. Series (KIS):

Table No. 14.4e Kanapat Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Kanapat Imp. Series (KIS)	Bisoi WL	KIS-I	2021-22	Kanapat RF	1(2 nd P)	220.00	220.00
		KIS-II	2022-23		1 (Balance)	217.00	217.00
		KIS-III	2023-24		2 (1 st P)	195.00	195.00
		KIS-IV	2024-25		2(2 nd P)	190.00	190.00
		KIS-V	2025-26		2 (Balance)	193.40	193.40
		KIS-VI	2026-27		3(1 st P)	190.00	190.00
		KIS-VII	2027-28		3(2 nd P)	190.00	190.00
		KIS-VIII	2028-29		3(3 rd P)	190.00	190.00
		KIS-IX	2029-30		3(Balance)	187.60	187.60
		KIS-X	2030-31		1 (1 st P)	215.00	215.00
			Total			1988.00	1988.00



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vi. Badabantha Imp. Series (BIS):

Table No. 14.4f Badabantha Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Badabantha Imp. Series (BIS)	Bisoi WL	BIS-I	2021-22	Kanapat RF	4(2 nd P)	170.00	170.00
		BIS-II	2022-23		4(3 rd P)	170.00	170.00
		BIS-III	2023-24		4(4 th P)	170.00	170.00
		BIS-IV	2024-25		4(Balance)	171.20	171.20
		BIS-V	2025-26		5 (1 st P)	160.0	160.0
		BIS-VI	2026-27		5(2 nd P)	160.0	160.0
		BIS-VII	2027-28		5(3 rd P)	160.0	160.0
		BIS-VIII	2028-29		5(4 th P)	160.0	160.0
		BIS-IX	2029-30		5(Balance)	161.20	161.20
		BIS-X	2030-31		4 (1 st P)	170.00	170.00
				Total		1652.40	1652.40

vii. Sarali Imp. Series (Sr. IS):

Table No. 14.4g Sarali Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Sarali Imp. Series (Sr. IS)	Bisoi WL	Sr.IS-I	2021-22	Sarali RF	1(2 nd P)	106.00	106.00
		Sr.IS-II	2022-23		1(3 rd P)	106.00	106.00
		Sr.IS-III	2023-24		1(4 th P)	106.00	106.00
		Sr.IS-IV	2024-25		1(5 th P)	106.00	106.00
		Sr.IS-V	2025-26		1(6 th P)	106.00	106.00
		Sr.IS-VI	2026-27		1 (Balance)	106.40	106.40
		Sr.IS-VII	2027-28		2 (1 st P)	120.00	120.00
		Sr.IS-VIII	2028-29		2(2 nd P)	120.00	120.00
		Sr.IS-IX	2029-30		2(Balance)	118.50	118.50
		Sr.IS-X	2030-31		1 (1 st P)	106.00	106.00
				Total		1100.90	1100.90



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viii. Guddamura Imp. Series (GIS):

Table No. 14.4h Guddamaru Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Guddamura Imp. Series (GIS)	Bisoi WL	GIS-I	2021-22	Sarali RF	3(2 nd P)	105.00	105.00
		GIS-II	2022-23		3(3 rd P)	105.00	105.00
		GIS-III	2023-24		3(4 th P)	105.00	105.00
		GIS-IV	2024-25		3(Balance)	104.20	104.20
		GIS-V	2025-26		4 (1 st P)	135.00	135.00
		GIS-VI	2026-27		4(2 nd P)	140.00	140.00
		GIS-VII	2027-28		4(Balance)	133.80	133.80
		GIS-VIII	2028-29	Tower –I RF	1 st Part	100.00	100.00
		GIS-IX	2029-30		Balance	87.84	87.84
				Tower –II RF		13.350	13.350
		GIS-X	2030-31	Sarali RF	3 (1 st P)	100.00	100.00
				Total		1129.19	1129.19

ix. Bidhubhandar Imp. Series (Bn.IS):

Table No. 14.4i Bidhubhandar Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Bidhubhandar Imp. Series (Bn.IS)	Bisoi WL	Bn.IS-I	2021-22	Bidhubhandar PRF	A (P-2)	280.00	280.00
		Bn.IS-II	2022-23		A (P-3)	280.00	280.00
		Bn.IS-III	2023-24		A (P-4)	280.00	280.00
		Bn.IS-IV	2024-25		A (P-5)	280.00	280.00
		Bn.IS-V	2025-26		A (P-6)	280.00	280.00
		Bn.IS-VI	2026-27		A (P-7)	280.00	280.00
		Bn.IS-VII	2027-28		A (P-8)	280.00	280.00
		Bn.IS-VIII	2028-29		A (P-9)	280.00	280.00
		Bn.IS-IX	2029-30		A (P-10)	280.00	280.00
		Bn.IS-X	2030-31		A (P-1)	280.00	280.00
				Total		2800.00	2800.00



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x. Budhabalanga Imp. Series (Bg. IS):

Table No. 14.4j Budhabalanga Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Budhabalanga Imp. Series (Bg. IS)	Bisoi WL	Bg.IS-I	2021-22	Bidhubhandar PRF	B (P-2)	295.0	295.0
		Bg.IS-II	2022-23		B (P-3)	295.0	295.0
		Bg.IS-III	2023-24		B (P-4)	295.0	295.0
		Bg.IS-IV	2024-25		B (P-5)	295.0	295.0
		Bg.IS-V	2025-26		B (P-6)	295.0	295.0
		Bg.IS-VI	2026-27		B (P-7)	295.0	295.0
		Bg.IS-VII	2027-28		B (P-8)	295.0	295.0
		Bg.IS-VIII	2028-29		B (P-9)	295.0	295.0
		Bg.IS-IX	2029-30		B (P-10)	295.0	295.0
		Bg.IS-X	2030-31		B (P-1)	295.0	295.0
				Total		2950.0	2950.0

xi. Sanakacha Imp. Series (Sk. IS):

Table No. 14.4k Sanakacha Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Sanakacha Imp. Series (Sk. IS)	Bisoi WL	Sk.IS-I	2021-22	Bidhubhandar PRF	C (P-2)	250.0	250.0
		Sk.IS-II	2022-23		C (P-3)	250.0	250.0
		Sk.IS-III	2023-24		C (P-4)	250.0	250.0
		Sk.IS-IV	2024-25		C (P-5)	250.0	250.0
		Sk.IS-V	2025-26		C (P-6)	250.0	250.0
		Sk.IS-VI	2026-27		C (P-7)	250.0	250.0
		Sk.IS-VII	2027-28		C (P-8)	250.0	250.0
		Sk.IS-VIII	2028-29		C (P-9)	250.0	250.0
		Sk.IS-IX	2029-30		C (P-10)	250.0	250.0
		Sk.IS-X	2030-31		C (P-1)	250.0	250.0
				Total		2500.0	2500.0



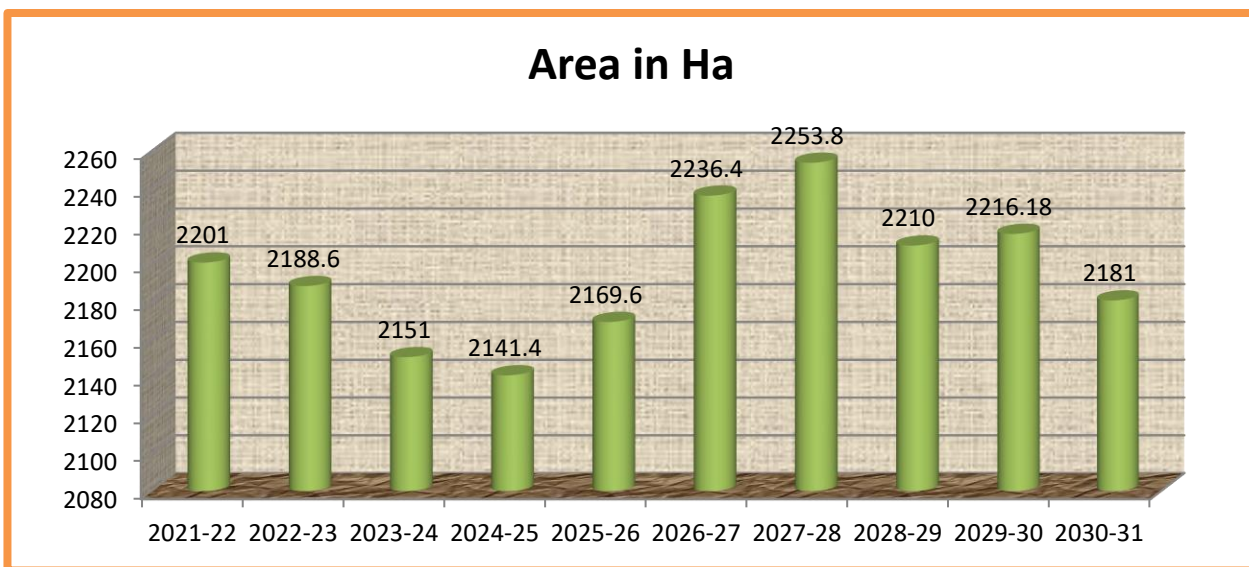
Working Plan of Rairangpur Forest division (2021 to 2031)

xii. Rajabasa Imp. Series (RIS)

Table No. 14.4I Rajabasa Imp. series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Rajabasa Imp. Series (RIS)	Bisoi WL	RIS-I	2021-22	Bidhubhandar PRF	D (P-2)	265.00	265.00
		RIS-II	2022-23		D (P-3)	260.00	260.00
		RIS-III	2023-24		D (P-4)	265.00	265.00
		RIS-IV	2024-25		D (P-5)	260.00	260.00
		RIS-V	2025-26		D (P-6)	265.00	265.00
		RIS-VI	2026-27		D(P-7)	260.00	260.00
		RIS-VII	2027-28		D (P-8)	265.00	265.00
		RIS-VIII	2028-29		D (P-9)	260.00	260.00
		RIS-IX	2029-30		D (P-10)	261.25	261.25
		RIS-X	2030-31		D (P-1)	260.00	260.00
				Total		2621.25	2621.25

14.6.7.1 Abstract of area allotted to various improvement series.

Table No. 14.5 Abstract of area allotted to various improvement series											
Name of Imp. Series.	Year										Total
	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	
Dublabeda	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	51.66	50.0	501.66
Mahubhandar	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	103.78	105.0	1048.78
Tunguru	205.0	205.0	175.0	175.0	175.0	175.0	175.0	175.0	174.40	200.0	1834.40
Sunajodia	150.0	145.60	155.0	155.0	155.20	225.0	230.0	225.0	231.60	150.0	1822.40
Kanapat	220.0	217.0	195.0	190.0	193.40	190.0	190.0	190.0	187.60	215.0	1988.00
Badabantha	170.0	170.0	170.0	171.20	160.0	160.0	160.0	160.0	161.20	170.0	1652.40
Sarali	106.0	106.0	106.0	106.0	106.0	106.40	120.0	120.0	118.50	106.0	1100.90
Guddamura	105.0	105.0	105.0	104.20	135.0	140.0	133.80	100.0	101.19	100.0	1129.19
Bidhubhandar	280.0	280.0	280.0	280.0	280.0	280.0	280.0	280.0	280.0	280.0	2800.00
Budhabalanga	295.0	295.0	295.0	295.0	295.0	295.0	295.0	295.0	295.0	295.0	2950.00
Sanakacha	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	2500.00
Rajabasa	265.0	260.0	265.0	260.0	265.0	260.0	265.0	260.0	261.25	260.0	2621.25
Total	2201.00	2188.60	2151.00	2141.40	2169.60	2236.40	2253.80	2210.00	2216.18	2181.00	21948.98



14.6.8 Calculation of the yield:

No yield is expected from forests of this Working Circle. There will be prescription for thinning in congested patches of light to D grade thinning to induce diameter growth in remaining trees / poles. As this will be of interim harvest, the thinning materials will be given to VSS for their local use. In case of other areas the materials will be disposed up as per Forest Department guidelines / OFD Code.

14.6.9 Table of felling / Treatment:

The area assigned to different years in different Improvement Series has been indicated at Para 14.6.7. The area allotted in different series may be strictly adhering to. Any deviation to the program may be recorded in the compartment history and necessary approval may be obtained.

14.6.10 Method of executing the Treatment:

The method of treatment and procedure is described as follows.

14.6.10.1 Demarcation of Annual Improvement Area:

The assigned area / coupe area is required to be demarcated in the field as per management map pertaining to this circle. The cardinal points of the coupe are to be marked on ground by stone cairns with help of GPS. The coupe boundary line is to be marked with black ring on existing trees along the line. If the boundary line coincides with RF/ PRF Boundary or Compartment boundary, then the Boundary line / compartment line is required to be



maintained as per standard practices / instructions. This demarcation is to be completed by end of June of the assigned year.

14.6.10.2 Description of Operations:

The operations that will be taken up in all forest areas included in this working circle. The operation involves

- a) Removal of Dead trees those are having utility and operation is economically viable.
- b) Light grade thinning i.e. C' grade thinning to D' grade thinning as required.
- c) Soil & Moisture Conservation through treatment of dry seasonal nalla.
- d) Covering of large blank areas more than 0.5 ac in extent through sowing of seeds after preparing the soil bed to receive the seeds.
- e) Closing to Grazing,
- f) Fire Protection measures.

14.6.10.3 Removal of Dead Trees:

The forests assigned to this working circle are having less number of big sized trees (above 150 cm GBH). Most of the crop is in between 30-60 cm girth class i.e. in young stage. It is prescribed to remove any dead trees which has a market value and economically viable to harvest and transport to nearby truck able point. If such type of trees exists in the coupe area, then such trees are to be removed departmentally and delivered to OFDC Ltd or VSS as the case may be. Two / three defective dead trees per hectare are required to be left as such from wildlife management point of view.

14.6.10.4 Thinning:

The objectives of taking of thinning are

- i) To improve the hygienic condition.
- ii) To create best conditions of growth & obtain diameter growth of remaining trees.
- iii) Salvage the anticipated losses of the merchantable volume.
- iv) To obtain a desirable composition of crops.
- v) Retaining seed bearers.
- vi) Improvement in wood quality.
- vii) To obtain intermediate yield and increase net yield and financial out-turn.
- viii) Decomposition of raw hummus.
- ix) To reduce the risk of diseases and pests.



After thinning, the results expected are

- Reduced competition in root and crown,
- Reduced weed growth,
- Improved quality of wood,
- Regulation of rate of growth,
- Increase seed production,
- Reduction in the net cost of growing,
- Reducing the risk of fire and diseases,
- Encouraging the advanced growth,
- Fulfilling the market demands.

For undertaking thinning the following aspects are to be kept in mind.

- a) Before planning the nature and intensity of thinning preference between the intensity of thinning and quality of thinning should be decided.
- b) The trees remaining after the thinning should be able to compensate for the loss in increment by trees removed in thinning.
- c) There will be an optimum stocking for a given site and species.
- d) For this individual trees are classified by height and size of crown and thinning is decided on the basis of which classes of trees are fit to be removed for maintaining the desired qualitative and quantitative nature of the thinning.
- e) The main purpose of the thinning is to release more space for future development of trees; the freedom of crown is the guiding factor for thinning purpose.
- f) The retention of trees per unit should be decided first and then the number of trees to be removed should be marked accordingly.
- g) The development of crown and stem are the deciding factor for sub-classification of the dominance classes of trees for the given site and species.
- h) Tree classification in regular forests are done as under

1. Classification based on height:

i) Dominant trees (D or D1)

It includes the trees that form the uppermost leaf canopy. They are the tallest trees that determine the top level of canopy they are also called pre-dominant trees.

ii) Co-dominant trees (CD or D2)

These are shorter than dominant. About $\frac{5}{6}$ th of the height of the dominant.



iii) Sub-dominant trees (SD or D3)

They do not form part of the uppermost leaf canopy. Their height is about $3/4^{\text{th}}$ that of the tallest trees. They are also called dominated trees.

iv) Suppressed trees (S)

The height of the suppressed trees is about $1/2$ to $5/8^{\text{th}}$ of the height of the best trees. Suppressed trees grown below the crowns of the other trees in the stand. The leading shoots are over-topped by their neighboring trees or at least shaded on all sides by them.

v) Wolf trees (W)

The wolf trees are large, coarse and misshapen trees.

vi) Whips (Wh)

This class comprises bent over and badly leaning trees. Whips have tall, thin stems which are unstable and may cause damage to other trees when they sway.

vii) Dead, dying and moribund trees (m)

This category consists of trees that are dead or at the point of death.

viii) Disease trees (k)

It includes trees that are infected with parasites and their growth is seriously affected due to infection.

ix) Reproduction or Regeneration (r)

It consists of recruits or regeneration.

x) Over mature or veterans.

Classification on the Basis of Crown

The crown spread may be taken as better indication than canopy position to understand growth potentialities of a tree. For this tree may be classification on the basis of the crown with average stem spacing as shown below:-



I. Spaced

Trees with free crown spreading having less than or equal to $3/4^{\text{th}}$ that of spacing.

II. Co-spaced

Trees with a free crown spread having $3/4^{\text{th}}$ to $1/2$ (50-75%) that of the available spacing.

III. Sub-spaced

Trees with the spread of free crown less than half but more than one-fourth $1/4^{\text{th}}$ of the spaced.

IV. Mal-spaced

Trees with a very small spread of trees crown which is less than a quarter of the spaced.

V. De-spaced

Trees will no free crown with little vigor.

VI. Dead, dying and low yielding trees

In the present situation, it is recommended to follow an ordinary thinning as described below.

This is known as “THINNING FROM THE BLOW” and consists of the removal of inferior individuals starting from the suppressed class, then taking the dominated class and ultimately some of the dominant class.

It is a very common form of selective thinning in regular crops. It has been devised to be in line with nature because only those trees which have been unsuccessful in the struggle for growth are removed first.

(A) Grade of Ordinary Thinning

The thinning grades are defined by the spacing class removed so that a check may be made by comparing yield table numbers for the mean diameter in question. There are various grades of thinning e.g. A, B, C, D, E, grades.

I. A-Grade

Light thinning- removal of dead, dying, diseased and suppressed trees.



II. B-Grade:

Moderate thinning - In addition to trees in A-grade further removal of defective dominated stems and whips. Advance growth which cannot be pruned or lopped may also be removed.

III. C- Grade (Heavy thinning):

This includes trees in grade A and B and all remaining dominated defective, co-dominants that may be removed without making lasting gaps in canopy. The C grade thinning is the standard grade in vogue for yield table compilation.

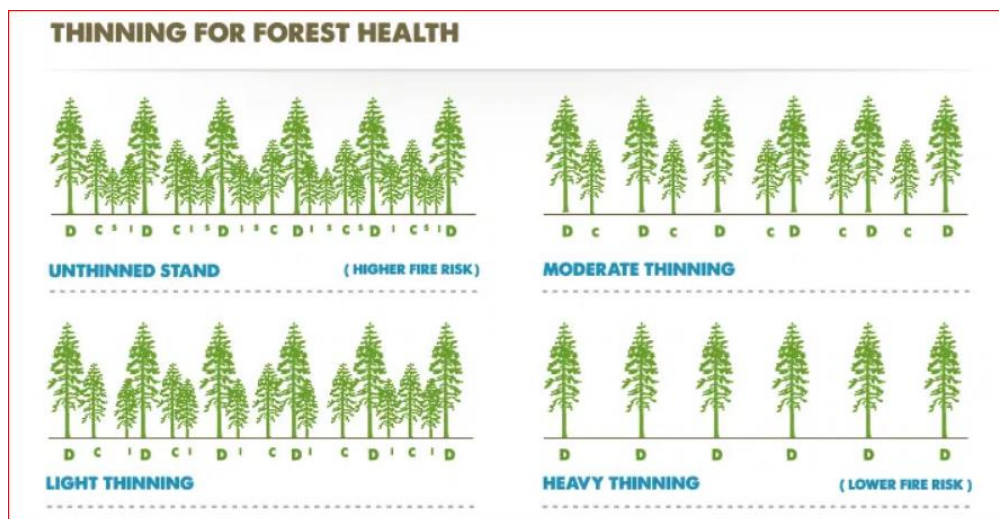
IV. D-Grade (Very Heavy Thinning):

This includes trees of all above grades and some good dominants so that no lasting or permanent gap develops in canopy. The left over trees are with good boles and crowns, well spaced and evenly distributed over the site for future development.

V. E-Grade (Extremely Heavy Thinning):

This type of thinning is adopted mainly for research purposes. This is the heaviest thinning that can be made in the crop without creating permanent gaps in the canopy. Many dominant stems are also removed.

It is always better to make C-grade or D-grade thinning in a dense crop in which thinning has been unduly delayed. The removal of trees should be Economic or Hygienic value. In addition to above classes the intermediate grades of thinning such as C/D may be carried out.





(B) Precautions in First Thinning

The first thinning is very important for any crop. The following factors should be considered at the time of first thinning.

- The thinning should take place before adjoining trees check one another's growth.
- The thinning should not be postponed on the ground that the poles obtained will be non-saleable or uneconomic.
- The age of first thinning should be taken on the basis of height or size attained.
- The heavy thinning should not be carried on poorer sites, drier areas and steeper slopes, because the gaps may not fill up due to poor growth of trees.
- All thinning should be done on the silvicultural lines.
- The light demander species may require heavier thinning as compared to the shade bearer species.
- It is best to carry out silvicultural thinning. Some admixture of secondary species may be retained where this is desired on silvicultural or protection grounds.

(C) Thinning In Irregular Crops:

It is difficult to classify tree in an irregular crop. The general classifications which are used for the research purposes are THREE crown positions. It is suggested that in regular crops the degree of crown freedom and their further classification into large, medium and small crown sizes, should be taken in account.

CROWN FREEDOM	FREE	RESTRICTED	CONFINE
Crown development or crown size	Well developed or large	Average or medium	Poor or small

- The crown freedom is judged irrespective of the size of the tree and its position in the stratification.
- The thinning in an irregular crop is done by selection method.
- The trees to be cut are that which restrict the growth of their neighbors on all sides and should be more valuable than their neighbors.
- The aim should be to maintain a crop of all diameter classes in a sufficient number of maximum sustained yield.
- The valuable species are retained whereas inferior trees of all diameter classes are removed.
- The removal of trees is carried out in diameter classes.



- It aims at continuous improvement by repeated removal of inferior stems in all diameter classes so that basal area or standing volume becomes more or less equal to theoretical ideal value.

(D) Factors Affecting Thinning Practice:

The following factors may be considered before the thinning practice:

1. Site Factors
2. Nature of species
3. Age

1. Site Factors

The site quality influence on thinning practice is that a relatively close canopy on the poorer sites should be maintained. On low quality sites heavy openings should not be made. The spacing out widely in earlier stages should not be carried out on hot, dry, slopes, on poor soils and on all sites where grass and other weed invasion is likely to occur. A poor site will usually support less stems per hectare than a good one.

2. Nature of Species

The shade-bearers are more tolerant of crown than the light demanders therefore more frequent thinning is needed for light demander species. Light demanders usually show good response to ordinary thinning where as shade-bearers to crown thinning. Sal, Sisoo, Asan, Teak, being light demanders require heavier grades of ordinary thinning.

3. Age

The crown formation depends on age and in young ages when the crown formation is not completed mechanical thinning or sticks thinning may be done with succession. The light demander species require heavier grade of thinning at frequent intervals in younger crops. On the other hand some species in middle age or maturity require crown thinning.

14.6.10.5 Soil & Moisture Conservation:

Moisture regime of a forest block greatly influences the crop composition, quality class and productivity of the forests. The dryer the tract – poorer is the vegetation. The forests included in this working circle are the best available forest blocks of the division. It is recommended to improve soil moisture regime in forests to improve the vigour of the crop, allow the species

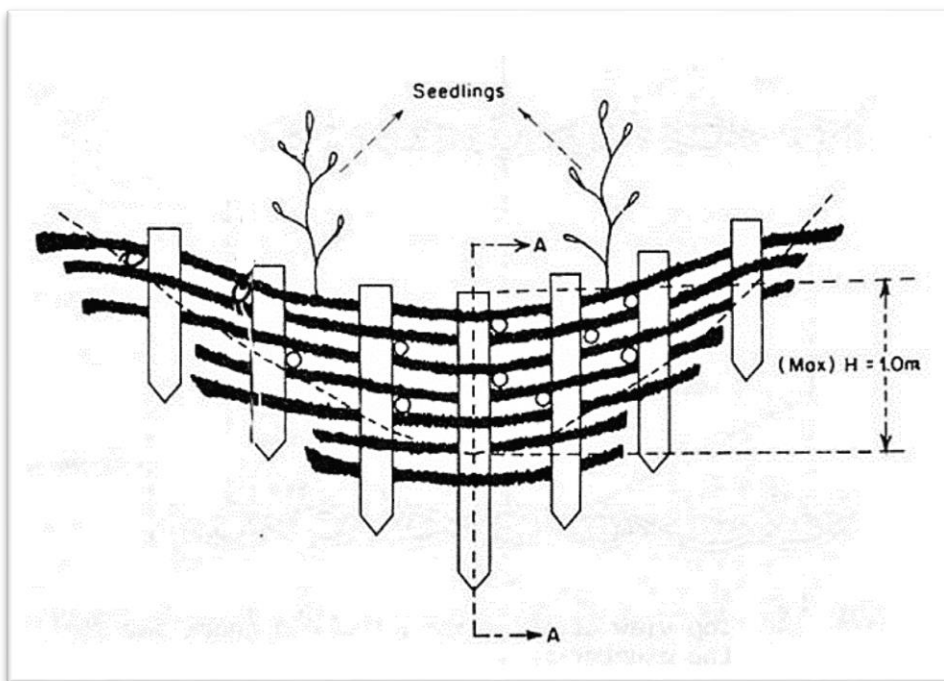


towards a climatic climax with increased biodiversity. It is recommended to treat all the available seasonal nallas to enhance period of water flow, check soil erosion in slopes, increase the humus layer in forest floor. The following activities are prescribed.

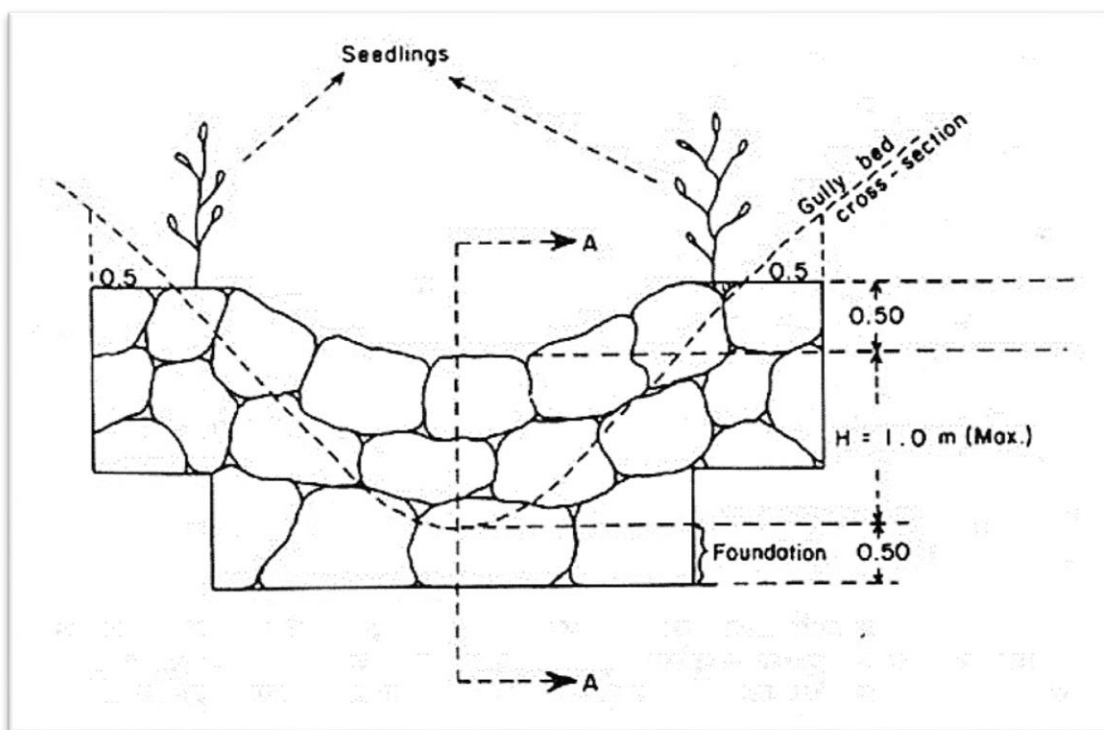
- a) Vegetative / brushwood Check dams on nalla bed.
- b) Loose boulder Check dams (LBCD)
- c) Percolation Pits.
- d) Create & Maintain Humus layers to reduce run off and enhance time of collection.

(A) Vegetative / Brushwood check dams:

Brushwood check dams made of posts and brush are placed across the gully / Nalla bed. The main objective of brushwood check dams is to hold fine material carried by flowing water in the gully / nalla. Small gully heads, no deeper than one meter, can also be stabilized by brushwood check dams. Brushwood check dams are temporary structures. They can be employed in connection with land use changes such as improved range management until vegetative and slope treatment measures become effective.



This type of check dams can be constructed by using fallen materials on forest floor.



(B) Loose Boulder Check Dams (LBCD):

Loose stone check dams made of relatively small rocks are placed across the gully. The main objectives for these dams are to control channel erosion along the gully bed and to stop waterfall erosion by stabilizing gully heads. Loose stone check dams are used to stabilize the incipient and small gullies and the branch gullies of a continuous gully or gully network.

(C) Percolation Pits / trench:

A percolation trench, also called an infiltration trench, is a type of best management practice (BMP) that is used to manage stormwater runoff, prevent flooding and downstream erosion, and improve water quality in an adjacent river, stream. It is a shallow excavated trench filled with gravel or crushed stone that is designed to infiltrate storm water through permeable soils into the groundwater aquifer.

A percolation trench is similar to a dry well, which is typically an excavated hole filled with gravel.



(D) Create & Maintain Humus layers:

The forest floor, also called detritus, duff and the O horizon, is one of the most distinctive features of a forest ecosystem. It mainly consists of shed vegetative parts, such as leaves, branches, bark, and stems, existing in various stages of decomposition above the soil surface. Although principally composed of non-living organic material, the forest floor also teems with a wide variety of fauna and flora. It is one of the richest components of the ecosystem from the standpoint of biodiversity because of the large number of decomposers and predators present, mostly belonging to invertebrates, fungi, algae, bacteria. Certain (adapted) plants may be more apparent in tropical forests, where rates of metabolism and species diversity are much higher than in colder climates.

The major compartments for the storage of organic matter and nutrients within systems are the living vegetation, forest floor, and soil. The forest floor serves as a bridge between the above ground living vegetation and the soil, and it is a crucial component in nutrient transfer through the biogeochemical cycle. Much of the energy and carbon fixed by forests is periodically added to the forest floor through litterfall, and a substantial portion of the nutrient requirements of forest ecosystems is supplied by decomposition of organic matter in the forest floor and soil surface. The sustained productivity of forests is closely linked with the decomposition of shed plant parts, particularly the nutrient-rich foliage.

The amount of material in the forest floor depends on the balance between inputs from litter production and outputs from decomposition, and amounts also reflect the site's disturbance history. Both litter production and decomposition are functions of the site (e.g., wet versus dry;



cold versus warm; nutrient rich versus nutrient poor) and the vegetation that occupies the site (e.g., conifer versus broadleaf). A site's forest floor is determined by its areal weight, depth, and nutrient content. Typically, forest floors are heaviest and deepest in boreal forests and mountain forests where decomposition rates are slow. In contrast, the lightest and thinnest forest floors usually occur in tropical forests where decomposition rates are rapid.

Key soil functions SOM provide for include:

Nutrient Supply.

Upon decomposition, nutrients are released in a plant-available form while maintaining current levels.

Water-Holding Capacity.

Organic matter behaves somewhat like a sponge. It has the ability to absorb and hold up to 90 percent of its weight in water. Another great advantage of organic matter is that it releases nearly all of the water it holds for use by plants. In contrast, clay holds great quantities of water, but much of it is unavailable to plants.

Soil Aggregation.

Organic matter improves soil aggregation, which improves soil structure. With better soil structure, water infiltration through the soil improves, which improves soil's ability to take up and hold water.

Erosion Prevention.

Because of increased water infiltration and stable soil aggregates erosion is reduced with increased organic matter. Estimating Organic Material Needed to Increase Soil Organic Matter.

In Sal forests heavy leaf fall during January / February covers the entire forest floor. Frequent forest fire break the nutrition cycle in forest resulting poor forest growth. In order to enhance decomposition of leaf litters it is recommended to check burning of leaf litters, allow moderate grazing in February/ March for trampling and breaking of curacious leaf.

14.6.10.6 Sowing of Seeds:

In the assigned forest blocks there are blank areas. It is recommended to cover the blank areas more than 0.50Ac to be covered under sowing of seeds. Seeds of Sal, Piasal, Sisoo, Asan, Arjun, Jamu, Kusum are to be sown on line or thali in June 1st / 2nd week just after few pre-monsoon



shower. This arrangement will allow recruits to come up. Subsequently little care in form of weeding may fill up the gaps.

14.6.10.7 Closing to Grazing:

The area assigned to a particular year is required to be closed to grazing for three to protect the natural regeneration to attain a sapling stage. This should be strictly adhering to. **A formal “Close to Grazing” order is to be issued and circulated to local offices / villages and VSS.**

Table no. 14.6 Closing to Grazing										
Year										
Coupe	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
I	Closed									
II		Closed								
III			Closed							
IV				Closed						
V					Closed					
VI						Closed				
VII							Closed			
VIII								Closed		
IX									Closed	
X										Closed

14.6.10.8 Fire Protection Measure:

Strict Fire Protection measures are required to be taken up / ensured for 1st three years. All possible measures at hand are required to be utilized to enforce Fire Protection. The following methods may be adopted depending upon extent of fire / time/ resource at hand.

- Control burning of debris,
- Fire line maintenance,
- Counter Firing,
- Beating out of Fire and use of blower machines,
- Use of Chemical extinguishers to control large in assessable fires.

As many forest blocks / large area have been assigned to VSS for protection etc, their assistance to be availed for fighting against fire.



14.6.10.9 General Strategy:

After demarcation of Coupe area, the area is to be thoroughly visited by the Range Officer. An improvement plan for the coupe is to be drawn up and submitted to the DFO for approval and order for implementation. The improvement plan must contain

- a) Map of the Coupe,
- b) Whether dead trees available for removal with its economic aspect.
- c) Area for thinning with grade of thinning.
- d) Soil & Moisture conservation plan indicating the nala position / Check dams etc.
- e) Area for sowing of seeds.
- f) Proposal for Closing to Grazing & Fire Protection strategy.
- g) Total Financial implication.

This improvement plan is required to be drawn up by Range Officer and checked by the Asst. Conservator of Forests. In approval marking for thinning / removal of dead trees is to be taken up. Thinning is to be implemented by the Range officer under supervision of Asst. Conservator of Forests.

14.6.11 Subsidiary Silvicultural Operation:

Silvicultural Cleaning and thinning are two major subsidiary silvicultural operations being prescribed. Cleaning is being taken up in Sapling crops where as thinning is prescribed in pole crops. The forests assigned to this working circle are mostly in pole stage. Hence thinning as required is prescribed. The details of thinning have been described under Para- 14.6.10.4 above.

14.6.12 Regeneration:

The silvicultural system adopted for this working circle is a "High Forest System". For regeneration, the seed bearers are to be well maintained and covering of blank areas by sowing of seeds with after care is prescribed. Collection of genetically good seeds is to be stressed. The standard guideline for selecting a mother tree is furnished below.

- Collect seed lots from between 15 and 25 individuals that are spaced at least 100 meters distance from any other collection tree of the same species.
- Choose trees in vigorous health and avoid any that are diseased, suppressed, deformed, environmentally stressed, or in otherwise poor health.



- Collect from trees that are well formed and either dominant or co-dominant in the canopy.
- Avoid individuals that are isolated from others of the same species.
- Harvest only mature seed from ripened fruits.
- To ensure genetic variation, collect fruits equally from all parts of the crown--top, sides, and bottom--as these parts may have been pollinated at varying times from different sources.
- Collect throughout a species' normal habitat, noting variations in site.
- Man-made stands, including live fencing, plantations, or windbreaks, should be carefully reviewed as to their establishment before being selected as a seed source.

14.6.13 Associated regulations and measures:

Fire, grazing though two important site degraders, it can be judiciously use in high forest system to initiate a good regeneration. This aspect is to be seriously thought up and implemented to have a better stand.

Villagers / VSS are to be actively involved in all operations in assigned area. Their contribution will have a better result at a long run.

14.6.13.1 Annual Control Form:

The forest blocks assigned to a particular year for operation shall be taken up in the assigned year. After execution of prescribed work, an annual Report to be furnished in the form prescribed below. In case any deviation, the reason for such deviation is to be recorded. In case of spill over to next year for taking up the assigned operation, necessary approval of deviation is required to be obtained from PCCF, Odisha / CCF (P&SM) before executing the work. A copy of approved deviation shall find place in the Compartment History File.

Table no 14.7: Annual Control Form (Form-1)

Name of Improvement Series.	Coupe No	Assignment year	Area in Ha	Operation Prescribed in Working Plan	Operations executed	Year of Operation	Reason for Deviation	Deviation Approval Status.



CHAPTER-15

REHABILITATION WORKING CIRCLE (RWC)

15.1 Rehabilitation Working Circle:

The Forest Blocks previously managed under Rehabilitation Working Circle and partly under Plantation Working Circle of Karanjia Forest Division and still in open forest category i.e. crop density below 40% are required to be treated further. Many forest blocks could not be treated in the previous plan period. The areas treated under working plan prescriptions but have not yielded desired result. Observing the present crop condition, status of regeneration and over all juvenility of vegetation and soil moisture regime, it is felt to provide adequate silvicultural treatment to bring the crop to medium dense forest. It is recommended to treat the forest blocks under “**Rehabilitation Working Circle**”.

15.2 General Constitution:

The Forest blocks of the Division i.e. Reserved Forests, Demarcated Protected Forests and Protected Forests having crop density less than 40% and heavily affected by biotic interference are included in this Working Circle. The total area included in this working circle is **20558.100 hectare** (46.51 %) of the total forest area under management prescriptions of this plan. The Forest Block assigned to this Working Circle and area allotted is furnished in **Table No 15.1. A, B, C.**



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 15.1 (A) Forest Area Allotted to Rehabilitation Working Circle.

Sl No	Name of Forest Block		Area available for Management in ha	Area allotted In Ha
		Comp no		RWC
Reserved Forests.				
A. Badampahar Range				
1	Badampahar (part)	1a	338.000	338.000
		1b	202.160	202.160
		2a	217.600	217.600
		2b	217.600	217.600
		3	209.600	209.600
		4	296.960	296.960
		5	284.160	284.160
		6a	128.000	128.000
		6b	331.190	331.190
		9b	391.600	391.600
		S. Total	2616.870	2616.870
2	Basila		220.540	220.540
3	Hat Badra		90.540	40.540
4	Jhatisiring		28.320	28.320
5	Kherna		495.720	395.720
	Range Total		3451.990	3301.990
B. Rairangpur Range				
6	Brahmani	1	373.760	373.760
		2	389.520	389.520
		S. Total	763.280	763.280
7	Gorumahisani	1	270.800	250.800
		2	780.000	760.000
		3	626.000	606.000
		4	149.600	129.600
		5	249.600	229.600
		6	295.900	295.900
		S.Total	2371.900	2271.900
8	Ichinda		64.140	54.140
		S. Total	64.140	54.140
9	Jari	1	533.600	533.600
		2	816.000	766.000
		3	330.800	330.800
		4	826.800	826.800
		5	474.800	474.800
		S.Total	2982.000	2932.000
10	Jhumukapahadi		70.400	70.400



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 15.1 (A) Forest Area Allotted to Rehabilitation Working Circle.

11	Karan JharanDhasra		540.600	540.600
12	Kucheibudhi		211.520	151.520
13	Naskaria		96.000	46.000
14	Sargoda		106.780	106.780
15	Dumurikudar		34.400	34.400
		S. Total	1059.700	949.700
	Range total		7241.020	6971.020
C. Bahalda Range				
16	Tiring	1	400.000	400.000
		2	366.440	206.440
17		S.Total	766.440	606.440
18	Bankmundi		433.300	433.300
19	RamgarhAsurghaty		907.060	857.060
20	Chahalapada		620.800	570.800
21	Debradihi		45.080	45.080
22	Gambharia		455.260	155.260
23	Manbir		656.520	631.520
		S. Total	3118.020	2693.020
24	Budheirana	1	1150.000	1000.000
		2	226.340	226.340
		S.Total	1376.340	1226.340
25	Khairpal		56.390	56.390
	Range Total		5317.190	4582.190
E. Manada Range				
26	Khadambeda		80.520	80.52
	Range total		80.520	80.520
	Divi. Total		16090.720	14935.720



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 15.1 (B) Forest Area Allotted to Rehabilitation Working Circle				
SI No	Name of Forest Block	Comp no	Area available for Management in ha	Area allotted to RWC (in Ha)
DPF (Demarcated Protected Forest)				
A. Badampahar Range				
1	Baneikala		52.220	52.220
2	Gundurua		20.720	20.720
3	Hatnabeda		81.950	81.950
4	Jaydhanposi		8.920	8.920
5	Jhatisiring		77.190	77.190
6	Patijhari		26.810	26.810
7	Ukam-I		57.160	57.160
8	Sargoda –II		91.490	91.490
9	Dubulabeda		34.900	34.900
10	Tirilipi		380.000	380.000
	Range Total		831.360	831.360
B. Rairangpur Range				
11	Anandpur		24.280	24.280
12	Badjari		47.690	47.690
13	Betjharan – I		118.550	113.550
14	Betjharan – II		85.360	85.360
15	Betjharan – III		32.740	32.740
16	Belpahari – VI		22.960	22.960
17	Balarampur		120.800	115.800
18	Gorumahisani		20.130	20.130
19	Jhumkapahadi		21.850	21.850
20	Juapahadi		41.980	41.980
21	Kalatamak		29.950	24.950
22	Kucheibudi		38.100	38.100
23	Radho		505.860	495.860
24	Merudihi		114.490	114.490
25	Dahupani		1328.140	1328.140
26	Saragada		124.440	124.440
27	Bhatgoda		20.240	20.240
	Range Total		2697.560	2672.560
C. Bahalda Range				
28	Bahalda		25.490	25.490
29	Bhitaramda		1060.620	970.620
30	Dumadihi		36.730	36.730
31	Sansadam		60.700	60.700
32	Jadunathpur		20.230	20.230
33	Rutughutu		20.490	10.490

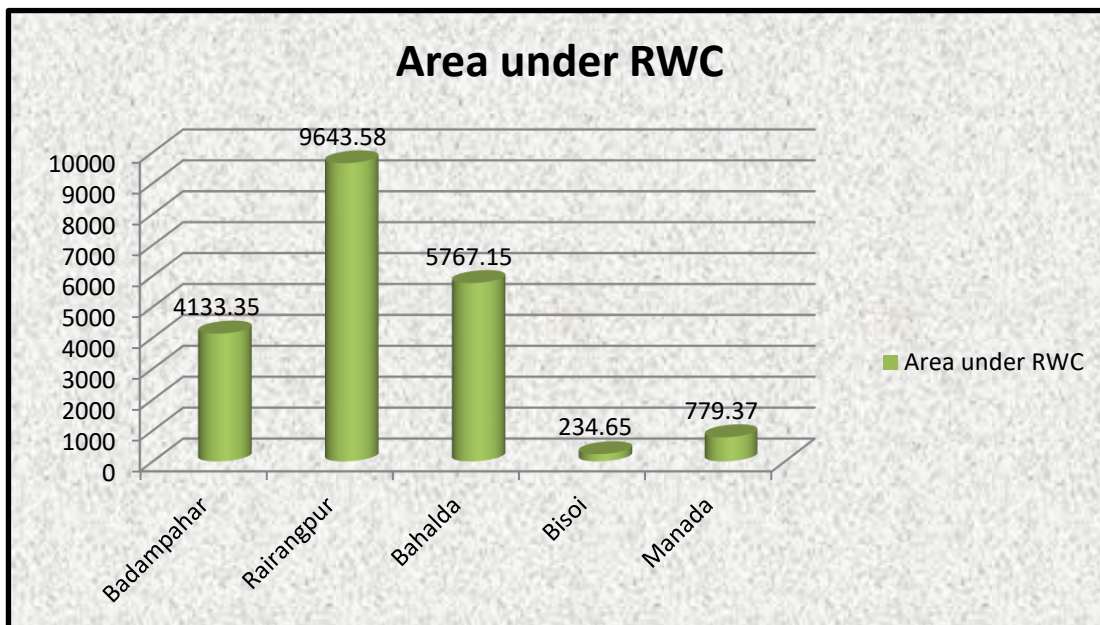


Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 15.1 (B) Forest Area Allotted to Rehabilitation Working Circle				
34	Salei		60.700	60.700
	Range Total		1284.960	1184.960
D. Bisoi WL range				
35	Asansikal		34.65	34.65
	Range Total		34.65	34.65
E. Manada Range				
	Dhenkia		384.34	374.340
	Ektali		3.79	3.790
	Jamda-V		15.52	15.520
	Pidhakata		335.2	305.200
	Range Total		738.85	698.850
	Divi. Total		5587.380	5422.380

Table No 15.1 (C) Forest Area Allotted to Rehabilitation Working Circle				
SI No	Name of Forest Block	Comp. No	Area available for Management in ha	Area allotted to RWC (In Ha)
Protected Forest (PF)				
Bisoi WL Range				
1	Hatichhad PF		200.00	200.00
	Total		200.00	200.00

Table No 15.2 Abstract of Area allotted to RWC (In Ha)		
Range	Total area of the Block / Comp.	Area allotted to RWC on Ha
Badampahar	4283.350	4133.350
Rairangpur	9938.580	9643.580
Bahalda	6602.150	5767.150
Bisot	234.650	234.650
Manada	819.370	779.370
Division Total	21878.100	20558.100



15.3 General characteristics of Vegetation:

The Blocks assigned to this working circle are degraded forest with crop density less than 40%. The crop is mostly Sal forest. Due to biotic interference and prolonged dry spell, crop composition is changing from Sal to mixed crops. Bamboo is absent. Some mixed plantations and bamboo plantations have been tried. The crop is quite uneven. Trees of all age class are noticed. Due to coppice origin, growth is stunted and in a pole stage. Due to Biotic interference, annual fire, the soil is mostly regressed. The open spaces created due to unplanned felling have been infested with heavy weeds. Now natural regeneration is difficult. There are plantations within RF/ DPF during last plan period as enrichment plantations. The growth is not so prominent than the surroundings. It became difficult to prescribe management practices for such plantations. An intensive silvicultural operation with strict fire protection may improve the condition.

15.4 Treatment Series / Treatment Section.

For convenience of treatment and well distributed working the following 18 Treatment Series are constituted. These are as follows.



15.4.1 Constitution of Treatment Series:

Table No 15.2 (A) Constitution of Treatment series (Area in ha) For RF

Sl No	Name of Treatment Series	Range	Forest Block	Comp. No	Area allotted to the Series	Total area in the Series
1	Badampahad (BTS)	Badampahad	Badampahad	1a	338.000	1184.96
				1b	202.160	
				2a	217.600	
				2b	217.600	
				3	209.600	
2	Patijhari (PTS)	Badampahad	Badampahad	4	296.960	1431.91
				5	284.160	
				6a	128.000	
				6b	331.190	
				9b	391.600	
3	Kherna TS (KTS)	Badampahad	Basila		220.540	685.12
			Hat Badra		40.540	
			Jhatisiring		28.320	
			Kherna		395.720	
4	Brahmani TS (Br.TS)	Rairangpur	Brahmani	1	373.760	970.20
				2	389.520	
			Ichinda		54.140	
			Naskaria		46.000	
			Sargoda		106.780	
5	Jharan TS (JTS)	Rairangpur	Jhumukapahadi		70.400	796.92
			Karan			
			JharanDhasra		540.600	
			Kucheibudhi		151.520	
6	Gorumahisani TS (GTS)	Rairangpur	Gorumahisani	1	250.800	1010.80
				2	760.000	
7	Badamtalia TS (Bd.TS)	Rairangpur	Gorumahisani	3	606.000	1261.10
				4	129.600	
				5	229.600	
				6	295.900	
8	Jari TS (Ja. TS)	Rairangpur	Jari	1	533.600	1299.60
				2	766.000	
9	Kanapa TS (Ka. TS)	Rairangpur	Jari	3	330.800	1632.40
				4	826.800	
				5	474.800	



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Table No 15.2 (A) Constitution of Treatment series (Area in ha) For RF

10	Tiring TS (TTS)	Bahalda	Tiring	1	400.000	1084.82
				2	206.440	
			Bankmundi		433.300	
			Debradihi		45.080	
11	Budheirana TS (Bu. TS)	Bahalda	Budheirana	1	1000.000	1226.34
				2	226.340	
12	Ramgarh Asurghaty (RATS)	Bahalda	RamgarhAsurghaty		857.060	1427.86
			Chahalapada		570.800	
13	Manbir TS (MTS)	Bahalda	Gambharia		155.260	923.69
			Manbir		631.520	
			Khairpal		56.390	
		Manada	Khadambeda		80.520	
	13 TS for RF				14935.72	14935.72



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Table No 15.2 (B) Constitution of Treatment series (Area in ha) For DPF & PF

Sl No	Name of Treatment Series	Range	Forest Block	Comp. No	Area allotted to the Series	Total area in the Series
14	Tirilipi TS (Ti.TS)	Badampahad	Baneikala		52.220	831.36
			Gundurua		20.720	
			Hatnabeda		81.950	
			Jaydhanposi		8.920	
			Jhatisiring		77.190	
			Patijhari		26.810	
			Ukam-I		57.160	
			Sargoda –II		91.490	
			Dubulabeda		34.900	
			Tirilipi		380.000	
15	Dhaupani TS (DTS)	Rairangpur	Dahupani		1328.140	1328.14
16	Radho TS (RTS)	Rairangpur	Anandpur		24.280	1344.42
			Badjari		47.690	
			Betjharan – I		113.550	
			Betjharan – II		85.360	
			Betjharan – III		32.740	
			Belpahari – VI		22.960	
			Balarampur		115.800	
			Gorumahisani		20.130	
			Jhumkapahadi		21.850	
			Juapahadi		41.980	
			Kalatamak		24.950	
			Kucheibudi		38.100	
			Radho		495.860	
			Merudihi		114.490	
			Saragada		124.440	
			Bhatgoda		20.240	
17	Bhitaramda TS (Bh.TS)	Bahalda	Bahalda		25.490	1184.96
			Bhitaramda		970.620	
			Dumadihi		36.730	
			Sansadam		60.700	
			Jadunathpur		20.230	
			Rutughutu		10.490	
			Salei		60.700	
18	Manada – Bisoi TS (MBTS)	Manada	Dhenkia		374.340	933.50
			Ektali		3.790	
			Jamda-V		15.520	
			Pidhakata		305.200	
		Bisoi WL	Asansikal		34.65	
			Hatichhad PF		200.00	
	Total 5 Series				5622.38	5622.38



Each series is divided in to 10 sections. The section wise details are furnished at Para- 15.6.7.

15.5 Blocks, Compartments and JFM Area:

The Area allotted to RWC has been mostly assigned to VSS under JFM Resolution 2011. The areas assigned are furnished at Table No 15.3 below.

Table No 15.3 Area Allotted to Rehabilitation Working Circle Assigned to VSS					
SI No	Name of Forest Block	Comp no	Area available for Management in ha	Area allotted In Ha	
				RWC	Assigned to VSS (JFM)
Reserved Forests.					
A. Badampahar Range					
1	Badampahar (part)	1b	202.160	202.160	150.0
		6b	331.190	331.190	300.000
		1a	338.000	338.000	300.000
		3	209.600	209.600	200.000
		5	284.160	284.160	250.000
		6a	128.000	128.000	128.000
		2a	217.600	217.600	217.600
		4	296.960	296.960	253.700
		9b	391.600	391.600	385.000
		2b	217.600	217.600	204.000
		S. Total	2616.870	2616.870	2388.300
2	Basila		220.540	220.540	65.000
3	Hat Badra		90.540	40.540	56.520
5	Jhatisiring		28.320	28.320	28.320
6	Kherna		495.720	395.720	246.200
	Range Total		3451.990	3301.990	2784.34
B. Rairangpur Range					
7	Brahmani	1	373.760	373.760	373.760
		2	389.520	389.520	389.520
		S. Total	763.280	763.280	763.280
8	Gorumahisani	1	270.800	250.800	181.780
		2	780.000	760.000	740.000
		3	626.000	606.000	626.000
		4	149.600	129.600	149.600
		5	249.600	229.600	225.000
		6	295.900	295.900	280.000
		S.Total	2371.900	2271.900	2202.380
9	Ichinda		64.140	54.140	54.140



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Table No 15.3 Area Allotted to Rehabilitation Working Circle Assigned to VSS					
11	Jari	1	533.600	533.600	533.600
		2	816.000	766.000	766.000
		3	330.800	330.800	190.000
		4	826.800	826.800	800.000
		5	474.800	474.800	474.800
		S.Total	2982.000	2932.000	2818.54
12	Jhumukapahadi		70.400	70.400	70.400
13	Karan JharanDhasra		540.600	540.600	540.600
14	Kucheibudhi		211.520	151.520	151.520
15	Naskaria		96.000	46.000	46.00
16	Sargoda		106.780	106.780	106.780
17	Dumurikudar		34.400	34.400	34.400
		S. Total	1059.700	949.700	949.70
	Range total		7241.020	6971.020	6733.90
C. Bahalda Range					
18	Tiring	1	400.000	400.000	400.00
		2	366.440	206.440	206.440
		S.Total	766.440	606.440	606.440
19	Bankmundi		433.300	433.300	433.3
20	RamgarhAsur ghaty		907.060	857.060	857.060
21	Chahalapada		620.800	570.800	570.800
22	Debradihi		45.080	45.080	45.08
23	Gambharia		455.260	155.260	155.260
24	Manbir		656.520	631.520	631.52
		S. Total	3118.020	2693.020	2693.020
25	Budheirana	1	1150.000	1000.000	1000.000
		2	226.340	226.340	226.340
		S. Total	1376.340	1226.340	1226.340
26	Khairpal		56.390	56.390	56.390
	Range Total		5317.190	4582.190	4582.19
E. Manada Range					
34	Khadambeda		80.520	80.52	0
	Range total		80.520	80.520	0
	Divi. Total		16090.720	14935.720	14100.43



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 15.4 Area Allotted to Rehabilitation Working Circle Assigned to VSS—Continued.

Sl No	Name of Forest Block	Comp no	Area available for Management in ha	RWC	Assigned to VSS (JFM)
Of Demarcated Protected Forests					
A. Badampahar Range					
1	Baneikala		52.220	52.220	46.910
2	Gundurua		20.720	20.720	20.000
3	Hatnabeda		81.950	81.950	81.950
4	Jaydhanposi		8.920	8.920	0.000
5	Jhatisiring		77.190	77.190	77.190
6	Patijhari		26.810	26.810	0.000
7	Ukam-I		57.160	57.160	57.160
8	Sargoda –II		91.490	91.490	0.000
9	Dubulabeda		34.900	34.900	0.000
10	Tirilipi		380.000	380.000	295.250
	Range Total		831.360	831.360	498.12
B. Rairangpur Range					
11	Anandpur		24.280	24.280	0.00
12	Badjari		47.690	47.690	0.000
13	Betjharan – I		118.550	113.550	0.000
14	Betjharan – II		85.360	85.360	0.000
15	Betjharan – III		32.740	32.740	0.000
16	Belpahari – VI		22.960	22.960	0.000
17	Balarampur		120.800	115.800	0.00
18	Gorumahisani		20.130	20.130	0.000
19	Jhumkapahadi		21.850	21.850	0.000
20	Juapahadi		41.980	41.980	0.000
21	Kalatamak		29.950	24.950	0.000
22	Kucheibudi		38.100	38.100	0.000
23	Radho		505.860	495.860	0.00
24	Merudihi		114.490	114.490	0.000
25	Dahupani		1328.140	1328.140	0.00
26	Saragada		124.440	124.440	0.000
27	Bhatgoda		20.240	20.240	0.000
	Range Total		2697.560	2672.560	0.00
C. Bahalda Range					
28	Bahalda		25.490	25.490	25.490
29	Bhitaramda		1060.620	970.620	970.62
30	Dumadihi		36.730	36.730	36.730



Working Plan of Rairangpur Forest division (2021 to 2031)

Table No 15.4 Area Allotted to Rehabilitation Working Circle Assigned to VSS—Continued.

Sl No	Name of Forest Block	Comp no	Area available for Management in ha	RWC	Assigned to VSS (JFM)
31	Sansadam		60.700	60.700	60.700
32	Jadunathpur		20.230	20.230	20.230
33	Rutughutu		20.490	10.490	10.490
34	Salei		60.700	60.700	60.700
	Range Total		1284.960	1184.960	1184.96
D. Bisoi WL range					
35	Asansikal		34.65	34.65	34.65
	Range Total		34.65	34.65	34.65
E. Manada Range					
36	Dhenkia		384.34	374.340	384.34
37	Ektali		3.79	3.790	0
38	Jamda-V		15.52	15.520	15.52
39	Pidhakata		335.2	305.200	230.14
	Range Total		738.85	698.850	630.00
	Divi. Total		5587.380	5422.380	2347.73

Table No 15.4 Area Allotted to Rehabilitation Working Circle Assigned to VSS—Continued.

Sl No	Name of Forest Block	Comp no	Area available for Management in ha	RWC	Assigned to VSS (JFM)
Protected Forest (PF)					
Bisoi WL Range					
1	Hatichhad PF		200.00	200.00	0
	Division Total		21878.10	20558.10	0



15.6 Special Objectives of Management:

The Special Objectives of Management set out for this Working Circle within the ambit of the general objectives of management are as follows.

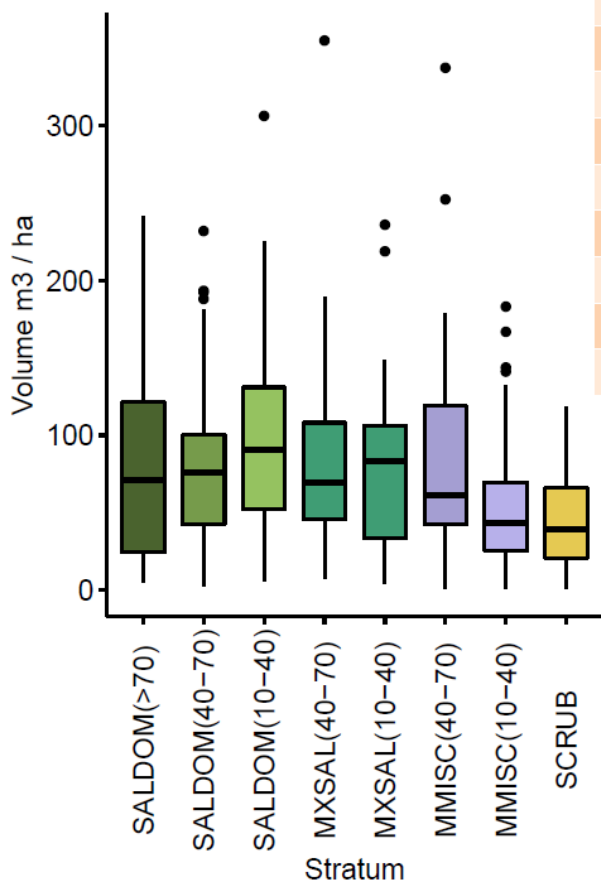
- (i) To induce natural regeneration & improve the condition of existing forests through protection against encroachment, grazing, fires and illicit felling.
- (ii) To improve the crop density to more than 50% from the present position through protection, Silvicultural practices.
- (iii) To enhance soil enrichment through Soil & Moisture Conservation measures.
- (iv) To regulate the surface water runoff to enhance percolation and water availability down the streams.
- (v) To protect against the River Bank / Stream Bank erosion through vegetative measures.
- (vi) To restock barren areas through artificial regeneration with most desirable indigenous species.
- (vii) To have partnership with the local community in protection and management of the forests.
- (viii) To increase the water retaining capacity of the soil.
- (ix) To Control / eradicate the weeds and check its invasion.
- (x) To restore and improve the microclimate and micro edaphic condition of forests.
- (xi) To increase the biodiversity and heterogeneity in the forest crop by encouraging natural regeneration.

15.6.1 Analysis of the crop:

The sample enumeration data were furnished to ORSAC for analysis. It helps in finding the tree distribution across the girth classes and volume distribution. The volume distribution / stratum furnished by ORSAC is furnished below.



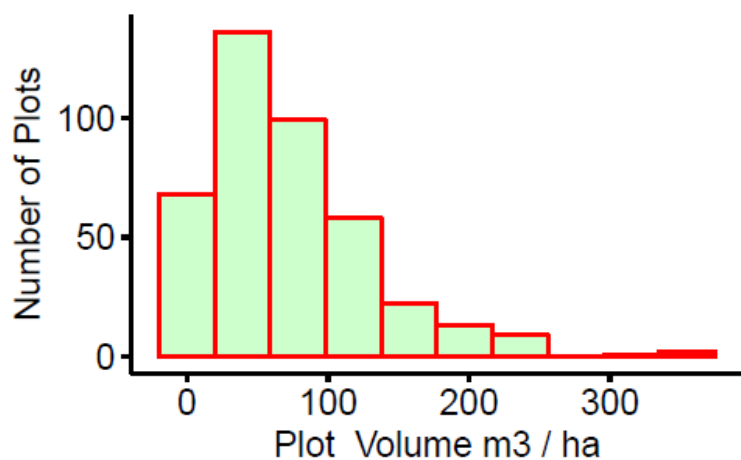
Enumerated Plot Volume by Type x Density Strata



Stratum	Numpt	MeanPerHa
SALDOM(>70)	38	78.69
SALDOM(40-70)	71	76.88
SALDOM(10-40)	46	98.06
MXSAL(>70)	2	147.32
MXSAL(40-70)	24	86.62
MXSAL(10-40)	31	78.75
MMISC(>70)	3	110.36
MMISC(40-70)	53	81.62
MMISC(10-40)	128	49.55
SCRUB	12	45.90

TreesPerHa	BAPerHa	VolPerHa
288.5	9.51	71.87

Plot Volume Distribution



Econsp	Mean	SE
Ano lat	7.81	0.11
Misc	24.23	0.05
Sho rob	16.84	0.08
Ter tom	14.93	0.09
Dio mel	2.02	0.15



Plot Distribution

RANGE	D1	D2	D3	D4
BADAMPAHAR	4	18	33	0
BAHALDA	10	28	32	4
BISOI	9	32	35	1
MANADA	0	0	4	0
RAIRANGPUR	20	67	85	7

Canopy Density Classes are
D1 : > 70%, D2 : 40-70%
D3 : 10-40%, D4 : <10%

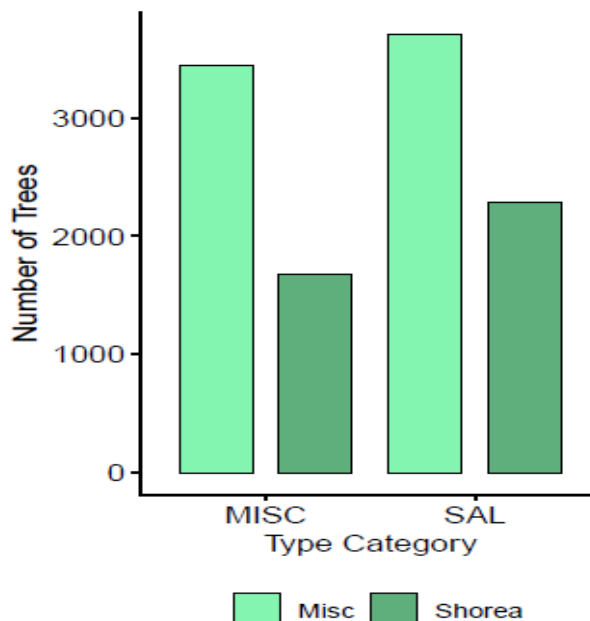
Plot Status

Status	Plots	Trees	Totals
No Large Trees	220		19.914
1 Tree	82	BArea	0.637
2 – 5 Trees	87	Volume	4.783
		Area	0.07

Basal area m^2/ha^{-1}
Volume m^3/ha^{-1}
Area ha

Estimates millions

Number of trees from Inventory plots



As per analysis report by ORSAC it is observed that the number of trees per ha is 288.5 with basal area $9.51m^2$ per ha. The volume per ha is about $71.87m^3$. The volume distribution is more in girth class 30-60cm. The distribution of economic species is furnished below.

Table 15.5: Species Distribution as per ORSAC Report.

Sl No	Economic Species	Mean	SE
1	<i>Anogeissus latifolia</i>	7.81	0.11
2	Misc	24.23	0.05
3	Shoria robusta	16.84	0.08
4	Terminalia tomentosa	14.93	0.09
5	Diospyros melanoxylon	2.02	0.15

On examination of data furnished for two major forest blocks i.e. Badampahad and Gorumahisani RF the findings indicate as follows.



Table 15.6: Girth Wise Tree list in Badampahad and Gurumahisani RF

Forest Block	Girth Class (Volume Distribution)					
	30-60	60-90	90-120	120-150	>150 cm	Total
Badampahad Com. 1a	8505	9005	5360	2242	3299	28414
1b	3752	3516	2089	1059	1735	12149
Total	12257	12521	7449	3301	5034	40563
Percentage	30.22	30.87	18.36	8.14	12.41	100
Gorumahisani RF Comp-2	19572	21350	10870	6570	4219	62582
Comp-3	2651	2840	1836	867	1104	9298
Total	22223	24190	12706	7437	5323	71880
Percentage	30.92	33.65	17.68	10.35	7.41	100.00

It is observed that the volume distribution is erratic in various blocks. The major available growing stock is in lower girth class. The main species is Sal with Kendu, Asan and other miscellaneous species. The stock map is given below to represent skewed distribution of crop density.

The distribution of trees in different girth class has been estimated by ORSAC. The result is produced bellow

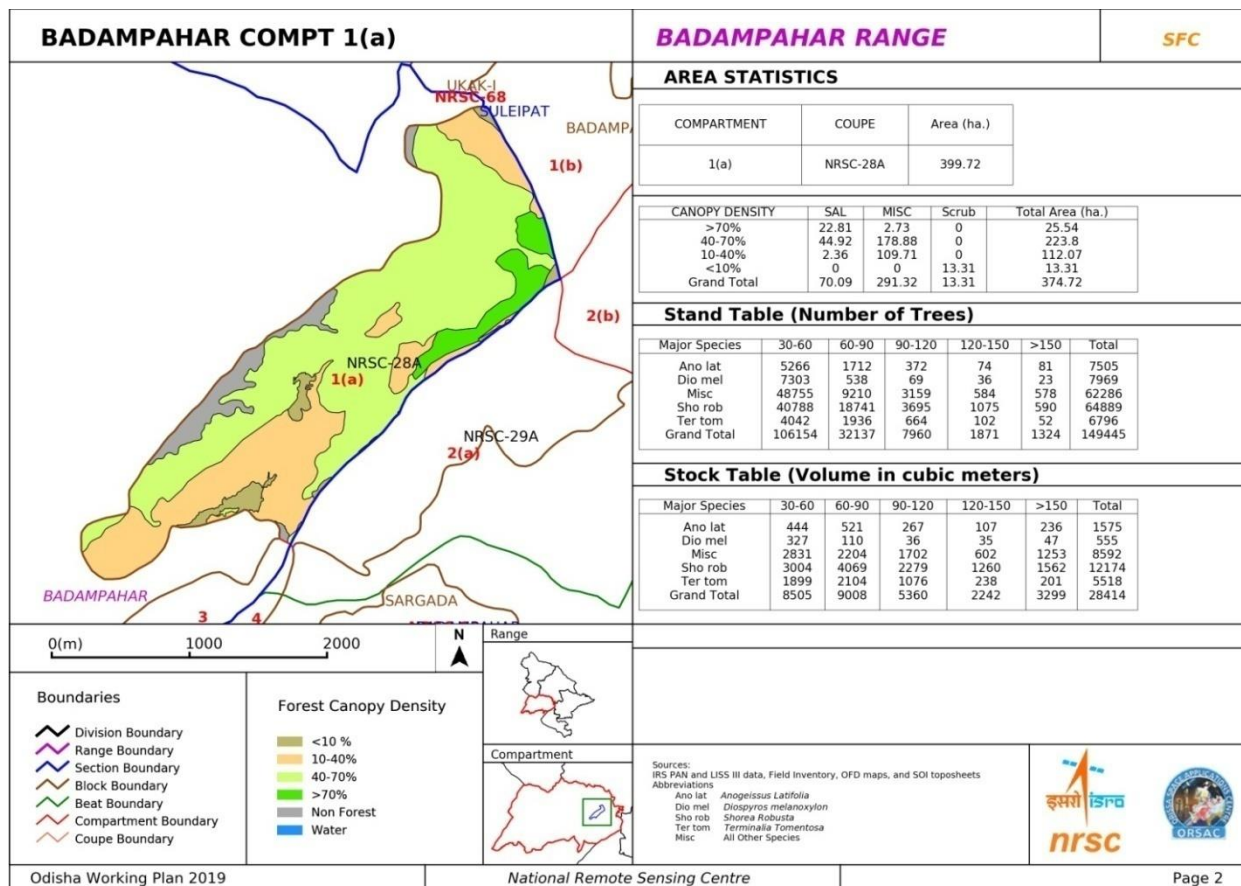
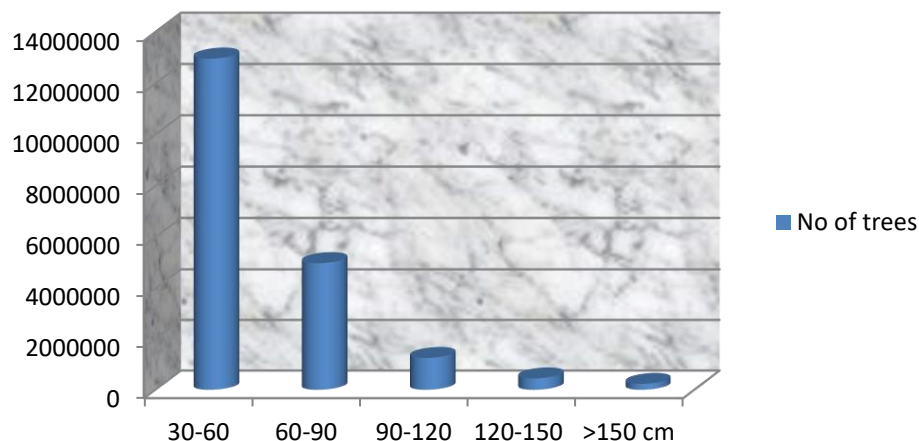
Table 15.7: Tree distribution different range

Range	Girth Class (Tree Distribution)					
	30-60	60-90	90-120	120-150	>150 cm	Total
Badampahad	1157361	337822	81779	23093	15876	1615931
Rairangpur	2554829	1240002	342920	116065	75652	4329468
Bahalda	1263391	366408	78314	24279	8743	1741135
Bisoi WL	4355906	1547007	355496	142087	59092	6459588
Manada	3636681	1507667	402388	146022	75492	5768250
Total	12968168	4998906	1260897	451546	234855	19914372
Percentage	65.12	25.10	6.33	2.27	1.18	100.00



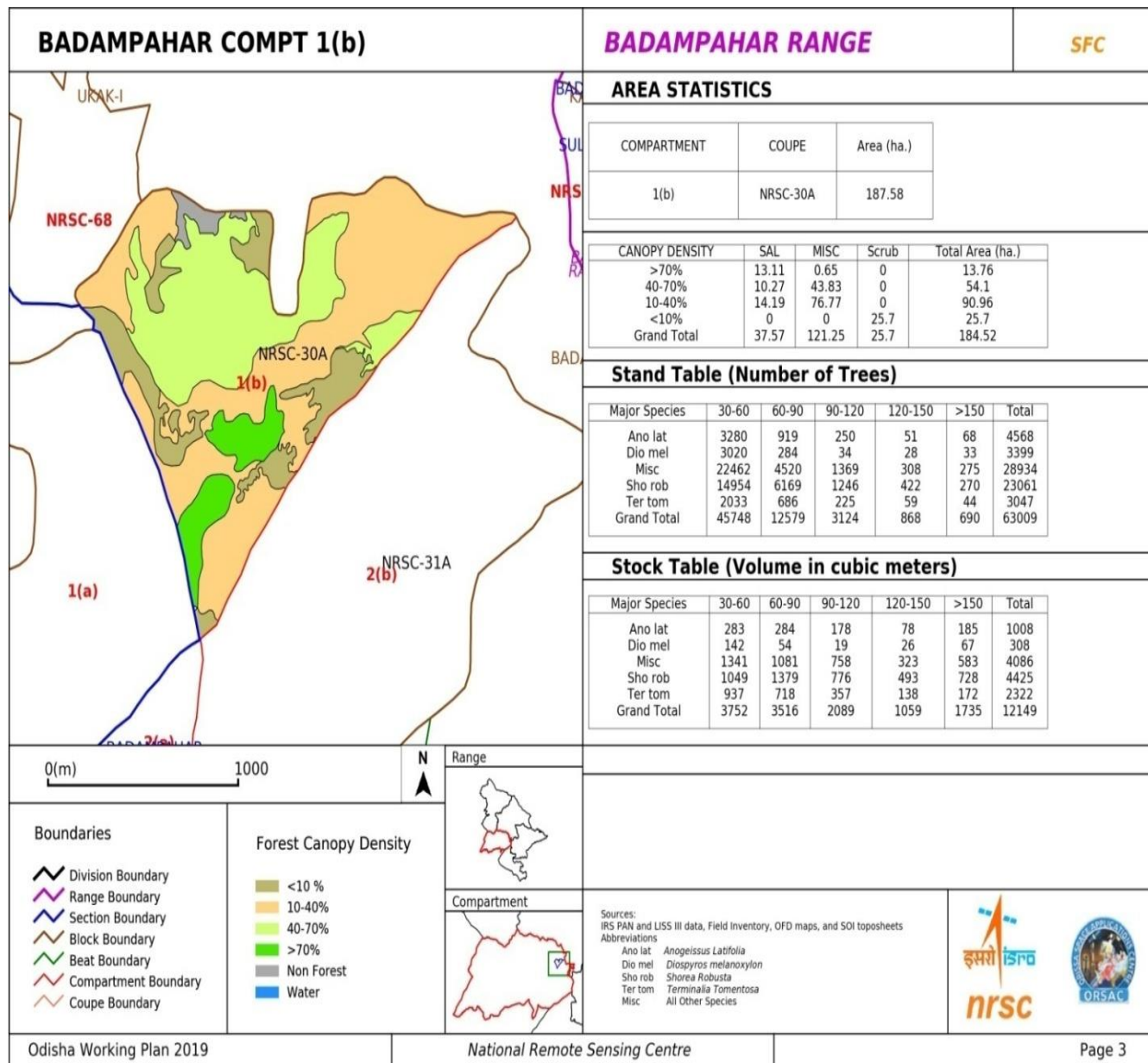
Working Plan of Rairangpur Forest division (2021 to 2031)

No of trees



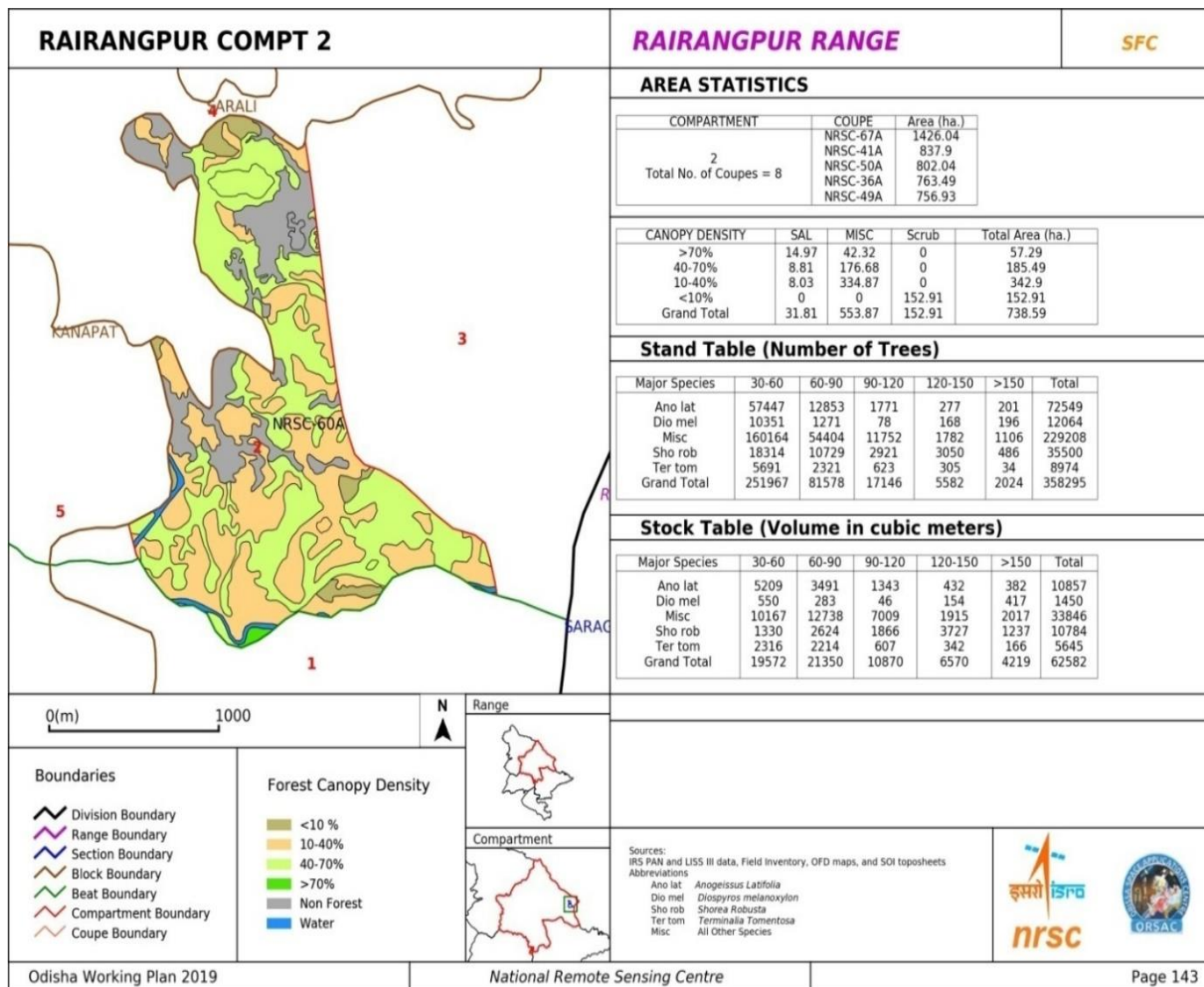


Working Plan of Rairangpur Forest division (2021 to 2031)



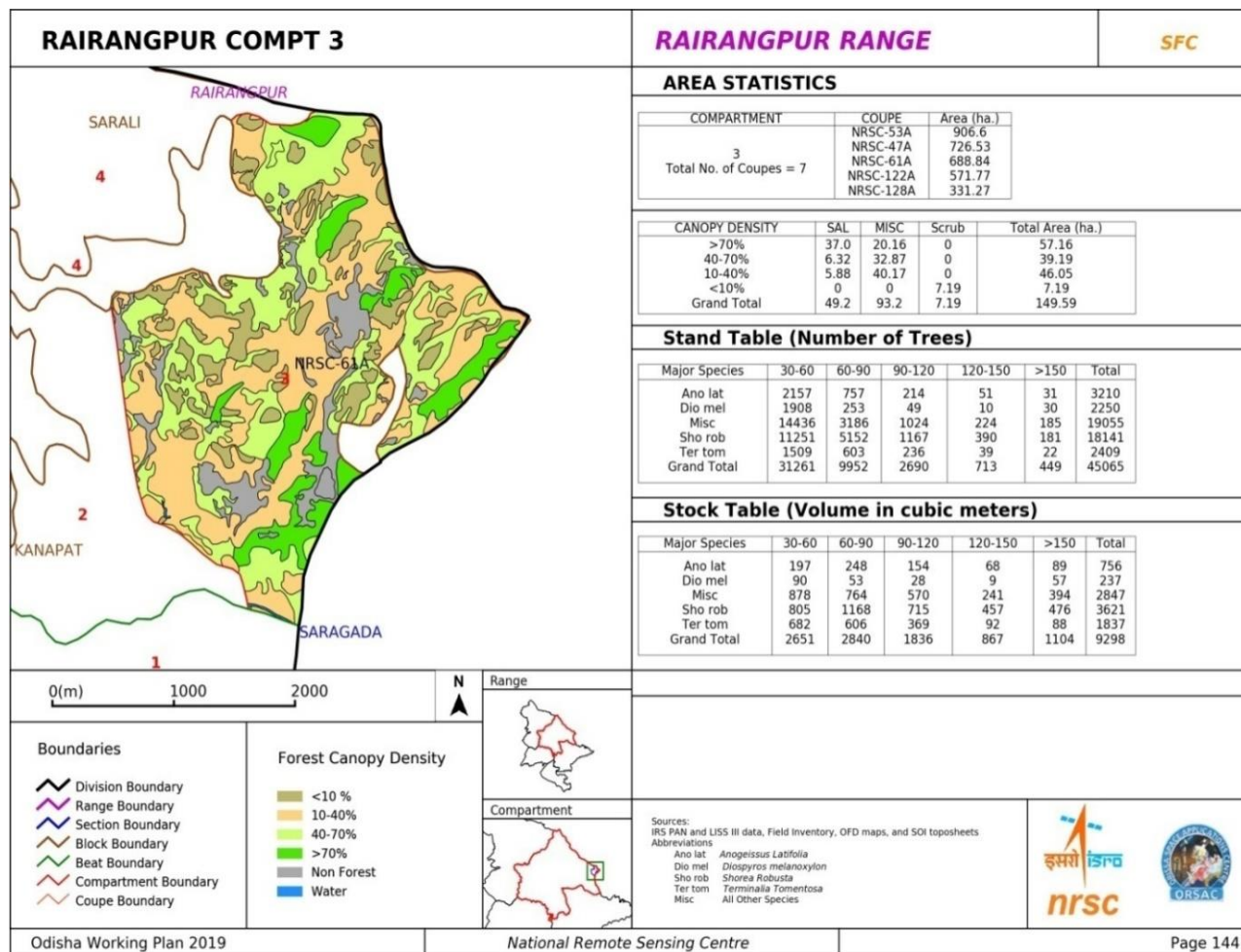


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15.6.2 Silvicultural System:

The Silvicultural System to be adopted for this working Circle is ***“Silvicultural Cleaning, Tending followed by Aided Natural Regeneration supplemented with enrichment Plantation”***

a) Silvicultural Cleaning:

Silvicultural Cleaning operation includes

- Removal of Soft stem Weeds (Annual in nature).
- Singling of Shoots.
- The species / plant if considered to be a good coppicer and in malformed, it may be cut flush to ground. This will induce a good promising shoot with high probability of **“Established Regeneration”**.
- Cut back the living high stumps to produce good coppice shoot.
- The annual climbers which hinders with the establishment of regeneration to be removed.



- Woody Climbers interlinking the trees above 10 m height may not be removed as it will help to sustain wind pressure during Cyclone.
- Eradication of weeds as a priority.

b) Silvicultural Tending:

Silvicultural Tending involves

- Thinning of natural growth in a congested patch (Above Sapling Stage i.e. in a pole crop to enhance diameter growth.)
- Advance growth / Natural growth are to be retained.
- Pruning in heavily branched individuals to allow faster height growth. Pruning should be restricted to one third height of the individual plant. ($1/3^{\text{rd}}$ of the Plant height)
- Woody climbers affecting poles below 5m height required to be cut down.
- List disturbance to Ground Flora.

c) Aided Natural Regeneration:

Besides Silvicultural Cleaning the following activities are prescribed for the Aided Natural Regeneration (ANR)

- Regeneration from Seed Origin (Recruits, Seedlings and Saplings) to be aided with weeding, Soil Working and application of fertilizer to enhance growth & speedy establishment.
- Extensive Soil & Moisture Conservation measures to be taken up. Besides Contour trenches, contour bonding, gully plugging, Vegetative check dams, percolation pits are required to be taken up to improve soil moisture regime. Individual plants of **Natural Origin** need to be provided with **Half Moon Trench**, Soil Mulching etc.

d) Enrichment Plantation

- In Blanks seedlings of indigenous species matching with the natural seedlings / saplings / vegetation available to be planted. Planting of teak inside natural forest to be avoided.
- Prepare the soil in blanks, around the existing seeding trees (Mother Trees) to receive seeds and allow the seeds to germinate and grow.

15.6.3 Rotation Period:

The present crop is not to be harvested during this plan period. No rotation period is prescribed at present. The entire area will be treated in a **Ten Year Cycle**.



15.6.4 Harvestable Diameters:

From enumeration / sampling data, it is observed that only 2.27 % of trees are above 120 cm and below 150 cm and 1.118 % above 150cm girth class. Under this condition no removal of trees is prescribed. Hence the harvestable diameter for any species has not been fixed in this plan.

15.6.5 Reduced Factors and reduced areas:

As no yield is expected from the annual treatment area, there is no yield regulation hence no reducing factor assessed.

15.6.6 Treatment Cycle:

A treatment Cycle of 10 years i.e. co terminated with Plan period is prescribed.

15.6.7 Division into Treatment Sections:

Under Para 15.4 the assigned area has been allotted to different treatment series. All total 18 treatment series have been constituted i.e. 13 TS for RF and 5 TS for DPF and PF. Each series is now subdivided to 10 sections with year of allotment as below.

(1) Badampahad Treatment Series (BTS):

Table No 15.8(1) Year wise area distribution Badampahad Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Badampahad Treatment Series (BTS)	Badampahad	BTS-I	2021-22	Badampahad RF	1a(2 nd P)	113.0	113.0
		BTS-II	2022-23		1a(Balance)	113.0	113.0
		BTS-III	2023-24		1b	202.16	202.16
		BTS-IV	2024-25		2a (P)	110.0	110.0
		BTS-V	2025-26		2a(Balance)	107.60	107.60
		BTS-VI	2026-27		2b(P)	110.0	110.0
		BTS-VII	2027-28		2b(Balance)	107.60	107.60
		BTS-VIII	2028-29		3 (P)	105.0	105.0
		BTS-IX	2029-30		3(Balance)	104.60	104.60
		BTS-X	2030-31		1a (1 st P)	112.0	112.0
			Total			1184.96	1184.96



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(2) Patijhari Treatment Series (PTS):

Table No 15.8(2) Year wise area distribution Patijhari Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Patijhari Treatment Series (PTS):	Badampahad	PTS-I	2021-22	Badampahad RF	4(Balance)	148.96	148.96
		PTS-II	2022-23		5 (P)	142.0	142.0
		PTS-III	2023-24		5(Balance)	142.16	142.16
		PTS-IV	2024-25		6a	128.0	128.0
		PTS-V	2025-26		6b (P)	165.0	165.0
		PTS-VI	2026-27		6b(Balance)	166.19	166.19
		PTS-VII	2027-28		9b (1 st P)	130.0	130.0
		PTS-VIII	2028-29		9b(2 nd P)	130.0	130.0
		PTS-IX	2029-30		9b (Balance	131.60	131.60
		PTS-X	2030-31		4(P)	148.0	148.0
			Total			1431.91	1431.91

(3) Kherna Treatment Series (KTS)

Table No 15.8(3) Year wise area distribution Kherna Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Kherna Treatment Series (PTS):	Badampahad	KTS-I	2021-22	Basila RF	2 nd P	75.0	75.0
		KTS-II	2022-23		Balance	70.54	70.54
		KTS-III	2023-24	Hat Badra RF		40.540	68.86
				Jhatisiring RF		28.320	
		KTS-IV	2024-25	Kherna RF	1 st P	65.0	65.0
		KTS-V	2025-26		2 nd P	65.0	65.0
		KTS-VI	2026-27		3 rd P	65.0	65.0
		KTS-VII	2027-28		4 th P	70.0	70.0
		KTS-VIII	2028-29		5 th P	65.0	65.0
		KTS-IX	2029-30		Balance	65.72	65.72
		KTS-X	2030-31	Basila RF	1 st P	75.0	75.0
			Total			685.12	685.12



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(4) Brahmani Treatment Series (Br.TS)

Table No 15.8(4) Year wise area distribution Brahmani Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Brahmani Treatment Series (Br.TS):	Rairangpur	Br.TS-I	2021-22	Brahmani RF	1(2 nd P)	95.0	95.0
		Br.TS-II	2022-23		1(3 rd P)	95.0	95.0
		Br.TS-III	2023-24		1(Balanace)	88.76	88.76
		Br.TS-IV	2024-25		2(1 st P)	95.0	95.0
		Br.TS-V	2025-26	Brahmani RF	2(2 nd P)	95.0	95.0
		Br.TS-VI	2026-27		2(3 rd P)	99.0	99.0
		Br.TS-VII	2027-28		2(Balance)	100.52	100.52
		Br.TS-VIII	2028-29	Ichinda RF		54.140	100.14
				Naskaria RF		46.000	
		Br.TS-IX	2029-30	Sargoda		106.78	106.78
		Br.TS-X	2030-31	Brahmani RF	1 (1 st P)	95.0	95.0
			Total			970.20	970.20

(5) Jharan Treatment Series (JTS):

Table No 15.8(5) Year wise area distribution Jharan Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Jharan Treatment Series (JTS):	Rairangpur	JTS-I	2021-22	Karan JharanDhasra	1 st P	75.0	75.0
		JTS-II	2022-23		2 nd P	80.0	80.0
		JTS-III	2023-24		3 rd P	75.0	75.0
		JTS-IV	2024-25		4 th P	80.0	80.0
		JTS-V	2025-26		5 th P	75.0	75.0
		JTS-VI	2026-27		6 th P	80.0	80.0
		JTS-VII	2027-28		Balance	75.60	75.60
		JTS-VIII	2028-29	Kucheibudhi	1 st P	100.00	100.00
		JTS-IX	2029-30		Balance	51.52	85.92
				Dumurikudar		34.40	
		JTS-X	2030-31	Jhumukapahadi		70.40	70.40
			Total			796.92	796.92



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(6) Gorumahisani Treatment Series (GTS):

Table No 15.8(6) Year wise area distribution Gorumahisani Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Gorumahisani Treatment Series (GTS):	Rairangpur	GTS-I	2021-22	Gorumahisani RF	1(Balance)	125.8	125.8
		GTS-II	2022-23		2(1 st P)	95.0	95.0
		GTS-III	2023-24		2(2 nd P)	95.0	95.0
		GTS-IV	2024-25		2(3 rd P)	95.0	95.0
		GTS-V	2025-26		2(4 th P)	95.0	95.0
		GTS-VI	2026-27		2(5 th P)	95.0	95.0
		GTS-VII	2027-28		2(6 th P)	95.0	95.0
		GTS-VIII	2028-29		2(7 th P)	95.0	95.0
		GTS-IX	2029-30		2 (Balance)	95.0	95.0
		GTS-X	2030-31		1(P)	125.0	125.0
			Total			1010.80	1010.80

(7) Badamtalia Treatment Series (Bd.TS)

Table No 15.8(7) Year wise area distribution Badamtalia Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Badamtalia Treatment Series (Bd.TS):	Rairangpur	Bd.TS-I	2021-22	Gorumahisani RF	3(2 nd P)	121.0	121.0
		Bd.TS-II	2022-23		3(3 rd P)	121.0	121.0
		Bd.TS-III	2023-24		3(4 th P)	121.0	121.0
		Bd.TS-IV	2024-25		3 (Balance)	122.0	122.0
		Bd.TS-V	2025-26		4	129.600	129.600
		Bd.TS-VI	2026-27		5 (P)	115.0	115.0
		Bd.TS-VII	2027-28		5(Balance)	114.600	114.600
		Bd.TS-VIII	2028-29		6 (P)	150.0	150.0
		Bd.TS-IX	2029-30		6(Balance)	145.90	145.90
		Bd.TS-X	2030-31		3 (1 st P)	121.0	121.0
			Total			1261.10	1261.10



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(8) Jari Treatment Series (Ja. TS):

Table No 15.8(8) Year wise area distribution Jari Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Jari Treatment Series (Ja. TS):	Rairangpur	JTS-I	2021-22	Jari RF	1(2 nd P)	135.0	135.0
		JTS-II	2022-23		1(3 rd P)	135.0	135.0
		JTS-III	2023-24		1(Balance)	128.60	128.60
		JTS-IV	2024-25		2(1 st P)	130.0	130.0
		JTS-V	2025-26		2(2 nd P)	125.0	125.0
		JTS-VI	2026-27		2(3 rd P)	130.0	130.0
		JTS-VII	2027-28		2(4 th P)	125.0	125.0
		JTS-VIII	2028-29		2(5 th P)	130.0	130.0
		JTS-IX	2029-30		2 (Balance)	126.00	126.00
		JTS-X	2030-31		1 (1 st P)	135.0	135.0
			Total			1299.60	1299.60

(9) Kanapa Treatment Series (Ka. TS):

Table No 15.8(9) Year wise area distribution Kanapa Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Kanapa Treatment Series (Ka.TS):	Rairangpur	KTS-I	2021-22	Jari RF	3(Balance)	165.40	165.40
		KTS-II	2022-23		4(1 st P)	165.0	165.0
		KTS-III	2023-24		4(2 nd P)	166.0	166.0
		KTS-IV	2024-25		4(3 rd P)	165.0	165.0
		KTS-V	2025-26		4(4 th P)	166.0	166.0
		KTS-VI	2026-27		4 (Balance)	164.8	164.8
		KTS-VII	2027-28		5(1 st P)	160.0	160.0
		KTS-VIII	2028-29		5(2 nd P)	155.0	155.0
		KTS-IX	2029-30		5(Balance)	159.80	159.80
		KTS-X	2030-31		3 (P)	165.40	165.40
			Total			1632.40	1632.40



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(10) Tiring Treatment Series (TTS):

Table No 15.8(10) Year wise area distribution Tiring Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Tiring Treatment Series (TTS):	Bahalda	TTS-I	2021-22	Tiring RF	1(2 nd P)	100.0	100.0
		TTS-II	2022-23		1(3 rd P)	100.0	100.0
		TTS-III	2023-24		1(Balance)	100.0	100.0
		TTS-IV	2024-25		2 (P)	100.0	100.0
		TTS-V	2025-26		2(Balance)	106.44	106.44
	Bahalda	TTS-VI	2026-27	Bankmundi	1 st P	110.00	110.00
		TTS-VII	2027-28		2 nd P	110.00	110.00
		TTS-VIII	2028-29		3 rd P	110.00	110.00
		TTS-IX	2029-30		Balance	103.30	148.38
				Debradihi		45.080	
		TTS-X	2030-31	Tiring RF	1 (1 st P)	100.0	100.0
			Total			1084.82	1084.82

(11) Budheirana Treatment Series (Bu.TS):

Table No 15.8(11) Year wise area distribution Budheirana Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Budheirana Treatment Series (Bu.TS):	Bahalda	Bu.TS-I	2021-22	Budheirana RF	1(2 nd P)	125.0	125.0
		Bu.TS-II	2022-23		1(3 rd P)	125.0	125.0
		Bu.TS-III	2023-24		1(4 th P)	125.0	125.0
		Bu.TS-IV	2024-25		1(5 th P)	125.0	125.0
		Bu.TS-V	2025-26		1(6 th P)	125.0	125.0
		Bu.TS-VI	2026-27		1(7 th P)	125.0	125.0
		Bu.TSVII	2027-28		1 (Balance)	125.0	125.0
		Bu.TS-VIII	2028-29		2(P)	113.0	113.0
		Bu.TS-IX	2029-30		2(Balance)	113.34	113.34
		Bu.TS-X	2030-31		1(1 st P)	125.0	125.0
			Total			1226.34	1226.34



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(12) Ramgarh Asurghaty Treatment Series (RATS):

Table No 15.8(12) Year wise area distribution Ramgarh Asurghaty Treatment series

Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Ramgarh Asurghaty Treatment Series (RATS):	Bahalda	RTS-I	2021-22	RamgarhA surghaty RF	2 nd P	145.0	145.0
		RTS-II	2022-23		3 rd P	145.0	145.0
		RTS-III	2023-24		4 th P	145.0	145.0
		RTS-IV	2024-25		5 th P	140.0	140.0
		RTS-V	2025-26		Balance	142.06	142.06
		RTS-VI	2026-27	Chahalapa da RF	1 st P	140.0	140.0
		RTS-VII	2027-28		2 nd P	145.0	145.0
		RTS-VIII	2028-29		3 rd P	140.0	140.0
		RTS-IX	2029-30		Balance	145.80	145.80
		RTS-X	2030-31	RamgarhA surghaty RF	1 st P	140.0	140.0
			Total			1427.86	1427.86

(13) Manbir Treatment Series (MTS)

Table No 15.8(13) Year wise area distribution Manbir Treatment series

Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block	Comp. No	Area assigned (in Ha)	Total (in ha)
Manbir Treatment Series (MTS):	Bahalda	MTS-I	2021-22	Gambharia	Balance	55.260	111.65
				Khairpal		56.390	
		MTS-II	2022-23	Manbir	1 st P	90.0	90.0
		MTS-III	2023-24		2 nd P	90.0	90.0
		MTS-IV	2024-25		3 rd P	90.0	90.0
		MTS-V	2025-26		4 th P	90.0	90.0
		MTS-VI	2026-27		5 th P	90.0	90.0
		MTS-VII	2027-28		6 th P	90.0	90.0
		MTS-VIII	2028-29		Balance	91.52	91.52
	Manada	MTS-IX	2029-30	Khadambeda		80.520	80.520
	Bahalda	MTS-X	2030-31	Gambharia	Part	100.00	100.0
			Total			923.69	923.69



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(14) Tirilipi Treatment Series (Tr.TS):

Table No 15.8(14) Year wise area distribution Tirilipi Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block (DPF)	Comp. No	Area assigned (in Ha)	Total (in ha)
Tirilipi Treatment Series (Tr. TS):	Badampa had	Tr.TS-I	2021-22	Hatnabeda		81.950	81.95
		Tr.TS-II	2022-23	Jaydhanposi		8.920	86.11
				Jhatisiring		77.190	
		Tr.TS-III	2023-24	Patijhari		26.810	83.97
				Ukam-I		57.160	
		Tr.TS-IV	2024-25	Sargoda –II		91.490	91.49
		Tr.TS-V	2025-26	Dubulabeda		34.900	34.90
		Tr.TSVI	2026-27	Tirilipi	1 st P	95.0	95.0
		Tr.TS-VII	2027-28		2 nd P	95.0	95.0
		Tr.TS-VIII	2028-29		3 rd P	95.0	95.0
		Tr.TS-IX	2029-30		Balance	95.0	95.0
		Tr.TS-X	2030-31	Baneikala		52.220	72.94
				Gundurua		20.720	
				Total		831.36	831.36

(15) Dhaupani Treatment Series(DTS):

Table No 15.8(15) Year wise area distribution Dhaupani Treatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block (DPF)	Comp. No	Area assigned (in Ha)	Total (in ha)
Dhaupani Treatment Series (DTS)	Rairangpur	DTS-I	2021-22	Dahupani DPF	1 st P	130.0	130.0
		DTS-II	2022-23		2 nd P	135.0	135.0
		DTS-III	2023-24		3 rd P	130.0	130.0
		DTS-IV	2024-25		4 th P	135.0	135.0
		DTS-V	2025-26		5 th P	130.0	130.0
		DTS-VI	2026-27		6 th P	135.0	135.0
		DTS-VII	2027-28		7 th P	130.0	130.0
		DTS-VIII	2028-29		8 th P	135.0	135.0
		DTS-IX	2029-30		9 th P	135.0	135.0
		DTS-X	2030-31		Balance	133.14	133.14
				Total		1328.14	1328.14



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(16) Radho Treatment Series (Ra. TS)

Table No 15.8(16) Year wise area distributionRadho Treatment series

Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block (DPF)	Comp. No	Area assigned (in Ha)	Total (in ha)
Radho Treatment Series (RTS):	Rairangpur	Ra.TS-I	2021-22	Betjharan – II		85.360	141.06
				Betjharan – III		32.740	
				Belpahari – VI		22.960	
		Ra.TS-II	2022-23	Balarampur		115.800	135.93
				Gorumahisani		20.130	
		Ra.TS-III	2023-24	Jhumkapahadi		21.850	126.88
				Juapahadi		41.980	
				Kalatamak		24.950	
				Kucheibudi		38.100	
		Ra.TS-IV	2024-25	Radho	1 st P	125.0	125.0
		Ra.TS-V	2025-26		2 nd P	125.0	125.0
		Ra.TS-VI	2026-27		3 rd P	120.0	120.0
		Ra.TS-VII	2027-28		Balance	125.86	125.86
		Ra.TS-VIII	2028-29	Saragada		124.440	144.68
				Bhatgoda		20.240	
		Ra.TS-IX	2029-30	Merudihi		114.490	162.18
				Badjari		47.690	
		Ra.TS-X	2030-31	Betjharan – I		113.550	137.83
				Anandpur		24.280	
				Total		1344.42	1344.42



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(17) Bhitaramda Treatment Series (Bh.TS):

Table No 15.8(17) Year wise area distribution BhitaramdaTreatment series

Table No 15.8(17) Year wise area distribution BhitaramdaTreatment series							
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block (DPF)	Comp. No	Area assigned (in Ha)	Total (in ha)
Bhitaramda Treatment Series (Bh.TS):	Bahalda	Bh.TS-I	2021-22	Dumadihi		36.730	107.92
				Rutughutu		10.490	
				Salei		60.700	
		Bh.TS-II	2022-23	Bhitaramda	1 st P	120.0	120.0
		Bh.TS-III	2023-24		2 nd P	120.0	120.0
		Bh.TS-IV	2024-25		3 rd P	120.0	120.0
		Bh.TS-V	2025-26		4 th P	120.0	120.0
		Bh.TS-VI	2026-27		5 th P	125.0	125.0
		Bh.TS-VII	2027-28		6 th P	125.0	125.0
		Bh.TS-VIII	2028-29		7 th P	120.0	120.0
		Bh.TS-IX	2029-30		Balance	120.62	120.62
		Bh.TS-X	2030-31		Bahalda		25.490
				Sansadam		60.700	
				Jadunathpur		20.230	
				Total		1184.96	1184.96

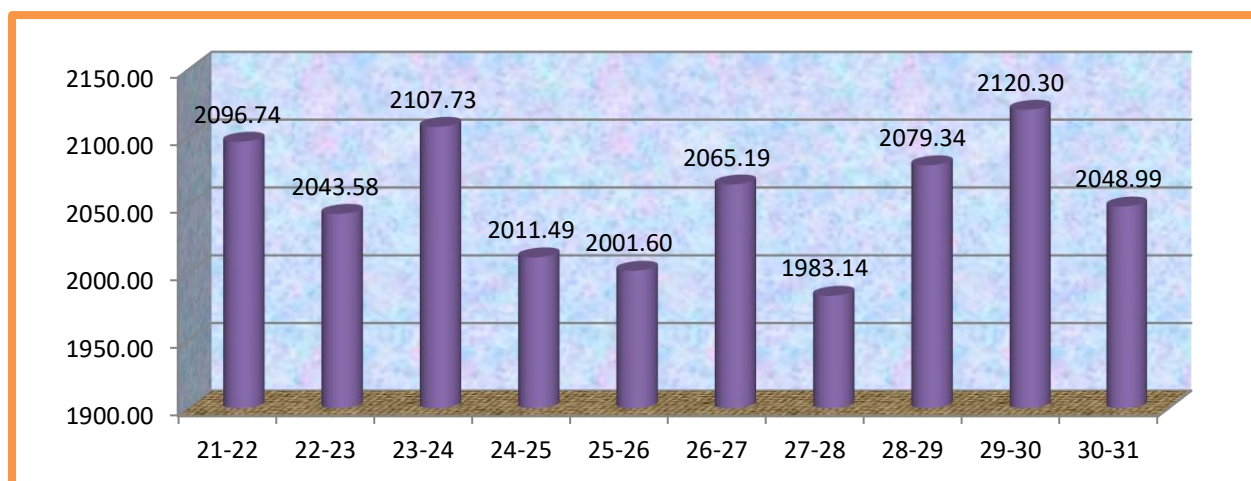
(18) Manada – Bisoi Treatment Series (MBTS):

Table No 15.8(18) Year wise area distribution Manada – Bisoi Treatment series

Table No 15.8(18) Year wise area distribution Manada – Bisoi Treatment series								
Name of Imp. Series	Range	Coupe no	Year assigned	Forest Block (DPF)	Comp. No	Area assigned (in Ha)	Total (in ha)	
Manada – Bisoi Treatment Series (MBTS):	Manada	MBTS-I	2021-22		2 nd P	95.0	95.0	
		MBTS-II	2022-23		3 rd P	95.0	95.0	
		MBTS-III	2023-24		Balance	94.34	94.34	
		MBTS-IV	2024-25	Pidhakata	1 st P	100.0	100.0	
		MBTS-V	2025-26		2 nd P	100.0	100.0	
		MBTS-VI	2026-27		Balance	105.20	105.20	
		Bisoi WL	MBTS-VII	2027-28	Ektali		3.790	53.96
					Jamda-V		15.520	
					Asansikal		34.65	
		MBTS-VIII	2028-29	Hatichhad PF	Part	100.0	100.0	
		MBTS-IX	2029-30		Balance	100.0	100.0	
		Manada	MBTS-X	2030-31	Dhenkia	1 st P	90.0	90.0
				Total		933.50	933.50	

Abstract of Treatment series:**Table No 15.8(19) Abstract of Treatment series**

Treatment Series	Area allotted (Year wise)										
	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	total
Badampahad	113.0	113.0	202.16	110.0	107.60	110.0	107.60	105.0	104.60	112.00	1184.96
Patijhari	148.96	142.0	142.16	128.0	165.0	166.19	130.0	130.0	131.60	148.00	1431.91
Kherna	75.0	70.54	68.86	65.0	65.0	65.0	70.0	65.0	65.72	75.00	685.12
Brahmani	95.0	95.0	88.76	95.0	95.0	99.0	100.52	100.14	106.78	95.00	970.20
Jharan	75.0	80.0	75.0	80.0	75.0	80.0	75.60	100.0	85.92	70.40	796.92
Gorumahisani	125.8	95.0	95.0	95.0	95.0	95.0	95.0	95.0	95.0	125.00	1010.8
Badamtala	121.0	121.0	121.0	122.0	129.6	115.0	114.6	150.0	145.9	121.00	1261.10
Jari	135.0	135.0	128.6	130.0	125.0	130.0	125.0	130.0	126.0	135.00	1299.60
Kanapa	165.40	165.0	166.0	165.0	166.0	164.8	160.0	155.0	159.80	165.40	1632.40
Tiring	100.0	100.0	100.0	100.0	106.44	110.0	110.	110.0	148.38	100.00	1084.82
Budheirana	125.0	125.0	125.0	125.0	125.0	125.0	125.0	113.0	113.34	125.00	1226.34
Ramgarh Asurghaty	145.0	145.0	145.0	140.0	142.06	140.0	145.0	140.0	145.80	140.00	1427.86
Manbir	111.65	90.0	90.0	90.0	90.0	90.0	90.0	91.52	80.52	100.00	923.69
Tirilipi	81.95	86.11	83.97	91.49	34.90	95.0	95.0	95.0	95.0	72.94	831.36
Dhaupani	135.0	130.0	135.0	130.0	135.0	130.0	135.0	135.0	133.14	130.00	1328.14
Radho	141.06	135.93	126.88	125.0	125.0	120.0	125.86	144.68	162.18	137.83	1344.42
Bhitaramda	107.92	120.0	120.0	120.0	120.0	125.0	125.0	120.0	120.62	106.42	1184.96
Manada – Bisoi	95.0	95.0	94.34	100.0	100.0	105.20	53.96	100.0	100.0	90.00	933.50
Total	2096.74	2043.58	2107.73	2011.49	2001.6	2065.19	1983.14	2079.34	2120.3	2048.99	20558.1



15.6.8 Calculation of the yield:

As there is no prescription to harvest forest produce, no yield has been calculated. However during silvicultural cleaning and thinning, brush wood, Fire wood and poles may be obtained. In order to maintain hygiene of the forest, dead trees may be removed leaving some dead trees / fallen trees at least 4-5 trees per hectare for wildlife management point of view.

In case of VSS assigned area, the removed forest produce may be given to the Villagers as per JFM Resolution after maintaining necessary records of removal and sharing mechanism as per VSS Resolution.

15.6.9 Table of Treatment:

The forest Blocks assigned to this working circle has been divided to 18 treatment series (13 Treatment Series for Reserved Forests and 5 Treatment Series for DPF / PF). For convenience of working each Treatment Series has been sub divided in to 10 sections. Each year the assigned area is required to be treated strictly. The Treatment Series and corresponding Sections and year of operation have been described under Para 15.6.7 above.

15.6.10 Method of executing the Treatment:

15.6.10.1 Demarcation of Annual Rehabilitation Area:

The Annual Rehabilitation Area (Treatment Area) has been depicted on Topo map (1: 50000 Scale) with marking like TS-I, TS-II. The area assigned for the year is to be surveyed, Pillars Posted well marked on the Ground. 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. As the area is very susceptible to land encroachment / heavy Biotic Pressure, the Boundary of the Forest Block is to be clearly demarcated/ concrete pillars posted as per the guidelines of PCCF, Odisha.
- iii. In the situation when the Treatment Section line is not coinciding with the block or Compartment lines, it is to be demarcated by cleaning a strip of 1.50 meter width and stone cairns of size 90 cmX60 cm are to be erected at the corners at visible intervals along the line. While clearing 1.50 meter strip, all trees below 20 cm GBH are to be felled .Trees of larger girth occurring along coupe line at visible distances are to be given with two Black Paint rings at breast height.
- iv. When Treatment Section Line is co-terminus with block or compartment line then the latter will be maintained as per prevailing practice.
- v. When the Treatment Section 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.
- vi. The sign boards exhibiting the serial number of the Treatment Section 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 Treatment Section line meets the road.

15.6.10.2 Preparation of Treatment Map & Treatment Plan.

(a) 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 five types of areas will be distinguished.

Type “A”

Area to be taken for Silvicultural Cleaning which includes singling out of coppice shoot, pruning, climber cutting removal of high stumps and other tending operations. Area for



eradication of weeds is to be marked on the map. Area with congested advance growth, if required thinning is also to be marked.

Type “B”

Seedlings / Recruits of seed origin available in the area are to be specifically noted & its approximate number / species to be mentioned. An available Blank Area which needs to be planted up is to be marked. The suitable species are also to be mentioned in the Treatment Plan.

Type “C”

Plantations raised under different Schemes (AR Only) are also to be specifically marked on the Map. The growth pattern and required treatment to plantations like thinning etc to be specifically indicated.

Type “D”.

The area assigned to VSS is also to be marked on treatment map. It may be cross checked with the VSS assigned map / MoU with the VSS to check the veracity.

Type “E”.

There are stony out crop of varied extent of sizable area. This type of area is also to be marked / noted on the Treatment Plan.

(b) Treatment Plan:

The treatment Plan shall include

- I. Site identification i.e. Forest Block/ Compartment No. / Treatment series No
- II. Area and Treatment map.
- III. Site characteristics (terrain, slope, drainage, soil type and depth).
- IV. Vegetation and extent of regeneration.
- V. Extent of degradation.
- VI. Year of operations (including maintenance if any).
- VII. Major operation to be undertaken.
- VIII. Cost norms and calendar of operations.
- IX. Involvement of VSS and works that can be executed through VSS.
- X. In case of Plantation / Gap filling required, the species required to be planted are need to be mentioned.
- XI. In case of availability of Dead / fallen trees required to be removed during the operation, it will be marked and a marking list is to be prepared as per standard format.

The treatment Plan is to be prepared by the Range Officer, checked by the Asst. Conservator of Forests and to be approved by the DFO, Rairangpur Division for execution.



The Treatment Plan may be drawn up within October – December of the previous year of assigned year. This will help in planning and arrangement of funds through budgetary provisions.

After receipt of the Treatment Plan, it is to be examined and execution plan to be decided by the Divisional Forest Officer well in advance.

(c) Execution of Rehabilitation Method.

After approval of the Treatment Map & Plan, the same is to be executed in the assigned year. The sequences of Operations are

- i) Fencing of the Area:
- ii) Removal of marked trees, if any.
- iii) Silvicultural Cleaning.
- iv) Silvicultural thinning,
- v) Eradication of weeds,
- vi) Treatment of bamboo clumps including Harvest / De-congestion)
- vii) Soil & Moisture Conservation.
- viii) Treatment of Natural seedlings available,
- ix) Restocking of Area by Planting (Artificial Regeneration) & Post-care operation.
- x) Subsidiary Silvicultural Operation for bamboo.
- xi) Control of Grazing,
- xii) Fire Protection Measures.

15.6.11 Description of Operations:

i) Fencing of the Area:

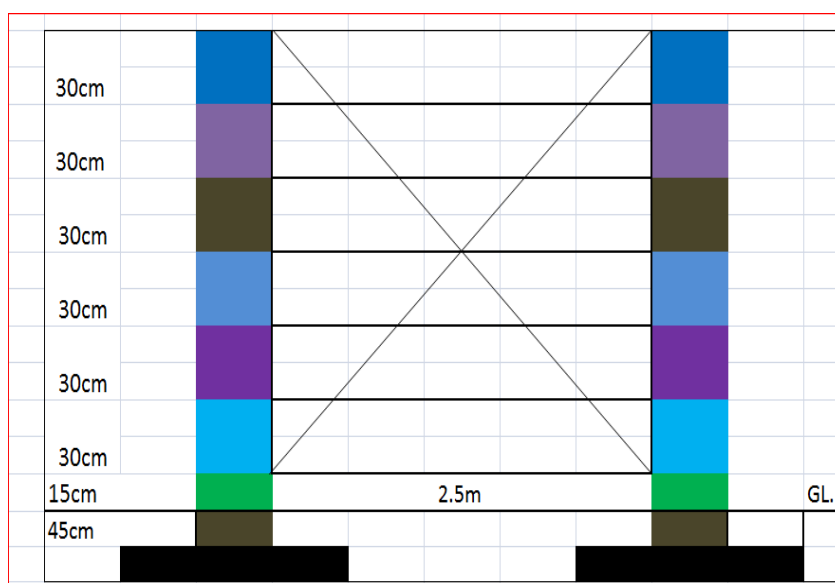
The area which are susceptible to encroachment and other biotic interferences are required to be fenced either with Vegetative fencing as per cost norm provided in Block Plantation or Barbed wire fencing if budgetary provisions support. In wildlife abundance areas, vegetative fencing is strongly recommended. To have a successful regeneration it is strongly required to fence the area with barbed wire.

Description of Barbed Wire Fencing:

It is suggested to put T shaped pillars at an interval of 2.5m. The length of such pillar is 2.40 m. (1.95 m above the ground & 0.45m below the ground.) Size: 15cmx15cm at bottom and 10cm x10cm at top. The Lower bar of inverted "T" is of 30cm including the width of the pillar. There will be 7 strands of two ply barbed wires and to be placed at a height of 15cm, 45cm, 75cm, 105cm, 135cm, 165cm and 195cm from the ground level. Two strands will be



put diagonally (connecting 15cm point to 195 cm point & 195cm point to 15cm point of adjacent pillar).



The approved Cost norm for barbed wire fencing based on wage rate of Rs280/- per Person days is at **Annexure-XVIII**.

ii) Silvicultural Cleaning.

The silvicultural cleaning is intended to achieve healthy growth of existing seedlings / saplings / coppice shoots of favoured species. The operation includes

- Cutting back of high stumps with preference to living stumps and having a good coppicing power.
- Cutting of climbers those are of annual nature and uprooting them wherever possible. The woody climbers those are interlocking the existing trees should not be cutback as it gives enforcement to trees during Cyclone / heavy wind.
- Singling out of multiple coppice shoots and retaining most promising ones.

iii) Silvicultural thinning.

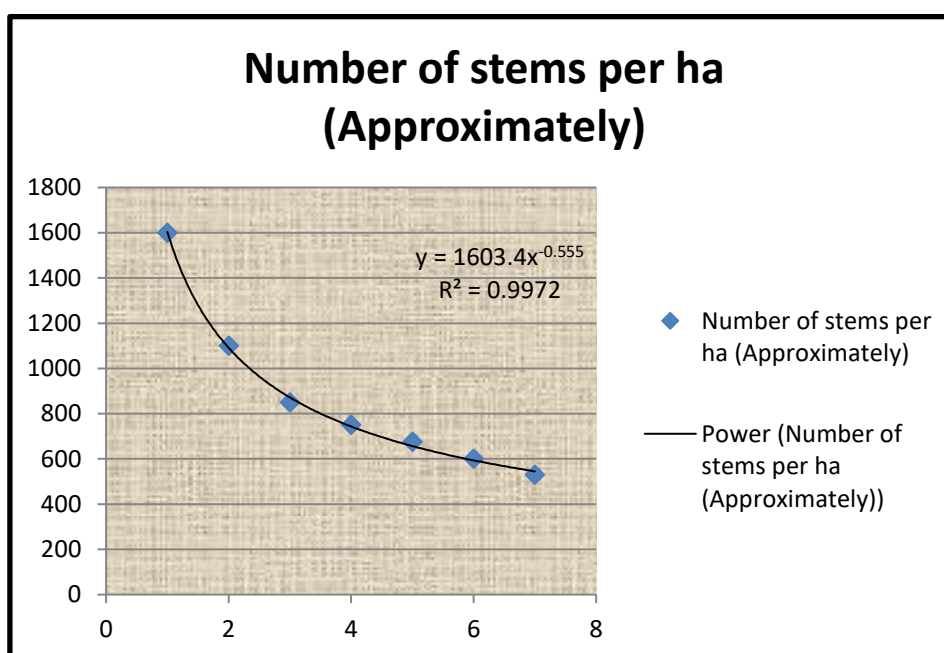
In cases of having congested advance growth at a pole stage, it is required to take up light thinning of “**C grade intensity**”. It is required to undertake removal of dead, moribund, diseased, suppressed, dominated and defective trees without creating a permanent gap in canopy. Some defective trees around five trees per hectare having cankers / holes should be retained for wildlife habitation. As the crop is mostly of coppice origin, heavy thinning is not preferred. The details of thinning procedure have been described under Para-14.6.10.4 which may be referred.



In case of Planted areas (AR Plantations) for which specific prescription not provided in this plan are to be thinned. The local stand table for miscellaneous plantations is required to be followed. From field observation, it is expected to have at least the number of stems per hectare as furnished below at Table No 15.9 in a miscellaneous plantation / B. Economic Plantation ideally. The equation / graph are given below. From the equation, the number of stems for any interim year can also be derived

Table No 15.9 Number of stems expected in different years from plantations.

Year	Number of stems per ha (Approximately)
1st year	1600
5th Year	1100
10th year	850
15th year	750
20th year	675
25th year	600
30th year	530



iv) Eradication of weeds:

The present Blank area included in this Working Circle is heavily infested with Eupatorium, Lantana, Bana Tulasi and other thorny weeds. These weeds are hindering with the growth of natural seed origin seedlings and planted seedlings. Before taking up plantation in these areas its eradication is essential. The details of eradication process have been described in



Part-I of this plan. Methods like repeated cutting at tender stage, uprooting of weeds by tractors and immediate covering the area with plantations / grass land creation may be followed. About 7% to 10% of the area assigned to this Working Circle is observed to be infested with weed. This indicates the quantum of task ahead.

v) Soil & Moisture Conservation.

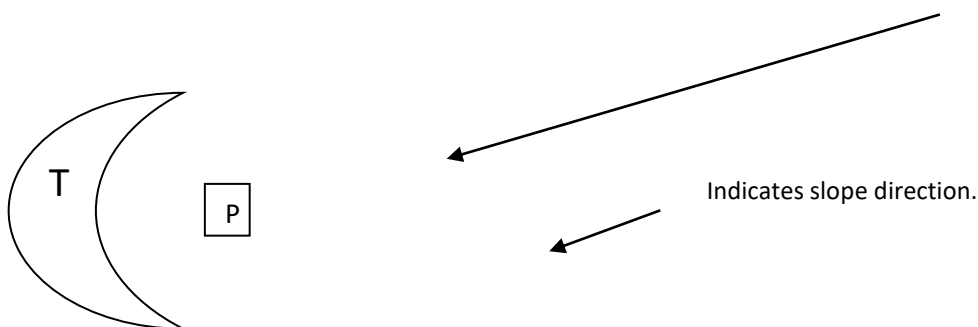
The area included in this working circle is mostly hilly terrain to moderate slope. Percolation pits of 2mx 1mx1m with gentle side slopes, Contour bonding within 200meters from water body/ River bank, Treatment of nalla / Rills / gullies are prescribed. Maintaining thick leaf litters in humus form coupled with fire protection measures will also help in moisture conservation.

vi) Treatment of Natural seedlings available,

The natural seedlings available in the treatment area are to be given appropriate attention to ensure its establishment.

The following measures are prescribed.

- Deep Soil Working around the seedlings at a width of 0.50 m with application of fertilizer.
- Weeds to be removed / uprooted at a radius of 1 meter.
- In case of sloppy location Half Moon trench to be provided.



- T : Half Moon Trench
- P: Plant position.

vii) Restocking of Area by Planting (Artificial Regeneration) & Post-care operation.

Plantation of indigenous species matching with the local species is required to be planted following the cost norm of Plantations approved by Forest department. The species suggested are Pahadi sisoo (*Dalbergia latifolia*), Khaira (*Senegalia catechu* / *Acacia catechu*), Bela (*Aegle marmelos*), Phasi (*Anogeissus acuminata*), Dhaura (*Anogeissus*



latifolia), Asan (*Terminalia tomentosa*), Arjun (*T. arjuna*), Bahada (*T. belerica*), Bandhan (*Ougeinia oojeinensis*), Kuruma (*Adina cardifolia*), Jamu (*Syzygium cumini*) etc.

viii) Control of Grazing.

The assigned area for a particular year is required to be closed to grazing at least for three years. During that period, VSS members, villagers may be allowed to collect grasses by cutting only. After three years controlled grazing may be allowed considering the quantum of grass growth in the protected area.

ix) Fire Protection Measures.

The area is to be protected against fire. Fire line is required to be maintained along the periphery and internal lines. Controlled burning of weeds / fallen leafs may be taken up under strict supervision of section forester.

x) Disposal of Forest Produce:

During Cleaning / thinning operation if any utilizable forest produce is obtained, it will be disposed up as per the guidelines of Forest Department. Delivery to OFDC Ltd is the favored practice. In case of VSS assigned area, it may be distributed to the VSS as per JFM resolution treating the produce as an interim harvest.

15.6.12 Subsidiary silvicultural operations (Cleaning & Thinning):

The process of thinning and Silvicultural cleaning has been described above.

15.6.13 Regeneration:

The area assigned to Rehabilitation Working Circle is found to be having poor regeneration. The basic objectives are to restock the area by

- Checking Degradation, Encourage High Forest System,
- Allow establishment of Saplings / regenerated seedlings within the time limit.
- Supplement the regeneration through planting.

15.6.13.1 Checking of Degradation:

The Forests assigned to this working Circle are in a path of degradation. This may be due to constant biotic interference, Heavy Grazing, Loss of Soil fertility, Soil erosion, reduced moisture regime and most important is Fire invasion and illegal removal of forest produce i.e. timber, poles and brush woods. Dedicated efforts are required to check the drivers of forest degradation.



15.6.13.2 Encourage High Forest System:

Most of the forest crops are observed to be of coppice origin than of seed origin. It should be our endeavour to create favourable ground situation to have seedlings / recruits more in number. The following suggestions are made to follow to have a better High Forest system to develop than artificially supplementing the regeneration.

- a) Identification of Mother trees in all forest blocks @5 trees per hectare irrespective of species. List of such trees may be prepared either prior to assigned year or in the assigned year. List of such mother trees may also be available in compartment history for the block.
- b) Most of the matured seeds fall to forest floor during winter and some species of low viability period before rains. Seeds those matured during winter / spring should be collected from mother trees only.
- c) The ground / soil may be manipulated by loosening and kept ready to receive seeds for germination.
- d) In pre-monsoon shower seeds to be dibbled / broadcasted as convenient and the area may be protected against trampling / grazing.
- e) After germination, if required organic fertilizer, FYM or Chemical fertilizer may be applied to have a better growth.
- f) This patch to be under constant supervision of Range Officers for three years. The location of such patch (Latitude / Longitude) may be recorded in the compartment history / Register or Journal for reference by succeeding officials.
- g) Naturally available seedlings to be treated as described under Para 14.6.11. (vi) above.

15.6.13.3 Establishment of Saplings / regenerated seedlings within the time limit:

It is mostly observed that villagers are removing the small saplings / poles for fencing and house hold use. Whatever regenerated / established saplings achieved are going in vain due to removal of poles etc in disguise of brush wood. Hence public awareness is required to be created for not removing any materials from forest in name of brush wood to have desired effect in a time limit.

15.6.13.4: Supplement the regeneration through planting.

Supplementing the regeneration by artificial method i.e. planting of seedlings is a favoured practice since long. The choice of seedlings in most cases mismatch with the local flora available and seedlings selected for planting is not compatible with the soil status / succession stage of plant community. In practice choice of species is guided by "Ease to



raise nursery attitude and seeds availability” than site requirement. These aspects may be addressed in the Treatment Plan prepared in advance. It will lead to a better forest at par with neutrality and keep bio diversity of the area unaffected.

15.6.14 Associated regulations and measures:

Besides the above prescriptions, the following associated regulations are prescribed to be followed. These are

- Grazing in forests required to be regulated as more damaged is caused to regeneration through trampling.
- Fire protection in the forest blocks especially on treated area should be strictly enforced.
- No logging is allowed within 5 years of treatment.
- Boundary maintenance in a cycle of 3 years is to be ensured.
- VSS is to be strengthened and regular interaction with villagers / VSS members to be maintained.

15.6.14.1 Degraded Forest Area Suitable for Compensatory Afforestation:

Compensatory Afforestation is an important component for Diversion of Forest land for various projects. The Central Govt. Protects, PSU of Central Govt. Transmission Line projects used to provide Degraded Forest Land for Compensatory Afforestation Purpose. The forest area under administrative control of suitable for taking under Compensatory Afforestation purpose has been tentatively identified. The list of sugc DFL (Degraded Forest Land) is at **Annexure-XIX.**

15.6.14.2 Coupe Control Form.

The activities are to be closely monitored to have the desired result. A set of Coupe control form is prescribed below to be filled up and submitted to DFO by the Range officer at the end of the year.

Table No 15.10 Coupe Control Form (Form No-2)									
Name of Treatment Series	Coupe No	Year of Assigned	Area in ha	Areas treated Under (in Ha)					Deviation
				Cleaning	Thinning	Planting	Seed sowing	SMC	





CHAPTER-16

PLANTATION WORKING CIRCLE (PWC)

16.1 Plantation Working Circle:

Plantation is an important component in enriching vegetation and a tool in hands of foresters to increase basal area of the crop in a forest and increase biomass production per annum per hectare. Block plantations raised under various schemes in Reserved Forests, PRFs and Village forest need to be intensively managed. During last plan period plantations have been raised in assigned area to enrich the forest crop. These plantations are now part of the vegetation & to be managed as normal crop on the forest block. There are gaps needs to be planted up to cover up the land quickly.

Similarly, plantations raised under erstwhile Social Forestry Project and declared as Village Forest under provisions of Odisha Forest Act, 1972 are also in a scattered manner and no management practices has been initiated after reorganization of Forest Department and transformation of Social Forestry Project Divisions / Ranges to some other Divisions / Ranges.

It is proposed to mange Social Forestry Village woodlots and take up fresh plantations under this working Circle. The plantation Working circle covers **1691.804ha**.

16.2 General Constitution:

This working Circle comprises erstwhile Social Forestry Village Woodlots declared as Village Forest under provisions of Odisha Forest Act, 1972 and blank areas identified in RF / DPF for planting within next 10 years. The details of Village Forests and identified area are furnished at Table no 16.1 below.



16.2.1 Areas identified in RF/ DPF:

Table No 16.1(a) Area allotted to Plantation WC (In Ha)(RF/DPF)					
Sl No	Name of Forest Block	Comp no	Area available for Management in ha	Plantation WC	Area under JFM
Reserved Forests.					
A. Badampahar Range					
1	Hat Badra		90.54	50.0	50.0
2	Kherna		495.72	100.0	100.0
	Range Total		586.26	150.0	150.0
B. Rairangpur Range					
3	Gorumahisani	1	270.80	20.00	20.00
		2	780.00	20.00	20.00
		3	626.00	20.00	20.00
		4	149.60	20.00	20.00
		5	249.60	20.00	20.00
		S.Total	2076.00	100.00	100.00
4	Ichinda		64.14	10.00	10.00
5	Hatibari		85.6	85.60	85.60
6	Jari	2	816	50.00	50.00
7	Kucheibudhi		211.52	60.00	60.00
8	Naskaria		96	50.00	50.00
	Range total		3349.26	355.60	355.60
C. Bahalda Range					
9	Tiring	2	366.44	160.00	160.00
10	RamgarhAsurghaty		907.06	50.00	50.00
11	Chahalapada		620.80	50.00	50.00
12	Gambharia		455.26	300.00	300.00
13	Manbir		656.52	25.00	25.00
14	Budheirana	1	1150.00	150.00	150.00
	Range Total		4156.08	735.00	735.00
	Divi. Total		8091.60	1240.60	1240.60
DPF (Demarcated Protected Forest)					
B. Rairangpur Range					
1	Betjharan – I		118.55	5.00	5.00
2	Balarampur		120.8	5.00	5.00
3	Kalatamak		29.95	5.00	5.00
4	Radho		505.86	10.00	10.00
	Range Total		775.16	25.00	25.00
C. Bahalda Range.					
5	Bhitaramda		1060.62	90.0	90.0
6	Rutughutu		20.49	10.0	10.0
	Range Total		1081.11	100.0	100.0
E. Manada Range					
7	Dhenkia		384.34	10.0	10.0



Working Plan of Rairangpur Forest division (2021-22 to 2030-31)

8	Pidhakata		335.2	30.0	30.0
	Range Total		719.54	40.0	40.0
	Divi. Total		2575.81	165.0	165.0

Table No 16.1(b) Area allotted to Plantation WC (In Ha)

Sl No	Name of Forest Block	Comp no	Area available for Management in ha	Plantation WC	Area under VFC
Village Forest					
A. Badampahar					
1	Gopalpur		3.408	3.408	3.408
2	Kaduani		8.44	8.44	8.44
3	Chingudipokhari		16.6	16.6	16.6
4	Bakedihi		2.24	2.24	2.24
5	Chulibhanga		12.46	12.46	12.46
6	Chahalapada		5.0	5.0	5.0
7	Chhanua		5.0	5.0	5.0
8	Dalki		5.0	5.0	5.0
9	Kasiabeda		25.0	25.0	25.0
10	Tirilidihi		10.0	10.0	10.0
11	Jhipabandh		7.672	7.672	7.672
12	Pechadara		13.356	13.356	13.356
13	Pandugandi		15.0	15.0	15.0
14	Dova		15.0	15.0	15.0
15	Ghodadega		10.0	10.0	10.0
16	Bargimora		10.0	10.0	10.0
	Range total		164.176	164.176	164.176
B. Rairangpur Range					
17	Kalarda		2.08	2.08	2.08
18	Sujukala		0.16	0.16	0.16
19	Haldibani		5.0	5.0	5.0
20	Neuti		7.0	7.0	7.0
	Range total		14.24	14.24	14.24
C. Bahalda Range					
21	Gambharia		2.8	2.8	2.8
22	Bhadusahi		1.408	1.408	1.408
23	Gudta		3.8	3.8	3.8
24	Jaritandi		1.54	1.54	1.54
25	Chadri		9.916	9.916	9.916
26	Surda		1.112	1.112	1.112
27	Asana		5.0	5.0	5.0
28	Kumbhirmundi		5.0	5.0	5.0
29	Dubulabeda		8.8	8.8	8.8
30	Bhaleidihi		3.96	3.96	3.96
31	Kainpur		20.0	20.0	20.0
32	Jashipur		9.948	9.948	9.948
33	Jhadgaon		1.1	1.1	1.1



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34	Gayalkata		0.28	0.28	0.28
35	Kuldiha		7.088	7.088	7.088
36	Brahmanbose		0.572	0.572	0.572
37	Pasna		9.0	9.0	9.0
38	Tarana		15.0	15.0	15.0
	Range total		106.324	106.324	106.324
D. Manada Range					
39	Dhana		1.464	1.464	1.464
	Range total		1.464	1.464	1.464
	Division Total		286.204	286.204	286.204
	G.Total (PWC)		10953.614	1691.804	1691.804

16.2.2 Abstract of area under Plantation Working Circle:

Table No 16.2 Abstract of Area under PWC.				
Range	RF	DPF	VF	Total
Badampahad	150.000	0.000	164.176	314.176
Rairangpur	355.600	25.000	14.240	394.840
Bahalda	735.000	100.000	106.324	941.324
Bisoi WL	0.000	0.000	0.000	0.000
Manada	0.000	40.000	1.464	41.464
Total	1240.600	165.000	286.204	1691.804

16.3 General characteristics of Vegetation:

The areas included from RF / DPF are devoid of vegetation. In many cases the area is infested with weeds and thorny bushes. In Village Woodlots of Social Forestry Project the main crop is Eucalyptus, Acacia and San Chakunda. The growth is good on alluvial soils but stunted on dry stony soil. About 30% have achieved a girth of 60 cm and above. The crop is scattered.

16.4 Treatment Series and JFM Area:

The area from Reserved Forests and DPF are assigned to two planting series i.e. Rairangpur Planting Series and Bahalda Planting Series. The Social Forestry Plantations are included in one Planting series i.e. Village Woodlot Planting Series. Area assigned to each planting Series is furnished below.



16.4.1 Rairangpur Planting series:

Table No 16.3: Rairangpur Planting series					
Name of Series	Range	Forest block	Compt. No	Area in Ha	
Rairangpur Planting series. (RPS)	Badampahad	Hat Badra RF		50.0	150.0
		Kherna RF		100.0	
	Rairangpur	Gorumahisani RF	1	20.00	380.60
			2	20.00	
			3	20.00	
			4	20.00	
			5	20.00	
		Ichinda RF		10.00	
		Hatibari RF		85.60	
		Jari RF	2	50.00	
		Kucheibudhi RF		60.00	
		Naskaria RF		50.00	
		Betjharan – I DPF		5.00	
		Balarampur DPF		5.00	
		KalatamakDPF		5.00	
		Radho DPF		10.00	
	Manada	Dhenkia DPF		10.0	40.0
		Pidhakata DPF		30.0	
		Total		570.60	570.60



16.4.2 Bahalda Planting Series:

Table No 16.4: Bahalda Planting series					
Name of Series	Range	Forest block	Compt. No	Area in Ha	
Bahalda Planting series (BPS)	Bahalda	Tiring RF	2	160.00	735.0
		Ramgarh Asurghaty RF		50.00	
		Chahalapada RF		50.00	
		Gambharia RF		300.00	
		Manbir RF		25.00	
		Budheirana RF	1	150.00	100.00
		Bhitaramda DPF		90.0	
		Rutughutu DPF		10.0	
		Total		835.00	835.00

16.4.3 Village Woodlot planting series:

Table No 16.5 Village Woodlot Planting Series					
Name of Planting series	Range	Sl No	Village Woodlot	Area in ha	
Village Woodlot Planting Series (VWPS)	Badampahad	1	Gopalpur	3.408	164.176
		2	Kaduani	8.44	
		3	Chingudipokhari	16.6	
		4	Bakedihi	2.24	
		5	Chulibhanga	12.46	
		6	Chahalapada	5.0	
		7	Chhanua	5.0	
		8	Dalki	5.0	
		9	Kasiabeda	25.0	
		10	Tirilidihi	10.0	
		11	Jhipabandh	7.672	
		12	Pechadara	13.356	
		13	Pandugandi	15.0	
		14	Dova	15.0	
		15	Ghodadega	10.0	
		16	Bargimora	10.0	
Village Woodlot Planting Series (VWPS)	Rairangpur	17	Kalarda	2.08	14.24
		18	Sijukala	0.16	
		19	Haldibani	5.0	



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Table No 16.5 Village Woodlot Planting Series

Name of Planting series	Range	Sl No	Village Woodlot	Area in ha	
		20	Neuti	7.0	
Village Woodlot Planting Series (VWPS)	Bahalda	21	Gambharia	2.8	106.324
		22	Bhadusahi	1.408	
		23	Gudta	3.8	
		24	Jaritandi	1.54	
		25	Chadri	9.916	
		26	Surda	1.112	
		27	Asana	5.0	
		28	Kumbhirmundi	5.0	
		29	Dubulabeda	8.8	
		30	Bhaleidihi	3.96	
		31	Kainpur	20.0	
		32	Jashipur	9.948	
		33	Jhadgaon	1.1	
		34	Gayalkata	0.28	
		35	Kuldiha	7.088	
		36	Brahmanbose	0.572	
		37	Pasna	9.0	
		38	Tarana	15.0	
	Manada	39	Dhana	1.464	1.464
			Total	286.204	286.204

16.4.4 Planting Series Abstract:

Table No 16.6 Planting Series Abstract

Sl . No	Name of Series	Area allotted in Ha
1	Rairangpur Planting series. (RPS)	570.60
2	Bahalda Planting series (BPS)	835.00
3	Village Woodlot Planting Series (VWPS)	286.204
	Total of 3 Series	1691.804

16.5 Blocks, Compartments and JFM Area:

All the areas under this Working Circle has been assigned to JFM (VSS or VFC). The same has been indicated in Table No 16.1 above.



16.6 Special Objectives of Management:

The objectives of management of this working circle are in tandem with the general objectives of this Plan. The Special Objectives are as follows.

- i) To cover the conspicuously available open space with plantations.
- ii) To enrich existing forest crop.
- iii) To bring the plantations raised here and there to a single management fold and scientifically managed to optimize the yield.
- iv) To encourage participatory management of erstwhile Social Forestry Plantations and activate the VFC.
- v) To Increase availability of Firewood and timbers in the locality and reduce pressure on forests for fuel wood and furniture wood.
- vi) To increase the crop density of forests and improve the Carbon Sequestration.
- vii) To develop a healthy usufruct benefit sharing mechanism in the villages and encourage natural resource management with a community approach method.

16.6.1 Analysis of the crop:

The existing crop on village Wood lots is of miscellaneous species. The important species are Eucalyptus, Acacia, San- Chakunda and NTFP species. The survival is above 60% in most of the cases. The average Girth is above 45 cm.

The fresh areas assigned to this Working Circle are full of weeds and bushes. It has no economic value.

16.6.2 Silvicultural System:

The Silvicultural System for fresh area is “ **Artificial Regeneration by Planting**” and the village woodlots of erstwhile Social Forestry Plantation will be managed with Silvicultural System “**Clear felling with standard followed by Artificial Regeneration**” by planting will be adopted. Wherever promising coppice shoots will be developed / come up, the same will also be retained to reduce the replanting cost. The number of standards per hectare will depend upon biotic interference, possibility of dispersal of seeds for a high forest system, fruit bearing species, having timber value at a higher girth class. The minimum number of trees prescribed for retention is 25 number and maximum 75 numbers per hectare.



16.6.3 Rotation Period:

In case of Social Forestry village woodlots no rotation period is prescribed. The crop will be clear felled during the plan period except those trees left as standard to act as seed bearing trees / mother trees. The standard trees will be removed in the next plan period considering the number retained Girth class and effectiveness to act as plus trees. In case of low survival area, the Blank areas will be planted up during this plan period. No harvesting will be taken up in such areas and in very refractory sites.

16.6.4 Harvestable Diameters:

For village woodlots of erstwhile Social forestry plantation, as clear felling with standard practice will be followed no harvestable diameter is prescribed.

16.6.5 Reduced Factors and reduced areas:

The yield from plantations will be small quantum and irregular. It will be regulated "by area only". Hence no reduced factor is prescribed in this plan.

16.6.6 Planting Cycle:

The area assigned to each Planting series will be covered within the plan period i.e. in 10 years. Hence a planting cycle of ten years will be followed.

16.6.7 Division into Planting Sections.

For convenience of planting activities distributed throughout the division, each series is divided in to 10 sections. Each section will be assigned for working in a year. The series wise distribution is furnished below.



16.6.7.1 Rairangpur Planting series. (RPS):

Table No 16.6 Rairangpur Planting series. (RPS)

Name of Series	Range		Year of Working / Planting	Forest Block	Comp. No	Area in Ha	
Rairangpur Planting series. (RPS)	Badampahad	RPS-I	2021-22	Hat Badra RF		25.0	60.00
	Rairangpur			Gorumahisani RF	2	20.0	
	Manada			Pidhakata DPF		15.00	
	Badampahad	RPS-II	2022-23	Kherna RF		25.00	60.00
	Rairangpur			Gorumahisani RF	3	20.0	
	Manada			Pidhakata DPF		15.00	
	Badampahad	RPS-III	2023-24	Kherna RF		25.00	60.00
	Rairangpur			Gorumahisani RF	4	20.0	
				Ichinda RF		10.00	
				Betjharan – I DPF		5.00	
Rairangpur Planting series. (RPS)	Badampahad	RPS-IV	2024-25	Kherna RF		25.00	70.00
	Rairangpur			Gorumahisani RF	5	20.0	
				Jari RF	2	25.00	
	Badampahad	RPS-V	2025-26	Kherna RF		25.00	60.00
	Rairangpur			Jari RF	2	25.00	
				Balarampur DPF		5.00	
				KalataamakDPF		5.00	
	Rairangpur	RPS-VI	2026-27	Hatibari RF		30.60	55.60
				Kucheibudhi RF		15.0	
				Radho DPF		10.00	
	Rairangpur	RPS-VII	2027-28	Kucheibudhi RF		15.0	55.00
				Naskaria RF		25.00	
				Hatibari RF		15.0	
	Rairangpur	RPS-VIII	2028-29	Kucheibudhi RF		30.00	50.00
				Hatibari RF		20.00	
	Rairangpur	RPS-IX	2029-30	Hatibari RF		20.00	45.00
				Naskaria RF		25.00	
	Badampahad	RPS-X	2030-31	Hat Badra RF		25.0	55.00
	Rairangpur			Gorumahisani RF	1	20.0	
	Manada			Dhenkia DPF		10.0	
				Total		570.60	570.60



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16.6.7.2 Bahalda Planting series (BPS):

Table No 16.7 Bahalda Planting series (BPS)

Name of Series	Range	Section	Year of Working / Planting	Forest Block	Com. No	Area in Ha	
Bahalda Planting series (BPS):	Bahalda	BPS-I	2021-22	Tiring RF	2	20.00	85.00
				Gambharia RF		30.00	
				Budheirana RF		20.00	
				Ramgarh Asurghaty RF		15.00	
Bahalda Planting series (BPS):	Bahalda	BPS-II	2022-23	Tiring RF	2	20.00	85.00
				Gambharia RF		30.00	
				Budheirana RF		20.00	
				Ramgarh Asurghaty RF		15.00	
	Bahalda	BPS-III	2023-24	Tiring RF	2	20.00	95.00
				Gambharia RF		30.00	
				Budheirana RF		20.00	
				Ramgarh Asurghaty RF		10.00	
				Manbir RF		15.00	
	Bahalda	BPS-IV	2024-25	Tiring RF	2	20.00	80.00
				Gambharia RF		30.00	
				Budheirana RF		20.00	
Manbir RF					10.00		
Bahalda Planting series (BPS):	Bahalda	BPS-V	2025-26	Tiring RF	2	20.00	90.00
				Gambharia RF		30.00	
				Budheirana RF		20.00	
				Bhitaramda DPF		20.00	
	Bahalda	BPS-VI	2026-27	Tiring RF	2	20.00	90.00
				Gambharia RF		30.00	
				Budheirana RF		20.00	
				Bhitaramda DPF		20.00	
Bahalda Planting series (BPS):	Bahalda	BPS-VII	2027-28	Tiring RF	2	20.00	80.00
				Gambharia RF		30.00	
				Budheirana RF		10.00	
				Bhitaramda DPF		20.00	
	Bahalda	BPS-VIII	2028-29	Gambharia RF		30.00	70.00
				Chahalapada RF		20.00	
				Bhitaramda DPF		20.00	
	Bahalda	BPS-IX	2029-30	Gambharia RF		30.00	70.00
				Chahalapada RF		30.00	
				Bhitaramda DPF		10.00	
	Bahalda	BPS-X	2030-31	Tiring RF	2	20.00	90.00
				Gambharia RF		30.00	
				Budheirana RF		20.00	
Rutughutu DPF					10.00		
Ramgarh Asurghaty RF					10.00		
				Total		835.00	835.00



16.6.7.3 Village Woodlot Planting Series (VWPS)

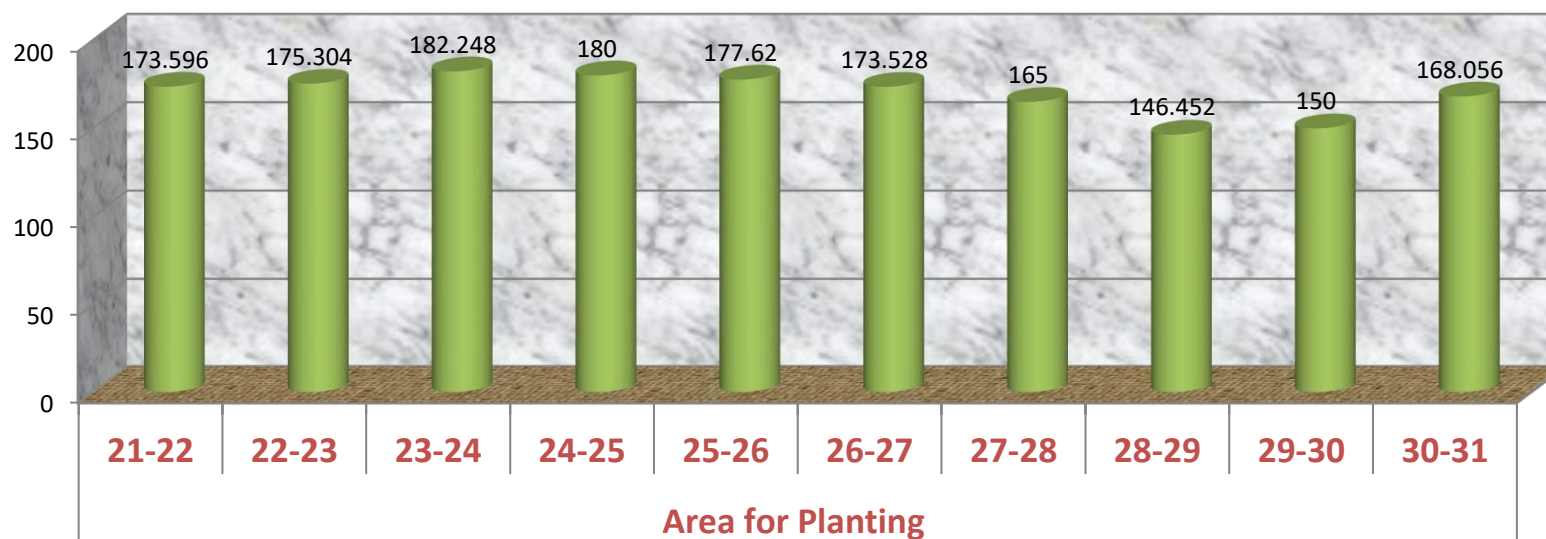
Table No 16.8 Village Wood Lot Planting series (VWPS)

Name of Series	Range	Section	Year of Working / Planting	Forest Block	Area in Ha		
Village Woodlot Planting series (VWPS):	Badampahad	VWPS-I	2021-22	Chingudipokhari	16.6	28.596	
	Rairangpur			Kalarda	2.08		
	Bahalda			Chadri	9.916		
	Badampahad	VWPS-II	2022-23	Bakedihi	2.24	30.304	
	Bahalda			Chulibhanga	12.46		
				Gudta	3.8		
				Jaritandi	1.54		
				Dubulabeda	8.8		
	Manada			Dhana	1.464		
Village Woodlot Planting series (VWPS):	Badampahad	VWPS-III	2023-24	Chahalapada	5.0	27.248	
				Chhanua	5.0		
				Dalki	5.0		
	Rairangpur			Sijukala	0.16		
	Bahalda			Haldibani	5.0		
				Kuldiha	7.088		
				Village Woodlot Planting series (VWPS):	Badampahad		VWPS-IV
Bahalda	Asana	5.0					
Badampahad	VWPS-V	2025-26	Tirilidihi		10.0	27.62	
Bahalda			Jhipabandh		7.672		
			Jashipur		9.948		
Village Woodlot Planting series (VWPS):	Badampahad	VWPS-VI	2026-27	Pechadara	13.356	27.928	
				Kumbhirmundi	5.0		
				Pasna	9.0		
				Brahmanbose	0.572		
	Village Woodlot Planting series (VWPS):	Badampahad	VWPS-VII	2027-28	Pandugandi	15.0	30.0
Bahalda		Tarana			15.0		
Badampahad		VWPS-VIII	2028-29	Ghodadega	10.0	26.452	
				Bargimora	10.0		
				Surda	1.112		
				Bhaleidihi	3.96		
				Jhadgaon	1.1		
				Gayalkata	0.28		
				Badampahad	VWPS-IX		2029-30
Bahalda		Kainpur	20.0				
Badampahad		VWPS-X	2030-31	Gopalpur	3.408	23.056	
				Kaduani	8.44		
				Gambharia	2.8		
				Bhadusahi	1.408		
				Bahalda	Neuti		7.0
			Total			286.204	286.204

16.6.7.4 Abstract of Planting Series:

Table No 16.9 Year wise abstract of area proposed for planting.

Name of P.S.	Year of assignment										Total
	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	
R.P.S	60.0	60.0	60.0	70.0	60.0	55.6	55.0	50.0	45.0	55.000	570.60
B.P.S	85.00	85.00	95.00	80.00	90.00	90.00	80.0	70.0	70.0	90.000	835.00
VWP.S	28.596	30.304	27.248	30.0	27.62	27.928	30.0	26.452	35.0	23.056	286.204
Total	173.596	175.304	182.248	180.0	177.62	173.528	165.0	146.452	150.0	168.056	1691.804



16.6.8 Calculation of the yield:

In the Rairangpur Plantation Series and Bahalda Plantation Series no yield is expected. In case of Village Wood lot Planting Series, There is harvest provision. It is expected to obtain about 10 Tons of Fire wood and 7.5 cum of timber or poles. Hence the expected yield is calculated to be 2862 Tons of Fire wood and 2146.5 Cum of timber within the plan period. The year wise yield is as follows.

Table No 16.10 Projected Yield from Village Woodlots of SFP.											
Name of P.S.	Year of assignment										Total
	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	
VWP.S	28.596	30.304	27.248	30.0	27.62	27.928	30.0	26.452	35.0	23.056	286.204
Timber (cum)	214.47	227.28	204.36	225	207.15	209.46	225	198.39	262.5	172.92	2146.53
F. Wood (Ton)	285.96	303.04	272.48	300	276.2	279.28	300	264.52	350	230.56	2862.04

16.6.9 Table of felling and Planting:

The year wise area assigned for Planting has been indicated in Table No 16.6, 16.7, 16.8 and 16.9. These tables may be referred to.

16.6.10 Method of executing the felling & planting:

16.6.10.1 Method of Executing Harvesting (Felling):

a) Consultation with VSS / VFC:

Prior to taking of Operation like demarcation, marking etc, the VSS / VFC is required to be consulted, if the area is assigned to VSS/ VFC. The process of harvesting and restocking is to be explained. The mechanism of Usufruct Sharing is to be decided and resolution to be passed to that effect. Sharing of produce either in monetary term or in kind to be specifically discussed & decided. In case of Village Forest the working cost is required to be adjusted against sale value / royalty of the produce so obtained. Voluntary contribution of labour by villagers for operations may also be examined to reduce the cost of operation. After harvesting, the planting modality is also to be discussed at length.

b) Demarcation of Area:

In case of RF / DRF, the area is to be demarcated on ground by putting RCC pillars, if the demarcating line coincides with the RF/ PRF Boundary. In other cases, putting of Stone Cairns at a visible distance will be sufficient.



In case of Village Forests, the area / boundary is not demarcated on ground. It is required to demarcate the Village Forest as notified with the help of Revenue personal in presence of VFC Members. RCC pillars of 20cm x 20cm x 120cm may be posted to keep the boundary line visible permanently. In all cases, the entire block is assigned for working in a single year; in that case only boundary line is of importance. This demarcation process is to start at least from April- May of previous year. For keeping the boundary line naturally demarcated, it is proposed to put Palm Seeds on the boundary at an interval of 5 meters which will grow to a tree within 5 years.

c) Selection of Standard Trees:

As the system to be followed is “**Clear Felling with Standard**”, it is required to mark the standards initially. The criteria for selection of standards in general are furnished below.

- Timber species of greater importance,
- Fruit bearing trees like Mango, Jack Fruit, Barkoli (Zyziphus), Palm, Cashew,
- Any Plus tree suitable for seed collection for raising plantations,
- Any trees associated with sentiments of local villagers are to be retained as standard.

The number of Standard trees per hectare shall not be less than 25 and more than 75. A list of Standard Trees to be prepared and will be a part of Compartment History File. The information may be recorded in a standard format.

Suggested format:

1. Name of Range:
2. Name of Forest Block / Coupe:
3. Area under marking in Ha:
4. Year of Marking:
5. Name of Marking Officer & Designation.

List of Standard Trees selected for retention					
Sl No	Name of Species	GBH in cm	Latitude / Longitude	Crown width in meter	Remark
				Signature of Marking Officer.	



d) Marking of trees for felling:

After selection of Standard trees, all remaining trees above 30cm GBH are marked for felling. However marking on sensitive areas, the following marking rules are to be followed.

- i) Trees near to perennial nala / river banks to a width of 40m measured from High Flood level are not to be marked.
- ii) Tree on which bird's nests is observed is to be retained.
- iii) Trees having cavity, suitable for nocturnal birds habitation up to five numbers per hectares is to be retained.
- iv) Trees on rocky surface / above 30° slope / high erosion prone area are not to be marked for felling.

Marking should be taken up by the section forester and to be checked by the Range Officer minimum up to 20% of marked trees. The marking list is to be prepared in quadruplicate in standard format with a standard estimate of timber and fire wood production. Marking is to be done in February / March of previous year to year of working.

e) Delivery of Coupes for Harvesting:

The Coupe are to be delivered to OFDC Ltd for harvesting and marketing thereof. In case the VSS is willing to participate in harvesting operation, they may be engaged by OFDC Ltd for felling / logging & conversion operation. The Coupe working may be allowed normally for nine months. Any extension of working period may be allowed as per administrative instruction / Odisha Forest Contract Rules, 1966.

The VSS may take up the harvesting operation as the yield expected will not be economical to OFDC Ltd. In that case, the removal of trees and sharing will be under supervision of Range Officer / Forest Department.

f) Felling of trees & Removal thereof:

The marked trees may be felled, converted and removed as per modern logging practices and the Odisha Timber and Other forest produce transit Rules, 1980 and up to date amendments thereof. The trees felled by axe and saw do not produce coppice shoots. As most of the species are good coppicer, it is suggested to fell the trees with axe only. Subsequent logging may be taken up by saw or as convenient to OFDC Ltd / VFC as per modern logging practices.



g) Sharing of Produce in case of VSS / VFC area:

Sharing of forest produce, in case of VSS area will be regulated as per **Para 11 of Joint Forest Management Resolution, 2011**. In case of village Forests, the sharing of forest produce will be regulated as per **Rule 9 of the Odisha Village Forest Rules, 1985**.

h) Surrender of Coupe Area:

After harvesting the marked trees and removal thereof, the Coupe area shall be surrendered by OFDC Ltd as soon as possible so as to take subsidiary silvicultural operation / planting activities on the same area. In case of harvesting by VFC, preliminary operation for planting may be taken up simultaneously.

16.6.11(a) Cleaning:

As the silvicultural system adopted is clear felling, the cleaning operation involves

- Removal of debris from the coupe and either buried under ground with a purpose to allow left over materials decompose and enrich soil organic content.
- Fell & Remove the marked trees, if not removed by the OFDC Ltd.
- Remove all weeds by cutting mechanically.
- Make the coupe area suitable for taking up plantation.

16.6.11(b) Thinning:

In the coupe area, if any advance growth is left unmarked / not removed for any consideration and the advance growth is at pole stage, it is required to take up thinning. In this case no thinning will be required as the felling cycle is ten year and clear felling with standard system is adopted.

16.6.12 Regeneration:

The area assigned for fresh plantation is to be covered up through artificial Regeneration i.e. Block Planting. The standard procedure for planting is to be followed as per Approved Cost Norm. The standard procedure is described below for general reference.

The assigned area is to be restocked through Artificial Regeneration i.e. by planting of seedlings with adequate Soil & Moisture Conservation measures.

16.6.12.1 Survey, demarcation, site preparation, alignment & stacking:

The assigned area has been well demarcated and pillars posted during coupe marking and described under **Para 16.6.10.1(b)**. In case of fresh area, the assigned area is required to be



demarcated and pillars posted. In case of Block plantation @1600 trees per hectare spacing of 2.5mx2.5m is to be adopted. The approved cost norm is to be followed.

16.6.12.2 Pitting:

The areas under consideration are mostly stony /alluvial soil. A pit size of 30cmx30cmx30cm is recommended. Though pitting is generally carried out during January-March, there is possibility of refilling of pits during pre-monsoon due to rain water. It is normally recommended to carryout pitting in March- May and allows weathering at least for one month before planting.

16.6.12.3 Choice of Species & Nursery:

It is recommended to plant species matching to the vegetation of the forest. Government has also suggested not planting Acacia, Eucalyptus, Sana Chakunda, Teak in natural forests. The species recommended are

- i) *Acacia catechu* (Khair),
- ii) *Anogeissus latifolia* (Dhaura),
- iii) *Bahunia purpuria* (Kanchan),
- iv) *Bahunia Vahilii* (Siali),
- v) *Bombax ceiba* (Simili),
- vi) *Dalbergia Sisoo* (Bali Sisoo),
- vii) *Dalbergia latifolia* (Pahadi Sisoo),
- viii) *Emblica occicinalis* (Anla),
- ix) *Erithrina indica / suberosa* (Paladhua),
- x) *Gmelina arborea* (Gamhar),
- xi) *Melia azadirachta* (maha neema),
- xii) *Samania saman* (Bada chakunda,
- xiii) *Syzygium cumini* (Jamu),
- xiv) *Terminalia belerica* (Bahada),
- xv) *Terminalia chebula* (Harida,
- xvi) *Terminalia tomentosa* (Asan)

Nursery for required species and number may be raised in permanent nursery or in a temporary nursery as convenient. The standard nursery technique found in any silviculture text or standard practices may be followed. The recommended height of seedling before planting is 60cm to 75cm in case of six month old seedlings and 100 cm in case of one year old seedlings. For seed collection & use, plus trees available in the locality or brought from known source of origin may only be utilized. Unknown source should be strictly avoided to have a better plantation.



16.6.12.4 Planting:

Planting of seedlings shall be taken up during last week of June / 1st week of July. During planting, application of Chemical fertilizer is recommended at sites away from water sources. Near water source application of FYM / Organic fertilizer is recommended. In no case chemical insecticides should be applied.

After planting following Post care is recommended.

a) Causality Replacement.

After planting, some planted seedlings may get damaged. These dead / defective seedlings are required to be replaced within 15 days of planting or as soon as possible with better seedlings.

b) Weeding & Soil Working:

After 30 days of planting, the planted seedlings start bearing new leaf. From 30 days to 45 days soil working around the plant along with application of fertilizer is recommended. Weeding around the plant i.e. patch weeding is to be taken up. In case of area with heavy weeds or grasses strip weeding proves beneficial. Number of weeding in a year may be decided as per cost norm provisions. Two weeding in 1st year is always prescribed.

c) Mulching:

In sandy / refractory soil mulching by grasses from February to June helps in retaining soil moisture. Hence it is recommended in case of sand or refractory soil with complete open areas.

d) Fire Protection / watch & ward:

Fire protection measures and watch & ward against grazing are strictly to be implemented.

16.6.12.5 Soil & Moisture Conservation:

To improve the vegetation and ensure a good plantation role of Soil & Moisture Conservation is crucial. As the selected site is mostly of degraded soil, it is recommended to have contour bonding, percolation pits, contour trenches and half moon trench in all plantations within cost norm provided. In case of eroded soil, gully plugging is also to be executed on priority.



16.6.13 Associated Regulations and Measures:

In case of plantations the plantation journal, Nursery journal is to be maintained. The details of operation, yield, year of working etc along with the photographs are to be recorded / placed in the Compartment history. Each plantation site may be given a Identification number to be maintained at Division level for ease identification.

16.6.13.1 Grazing:

The area planted is to be closed to Grazing for at least for 3 years. The VFC / VSS may be allowed to cut and take grasses from plantations to encourage stall feeding.

16.6.13.2 Map on Topo Sheet:

The planted up area is required to be marked / depicted on Survey of India topo map either 1:50000 scale of 1:25000 scale for future management and next plan preparation.

16.6.13.3 Plantation Control Form:

After completion of planting, a plantation control form is required to be submitted by the Range Officer to regulate activities as per Working Plan prescription.

Table No 16.11 Plantation Control Form No-3

Name of Planting Series	Year of Working	Area assigned in ha	No of Standard Trees marked	Quantum of Timber / F.W obtained	Area actually planted up	Reason of Deviation if any.



CHAPTER-17

WILDLIFE (OVERLAPPING) WORKING CIRCLE [W (O) WC]

17.1 Wildlife (Overlapping) Working Circle:

Wildlife is an integrated part of forest management. The National Forest Policy 1988 has emphasized the need to conserve Wild Life and their habitat. **Wildlife Conservation** is the practice of protecting wild species and their habitats in order to prevent species from going extinct. Major threats to wildlife include habitat destruction/degradation/ fragmentation, overexploitation, poaching, pollution and climate change. The IUCN estimates that 27,000 species of the ones assessed are at risk for extinction. Expanding to all existing species, a 2019 UN report on biodiversity put this estimate even higher at a million species. It's also being acknowledged that an increasing number of ecosystems on Earth containing endangered species are disappearing. To address these issues, there have been both national and international governmental efforts to preserve Earth's wildlife. Prominent conservation agreements include the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the 1992 Convention on Biological Diversity (CBD). In tandem with the National and international concern about Wildlife and its habitat protection & improvement; Wildlife (Overlapping) Working Circle has been constituted for management of Wildlife. The entire forest area (Reserved forests, PRF, DPF and PF) has been assigned to this Working Circle. This is an overlapping Working Circle. The total area assigned is **43912.680 ha**.

17.2 General Constitution:

There are 34 Reserved Forest Blocks, 39 DPF, 1 PRF and 1 PF blocks in the Division. The total area under management and included in this Plan for Management is 43912.680 ha as indicated in Table No 17.1

Table No 17.1 Forest area of Rairangpur Division assigned to Wildlife (Overlapping) Working Circle.

Name of Range	Area under				
	RF	PRF	DPF	PF	Total (In ha)
Badampahad	3950.150	0	831.360	0	4781.510
Rairangpur	7326.620	0	2697.560	0	10024.180
Bahalda	5317.190	0	1284.960	0	6602.150
Bisoi WL	10576.070	10871.25	34.65	200.0	21681.970
Manada	84.020	0	738.85	0	822.870
Division Total	27254.050	10871.25	5587.380	200.0	43912.680



The Buffer Zone of Similipal Tiger Reserve is partly coming within Bisoi WL Range. The Bidhubhandar PRF having 10871.25 ha (about 27.75% of the total forest area of the division) is included in the buffer zone of Tiger Reserve. Similipal Tiger Reserve Notification is at Annexure-XX. Similarly, Rairangpur Division constitutes a part of Mayurbhanja Elephant Reserve. The notification is at Annexure-XXI.

The entire forest area i.e. **43912.680 ha** is assigned to this Working Circle for management of wildlife and related matters.

17.3 General characteristics of Vegetation & Fauna:

17.3.1 Characteristics of Flora:

The vegetation of Rairangpur division has been broadly classified as Moist Deciduous Sal Forest and Dry Deciduous Sal Forest. The associates of Sal are Piasal, Asan, Kuruma, Arjun, Kendu etc. The crop density is mostly around 40%. It is denser towards Similipal and becoming dryer and open towards Bahalda / Tiring.

17.3.2 Characteristics of Fauna:

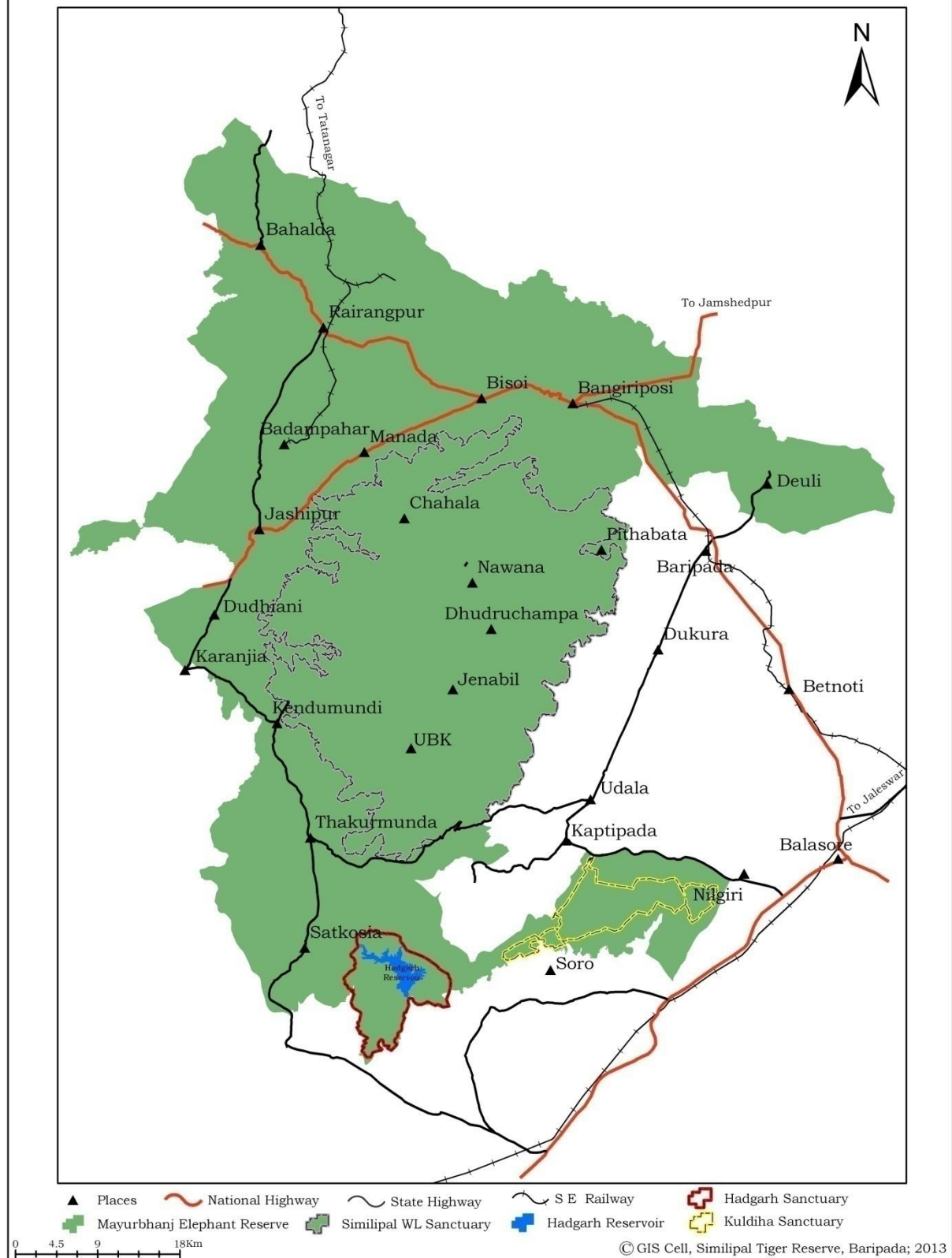
17.3.2.1 Mayurbhanja Elephant Reserve:

The Similipal-Kuldiha-Hadgarh Elephant Reserve popularly known as Mayurbhanj Elephant Reserve in the State of Orissa was notified vide Notification No.15806 dt.29.09.2001 and revised vide No.18639 dt.28.11.2001 of Forest and Environment Department, Government of Orissa comprising an area of 7043.04 km². The area includes 3 protected areas i.e. Similipal Tiger Reserve (2750.00 km²), Hadgarh Wildlife Sanctuary (191.06 km²) and Kuldiha Wildlife Sanctuary (272.75 km²). Other Reserve Forests, Protected Forests, Private land and Revenue land including agricultural land lying adjacent to the protected areas measuring 3829.93 Sq. km are included in the Reserve to form a compact area of the landscape. The entire Rairangpur Division comes within Mayurbhanja Elephant Reserve.





Mayurbhanj Elephant Reserve





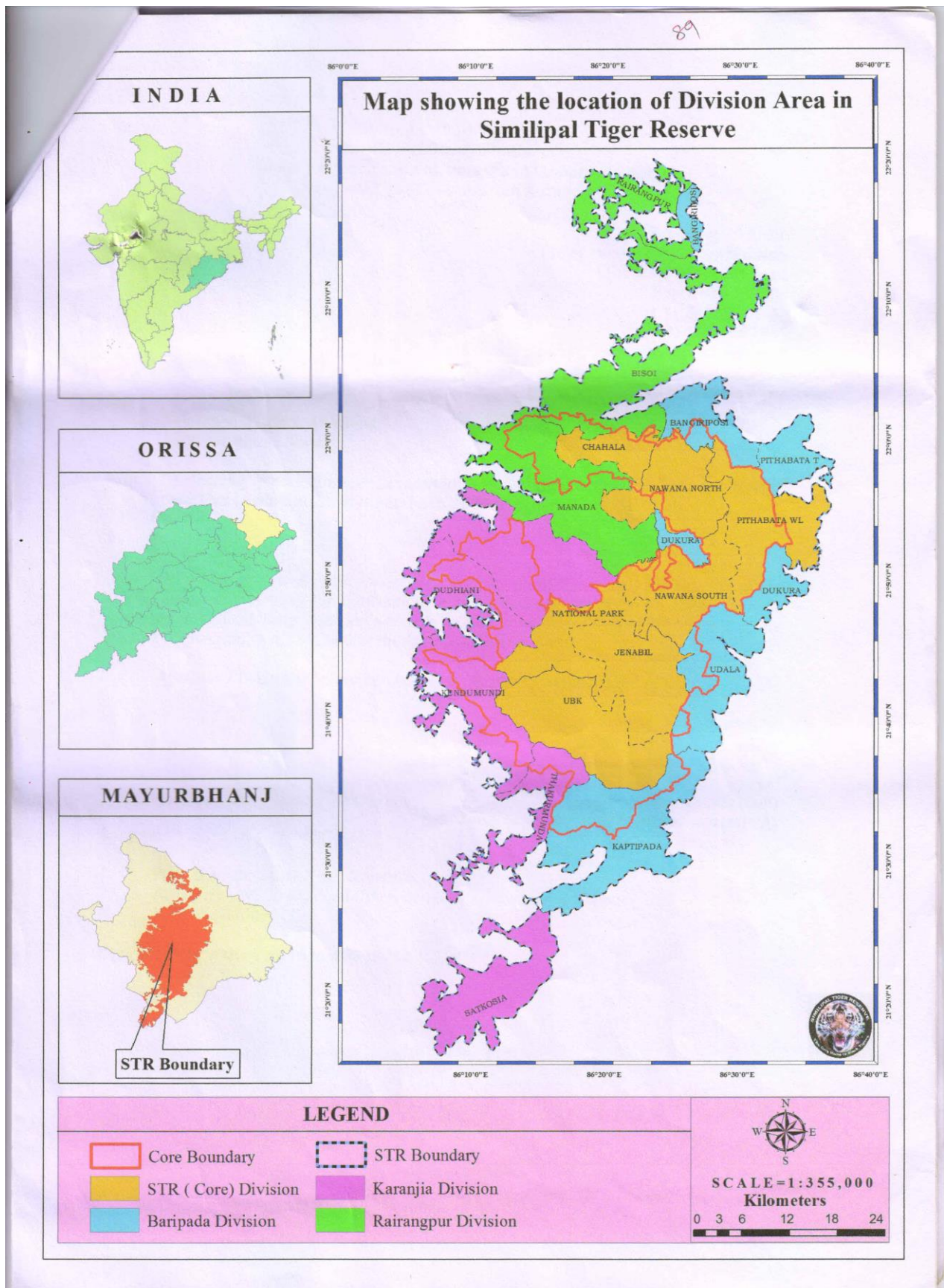
17.3.2.2 Similipal Tiger Reserve:

The Similipal Tiger Reserve is a compact block of elevated plateau located in central portion of the Mayurbhanj district and lies between 20° 17' and 22° 34' North and 85° 40' and 87° 10' East longitude. The stretch of forest including Similipal RF spread over an area of 2750 km² has been declared as 'Tiger Reserve' with effect from 04-12-1973 under 'Project Tiger' Scheme of Government of India. It has been conferred with legal status as per provisions of Section 38V of Wildlife (Conservation) Act, 1972 vide notification no. 8F(T)-9/2007/20801/ F&E dt.31st December, 2007 of Govt. of Orissa in Forest & Environment Department. The notification has clearly indicated with boundary description of Critical Tiger Habitat (Core) extending over 1194.75 km² and buffer area of 1555.25 km². There are 3 in-habitated villages inside the Critical Tiger Habitat and 65 villages in the buffer area.

Bidhubhandar PRF coming within Bisoi WL Range of this division is partly coming within the buffer zone of Similipal Tiger Reserve. (85.95 sq. km out of total 108.7125 sq. km).



Working Plan of Rairangpur Forest division (2021-22 to 2030-31)





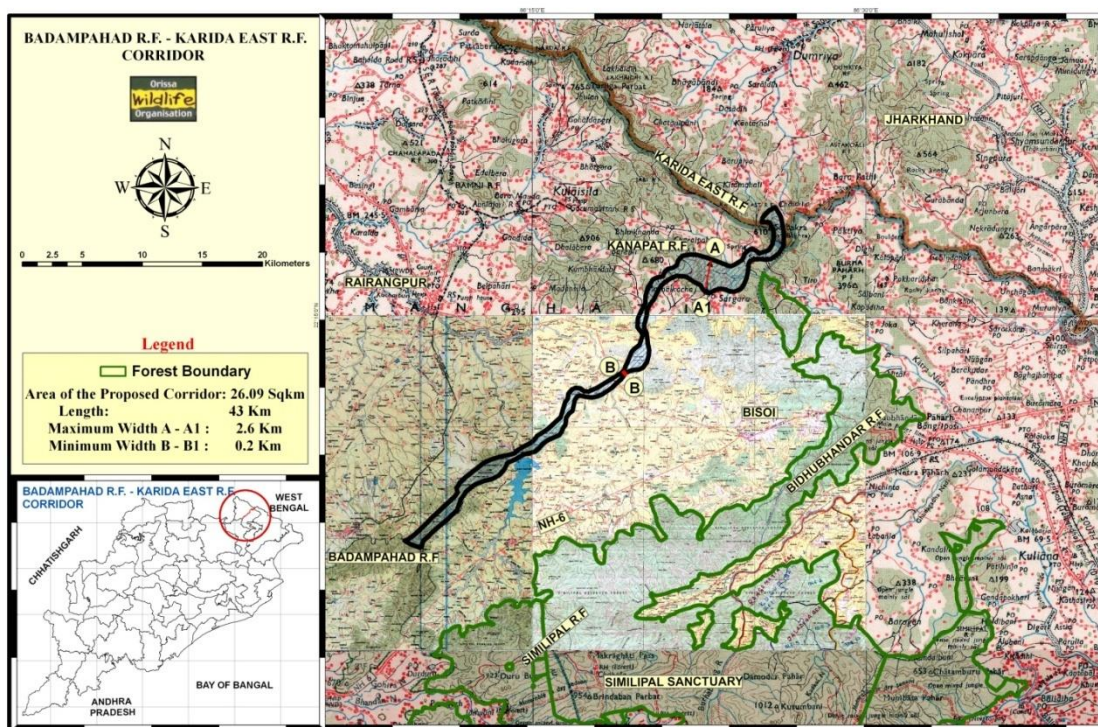
17.3.2.3 Elephant Corridors:

In the state there are 14 identified elephant corridors. Out of 14 corridors, two corridors are coming within Rairangpur Division. These are

Sl no	Name of the Corridor	Extends over Districts	Name of the Divisions	Length of corridor(km)	Width of corridor(km)	Total area(Sq.km)
1	Badampahar(Mayurbhanj)-Dhobadhobin(Jharkhand) INTERSTATE	Mayurbhanj	Karanjia, Rairangpur	16	0.5 - 1.5	24.3
2	Badampahar(Mayurbhanj)-Karida(Jharkhand) INTERSTATE	Mayurbhanj	Rairangpur	43	0.2 - 2.6	26.09

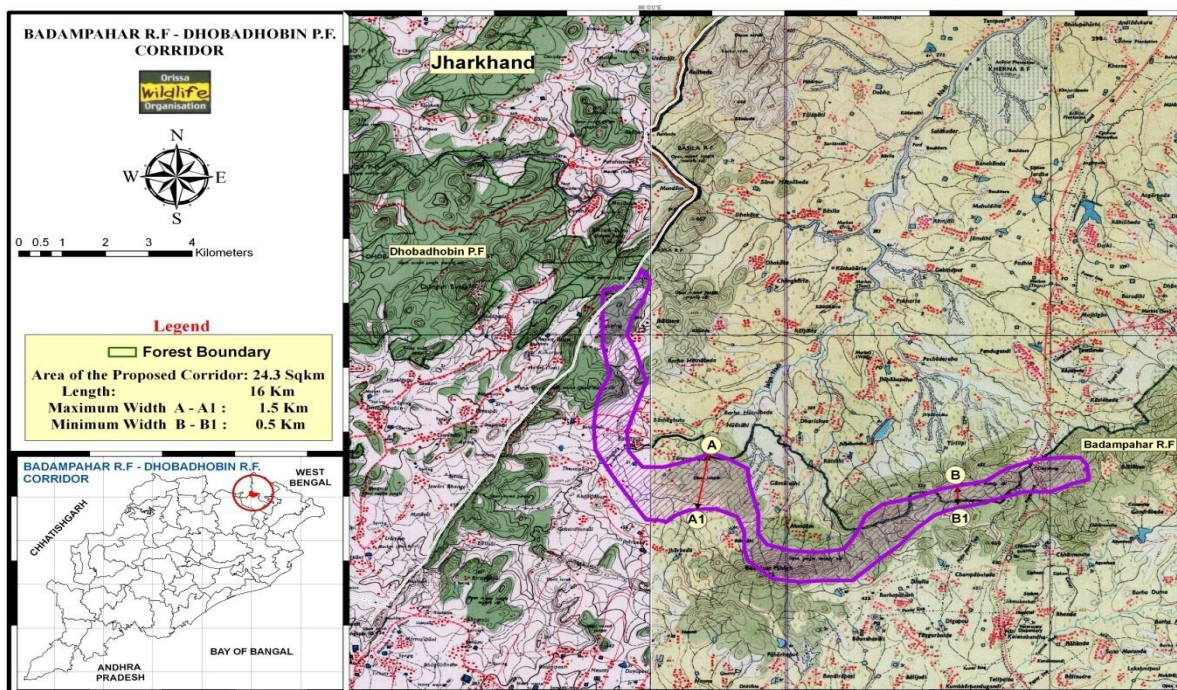
These two elephant corridors are interstate corridors linking Odisha and Jharkhand State. The total area coming under corridors is 50.39 Sq. Km

The major mammals include Tiger, Leopard, Asian Elephant, Sambar , Barking Deer, Gaur, Jungle Cat, Wild Boar, Chausingha (four horned antelope), Giant Squirrel and Common Langur. Red Jungle Fowl, Hill Mynah, Peafowl, Alexandrine Parakeet, Crested Serpent Eagle are the commonly found birds. The grey hornbill, Indian pied hornbill, Malabar pied hornbill and Indian trogon are also found in the tract.





Working Plan of Rairangpur Forest division (2021-22 to 2030-31)



17.4 Management Series:

For effective and better management point of view, the assigned area / Forest Blocks allotted to different Management unit is furnished below. The management Unit is named after the Range.

Table No 17.2 Area allotted to different Management Unit.		Graphical Presentation.	
Name of the Range	Total (In ha)		
Badampahad	4781.510	Badampahad	4781.51
Rairangpur	10024.180	Rairangpur	10024.18
Bahalda	6602.150	Bahalda	6602.15
Bisoi WL	21681.970	Bisoi WL	21681.97
Manada	822.870	Manada	822.87
Division Total	43912.680		

Though the Range is divided to Sections and Beats for administrative convenience, for management of wildlife no further sub units are prescribed.

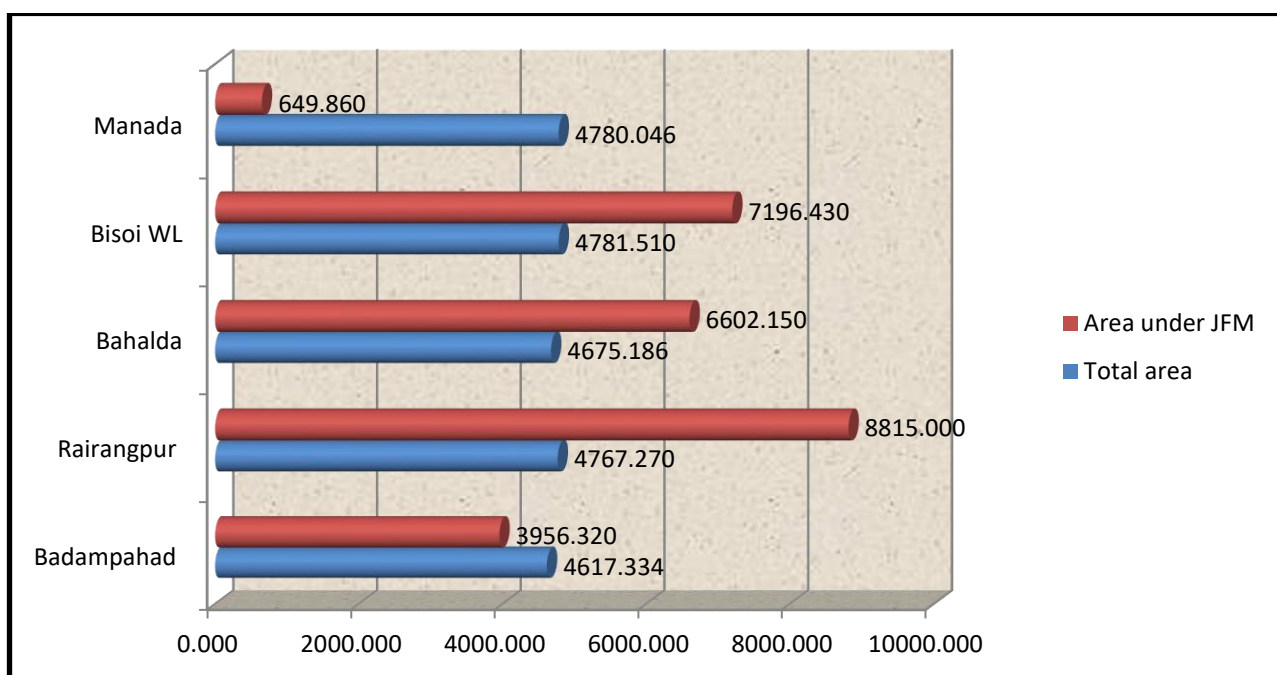


17.5 Area assigned to JFM.

The area assigned to JFM (VSS) is same as area considered under JFM (O) Working Circle. The area assigned to VSS in each range is furnished below.

Table No 17.3. Forest area assigned to JFM in Rairangpur Division.

Name of the Range	Total (In ha)	Area assigned to VSS (in Ha)	Percentage to total forest area
Badampahad	4781.510	3956.320	85.68
Rairangpur	10024.180	8815.000	184.91
Bahalda	6602.150	6602.150	141.22
Bisoi WL	21681.970	7196.430	150.51
Manada	822.870	649.860	13.60
Division Total	43912.680	27219.760	61.99



17.6 Special Objectives of Management:

The Special objectives of the management of this Working Circle are within the scope of general objectives of management. The special objectives are

- To Conserve, Protect and improve existing wild life and their habitat.
- To enhance bio-diversity and Wild Life population in the region.
- To improve the elephant corridors within the division for safe passage of elephants.



- To educate farmers to different cropping pattern within elephant corridors to minimize crop depredation.
- To involve people in management of Wildlife & associate them in preventing crime against Wild animals.
- To build up scientific knowledge on wildlife resources of the region.
- To train personnel at various levels for conservation and management of wildlife.
- Carry out research relevant to management including the development of techniques appropriate to Indian conditions especially to this locality.
- To educate people about wildlife and need for their conservation.
- To prevent sporadic and strategic crime against wild animals / birds.
- To protect Life and properties of public against animal depredation.

17.6.1 Distribution of Fauna in the Division:

Animals / birds and reptiles are observed throughout the Division. Elephant is the main species seen all over the division. The animal's concentration is more in some forest blocks as given in the Table 17.4 below.

Table No 17.4 Distribution of wild animals in the division.		
Name of the RF	Name of the Wild Animal (Mammal)	Name of the Bird
Mahubhandar RF & Tunguru RF	Bear, Spotted Deer, Barking Deer, Wild Pig, Hyena, Jackal, Indian Hare Monkey, Elephant etc.	Parakeet, Myna Coocho bird , Red Jungle fowl , Spotted Dove, Pea fowl,
Kanapat RF	Bear, Spotted Deer, Barking Deer, Wild Pig, Jackal, Indian Hare Monkey, Elephant.	
Gorumahisani RF	Bear, Deer, Barking Deer, Wild Pig, Jackal, Rabbit, Indian Hare Monkey, Elephant.	
Sarali RF	Bear, Spotted Deer, Barking Deer, Wild Pig, Hyena, Jackal, Rabbit, Indian Hare Monkey, Elephant.	
Jari RF	Bear, Spotted Deer, Barking Deer, Wild Pig, Hyena, Jackal Indian Hare, Monkey, Elephant.	
Brahamani RF	Bear, Wild Pig, Jackal, Rabbit, Monkey.	
Badampahar RF	Bear, Spotted Deer, Barking Deer, Wild Pig, Jackal, Indian Hare Monkey, Elephant.	
Budheirana RF	Bear, Barking Deer, Wild Pig, Jackal, Indian Hare Monkey, Elephant.	
Bidubhandar PRF	Bear, Spotted Deer, Barking Deer, Wild Pig, Hyena, Jackal, Indian Hare, Monkey, Leopard Elephant.	



17.6.2 Management Practices:

The general management practices involves

- a) Improvement of existing habitat and Development of new habitat for any species found in the locality. Preservation of existing wetlands.
- b) Providing a conducive and safe breeding zone for existing animals.
- c) Provide water to animals during summer.
- d) Create & maintain grass lands/ meadows.
- e) Remain vigilant against poaching of animals by live electric wire and loops.
- f) Legal action against poachers.
- g) Public education / awareness camps on wild animals.

17.6.3 Methods of Treatment:

17.6.3(i) Improvement of Habitats:

Special habitats are biological in origin and provide habitat functions for small Wild animals. They include snags, snag recruits, den trees, down wood, isolated large old trees, trees with fluting boles, buttresses, lianas, some significant species of fruit bearing trees and shrubs. These special habitats have been neglected in the past. Care should be taken while implementing the prescription of the Plan to maintain these special habitats.

a) Snags:

As a thumb rule it is required to maintain at least the 5 tallest and largest diameter snags per hectare, in a well distributed design 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 secondary hole-nesters like Hill Mynas, Indian Rollers, and Owlets etc during subsequent years.





b) Snag Recruits:

Likewise it is required to maintain 5 snag recruits per hectare. These are dying trees, mostly affected by heart rot fungus but not quite 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, birds and insects.





c) Down Wood:

Many species require or use down wood (fine and coarse woody debris) as habitat. Where forestry has been practiced for several rotations large proportions of these species are considered threatened. Key attributes determining the suitability of down wood as habitat are decay stage, tree species, and size, specifically diameter. Both quantity and distribution of suitable down wood influence species' presence and abundance.

In felling operations, among the rejects, apart from lops and tops, large size irregular shaped hollow logs often feature. Being uneconomical they usually remain on site, or are converted into fuel wood. Such large sized woody material provides critical ecological functions in support of maintenance of vegetation and animal diversity, besides serving the functions of cover and microhabitat for several species. The largest size hollow logs, or rejects for any reason need to be maintained at the rate of at least three logs per hectare, and as far as practicable evenly distributed. These should suitably find place in the compartment history.





d) Large Old Trees

Large old trees naturally occur in low densities. The Ficus species 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 retained in any felling or tending operation. These retained trees (2 to 4 number per ha) need to be entered in the compartment histories and serve as daytime roosts or nesting sites for birds, large owls of Bubo species.

e) Trees with Fluting Boles, Buttresses and Holes:

These are expected to occur in very low densities represented by a small number of species. They provide significant microhabitat functions for small mammals like the Mouse Deer and reptiles. One such trees at least, the largest possible, needs to be retained per hectare and entered on the compartment history.

f) Lianas and Tangled Climbers:

Climber cutting operation is a standard practice, which has been prescribed in all Working Circles. However lianas provide significant habitat 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, some rodents and lizards. A climber with tangles is especially important. It is recommended that woody well distributed tangled climbers all over the area may be retained & entered in the compartment histories.



g) Fruit Bearing Trees and Shrubs:

In all operations keeping fruit bearing tree species in felling or tending operations is the standard practice. Species providing fruits to local human inhabitants and Wild Life are to be retained / nursed and propagated. The information on human use is probably complete but the same cannot be said to Wild Life. The species liked by animals/ birds needs to be elaborately listed by local observation and distribution needs to be recorded.

h) Roosting or Nesting Trees:

All trees which are known to support nesting colonies of water birds or roosting congregations of raptors or other birds need to be retained. This is crucial especially with reference to vultures, which are critically endangered along with Pallas's Fishing Eagle and White-bellied Sea Eagle, which have become very rare in this tract. It helps migratory birds along Rivers / creeks etc.

i) Maintenance of Wet lands:

Wetlands are breeding grounds of reptiles, birds etc. Day by day wetlands are vanishing due to land filling / construction etc. Many wetlands are under administrative control of Revenue department. Initiative is to be taken by the forest department to map the wetlands through Satellite imagery and GPS. The list of such wetlands needs to be approved by the District administration and maintenance of such wetlands may be regulated by the Forest department. The maintenance involves

- Demarcate extent of wetland.
- Partial de-silting of wetland.
- Allow growth of submerged weeds palatable to birds to some extent.
- Allow fish fauna / snails/ crabs to breed & grow naturally.
- Prevent fishing, poaching of birds in the designated wetland.

j) Creation & Maintenance of Grass Land:

The common wildlife species available in the division are herbivorous. Day by day grass lands are reducing posing a stress time for herbivorous. It is highly required to create and maintain grass lands inside forest blocks, Village forests, river banks, near wetlands and swampy areas. This will boost the concentration of food base for herbivorous vis a vis carnivores.



k) Providing water to animals:

The forest blocks are mostly of hilly terrain and water impounding within forest area is poor. During summer, provision of water inside the forests is important. Hence creation of water holes / Water body and impounding of water through check dams is suggested.



Latitude: 22.254331
Longitude: 86.277656
Elevation: 309.44m
Accuracy: 3.8m
Time: 12-16-2019 09:57



WHS work Inside Gorumahisani Reserve Forest-2018-19.
GPS Reading-N22.2929 E86.2384
Size- 45mtr x 30mtr x 3mtr.

WATER BODY PAHADPUR OF BAHALDA RANGE



Latitude: 22.253802
Longitude: 86.00431
Elevation: 306.35m
Accuracy: 2.0m
Time: 08-05-2019 11:58



Latitude: 22.197216
Longitude: 86.417784
Elevation: 362.73m
Accuracy: 3.2m
Time: 04-10-2020 11:25
Note: kesargadia Dam Gargadi Beat, Ungaru Rf

Keshargadia Water shed
Gargadi Beat
Bisoi Wildlife Range

17.6.3 (ii) Providing Protection:

It is of paramount importance to provide adequate protection to available fauna / migratory birds and elephants/ tiger / leopard. Adequate protection measures are required. Deployment of squad, construction of watch tower and patrolling are suggested measures for protection of Wildlife.



17.6.3(iii) Improvement of Elephant Corridors:

It is required to improve the existing corridors so as to allow safe passage of animals. As large area of privately owned lands is involved or corridor lands are settled by weaker sections of society, it is not possible to displace them from the corridors. Corridors can only be strengthened only through making adequate provisions for safe guarding people's lively hood, especially in tribal dominated tracts of the division. Economic incentives or adequate financial package are necessary to persuade people to maintain wildlife friendly land use that would allow movement of elephants. Steps also to be initiated to divert the linear projects those fragment the habitat and corridors. A comprehensive Corridor management plan is required to be prepared in consultation with the villagers, wildlife experts & silviculturist. The elephant corridor management plan may focus on the basic matters outlined below.

- a) Villages within the Corridors & its population,
- b) The land use pattern with special thrust on Agricultural practices,
- c) Forest blocks and extent of area and its proportion,
- d) Liner infrastructures within the corridors & its effect on movement of elephants/ animals.
- e) Mining and other industrial growth within the corridors.
- f) Possibility of change of cropping pattern and introducing agro forestry practices.
- g) Complete tracking of elephants by squad and help modern technology, drone camera.
- h) Improve tree cover / elephant liked fodders in forest blocks coming in corridors.

17.6.3(iv) Detail study of Animal behavior& scientific Documentation:

Detail study of various animal behaviours / life cycle, reason for dwindling population and effect of increase in human interface is required in depth with a scientific approach. Periodical documentation is also stressed upon.

17.6.3(v) Creation of Public awareness & public participation in management:

For better management and co-habitation with animals, required public awareness is required. It is proposed to conduct awareness camps with villagers, School Children and other functionaries including voluntary organizations.

17.6.3 (vi) Natural Salt Lick & its Maintenance.

At present there is no Natural Salt lick in the Division. Attempt will be made to create and maintain Artificial Salt Lick for animals in probable animal concentrated area.



17.6.4 Threat to wild animals & Suggested mechanism:

The threats to wildlife have been dealt with at length in chapter-3. Some of important threats are

- a) Annual Fire and loss of Ground Flora.
- b) Heavy biotic interference and intrusion by domestic animals (Cattle/ Goat/ Sheep)
- c) Transmission of contagious diseases from domestic cattle to Wild animals.
- d) Poaching by putting nets/ loops and live electric wires.
- e) Akhanda Sikar in festive occasions like Makara Sankranti.
- f) Hunting of birds.
- g) Public irritation against elephant depredation.
- h) Fragmentation of habitat due to development of infrastructures / mining.
- i) Squeegie of Water body / wet lands.

In order to handle the situation it is proposed to

- Prevent forest fire with the help of VSS/ Public.
- Equip the forest staff with modern fire fighting tools.
- Have intelligence network deep inside the forest especially close to Sanctuary.
- Make public aware about ill effect of loss of bio diversity and loss of threatened flora and fauna.
- Enforce provisions of the Wildlife (Protection) Act, 1972.
- Take help of Wildlife Crime Control Bureau (WCCB) for investigating inter district & interstate clandestine Wildlife trade.
- Cattle immunization Programs in villages coming within buffer zone of Similipal Tiger Reserve.
- Encourage people to change to use of alternate source of energy.

17.6.5 Associated regulations and measures:

In order to combat against transmitted diseases from domestic cattle, regular cattle immunization program in forest fringe villages is required. Grazing though prohibited in forests, it could not be enforced. It can only be checked if grass land could be developed outside forest area. Further fodder farms to be established both at Govt. Land and also at private land to promote stall feeding of cattle.

The attitude of public towards wildlife is required to be moulded to a conducive and cohabitation. The mother earth is **“for all living creatures both Plant & Animals”**. This principle is to be adopted universally.



**CHAPTER-18****Non Timber Forest Produce (Overlapping) Working Circle
[NTPF (O) WC]****18.1 Non Timber Forest Produce Working Circle:**

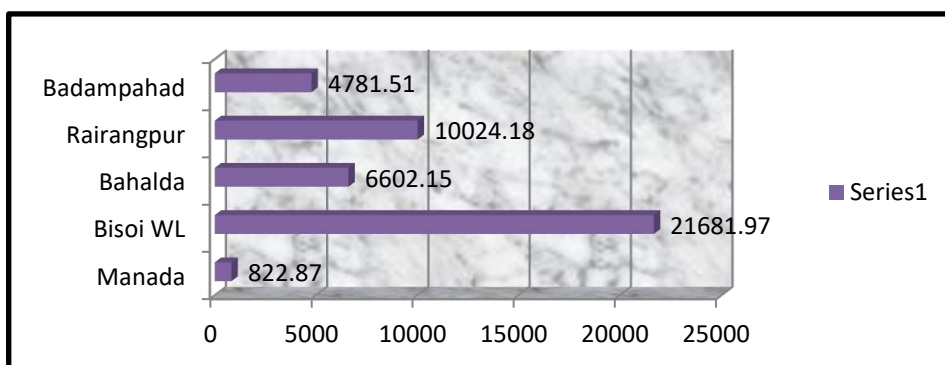
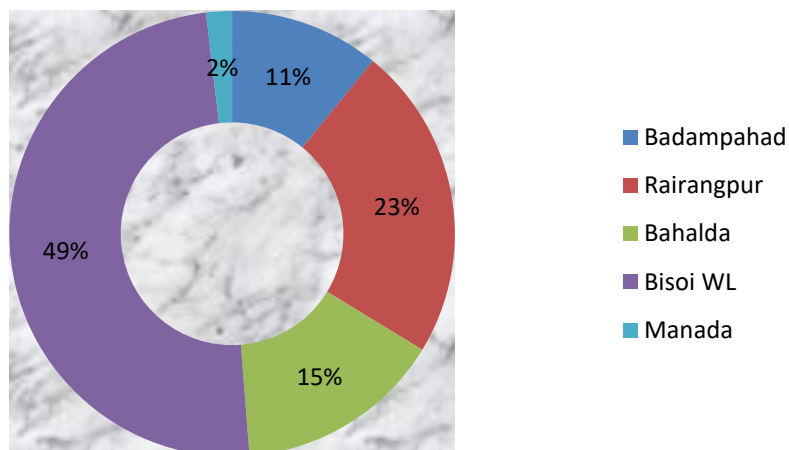
The Non Timber Forest Produces including Medicinal & Aromatic Plants are mostly seen in Similipal Hill Ranges of Mayurbhanja District. Besides this rich zone of NTFP, Mahua Flowers, Char, kendu, Kusuma, myrobalanase, Siali leaves, Kendu leaf, honey, wax, mushroom, roots barks etc are available in the division. The available Kendu leaf is being managed under Keonjhar KL Division. For management of other NTFP available in the division this **Non Timber Forest Produce (Overlapping) Working Circle [NTPF (O) WC]** has been constituted. The entire forest area excluding those of erstwhile Social Forestry Plantation has been assigned to this Working Circle. The area assigned is **43912.680 ha**.

18.2 General Constitution:

There are 34 Reserved Forest Blocks, 39 DPF, 1 PRF and 1 PF blocks in the Division. The total area under management and included in this Plan for Management is 43912.680 ha and assigned in Toto to this NTFP (O) working Circle. The area assigned is as indicated in Table No 18.1

**Table No 18.1 Forest area of Rairangpur Division & assigned to
NTPF (Overlapping) Working Circle.**

Name of Range	Area under				
	RF	PRF	DPF	PF	Total (In ha)
Badampahad	3950.150	0	831.360	0	4781.510
Rairangpur	7326.620	0	2697.560	0	10024.180
Bahalda	5317.190	0	1284.960	0	6602.150
Bisoi WL	10576.070	10871.25	34.65	200.0	21681.970
Manada	84.020	0	738.85	0	822.870
Division Total	27254.050	10871.25	5587.380	200.0	43912.680



18.3 General characteristics of Vegetation:

Non-timber forest products available inside forests of Rairangpur Division can be classified under various heads. i.e.

- (a) Fiber and flosses;
- (b) Grass, Bamboo and Canes;
- (c) Edible fruits / nuts etc;
- (d) Essential oil including those from grasses;
- (e) Medicinal & Aromatic Plants;
- (f) Tans and Dyes;
- (g) Gums and Resins;
- (h) Leaves, Fruits and Seeds.



Some of these are very useful to the local population for meeting their subsistence consumption need while other is of commercial importance. The ethno-botanical resources not only provide the three basic needs of life, i.e. food, shelter and clothing but also strengthen the economic status of the forest dwellers.

The list of important NTFP species available in the division is furnished below.

Table No 18.2 Indicative list of NTFPs found in Rairangpur Forest Division.				
Sl No.	NTFP Group	NTFP Item(s)	Main species	Part(s) Yielding NTFP
1	2	3	4	5
01	Fibres	1. Fibres	<i>Sterculia urens</i>	Bark.
			<i>Grewia tiliafolia</i>	Bark
			<i>Bauhinia vahilii</i>	Bark
			<i>Butea monosperma</i>	Roots
			<i>Caryota urens</i>	Leaves
		2.Jungle	<i>Corchorus olitorius</i>	Bark
02.	Flosses	1. Flosses	<i>Bombax ceiba</i>	Capsules.
03.	Grasses	1. Grasses	<i>Imperata cylindrica</i>	Leaves.
			<i>Eulaliopsis binata</i>	leaves
04.	Oil Seeds.	1. Oil Seeds	<i>Pongamia pinnata</i>	Seed
			<i>Madhuca indica</i>	Seed
			<i>Shorea robusta</i>	Seed
			<i>Mallotus philippinensis</i>	Seed
			<i>Melia azadirach.</i>	Seed
			<i>Schleichera oleosa.</i>	Seed
			<i>Azadrachta indica.</i>	Seed
			<i>Butea momosperma</i>	Seed
			<i>Acacia nilotica.</i>	Seed
			<i>Cassia species.</i>	Seed
			<i>Ricinus cumunis.</i>	Seed
			<i>Perila ocinoides.</i>	Seed
			<i>Wrightia tinctoria.</i>	Seed
			<i>Entadaphoseoloides</i>	Seed
05.	Tans & Dyes	1.Tans & Dyes	<i>Anogeissus latifolia</i>	Leaves
			<i>Cassia fistula</i>	Bark
			<i>Cleistanthus collinus</i>	Bark
			<i>Emblica officinalis</i>	Twigs/Bark
			<i>Peltophorum</i>	Bark
			<i>Shorea robusta</i>	Bark
			<i>Terminalia bellerica</i>	Nut
			<i>Terminalia chebula</i>	Nut
			<i>Terminalia tomentosa</i>	Bark
06.	Gums & Resins	1.Gums & Resins	<i>Anogeissus latifolia.</i>	Stem
			<i>Bauhinia retusa.</i>	Stem
			<i>Lannea coromondelica.</i>	Stem
			<i>Sterculia urens.</i>	Stem



Table No 18.2 Indicative list of NTFPs found in Rairangpur Forest Division.

			<i>Shorea robusta</i>	Stem
			<i>Boswellia serrata</i>	Stem
07.	Medicinal plants	1. Drugs	<i>Rauwolfia serpentina.</i>	Root
			<i>Alstonia scholaris.</i>	Bark
			<i>Cassia fistula.</i>	Root
			<i>Hollarhyena antidysenterica.</i>	Bark
			<i>Azadirachta indica.</i>	Seed/Leaves
			<i>Aegle marmelos.</i>	Leaves/Fruits
			<i>Emblia officinalis</i>	Root/bark/frui
08.	Fruits/ Flowers	1.Fruits	<i>Anacardium occidentale.</i>	Thalamus/seed
			<i>Bauhinia vahlii.</i>	Fruit
			<i>Buchanania lanzan.</i>	Fruit/seeds
			<i>Caryota urens.</i>	Fruit
			<i>Dillenia pentagyna.</i>	Fruit
			<i>Diospyros melanoxylon.</i>	Fruit
			<i>Emblia officinalis.</i>	Fruit
			<i>Mangifera indica.</i>	Fruit
			<i>Tamarindus indica</i>	Fruit
		2.Flowers	<i>Madhuca indica</i>	Flowers/seed
			<i>Woodfordia fruticosa</i>	Flowers
09.	Leaves	1.Leaves	<i>Diospyros melanoxylon</i>	K.L. leaves
			<i>Bauhinia vahlii</i>	Leaf plates
			<i>Shorea robusta</i>	Leaf plates.
10.	Other items	1.Hill Broom	<i>Thysanolan agrostis</i>	Panicle
		2.Shikaya	<i>Accacia concina</i>	Pod/seed
		3.Tasar	<i>Antheraea mylitta</i>	Cocoons
		4.Marking	<i>Semicarpus anacardium</i>	Fruit
		5.Arrowroot	<i>Curcuma angustifolia</i>	Roots

18.4 NTFP Collection Series and JFM Area:

The NTFP (Minor Forest produce) is being collected and regulated by *The Orissa Grama Panchayats (Minor Forest Produce Administration) Rules, 2002. (Annexure-XXII)* The forest department has only an advisory roll and has no control over collection and regulatory mechanism. Considering the legal provisions no collection series has been constituted under this Plan.

Out of the total area assigned to this working circle **24905.90 hectares** has been assigned to JFM (VSS) for Protection, management and collection of NTFP Species. As per JFM Resolution, the VSS has all the rights for collection / processing and marketing over NTFP species. The Forest Rights Act, 2005 and Rules thereof has also empowered the community to exercise the community rights. The Range wise area assigned to VSS under JFM Resolution is furnished below.

Table No 18.3 Area assigned to JFM in NTFP WC.									
Range	Reserved Forests		PRF		DPF / PF		Total (in Ha)		Percentage to Total area
	Total Area	Area Under JFM	Total Area	Area Under JFM	Total Area	Area Under JFM	Total Area	Area Under JFM	
Badampahad	3950.150	3377.860	0	0	831.360	578.460	4781.51	3956.320	85.68
Rairangpur	7326.620	6882.720	0	0	2697.560	1932.280	10024.18	8815.000	184.91
Bahalda	5317.190	5317.190	0	0	1284.960	1284.960	6602.15	6602.150	141.22
Bisoi WL	10576.070	4383.780	10871.25	2778.0	234.65	34.65	21681.97	7196.430	150.51
Manada	84.020	0.000	0	0	738.85	649.86	822.87	649.860	13.60
Division Total	27254.050	19961.550	10871.25	2778.0	5587.380	4480.210	43912.68	27219.760	61.99

18.5 Blocks, Compartments and JFM Area:

The detail list of Forest Blocks assigned to VSS under JFM Resolution is given at Chapter 13 Table No 13. 2 i.e. in Constitution of Working Circles.

18.6 Special Objectives of Management:

The special objectives of management are as follows.

- i. To educate VSS / JFM Committee and Gram panchyat about scientific collection methods of NTFP on a sustainable basis.
- ii. To educate primary collectors of NTFP about contribution of NTFP towards their livelihood and share of income from NTFP.
- iii. To educate VSS / Primary collectors about propagation of various herbs / shrubs / climbers and how to improve the stock in forest both quality and quantity.
- iv. To enhance abundance of NTFP species in forest through regulatory mechanism in non-assigned VSS areas / VSS areas.
- v. To conserve and protect the depleting natural medicinal plant resources in the forest area.
- vi. To encourage local community for ex-situ / in situ conservation of NTFP & medicinal plants through VSS.
- vii. To generate self employment and livelihood support for the forest fringe dwellers.
- viii. To develop and disseminate scientific harvesting, processing and storage techniques relating to NTFP products.
- ix. To share market information to primary gatherers.
- x. To impart training on value addition.

18.6.1 Analysis of the crop:

No systematic study has been made to assess the potentiality of NTFP species wise. However on general observation, the area is rich in Sal leaf, Siali Leaf & Fiber. , Kendu, Chara, Bahada, Harida, Anla, Kusum various barks and tubers. It is desired to have a complete study and documentation of available NTFP and MAP in the region. The availability of NTFP is in a declined trend all over the division with depletion of forest resources.

18.6.2 Silvicultural System:

No silvicultural System is prescribed for management of NTFP species found in the forests. It is proposed to manage the NTFP resource through

- Regulated collection & trading with Value addition by regular training.



- Improve growing Stock by checking biotic interference.
- In-situ & Ex-situ Conservation.

18.6.3 Collection Cycle:

The NTFP like fruits / leaves, tubers, etc are normally collected in an annual cycle depending on its maturity and requirement/ utility. Honey, wax, mushrooms are widely collected depending upon availability & season.

18.6.4 Calculation of the yield:

As collection of NTFP is regulated by Grampanchayat and local people collect as and when required basis, no record is available about quantum of produce harvested / utilized. No attempt has been made to calculate the yield potential vis a vis actual harvesting of NTFP.

Sal leaf is collected through department. The collection potential of the division is about 10000 MT. Similarly Siali leaf potential is about 20000 MT as estimated from personal experience.

18.6.4.1 Declining trend of availability& Demand.

Once upon a time Sal Seed was collected in a huge scale and being marketed to outside the state. Now due to lack of trading and utilization, Sal seed collection is virtually stopped. Market for Mahua Flowers / Cornels is in a balance state of collection as its market is stabilized. Availability of Myrobalance (Harida, Bahada and Anla is in a declined stage. Due to unscientific collection the available fruit bearing trees has declined. Similar situation is with all fruit bearing trees and its product. Striping of barks to a greater extent than that a tree can sustain has resulted death of many trees. Due to decreasing number of rainy days, the forests are marching from Moist to dryer vegetation / Forest Type. The concentration of Siali climber is reducing resulting reduction in Siali Leaves and fibres. Reduced number of Sal trees on higher girth class has also reduced production of Sal Reigns (Jhuna) which was in plenty during eighties.

NTFP Collection, Market and utilization is very fluctuating and it leads to over exploitation to no exploitation situation.

18.6.5 Collection calendar:

NTFP is seasonal and its collection depends upon ripening of fruits/ Flowering of a species, dormant stage of tubers / roots / rhizomes. Collection period of various NTFP is furnished



below. The time given may vary ± 15 days depending upon Climatic and edaphic condition of a region.

Table No 18.4 : NTFP Collection Calender

Sl No	Name of NTFP	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec
1	Sal leaf												
2	Mahula												
3	Chhatu												
4	Kusuma												
5	Saga												
6	Dantakathi												
7	Alu (Tubers)												
8	Karanja												
9	Kendu												
10	Tentuli												
11	Chara												
12	Jhuna												
13	Mahu												
14	Ambda tanku												
15	Kurkuti												
16	Sal seed												
17	Jangi												
18	Jamu												
19	Kuduchi seed												
20	Satabari												
21	Kalibahu												
22	Nimba												
23	Harida												
24	Bahada												
25	Kochila												
26	Dudhi naha												
27	Ata												
28	Ambada												
29	Amla												
30	Siali leaf												
31	Siali Chhali												
32	Kendu leaf												
33	Tasar												

18.6.6 Scientific collection Methods:

Forest degradation has affected poorer sections of the community (e.g. tribals, scheduled castes, women and other disadvantaged groups) in several ways:



1. The flow of forest products to poor households has reduced. This is not only because of deforestation, but also because of a lack of emphasis on planting usufruct-based trees that are slow to grow and are often browsable, hence difficult to protect.
2. Degradation has resulted in decreasing employment opportunities. The rural poor's food and livelihood security have both thus been adversely affected.
3. Three, the collection of NTFP is primarily the occupation of women, and they are the ones who bear the burden of increasing deforestation.

What may be the reasons for declining NTFP availability?

Many times, while collecting NTFP items, the local inhabitants do not use proper scientific method for sustainable harvesting. Setting of fire in the forest floor for collecting Sal seed, cleaning beneath Mohua trees for collecting Mohua flowers, lopping of fruit bearing branches for seeds and fruit, uprooting the plants for 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.

18.6.6.1 Leaf:

Leaf is the vital part of a plant. Photosynthesis takes place in the leaf. Hence removal of leaves reduce production of food materials for the plant. Only matured leaves can be removed if necessary. In many cases tender leaves are useful as a NTFP e.g. Sal leaf, Siali leaf, Palas leaf etc in that case leaves can be collected by plucking the leaf alone. In no case a branch can be sacrificed to collect leaf easily. In a year not more than 1/3rd of the leaf in a branch can be collected in different spell. This will not hamper the growth of the plant.

18.6.6.2 Bark:

Bark of a plant is the protecting cover against external injury and against pathogens. Removal of bark of a tree / plant exposes it to external diseases. The debarking of trees yielding bark of commercial importance, viz, Lodha, Medha, Phenfena, Arjun, Asan, and Ashok etc is to be done at least 3 feet 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 1/3rd 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. For local consumption, the barks are being collected by villagers / local baidya.

18.6.6.3 Fruits / Seeds:

Fruits and Seeds are means of propagation of most of the species. Collection of Fruits / seeds should be taken up when the fruits are matured. In no case immature fruits should be collected as the desired result / medicinal value is not obtained from an immature fruits / seeds. All fruits should not be collected as there will be no seed / fruits for further propagation. For collection of fruits / seeds, it is observed that the branches containing ripe and green fruits are cut down and carried to home for selective plucking. This is the most destructive practice being followed. The following points may be borne in mind while collecting fruits / seeds.

- Only Ripe fruits to be collected.
- No lopping of branches containing the fruits.
- Tree branches to be shaken vigorously so that ripe fruits will fall. Then it can be hand pricked.
- If the fruits are small then collect the panicle / bunch having matured fruits above 75%.
- Clean the forest floor by a broom for ease collection from ground rather setting fire to have a clean floor.
- Leave at least 1/3rd of fruits on the tree for seed dispersal by animals / birds for future regeneration.

18.6.6.4 Flowers:

Flowers of many plants are required for medicinal / Dye purpose. Dhatki, Sankha puspa (Aparajita), Palas, Ashok etc are collected. Mahua Flower is also collected in huge scale for alcohol and Cattle feed. While collecting flowers the following precautionary measures required to be taken.

- Some flowers fall freely from trees just after few hours of blooming. In such case collect the same from ground i.e. Mahul. Some mahua flowers shall be left on ground every day for wild animals.
- Some flowers remain attached to calyx for a long time. In that case, collect the flower handpicked climbing the tree.
- In cases of very small flowers, the entire inflorescence may be collected. It should be collected from the tree crown here and there not in a continuous fashion.
- Not more than 1/3rd of flowers should be removed from tree as it will mature to fruit / seed and held its propagation.



- Always remember that flower / fruits/ seeds are the future crop of the forest and its collection shall be limited leaving 2/3rd of the crop for future regeneration.

18.6.6.5 Tubers / Roots / Rhizomes:

Tubers / Roots / Rhizomes of herbs / shrubs / climbers are used for medicinal and for food purpose. Primary collectors dig out the Tubers / Roots / Rhizomes and throw the plant to die. The primary collectors shall be trained to take the lower part of the tuber. Rhizomes and top of the tuber which is used for propagation should be replanted in the same pit duly compacted to give rise a new plant for the next season. After planting, the debris are required to be removed from the site so as to save the tuber / rhizome from fire.

18.6.6.6 Gum and resin:

Now availability of Gum and resins has been reduced. Still then Sal resins are being collected in many parts of the division. While collecting gums and resins, no deep cut shall be given 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.

18.6.6.7 Honey & Wax:

Collection of Honey & Wax by tribal is an age old practice. The method adopted is very destructive and many Bee group are destroyed / killed in the process. Sometimes bee hives were torched with naked fire killing most of the bee. Honey is extracted by squeezing the entire comb by hand, which leads to accumulation of dirt in the honey. The honey collectors are required to be trained to collect honey by using slight smoke, removing the honey from the comb by using extractor. Then the comb shall be placed appropriately for use by the bee workers.

The forest fringe villagers should be educated about use of insecticides in agricultural crop and damaged caused to bee / other useful insects.

18.6.7 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. Over exploitation of seeds of various important NTFP, yielding species is to be prevented for encouraging natural regeneration. The following points may be kept in mind to improve NTFP status in forest.

- Harvest / collect NTFP items by trained local collectors. Extensive training may be organized by the department. This is the only way to save NTFP resource in forests.
- Over exploitation is to be prevented. During collection period, forest staff should remain vigilant.
- Items of NTFP and period of Collection may be displayed at vintage points and VSS members are made aware of the fact.
- VSS members may be trained and engaged to supervise collection of NTFP items by primary gatherers and guide them in the spot within the forest.
- Steps to be taken to avoid unhealthy competition for collection. This leads to premature collection, cutting of branches even felling trees for collection of fruits.
- Though collection is within the dolmen of Panchyat, the burnt is caused to the forest. The forest staff has a greater role in regulating collection in the forest through voluntary supervision, training and regeneration practices. Forest staffs should shoulder voluntary responsibility to save NTFP sustainability and tribal lively hood.
- In wildlife dominated area / Near to Similipal Tiger Reserve NTFP Collection may be reduced substantially to provide adequate food to animals.

18.6.8 Market of NTFP:

The NTFP market in India is an Oligopoly, with relatively few well-informed (and secretive) buyers and a very large number of ill-informed sellers. The limits on information from the demand side are intentional for the purpose of artificially manipulating the market price in their favor, whereas the information flow from the sellers is unintentional. Such opaque market structures are disadvantageous to the collectors and cultivators and also lead to over-harvesting of the natural resource in the absence of reliable and accurate information about market demand and price. These markets thus suffer from the following imperfections.

- Lack of proper information about the demand and supply of the products being traded.
- Lack of assured markets for the collectors and cultivators.
- Unique characters of medicinal plants and uncertainty regarding their availability, inadequate knowledge about the herbs being collected, cultivated or traded.
- Quality issues in collection of medicinal herbs and the processing of final products.



- Stakeholders not aware of intellectual property rights issues related to the medicinal plant products.
- Market barriers for new entrants in a closed market with scarce market information.
- Problems in marginal cost pricing of the medicinal herbs, i.e. with sellers unable to receive fair value.

To give a fair price to the primary gatherers, there is a pricing committee at District Level and Block Level. The Divisional Forest Officer is a member of the committee. The Committee usually fixed the price for various NTFP items commonly available and marketed in local Bazar / Hat. The price of NTFP items for Rairangpur Division as fixed for the year – is at Annexure-X.

18.6.9 Regeneration:

Regeneration of NTFP species in forests will improve quality collection. For inducing regeneration of NTFP species both In- situ conservation and ex-situ conservation is suggested.

18.6.9.1 In-situ Conservation:

The forest blocks rich in NTFP are to be improved through inclusion of NTFP Species while deciding species for planting in Rehabilitation Working Circle. Close to grazing principle suggested in RWC will improve propagation and conservation of NTFP Species.

18.6.9.2 Ex-situ Conservation:

Under Ex situ conservation it is proposed to have plantations of important NTFP species which became rare and endangered in the locality. It is proposed to cover at least 100 ha of plantation of following species in different patches of Bisoi WL Range and Manada Range. It may be taken up outside the forest area.

- a) Ashok (*Saraca indica*)
- b) Harida (*Terminalia chebula*)
- c) Anla (*Emblica officinalis*)
- d) Genduli (*Sterculia urens*)
- e) Sunari (*Cassia fistula*)

18.6.10 Associated regulations and measures:

As per **the Orissa Grama Panchayats (Minor Forest Produce Administration) Rules, 2002**, collection of most of the NTFP is vested with the Grampanchayat. The Rule is at Annexure-XXII. The provisions may be followed for all purpose relating to NTFP (Minor Forest



Produce). OFDC Ltd has its own marketing wings for NTFP. They mostly deal with Honey besides Kendu leaf, Bamboo etc. The OFDC Ltd may consider expansion of their business in other items of NTFP.

TDCCOL (Tribal Development Cooperative Corporation Ltd) is making market facilities for Arjuna Bark, Ashwagandha, Tamarind, Arrowroot etc. Their role in NTFP trading in this division needs to be enhanced.





CHAPTER-19

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE)[JFM (O) WC]

19.1 Joint Forest Management Working Circle:

19.1.1 General:

Joint Forest Management often abbreviated as **JFM** is the official and popular term in India for partnerships in forest movement involving both the state forest departments and local communities. The policies and objectives of Joint Forest Movement are detailed in the Indian comprehensive National Forest Policy of 1988 and the Joint Forest Management Guidelines of 1990 of the Government of India.

Joint forest management is concept of developing relationships between fringe forest groups and forest department on the basis of mutual trust and jointly defined roles and responsibilities for forest protection and development. Odisha remains the first state to pass the first resolution for JFM. At present, the JFM Resolution 2011 is the basis on which forests are assigned as follows.

“The forests of the State to be covered under this Resolution shall be grouped into the following two categories:

- a) Reserved Forests, Protected forests, Village forests, Revenue forests etc. Not covered under Protected Areas.
- b) Protected Areas (National Park and Sanctuaries) excluding Core Areas, and Mangrove Wetlands.

The Committee constituted for the first category of forests will be known as **Vana Surakshya Samiti (VSS)** while the Committee constituted for the second category will be known as **Eco-Development Committee (EDC)**”.

19.1.2 Salient Features of Joint Forest Management:

Joint Forest management encourages the development of partnerships between local people and forest department to manage forest resource jointly. It provides a communication structure for consultation and negotiation between forest Department and forest users and provides legalized access for the local communities to forest lands. JFM encourages local people to protect forest areas in order to prevent free grazing of livestock and to assist in preventing illegal activities by outsiders. JFM assures local people that a certain proportion of the intermediate and final harvests from forest lands will accrue to them.



19.2: General Constitution of Working Circle:

The main principle of JFM is to motivate the forest communities to protect the forest from over exploitation so that it meets the subsistence needs of the rural poor. JFM represents a significant shift in India's forest policy that balances community and government interest while remaining sensitive to local conditions, institutions and forest dependence. With this background, the JFM Resolution has outlined the category of Forests that has been assigned or to be assigned to VSS / EDC. The scope is spelled out as follows.

Area that can be assigned to VSS may be Reserved Forests, Protected forests, Village forests, Revenue forests etc. not covered under Protected Areas.

Area that can be assigned to EDC may be Protected Areas (National Park and Sanctuaries) excluding Core Areas, and Mangrove Wetlands.

At present **230 VSS** has been constituted as per JFM Resolution and functioning as such. Besides VSS constituted under JFM Resolution 1993 / 2011, there are **39 (VFC)** Village Forest Committees constituted under the Odisha Village Forest Rules, 1985 for management of 286.204 ha of Village woodlots created during Social Forestry Project. The Forests assigned to various VSS have been indicated in Chapter 13. The abstract of area assigned to VSS is furnished at Table No 19.1

Table No 19.1 Abstract of VSS									
Sl No	Range	RF		PRF		DPF		Total	
		No	Area	No	Area	No	Area	No	Area
1	Badampahar	37	3282.5			7	498.12	44	3780.62
2	Rairangpur	47	6882.72			10		57	6882.72
3	Bhalda	55	5317.19			17	1284.96	72	6602.15
4	Bisoi WL	30	4383.78	16	2525	0		46	6908.78
5	Manada	0	0		253	11	630	11	883
	Total	169	19866.19	16	2778	45	2413.08	230	25057.270
	% to total area assigned		79.28		11.09		9.63		100.00

Besides the RF, PRF, PF and DPF village forests of Social Forestry Project is being managed as per provisions of the Odisha Village Forest Rule, 1985. The range wise area assigned is also at Table -19.2



Table No 19.2 Area assigned to VFC as per Village Forest rule,1985.

Sl No	Name of Range	No of VFC	Area assigned in Ha
1	Badampahad	16	164.176
2	Rairangpur	4	14.240
3	Bahalda	18	106.324
4	Bisoi WL	0	0.000
5	Manada	1	1.464
Total		39	286.204

The total area assigned to JFM (O) WC is **25343.474** ha, which is **57.34%** of the total forest area under management.

19.3 General characteristics of Vegetation:

The forests assigned to JFM (VSS) are mostly forest fringe area and categorized as Degraded Forests. In case VSS assigned from Bidhubhandar PRF and forests of Bisoi WL range are above 40% crop density and rich in NTFP and MAP (Medicinal & Aromatic Plants).

The village forests assigned to VFC (Village Forest Committee) are all manmade forests raised in between 1985 to 1993. The crop density varies from 30% to 70% and bears a good crop mostly of Eucalyptus, Acacia, and San Chakunda i.e. mostly Fuel wood & Fodder species etc.

19.4 Felling Series / Cutting Section and JFM Area;

The JFM assigned area is an Overlapping Working Circle. The forests assigned to respective independent working Circle will be applicable. Mostly the forests are assigned to Improvement Working circle, Rehabilitation Working Circle and Plantation Working Circle.

19.5 Blocks, Compartments and JFM Area:

The area allotted to different VSS are depicted on the Management Map (Topo Map of 1:50000 Scale). The list of VSS / EDC and area assigned is furnished in Chapter 8 of this plan.

19.6 Special Objectives of Management:

The special objectives of Management of this Working Circle are as follows.

- i) To restock the degraded Forests through community participation.
- ii) To ensure protection, regeneration and management of the forest wealth through a participatory approach.



- iii) Mass Awareness campaign and motivation to the villagers is to be spread to every forest fringe village.
- iv) To make the people and Forest Department equal partners in management process.
- v) Demarcation and Survey of the area allotted under V.S.S.
- vi) Artificial regeneration in the degraded forest area is to be taken up to restore the barren and blank area.
- vii) Soil and Moisture Conservation Measures have to be adopted in the VSS assigned area and preparation of micro-plan to each VSS.
- viii) To reduce the dependency on forest, income generating activities are to be created.
- ix) The other Department involve in peoples participatory aspects like Agriculture, Horticulture, Soil Conservation, veterinary; Health, mass education etc. have to be involved to achieve all-round socio-economic development of the village.
- x) To develop VSS as an institution at local level to manage **“Natural Resource”**.
- xi) To have special thrust on **“Fringe Forest Management.”**

19.6.1 Analysis of the crop:

The Forests assigned to VSS are mostly degraded in nature except plantations under various schemes Forest Development Agency and Social Forestry Project Plantations. Crop varies from natural forest to monoculture like Eucalyptus. Crop Density also varies from 30% in case of natural forest to 70% in plantations.

19.6.2 Silvicultural System:

The VSS area is under overlapping working circle. It overlaps with Improvement Working Circle, Rehabilitation Working Circle and Plantation Working Circle. The silvicultural system prescribed to these working circles will be followed as applicable. The Micro Plan of VSS is required to be revisited after approval of this working plan so as to accommodate the prescriptions of the working plan. The overall prescription of Micro plan shall be in line of prescriptions of this working Plan. In case of any contradictory prescription in micro plan is made by any VSS, the working plan prescription will supersede the micro plan prescription.



19.6.3 Method of Execution

1. Demarcation of VSS Area:-

Demarcation of area assigned to VSS is very important task. The demarcation of area is to be done with pillar posting. It helps to give a specific identity to the VSS and to motivate them to protect and to avoid dispute between the villages. A uniform system may be adopted over the entire division while demarcating the VSS area. The Village forests of erstwhile Social Forestry Project needs special thrust as village forests have remained unattended since 2003.

2. Preparation of Micro-plan:-

Micro-plans should be prepared for each VSS irrespective of whether money for implementation is available or not. The micro-plan should be prepared keeping in view the overall prescription of the concerned Working Circle. Prescription like prescribed exploitable girth class of different species of the final harvest, specific marking rules, limiting the final yield with due emphasis conservation measures and biotic pressure etc. should be followed while preparing the micro-plan. The yield in the area assigned to the VSS should be calculated with due consideration to safeguard against erosion, illicit felling and other biotic pressure. The Plantation and Soil and Moisture Conservation Measures is to be undertaken and effort should be taken to obtain funds from different sources and while preparing the Micro-plans, PRA exercise are to be followed. Other tools like GIS and MIS can also be taken in to account. The detail process has been provided in the JFM Resolution-2011 Para -10. The same should be followed. In case of village forest, the management plan shall be prepared as per Rule 11 of the Odisha Village Forest Rule, 1985 (as amended vide F.F. and A.H. Deptt. Notification No. 27109 Dt. 17.11.1989).

3. Plantation & Choice of Species.

In many of the VSS assigned area due to protection by villagers' bamboo and other species have attend harvestable situation. After harvesting, the area may be planted up. The Choice of Species may be carefully decided to shoot the soil condition.

Whenever plantation exist in VSS allotted area, these plantation should be thinned and pruned as per requirements. (Prescription under Plantation Working Circle may be the guiding principle) Sweeping of floor of the plantations and twigs should be avoided since it affects the cycling of nutrients. Grazing and fire protection should be provided to all plantations. In natural vegetation area where crop is approaching established stage



regulated grazing may be allowed after discussion in the VSS. These prescriptions should serve as a guideline while preparing the micro-plan in these areas.

4. Incentive Schemes for the VSS

The following incentive based activities shall be introduced under the Joint Forest Management (JFM) in order to increase village participation.

- (i) **Entry Point Activities (E.P.A.)** in other words called Community Development Works (CDW) which includes small community infrastructures such as water tanks, rural roads/community halls as desired by the villagers which attract people's attention to the forest development activities. Forest/water conservation related activities as well as non-forest activities can also be selected for CDW based on the needs of each VSS. CDW shall be selected based on the Rapid Rural Appraisal (RRA)/Participatory Rural Appraisal (PRA) and incorporated in the Micro Plan prepared by the VSS. The implementers of these activities should start preferably before the plantation and other activities take place. The JFM Committee is required to collect user's fee for the assets provided by the CDW. EPAs are part of the community mobilization process taken up in the respective villages at the initial stage of project implementation. EPA will be selected in a well facilitated participation manner.
- (ii) **Income Generation Activities (I.G.A.)** shall be identified at the micro planning stage. However, the local NGOs shall be required to provide inputs with regards to the marketability potential of the goods to undertake the IGAs by Self Help Groups (SHG) existing within a VSS. It is confirmed that IGA are not restricted in the forest related activities but any potential IGA activities are to be encouraged based on the agricultural, horticultural and forestry etc. produces are concerned. The value addition in the produces may be encouraged with handholding, capacity building and market linkage supports provided by the NGOs. Each Self Help Groups (SHG) may be provided. Revolving Fund supports from JFM Committee on loan basis to undertake the Income Generation Activities. Prior to beginning of IGAs a market research will be undertaken by the group of specialists from specialized market research organization. It will look at a macro level market environment as well as field level situations in close collaboration with the NGOs assigned to the community. A final shortlist of potential options of project areas based IGAs for forest dependents and other poor communities will be assessed through the market research study for implementation to the IGAs. IGA will be implemented by the Self Help Groups through the help of Revolving Fund loans provided to the JFM Committee.



(iii) The Basic Livelihood Improvement Activities: Under such component, the fulfillment of basic human needs to make the local people capable for participating in JFM activities are to be prioritized during the micro planning process in the community. The provision of incentives to the local people towards the information dissemination on environmental protection and basic livelihood improvement activities. The following activities may be facilitated in the community on priority basis.

- a) Medical & Health Camps in convergence with the Govt. PHC/Hospitals.
- b) Prevention and Control of Vector & Water Borne Diseases.
- c) Reproductive and Child Health Care through providing seeds to VSS for kitchen garden.
- d) Non Formal Education Centres in the VSS for drop outs to school going.
- e) Promotion of Fuel Efficient Devices in convergence with OREDA.

(iv) Capacity Building Programmes: To enable VSS to manage the respective JFM areas, organizations and forests a standard JFM Management Manual in Odia will be prepared. Different trainings modules also to be prepared by the consultant agencies for imparting trainings to the JFM Committee in the following thematic areas.

- a) Maintenance and submission of records, reports and bills to forest departments at VSS level.
- b) Financial management, budgeting and book keeping.
- c) Duties and responsibilities of the General Body and Executive Body
- d) Conflict resolution mechanism.
- e) Forest protection and management arrangements.
- f) Sustainable harvesting management for different forest products.
- g) Beneficiary management within the community.
- h) Exposure trips/ exchange visits.

(v) VFDF (Village Forest Development Fund): A financial establishment is essential for the VSS activities to be sustained. Provisions of budget for EPA, Revolving Fund for Income Generation Activities and Basic Livelihood Improvement Activities should be made under the Forest Department for implementation of a scheme. VSS will contribute to a Village Forest Development Fund by raising money from user fees for the asset created under EPA, penalty for illegal actions, interest from bank savings and sales for the forest products. The budget provided



by the Forest Department for EPA, IGA & Livelihood Improvement Activities should be utilized only for the original designed objectives of a scheme while VFDF could be flexibly used according to the needs of the VSS. Provision of Corpus Fund may also be arranged under a scheme for strengthening of the JFM, VFDF. It suggested that at least 50% of the savings of the VFDF should be allocated for maintenance of the forest area after completion of the scheme.

(vi) Formulation of Micro Planning: A Micro Planning is a comprehensive document to guide the VSS in pursuing all forest management for its JFM area, community development and institutional development and other intervention under a scheme designed. The VSS will be responsible for formulation of their Micro Plan which will be assisted by the contracted NGOs/Experts and the forest division concerned. PRA for resource assessment for analysis will be conducted for this purpose. Micro Planning is vital for any JFM Committee for ensuring their participation at different levels of implementation of a scheme.

(vii) Engagement of specialized agencies for input support to JFM

1. For Micro Planning Preparation- Local NGOs
2. For capacity building of JFMC- Local NGOs
3. For IGAs- Specialized IGA Support Agencies

(viii) Training camps for VSS Members.

The JFM resolution-2011, Para-9, the role of Forest department has been defined. The role includes

- To assist in capacity building of VSS / EDC members on different aspects of forest management, planning, silviculture, nursery technology, forest laws, accounting, book keeping, micro-enterprise development, value addition and processing of NTFPs etc.
- To provide technical help to the VSS / EDCs in preparation and implementation of the Micro plan/ annual work programme.

To fulfill the responsibility in this aspect, it is recommended that the DFO, may arrange training camps for 2/3 days duration for VSS members where plantations/ Rehabilitation and harvesting operation is likely to be taken during the same year / coming year. It may be made an annual feature and included in the work schedule of the division.



19.6.4 Usufruct Sharing Mechanism:

The Joint Forest Management Resolution 2011 Para 11 elaborately deals with usufruct sharing. The Para is reproduced for immediate reference.

11. Usufruct sharing:

(i) The VSS / EDC shall be entitled to the usufructuary benefits from the assigned forests as under:—

(a) Usufructs like fallen leaves, fodder grasses, thatch grass, broom grass, fencing materials, brushwood, fallen lops, tops and twigs to be used as fuel shall be available to the members free of cost.

(b) All intermediate yields in the shape of small wood, poles, firewood etc as maybe obtained as a result of silvicultural operations and bamboo harvested in VSS / EDC assigned area shall be made available to the VSS / EDC members in a manner as may be decided by EC. If sold at a price, the funds so obtained shall be deposited in the VSS / EDC account.

(c) In case of Kendu leaves and specified forest produce other than bamboo, if any, the VSS will have the right to collect the same from the assigned forest but these items will be disposed of as per the prevailing provisions of Government and practices.

(d) While maintaining the forest cover in perpetuity, if any major harvest or final felling occurs in the assigned forest, the same shall be taken up by the forest department as per the prescription of the working plan/ duly approved micro plan. In case of natural calamities, harvesting of wind-fallen trees shall be treated as final harvest. Priority will be given to the members of the VSS /EDCfor salvaging and harvesting work. Valuation of the produce so obtained shall be done and information shared with the VSS /EDC and the produce will be sold / disposed of by the forest department or by agents of the forest department. The VSS / EDC will receive 50% share of the sale price after deduction of proportionate harvesting cost and this will be deposited in the "VSS account". The VSS may also opt for 50% of the forest produce so harvested if it is for their bona fide domestic use and they agree to pay the proportionate cost of harvesting.

(e) In case of village woodlots created and maintained by the VSS / EDC on non-forest land, all usufructs including interim and rotational harvests shall go to the VFC / VSS / EDC.

(f) In the event of a natural calamity occurring in the village there may be a demand for house building materials and other forest produce from the assigned forest. In such cases, the VFC/ VSS / EDC may go for harvesting the required quantity of timber or other forest



produce as a deviation to the Micro Plan, with due approval of the Divisional Forest Officer concerned.

(ii) The EC shall be responsible for the distribution of the usufructuary benefits equitably among the members of the VSS. Need of the group or community, who do not have any livelihood support other than depending on the forests, should be specially considered.

(iii) In cases where member/ a group of members of the VSS /EDC play a major role in the collection of intelligence, detection and seizure of illegal forest produce in transit the concerned VSS/EDC shall be entitled to the prescribed percentage of the sale price of the forest produce as per Rule 4 (3) of the Orissa Rewards for Detection of Forest Offences Rules, 2004. Such amount shall be deposited by the DFO in the "VSS account/EDC account" after disposal of the seized produce following due procedure of law.

In case of Village Forest created during Social Forestry Project, the sharing mechanism will be as per Rule -9 of the Village Forest Rule, 1985. The rule reads as follows.

"9. Sharing of Forest Produce:

(1) The beneficiaries shall on payment, as prescribed under Rule 13, be entitled to the forest produce from the village forest for their bona fide use or consumption. The beneficiaries shall obtain necessary permit under Rule 8 in case of their bona fide use or consumption. The Committee will be entitled to sell part of the forest produce for generating funds for management and regeneration of the village forests and the buyer shall obtain necessary permit under the Rule 8 for transportation of the village forest produce.

(2) The Committee shall be responsible for the proper distribution of all available forest produce from the village forest amongst the beneficiaries for their bona fide use or consumption on the basis of one equal share for each kitchen as far as possible. The Committee shall maintain a record of distribution of the forest produce and all the distributions made before a particular meeting shall be reviewed in the said meeting of the Committee.

19.6.6 Rights and Concessions:

Rights and Concessions in this Working circle shall be regulated in accordance with the provision of the relevant gazette notification of the respective forest blocks and the Government of Odisha policy with regard to JFM. Community rights as allowed under The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act,



2006 will also be honored. The provisions of the Odisha Village Forest Rule, 1985 will also be followed for allowing the rights and concession to villagers.

19.6.7 Scope of expanding JFM Working Circle:

- i. Out of 44198.884 ha of forest area under management fold, 24619.70 ha has been assigned to different JFM committee (Both VSS and VFC) which workout to be 56.35 % of the forest area. There is ample scope to increase the area under JFM. At present “**AJY -Aama Jungal Yojana**” is being implemented which provides an avenue to expand area under JFM.
- ii. There are many forested area under the administrative control of Revenue department. The JFM resolution 2011 has extended its purview to manage Revenue Forests in a **Joint Forest Management** approach. Where PRI (Panchyat Raj Institutes) are interested in management of such forests, the same may be taken for management under VSS.

19.6.8 Evaluation of Performance & Incentive:

The incentive to VSS / VFC or any other group is always drive the group in a positive direction. It encourages the villagers for better participation. The Principal Chief Conservator of Forests, Odisha Bhubaneswar has formulated a set of parameters for evaluation of performance of VSS. The Government also rewards the VSS every year either on “World Forest day” or World Environment day in state level functions. The evaluation is being carried out on ten important criteria and each point is evaluated out of 10 mark scale. The criteria’s are

- a) Extent of Forest area under effective control, Protection and management of VSS.
- b) Regularity & frequency of holding meetings of General Body and Executive committee of the VSS, proper attendance in those meetings, deliberation of vital issue and record keeping.
- c) Improved status of Forest Protection.
- d) Quality of control exercised by the VSS on day- to- day management of the forest.
- e) Resolution of conflict.
- f) Sustainable collection of NTFP.
- g) Effective preservation & control of Forest Fire.
- h) Reduction of day- to- day dependency on Forest Produce.
- i) Effectiveness in implementation of afforestation, soil moisture conservation measures and silvicultural operation.
- j) Equity and gender equity.



Similarly the Divisional Forest Officer shall under take motivation cum evaluation camps and reward the VSS / NGO/ Staffs for their contribution for Joint Forest Management.

19.6.9 Associated Regulations and Measures:

(i) The JFM area is mostly covered either plantations or degraded forest area intended to regenerate the area through Aided Natural Regeneration. Plantation area will be managed through clear felling with Standard followed by planting. During planting period till its establishment, control of Grazing is of paramount importance. In the Village Forest Rule, 1985, elaborated provisions have been made for Control of Grazing. Rule 10 of the Odisha Village Forest Rule is reproduced below for reference and guidance.

“Rule 10(1) The Committee shall regulate grazing in the village forest by alternate closing and opening of areas for such period as it may deem proper and by such methods as it may adopt:

Provided that the provisions in the Orissa Forest (Grazing of Cattle) Rules, 1980 shall, as far as possible may be adopted to regulate such grazing.

(2) The Committee shall have the power to impound the cattle that enter the village forest contrary to these rules.

(3) Pasture development and fodder cultivation in Go char lands within the limits of the village may be taken up by the Committee in accordance with schemes drawn up by the Sub-Collector or the Divisional Forest Officer, or the Soil Conservation Officer in that regard, For implementing the schemes, the Committee shall ensure that every household owning cattle has access to the benefit of the scheme.”

The same principle may be extended to the VSS area / area worked out under National Afforestation Program by Forest Development Agency. The Divisional Forest Officer shall declare the plantation area, Regeneration area closed to Grazing at least for three years from year of plantation. After third year Rotational Grazing may be allowed depending upon growth Pattern of plantations.

(ii) Auditing / accounting of VSS Account.

The accounting procedure for VSS has been well defined in the JFM Resolution. The accounts of VSS involved in FDA program, AJY are regularly maintained and audited. In case of other VSS, the Secretary of VSS shall make it a point to update the Account and get audited annually. It will increase the interest of VSS and transparency in VSS Executive Committee activities.



In VFC constituted during Social Forestry Project may not have their own account. The Secretary of VFC may open an account jointly as in line of Rule 12 of the Odisha Village Forest Rules-1985 and in line of JFM Resolution-2011 & up to date amendments.

(iii) Regular Meeting of EC/ General body:

In many VSS / VFC monthly meeting of EC and Annual Meeting of General body is found to be irregular. The Secretary of VFC / VSS shall make a point to convey / conduct regular meeting of VSS / VFC in his jurisdiction.



CHAPTER-20

TOF WORKING CIRCLE

(Tree outside the Forest Working Circle)

20.1 Tree Outside the Forest (TOF) Working Circle:

The Forest area in Rairangpur Division is about 22.21% of Geographical area. Besides the forests, under administrative control of Forest department about 152.40 Sq.KM of Revenue forests (7.61% of the Geographical area) remain outside the management purview. Plantations are being raised under various schemes like Forest Development Agency, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), Farm Forestry, Avenue Plantations etc. These Forests covered about 25% of the traditional forest area. Hence its management is of equal importance. In order to provide a management strategy for these plantations / natural forests, it is proposed to constitute **ToF Working Circle**.

20.2 General Constitution:

The TOF are integrated contribution of Plantations Raised outside the conventional Forest area by Forest Department, Horticultural plantation and other department, Plantations raised by private individuals in their fallow land and back yard, Agro Forestry practices, Avenue Plantations and Institutional Plantations.

The plantations raised during last plan period outside the Forest area are included in this Working Circle. The total area planted is 140.00 ha under other schemes. Under FDA (NAP) 120ha (40 ha – AR, 80 ha- ANR) have also been planted. Besides block plantation 281.50 RKM Avenue plantations have been taken up during last 10 years and will be covered under this Working Circle.

Under farm Forestry program 33.39 lakh seedlings have been distributed and it is estimated that 2087.06 ha area might have been planted up out of these seedlings distributed.

These three categories of Plantations will be considered for TOF management. The revenue forests though contribute to TOF, a general guideline will be prescribed for its management.

20.2.1 Plantations outside the Forest area.

Besides plantations raised within the Forest area under department control, plantations have been raised elsewhere under different schemes. All total 140.00 ha of plantations have been raised. The list of Plantation is at table No 20.1 below.



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Table No 20.1 List of Plantations Raised Outside the Forest Area.

Name of Range	Name of Planting Site	Year of Plantation	Area in Ha	Present growth Status	Survival %
Badampahar	Timitma	2011-12	20.0	Good	60
	Suliduma	2011-12	20.0	Good	58
	Badhatnabeda Revenue Land	2012-13	20.0	Good	70
	Badhatnabeda	2013-14	5.0	Good	65
	Badhatnabeda	2014-15	10.0	Good	60
	Gobindpur	2015-16	10.0	Good	62
	Bhandan Bald Hill	2019-20	5.0	Good	80
	Range Total		90.00		
Rairangpur	Badbaikala	2013-14	10.0	Good	65
	Dahanimari	2013-14	10.0	Good	72
	Mahuldiha	2015-16	20.0	Good	85
	Range Total		40.00		
Bahalda	Gayalkota	2012-13	15.0	Good	50
	Bad Narayani	2012-13	15.0	Good	56
	Maghua	2015-16	10.0	Good	52
	Range total		40.00		
	Total		170.0		



20.2.2 Plantation under FDA:

National Afforestation Program (NAP) through FDA (Forest Development Agency) is being implemented since 2002 in the division. Till date 40 ha under AR (Block Plantation) and 80 ha ANR has been taken up in the division outside the forest area. These plantations are included in this Working Circle.

Table No 20.2 Plantations under FDA taken up outside the Forest area.

Name of Range	Year of Plantation	Name of VSS	Location	AR (Block Plantation) in Ha	ANR (in Ha)
Badampahar	2004-05	Dubulabeda	Dubulabeda		40.0
Badampahar	2013-14	Badhatnabeda	Badhatnabeda	5.00	
Badampahar	2013-14	Jhipabandh	Jhipabandh	10.00	
Badampahar	2013-14	Edelbeda	Edelbeda	5.00	
Badampahar	2013-14	Thuntipani	Thuntipani	15.00	
Badampahar	2014-15	Bhuyanbasa	Bhuyanbasa		5.0
Badampahar	2014-15	Jhipabandh	Jhipabandh		5.0
Badampahar	2014-15	Thuntipani	Thuntipani		5.0
Badampahar	2014-15	Badhatnabeda	Badhatnabeda		5.0
Badampahar	2014-15	Edelbeda	Edelbeda		5.0
Badampahar	2015-16	Hatisikuli	Hatisikuli	5.00	
Badampahar	2015-16	Timtima	Timtima		10.0
Badampahar	2017-18	Rayasahi	Rayasahi		5.0
	Range Total			40.0	80.0



20.2.3 Avenue plantations:

During last plan period 281.50 RKM Avenue Plantations has been raised along 43 Roads. The location wise details are furnished in Table no 20.3

**Table No: 20.3 List of Avenue Plantations Raised during last plan period.
Rairangpur Division**

Sl No	Year	Name of Road	RKM Planted	No of Seedlings Planted.
1	2013-14	Jhaldungri to Balhadpur	10	2500
2	2013-14	Talka to Guhaldangiri	17	4250
3	2013-14	Rairangpur to Nirajan	13	3250
4	2013-14	National Highway 220	8	2000
5	2013-14	Bisoi to Madhupur	5	1250
6	2013-14	Bangriposi to Kalabadhia	5	1250
7	2014-15	Badampahar to Jhaldungri	10	2500
8	2014-15	Asanbani to Badamtalia	7	1750
9	2014-15	Balarampur to Tulasibani	23	5750
10	2014-15	Ba;Rampur to Kalsibhanga	14	3500
11	2014-15	National Highway 220	6	1500
12	2014-15	National Highway 220	4	1000
13	2014-15	Bisoi to Pokharia	10	2500
14	2015-16	Bagdega to Bhandan	4	1000
15	2015-16	Dova to Kathbharia	10	2500
16	2015-16	Neuti to Anlajodi	3	750
17	2015-16	Chadheipahadi to Bhimkanda	6	1500
18	2015-16	Bijatata to Tualsibani	8	2000
19	2015-16	Sanmarada to Shyamsundarpur	8	2000
20	2015-16	Dangapani to Bhaludihi	8	2000
21	2015-16	Chegjoda Chhak to Raghunathpur	2.5	825
22	2015-16	Chegjoda Chhak to Satpur	3	750
23	2015-16	Chengjodi to Satpuri RD Road	3	750
24	2015-16	Kulgi to Kumbirmundi RD Road	5	1250
25	2015-16	Jharadihi to Maliokedam RD Road	2	500
26	2015-16	Jharadihi Railway Phattak to Majhigaon RD Road	2	500
27	2015-16	Jharadihi to Gorumahisani RD Road	6	1500
28	2015-16	Gohira to Pasma RD Road	5	1250



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29	2015-16	Dhalpur to DumadihiRD Road	5	1250
30	2015-16	Basantpur to MatialiRD Road	5	1250
31	2015-16	Kundulia to Judia	5	1250
32	2015-16	Baunsabudi to Mangarh	5	1250
33	2015-16	Begunia to Badsialinai	4	1000
34	2016-17	Dhangdimuta toDighiabeda	4	1000
35	2016-17	Purunapani to Chuapani	4	1000
36	2016-17	Kashiabeda Chhak to Kashiabeda Village	2	500
37	2016-17	Nagalsila to Suleipat	2	500
38	2016-17	Bhuyanbasa to Bhitaramda	2	500
39	2016-17	Gorumahisani to Chhatramandal	10	2500
40	2016-17	Kuleisila to Kalimati	8	2000
41	2016-17	Jambani to Udaypur	6	1500
42	2016-17	Rakhasahi to Badadara	6	1500
43	2016-17	Badhunia-Chuakanakr Road	6	1500
		Total	281.5	70575

20.2.4 Seedling distributed under Farm Forestry:

The seedlings distributed under farm forestry during last plan period are to a tune of 33.39 lakh as detailed below.

Table No:20.4 Seedlings distributed under Farm Forestry.		
Year	Number of seedlings distributed	Area of coverage in ha. @1600 plant per ha
2010	315000	196.88
2011	250000	156.26
2012	225000	140.63
2013	425000	265.63
2014	1005500	628.44
2015	649540	405.96
2016	291750	182.34
2017	0	0
2018	0	0
2019	45500	28.44
Total	3339290	2087.06



20.3 General characteristics of Vegetation:

The plantations raised under different schemes outside the conventional Forest Area are of mixed plantation. The species planted are of fuel wood, fodder, timber, Bamboo and fruit bearing species. The plantations are just 1- 10 year age class. In case of harvesting very little bio mass will be obtained. Avenue plantations raised are surviving with a survival rate of 75%. Back yard forests created from distributed seedlings are very scattered in nature and difficult to monitor during working plan preparation period.

20.4 Treatment Series / Section and JFM Area:

170.00 ha of plantation raised from 2011-12 in all ranges. One Treatment series is prescribed i.e. Rairangpur TOF Series. For better management purpose it is sub-divided in to ten sections as follows.

Table No 20.5 Rairangpur TOF Series & Sections:

Name of Series	Range	Section	Year of treatment	Forest Block	Area in Ha	Year of Plantation
Rairangpur TOF Series	Badampahad	TOF-I	2021-22	Suliduma	20.00	2011-12
	Badampahad	TOF-II	2022-23	Badhatnabeda	20.00	2012-13
	Bahalda	TOF-III	2023-24	Gayalkota	15.00	2012-13
	Bahalda	TOF-IV	2024-25	Bad Narayani	15.00	2012-13
	Rairangpur	TOF-V	2025-26	Badbaikala	10.00	2013-14
	Badampahad			Badhatnabeda	5.00	
	Rairangpur	TOF-VI	2026-27	Dahanimari	10.00	2013-14
	Badampahad			Badhatnabeda	10.00	2014-15
	Bahalda	TOF-VII	2027-28	Maghua	10.00	2015-16
	Badampahad			Gobindpur	10.00	2015-16
	Rairangpur	TOF-VIII	2028-29	Mahuldiha (P)	10.00	2015-16
	Rairangpur	TOF-IX	2029-30	Mahuldiha (B)	10.00	2015-16
	Badampahad			Bhandan Bald hill pl.	5.00	2019-20
	Badampahad	TOF-X	2030-31	Timitma	20.00	2011-12
Total					170.00	

The Plantations raised under FDA is 120 ha (40 ha AR and 80.0 ha ANR). Another Series namely FDA Series is constituted for treatment of the plantations raised. As the area is small, it will be covered in five years cycle and revisited for improvement in the next cycle. The series is subdivided in to five sections as furnished below.



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Table No 20.6 Rairangpur FDA Series & Sections:

Name of Series	Range	Section	Year of treatment	VSS / Plantation	Area in Ha		Year of Plantation
					AR	ANR	
Rairangpur FDA Series	Badampahad	FDA- I	2021-22	Badhatnabeda	5.0		2013-14
				Jhipabandh	10.0		
	Badampahad	FDA-II	2022-23	Edelbeda	5.0		2013-14
				Thuntipani	15.0		
	Badampahad	FDA-III	2023-24	Bhuyanbasa		5.0	2014-15
				Jhipabandh		5.0	
				Thuntipani		5.0	
				Badhatnabeda		5.0	
				Edelbeda		5.0	
	Badampahad	FDA-IV	2024-25	Hatisikuli	5.0		2015-16
				Timtima		10.0	
				Rayasahi		5.0	2017-18
	Badampahad	FDA-V	2025-26	Dubulabeda		40.0	2004-05
				Series Total	40.0	80.0	
	2 nd Cycle:						
	Badampahad	FDA-I	2026-27	Badhatnabeda	5.0		2013-14
				Jhipabandh	10.0		
	Badampahad	FDA-II	2027-28	Edelbeda	5.0		2013-14
				Thuntipani	15.0		
	Badampahad	FDA-III	2028-29	Bhuyanbasa		5.0	2014-15
				Jhipabandh		5.0	
				Thuntipani		5.0	
				Badhatnabeda		5.0	
				Edelbeda		5.0	
	Badampahad	FDA-IV	2029-30	Hatisikuli	5.0		2015-16
				Timtima		10.0	
				Rayasahi		5.0	2017-18
	Badampahad	FDA-V	2030-31	Dubulabeda		40.0	2004-05
	Total			Series Total	40.0	80.0	

20.5 Blocks, Compartments and JFM Area:

All the area stated above have been assigned to the VSS of the same village.

20.6 Special Objectives of Management:

The objectives of management are varied and depending upon category of plantations the special objectives TOF management & specific objectives are furnished as follows.

General Objectives:

- i. To increase tree cover of the district through planting outside the forest land.
- ii. To increase bio mass production by planting quick growing species.



- iii. To stabilize the soil through planting.
- iv. To improve the aesthetic value along the road net work.

a) Of Avenue Plantations:

- To improve the aesthetic value of the land scape,
- To ameliorate the climate,
- To provide shade to passer-by,
- To provide habitat to birds / reptiles/ rodents.
- To add tree cover to bring the area within the standard norm i.e. 33% tree cover of the total geographical area.

b) Of Farm Forestry:

- To encourage public to have their own backyard plantation to meet their household requirement on firewood, fodder.
- To bring private land under tree planting.
- To supplement raw material availability for industries/ furniture woods.
- To make public less dependent on forests.

20.6.1 Analysis of the crop:

a) Plantations:

Plantations raised are of mixed crop / species varied from fodder species to Timber species with a long term rotation period to short term rotation period. The crop also consists of fruit bearing species with objectives to bear fruits during its entire live time. The survival is about 75-80% as a whole.

b) Avenue Plantations:

Avenue plantations have been raised with an aim of providing shed and to act as a sound barrier, catching dust from atmosphere and provide an aesthetic view. There are old trees above 30- 40 years on some roads scattered here and there. Growth varies from 3m tall to 5m tall.

c) Farm Forestry:

Plants distributed free of cost / at a nominal price. Seedlings Planted up by people in their back yard. Villages are slowly looking green. Its growth & survival not assessed.



20.6.2 Silvicultural System:

For mixed plantations and avenue plantations the silvicultural system to be adopted is **“Selection cum Improvement System”**. No system is prescribed for Farm Forestry. Its management will be regulated by set of **“General Principle.”**

20.6.3 Rotation Period:

The rotation period is variable depending upon Species available in Plantations / Avenue plantations. The species / category wise rotation period is furnished at **Table no 20.7.**

Table No 20.7 Rotation periods for Mixed Plantation.			
Sl No	Species (Category)	Rotation Period in Year	Remark
1	Timber species	40	Sisoo, Gambhar, Teak, Bada Chakunda
2	Fuel Wood / fodder	20	Acacia, San Chakunda, Radhachuda, Maha neema
3	NTFP Species	60	Karanja, Amla, Mahula, Harida, Bahada, Neema,
4	Fruit bearing species	Till fruiting continues.	Mango, Kendu, Jack fruit, Jamun,
5	Bamboo	5 year cutting Cycle after clump formation.	With SSO (Simultaneous silvicultural operation).
6	Aesthetic value	Till not a threat to live & property.	Mostly in avenue plantations.

20.6.4 Harvestable Diameters:

There are many plantations where the year of plantations could not be found out. In some cases due to poor site quality, the required growth is not achieved as projected. In both the cases the trees to be harvested basing on its growth pattern. Hence harvestable diameter for Rairangpur Division is prescribed below.



Table no 20.8 Exploitable Diameter / Girth of Selected trees.

Sl No	Species	Exploitable diameter / Girth in Cm		Remark.
		GBH	Diameter	
1	<i>Acacia auriculiformis</i> (Sunajhari)	90	29	
2	<i>Anthocephalus cadamba</i> (Kadamba)	150	48	
3	<i>Azadirachta indica</i> (Neem)	190	57	
4	<i>Bomax ceiba</i> (Simili)	150	48	
5	<i>Dalbergia latifolia</i> / Sisoo (pahadi sisoo/ bali Sisoo)	150	48	
6	<i>Gmelina arborea</i> (gambhari)	150	48	
7	<i>Melia azedarach</i> (Mahaneema)	90	29	
8	<i>Pongamia pinnata</i> (Karanja)	190	57	
9	<i>Samanea saman</i> (bada chakunda/ Siris etc)	150	48	
10	<i>Tectona grandis</i> (Teak)	140	45	
11	Fruit bearing species (Mango, Jack fruit, Tamarind, Mahula, Kendu, Char,)	As long as Fruiting continues.		

20.6.5 Reduced Factors and reduced areas:

No yield is prescribed within this plan period. Materials likely to be obtained are from thinning and other silvicultural operation only. Hence no reduced area / factor have been prescribed. In case of seedling distribution under Farm Forestry, the area under tree cover is calculated taking a plant density of 1600 plants per ha. Hence 31, 61,790 plants is equivalent to 1976.14 ha or say 1976 ha. Similarly in case of avenue plantations a plant density of 1600 plans per ha may be taken as conversion factor. During the plan period 281.50 RKM plantation have been raised which is equivalents to 70,575 seedlings. It is equated with 44.10 ha.

20.6.6 Silvicultural Treatment Cycle:

For treatment of plantations raised under Mixed plantation and Avenue plantation will be treated with in a “Treatment Cycle” of 10 years i.e. co- terminus with the Plan period.

20.6.7 Table of Treatment:

20.6.7.1: Mixed Plantations& FDA Plantations:

The mixed plantations raised within the Plan period will be treated for a better growth as per time table furnished at Para 20.4. (Table No 20.5 & 20.6)

20.6.7.2: Avenue Plantations:

The avenue plantations raised within the Plan period will be treated in a cycle of 10 years i.e. co- terminus with the Plan period. Year wise work schedule is furnished at Table no 19.7 below. The treatment Series is called Rairangpur Avenue Treatment Series (RATS)



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Table No 20.9 Work schedule for Rairangpur Avenue Treatment Series (RATS)

1	2	3	4	5	6	
Range	Treatment section	Year of Treatment	Name of Avenue Plantation	Year of Plantation	RKM Covered	
Rairangpur	RATS-I	2021-22	Rairangpur to Niranjana	2013-14	13.0	31.00
Rairangpur			National Highway 220	2013-14	8.0	
Bisoi WL			Bisoi to Madhupur	2013-14	5.0	
Bisoi WL			Bangriposi to Kalabadhia	2013-14	5.0	
Rairangpur	RATS-II	2022-23	Asanbani to Badamtalia	2014-15	7.0	30.0
Rairangpur			Balarampur to Tulasibani	2014-15	23.0	
Badampahad	RATS-III	2023-24	Badampahar to Jhaldungri	2014-15	10.0	30.0
Rairangpur			Balrampur to Kalsibhanga	2014-15	14.0	
Rairangpur			National Highway 220	2014-15	6.0	
Rairangpur	RATS-IV	2024-25	National Highway 220	2014-15	4.0	28.0
Bisoi WL			Bisoi to Pokharia	2014-15	10.0	
Badampahad			Bagdega to Bhandan	2015-16	4.0	
Badampahad			Dova to Kathbharia	2015-16	10.0	
Rairangpur	RATS-V	2025-26	Neuti to Anlajodi	2015-16	3.0	28.0
Rairangpur			Chadheipahadi to Bhimkanda	2015-16	6.0	
Rairangpur			Bijatala to Tualsibani	2015-16	8.0	
Rairangpur			Sanmarada to Shyamsundarpur	2015-16	8.0	
Bahalda			Cheggoda Chhak to Satpur	2015-16	3.0	
Rairangpur	RATS-VI	2026-27	Dangapani to Bhaludihi	2015-16	8.0	28.5
Bahalda			Cheggoda Chhak to Raghunathpur	2015-16	2.5	
Bahalda			Chengjodi to Satpuri RD Road	2015-16	3.0	
Bahalda			Kulgi to Kumbirmundi RD Road	2015-16	5.0	
Bahalda			Jharadihi to Maliokedam RD Road	2015-16	2.0	
Bahalda			Jharadihi Railway Phattak to Majhigaon RD Road	2015-16	2.0	
Bahalda			Jharadihi to Gorumahisani RD Road	2015-16	6.0	
Bahalda	RATS-VII	2027-28	Gohira to Pasma RD Road	2015-16	5.0	29.0
Bahalda			Dhalpur to Dumadihi RD Road	2015-16	5.0	



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Bahalda			Basantpur to MatialiRD Road	2015-16	5.0	
Bisoi WL			Kundulia to Judia	2015-16	5.0	
Bisoi WL			Baunsabudi to Mangarh	2015-16	5.0	
Bisoi WL			Begunia to Badsialinai	2015-16	4.0	
Badampahad	RATS-VIII	2028-29	Dhangdimuta toDighiabeda	2016-17	4.0	24.0
Badampahad			Purunapani to Chuapani	2016-17	4.0	
Badampahad			Kashiabeda Chhak to Kashiabeda Village	2016-17	2.0	
Badampahad			Nagalsila to Suleipat	2016-17	2.0	
Badampahad			Bhuyanbasa to Bhitaramda	2016-17	2.0	
Rairangpur			Gorumahisani to Chhatramandal	2016-17	10.0	
Rairangpur	RATS-IX	2029-30	Kuleisila to Kalimati	2016-17	8.0	26.0
Rairangpur			Jambani to Udaypur	2016-17	6.0	
Rairangpur			Rakhasahi to Badadara	2016-17	6.0	
Bisoi WL			Badhunja-Chuakanakr Road	2016-17	6.0	
Badampahad	RATS-X	2030-31	Jhaldungri to Balhadpur	2013-14	10.0	27
Rairangpur			Talka to Guhaldangiri	2013-14	17.0	
			Total		281.5	281.5

20.6.8 Method of Treatment:

20.6.8.1 In case of mixed Plantation& FDA:

The mixed plantations assigned to a particular year are to be treated in the following manner.

- Area to be re-demarcated and pillars posted are to be rechecked.
- The survival percentage is to be ascertained along with the growth pattern.
- Elite thinning is to be carried out. If the survival percentage is around 60% no thinning is to be taken up.
- Any substantial blank area, if created due to mortality / biotic interference etc, the same is to be planted up with the help of VSS.
- In course of protection, if natural vegetation has come up it may be recorded in the plantation journal.
- During thinning importance of natural grown species is to be kept in mind.
- If the natural vegetation is in a sapling stage, then Silvicultural cleaning is to taken up instead of thinning. (Cleaning in Sapling stage – height within 3m. Thinning in Pole crop and above i.e. GBH above 30 cms. And dead bark formation)



- The thinning materials are to be distributed among the VSS members as per JFM resolutions.

20.6.8.2 For Avenue Plantations:

Lot of Avenue plantations have been raised in the past plan period. After planting operation, no specific management practices have been set up. It is warranted to have a set of guiding principle for avenue plantation (TOF).

The avenue plantations included in this treatment series are at young stage. Considering the present condition, the following prescriptions are recommended.

- a) The avenue plantation site is to be visited and existing plants are to be recorded in the following form

Name of the Treatment Section	Name of the Road & Distance / Chainage in Km	Name of Species	Height in Meter	BGH in cm	Present Condition.	Remark / Suggestion.

- b) If any plant / tree is badly damaged and above 30cm GBH it is recommended to remove the plant and a new plant with promising growth is to be planted.
- c) Any old / hollow diseased tree likely to be fallen down in moderate wind is to be marked and enlisted. Such trees are to be jointly visited by Range Officer and any representative of PWD / NH Authority and record their suggestion on removal or retention. In case of suggestion for removal DFO is to intimate the district authority and take steps for its removal followed by planting in the assigned year.
- d) All retained plants above 30cm GBH are to be checked for hanging branches if found to be removed.
- e) The PWD / NH authority may be requested to put Radiant paints on trees at Breast Height for visibility during night.
- f) Similar exercise is recommended for other avenue plantations not included in this series.

20.6.8.3 Species suggested for Road Side Plantation.

Considering the soil characteristics, proximity to tourist sports, prone to cyclonic effect the following species are recommended for avenue plantations. It is also suggested for planting one species on both the sides over a length of 2 km to add to the beauty / aesthetic value of the road. Species suggested are



- i. Lagerstomia flosregin (Patuli),
- ii. Cassia fistula (Sunari),
- iii. Dalbergia sisoo (Sisoo),
- iv. Syzigium cumini (Jamu)
- v. Mangifera indica (Mango)
- vi. Samania saman (Bada Chakunda)
- vii. Peltodermis ferugenum (Radha Chuda)
- viii. Spathodia campanulata (Mysore Queen)
- ix. Mimosa elengi (Baula)
- x. Azadirachta indica (Neem)
- xi. Alstonia scholaris (Chatiana)
- xii. Pongamia pinnata (Karanja)

Planting of one year old promising seedlings in a block mixture than intimate mixture form is recommended.

20.6.8.4 Modalities for Farm Forestry:

Free seedlings are distributed for planting on private lands / back yard etc. It remained without follow of action. It is suggested to take up following action to evaluate the result.

- After distribution is completed by end of August, the distribution registers are to be examined to find out person those have taken more than 150 seedlings for planting.
- 10% of such cases, the person are to be located and his planting place is to be inspected by forester and technical suggestion for soil working, application of fertilizer and required suggestion is to be tendered.
- Its survival at end of December of same year is to be recorded.
- Some photographs are to be taken and album for every year is to be prepared and kept as record and for future reference.

20.6.9 Associated Regulations and Measures:

In the District / Division more waste land is available in Bahalda, Rairangpur Range. Every year atleast 150 ha of plantation outside the forest land (RF/ PRF/ PF and VF) is recommended for plantations. All out efforts is required to be made to plant outside the forest area to increase the forest cover of the district / division.





CHAPTER -21

Reduce Emissions from Deforestation and forest Degradation (REDD+)

21.1. Introduction:

REDD+ stands for countries' efforts to "Reduce Emissions from Deforestation and forest Degradation", and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks. Deforestation and forest degradation are the second leading cause of global warming, responsible for about 15% of global greenhouse gas emissions, which makes the loss and depletion of forests a major issue for climate change. In some countries, such as Brazil and Indonesia, deforestation and forest degradation together are by far the main source of national greenhouse gas emissions.

Eighty percent of the Earth's above-ground terrestrial carbon and forty percent of below-ground terrestrial carbon is in forests. In addition to the large contribution of deforestation and forest degradation to global emissions, combating both has been identified as one of the most cost-effective ways to lower emissions.

Deforestation and forest degradation are responsible for about 15% of global greenhouse gas emissions.

Currently, there appears to be a consensus that the issue of deforestation and forest degradation must be effectively tackled as it would otherwise limit the options available to reduce greenhouse gas emissions, greenhouse gas concentrations and increases in temperature to acceptable levels. Any reduction in the rate of deforestation and forest degradation has the benefit of avoiding a significant source of carbon emissions and reducing other environmental and social problems associated with deforestation.

Unlike afforestation and reforestation activities, which generally cause small annual changes in carbon stocks over long periods of time, stemming deforestation causes large changes in carbon stocks over a short period of time. Most emissions from deforestation take place rapidly, whereas carbon removal from the atmosphere through afforestation and reforestation activities is a slow process.

In addition to mitigating climate change, stopping deforestation and forest degradation and supporting sustainable forest management conserves water resources and prevents flooding,



reduces run-off, controls soil erosion, reduces river siltation, protects fisheries and investments in hydropower facilities, preserves biodiversity and preserves cultures and traditions. With all that at stake it is clear what has to happen. With all the services that forests provide both to humanity and the natural world, there is now widespread understanding of a simple yet profound fact that forests are more important left standing, than cut. Out of that understanding, the Forest Carbon Partnership Facility has come up.

Country commitments to mitigate and adapt to climate change are an integral part of the 2030 Agenda for Sustainable Development with its 17 global goals that countries have adopted to guide development efforts. The REDD+ mechanism contributes directly to achieving Sustainable Development Goals (SDGs) 13 and 15. Those address climate change, reducing deforestation and sustainable use of ecosystems. REDD+ can also contribute to achieving other SDGs – including those which address poverty reduction, health and well-being, hunger alleviation, and improving institutions.

21.2 FAO's support to countries' Nationally Determined Contributions (NDCs):

With FAO's technical support, countries can use REDD+ actions as catalysts to deliver on their Nationally Determined Contributions (NDCs) towards climate change mitigation and adaptation. Agriculture, Forestry and Other Land Use (AFOLU) are among the climate actions that most countries have included their NDCs, which underscores the important role these sectors play in climate change mitigation and adaption. Many NDCs have also made specific reference to REDD+ plans, offering an opportunity to mainstream REDD+ and climate efforts into countries' national planning processes and ultimately, actions on the ground.

21.3 REDD+ Implementation:

FAO's support to countries is based on technical expertise in assessing the drivers of deforestation and forest degradation and finding opportunities for forest carbon conservation, management and enhancement. FAO also helps countries design and implement REDD+ mitigation actions, which offer both carbon and non-carbon benefits, taking advantage of cross-sectoral expertise and building on existing experience. FAO works to strengthen collaboration with other initiatives and helps to promote public-private partnerships to scale up investments on REDD+ implementation.



21.3.1 Country highlights:

Equatorial Guinea highlights the transformational role of women in climate action. Aiming to address gender inequalities and strengthen women's contributions to the planning of national climate action, Equatorial Guinea organized a national workshop with the participation of 53 women representing various sectors and social groups. The workshop complemented an ongoing participatory process to develop the country program for the Green Climate Fund (GCF), which defines the national priorities to contribute to the global fight against climate change, and ways to translate these priorities into projects to be submitted to the GCF.

The 21st session of the Conference of the Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC) was held in Paris in November and December 2015. All together 195 participating countries negotiated and adopted the Paris Agreement, which includes objectives to peak greenhouse gas emissions as soon as possible, to limit the global average temperature increase above pre-industrial levels to well below 2°C, and to pursue efforts to limit the increase to 1.5°C.

The Paris Agreement, which entered into force on 4 November 2016, requires Parties to put forward their best efforts through "nationally determined contributions" (NDCs). These NDCs represent targets and actions for the post-2020 period. India ratified its' contribution the 2 of October 2016.

21.3.2 India's first NDC includes commitments:

Our country's commitment for "**Nationally Determined Contributions**" (NDCs) are

- To reduce the emissions intensity of its GDP by 33-35% from 2005 levels by 2030.
- To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF).
- To create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030.
- To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.

India announces its INDC, pledges to cut emission intensity of its GDP by 33-35 per cent by 2030. All countries are required to submit voluntary climate action plans as contribution. These



will form part of the outcome of Paris climate summit. India's INDC is fair, and its renewable energy and forestry targets are ambitious, says CSEAhead of the UN Conference of Parties on Climate Change, scheduled in December 2015 in Paris, India on Sunday submitted its Intended Nationally Determined Contribution (INDC) to the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC). Delhi-based non-profit Centre for Science and Environment (CSE) has called the Indian INDC "fair" and its renewable and forestry targets "ambitious".

In its INDC, India has pledged to improve the emissions intensity of its GDP by 33 to 35 per cent by 2030 below 2005 levels. It has also pledged to increase the share of non-fossil fuels-based electricity to 40 per cent by 2030. It has agreed **to enhance its forest cover which will absorb 2.5 to 3 billion tons of carbon dioxide (CO₂, the main gas responsible for global warming) by 2030.**

India has accepted the huge impact that climate change is exerting and will exert on different sectors of its economy and has agreed to enhance investments to adapt in vulnerable sectors like agriculture, water resources, coastal regions, health and disaster management.

India has also reiterated its need for international finance and technology support to meet its climate goals. In this regard, it has said it would require at least US \$ 2.5 trillion (at 2014-15 prices) to meet its climate change actions between now and 2030.

India's forestry target is also very ambitious. It intends to create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ through additional forests by 2030.

Talking about the efforts already in the pipeline, the government highlights

- India's National Solar Mission,
- Green Energy Corridor projects,
- Swatchh Bharat,
- National Air Quality Index,
- Smart Cities,
- Paramparagat Krishi Vikas Yojana,
- Soil Health Card Scheme,
- Pradhan Mantri Krishi Sinchayee Yojana,
- National Mission for Clean Ganga etc among others.



21.3.3 Indicative Work plan to combat Climate Change:

- Government harps on sustainable lifestyle to fight climate change.
- Promising raising requisite funds and adopting new technology.
- More focus on agriculture, water resources, coastal regions, and health and disaster management.
- To tackle climate change by adopting healthy and sustainable lifestyle, which were “inherent in traditions and values of conservation & moderation.
- To reduce consumerism in our lifestyle & reduce to reduce per capita consumption by not wasting food and limiting the number of durables / cars per household.
- To have ambitious focus on energy efficiency and dramatic increase in renewable energy.
- To enhance dependency on non-fossil fuel-based energy.

21.3.4 Suggestive measures on Forestry Sector.

In forestry sector to combat climate change the following activities are suggested.

- a) To reduce felling of trees in all sphere and enhance creation of renewable energy.
- b) To reduce dependency on fossil fuel including that of firewood.
- c) To enhance use of solar energy / wind energy where ever possible.
- d) To motivate people to reduce consumerism & reduce generation of solid waste.
- e) Conserve water body and enhance efficient use of water.





CHAPTER-22

APPLICATION OF MODERN TECHNOLOGY TO FOREST MANAGEMENT

22.0 Introduction:

A number of popular technologies are currently being used in the field, but Geographic Information Systems (GIS) and Global Positioning System (GPS) rank at the top. Pick up a modern smart phone and you'll see how far this technology has come in just a short period of time. For modern foresters and loggers, an array of similar handheld receivers can be used to download data gathered from GPS, which can then be input into databases that combine it with other GIS information. This data can then be added directly into spreadsheets, modeling programs, visualization applications and mapping projects. Such technology helps foresters and loggers monitor and analyze timberland health, improve transportation routing, track forest growth and maintain a database of timberland changes.

LIDAR technology (Light Detection and Ranging) is also beneficial for modern foresters, which collects tree measurements and detailed imaging. While traditional prisms are still valuable tools, LIDAR helps to measure canopy heights and volume, basal areas and habitat mapping. Drones are also proving to be increasingly valuable to foresters. While drones are still considered to be a hobbyist toy by many, forestry professionals use them to help with forest management planning, detecting disease and managing forest fires. For large properties, drones are a great device for assessing volume and the overall condition of tree plantations. Most of these tools have practical applications on the ground and in the field, which result in real-world information that cannot be replaced. However, combining this information with the detailed, customizable datasets that are available in SilvaStat360 allows foresters to apply context to the information they gather in the field so they are better equipped to make more informed decisions.

All of these technologies provide incredible benefits to the forestry industry and the pace of exciting, new technological developments continues to quicken. Members of the modern forest supply chain who embrace and utilize these technologies will be well-positioned to succeed in the modern global forest economy.

22.1 Modern Technology being adopted:

At present the Forest Officials are quite conversant with the following technology and frequently using for forest management. These are



- Use of Global Positioning System (GPS) in survey, Demarcation & locating the specified spot.
- Use of Differential Global Positioning System (DGPS) for survey of Forest blocks / area with an exact accuracy of 95% level.
- GIS applications for map study / Map preparation etc.
- Study and use of Satellite Imagery for detecting vegetation change, degradation of land / vegetation.
- Use of Satellite imagery for detection of Fire and faster communication of location of incidents.
- Clonally Propagation with mist chamber facilities for better genetically improved seedlings for plantation purpose.
- Root trainer nursery for mass seedling production.
- Use of Sprinkler for watering in Nursery.
- Use of blowers, Chemical fire extinguisher to combat Forest fire.
- Various mobile applications, Satellite telemetry, Infrared radio collars to monitor animal movement & reporting.
- Use of Bioacoustics machine, Trip alarm system, Scare away multiboring guns etc. are being used as elephant human conflict mitigation measures.

The available technology at the hands of Forester, as stated above are not used / applied in an extensive manner that is required & desirable. During this plan period it is expected that each forester in field should have access to all these facilities and use them for day to day management.

22.2 Modern Technology to be introduced in Forest Management:

With advancement of technology it is proposed to have the following facilities available with Puri Wildlife Division for better management.

- a. Identified Plus trees within the Division and maintaining a Clonal Orchard.
- b. To have improved MegaHi-techNursery with clonally propagation facilities with mist chamber, Sprinkler System.
- c. Root trainer facilities and capacity to meet requirement of Quality Planting Materials (QPM) for the division instead of depending upon temporary nursery.
- d. All forest blocks / plantations to be surveyed with DGPS and mapping thereof.
- e. Establishment of GIS Cell with available Satellite imagery for monitoring purpose at Divisional and Range level.
- f. Modern logging tools to meet emergency in **Post Cyclone Management**.



- g. Drone camera facilities to watch forest fire, wildlife movement and winter bird's congregation & problems.
- h. Use of Tranquilizing guns and drug and other rescue equipments for dealing with problematic Wild animals.
- i. Use of Red Dot Sight and Laser Range Finder.
- j. Night vision Binocular.
- k. Trap- Cameras, Mega phone with Siren, Public Portable Address Sound system.
- l. Use of VHF fixed set and Hand held set for communication.
- m. Improvement and enhancement of VHF network is suggested.





CHAPTER-23

GENERAL

23.1 General financial forecast and financial plan of operation;

Considering the prescriptions in various working circles, the activities involve & its quantum of operation with financial forecast at the present price level is furnished at Table no 23.1

Table No 23.1 Financial forecast. Rairangpur Division.

Sl No	Name of Working Circle	Suggested area of operation. In Ha	Per unit Cost norm in Lakh Rs	Total amount in Lakh Rs
1	Improvement WC	21948.980		
a	Demarcation of area	21948.980	@1.00 lakh /- per ha	21948.98
b	Removal of Dead Trees			
c	Thinning			
d	SMC			
e	Closing to Grazing & Fire Protection			
2	Rehabilitation WC			
a	RDF activities	20558.10	@Rs61000/- per ha	12540.44
b	Treatment to natural seed origin seedlings	20558.10	@Rs1000/- per ha	205.581
3	Plantation WC			
a	Replanting of VWL (VF)	286.204	@Rs2.00 Lakh	572.408
b	Fresh Plantation (new area)	1405.60	@Rs2.00 lakh	2811.20
4	NTFP(O) WC			
a	In situ conservation		LS	50.00
b	Ex- situ conservation	100.00	@2.00 lakh per ha	200.00
c	Demonstration Plot		LS	40.00
5	Wildlife (O) WC			
a	Creation of Water body	100 no	@6.00 Lakh	600.00
c	Wetland Management	2	@15.00 Lakh	30.00
d	Grass Land Development.	100 ha	@50,000/-	50.00
e	Public Awareness	50 Nos.	@35000/-	17.50
6	JFM (O) WC			
a	Training of VSS members		LS	50.00
b	Audit of VSS Account & Documentation.		LS	50.00
c	NAP		@Rs3.00 Lakh	1500.00



Working Plan of Rairangpur Forest division (2021-22 to 2030-31)

7	TOF WC			
a	Planting	1500 ha	@2.00 Lakh	3000.00
b	Avenue Plantation	281.50 RKM	@1000/- per RKM	2.815
c	Monitoring of Farm Forestry		LS	10.00
8	REDD+			
a	Reduce dependency on fossil fuel including that of firewood		LS	100.00
b	Use of solar Energy		LS	100.00
c	Public awareness		LS	50.00
9	Application of Modern Technology			
a	Plus Tree / Clone Orchard		LS	100.00
b	High tech Nursery		LS	150.00
c	GIS Cell & Drone camera		LS	40.00
			Total	44218.92

(NB: The financial requirement to implement the plan prescription is 44218.92lakhs at the present price level on an holistic approach. Basing on Wage escalation, the cost of implementation will be hiked by minimum 20% of the estimated cost.)

23.2 Source of Funding:

The division receives funds from State Plan, Central Plan, CAMPA Fund, OMBARDS, GIM, National Afforestation Program (NAP), MGNREGA etc. The level of present resource allocation is to a tune of 8.00 Crore to 10.00 Crore. Govt. is putting more thrust in plantations and rehabilitation of degraded forests. Resources to a tune of Rs40.00 crores to 45.00 crores annually will not be a constrain. Hence it is expected to implement the plan prescription in totality will not be a problem.

23.3 Miscellaneous regulations:

Besides the Working Plan Prescription various miscellaneous regulation in form Acts/ Rules / administrative directives are framed and being implemented by the Forest Department. These are

- 1) Forest (Conservation) Act, 1980;
- 2) Environment Protection Act, 1986.
- 3) Biodiversity Act, 2002.
- 4) Forest Rights Act, 2005, etc.
- 5) Wildlife (Protection) Act-1972 amended.
- 6) Odisha Forest Act- 1972 amended.



These rules / guidelines are to be followed for better management of Forest & Environment.

23.4 Petty felling and Extraction:

Petty Felling and extraction for research and training needs may be allowed by Divisional Forest Officer on academic interest. It is necessary to emphasize the fact that experimental, preservation and sample plot, seed stand and their demarcated surrounds, etc. are excluded from all operations prescribed in the working plan. Special grants in exceptional circumstances for maintenance of these may be allowed, which do not cause much deviation.

23.5 Rights and Concessions:

At present Rights & Concessions those are allowed are

- i) Right of Way on Forest Blocks,
- ii) Collection of Non Timber Forest Produce as admissible in JFM Resolution-2011
- iii) Rights on Forest land either individual or Community to be allowed as per provisions of Forest Rights Act, 2005 / Rules, 2006

No other rights & concessions are allowed at this stage.

23.6 Other research and Bio Diversity study.

It is proposed to have a detail Biodiversity Study for Forest blocks coming within buffer zone of Similipal Tiger Reserve, Development plan for Elephant Corridors and assessment of NTFP in Rairangpur Division.

Some suggested Research proposals-

1. Regional Changes in Species richness and diversity.
2. Study of Prey base density with respect of tiger habitat.
3. Study on ethno botany and Traditional knowledge of indigenous people.
4. Monitoring population of flag ship species and other endangered species.
5. Identification of Wildlife corridors and management strategies.
6. Floral diversity of Rairangpur Division.
7. Bird diversity of Rairangpur Division.
8. Survey of roosting sites of bats in Rairangpur Division.
9. Status and extent of Human- Elephant conflict in Rairangpur Division.





CHAPTER-24

SUMMARY OF PRESCRIPTION

24.1 Summary of Prescription:

The forests of Rairangpur consists of Reserve forests, Demarcated Protected Forests, Proposed Reserved Forests, Protected Forest and Village forests declared under the provisions of Odisha Forest Act, 1972. The total Forest area under management of this plan is 44198.884 ha (441.98 sq.km). Considering the condition of forests, growth pattern, it is suggested to manage the forests under three independent working circles i.e. Improvement Working Circle, Rehabilitation Working Circle and Plantation working circle. Besides these independent working circles, three overlapping working circles have been prescribed for overall management of wildlife, Non Timber Forest Produce and Participatory Forest Management under JFM.

There are forests created on revenue land to increase the tree cover under various plans and schemes. In order to provide a better management to these tree cover, TOF Working Circle has been constituted. The area assigned to each working circle is furnished below.

- i. Improvement Working Circle – (Area- 21948.98 ha)
- ii. Rehabilitation Working Circle – (Area assigned – 20558.10 Ha)
- iii. Plantation Working Circle – (Area assigned- 1691.804Ha)
- iv. Wildlife (Overlapping) Working Circle- (Area assigned – 43912.680 Ha)
- v. Non Timber Forest Produce (Overlapping) Working Circle- (Area assigned- 43912.680 Ha).
- vi. Joint Forest Management (Overlapping) Working Circle. (Area assigned – 25343.474ha.
- vii. TOF Working Circle (Area assigned - 290.0 ha and 281.50 RKM avenue plantation.)

The prescriptions for each working circle are furnished below to have a bird's eye view of the suggested prescriptions to improve the forest crop.

24.2 Improvement Working Circle:

24.2.1 Silvicultural System prescribed:

The crop is mostly of young poles. No harvest is expected from this Working Circle. It is to recover the forest from effects of over exploitation during past era. The Silvicultural System **“Stand Improvement through Natural regeneration with intensive Soil & Moisture Conservation”** will be adopted.



24.2.2 Rotation Period:

The crop is mostly Sal. To reach an exploitable Girth above 150 cm or so, considering the present Soil Productivity and soil moisture regime a Rotation period of 60 years is predicted. As no harvest is expected from this working circle, no rotation period is prescribed in this plan.

24.2.3 Prescriptions for implementation:

The area assigned to this Working circle has been divided to twelve improvement series. Each series is sub divided in to ten sections for intensive working. It is prescribed to prepare an improvement plan containing the following items.

- a) Map of the Coupe,
- b) Whether dead trees available for removal with its economic aspect.
- c) Area for thinning with grade of thinning.
- d) Soil & Moisture conservation plan indicating the nala position / Check dams etc.
- e) Area for sowing of seeds.
- f) Proposal for Closing to Grazing & Fire Protection strategy.
- g) Total Financial implication.

It is suggested to take up the following activities in the section (Coupe) during the assigned year.

The works prescribed area:

- a) Removal of Dead trees those are having utility and operation is economically viable.
- b) Light grade thinning i.e. C' grade thinning to D' grade thinning as required.
- c) Soil & Moisture Conservation through treatment of dry seasonal nalla.
- d) Covering of large blank areas more than 0.5 ac in extent through sowing of seeds after preparing the bed to receive the seeds.
- e) Closing to Grazing,
- f) Fire Protection measures.

24.3 Rehabilitation Working Circle:

24.3.1 Silvicultural System:

The Silvicultural System to be adopted for this working Circle is ***“Silvicultural Cleaning, Tending followed by Aided Natural Regeneration supplemented with enrichment Plantation”***



24.3.2 Rotation Period:

The present crop is not to be harvested during this plan period. No rotation period is prescribed at present. The entire area will be treated in a **Ten Year Cycle**.

24.3.3 Treatment Prescribed:

The area assigned to this working circle are further divided in to 18 Treatment Series and each series in turn to 10 sections (coupe). After demarcation of coupe area it is suggested to have a treatment plan as furnished below.

The treatment Plan shall include

- i) Site identification i.e. Forest Block/ Compartment No. / Treatment series No
- ii) Area and Treatment map.
- iii) Site characteristics (terrain, slope, drainage, soil type and depth).
- iv) Vegetation and extent of regeneration.
- v) Extent of degradation.
- vi) Year of operations (including maintenance if any).
- vii) Major operation to be undertaken.
- viii) Cost norms and calendar of operations.
- ix) Involvement of VSS and works that can be executed through VSS.
- x) In case of Plantation / Gap filling required, the species required to be planted are need to be mentioned.
- xi) In case of availability of Dead / fallen trees required to be removed during the operation, it will be marked and a marking list is to be prepared as per standard format.

Execution of Rehabilitation Method: After approval of the Treatment Map & Plan, the same is to be executed in the assigned year. The sequences of Operations are

- i. Fencing of the Area:
- ii. Removal of marked trees, if any.
- iii. Silvicultural Cleaning.
- iv. Silvicultural thinning,
- v. Eradication of weeds,
- vi. Treatment of bamboo clumps including Harvest / De-congestion)
- vii. Soil & Moisture Conservation.
- viii. Treatment of Natural seedlings available,
- ix. Restocking of Area by Planting (Artificial Regeneration) & Post-care operation.



- x. Subsidiary Silvicultural Operation for bamboo.
- xi. Control of Grazing,
- xii. Fire Protection Measures.

24.4 Plantation Working Circle:

The area assigned to this working Circle comprises two types of area i.e. fresh blank area for planting and village forests of erstwhile Social Forestry Project. The area is divided in to three planting series. Each series is to be covered within 10 year cycle.

24.4.1 Silvicultural System:

The Silvicultural System for fresh area is “ **Artificial Regeneration by Planting**” and the village woodlots of erstwhile Social Forestry Plantation will be managed with Silvicultural System “**Clear felling with standard followed by Artificial Regeneration**” through planting will be adopted. Where ever promising coppice shoots will be developed / come up, the same will also be retained to reduce the replanting cost. The number of standards per hectare will depend upon biotic interference, possibility of dispersal of seeds for a high forest system, fruit bearing species, having timber value at a higher girth class. The minimum number of trees prescribed for retention is 25 number and maximum 75 numbers per hectare.

24.4.2 Rotation Period:

In case of Social Forestry village woodlots no rotation period is prescribed. The crop will be clear felled during the plan period except those trees left as standard to act as seed Bering trees / mother trees. The standard trees will be removed in the next plan period considering the number retained Girth class and effectiveness to act as plus trees. In case of low survival area, the Blank areas will be planted up during this plan period. No harvesting will be taken up in such areas and in very refractory sites.

24.4.3 Exploitable Girth:

For village woodlots of erstwhile Social forestry plantation, as clear felling with standard practice will be followed no harvestable diameter is prescribed.

24.4.4 Marking of Standard Trees:

As the system to be followed is “**Clear Felling with Standard**”, it is required to mark the standards initially. The criteria for selection of standards in general are furnished below.



- Timber species of greater importance,
- Fruit bearing trees like Mango, Jack Fruit, Barkoli (Zyziphus), Palm, Cashew,
- Any Plus tree suitable for seed collection for raising plantations,
- Any trees associated with sentiments of local villagers are to be retained as standard.

The number of Standard trees per hectare shall not be less than 25 and more than 75.

24.4.5 Planting Process:

The standard planting procedure prescribed in the approved cost norm for Block Plantation (1600 plants per ha) is to be followed. Species suitable for the site and as per VSS consultation outcomes to be taken up for planting.

24.5 Wildlife (Overlapping) Working circle:

The entire forest area has been assigned to this overlapping Working Circle. The important features are that it is a part of Mayurbhanha Elephant Reserve, Part of Bidhubhandar PRF comes within Similpal Tiger Reserve (Buffer zone) (85.95 sq. km out of total 108.7125 sq. km) and two interstate Elephant Corridors i.e. Badampahar(Mayurbhanj)-Dhobadhobin(Jharkhand) Interstate and Badampahar (Mayurbhanj) -Karida(Jharkhand) Interstate are within the division. The important animals observed are Elephant, Leopard, Bear, Deer, Barking Deer, Wild Pig, Hyena, Jackal, Rabbit, Monkey, Reptiles, and Birds etc.

24.5.1 Improvement of Elephant Corridor:

Elephant movement is most important aspect that needs day to day attention. It is suggested to have comprehensive **Corridor Improvement Plan**. The plan may contain the following aspects.

- a) Villages within the Corridors & its population,
- b) The land use pattern with special thrust on Agricultural practices,
- c) Forest blocks and extent of area and its proportion,
- d) Liner infrastructures within the corridors & its effect on movement of elephants/ animals.
- e) Mining and other industrial growth within the corridors.
- f) Possibility of change of cropping pattern and introducing agro forestry practices.
- g) Complete tracking of elephants by squad and help modern technology, drone camera.
- h) Improve tree cover / elephant liked fodders in forest blocks coming in corridors.



24.5.2 Threats & remedial measures:

Important threats are

- a) Annual Fire and loss of Ground Flora.
- b) Heavy biotic interference and intrusion by domestic animals (Cattle/ Goat/ Sheep)
- c) Transmission of contagious diseases from domestic cattle to Wild animals.
- d) Poaching by putting nets/ loops and live electric wires.
- e) Akhanda Sikar in festive occasions like Maker Sankranti.
- f) Hunting of birds.
- g) Public irritation against elephant depredation.
- h) Fragmentation of habitat due to development of infrastructures / mining.
- i) Shrinking of Water body / wet lands.

In order to handle the situation it is proposed to

- Prevent forest fire with the help of VSS/ Public.
- Equip the forest staff with modern fire fighting tools.
- Have intelligence network deep inside the forest especially close to Sanctuary.
- Make public aware about ill effect of loss of bio diversity and loss of threatened flora and fauna.
- Enforce provisions of the wildlife (Protection) Act, 1972.
- Take help of Wildlife Crime Investigation Burro for investigating inter district organized crimes.
- Cattle immunization Programs in villages coming within buffer zone of Similipal Tiger Reserve.
- Encourage people to change to use of alternate source of energy.

24.5.3 Prescriptions suggested:

- i. Improvement of Habitats
- ii. Maintenance of Wet lands,
- iii. Creation & Maintenance of Grass Land,
- iv. Providing water to animals,
- v. Providing Protection and different covers viz- Refuge cover, Ambush cover, Loafing cover, Breeding cover, Roosting cover for birds etc.
- vi. Detail study of Animal behavior& scientific Documentation,
- vii. Creation of Public awareness & public participation in management.
- viii. Protection of Key areas viz- Edges, Snags, dead and downy wood materials, riparian vegetation, Swamps & marshes(Daldali)



24.6 Non Timber Forest Produce (Overlapping) Working Circle:

The entire forest area has been assigned to this overlapping Working Circle. The important NTFP items available in this tract are Sal Leaf, Kendu Leaf, Siali Leaf and fibre, Myrobalance, Honey, Wax, Mahua Flower etc. The NTFP items are in a declined trend. Degradation of Forest and NTFP Items are correlated.

24.6.1 Measures to Improve Production of NTFP Items:

The following points may be stressed to improve NTFP status in forest.

- Harvest / collect NTFP items by trained local collectors. Extensive training may be organized by the department. This is the only way to save NTFP resource in forests.
- Over exploitation is to be prevented. During collection period, forest staff should remain vigilant.
- Items of NTFP and period of Collection may be displayed at vintage points and VSS members are made aware of the fact.
- VSS members may be trained and engaged to supervise collection of NTFP items by primary gatherers and guide them in the spot within the forest.
- Steps to be taken to avoid unhealthy competition for collection. This leads to premature collection, cutting of branches even felling trees for collection of fruits.
- Though collection is within the dolmen of Panchyat, the burnt is caused to the forest. The forest staffs have a greater role in regulating collection in the forest through voluntary supervision, training and regeneration practices. Forest staffs should shoulder voluntary responsibility to save NTFP sustainability and tribal lively hood.

24.6.2 Suggested mechanism:

a) In-situ Conservation:

The forest blocks rich in NTFP are to be improved through inclusion of NTFP Species while deciding species for planting in Rehabilitation Working Circle. Close to grazing principle suggested in RWC will improve propagation and conservation of NTFP Species.

b)Ex-situ Conservation:

Under Ex situ conservation it is proposed to have plantations of important NTFP species which became rare and endangered in the locality. It is proposed to cover at least 100 ha of plantation of following species in different patches of Bisoi WL Range and Manada Range. It may be taken up outside the forest area.



- a) Ashok (*Saraca indica*)
- b) Harida (*Terminalia chebula*)
- c) Anla (*Emblica officinalis*)
- d) Genduli (*Sterculia urens*)
- e) Sunari (*Cassia fistula*)
- f) Bija (Piasal) (*Pterocarpus marsupium*)
- g) Haldu (*Adina cordifolia*)
- h) Mundi (*Mitragyna parviflora*)

c) Improvement of Marketing:

In order to improve the pricing structure vis a vis improvement of collection practices a good well informed market is required. It is suggested to improve market related information sharing through improved technology.

24.7 JFM (overlapping) Working Circle:

Most of the degraded forests have been assigned to VSS for Joint Forest management. About 57.34 % of the forest has been assigned to VSS. The success of Forest improvement rests on VSS.

24.7.1 Method of Execution:

The methods suggested for this Working circle are

- Demarcation of VSS Area,,
- Preparation of Micro-plan,
- Plantation & Choice of Species,
- Incentive Schemes for the VSS,
- VFDF (Village Forest Development Fund),
- Engagement of specialized agencies for input support to JFM
- Training camps for VSS Members.
- Evaluation of Performance & Incentive

24.7.2 Expansion of JFM Area:

There is scope to enhance the area under the JFM. It is suggested to increase the number of VSS and corresponding area under JFM.



24.8 ToF Working Circle:

Besides the forests, under administrative control of Forest department about 152.40 Sq.KM of Revenue forests (7.61% of the Geographical area) remain outside the management purview. Plantations are being raised under various schemes like Forest Development Agency, Mahatma Gandhi National Rural Employment Guarantee Act (MANREGA), Farm Forestry, Avenue Plantations etc. These Forests covered about 25% of the traditional forest area. The TOF are integrated contribution of Plantations Raised outside the conventional Forest area by Forest Department, Horticultural plantation and other department, Plantations raised by private individuals in their fellow land and back yard, Agro Forestry practices, Avenue Plantations and Institutional Plantations.

24.8.1 Silvicultural System:

For mixed plantations and avenue plantations the silvicultural system to be adopted is **“Selection cum Improvement System”**. No system is prescribed for Farm Forestry. Its management will be regulated by set of **“General Principle.”**

24.8.2 Rotation Period:

The rotation period is variable depending upon Species available in Plantations / Avenue plantations. The species / category wise rotation period is furnished below.

Table No 24.1 Rotation periods for Mixed Plantation.

Sl No	Species (Category)	Rotation Period in Year	Remark
1	Timber species	40	Sisoo, Gambhar, Teak, Bada Chakunda
2	Fuel Wood / fodder	20	Acacia, San Chakunda, Radhachuda, Maha neema
3	NTFP Species	60	Karanja, Amla, Mahula, Harida, Bahada, Neema,
4	Fruit bearing species	Till fruiting continues.	Mango, Kendu, Jack fruit, Jamun,
5	Bamboo	5 year cutting Cycle after clump formation.	With SSO (Simultaneous silvicultural operation).
6	Aesthetic value	Till not a threat to live & property.	Mostly in avenue plantations.



24.8.3 Harvestable Diameters:

There are many plantations where the year of plantations could not be found out. In some cases due to poor site quality, the required growth is not achieved as projected. In both the cases the trees to be harvested basing on its growth pattern. Hence harvestable diameter for Rairangpur Division is prescribed below.

Table no 24.2 Exploitable Diameter / Girth of Selected trees.				
Sl No	Species	Exploitable diameter / Girth in Cm		Remark.
		GBH	Diameter	
1	<i>Acacia auriculiformis</i> (Sunajhari)	90	29	
2	<i>Anthocephalus cadamba</i> (Kadamba)	150	48	
3	<i>Azadirachta indica</i> (Neem)	190	57	
4	<i>Bomax ceiba</i> (Simili)	150	48	
5	<i>Dalbergia latifolia</i> / <i>Sisoo</i> (pahadi sisoo/ bali Sisoo)	150	48	
6	<i>Gmelina arborea</i> (gambhari)	150	48	
7	<i>Melia azedarach</i> (Mahaneema)	90	29	
8	<i>Millettia pinnata</i> (Karanja)	190	57	
9	<i>Samanea saman</i> (bada chakunda/ Siris etc)	150	48	
10	<i>Tectona grandis</i> (Teak)	140	45	
11	Fruit bearing species (Mango, Jack fruit, Tamarind, Mahula, Kendu, Char,)	As long as Fruiting continues.		

24.8.4 Method of Treatment:

A) In case of mixed Plantation:

The mixed plantations assigned to a particular year are to be treated in the following manner.

- Area to be re-demarcated and pillars posted are to be rechecked.
- The survival percentage is to be ascertained along with the growth pattern.
- Elite thinning is to be carried out. If the survival percentage is around 60% no thinning is to be taken up.
- Any substantial blank area, if created due to mortality / biotic interference etc, the same is to be planted up with the help of VSS.
- In course of protection, if natural vegetation has come up it may be recorded in the plantation journal.



- During thinning importance of natural grown species is to be kept in mind.
- If the natural vegetation is in a sapling stage, then Silvicultural cleaning is to be taken up instead of thinning. (Cleaning in Sapling stage – height within 3m. Thinning in Pole crop and above i.e GBH above 30 cms. And dead bark formation)
- The thinning materials are to be distributed among the VSS members as per JFM resolutions.

B) For Avenue Plantations:

- a) The avenue plantation site is to be visited and existing plants are to be recorded.
- b) If any plant / tree is badly damaged and above 30cm GBH it is recommended to remove the plant and a new plant with promising growth is to be planted.
- c) Any old / hollow diseased tree likely to be fallen down in moderate wind is to be marked and enlisted. Such trees are to be jointly visited by Range Officer and any representative of PWD / NH Authority and record their suggestion on removal or retention. In case of suggestion for removal DFO is to intimate the district authority and take steps for its removal followed by planting in the assigned year.
- d) All retained plants above 30cm GBH are to be checked for hanging branches if found to be removed.
- e) The PWD / NH authority may be requested to put Radiant paints on trees at Breast Height for visibility during night.
- f) Similar exercise is recommended for other avenue plantations not included in this series.

C) Modalities for Farm Forestry:

Free seedlings are distributed for planting on private lands / back yard etc. It remained without follow of action. It is suggested to take up following action to evaluate the result.

- After distribution is completed by end of August, the distribution registers are to be examined to find out person those have taken more than 150 seedlings for planting.
- 10% of such cases, the person are to be located and his planting place is to be inspected by forester and technical suggestion for soil working, application of fertilizer and required suggestion is to be tendered.
- Its survival at end of December of same year is to be recorded.
- Some photographs are to be taken and album for every year is to be prepared and kept as record and for future reference.



24.9 Reduce Emissions from Deforestation and forest Degradation (REDD+)

REDD+ stands for countries' efforts to “Reduce Emissions from Deforestation and forest Degradation”, and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks.

24.9.1 India's first NDC includes commitments:

Our country's commitment for “**Nationally Determined Contributions**” (NDCs) are

- To reduce the emissions intensity of its GDP by 33-35% from 2005 levels by 2030.
- To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF).
- To create an additional carbon sink of 2.5 to 3 billion tones of CO₂ equivalent through additional forest and tree cover by 2030.
- To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.

India announces its INDC, pledges to cut emission intensity of its GDP by 33-35 per cent by 2030. India's forestry target is also very ambitious. It intends to create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ through additional forests by 2030.

24.9.2 Indicative Work plan to combat Climate Change:

- Government harps on sustainable lifestyle to fight climate change.
- Promising raising requisite funds and adopting new technology.
- More focus on agriculture, water resources, coastal regions, and health and disaster management.
- To tackle climate change by adopting healthy and sustainable lifestyle, which were “inherent in traditions and values of conservation & moderation.
- To reduce consumerism in our lifestyle & reduce to reduce per capita consumption by not wasting food and limiting the number of durables / cars per household.
- To have ambitious focus on energy efficiency and dramatic increase in renewable energy.
- To enhance dependency on non-fossil fuel-based energy.



24.9.3 Suggestive measures on Forestry Sector.

In forestry sector to combat climate change the following activities are suggested.

- a) To reduce felling of trees in all sphere and enhance creation of renewable energy.
- b) To reduce dependency on fossil fuel including that of firewood.
- c) To enhance use of solar energy / wind energy where ever possible.
- d) To motivate people to reduce consumerism & reduce generation of solid waste.
- e) Conserve water body and enhance efficient use of water.

24.10 Application of Modern Technology To Forest Management:

24.10.1 Modern Technology being adopted:

At present the Forest Officials are quite conversant with the following technology and frequently using for forest management. These are

- Use of Global Positing System (GPS) in survey, Demarcation & locating the specified spot.
- Use of Differential Global Positing System (DGPS) for survey of Forest blocks / area with an exact accuracy of 95% level.
- GIS applications for map study / Map preparation etc.
- Study and use of Satellite Imagery for detecting vegetation change, degradation of land / vegetation.
- Use of Satellite imagery for detection of Fire and faster communication of location of incidents.
- Clonally Propagation with mist chamber facilities for better genetically improved seedlings for plantation purpose.
- Root trainer nursery for mass seedling production.
- Use of Sprinkler for watering in Nursery.
- Use of blowers, Chemical fire extinguisher to combat Forest fire.
- Various mobile applications, Infrared radio collars to detect animal movement & reporting.
- Strengthening of VHF Net work.

24.10.2 Modern Technology to be introduced in Forest Management:

With advancement of technology it is proposed to have the following facilities available with Puri Wildlife Division for better management.

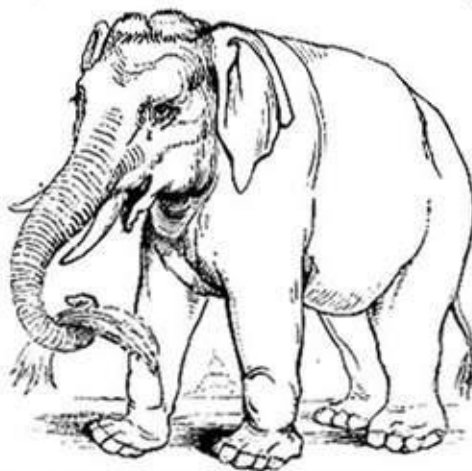


- a. Identified Plus trees within the Division and maintaining a Clonal Orchard.
- b. To have improved Mega Nursery with clonally propagation facilities with mist chamber, Sprinkler System.
- c. Root trainer facilities and capacity to meet requirement of Quality Planting Materials for the division instead of depending upon temporary nursery.
- d. All forest blocks / plantations surveyed with DGPS and mapping thereof.
- e. Establishment of GIS Cell with available Satellite imagery for monitoring purpose.
- f. Modern logging tools to meet emergency in **Post Cyclone Management**.
- g. Drone camera facilities to watch forest fire, wildlife movement and winter bird's congregation & problems.

24.11 Working Plan Period:

This is the first Working Plan for Rairangpur Division after reorganization of Forest Department and creation of this Division with effect from 01.10.2003 and further reorganization vide notification no 1F-(A)-71/2018-3913/F&E dated 21.02.2019 w.e.f 1st October'2019. This plan on approval will remain valid for ten years i.e. from **2021-22 to 2030-31**.

THE END





ANNEXURES





ANNEXURES

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