



GOVERNMENT OF ODISHA



FOREST AND ENVIRONMENT DEPARTMENT



WORKING PLAN FOR MALKANGIRI FOREST DIVISION

(Koraput Circle)

2021-22 to 2030-31

Prepared By,
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Preface



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Working Plan is the governing document for planning and executing forestry operations for sustainable management of forests. For revision and preparation of Working plan, Preliminary Working Plan Report (PWPR-I) was prepared in the year 2016 and approval from State Level Committee (SLC) to the PWPR was received on 04.02.2017.

The Working Plan of Malkangiri Forest Division was written by Mr. M. Bodaik, OFS-I for a period of 10 years from 2007-08 to 2016-17. Upon its expiry, working schemes were written from 2016-17 to 2020-21 and hence there was acute necessity of the revision of the plan for the coming 10 years. The main emphasis of this Working Plan is on protection, eco-restoration, afforestation and conservation.

In order to ensure better results and also to encourage existing native root stock, the present plan lays emphasis on taking up SMC works for more availability of moisture in the forest soil, along with preventing the soil from erosion. Encouragement of native vegetation through SMC measures and effective closure over a period is given the top priority, as far as management inputs are concerned. Rills/gullies on hill sides need more such structures which should form the first green pockets in the area of treatment. As the number of rainy days in the region is small and the rainfall is itself low, the plan has stressed upon strengthening all such SMC structures with vegetative means to take full benefit of available moisture.

An attempt has been to include all relevant and as accurate as possible (within constraints) forestry related statistical information of the Division, so that the document becomes handy for the local forest managers in day to day working. The reported figures have been cross-checked with other possible sources to arrive at the most reliable and authentic information and to minimize errors.

Implementation of this working plan would enhance productivity of forests; it will contribute to environmental stability, protection of soil and water regime, conservation of plant diversity and wildlife. Various forestry operations implemented under this Working Plan would provide employment to local tribals and people below poverty line. There will also be availability of considerable timber and firewood through the harvesting operations.

The writer's thanks are due to **Dr. Sandeep Tripathi**, IFS, Principal Chief Conservator of Forests, Odisha Forest Department for providing all the guidance during the preparation of this Working Plan Report.

The writer is gratified to **Sh. M. Mohan**, IFS, Additional Chief Conservator of Forests, and previous the Regional Chief Conservator of Forests, Koraput Circle for kind support and timely guidance during preparation of PWPR.

The writer's thanks are also due to **Sh. P. K. Mallik**, IFS, Additional Chief Conservator of Forests, and Chief Executive, ORSAC for his guidance and superior level of support provided from time to time. He did not leave any stone unturned to provide all the support for collection of all the sample plot data through GPS PDA and then providing the processed data from NRSC, Hyderabad.

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The writer's sincere thanks are also due to **Ms. Lilly Amanatya**, ACF, **Sh. Prasad Kumar Behera**, Junior Accountant, **Sh. Himansu Sekhar Sahu**, Junior Accountant, **Sh. Goutam Debnath**, DEO Accounts who helped a lot during writing this plan and giving it a final touch to it.

Beside this, all the officials and staff have put in a great deal of effort to carry out field exercise during sample plot surveys and helped in timely completion of field exercise. The writer sincerely thanks the staff of Malkangiri Forest Division for their crucial assistance during the testing times.

There is a possibility that in spite of all precautions, some typographical/factual errors might have cropped into the document. It is hoped that all such gaps/mistakes get filled in/rectified during the next revision of the Plan.

(Sd/-)

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EXECUTIVE SUMMARY ALONG WITH THE CONSTRAINTS FACED DURING WRITING OF THE PLAN

I. INTRODUCTION

Malkangiri Forest Division was created on 01.10.2003 vide Govt. of Odisha, Forest & Environment Department Notification **No.1F (A) 100/2003/13228/F&E dated 08.8.2003**. Previously it was included with Jeypore Forest Division. there are six Ranges namely Malkangiri Range headquarter at Malkangiri, Mathili, Range headquarter at Govindapalli, Balimela Range headquarter at Balimela, Kalimela Range headquarter at Kalimela, Chitrakonda Range headquarter at Chitrakonda and Motu Range headquarter at M.V.-79, 23 Sections and 116 Beats. The proposed period of the plan is for 10 years i.e. from 2021-22 to 2030-31.

a) **Vision Statement:** The forests of the Malkangiri division shall be managed sustainably through scientific management by following the prescriptions given in the working plan and people's participation through Joint Forest Management.

b) **Goals and Objectives of management:**

1. To maintain environmental stability and ecological balance by protecting, preserving and enriching the existing natural forests.
2. To ensure protection of the soil by checking soil erosion.
3. To carry out improvement operations by encouraging natural regeneration and planting of indigenous species.
4. Meeting the requirement of fuel wood, fodder, non-wood forest produce and small timber of the rural and tribal populations. Salvaging of the available dead and fallen trees in order to cater the needs of the population to the extent possible.
5. The Non-Timber Forest Produce resources will be managed in a sustainable manner by the VFC under JFM.
6. To involve people in protection, management and development of forests. Joint Forest Management (JFM) programmes will be an integral part of management and protection of forests.

c) SWOT Analysis for preparation of strategies for achieving the goals and objectives:

In the preparation of working plans with the objectives for achieving sustainable forest management, Strengths, weakness, Opportunities and Threats are identified. Based on the SWOT analysis alternative strategies are developed for the division.

Strength

- Ability to maintain forest cover.
- Trained Staff.
- Area of the forest department is well spread.
- Rich biodiversity.
- Infrastructure of nurseries, offices and quarters are good.
- The local people involve in the VSS activities through Joint Forest Management.

Weakness

- Lack of innovation and motivation.
- Inability to maintain dense forest.
- Lack of legal awareness and implementation.
- Inadequate wireless communication; Wi-Fi/ Internet.
- Less Staff position in the division.
- Lack of intelligence networking in Forest department.
- Rate of Conviction in Forest offence cases is very rare.

Opportunity

- Miyawaki Plantation as a good initiative to maintain green cover. More nos. of these types of plantations can be done in future.
- Training in new technology and exposures to staff.
- Creation of assets and infrastructures.
- Involvement of people and NGOs in conservation of Biodiversity.
- Increasing the scope of Ecotourism, creating new tourist points, as Malkangiri has a nos. of unexplored places.

Threats

- Lack of control over encroachment, shifting cultivation, over grazing, illicit felling, etc.
- Forest Fire.
- As Malkangiri is a border district, the Interstate Wildlife trade is a major threat.
- Naxalite activities are more in this district.

External and Internal factors of environment are considered to achieve the expected outcome.

d) Expected outcome:

- (i) Increase in productivity of the forest ecosystem and maintenance of the vitality
- (ii) Reduction in soil erosion, enhancement of fertility of the soil and ensured stability of the forest ecosystem
- (iii) Enhancing water conservation capacity of the forest ecosystem and assisting in regulating the flow of water from its catchment.
- (iv) Mitigation/carbon sequestration capacity of the forests and adaptation with change in climate.
- (v) Meeting the fuel wood, fodder and timber requirements of the local communities, enhancing livelihood and employment opportunities, ensuring usufruct/ benefit sharing and protection of their traditional knowledge and traditional/cultural practices, etc.

e) Abstract of plan prescriptions

Chapter No	Para No./ Sub para No.	Prescribed activity	Remarks
A	B	C	D
2. Selection cum improvement working circle	2.4	Felling of mature trees as per Annual Coupes.	Marking of Trees should be conservation oriented rather than commercial harvesting.
	2.6.2	The silvicultural system prescribed is Selection cum Improvement System. Only silvicultural available trees above the exploitable diameter (150 cm) shall be removed.	
	2.6.10	Execution of felling is done by demarcation of Annual Coupes, Marking of trees and felling.	The improvement Marking is mainly intended for improving the crop composition without aiming on Yield.
	2.6.11	The Subsidiary Silvicultural Operations i.e. tending operations like singling of coppice shoots, cutting of High stump, climbers, angiosperm parasites, Lantana and Eupatorium species should be done.	When the climbers and weeds dry, it may cause forest fire. The weeding and tending operations are to be carried out in these forest areas to encourage growth of natural seedlings.
	2.6.13	Associated regulations like Fire protection, grazing, Rights & concession are to be taken in to account.	For Protection point of view.

II. Rehabilitation Working Circle	3.2	Site specific treatment plan is carried out which is area oriented, site- specific approach to check degradation of Rehabilitation areas.	For restoration of Forest cover.
	3.6	Protection of areas from fire, grazing and illicit felling.	
	3.6.13	In each block, soil and moisture conservation works like Bunding, trenching, drainage Line treatment measures and Water Harvesting Structures are to be taken up.	To increase the moisture retaining of soil, and to control soil erosion.
	3.6	To improve the economic condition of local people by creating employment opportunities in the process of management of forest.	
4. Plantation working circle	4.6	Afforest the barren and degraded areas with suitable species.	To restock the degraded Forests.
	4.6.2	Artificial Regeneration is to be followed which includes tending operation. Previously the tree species planted are Teak, Gambhar, Sissoo, Chakunda, Simarouba, etc.	To enhance the productivity thereby improving the growing stock.
	4.6.10	Plantation method of execution includes demarcation of annual coupes, preparation of treatment plan and map, raising of nursery, site preparation, stacking, pitting, planting, post planting operations and protection to the plantations.	

5. Protection Working Circle	5.6	All the forest blocks have been taken in this circle. The Blocks which are subjected to heavy forest fire, illicit felling, and encroachment, ecologically fragile areas have been kept in Ecological protection series where as others have been kept in Biotic protection series.	
	5.6	Other Protection measures like Controlling shifting cultivation, Boundary maintenance, grazing control, Development of forest road network and communication system & mobility are to be implemented.	To protect the forest from further degradation and to maintain adequate forest cover.
6. Bamboo (OL) Working circle	6.6.10	Method of execution includes the demarcation of annual coupes, preparation of treatment map, estimation of yield, fixation of target and working of bamboo.	To ensure systematic & scientific exploitation of bamboo to prevent further degradation.
	6.6.11	Subsidiary silvicultural operation like removal of debris, removal of dead & high stumps, pruning and climber cutting etc, treatment of exposed rhizomes by covering soil on it, half-moon trenches on uphill sides of the clump.	To rehabilitate the degraded bamboo clumps with suitable tending operation and soil moisture conservation works.

7. Wildlife (Overlapping) Working Circle	7.6.14	Maintenance of special habitats, unique habitats (caves, cliffs etc), critical micro habitats, cultural landscapes (sites of pilgrimage).	To conserve, protect and improve the wildlife habitat.
	7.6.13	Other WL protection measures like deployment of anti-poaching staff, installation of VHF and other communication infrastructure, Collection of information on Wildlife Crime, etc.	
	7.6.16	Promotion of Eco-tourism	To create awareness among the people.
6. JFM (Overlapping) Working Circle	8.6.2	To involve local people in forest management to make them self-sufficient in respect of forest produce and self-employment by preparing micro plans for individual VSS. The prescription for each forest blocks will guided by the prescription under the individual working circle.	Peoples participatory approach towards Forest Management
	8.6.10	The existing VSSs shall be encouraged in forest protection and where ever there is no VSS, action shall be taken to form new VSS.	
9. NTFP (OL) Working Circle	9.6	To ensure sustainable production and its utilization. To protect NTFP trees and promote their regeneration. To ensure peoples' participation in all	

		sorts of activities in management of NTFPs for the greater interest of regeneration and protection of the forests.	
	9.6.13	The major NTFPs in Malkangiri Division are Tamarind, Kenduleaves, Myrobalans, Char seeds, Hill brooms. Formation of Biodiversity Management Committees of local people	

f) Works prescribed during the Plan period:

Chapter No.	Para No./ Sub Para No.	Prescribed activity	Year wise (year 1-10) distribution of physical target (HA)
A	B	C	D
2. Selection cum improvement working circle	2.5	Entire Area has been divided into 9 felling series with 10 Annual coupes in each. There are whole/ part of 21 nos. of RFs and 23 nos. of PRFs allotted.	48271.8566 Ha over 10 Years
3. Rehabilitation Working Circle	3.5	Entire Area has been divided into 7 Rehabilitation series with 10 Annual coupes in each. There are whole/ part of 28 nos. of RFs and 61 nos. of PRFs allotted	139183.5591 Ha over 10 Years
4. Plantation working circle	4.5	Entire Area has been divided into 2 plantation felling series, 1 miscellaneous tending operations, 1 teak tending operation and 1 VF tending operation with 10 Annual coupes in each. There are whole/ part of 2 nos. of RFs and	For 10 Years plantation felling series-1058.62 Ha miscellaneous tending operations- 2801.76 Ha Teak tending operation- 2041.80 Ha

		12 nos. of PRFs allotted.	VF tending operation- 268.20 Ha Total-6197.38 Ha
5. Protection Working Circle	5.5	Entire Area has been divided into 6 protection series with 10 Annual coupes in each. There are whole/ part of 52 nos. of RFs and 66 nos. of PRFs allotted.	24649.3938 Ha over 10 years
6. Bamboo (OL) Working circle	6.5	Entire Area has been divided into 21 felling series with 4 years cutting cycle has been prescribed. There are whole/ part of 32 nos. of RFs and 88 nos. of PRFs allotted.	110367.5123 Ha over 10 years.
7. Wildlife (Overlapping) Working Circle	7.5	This Working circle covers the entire plan area: i.e. 164 Forest blocks.	218302.1895 Ha over 10 years.
6. JFM (Overlapping) Working Circle	8.5	Range wise blocks have been allotted.	16623.59 Ha over 10 years.
9. NTFP (OL) Working Circle	9.5	All forest blocks except under protection working circle has been allotted in this working circle.	189045.9106 Ha over 10 years

II. GLOSSARY OF TECHNICAL TERMS

Abundance	No. of Particular species in an area.
Acidity	The extent to which the P.H value of solution falls below 7.
Adaptation	Cling to certain habit
Afforestation	To establish a forest by planting trees.
Age Class	The interval in to which the range of age of trees growing in a forest is divided for classification or use.
Alkalinity	The extent to which the P.H value of solution exceeds 7.
Alluvial	A type of fertile soil from out of humus and other soil mixture.
Anaerobic	An organism that can leave without free oxygen and to conditions in which free oxygen is not available.
Artificial Regeneration	The process of renewal of a forest by showing, planting or other artificial method.
Aspect	The direction towards which a slope faces.
Bark	Tissues of stem and root of a tree outside the cambium layer.
Basal Area	The area of the cross section of a stem at breast height.
Base Line	A line which is used as a base for further work.
Beat	A territorial charge primarily protective in scope, sub-division of a Range.
Bed rock	The solid rock under laying the soil.
Biotic	Influence of a living organism.
Biotic factor	Any influence of a living organism usually redistricted to the influence to the animals including man.
Block	A main territorial division of a forest, generally bounded by natural features and bearing a local proper name.
Bole	A main stem of a tree.
Breast Height	Is the standard height for measuring girth, it is taken as 1.37Mt.
Browsing	Feeding by animal.
Brush wood	A growth of low shrubs and bushes.

Buttress	An out growth from the base of the tree connecting with the roots.
Canopy	The cover of branches and foliage form by the crown of trees in a wood.
Catchment Area	The total area draining in to a given water way, lake or reservoir.
Census	Enumeration and classification of population.
Check dam	A small dam constructed in a gully to decrease velocity of stem.
Clay	The finest soil particles under 0.002 mm in diameter.
Clayey loam	The soil intermediate in texture between clay and loam.
Cleaning	Removal of interior growth , climber etc.
Climate	Weather condition.
Close season	The period during which hunting, catching or killing any particular bird/animal/fish.
Clump	The aggregate of the stems issuing from the same root.
Compartment	A territory unit of a forest permanently defined for purpose of administration, description and record.
Comptt. History	A record of all events affecting the forestry of an individual compartment.
Comptt. Line	The boundary of a compartment.
Concession	Relief extended to purchaser.
Coppice	A crop of coppice shoots.
Coppice shoots	A shoot arising from an adventitious bud at the base of the plant.
Coupe	A felling area usually of an annual series unless otherwise stated.
Creeper	A plant rarely with a woody stem, which grows mainly horizontally on or near the ground and puts out roots at interval.
Crown	The upper branchy part of a tree above the whole.
Crown height	The height of crown as measured vertically from the lowest green branch to green branches on the top.
Culm	The characteristic hollow and jointed stem of a bamboo or grass.
Cultural Operation	A general term for operation to promote the proper development of crop.

Deciduous	The perennial plant normally leafless for sometime during the year.
Defoliation	A reduction in the normal amount of foliage due to insect or fungal attack or other injurious.
Degraded	Loss of fertility.
Demarcate	The setting out and marking the limits of a forest in terms of a notification under the forest law.
Density	The relative completeness of a canopy usually expressed as a decimal coefficient.
Depot	A site on which forest produce is collected.
Diameter Class	One of the interval into which the range of stem diameter i.e of trees or logs is divided for classification or use.
DLC	District Level Committee.
Dominant	A tree forming part of the dominant tree class.
Dormant bud	A bud that remains inactive for an indefinite period until stimulated for growth.
DPF	Demarcated Protected Forest.
DRDA	District Rural Development Agency.
Durability	Of wood, the resistance offered by it against disease, decay and insect attack.
Ecology	The study of plants and or animals in relation to their environment.
Encroachment	Unauthorized occupation of land.
Enumeration	The counting, singly or together of individuals of one or more species in a forest crop and their classification by species, size, conditions etc.
Environment	All the biotic and a- biotic factor of a site.
Epiphyte	A plant growing on, but not nourished y other plant.
Erosion	The removal of soil and rock materials by water, wind and gravity.
Even aged	Applied to a stand consisting of trees of approximately the same age.
Ever green	Never entirely without green foliage, leaves persisting until a new sets has appeared.

Exotic	Not native to the area in question.
Exploitable	The age at which a tree or crop attains its final stage.
Exposure	The relation of a site to the weather condition especially sun and wind.
FDA	Forest Development Agency.
GIS	Geo- Information System.
GPS	A machine known as global positioning system use to determine a point with reference to Longitude and Latitude.
JFM	Joint Forest Management.
MFP	Minor Forest Produce.
NRSA	National Remote Sensing Agency.
NTFP	Non-Timber Forest Produce.
OFA	Orissa Forest Act, 1972.
OFDC Ltd.	Orissa Forest Development Corporation Ltd.
OR	Offence Record.
ORSAC	Orissa Remote Sensing Application Center.
PRF	Proposed Reserve Forest declared under section 4 of OFA. 1972.
RF	Reserve forest declared under section 21 & 22 of OFA, 1972.
U/S	Under section of Act i.e. OFA, 1972, Wild life Protection Act, 1972.
UD	Undetected.
VF	Village forest declared U/S 30 of OFA, 1972.
VSS	Vana Surakshya Samiti
NREP	Nation Rural Employment Agency.
RLEGP	Rural Landless Employment Guaranty Programme.
WFP	World Food Programme.
NAP	National Afforestation Programme.
GOI	Government of India.

Felling Cycle	The time which elapses between successive main felling on the same area,
Felling series	A forest area forming the whole or part of a working circle.
Fire line	A cleared permanent fire break intended to prevent fire crossing from one area to another.
Forests	An area set aside for the production of timber and other forest produce.
Forest un-classed	Forest land owned by Govt. but not constituted in to a reserved village for protected forest.
Forest Floor	A general term for the surface of the ground under the tree.
Forest Policy	The general principle determined according to social and economic objects adopted for the creation and/ or maintenance of the forests and their uses.
Forest produce	All materials yielded by a forest estate.
Forest type.	A category of forests defined generally with reference to its geographical ly location, climate and edaphic, features, composition and condition.
Germination	The resumption of growth of a seed or spore.
Genetic	The science of heredity.
Girdle	The cut through the bark and outer leaving layers of wood in a continuous incision all round the bole of a tree,
GBH	Girth of a stem measured usually over bark at breast height.
Grazing	The eating of any kind of standing vegetarian by domestic live stock or wild animals.
Gregarious	Habitually living and/or reproducing in more or less pure groups of communities.
Growing stock	The sum (By number or volume) of all the trees growing in the forests,
Ground flora (Layers)	The lowest stratum of a many layered plant community consisting of herbs, grasses, low shrubs and bryophytes,
Gully	A large in terminate watercourse with steep sites.
Gum wound	A dark amorphous substance produces in a wood of hard woods and some conifers in response to injury, infection and other irritation.
Habitat	The some of effective environmental conditions under which an organism lives.

Height	The total length from the ground level of a tree to the top.
Hectare	Area measured in the Metric system equal to 10,000sq. Mtrs. Or 2.471Ac.
Humidity	The ration generally expressed as a percentage the amount of water vapor present in the air required for the saturation at the same temperature.
Humus	The more or less decomposed organic matter for the soil which may form a separate layer.
Indigenous	Native to specified area or region not introduced.
Inter plant	To set young trees among existing forest growth, planted or naturally.
Jungle	A general Indian term for forests.
Laterite	A soil horizon indurate with hydrate iron and aluminium oxides formed in humid tropical climates.
Litter	The uppermost layer of organic debris on a forest floor, freshly fallen or slightly decomposed.
Loamy	Includes all sandy loams, clay loam, silt and silt loam texture.
Log	The stem of a tree or a length of a tree after felling.
Marking	Selection of trees to be cut or retain in a felling or felling operation.
Marking Hammer	An implement used for impressing on timber standing or felled.
Maturity	The stage at which a tree is capable of reproducing itself by seed and as attended its full height.
Mesophyte	A plant whose normal habitat is neither very wet nor very dry.
Mineral soil	A soil whose properties are dominated by the mineral matter usually containing less than 20% organic matter.
Mortality	Death or destruction of a forest trees as a result of competition, disease, insect damage, drought, owing, fire and other factor.
Mulch	Plant residue and other material used as a covering for the soil to conserve moisture.
Nursery	An area where plants are raised for planting purpose.
Nursery bed	Prepared areas in a nursery where seed is shown or into which transplant are put.
Over wood	The uppermost story of a forest or of any crop in which tow or more

	distinct crown layer occurs.
Period, working plan	The period for which detailed prescription are laid down in a working plan.
Phloem	The tissue of the inner bark used for the transportation of food stock and water.
Plantation	A forest crop raised artificially either by showing or planting.
Planting series	A series from to control planting operation.
Plot. Sample	A plot presumes as representative of a larger area.
Pole	A young tree form the time when the lower branches begin to fall off to the time when the rate of height growth begins to slow and crown expansions develop.
Prune	To remove live or dead branches from the standing trees for the improvement of the trees.
Pulp wood	Wood cut or prepared primarily for manufacture into wood pulp.
Regeneration	The renewal of a forest crop by natural or artificial means.
Regeneration survey	A survey for the assessment of established and all established regeneration generally by sample enumeration.
Root sucker	A shoot rising from the root of a woody plant.
Rotation	The planned number of year between the formation or regeneration of a crop and the final felling.
Royalty	A prescribe fee for forest produce payable to the owner of the forest.
Sanctuary	An area constitutes by competent authority in which killing or capturing of any form of wildlife is prohibited except with permission.
Sapling	A young tree from the time when it reaches 3' in height till the lower branches begin to form.
Seed bearer	A tree used for or capable of providing seed.
Seeding	The act on the part of a plant producing seed.
Seedling	A plant grown from seed, before it reaches the sampling stage.
Shrub	A woody perennial plant differing from a perennial herb in its persistence.
Silvicultural System	A method of silvicultural procedure worked out in accordance with

	accepted sets of silvicultural principles.
Silviculture	The art and science of cultivating forest crop.
Slope	The gradient of the surface of the ground.
Soil	The uppermost weathered layer of the earth's crust.
Soil Conservation	The preservation of soil against deterioration and loss by using the conservation practice.
Soil structure	The arrangement of individuals soil particles in to aggregates of definite size and shape.
Soil texture	The relating proportions of the various size groups of individual soil particles.
Soil type	A subdivision of a soil series based mainly upon the soil texture of the upper layer.
Soil working.	Loosening of the soil around plants by means of a pointed implement with a view to promote soil erosion and conserving moisture.
Stand table	A table showing the distribution of stem by diameter classes for each of a series of crop.
Stem	The principal axis of a plan form which buds and shoots are developed.
Storey	A horizontal stratum or layer of canopy in plant community.
Stock table	A table showing the distribution of volume by diameter class wise for each of a series of crop.
Stump	The base of tree and its roots left in the ground after felling.
Taper	The decrease in diameter of the stem of a tree or of a log from the base to upward.
Tending	An operation carried out for the benefits of a forest crop, at any stage of its life.
Thinning	A felling made in an immature stand for the purpose of improving the growth and form of the trees that remain without permanently breaking the canopy.
Thinning cycle	The planned interval, which elapses between successive thinning in the same area.
Timber	Categories of wood other than firewood.

Tree	A large woody perennial plant having a single well-defined stem and a more or less definite crown.
Under growth	The lowest stratum of woody and other vegetation above the ground cover.
Under storey	The lower storey of a forest crop.
Unevenaged	Applied to crops in which individual stem vary widely in age, the range of difference being usually more than 20 years.
Volume table	A table showing for a given species the average contents of trees, logs or sawn timber for one or more given dimensions.
Waste-land	Land not capable of producing materials or services of value. A miscellaneous land types.
Weed	Any unwanted plant that interferes or tends to interfere with the growth of individuals or favoured species.
Weeding	A tending operation done in the seedling stage in a nursery or in forest crop that involves the removal or cutting back of all unwanted species.
Working Circle	A forest area (Forming the whole or part of a working plan area) organized with a particular object, and under one silvicultural system and one set of working of plan prescriptions. In certain circumstances working circles may overlap.
Working Plan	A written scheme of management aiming at continuity of policy and action and controlling the treatment of a forest.
Yield	The volume of stem that can be removed annually or periodically.
Yield table.	A tabular statement which summarizes on an acre or other unit area or other unit area basis all the essential data relating to the development of a fully-stocked and regularly thinned even aged crop at periodic intervals covering the greater part of its useful life.

III a. LIST OF FLORA

TREE SPECIES

Sl No.	Local Name	Botanical Name	Family
1	Achhu	<i>Morinda tinctoria</i>	Rubiaceae
2	Amba	<i>Mangifera indica</i>	Anacardiaceae
3	Ambada	<i>Spondias mangifera</i>	Anacardiaceae
4	Amla	<i>Emblica officinalis</i>	Euphorbiaceae
5	Ankula	<i>Alangium salvifolium</i>	Alangiaceae
6	Arjun	<i>Terminalia arjuna</i>	Combretaceae
7	Asan	<i>Terminalia tomentosa</i>	Combretaceae
8	Ashoka	<i>Saraca asoca</i>	Caesalpinaceae
9	Aswastha	<i>Ficus religiosa</i>	Moraceae
10	Ata	<i>Anona squamosa</i>	Annonaceae
11	Babul	<i>Acacia arabica</i>	Mimosaceae
12	Balisssoo	<i>Dalbergia sissoo</i>	Fabaceae
13	Bakani (Mahaneem)	<i>Melia azadirachta</i>	Meliaceae
14	Bahada	<i>Terminalia belerica</i>	Combretaceae
15	Paladhua	<i>Erythrina suberosa</i>	Fabaceae
16	Bandhan	<i>Ougeinia oojeinensis</i>	Fabaceae
17	Bara	<i>Ficus bengalensis</i>	Moraceae
18	Barada	<i>Bauhinia purpurea</i>	Caesalpinaceae
19	Bana Kapasia	<i>Kydia calcyina</i>	Malvaceae
20	Bana kurudu	<i>Gardenia lucida</i>	Rubiaceae
21	Barkoli	<i>Zizyphus jujuba</i>	Rhamnaceae
22	Barabakulia	<i>Dalbergia paniculata</i>	Fabaceae

23	Barun	<i>Crataeva religiosa</i>	Capparaceae
24	Behanta	<i>Limonia accidissima</i>	Rutaceae
25	Bela	<i>Aegle marmelos</i>	Rutaceae
26	Bhalia	<i>Semicarpus anacardium</i>	Anacardiaceae
27	Bheru	<i>Chloroxylon swietenia</i>	Maliaceae
28	Bija	<i>Pterocarpus marsupium</i>	Fabaceae
29	Chadeigundi	<i>Vitex peduncularis</i>	Lamiaceae
30	Chakundi	<i>Cassia siamea</i>	Fabaceae
31	Champa	<i>Michelia champaca</i>	Magnoliaceae
32	Chandan	<i>Santalum album</i>	Santalaceae
33	Chatian	<i>Alstonia scholaris</i>	Apocynaceae
34	Char	<i>Buchanania lanjan</i>	Anacardiaceae
35	Damkurudu	<i>Gardenia latifolia</i>	Rubiaceae
36	Debadaru	<i>Polyalthia longifolia</i>	Annonaceae
37	Dhamana	<i>Grewia tilifolia</i>	Annonaceae
38	Dhaura	<i>Anogeissus latifolia</i>	Combretaceae
39	Dimiri	<i>Ficus glomerata</i>	Moraceae
40	Dhala Siris	<i>Albizzia procera</i>	Leguminaceae
41	Dhauranja	<i>Holoptelia integrifolia</i>	Ulmaceae
42	Genduli	<i>Sterculia urens</i>	Sterculiaceae
43	Gambhari	<i>Gmelina arboria</i>	Verbenaceae
44	Gandhapanas (Baghoari)	<i>Letsea macrophylla</i>	Lauraceae
45	Ganto	<i>Zizyphus mauritiana</i>	Rhamnaceae
46	Ghoralanjia	<i>Albizzia stipulata</i>	Leguminaceae
47	Giringa	<i>Pterospermum heyneanum</i>	Sterculiaceae

48	Gohira	<i>Acacia leucocephloea</i>	Mimosaceae
49	Gondaguria	<i>Macaranga peltata</i>	Euphorbiaceae
50	Gurudu	<i>Gardenia gummifera</i>	Rubiaceae
51	Ganiari (kantapalas)	<i>Coclospermum gossypium</i>	Cochlospermaceae
52	Genduli	<i>Sterculia urens</i>	Sterculiaceae
53	Haladu	<i>Adina cordifolia</i>	Rubiaceae
54	Harida	<i>Terminalia chebula</i>	Combretaceae
55	Hinjal	<i>Barringtonia acutangula</i>	Barringtoniaceae
56	Handiphuta	<i>Butea parviflora</i>	Fabaceae
57	Jafrā	<i>Bixa orillana</i>	Bixaceae
58	Jamu	<i>Syzygium cumini</i>	Myrtaceae
59	Karada	<i>Cleistanthus collinus</i>	Euphorbiaceae
60	Kendu	<i>Diospyros melanoxylon</i>	Ebenaceae
61	Kusum	<i>Schleichera oleosa</i>	Sapindaceae
62	Kasi	<i>Bridellia retusa</i>	Euphorbiaceae
63	Kumbhi	<i>Careya arboria</i>	Lecythidaceae
64	Kangada	<i>Xylia xylocarpa</i>	Fabaceae
65	Khirkoli	<i>Manilkara hexandra</i>	Sapotaceae
66	Khaira	<i>Acacia catechu</i>	Mimosaceae
67	Kauha	<i>Feronia limonea</i>	Rutaceae
68	Kaju	<i>Anacardium occidentale</i>	Anacardiaceae
69	Kalasiris	<i>Albizia lebeck</i>	Mimosaceae
70	Kalachu	<i>Glochidian lanceolarium</i>	Euphorbiaceae
71	Kamalagundi	<i>Mallotus phillippiensis</i>	Euphorbiaceae
72	Kanchan	<i>Bauhinia variegata</i>	Caesalpinaceae
73	Khakada	<i>Casearia tomentosa</i>	Flacourtiaceae

74	Kadamba	<i>Anthocephalus cadamba</i>	Rubiaceae
75	Kharsan	<i>Ficus glaberrima</i>	Moraceae
76	Khekad	<i>Garuga pinnata</i>	Bruseraceae
77	Kochila	<i>Strychnos nuxvomica</i>	Strychnaceae
78	Kurei	<i>Holarrhena antidysenterica</i>	Apocynaceae
79	Kansa	<i>Hymenodictyon excelsum</i>	Rubiaceae
80	Lodha	<i>Symplocos recemosa</i>	Symplocaceae
81	Mahula	<i>Madhuca indica</i>	Sapotaceae
82	Mai/ Mode	<i>Lannea coromondelica</i>	Anacardiaceae
83	Mahala/ Mahanim	<i>Ailanthus excelsa</i>	Simarubaceae
84	Mankada Kendu	<i>Diospyros embryopteris</i>	Ebenaceae
85	Makha	<i>Schrebera swietenioides</i>	Oleaceae
86	Mundi	<i>Mitragyna parvifolia</i>	Rubiaceae
87	Nimba	<i>Azadirachta indica</i>	Meliaceae
88	Phasi	<i>Anogeissus acuminata</i>	Combretaceae
89	Phanphana	<i>Oroxylon indicum</i>	Bignoniaceae
90	Panas	<i>Artocarpus heterophyllus</i>	Moraceae
91	Padel	<i>Stereospermum suaveolens</i>	Sterculiaceae
92	Palas	<i>Butea monosperma</i>	Fabaceae
93	Pani Gambhar	<i>Trewia nudiflora</i>	Euphorbiaceae
94	Rai	<i>Dillenia pentagyna</i>	Dilleneaceae
95	Rohini	<i>Soymida febrifuga</i>	Meliaceae
96	Raktachandan	<i>Pterocarpus santalinus</i>	Fabaceae
97	Sal	<i>Shorea robusta</i>	Dipterocarpaceae
98	Simili	<i>Bombax ceiba</i>	Bombacaceae

99	Pahadi Sisoo	<i>Dalbergia latifolia</i>	Fabaceae
100	Salai	<i>Boswellia serrate</i>	Burseraceae
101	Sahada	<i>Streblus asper</i>	Moraceae
102	Samarsinga	<i>Cordia macleodii</i>	Boraginaceae
103	Saguan	<i>Tectona grandis</i>	Verbenaceae
104	Sunari	<i>Cassia fistula</i>	Caesalpinaceae
105	Sidha	<i>Lagerstoemia parviflora</i>	Lytheraceae
106	Salapa	<i>Caryotoa urens</i>	Arecaceae
107	Tal	<i>Borassus flabellifer</i>	Arecaceae
108	Telakurum	<i>Ixora parviflora</i>	Rubiaceae
109	Tentuli	<i>Tamarindus indica</i>	Caesalpinaceae
110	Thelko	<i>Randia dumetorum</i>	Rubiaceae
111	Toon	<i>Cedrela toona</i>	Meliaceae

SHRUBS

1	Anantamula	<i>Hemidesmus indicus</i>	Asclepiadaceae
2	Ankakoli	<i>Carissa sprinarum</i>	Apocynaceae
3	Anita (Murmura)	<i>Helicteres isora</i>	Sterculiaceae
4	Arakha	<i>Calotropis gigentia</i>	Asclepiadaceae
5	Bana Tulasi	<i>Perilla ocmoides</i>	Lamiaceae
6	Bisalya Karani	<i>Tridax procumbens</i>	Asteraceae
7	Banamali	<i>Coffea bengalensis</i>	Rubiaceae
8	Baigaba	<i>Jatropha carcus</i>	Euphorbiaceae
9	Bajramuli	<i>Sida cordifolia</i>	Malvaceae
10	Banahaladi	<i>Curcuma spp.</i>	Scitamineae

11	Banakadali	<i>Musa superba</i>	Dioscoreaceae
12	Banakhajuri	<i>Phoenix sylvestris</i>	Arecaceae
13	Barakoli	<i>Zyziphus mauritiana</i>	Rhamanaceae
14	Basanga	<i>Jastaci adhaotoda</i>	Acanthaceae
15	Begunia	<i>Vitex negunda</i>	Rutaceae
16	Amari	<i>Ipomea carnea</i>	Convolvulaceae
17	Bhant	<i>Clerodendron infortunatum</i>	Verbenaceae
18	Bheji Baigan (Ankaranti)	<i>Solanum xanthocarpum</i>	Solanaceae
19	Banaharada	<i>Atylosia cajanifolia</i>	Papilionaceae
20	Bhrusanga	<i>Murraya koengii</i>	Rutaceae
21	Bichuati	<i>Tragia involucrata</i>	Euphorbiaceae
22	Chhuabhua	<i>Glycosmis peniaphyllia</i>	Rutaceae
23	Dhatki	<i>Woodfordia fruticosa</i>	Lythraceae
24	Duddura	<i>Datura stramonium</i>	Solanaceae
25	Dhala chakunda	<i>Cassia tora</i>	Ceasalpinaceae
26	Gangasiuli	<i>Nyctanthus arbortristis</i>	Oleaceae
27	Gilri	<i>Indigofera pulchella</i>	Fabaceae
28	Gokhara	<i>Tribules terrestris</i>	Averrhoaceae
29	Gudmari	<i>Premna herbeceae</i>	Verbenaceae
30	Hansalata	<i>Aristolochia bracteata</i>	Aristolochiaceae
31	Hariharika	<i>Euphorbia hirta</i>	Euphorbiaceae
32	Jati	<i>Eugenia bracteata</i>	Myrtaceae
33	Jajangi	<i>Phyllanthus reticulatus</i>	Euphorbiaceae
34	Kamini	<i>Murraya exotica</i>	Rutaceae
35	Kanteikoli	<i>Zizyphus oenoplia</i>	Rhamanaceae

36	Kalachua	<i>Glochidion lanceolarium</i>	Euphorbiaceae
37	Karabira	<i>Nerium indicum</i>	Apocynaceae
38	Khakda	<i>Casearia tomentosa</i>	Rubiaceae
39	Khadisiju	<i>Euphorbia tirucalli</i>	Euphorbiaceae
40	Khirkoli	<i>Mimosops hexandra</i>	Mimosaceae
41	Khuradu	<i>Gardenia gummifera</i>	Rubiaceae
42	Lajakoli	<i>Mimosa pudica</i>	Mimosaceae
43	Mehendi	<i>lawsonia inermis</i>	Lythraceae
44	Mohana	<i>Randia dumetorum</i>	Rubiaceae
45	Mudimudika	<i>Helecteres isora</i>	Sterculiaceae
46	Nagauri	<i>Lantana camara</i>	Verbenaceae
47	Nilabaigaba	<i>Jatropha gossypifolia</i>	Euphorbiaceae
48	Palma (palogunda)	<i>Curcuma angustifolia</i>	Zingiberaceae
49	Panidatun	<i>Flemingia chapper</i>	Papilionaceae
50	Patalagaruda	<i>Rauwolfia serpentina</i>	Apocynaceae
51	Pokasungha	<i>Eupatorium odoratum</i>	Asteraceae
52	Siju	<i>Euphorbia royaleana</i>	Euphorbiaceae
53	Simakayan	<i>Pithecelobium dulce</i>	Mimosaceae
54	Sisal	<i>Agave sisalana</i>	Agavaceae
55	Sitaparu/ Dhala Chitaparu	<i>Elumbago zeylanica</i>	Plumbaginaceae
56	Sunaragoda	<i>Grewia hirsuta</i>	Tiliaceae
57	Pengu- Lai Lata	<i>Celastrus paniculata</i>	Celastraceae
58	Satabari	<i>Asparagus recemosus</i>	Liliaceae
59	Kia Ketaki	<i>Pandanus tectorius</i>	Pandanaceae

HERBS

1	Apamaranga	<i>Achyranthus aspera</i>	Amaranthaceae
2	Bhuinnimba	<i>Andrographis paniculata</i>	Acanthaceae
3	Gheekuanri	<i>Aloe vera</i>	Asphodelaceae
4	Palua	<i>Curcuma aromatica</i>	Zingiberaceae
5	Kashatandi	<i>Saccharum spontaneum</i>	Poaceae
6	Salaparni	<i>Desmodium gangeticum</i>	Fabaceae
7	Saptapheni	<i>Opuntia dillenii</i>	Cactaceae

CLIMBERS

1	Atundi	<i>Combretum decandrum</i>	combretaceae
2	Akanabindhi	<i>Cissamplelos pareira</i>	Menispermaceae
3	Dantari	<i>Acacia torta</i>	Mimosaceae
4	Siali	<i>Bauhinia vahlii</i>	Caesalpiniaceae
5	Takua Lai	<i>Vitis ripanda</i>	Vitaceae
6	Guluchi	<i>Tinospora cordifolia</i>	Menispermaceae
7	Kankada	<i>Memordica dioica</i>	Cucurbitaceae
8	Baidanka	<i>Macuna pruriens</i>	Fabaceae
9	Palas Lata	<i>Butea superba</i>	Fabaceae
10	Desi alu	<i>Dioscorea deltoideae</i>	Dioscoreaceae
11	Dantari	<i>Acacia pinnata</i>	Mimosaceae
12	Gaja pippali	<i>Scindapsus officinalis</i>	Aracaceae
13	Malati	<i>Aganosma dichotoma</i>	Apocynaceae
14	Muturi	<i>Smilax macrophylla</i>	Smilacaceae
15	Nirmuli	<i>Cuscuta reflexa</i>	Cuscutaceae

16	Kantamali	<i>Ventilago denticulate</i>	Rhamanaceae
17	Pitali	<i>Dioscorea bulbifera</i>	Dioscoreaceae

BAMBOOS

1	Salia Baunsa	<i>Dendrocalamus strictus</i>	Poaceae
2	Kanta Baunsa	<i>Bambusa bambos</i>	Poaceae
3	Daba Baunsa	<i>Bambusa bambos</i> Var- <i>gigantea</i>	Poaceae

GRASSES

1	Balunga	<i>Oryza rufipogon</i>	Poaceae
2	Basana	<i>Bethriochloa pertma</i>	Poaceae
3	Broom Grass (Phula Jhadu)	<i>Thysanolaena maxima</i>	Poaceae
4	Chana	<i>Imperata arundinacea</i>	Poaceae
5	Dhanwantari	<i>Cymbopogon flexosus</i>	Poaceae
6	Duba	<i>Cynadon dactylon</i>	Poaceae
7	Ghodalanja grass	<i>Aristida sctacea</i>	Poaceae
8	Gondabena	<i>Bethriochloa bladhii</i>	Poaceae
9	Guguchia	<i>Chrysopogon gryllus</i>	Poaceae
10	Jharu	<i>Arundinella setosa</i>	Poaceae
11	Kasatandi	<i>Saccharum spontaneum</i>	Poaceae
12	Khas khas	<i>Vetiveria zizanioides</i>	Poaceae
13	Mutha grass	<i>Cyporus rotundus</i>	Poaceae
14	Noto	<i>Phragmites karka</i>	Poaceae
15	Phuri phuri	<i>Eragrostios unioloids</i>	Poaceae

16	Rosa grass	<i>Cymbopogon martinii</i>	Poaceae
17	Sabai Grass	<i>Eulaliopsis binata</i>	Poaceae
18	Sinkula Grass	<i>Heteropogon contortus</i>	Poaceae
19	Thetch grass	<i>Themeda arundinacea</i>	Poaceae

III b. LIST OF FAUNA

ANIMALS

	Local Name	English Name	Scientific Name
1	Badodi	Fulvous fruit bat	<i>Rousettule schenaulti</i>
2	Badudi	Shortnosed Fruit bat	<i>Cynopterus spinuex</i>
3	Bajrakapta	Pangolin	<i>Manis crassicaudata</i>
4	Banabiradi	Jungle Cat	<i>Felis chaus affinis</i>
5	Barha	Wild Boar	<i>Sus scrofa cristatus</i>
6	Balia kukur	Wild dog	<i>Cuon alpinus dukhunensis</i>
7	Bhalu	Black bear	<i>Melursus ursinus</i>
8	Bilua	Jackal	<i>Canis sureus indicus</i>
9	Cheeta Biradi	Leopard Cat	<i>Felis bengalensis</i>
10	Chhuchhundra	Grey Muskshrew	<i>Suncus murinus</i>
11	Gadamhalu	Ratel	<i>Mellivora capensis</i>
12	Gunduchimusa	Squirrel	<i>Funumbnuus pennanti</i>
13	Heta Bagha	Hyaena	<i>Hyaena hyaena</i>
14	Jhinka (Saju)	Porcupine	<i>Hystrix indica</i>
15	Kalarapataria Bagha	Leopard	<i>Panthera pardus fusca</i>
16	Katash	Toddy cat	<i>Paradoxurus hermaphroditus</i>
17	Kokisiali	Fox	<i>Vulpes bengalensis</i>

18	Kutura	Barking Deer	<i>Muntiacus muntjak</i>
19	Mankad Hanu	Monkey	<i>Presbytis entellus</i>
20	Mankada Pati	Rhesus macaque	<i>Macaca mulatta</i>
21	Musa	Rat	<i>Rattus rattus</i>
22	Musa (Nepali)	Flying squirrel	<i>Ratufa indica</i>
23	Musa	Long tailed tree mouse	<i>Vandeleuria oleracca</i>
24	Neula (Hatia)	Common mongoose	<i>Herpestes edwardsii</i>
25	Neula (Kuji)	Small Indian Mongoose	<i>Herpestes autopunctatus</i>
26	Ramsiali	Wolf	<i>Canis lupus</i>
27	Saliapatani	Small Indian Civet	<i>Viverricula indica</i>
28	Thekua	Hare	<i>Lepus nigricollis</i>

BIRDS

1	Baga	Cattle Egret	<i>Babulcus ibis</i>
2	Bana kukuda	Jungle Fowl (Red)	<i>Gallus gallus</i>
3	Bana kukuda	Jungle Fowl (Grey)	<i>Gallus soneratii</i>
4	Bani	Indian Myna	<i>Acridotheres tristis</i>
5		Bar headed goose	<i>Anser inicus</i>
6	Bataka	Common teal	<i>Anas crecca</i>
7	Baya	Weaver Bird	<i>Ploceus philippinus</i>
8	Bajapakhi	Sikhra	<i>Astur badius</i>
9	Bhadabhadalia	Roller or Blue jay	<i>Coracas bengalensis</i>
10	Bhaliakhai	Common grey Hornbill	<i>Tockus birostris</i>
11	Bhrungaraj	Racket Tailed Dronga	<i>Dissemurus paradisens</i>
12	Brahminy duck (Chakua chaki)	Ruddy Shell Duck	<i>Casarea fermuginea</i>

13	Bulbul	Red vented Bulbul	<i>Pyononotus cafer</i>
14		Bustard quail	<i>Turnix buscitator</i>
15	Chatak	House swift	<i>Micropus affinis</i>
16	Chatak	Pid crested cuckoo	<i>Clammator jacobinus</i>
17	Chalia (Common Kite)	Common parakeet	<i>Milvus migrans</i>
18	Cuckoo	Common Cuckoo	<i>Cuculus indiana</i>
19	Damara Kau	Jungle Crow	<i>Corvus macrorhynchos</i>
20	Dahuka		<i>Amanronis phoenicurus</i>
21	Deulia para	Blue Rock pigeon	<i>Coluba livia</i>
22	Gendalia	Open billed Stork	<i>Anastomus oseitans</i>
23	Ghar chatia	House Sparrow	<i>Posser domesticus</i>
24	Ghukalia	Common pied Myna	<i>Strunus contra</i>
25	Gobara Chadhei	<i>Red vented Bulbul</i>	<i>Molpastes cafer</i>
26	Gunduri	Quail blue legged	<i>Turnix susciator</i>
27		Grey Partidge	<i>Francolinus pondicerianus</i>
28	Haladi basanta	Black headed Oriole	<i>Oriolus anthornus</i>
29	Harada chadhei		<i>Crocopusn phoenicopterus</i>
30	Hansa	Spot Bill Duck	<i>Anas phoenicopterus</i>
31	Hansarali	Little Grebe	<i>Podiceps ruficollis</i>
32	Kajalpati	Black Drongo	<i>Dicrurus maorocerus</i>
33	Kantia Baga	Pond heron	<i>Ardeola grayili</i>
34	Kapota	Dove king	<i>Streptopelia decaocto</i>
35	Kapota	Spotted Dove	<i>Streptopelia chinensis</i>
36	Kathahana	Wood pecker	<i>Picoidis nanus</i>
37	Kathahana	Woodpecker golden backed	<i>Dinopium benghalense</i>
38	Kaupati	House Crow	<i>Corvus splendens</i>

39	Kochila khai	Malabar pied Hornbill	<i>Anthrococeros coronatus</i>
40	Koili	Cuckoo Indian	<i>Eudynamis scolopaceus</i>
41	Kumbhatua	Crow pheasant	<i>Centropus sinensis</i>
42	Kundachadhei	Babbler Common	<i>Turdoides somervillei</i>
43	Macharanka	King Fisher pied	<i>Cerytle rudis</i>
44	Mayura	Peafowl Common	<i>Pavo cristatus</i>
45	Nilakantha	Robin magpie	<i>Copsychuys saularis</i>
46	Pahadi bulbul	Red whiskered bulbul	<i>Pyononotus jocosus</i>
47	Panikua	Little cormorant	<i>Phalacrocorax niger</i>
48	Para	Imperia green Pigeon	<i>Ducula aenea</i>
49	Matia Titiri	Painted Spur fowl	<i>Galloperodix lunulata</i>
50	Pecha	Indian Owl	<i>Bubu bubu</i>
51	Pecha	Spotted owlet	<i>Athena brama</i>
52	Phutki	Tailor Bird	<i>Orthotonus sutorius</i>
53	Saugna	White Backed Vulture	<i>Gyps bengalensis</i>
54	Sankha Chila	Bramhiny kite	<i>Haliastur indus</i>
55	Sari (Maina)	Hill myna	<i>Gracula religiosa</i>
56	Sua	Large Indian Parakeet	<i>Psittacula eupatria</i>
57	Teetri	Grey partridge	<i>Francolinus fracolinuasiae</i>
58	Teetri	Quail	<i>Perdicula asiatica</i>
59	Whistling teal		<i>Dendrocynna javanica</i>
60	Yellow checked tit		<i>Machlolophys xanthogenysapilonotus</i>

SNAKES

1	Ahiraja	King cobra	<i>Naja hannah</i>
2	Ajagarh	Indian python	<i>Python molurus</i>

3	Boda	Common Boa	<i>Boa constricta</i>
4	Chiti	Common Indian Krait	<i>Bungarus caeruleus</i>
5	Dhandaboda	Russels viper	<i>Viper russelli</i>
6	Dhamana	Rat snake	<i>Ptyas mucosus</i>
7	Dhuli Naga	Saw scaled viper	<i>Echis carinatus</i>
8	Domundia	John's Sandboa	<i>Eryx stolata</i>
9	Gokhar	Indian Cobra	<i>Naja naja naja</i>
10	Kundanali	Tree snake	<i>Athetula spp.</i>
11	Lau donkia	Common green whip snake	<i>Dryophis nasutrus</i>
12	Pani Dhanda	Checked keel back	<i>Natrix piscator</i>
13	Rana	Banded Krait	<i>Bungarus fasciatus</i>
14	Tampa	Monocellate cobra	<i>Naja naja kuothia</i>
15	Telia sapa	Common blind snake	<i>Typhlops brahminus</i>

LIZARDS

1	Bahurupi	Indian Chameleon	<i>Chamaeleon zeyanicus</i>
2	Champeinali	Mabuya	<i>Mabuya bibro</i>
3	Endua	common Garden Lizard	<i>Calotes versicolor</i>
4	Endua	Fan throated Lizard	<i>Sitana panticerina</i>
5	Godhi	Monitor Lizard	<i>Varnus monitor</i>
6	Jhitipiti	House Lizard	<i>Himidactylus flaviviridis</i>
7	Pohala endua	India Chameleon	<i>Chamaeleon zeycunicus</i>

TORTOISE

1	Pathae Kainch	Land Tortoise	<i>Testudo conguta</i>
2	Pani Kaincha	Fresh Water Turlte	<i>Lessemys punctan granosa</i>

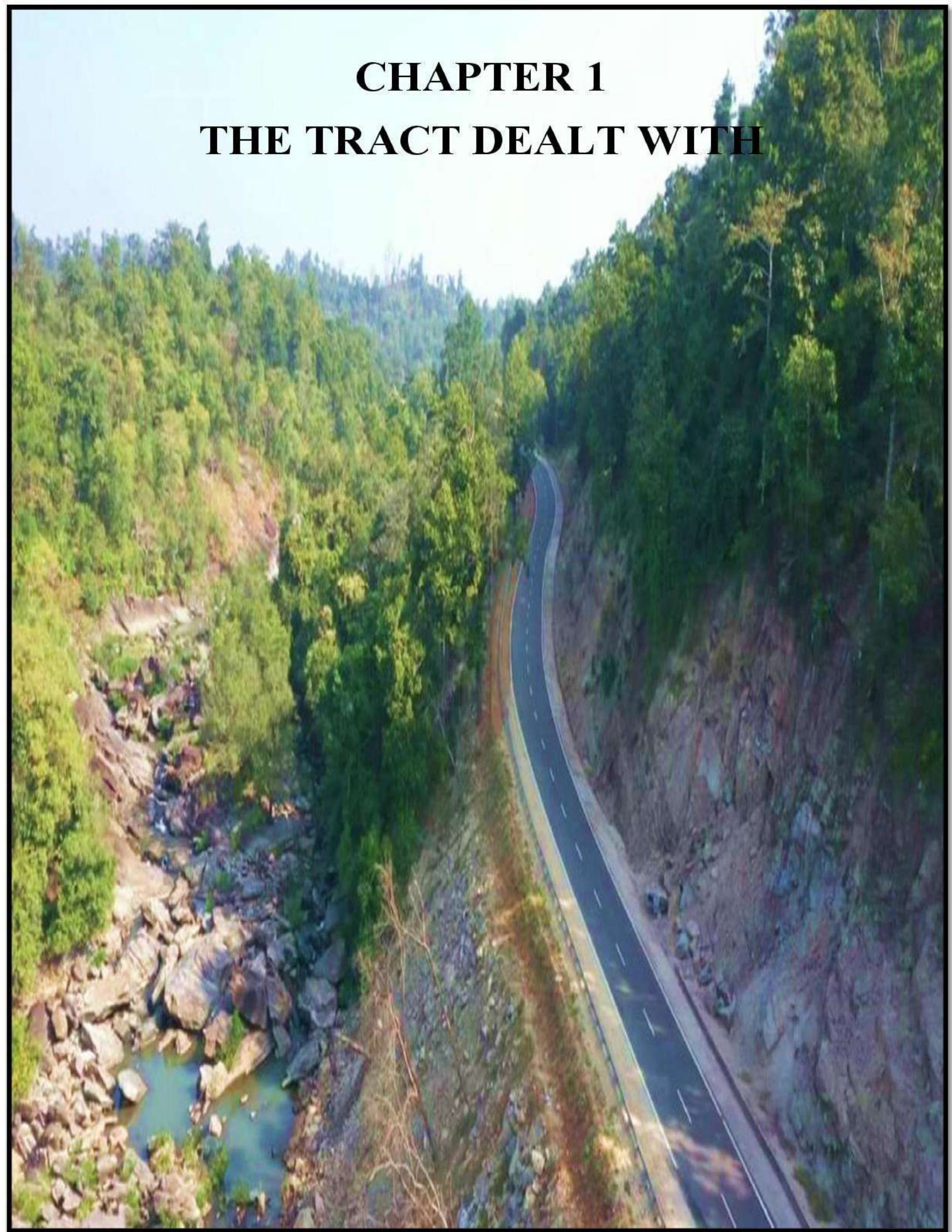
FISHES

1	Balia	<i>Wallagonia attu</i>
2	Baligarada	<i>Glossogobius giuris</i>
3	Banaspati	<i>Allia coha</i>
4	Bhakura	<i>Catla catla</i>
5	Chenga	<i>Ophiocephalus gachua</i>
6	Chitala	<i>Notopterus chitala</i>
7	Dandkhiri	<i>Esomus dandrica</i>
8	gadisa	<i>Ophiocephalus punetatus</i>
9	Jalanga	<i>Pangasius</i>
10	Jallah	<i>Cheal argentea</i>
11	Kantia	<i>Myotus cavasius</i>
12	Kerandi	<i>Barbus ambassis</i>
13	Magura	<i>Clarias batrachus</i>
14	Mirikali	<i>Cirrhina mrigala</i>
15	Mohurali	<i>Amblypharyngodon mola</i>
16	Pohala (Chuna)	<i>Cirrhina reba</i>
17	Pohala (Denga)	<i>Labeo bata</i>
18	Phali	<i>Notopterus notopterus</i>
19	Rohi	<i>Labeo rohita</i>
20	Serana	<i>Barbus serana</i>
21	Beula	<i>Ophiocephalus striatus</i>
22	Singi	<i>Heterophneustes fossilis</i>
23	Todi	<i>Mastacembelus armatus</i>

PART- I
SUMMARY OF FACTS
ON WHICH PROPOSALS
ARE MADE

CHAPTER 1

THE TRACT DEALT WITH



1.1 Name and Situation

1.1.1 Malkangiri Forest Division was created on 01.10.2003 vide Govt. of Odisha, Forest & Environment Department Notification **No.1F (A) 100/2003/13228/F&E dated 08.8.2003.** Previously it was included with Jeypore Forest Division. The Jeypore Forest Division created in the year 1958 and late Trinath Das A.C.F. prepared the first Working Scheme for management and exploitation of forest for 10 years i.e. from 1960-61 to 1969-70. On expiry of the scheme, the Working plan was written by Sri N.C. Patnaik B.Sc. AIFC, the former Working plan officer, Koraput Circle Koraput. The plan was for the period from 1971-72 to 1990-91 for Reserve and Protected lands and Working Scheme was also prepared from 1971-72 to 1980-81 for Un-reserved lands. The Working plan was first extended up to 1992-93 vide Letter No-13-FCWP-05-JYPR Dt.24.02.1990 of the C.C.F, Central Bhubaneswar and subsequently up to March, 2000 vide Letter No-13-05-548 Dt.01.11.1993 of the C.C.F, Central Bhubaneswar. Similarly, the Scheme has been extended up to March, 2000 Vide Letter No-13-FCWP-OS-JYP Dt.09.02.1994 of the C.C.F, Central, Eastern Region, Bhubaneswar.

1.1.2 During re-organization of the Forest Department, the Jeypore Forest Division has been bifurcated into two Forest Division i.e. Jeypore Forest Divisions, headquarter at Jeypore and Malkangiri Forest Division, and headquarter at Malkangiri. The administrative jurisdiction of the Division was a part of Jeypore Sub-Division of Koraput District and whole of Malkangiri Sub-Division of Malkangiri District. The last Working plan was prepared by Sri M Badaik, OFS-I, DFO, Kenduleaf Division Jeypore. The proposed period of the plan is for 10 years i.e. from 2021-22 to 2030-31.

1.1.3 The proposed Working plan includes all Reserved Forest (RFs) and Proposed Reserved Forest (PRFs). In addition to this 51 no's VFs, 10RL, 1UDPF and 11no's coupes of Bamboo working scheme area(4URL) has also been proposed to include in the revised Working plan.

1.1.4 This Forest Division comprises Malkangiri, Mathili, Khairput, Chitrakonda, Kalimela, Motu and Kudmulgumma Tahasils of Malkangiri Sub- Division of Malkangiri District. Now the Kudmulgumma Tahasils shifted to Chitrakonda and functioning as Chitrakonda Tahasils instead of Kudmulgumma. There are two Urban Centers i.e. Malkangiri Municipality and Balimela N.A.C.

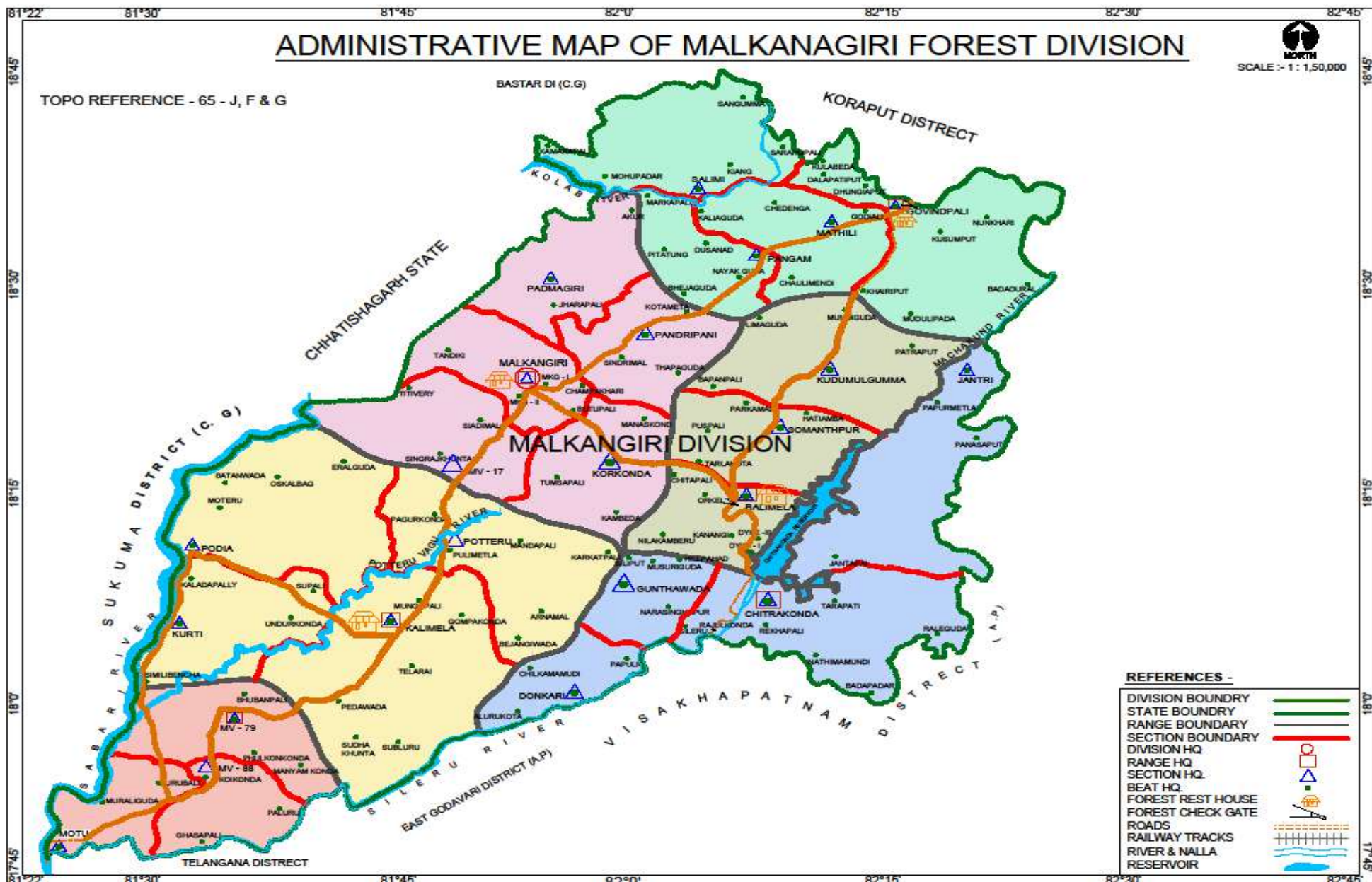


Fig. 1.1: Administrative Map of Malkangiri Forest Division

MALKANGIRI DISTRICT

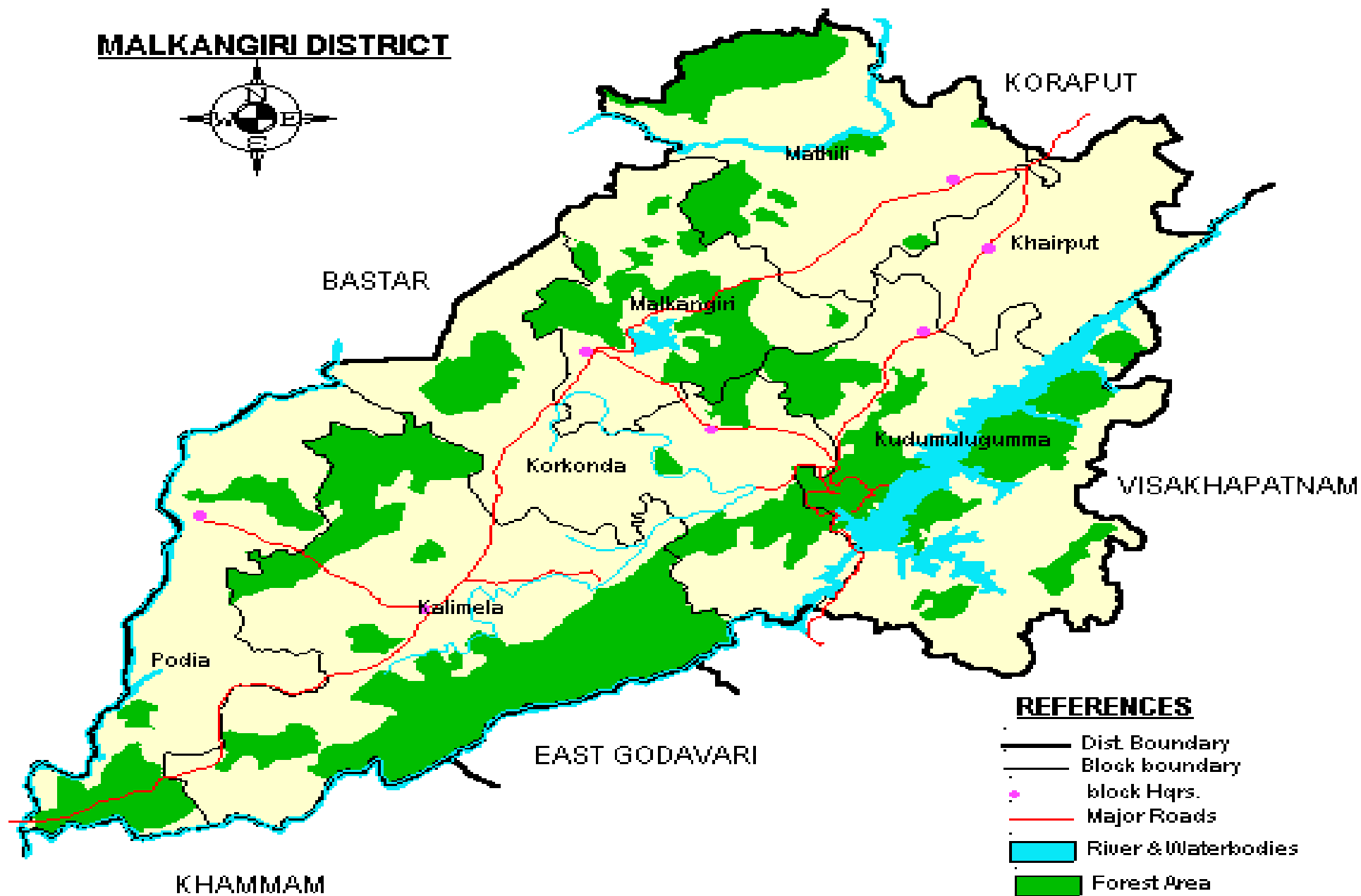
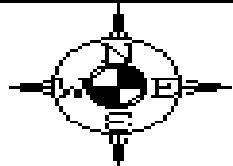


Fig.1.2: Malkangiri District Map with Block Headquarters

1.1.5 The administrative jurisdiction of the Division was a part of Jeypore Sub-Division of Koraput District and whole of Malkangiri Sub-Division of Malkangiri District. During re-organization of the Forest Department, the present Jeypore and Malkangiri Forest Division came into existences with administrative jurisdiction of Jeypore Sub-Division of Koraput District and Malkangiri District respectively. This Division extends from longitude E 81° 23'16'' to E 82°24'18'', latitude N 17°49'38'' to N 18°44'15''.

During the re-organization of Forest Department, the Malkangiri Forest Division was under the administrative control of the then Jeypore Forest Division and systematic/scientific management practices were being followed.

As such there are six Ranges namely Malkangiri Range headquarter at Malkangiri, Mathili, Range headquarter at Govindapalli, Balimela Range headquarter at Balimela, Kalimela Range headquarter at Kalimela, Chitrakonda Range headquarter at Chitrakonda and Motu Range headquarter at M.V.-79, 23 Sections and 116 Beats. The detailed list of Section and Beats are given Range wise in **Appendix VIII**.

The Division has sixteen Forest Roads with total length of 113.53 kms falling within its jurisdiction connecting important locations inside the forest. The Division has around buildings used as Office, Residence, and Rest sheds. The details of these buildings are given in **Appendix IX**.

1.1.6 Demographic profile:

The total population of Malkangiri Forest Division as per 2011 census is 613192 of which male population is 303624(49.52 %) and female population is 309568 (50.48%). The density of population per sq.km is 106 as against 270 people per sq. km. of the Odisha State. The population in this Division almost change from 2001 to 2011 is 21.62% in the population compared to population as per 2001 census. In the previous census of India 2001, Malkangiri District recorded increase of 19.39 percent to its population compared to 1991. The average literacy of population of Malkangiri District is 48.54% as per census 2011. Similarly, the Male literacy is 59.07% and Female literacy is 38.28%. The population growth trends of Malkangiri Division from 2001 to 2011 are given **Table No-1.1**

Table No. 1.1: Population Growth in Malkangiri District

Year	2001	2011
Population	504198	613192
Annual growth rate	1.94%	2.16%

The Division shares its boundary in the following manner.

North	: Jeypore Division
South	: Andhra Pradesh/Chhattisgarh
East	: Koraput Division / Andhra Pradesh
West	: Chhattisgarh

Table No.1.2: Population Rate in Malkangiri

	Odisha	Malkangiri	(% of State)
Population	41974218	613192	1.46%
Population Density	270/ sq. km.	106 / sq. km.	
Male/Female Ratio	979	1020	
Literacy	73.45%	48.54%	
Forest Area (As per FSI report 2019)	51619 sq. km.	2336.17 sq. km.	4.53%
Forest cover	33.15%	40.34%	

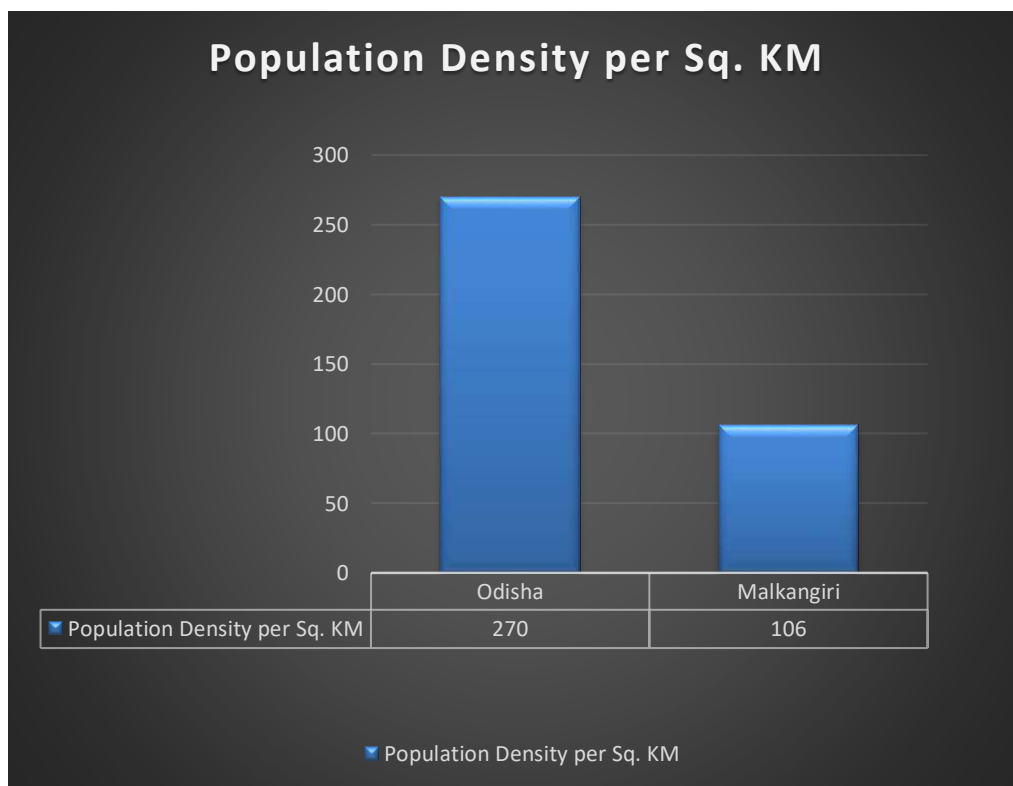


Fig.1.3: Population Density of Malkangiri District compared to Odisha

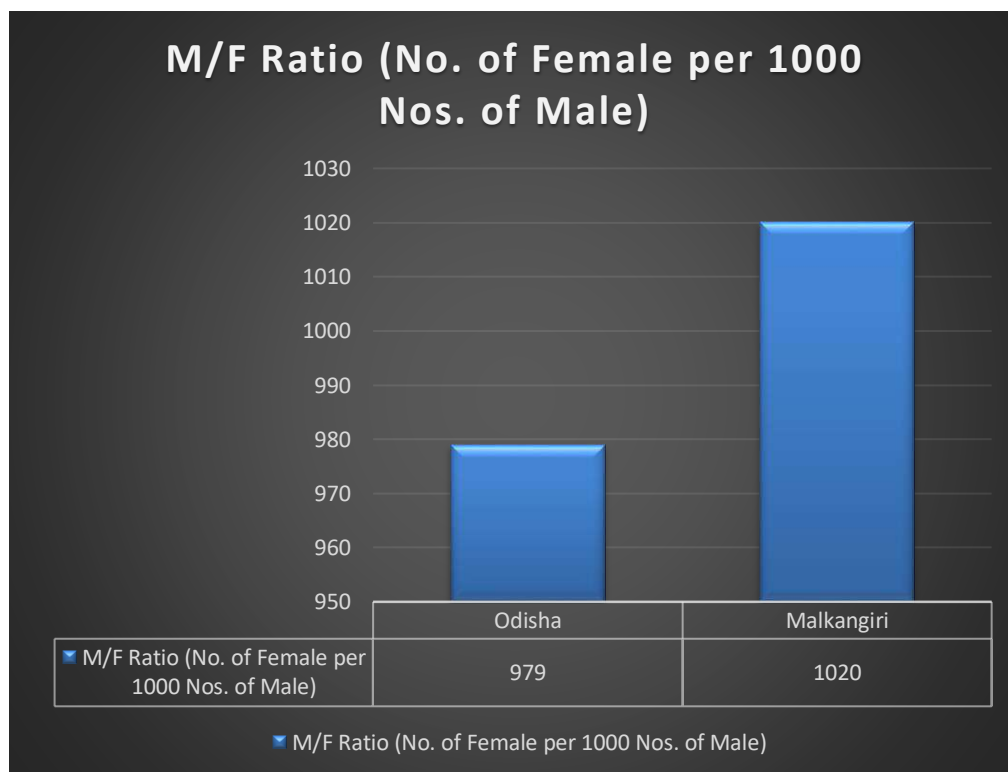


Fig.1.4: M/F Ratio of Malkangiri District Compared to Odisha

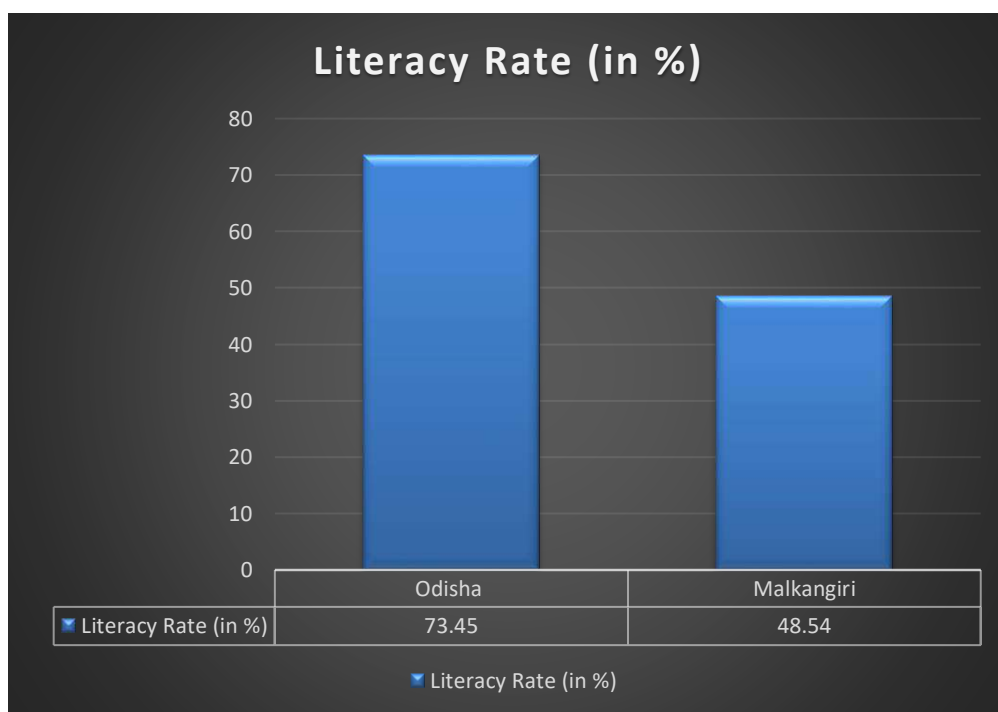


Fig.1.5: Literacy Rate of Malkangiri District compared to Odisha

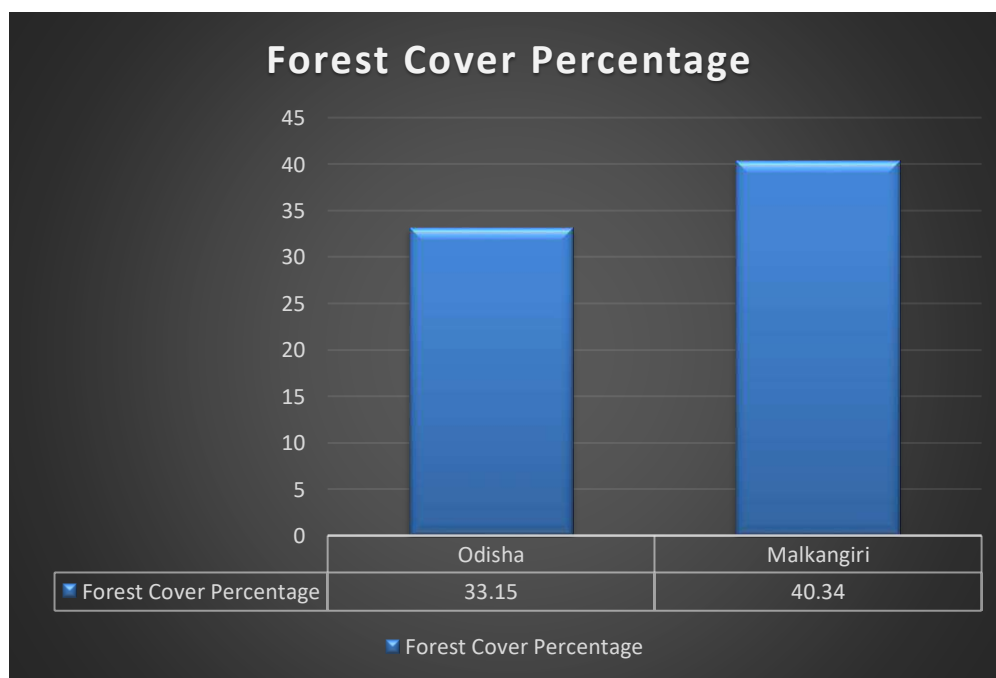


Fig.1.6: Forest Cover Percentage of Malkangiri District Compared to Odisha

1.2 Configuration of the Ground

1.2.1 Physiography

The Malkangiri Forest Division is situated in a very peculiar physiographic location having two stratified zones i.e. low plain and 900mtrs and above landmass of Bonda Hills, Kondakamberu etc.

1.2.2 The low plain of Malkangiri area starts right from Govindpalli in the North (243 M) and extends up to the extreme South, the confluence of the river Sabari and Sileru. There is also number of small numbers of rocky hills breaking the monotony of the plains. The hills like Goiparbat, Akur and Bhejangiwada etc. contains good forest cover. The important peaks of Malkangiri Forest Division are shown in the Table.

Table: 1.3: Important Peaks of Malkangiri Forest Division

Sl. No	Name of Peak	Forest Block	Height in (m) above MSL
01	Sindhimal	Sindimal PRF	565
02	Chitapari	Chitapari RF	454
03	Tarlakota	Tarlakota PRF	431
04	Balimela	Balimela PRF	904
05	Matumkonda	Matumkonda PRF	1025
06	Sileru	Sileru West RF	825
07	Udayagiri	Udayagiri RF	532
08	Dantunguda	Dantnguda PRF	970
09	Gotiguda	Gotiguda RF	512
10	Putparbat	Putparbat RF	618
<i>Source: As per the Survey of India Topo maps.</i>			

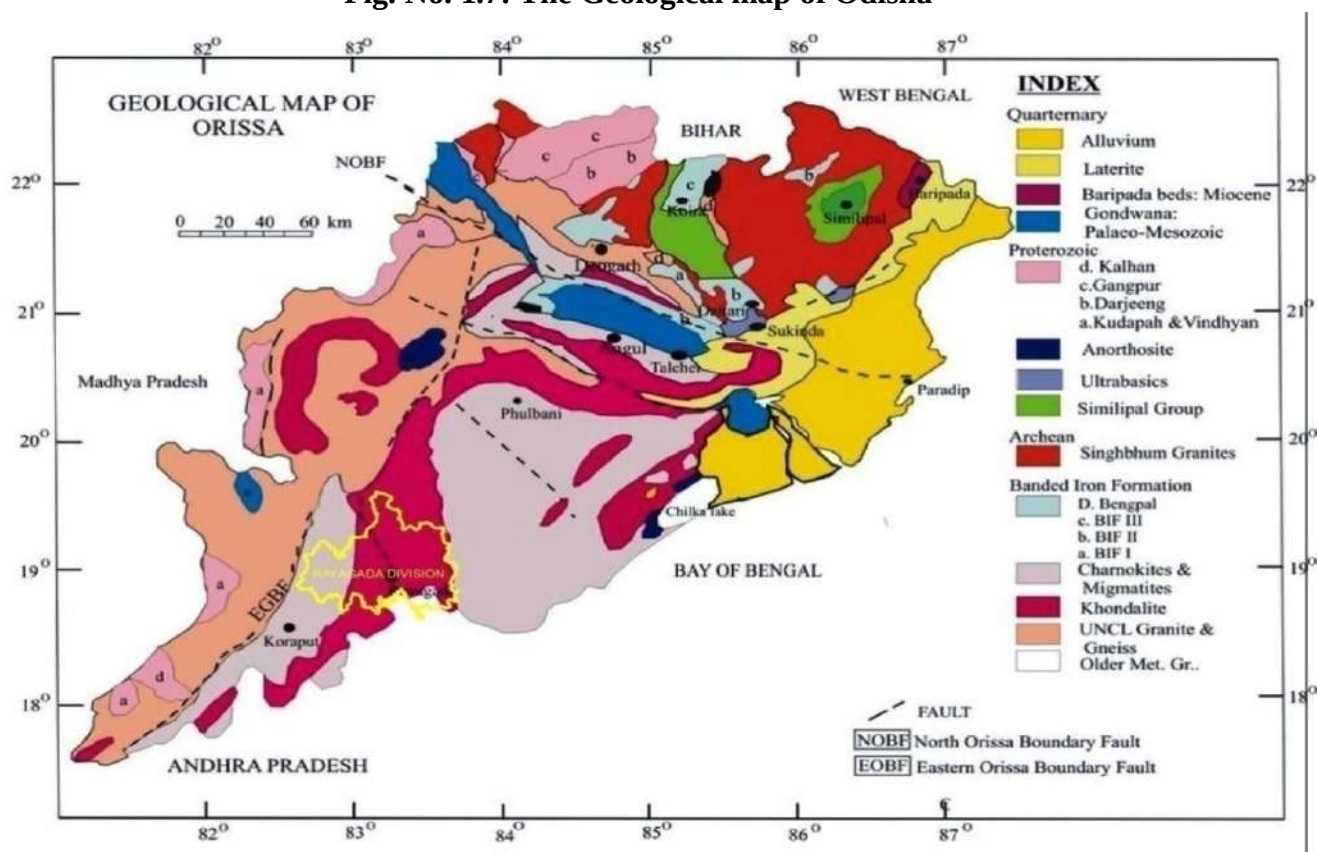
1.3 Geology, Rock and Soil

1.3.1 Geology

Geologically this Division forms the part of the Indian Peninsula, one of the oldest rock masses on the earth. The early geological history of about 1600 million years back, the sedimentary and igneous rock were formed which were repeatedly subject to change in temperature and pressure, resulting to formation of altered or metamorphic rock such as

Charnockite, Khondalite and Granite Gneiss. Later around 1400 million years back, an arm of the sea extended into the western part during the Cuddapah period, resulting formation of Sand Stone, Shale and Lime Stone. The Sand Stones generally forms the hills, where as the Line Stone and the Shales forms the valleys. Similarly, Khondalite constitute flat-topped hills and plateau, while the Charnockites form sharp ridges and hills. Thus, the many hills and valleys resulting undulating uplands are covered with an extensive capping of laterite. The Koraput plateau and its high hills represent his early laterite surface. Thus, the prolonged erosion to this old plateau resulted to three levels 300mt. of Malkangiri Plain.

Fig. No. 1.7: The Geological map of Odisha



1.3.2 Rock:

The hill tracts are mainly composed of very ancient rocks, completely altered and Crystallized due to metamorphism. Their original nature and organic remains are obliterated and are known as the crystalline or metamorphic series. The chief group of rocks is Archeans, Cuddapah and Territory. Also, the recent formations like laterite and alluvium are seen in most part of the Division.

1.3.2.1 Khondalite Group.

These are mainly Archeans sediments comprise of graphite, sillimanite, garnet, feldspar, quartz, schist, gneisses. The Khondalite form step hills and occur as linear ridges. Also, they are brownish in colour. Graphite is found many places of the Division.

1.3.2.2 Charnockite Group.

These rocks are represented by the altered pyroxene granulite and acid to intermediate Charnockite equivalent to composition of hypersthene granite and hypersthene diorite. The rock is greasy-gray to dark gray in colour. This group shows a wide variation in composition and proportion of different minerals such as hypersthene, quartz, plagioclase, feldspar etc. besides minor amount of hornblende and biotite.

1.3.2.3 Granite and Schist: - This rock group occurs closely associated with above two groups are disconnected out crops and narrow cliffs. This also comprises of mainly quartz, feldspar, garnet and biotite. The rock is leucocratic and grayish- white to pinkish-white.

1.3.2.4 Thus the common rock types in Malkangiri are Granite gneiss. In Malkangiri, Kotametta the Cuddapah series are found resting on the archeans. These are purple shale and slates intercepting with limestone in places, overlying a variable thickness of white quartzite. During field exercise, the following metamorphosed sediments were identified.

- a) Grits and Andalusite in the Tulasi Hill
- b) Andalusite Schists in Kolab Valley
- c) Banded Maematite and Quartzite in Akur Hill.
- d) Chlorite and biotite schist in Pitatung PRF
- e) Banded Haematite, Magnetite and Quartzite in Malkangiri – Balimela road.

However, Soil formations on weathering from different Rock –Types are given below:

Table No. 1.4: Relation between rock- types and resulting Soil formations

Rock Type	Nature of Resulting Soil
Lime Stone	Soils are generally calcifying in nature with low to very low silica content
Shale	Basic Soils, rich in iron (Fe), Aluminum (Al), Magnesium (Mg) and Calcium (Ca)
Quartzite	Hard rock generally does not form any soil, but when formed soils have high silica content.
Granitic-intrusive	Acidic soils with high silica content, rich in Aluminum (Al) and Iron (Fe)
Garnetiferous-Granite	Acidic soils with high silica content, rich in Aluminum (Al) and iron (Fe)
Khondalite	Acidic to basic soils, very suitable for prolific, luxuriant growth of plants.

Source: Geological Survey, Southern Region, Berhampur.

1.3.3 Soil:

The soil throughout the district is Red, Lateritic and Black type. The Soil is mostly neutral to acidic in nature. Available of Phosphorus and Potash are high in nature whereas except Malkangiri block the Nitrogen status in the entire block is medium where as low in Malkangiri. The Soil Classification has been made basing on the physical characteristics and main Soil types are 1) Red Laterite Soil, 2) Red Sandy Soil, 3) Black Soil and 4) Alluvial Soil.

1.3.3.1 Red Laterite Soil: These soils are poorly fertile with low organic matter. Available nitrogen and phosphate are low and potash is medium. Nitrogen is lost due to leaching and phosphate becomes unavailable due to fixation by Fe and Al oxides. Cation exchange capacity of the soil is low and it is low in percentage base saturation. Sulphur is absorbed as pyrites or zinc sulphide. The Red laterite soil of Malkangiri is formed from Sedimentary Rocks, poor in organic content and low in water holding capacity. These types of Soil are found in Mathili, Motu, Chitrakonda, Kudumulugumma and Kahairput and part of Kalimela area. Khondalitic hills are generally covered with good soil. They are sandy in texture. The mantle varies from 0.5m to a depth of 10m. It is generally well drained and deep to very deep in Balimela and Mantriput forest blocks.

1.3.3.2 Sandy Soil: The red sandy soils are partially deposited soils occurring on very gentle slope to nearly level or flat valley bottom areas. They are neutral to weakly alkaline, noncancerous to calcareous and have medium to high cation exchange capacity and base saturation. The water holding capacity is relatively high. These soils are moderately well drained to poor drainage with moderately low to low permeability. These soils normally respond to irrigation, manuring and other management practices and generally good yields are obtained on these soils. In Plain area of Pangam, Pandripani, Korkunda Udayagiri Poteru area of the District having characteristics of Red Sandy Soil.

1.3.3.3 Black Soil: These soils occur sporadically in the districts in the area Mathili, Padmagiri, MV -7, MV-17, Kalimela, Podia Part of Balimela, part of Khairput etc. The black colour of the soil is due to presence of titaniferous magnetite, humous, bituminous etc. These soils are formed due to weathering of basic rocks in the low-lying areas. These soils are heavier in texture having clay content more than 30 percent. Clay minerals are dominated with smectites for which deep cracks are observed during summer. The effective soil depth extends to more than 90 cm. The soils swell on wetting holding maximum amount of moisture. Permeability of these soils is slow which result in severe surface soil erosion. The soil pH is neutral to alkaline having free calcium carbonate nodules in the profile. The soil is rich in calcium but deficient in phosphorus, potassium, zinc and boron.

1.3.3.4 Alluvial soil: It is restricted to nallah and river banks and is shallow to deep. Most of the alluvial soils are derived from the sediments deposited by rivers. Thus, the parent material of these soils is all of transported origin. The alluvial soils are yet immature and have weak profiles. The chemical composition of the alluvial soils makes this group of soils as one of the most fertile in the world. The proportion of nitrogen is generally low, but potash, phosphoric acid and alkalis are adequate, while iron oxide and lime vary within a wide range. The widest occurrence of the alluvial soils in Salimi, Kiang, Tentuliguma, Mendikuli and Motu Area. In forest block concerned in Dharmaguda RL, Dhasmantpur RL, Motu RF etc.

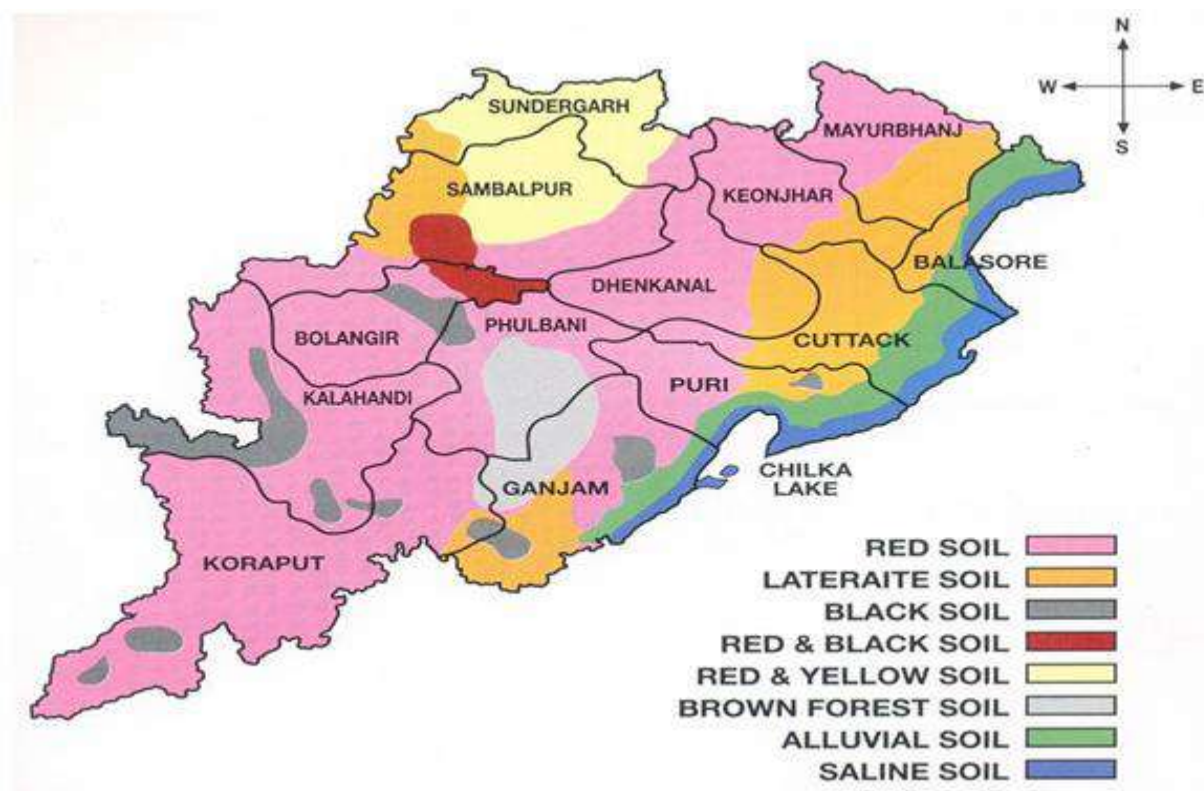


Fig. No. 1.8: The Soil map of the State

1.3.4 Nutrient Status : No soil study and analysis has been undertaken, neither by the field staff nor by any soil scientists, due to shortage of time and local conditions. But as per the early report the soil is rich in Organic Matter, Carbon and Nitrogen in Forest like Bonda Hills, Kondakamberu PRF, Balimela PRF due to cleaning of Forest and Podu Cultivation. The Soil depth is very low, resulting low nutrient content.

Table No. 1.5: Essentiality of Nutrients in the Soil

(A) Macro Nutrients	
Element	Rock
Nitrogen	Essential part of Chlorophyll and proteins, foster vegetative growth.
Phosphorus	Promotes root growth and stem strength, essential in all energy transfer in plants.
Potassium	Promotes starch and sugar formation, root growth and plant vigor.
Calcium	Enhances N uptake, cell elongation and development of meristematic tissues
Magnesium	Major constituent of chlorophyll in plants, important in Phosphorus

	Metabolism and enzyme activities
Sulphur	Essential for Synthesis S- containing amino acids and nitrogen fixation by legumes.

(B) Micro nutrients	
Element	Rock
Iron	Important in chlorophyll production and enzyme activation
Manganese	Activates enzymes regulating carbohydrate metabolism and essential for photochemical reaction.
Copper	Metal activate for several enzymes and possible light reaction in plants.
Zinc	Metal activates for enzyme.
Boron	Responsible for several regulatory mechanisms in many plants, including sugar translocation across cell membranes and oxidation process.
Molybdenum	Required for N- Fixation in legumes and nitrate reduction in non- legumes.

1.3.5 Soil Erosion: Various types of soil erosion like, sheet erosion, rill erosion, gully erosion and stream bank erosion are abundantly observed in the Division. The main causes of erosion are repeated removal of trees, overgrazing, forest fire and podu cultivation in hilly terrain. As the crest of the plateau begins to fall through ghats and rugged hills, red soil get thinner over exposed sheet rocks or become skeletal with quartzite gravel. In hollows or flat terrains, where there is some accumulation, soils are sticky and ill-drained. Generally, inside forest such dark grey sandy soils are thin, poor, and calcareous having high Ph value. Along nallahs or valleys with better depth of soils Sal makes its appearance in Dasamantpur RL and Dharmagarh RL. The eroded hills support the species like *Cleistanthus collinus*, *Terminalia tomentosa*, *Xylia xylocarpa* and *Boswellia serrata* etc.

1.3.6 Mineral Resources: Department of Mines, Govt. of Odisha has surveyed mineral resources available in this tract. Major minerals include quartz, iron ore, china clay, mica and limestone. In addition, granite and other minerals are also found. A list of minerals and their probable locations are given below:

1.3.7 Overview of Mining Activities in the Division.

Other than ordinary stone a great variety of major mineral potential like Bauxite, Tin, Asbestos, Limestone and Specified Minor Minerals Lime Quartz, Talc/Soap Stone & Decorative stone (Granite) are available in the Division.

Table No. 1.6: Major Minerals

Sl. No.	Minerals	Location	Reserve (in MT)	Remarks
1	Bauxite	Korukonda	0.018	
2	Limestone	Kottameta-Nandiveda-Uskalbagu	240	
3	Tin	Salimi and undaguda	0.000347	
4	Asbestos	Bejingwada	-	Not estimated

Table No. 1.7: Minor Minerals (Specified Minor Mineral).

Sl. No.	Minerals	Location	Reserve (in MT)	Remarks
1	Quartz	Gorespalli, Saradaput, Ramvaram, Kotapalli, MV-79, MV-127, MV-96	-	Not estimated
2	Talc/Soap Stone	Saradaput, Pandripani	-	Not estimated

Source: Dist. Survey Report 2019, Malkangiri

Table No. 1.8: DECORATIVE STONES.

DIVISION: MALKANGIRI NAME OF MINERAL: DECORATIVE STONE											
Sl. No.	Name of Concession	Type of Concession	Status (Running/ Temp-closed)	Name of Concession Holder	Village	Tahasil	Co-ordinate all boundary point		Area (in ha.)	Validity of conerssion	
							Lottitude	Longitude		From	To
1	Peta	ML	Working	Ch. Venugopal HIG-I Phase-I BD Colony, Pokhariput, Bhubaneswar	Peta	Motu	17°25'00" to 17°52'30"	81°25'00" to 81°30'00"	19.425	07.06.2018	20.06.2048
2	Peta	ML	Working	K.srinivasa Rao. Plat No-13, Nutan colony New Bowenpally, Secuderabad	Peta	Motu	18°54'48" to 18°54'54"	81°27'28" to 81°27'44"	9.981	02.04.2019	02.04.2049
3	Peta	ML	Non-working	P.Vengal Rao16-2-836/3 Mdhavnagar, Saidabad, Hyderabad	peta	Motu	17°55'27" to 17°55'51"	81°27'36" to 81°27'46"	4.917	01.01.2004	31.12.2034
4	Panarguda	ML	Non-working	M/S Krundei granaite. No-8 2 nd block, Karamangala, Madivala Post, Bangalore-560068	Panarguda	Malkangiri	18°20'00" to 18°15'00"	81°45'00" to 81°50'00"	9.134	27.07.2004	26.07.2034
5	Jagannathpali	ML	Non-working	M/S Krundei granaite. No-8 2 nd block, Karamangala, Madivala Post, Bangalore-560069	Jagannathpali	Malkangiri	18°20'00" to 18°15'00"	81°45'00" to 81°50'00"	8	27.07.2004	26.07.2034
6	Potteru	PL	Applied for mining lease	M/s Aakash Stone Industries Ltd., Santacruz Airport side, Marble Market, SE, Highway Vile parle (East) Mun=mbai-400099	Potteru	Kalimela	17°56'56" to 17°57'02"	81°01'20" to 81°01'27"	2.958	20.12.2006	19.12.2008
7	Potteru	PL	Applied for mining lease	M/s Oriental Timex Ltd., 26/25 Bazar Marg Old Rajedndra Nagar New Delhi-110060	Potteru	Kalimela	17°56'52" to 17°57'08"	81°40'13" to 81°40'32"	10.279	07.05.2007	06.05.2009
8	Majhiguda	PL	Applied for mining lease	M/s KPK Granaite . H. No-39-47/D Old Baypass RoadNandigama Dist-Krishna (AP)	Majhiguda	Khairput	18°28'18.7" to 18°28'28.5"	81°15'00.6" to 81°15'22.7"	19.29	23.08.2016	22.08.2018
9	Majhiguda		Applied for mining lease	M/s Sri Bhubaneswari Granaite . Flat No.528 C-Block, Rajendra Vihar Forest Park, Bhubaneswar	Majhiguda	Khairput	18°28'28.5" to 18°28'36.5"	82°15'00.9" to 81°15'22.8"	10.522	23.08.2016	22.08.2018

Source: Dist. Survey Report 2019, Malkangiri

1.3.8 Other Minerals:

The total good quality limestone reserves near Kotameta, Nandiveda and Uskalvagu estimated around 240 million ton and Bauxite deposits are recoded near Korukonda estimated 0.018 Million Ton and Tin is occurred near village Salimi and Mundaguda around 0.000347 MT. In the Minor Mineral categories, the specified minor minerals like quartz occurred in the villages of Gorespalli, Saradaput, Ramavaram, Kotapalli and MV-79, 127, 96 and Talc/soap stone are the resources of these minerals are not estimated by DG (O), BBSR. The Dimension stone are located around the village Sargiguda, Goliaguda, Padmagiri, but the reserves are not estimated by DG (O) BBSR.

Table No. 1.9: Minerals and their Probable Locations

Sl No	Minerals	Probable location	Range
1	Asbestos(A)	Motu	Motu
2	Limestone (Ls) Dolomite(D)	Kotamatteru- Nandiwada-Uskalbag	Kalimela
3	Soapstone(S)	Kalimela area	Kalimela Range
4	Tin ore(T)	Kiang,Salimi,Tentuligumma,Guruguda, Mundaguda, Kurumpalli	Mathili
5	Gold (Prospects)(Au)	Kiang & Govindapalli	Mathili
6	Quartz & Quartzite(Q)	Godiali	Mathili

1.4 Climatic Parameters:

1.4.1 Climate: The general climate of Malkangiri Division is characterized by tropical to sub-tropical climate more is to Deccan type. This is due to its elevation and hilly terrain at most of the places. Actually, four distinct seasons i.e. summer, rain, autumn and winter are experienced during the year. The summer season from February to Mid-June, the rainy season from mid-June to September, the autumn season is from October to November and the winter is from December to February. In Malkangiri plains rains come in Mid-July, days are even warm in February, March quite hot and the summer is long and pronounced. Warm is very high in Malkangiri, Kalimela and Motu area other than Mathili, Balimela and Chitrakonda area.

1.4.2 Rainfall: This Forest Division gets rainfall mainly through South West Monsoon and the Ghat Area of the Division largely influences the distribution of rainfall. The monsoon gets established in the 2nd part of June and the Low pressure supports it. The peak monsoon period is the month of July, August and September when 70% annual rainfall received. Then slowly the rain recedes from October and complete by the month of November.

The climate in the district is generally cold during winter and hot in summer with temperature ranging from 13 degree C to 47-degree C. The average annual rainfall is about 1700 mm. Relative humidity is generally high, especially in the monsoon and post-monsoon months. During the rainy season, most areas of the District became impassably swampy and heavy floods isolate it from the outer world.

Table No. 1.10: Month Wise Rainfall Data of Malkangiri District for 2018 (Fig. in mm)

Month	Total	Average	Normal
January, 2018	0.00	0.00	2.70
February, 2018	0.00	0.00	4.10
March, 2018	0.00	0.00	8.90
April, 2018	445.00	63.57	34.80
May, 2018	329.96	47.14	9.10
June, 2018	1336.27	190.90	212.20
July, 2018	5331.10	761.59	465.70
August, 2018	5212.17	744.60	472.80
September, 2018	2639.60	377.09	281.20
October, 2018	409.40	58.49	109.50
November, 2018	0.00	0.00	23.60
December, 2018	116.30	16.61	3.00
TOTAL	15819.80	2259.97	1667.60

Source: Dist. Survey Report 2019, Malkangiri

Table No. 1.11: Month Wise Rainfall Data Of Malkangiri District For 2019 (in mm)

Month	Total	Average	Normal
January, 2019	8.00	1.14	2.70
February, 2019	0.00	0.00	4.10
March, 2019	13.00	1.86	8.90
April, 2019	38.00	5.43	34.80
May, 2019	236.00	33.71	49.10
June, 2019	1060.40	151.49	212.20
July, 2019	4436.90	633.84	465.70
August, 2019	5343.40	763.34	472.80
September, 2019	2379.20	339.89	281.20
October, 2019	1194.30	170.61	109.05
November, 2019	--	--	--
December, 2019	--	--	--
TOTAL	14709.20	2101.31	1640.55

Source: Dist. Survey Report 2019, Malkangiri

Table No. 1.12: The average annual rain fall during the last 10 years of Malkangiri is 1412.673.

Division	Actual Rainfall												
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2019
Malkangiri	1915.26	1854.24	1356.99	1114.90	1853.06	1104.02	1714.64	1783.33	1509.62	1770.40	1472.70	1722.70	2260.00

Source: Annual rainfall data of Dist. Administration, Malkangiri

Table No. 1.13: Seasonal Rainfall of Malkangiri district from 2014-2019

Period	Month	Normal Rainfall in mm.	Rainfall data for the year 2014		Rainfall data for the year 2015		Rainfall data for the year 2016		Rainfall data for the year 2017		Rainfall data for the year 2019		Rainfall data for the year 2019	
			% of Rainfall	Actual Rainfall In mm	% of rainfall	Actual Rainfall In mm	% of rainfall	Actual Rainfall In mm	% of Rainfall	Actual Rainfall In mm	% of rainfall	Actual Rainfall In mm	% of rainfall	Actual Rainfall In mm
Pre Mon soon	Mar.	8.9	14.57	102	11.14	78	4.4	30.8	1.77	12.4	0	0	1.85	13.0
	April	34.8	17.4	121.8	74.73	523.1	0	0	6.57	46.0	63.57	445	5.43	38.0
	May	49.1	50.27	351.9	40.14	281	65.33	457.3	34.37	240.6	47.14	329.96	33.71	236.0
South West Mon soon	June	212.2	89.19	624.3	591.61	4141.28	261.3	1829.1	334.53	2341.72	190.9	1336.27	151.49	1060.4
	July	465.7	456.93	3198.4	196.56	1375.9	353.73	2476.1	454.17	3179.2	761.59	5331.1	633.84	4436.9
	Aug.	472.8	339.83	2378.6	405.02	2835.13	381	2667	493.84	3456.9	744.6	5212.17	763.34	5343.4
	Sept.	281.2	317.39	2221.7	384.83	2693.8	280.96	1966.7	219.47	1536.3	377.09	2639.6	339.96	2379.7
Post Mon soon	Oct.	109.5	185.73	1300	38.38	271.8	120.33	842.32	177.94	1245.6	58.49	409.4	170.61	1194.3
	Nov	23.6	17.63	123.4	24.66	172.6	0.14	1	0	0	0	0	0	0
	Dec.	3.0	0.71	5	0.57	4.0	0.86	6.04	0	0	16.61	116.3	0	0
Winter	Jan.	2.7	16.70	116.9	0.43	3	0	0	0	0	0	0	1.14	8.0
	Feb.	4.1	3.30	23.1	2.5	17.5	4.6	32.2	0	0	0	0	0	0
	TOTAL	1667.6	1509.65	10567.1	1770.57	12397.11	1472.65	10308.56	1722.66	10813.12	1245.6	2259.99	15819.8	2101.37

Source: Seasonal Rainfall data of Dist. Administration, Malkangiri

1.4.3 Temperature:

The hypsographic units i.e. low plain of Malkangiri District now the Malkangiri Forest Division (up to 300 MSL). The Malkangiri plains are the hottest when Jeypore plateau is hotter and the Koraput plateau is cooler in nature due to its hypsographic situation. The summer is very severe in Malkangiri and sometimes it is touching 42 to 45° during April-May. In fact, the frequent forest fire in this area during summer months is the evident of high temperature. From November onwards when the monsoon withdraws temperature decreases progressively and the drop in night temperature begins more rapidly. December is the coldest month. During winter the minimum temperature goes down to about 12°C in Malkangiri area.

1.4.4 Relative Humidity:

The relative humidity and other forms of precipitations i.e. mist and dew is helpful in prolonging humid condition in the locality. These conditions are favorable for development for natural vegetation and other growths like orchids and epiphytes. The relative humidity is generally high during the monsoon and post monsoon months. In other months the afternoons are comparatively drier. Daily variation of temperature causes morning dew.

As per the Indian Meteorological department data the Relative Humidity of Malkangiri District is as mentioned below;

Minimum RH is = 63 %

Maximum RH is = 93 %

These conditions are helpful in development of natural vegetation and other growth like tropical epiphytes and semi-evergreen pockets. However, limited data are available only in adjoining recording station which has been considered. Month-wise, maximum and minimum average humidity in percentage as per the outgoing Plan is reproduced in Table below.

1.4.5 Special Weather Phenomenon:

During pre-monsoon months, the area experiences a few thunderstorms. In hilly terrains, flash flood is a normal feature during heavy rain. With the fast depleting vegetative cover due to Podu Cultivation and uninterrupted illicit felling in the hills, these flash floods are become quite frequent resulting in disruption of the communication system in the interior pockets of the Division.

Though some river valley projects for irrigation to the agriculture sector have been developed in this division, sometimes due to deficit rainfall during rainy season, drought occurs in some pockets. Thus, from last few years' heat waves and sunstrokes have affected the division resulting in some casualty during summer. In order to rescue the people from such scorching sun, Govt. of Odisha has taken steps not to engage the people in field works after 11.00AM and before 3.00PM, supplying clean drinking water to the travelers on the road side and creating awareness among the people through different electronic media. During the scarcity period, the wild life becomes easy prey as they flung to waterholes in search of water.

1.4.6 Natural Calamities:

Though the Odisha faced two Nos. of Natural calamities e.g. cyclone in the recent past but the Hudhud cyclone had a great impact in Malkangiri District particularly in Forest point of view. Hudhud originated from a low-pressure system that formed under the influence of an upper-air cyclonic circulation in the Andaman Sea. Hudhud underwent rapid deepening in the following days and was classified as a Very Severe Cyclonic Storm by the IMD. Shortly before landfall near Visakhapatnam, Andhra Pradesh, on October 12, Hudhud reached its peak strength with three-minute wind speeds of 175 km/h (109 mph.). That heavy wind during Hudhud had resulted in falling many trees in Malkangiri District particularly Chitrakonda and Mathili areas.

The details of impact of Huhud Cyclone on Forest are given in the table below;

Table No. 1.14: Impact of Cyclone

Year/session	Type of natural calamity	Frequency of natural calamity (incidences)	Forest area affected and level of impact	Intervention made	Impact of intervention
2014	Cyclone Hudhud	First time	254 Nos of Trees has been uprooted in Malkangiri	221 Nos. trees have been salvaged and handed over to OFDC.	---

Other natural calamity i.e. floods which is uncommon as the area in the Division does not have much low-lying areas. Drought in the area is experienced sporadically.

1.4.7 Health: The tropical climate with high humidity harbors variety of diseases causing through bacteria and virus. Malaria and tuberculosis are quite rampant in the interior pockets. Sometimes Malaria becomes more complicated in the form of black water fever and cerebral malaria in Malkangiri, Kondakamberu, Chitrakonda, Motu areas. During summer months when water is scarce, the dysentery and enteric fever become common in the rural pockets. In rural areas the sanitation as well as water sources are polluted and unhygienic. However, gradually medical facilities have improved and at present steps have been taken by the Health Department Malkangiri for eradication of important diseases like Malaria, Tuberculosis, Typhoid, and Diarrhea etc. Now the diseases like Japanese encephalic and chikungunya have spread some area of the Malkangiri due to ignorance of sanitary principles and lack of education among the poor wages-earning tribal. The medical infrastructure available in the Division is given below.

Table No 1.15: Medical infrastructure

Sl No	District Hqrs Hospital	Community Health Centre	Primary Health Centre (New)	Area Hospital	Sub Centre	Intensive Care Unit	Blood Bank	No. of Sector	No. of Hospital bed
1	2	3	4	5	6	7	8	9	10
1	01	08	24	04	158	01	01	26	326

(Source: -District Statistical Handbooks 2015 and Websites of Malkangiri Districts Health)

1.4.8 Water Supply: This Division is also bounded with perennial River Kolab in the North and Northwest, Sileru in the East and Sabari in the West. Also, its main tributary Gurupriya in Kondakamberu Reserve (Known as Sileru) which ultimately passes on the border and joins with Sabari near Motu, the extreme South end of the District and State. The Kolab River originates near Sinkana hills, the 900mt. plateau and passes through 600mt. Jeypore Plateau. Then turning towards Southwest, it flows on the Koraput Chattisgarh border till it joins Sileru near Motu. It is also known as Sabari in the District of Malkangiri and further South. Its main tributaries are Garianodi and Poteru; both are perennial.

Table No. 1.16: Important Rivers and Streams

Sl. No.	Name of the River of stream	Total length in the District (in Km)	Place of Origin	Altitude at Origin
01	Saberi/ Kolab River	380.00	Sinkaram Hill (Western Slopes of Eastern ghats)	1370.00
02	Sileru/ Machkund	112.00	Eastern Ghats in northern Andhra Pradesh	600.00 900.00
03	Potteru	111.25	Balimela Power House	418.00
04	Sataguda Nallah	17.000	Down-stream of Satiguda Dam	192.63
05	Korukonda Nallah	26.400	Dhumsilgurah	200.00
06	Tamasa Nallah	21.200	Chhatisgarh	N A.

Source: Dist. Survey Report 2019, Malkangiri

1.4.8.2 The Balimela Reservoir is located on the river Sileru which is a tributary of the Godavari River. The Govt. of Odisha developed the 360 MW (6 × 60 MW units) power house by diverting the Balimela waters to the Potteru sub-river basin. A barrage at Surlikonda across the Potteru stream was constructed to utilize the discharge from Balimela Power House for irrigation by means of two main canals; one on the right side named Tamasha Main Canal and the second on the left side named Gompakonda Main Canal. These two canals were constructed under the Potteru Irrigation Project for irrigation in Malkangiri district, the most backward district of the state and thereby lifting the living standard of the inhabitants. Two more power generation units 75 MW each were added under stage-2 to increase the installed capacity up to 510 MW.



Fig. No. 1.9: Chitrakonda Dam



Fig. No. 1.10: Waterbody at Chitrakonda

1.4.8.3 The Nallah as well as the ponds and wells become dry in summer and the poor tribal solely depend upon the water holes on the dry streambeds for drinking water. These waters are generally dirty and unfit for drinking purpose and sometimes become the cause of water born diseases. The Balimela Hydro-Electric Projects cater the need of water both for drinking and irrigation. Similarly, in urban centers like Malkangiri the public enjoy the privilege of Water supply through PHD supported by a number of Wells, Tube wells and huge Tanks within the town limits for ordinary use. Irrigation channels to their field are generally made from nallahs. All seasonal streams and nallahs dry up during peak summer.

1.4.8.4 In most of the rural areas of the Division, tube wells are being dug under different scheme like ‘Panipanchayat’, ‘Watershed Mission’, which are the safest and most feasible source of rural water supply. Many Water Harvesting Structures (WHS) have been constructed by the Soil Conservation Department, which also serve as temporary water source of local use. The RWSS department working in the area of the division has assessed this position. The availability of drinking water supply in the Division is furnished at Table.

Table No. 1.17: Availability of Drinking Water Facilities

Particulars	Number
No. of Villages/ hamlets	1055
No. of Villages covered with Rural drinking Water Supply	562
No. of working Tube Wells	11137
No. of working Sanitary Wells	1002
No. of Piped Water Projects	374

(District Statistical Handbooks 2015 and Websites of Malkangiri Districts and RWSS Department, Malkangiri)

1.4.8.5 Iron contaminated water:

The presence of iron in ground water is a direct result of its natural existence in underground rock formations and precipitation water that infiltrates through these formations. As the water moves through the rocks some of the iron dissolves and accumulates in aquifers which serve as a source for ground water. Since the earth's underground rock formations contain about 5% iron it is common to find iron in many geographical areas around the globe. Iron in water is typically found in three major forms and is rarely found in concentrations greater than 10 milligrams per liter or parts per million (mg/l or ppm):

- ‘Clear water iron’ is a non-visible ferrous (Fe^{2+}) form of dissolved iron is found in water that is not exposed to oxygen, such as in wells and springs.
- ‘Iron bacteria’ – Dissolved iron contributes greatly to the growth of iron bacteria. These bacteria form dark-coloured slime layers on the inner walls of the system's pipes.

1.4.8.6 Problem of Iron contaminated water

In surface water, such as rivers and lakes, dissolved iron is hardly ever found, because it reacts with oxygen, forms insoluble compounds and sinks out of the water. However, in ground water such as wells and springs, iron is the most common dissolved chemical. Although not considered to cause health problems in humans, its presence in potable water is rather unpleasant due to the bad odours it spreads, its rusty taste and colour, its feel on skin and hair, and its tendency to stain clothing.

In addition, the presence of dissolved iron enhances the growth of iron bacteria, which forms dark-coloured slime layers on the inner side of a system's pipes. The slime is then released into the network through water flow fluctuations, leading to dirt build-up and damage to the plumbing.

The problem of dissolved iron is highlighted in Figure 1 which was taken in the city of Ramenskoe (a Moscow suburb), where local wells containing 0.8-4 mg/l of iron serve as the city's potable water source. In fact, the discomfort in this city is so severe that bottles of mineral water are provided to hotel guests for washing.

Most countries have accepted a safe drinking water standard (aesthetic, not health related) with a maximum of 0.3 ppm iron content. Water drawn from sources with higher iron content should be treated before entering any municipal water supply system. At the same time, iron is an essential nutrient for humans, with a recommended daily intake of 5 milligrams. Therefore, the official water and environment agencies in many countries have established a secondary limit for iron in drinking water, which is based on aesthetic concerns (Secondary Maximum Contaminant Level – SMCL). In countries such as the US, Canada, Greece, Iran, Russia and others, the SMCL for iron in drinking water is 0.30 mg/L (milligrams per liter) or ppm (parts per million).

The entire division is traversed by a number of rivers/ nallahs. These rivers originate from almost the center of the Division and run parallel to the general direction of North and North-West. The perennial rivers and streams found in Malkangiri Division are summarized in the **Table No.1.18**.

Table No.1.18: Perennial Rivers and Streams in Malkangiri Forest Division

Name of Range	Name of stream/river
Malkangiri	Saberi
Mathili	Saptadhara, Kolab
Kalimela	Poteru
Motu	Saberi, Sileru
Chitrakonda	Sileru

1.4.9 Population Pressure

1.4.9.1 In Urban area like Malkangiri the business community and other well to do sections are settled, the local population of division is largely composed of Schedule Caste and Schedule Tribe and other back ward castes. In fact, rapid increase in population over the period of time has put tremendous pressure on the forest resulting in decrease in forest area vis-a-vis in agriculture land. The population has been on continuous rise. The details of the last 2011 census are 613192.

Table No. 1.19: Population Trend in the Division

Year	1971	1981	1991	2001	2011
Population	268865	334890	421917	504198	613192

1.4.9.2 The local people in general depend upon the forest for fire wood, for house hold, small timber for construction of houses, fencing materials like poles, brushwood, thrones and bamboos etc. As more than 80% of the rural population depends upon agriculture for their livelihood, there is heavy demand of timber for making agriculture implements like plough, clod- breakers,

handle of axes, sickles and other such implements. On the other hand, there is also an increase in the livestock population that substantially adds to the pressure on forest. It is therefore, surprising that most of the forests around Malkangiri urban areas are now barren.

1.4.9.3 The pressure of population on the forests of Dandakaranya region of this Division has started to increase manifold with the resettlement of refugees from the erstwhile East Pakistan. The DNK project conceived in 1958, entailed the destruction of more than two lakhs hectares of virgin forest in Bastar and Koraput Districts of Chhatisgarh and Odisha state respectively to settle 7500 refugee families in 184 villages in its first phase. The resettlement however was not over then, as tension in the East Pakistan led to an ever-increasing influx of refugees till almost 1971. However, in the Malkangiri portion of the Division about 194 (127MV+67MPV) resettlement villages were set up officially by the Dandakaranya Development Authority by deforesting a large chunk of forestland and named with numbers i.e. MV-1, MV-79, and MPV-17 etc. MV stands for Malkangiri Village and MPV stands for Malkangiri- Potteru Village. Most of the villages are found on the two sides of Malkangiri – Motu road SH-25 (State Highway), now this State Highway converted to NH-326 (National Highway) nearly 100 KM stretch and towards Malkangiri- Balimela road. As time passes these settlements have become nucleus around which other satellite settlements have emerged leading to heavy encroachment and tremendous pressure on the remaining forest. The Bangladeshi Refugees were given 3 to 6 Acres for agriculture land and 1 to 1/6 Acres of land for house construction in accordance with the location vis-à-vis period of their settlement and policy of the Central Government. Besides that, the Bangladeshi Refugees have also been given houses, agriculture implements and cattle on free of cost. As the project is agriculture-oriented project, most of the refugees have been settled in agriculture by providing agriculture loans.

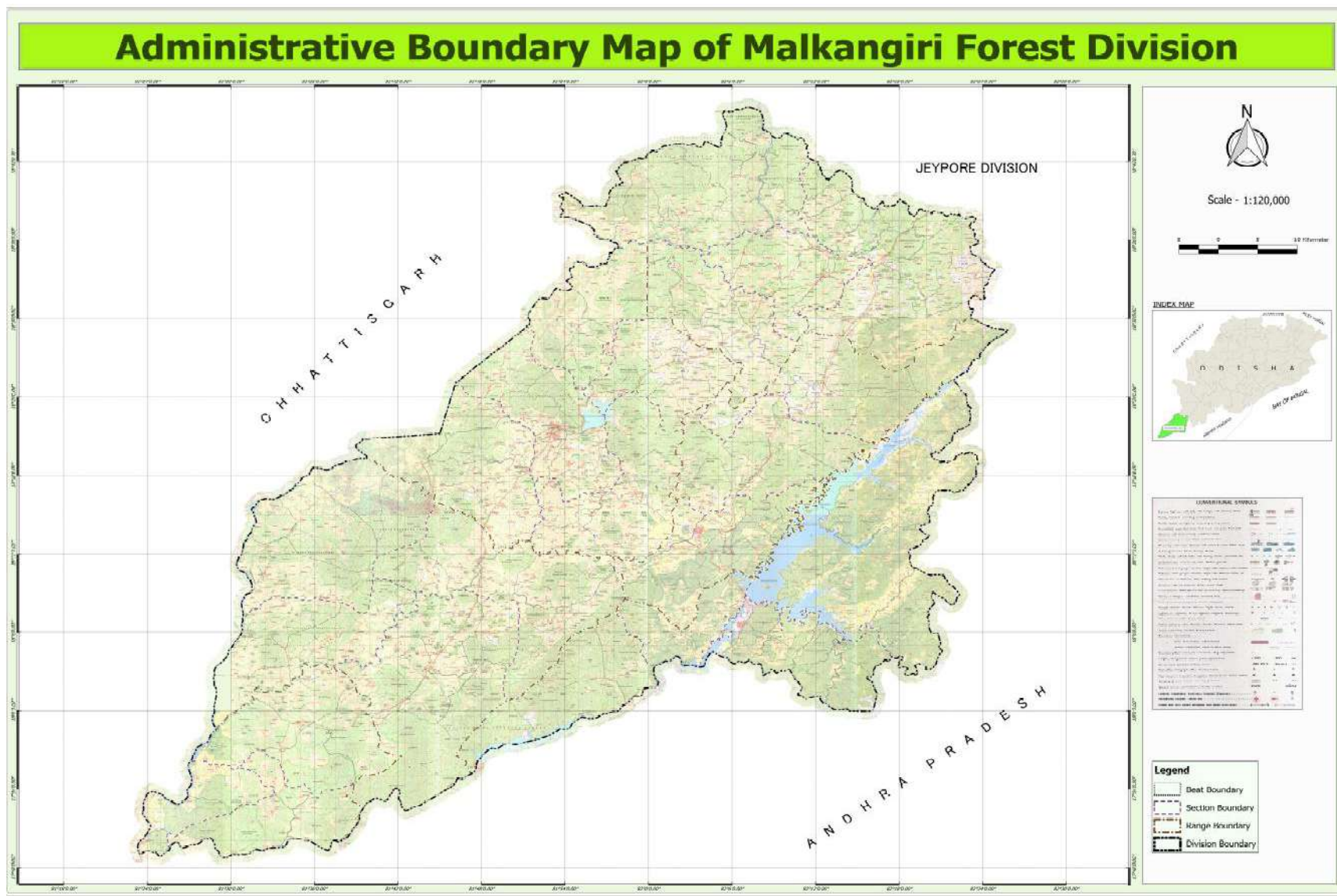
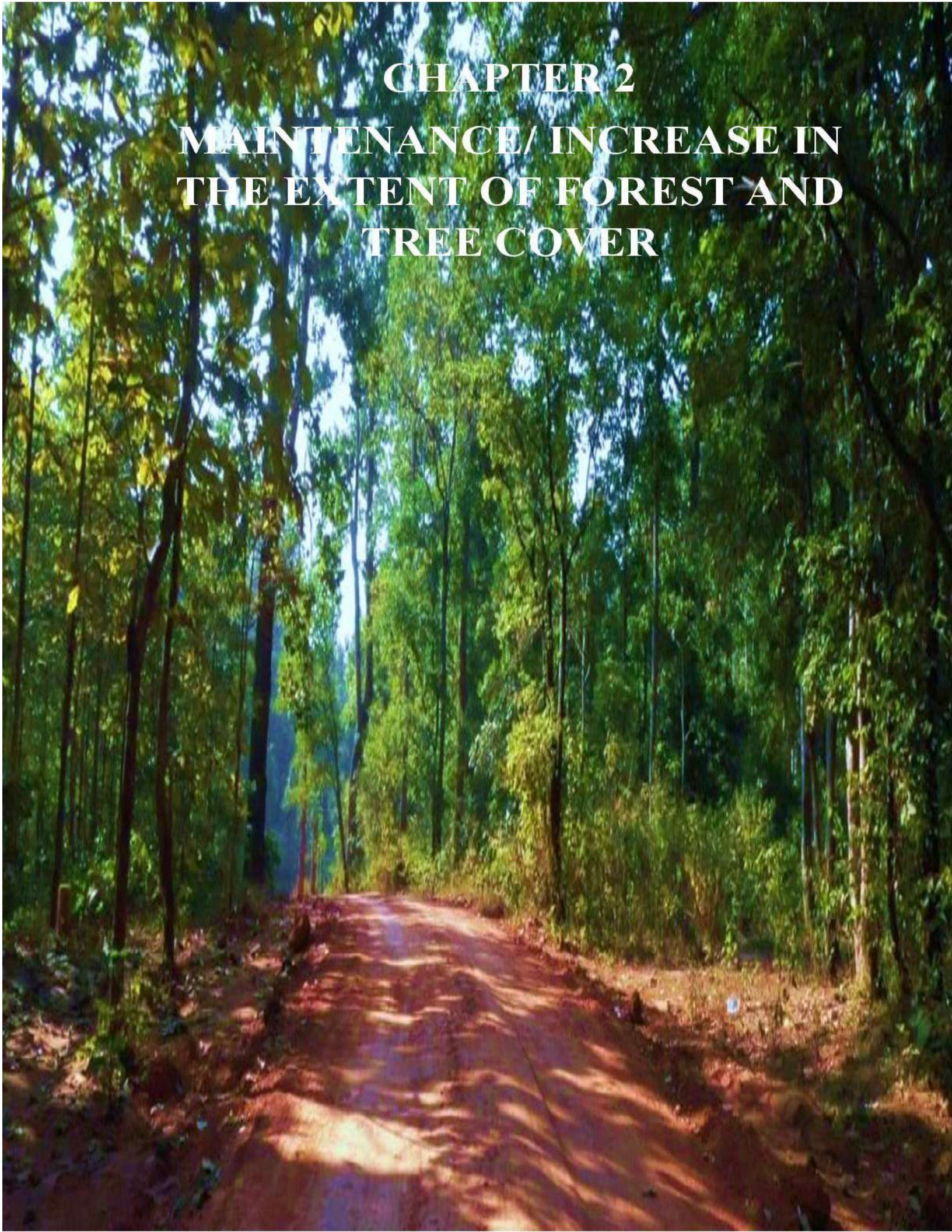


Fig No. 1.11: Administrative Boundary Map of Malkangiri Forest Division

A photograph of a dirt road winding through a dense forest. The road is reddish-brown and covered with shadows from the trees. The forest is composed of tall, thin trees with green foliage. Sunlight filters through the canopy, creating a dappled light effect on the road and the surrounding vegetation. The overall scene is peaceful and natural.

CHAPTER 2

MAINTENANCE/ INCREASE IN THE EXTENT OF FOREST AND TREE COVER

MAINTENANCE/INCREASE IN THE EXTENT OF FOREST AND TREE COVER

2

2.1 Area of Forest under Different Legal Classes (RF, PF, UF and Others)

The total geographical area of this Division is 5791 Sq. Km. It includes 164 No's of Forest Block (RFs and PRFs) covering an area of 88541.6503 Ha (as per Notification) and 89160.53 Ha (as per Topo depicted area) and after deduction of FRA area it comes to 87124.7294 Ha (RFs & PRFs). There are DPF, UDPF and Other Forests (Reserved Land) which are yet to be notified, hence forth those area are not included in the preparation of Working Plan except 10RL, 4URL and 1UDPF.

The detail statement of different categories of forest area is mentioned below:

Table No. 2.1: Different categories of forest area of Malkangiri Forest Division.

Table No. 2.1: Different categories of forest area of Malkangiri Forest Division.

Geographic area (in Ha)	RF (in Ha)	PRF (in Ha)	DPF (in Ha)	UDPF (in Ha)	Village forest (in Ha)	RL (in Ha)	URL (in Ha)	Un- classd Forest	Total	Percentage
579100	34063.6668	53061.0626	11946.8069	28589.5613	268.20	38834.2436	81225.0165	21.223	248009.7807	42.82%

Source: As per the Survey of India Topo maps.

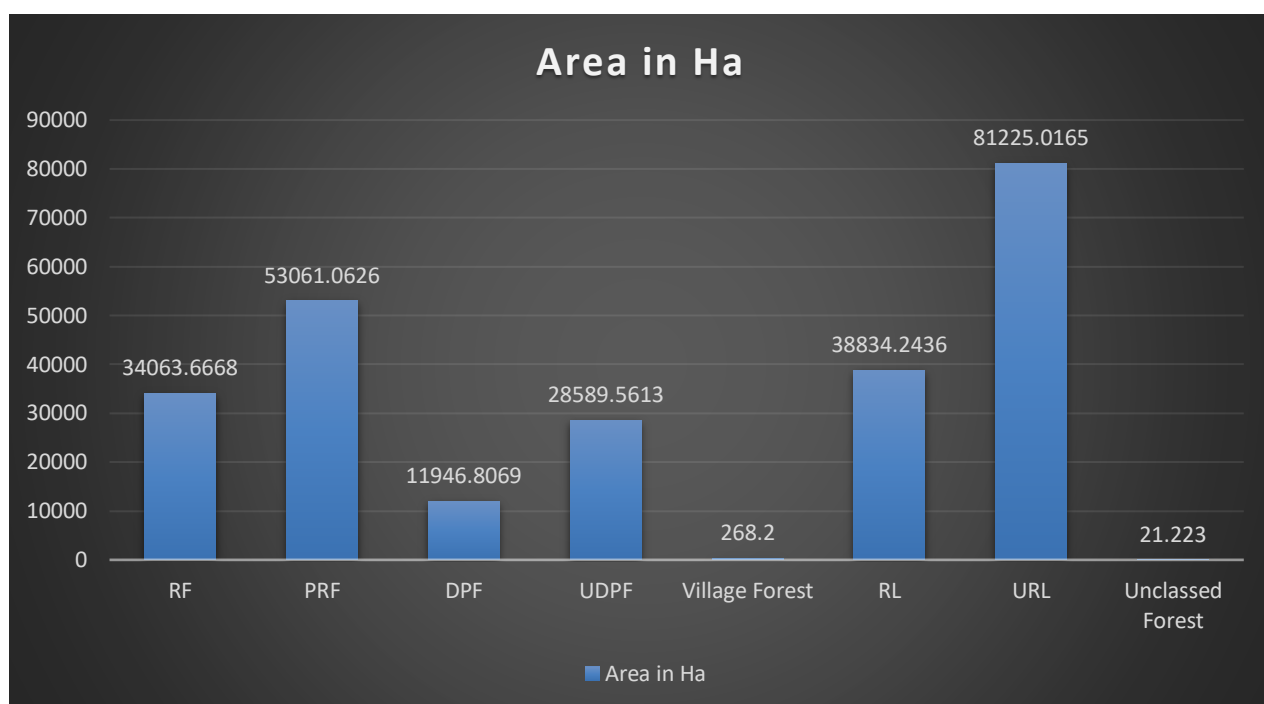


Fig. No. 2.1: Different Categories of Forest Area of Division

2.1.1 Forest area in details like RF,PRF,VF, RL,URL,UDPF etc.:

The Forest area like RF, PRF, VF, RL, URL, DPF and UDPF etc involved in Malkangiri Forest Division are given in details in the following table;

Table No 2.2: ABSTRACT OF AREA STATEMENT OF MALKANGIRI DIVISION.

Sl. No	Forest Blocks	No's	Area as per Notification and Record (in Ha)	No's	Area as per Topo depicted of previous plan and actual Record in Ha	Remarks
1	RFs	71	35,256.7103	71	35136.1500	Notified
2	PRFs	93	53284.9400	93	54024.3800	Notified
3	DPFs	75	18,865.0586	73	11946.8069	Verified records, actual comes to 73 DPFs but not notified.

4	UDPF	66	63663.7930	37	28589.5613	Verified records, actual comes to 37 UDPFs but not notified
5	RL	06	22615.7164	10	40394.7946	Notification no's are not available
6	URL	04	81639.9749	04	81639.9749	Not notified
7	VFs	51	268.2000	51	268.2000	Notified
Total		366	275594.3900	339	251999.8677	

Source: Govt. of Odisha Notification and Records

NB: - (UDPF comes to 37no's instead of 66 no's because some Forest Blocks have been included in both DPF and UDPF Category.)

Table No. 2.3: Abstract of Range & Type Wise Net Area included in the Plan

Range	Forest Block		Notified Area	Topo depicted area (in Ha)	Diversion under FC/FRA	Working Plan Area
	Type	No	(in ha)			(in ha)
Malkangiri	RF	3	697.70	717.05	16.6950	700.3550
	PRF	23+1(1)	14413.64	12642.9400	345.8660	12297.0740
	VF	20	99.00	99.00	0	99.00
	RL	05	0	14289.5826	710.4200	13579.1626
Total			15210.34	27748.5726	1072.9810	26675.5916
Mathili	RF	15	7197.08	6885.77	24.1230	6861.6470
	PRF	25+1(P)	1796.5600	3820.2000	37.730	3782.4700
	VF	28	153.20	153.20	0	153.20
	RL	3	-	9288.2270	(7.657+261.274)= 268.9310	9019.2960
	UDPF	1	-	10850.0000	0	10850.00
Total			9146.78	30997.3970	330.7840	30666.6130

Kalimela	RF	29	11068.9400	11197.06	747.5130	10449.5470
	PRF	21	4512.0900	4520.26	139.8100	4380.45
	VF	0	0	0	0	0
	RL	1	-	13435.7350	259.9850	13175.7500
	URL	1(P)	-	14247.0588	0	14247.0588
Total			15581.03	43400.1138	1147.3080	42252.8058
Balimela	RF	5	2776.00	2740.34	4.3350	2736.005
	PRF	7+1(P)	10858.15	12327.1500	302.3630	12024.7870
	VF	1	5.00	5.00	0	5.0
Total			13639.15	15072.4900	306.6980	14765.7920
Chitrakonda	RF	5	2268.3303	2324.89	(0.0672+60.404)= 60.4712	2264.4188
	PRF	11+1(P)	20176.2300	18915.8300	(2.4654+135.083)= 137.5484	18778.2816
	VF	0	0	0	0	0
	URL	4	0	60810.0659	404.3184	60405.7475
Total			22444.5603	82050.7859	602.3380	81448.4479
Motu	RF	14	11248.6600	11271.04	219.3460	11051.6940
	PRF	4	1528.2700	1798.00	0	1798.0000
	VF	2	11.0000	11.00	0	11.0000
	RL	1	-	3381.25	321.215	3060.0350
	URL	1(P)	-	6582.8502	10.6400	6572.2102
Total			12787.93	23044.1402	551.2010	22492.9392
G. Total			88809.7903	222313.4995	4011.3100	218302.1895

2.1.2 DLC Report of Division:-

Table No. 2.4: DLC Report of Malkangiri Forest Division

Sl. No	Blocks	Area as per DLC (ha)
1	RFs	35243.647
2	PRF	71176.357
3	RL/PL	22615.716
4	UDPF	66192.00
5	VF	269.002
6	Un-classed Forest	30.00
7	Area not recorded as Forest but which has sizable compact area of Natural Forest Growth and Plantation of Forest species both on Govt. & Private land	834.905
8	Forest as per Revenue Record	140061.394
G.Total		336423.021

2.1.3 Deviation Statement from DLC Report:

Table No. 2.5: Deviation Statement from DLC Report.

Sl. No	Category of Forest	Area as per the DLC Report		As per Records/Field verification		Remarks
		No's	Area (in Ha)	No's	Area (in Ha)	
1	RFs	71	35243.647	71	35,256.7103	
2	PRFs	93	71176.357	105	72561.600	12 No's of PRFs has been dropped while preparing WP due to not ascertained in the field and taken 93

						PRFs for Working plan of area is 53284.9400 Ha
3	RL/PL	6	22615.716	10	40394.7946	
4	UDPF	66	66192.000	37	28589.5613	
5	VFs	50	269.002	51	268.2000	
6	Un-classed Forests	0	30.0	33	7.477Ha and 45.819 Km	ForestroadLength=45.819 Km=45819mt,width=3mt.=13.746 Ha.Hence Total 21.223Ha
7	Area not recorded as Forest but which has sizable compact area of Natural Forest Growth and Plantation of Forest species both on Govt. & Private land		834.905	0	0	
8	Forest as per Revenue Record		140061.394	0	0	

The details list of RF, PRF and DPF are furnished in **Annexure-I (a), I (b) and I (c)** respectively.

2.1.4 Village Forests (VFs): There is 51no's Village Forest notified by Government of Orissa under the provisions of the Orissa Village Forest Rules 1985 covering an area of 268.20 Ha. These Forests are proposed to be brought under the fold of management in this plan. The list of Village Forests are furnished in **Annexure-I (d)**.

2.1.5 Un-classed Forests: 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 in Annexure-I.

2.2 Forest Area under different Working Circle/Management plan:

As per notification the total Working Plan area of Malkangiri Forest Division was 88541.6503(RF 35256.7103 & PRF 53284.9400) and as per Topo depiction area the Working Plan area was 89125.53 (RF 35119.15 & PRF 54006.38) of **Mr. Bodaiks Plan (2007-08 to 2016-17)**

which included RF & PRF only but wherein totaling the area of Forest Block wise, the Topo depicted area comes to 89160.53 Ha (RF **35, 136.15 Ha & PRF 54, 024.38 Ha**) instead of 89125.53 Ha of outgoing Plan. Hence area is revised and now in the proposed working plan, the actual topo depicted area comes to 89160.53 ha has been taken comprising of 71 RFs and 93 PRFs. In addition to this 51 no's VFs and 11 nos. coupe of Bamboo Scheme area (4URL), 10RL and 1 UDPF has also been proposed to include in revised Working Plan. Hence the total Working Plan area covered after deducting **218302.1895** the area diverted under FC Act and FRA from the topo depicted area, it comes 10.1896 ha and 4001.1204 ha respectively which are details below.

Table No. 2.6: Forest Area diverted under FC Act and FRA from the topo depicted area.

Sl. No	Forest Blocks (in No's)	Notified Area (In Ha.)	Topo depicted Area (In Ha)	Area diverted under FCA Act.	Area diverted under FRA	Working Plan Area Taken	Remarks
1	71 RFs	35, 256.7103	35, 136.15	0.0672	1072.4160	34,063.6668	
2	93 PRFs	53, 284.9400	54, 024.38	2.4654	960.8520	53,061.0626	Out of 105 No's PRFs, only 93No's of PRFs has been included in the WP and 12 No's PRF has been dropped as per previous W.P.
	Total	88541.6503	89160.53	2.5326	2033.2680	87124.7294	
3	51 VFs	268.20	268.20	-	-	268.20	Earlier V.F. Area not included in the plan & now included in this Plan under Plantation W.C.
4	4 URL	-	81639.9749	-	414.9584	81225.0165	Earlier Bamboo Scheme Area not included in the plan & now included in this Plan under Rehabilitation W.C. and Bamboo (OL)W.C

5	10 RL	-	40394.7946	7.6570	1552.894	38834.2436	Earlier RL Area not included in the plan & now included in this Plan under Selection-cum-Improvement W.C. and Rehabilitation W.C.
6	1UDPF	-	10850.00	-	-	10850.00	1 UDPF included in this Plan because this UDPF clearly marked in Topo Sheet.
	Grand Total	88809.8503	222313.4995	10.1896	4001.1204	218302.1895	

2.2.1 Forest area involved in the Outgoing Working Plan:

As per notification the total Working Plan area of Malkangiri Forest Division was 88541.6503(RF 35256.7103 & PRF 53284.9400) and as per Topo depiction area the Working Plan area was 89125.53 (RF 35119.15 & PRF 54006.38) of **Mr Bodaiks Plan (2007-08 to 2016-17)** which included RF & PRF only but wherein totaling the area of Forest Block wise, the Topo depicted area comes to 89160.53 Ha (RF **35, 136.15** & PRF **54, 024.38**) instead of 89125.53 Ha of out going Plan. Hence area has been revised and taken actual topo depicted area 89160.53 ha. The detail area statement of the outgoing Working Plan is given below ha which are detailed below.

Table No. 2.7: Statement showing area of the outgoing Working Plan.

Sl. No	Forest Blocks (in No's)	Notified Area (In Ha.)	Topo depicted Area (In Ha)	Working Plan Area Taken
1	71 RFs	35, 256.7103	35, 136.15	35, 136.15
2	93 PRFs	53, 284.9400	54, 024.38	54, 024.38
	Total	88541.6503	89160.53	89160.53

The area of RFs and PRFs only included in Bodaik's Plan does not tally with notified areas in some places for which the reasons has not been mentioned in the plan.

The above Working Plan were spread over 71 RF Blocks and 93 PRF Blocks and comprising of 213 compartments. The Range wise Area (in Ha.) allotted to Different Working Circles is given in **Table-2.8 below**.

Table No. 2.8: Range-wise Area Allotted to Different Working Circles in Malkangiri Division in the outgoing Working Plan in ha.

Working Circle		Mathili	Malkangiri	Balimela	Chitrakonda	Kalimela	Motu	Total
Sel-cum-Imp. WC		6512.99	6727.14	11811.45	6637.15	7928.58	1401.41	41061.92
Reha. WC		2198.49	5819.05	581.24	2278.16	1088.44	0	11922.18
Pltn. W.C		600.18	196.11	246.09	1391.34	387.57	155.65	2976.94
Prot.	Eco	1394.31	617.69	734.87	12627.91	6277.73	11511.98	33199.49
W.C	Bio	9486.35	12567.61	14332.62	8612.81	9404.59	1557.06	55961.04
W.P Area		10705.97	13359.99	13373.65	22934.56	15717.32	13069.04	89160.53
J.F.M O.W.C		4159.56	6239.37	2244.08	1958.72	3419.14	1696.76	19717.67
N.T.F.P O.W.C		6903.06	15150.90	14332.62	8612.81	9404.59	1557.06	55961.04
Bamboo O.W.C		4287.20	4729.55	13505.29	68043.2069	26622.6290	3839.87	121027.7459
Wildlife O.W.C		10705.97	13359.99	13373.65	22934.56	15717.32	13069.04	89160.53

Whereas, the Protection WC area has been divided into 6 No's of Ecological Protection Series for non-overlapping area and 6 No's of Biotic Protection Series for the overlapping areas, accordingly the Total Working Plan area of the outgoing plan is as mentioned below:

- i. Selection-cum Improvement WC = 41061.92 Ha
- ii. Rehabilitation WC = 11922.18 Ha

- iii. Plantation WC = 2976.94 Ha
- iv. Non-overlapping Ecological Protection Series of Protection WC = 33199.49 Ha

Grand Total of Working Plan Area = 89160.53 Ha

2.2.2 In the revised working plan the Reserved Forests, Proposed Reserved Forests, Notified Village Forests, Reserved Land, UDPF and outgoing Bamboo Scheme (URL) areas are under the management fold of this plan. The Forest area under different legal classes and working circles involved in this working plan (in Ha) are furnished in **Table No. 2.9**.

Table No. 2.9: Range-wise Area Allotted to Different Working Circles in Malkangiri Division in the revised WP in ha

Working Circle	Malkangiri	Mathili	Balimela	Kalimela	Chitrakonda	Motu	Total
Selection WC	2492.0000	12146.652	7930.3910	11753.56	9744.7036	4204.5500	48271.8566
Plantation WC	839.8000	724.5800	1714.0000	848.000	1684.0000	387.0000	6197.3800
Rehabilitation WC	17748.2816	16696.836	3010.0360	25626.6588	64979.5015	11122.2452	139183.5591
Protection WC	5595.51	1098.5450	2111.3650	4024.5870	5040.2428	6779.1440	24649.3938
Total Working Plan area	26675.5916	30666.613	14765.792	42252.8058	81448.4479	22492.9392	218302.1895
Bamboo OWC	1120.00	3206.00	12310.280	17897.0588	68861.9633	6972.2102	110367.5123
JFM (OWC)	7664.00	3328.00	1034.00	470.00	3152.59	975.00	16623.59
NFTP (OWC)	20771.2890	28523.772	12654.432	37392.4100	73702.4576	16001.5500	189045.9106
WL (OWC)	26675.5916	30666.613	14765.792	42252.8058	81448.4479	22492.9392	218302.1895

Table No. 2.10: Distribution of Working Plan area to different non overlapping Working Circle.

Sl. No.	Name of Working Circle	Area allotted (in ha.)	Remarks
	Selecection WC	48271.8566	
	Plantation Working Circle	6197.3800	
	Rehabilitation Working Circ	139183.5591	
	Protection Working Circle	24649.3938	
	Total	218302.1895	

In order to cover the entire Division and as per the necessity, the NTFP (OWC) comes to **189045.9106 Ha** and Wildlife (O) Working Circle has been constituted with an area of **218302.1895 Ha** for the entire Working Plan area.

2.2.3 Topographical Reference: The Topographical representation of Malkangiri Forest Division in the Top sheets of 1:50,000 scale shown in Table No 2.11-

Table no. 2.11: Topographical Representation of Malkangiri Division

E44J8	E44K1	E44P5
E44J11	E44K2	E44P9
E44J12	E44K3	E44P13
E44J14	E44K4	
E44J15	E44K6	
E44J16	E44K7	
	E44K8	

(Source: Records Vis-à-vis Field Vérification)

Table No. 2.12: Range Wise Topographical Representation of Malkangiri Division

Malkangiri	Mathili	Balimela	Kalimela	Chitrakonda	Motu
E44K3	E44K1	E44K3	E44P9	E44P13	E44P5
E44J11	E44K2	E44K4	E44P13	E44K4	E44P9
E44J14	E44K3	E44K7	E44J8	E44K7	
E44J15	E44K6		E44J11	E44K8	
E44J16			E44J12		
			E44J15		

(Source: Records Vis-à-vis Field Vérification)

2.2.3.1: The area of Malkangiri Forest Division is spread over 16 numbers of topo sheets of 1:50,000 scale implying vast geographical dimension of the Division. The individual block wise

topo sheet reference is furnished at **Annexure-II** which also contains details of block notification/boundary length/pillars and actual availability of pillars in the field.

2.3 PERCENTAGE OF FOREST WITH STATE OF BOUNDRIES

2.3.1 The boundary pillars of most of the forest blocks have been surveyed, demarcated and maintained during the plan period by various departmental schemes. The descriptions have also been notified in the relevant Orissa Govt. notifications of the gazette which is maintained in RF Register in the Division office. In most of the forest blocks boundary lines are not cleared. The position of most of boundary pillars masonry and stone cairns are maintained only in a few RFs. and PRFs. Numbers are written on wooden pillars, however many boundary pillars are in Dilapidated condition, at places boundary pillars are missing. It is often damaged by shifting cultivators. Repairs of pillars are inevitable. Systematic annual maintenance of boundary pillars should be done by the D.F.O. as per the five year maintenance programme which is given in miscellaneous regulations. The total length of the boundary length of Reserved Forests and Protected Reserved Forest are **1576.26 Kms.** No boundary length and pillars of RL, URL and UDPF are found in office record or field. Range wise boundary length in kilometers with pillars are given in Table below,

Table No. 2.13: Boundary Length in km of Malkangiri Forest Division

Sl. No	Name of the Range	Number of Forest Blocks	Boundary Length in Kms.	Boundary pillars (in Nos)
01	Mathili	40+1(P)	247.67	1720
02	Malkangiri	26+1(P)	240.81	1700
03	Balimela	12+1(P)	219.96	2028
04	Kalimela	50	324.74	2278
05	Motu	18	193.62	1146
06	Chitrakonda	16+1(P)	349.46	3027
	Sub-Total	164	1576.26	11899

2.3.1.1 The boundary position in the respect of few blocks is good. During the field exercise the status of boundary pillars was verified. The details of the boundary position as per notification,

position in the previous plan and position at present in various reserved forest blocks are given below.

Table No.2.14: Boundary Pillar Position of R.F. as per notification, previous plan & present status

SI No	Name of the Forest Block	Area in Ha	Length of boundary (in Rkm)	Boundary pillar as per Notification	Pillar as per previous plan	Pillar as per present verification			
						Good	Partly damage	Fully damage	Missing
MALKANGIRI RANGE									
01	Jharapalli RF	554.48	12.58	57	57	20	0	17	20
02	Akur R.F	128.86	5.28	35	35	3	0	8	24
03	Potrel Teak RF	33.71	1.88	16	16	0	0	0	16
MATHILI RANGE									
01	Siroli RF	51.62	2.60	18	18	12	6	0	0
02	Dangarkhalli RF	73.92	3.14	17	17	5	12	0	0
03	Sarangapalli RF	4287.20	23.20	96	96	40	20	13	23
04	Tandiki RF	150.71	5.88	41	41	8	33	0	0
05	Putparbat RF	387.50	9.12	54	54	5	10	9	30
06	Malidangar RF	399.26	2.12	52	52	12	25	05	10
07	Gotiguda RF	439.81	11.72	71	71	21	22	16	12
08	Chaulmendi RF	94.60	6.00	38	38	18	02	0	18
09	Sindhabeda 'A' RF	12.94	2.46	19	19	0	0	0	19
10	Sindhabeda 'B' RF	12.85	1.80	19	19	5	0	4	10
11	Saradaput RF	15.88	1.64	14	14	0	02	04	08
12	Dasmantpur Extn RF	18.98	1.94	16	16	7	0	0	09

13	Meca RF	70.00	3.60	21	21	7	6	0	08
14	Mathili RF	73.8500	6.66	65	65	23	20	0	22
15	Chedenga RF	796.65	18.70	187	187	87	52	10	38
BALIMELA RANGE									
1	Chitapari RF	2125.69	28.44	308	308	51	0	91	166
2	Nuagaon RF	198.78	6.04	46	46	11	04	05	26
3	Gopiguda RF	266.49	8.74	114	114	07	12	40	55
4	Teakguda RF	81.03	6.80	44	44	05	10	04	25
5	Mahadevpur RF	68.35	3.54	45	45	0	05	21	19
KALIMELA RANGE									
1	Rajulkonda, R.F	475.11	11.36	47	47	4	43	0	0
2	Bapanpally, R.F	423.31	8.52	82	82	12	50	0	20
3	Yengulkonda, R.F	1110.01	18.00	77	77	10	15	0	52
4	Venkatpallam, R.F	460.82	14.74	163	163	13	0	110	40
5	Gumuka Teak (B), R.F	2.41	0.46	05	05	0	0	0	05
6	Gumuka Teak (C), R.F	16.68	2.56	34	34	10	13	8	03
7	Kalimela, R.F	64.61	4.14	25	25	2	6	0	17
8	Gompakonda, R.F	776.49	14.34	112	113	15	12	0	86
9	Kawasiguda, R.F	14.10	1.36	15	15	0	1	0	14
10	Koimetla, R.F	42.11	2.40	25	25	16	5	0	4
11	Mangipally, R.F	251.89	6.04	31	31	15	4	0	12
12	Udayagiri, R.F	6650.29	59.14	255	255	50	0	100	105
13	Teakguda Teak –II, R.F	2.75	0.50	05	05	0	05	0	0
14	Mutumguda, R.F	164.04	7.08	50	50	19	06	0	25

15	Kaldapally , R.F	25.64	4.20	22	34	0	5	0	29
16	Tegedapally, R.F	130.28	5.36	51	51	19	16	0	16
17	Kangarkonda , R.F	67.52	3.86	26	26	02	10	0	14
18	Kurty Teak , R.F	15.25	2.00	20	20	0	0	0	20
19	Nadiwada Teak-I , R.F	3.07	1.50	07	07	0	0	0	07
20	Podia Teak (A) , R.F	4.75	0.74	11	11	04	0	05	02
21	Kaldapally Teak, R.F	47.52	4.20	22	34	0	0	0	34
22	Nandiwada Teak –II, R.F	14.76	1.72	13	37	0	0	0	37
23	Kamarguda Teak, R.F	7.50	1.20	09	09	01	0	04	04
24	Udayagiri (B), R.F	151.70	5.68	56	56	02	0	0	54
25	Podia Teak (B), R.F	3.98	0.80	11	11	03	0	02	06
26	Eralgundi , R.F	11.38	1.82	28	23	0	0	0	23
27	Tanginiguda , R.F	29.03	3.38	16	16	0	0	16	0
28	Supal (A) , R.F	61.19	4.132	26	26	2	10	0	14
29	Supal (B), R.F	68.87	3.80	39	39	30	9	0	0
CHITRAKONDA RANGE									
1	Sileru West R.F	1573.10	24.38	284	284	30	15	239	0
2	Banguru R.F	323.51	11.66	113	113	20	52	35	06
3	Limalori R.F	302.93	11.78	98	98	0	0	68	30
4	Pabliguda R.F	91.27	4.32	47	47	15	22	10	0
5	Gunthawada R.F	34.08	3.70	43	43	10	14	19	0
MOTU RANGE									
1	Pusugudam RF	3898.87	25.76	109	109	16	49	0	44

2	Poluru RF	407.49	9.72	86	86	0	86	0	0
3	Mallavaram RF	169.11	12.20	100	100	20	80	0	0
4	Anantapalli RF	818.48	20.84	170	170	0	0	0	170
5	Sirikonda RF	347.83	5.04	40	40	0	40	0	0
6	Katanpalli RF-A	27.08	2.25	16	16	2	12	0	2
7	Katanpalli RF-B	1014.63	14.93	48	48	21	4	0	23
8	Pendikonda RF	87.71	3.32	28	28	14	14	0	0
9	Motu Teak RF	48.31	1.86	16	16	0	16	0	0
10	Motu RF	716.27	11.70	24	24	20	4	0	0
11	Tandimetla RF	3702.47	33.22	137	137	70	67	0	0
12	Muruliguda Teak-A RF	3.75	0.50	08	08	0	8	0	0
13	Muruliguda Teak-B RF	16.25	1.26	16	16	0	16	0	0
14	Peta Teak-A RF	12.79	0.78	08	08	0	8	0	0

Table No. 2.15: Boundary Pillar Position of P.R.F. as per notification, previous plan & present status

Sl No	Name of the Forest Block	Area in Ha	Length of boundary (in Km)	Boundary pillar as per notification	Pillar as per previous plan	Pillar as per present verification			
						Good	Partly damage	Fully damage	Missing
MALKANGIRI RANGE									
01	Jhileriguda PRF	1125.91	17.42	44	44	14	04	06	20
02	Sindrimal P.R.F	2386.97	23.94	119	113	8	0	16	95
03	Girididongar PRF	337.43	8.80	80	80	25	25	0	30

4	Dharamdongar PRF	105.72	5.70	51	51	10	0	6	35
5	Pitatang PRF (P)	3296.77	21.61	57	0	05	10	07	35
6	Tamasa PRF	72.63	3.56	31	31	0	0	7	24
7	Namkonda PRF	357.25	6.48	108	108	20	0	23	65
8	Titiviry PRF	24.02	2.40	25	25	0	0	06	19
9	Kottamateru PRF	186.22	6.30	43	43	0	0	08	35
10	Allur PRF	32.19	2.96	26	26	0	0	07	19
11	Koilipari PRF	1817.02	24.90	213	213	13	27	48	125
12	Cheruguda PRF	161.62	8.40	75	75	0	0	10	65
13	Tumsapalli PRF	115.76	6.80	58	58	0	0	13	45
14	Kukudaguda PRF	458.19	13.72	125	125	10	0	20	95
15	Suliapadar PRF	64.14	3.26	29	29	0	04	08	17
16	Kutiguda PRF	33.00	2.96	21	21	0	0	07	14
17	Mariwada'B' PRF	22.04	3.38	32	32	0	0	06	26
18	Bailapari-Tumusapalli Teak PRF	67.25	4.82	31	31	02	0	14	15
19	Tandikonda PRF	78.20	8.16	63	32	0	0	07	56
20	Korukonda PRF	492.91	16.42	132	146	25	0	12	95
21	Boraja PRF	74.22	4.04	60	60	0	0	0	60
22	Katameta PRF	71.65	8.44	64	64	04	08	15	37
23	Guppakonda PRF	415.37	5.12	15	15	05	04	06	0
24	Kumadangar PRF	599.64	10.03	90	90	10	0	18	62

MATHILI RANGE									
01	Pititung PRF(P)	2408.60	20.67	51	0	0	0	12	39
02	Godiali PRF	211.99	6.42	33	33	05	10	04	14
03	Dhobaguda PRF	34.38	3.40	20	20	02	0	0	18
04	Duraguda PRF	44.63	8.44	70	70	0	0	0	70
05	Kolab Teak PRF	31.07	4.78	42	42	0	0	0	42
06	Pujariguda 'A' PRF	152.81	5.88	43	43	0	0	0	43
07	Pujariguda 'B' PRF	43.46	3.46	27	27	0	0	0	27
08	Champajharan PRF	141.05	4.74	46	46	33	13	0	0
09	Kurumpalli 'A' PRF	31.50	14.84	56	56	0	0	0	56
10	Kurumpalli 'B' PRF	8.53	1.30	15	15	0	0	0	15
11	Kurumpalli 'C' PRF	6.74	0.72	10	10	0	0	0	10
12	Kurumpalli 'D' PRF	12.56	1.06	29	15	0	0	0	29
13	Atalguda PRF	18.44	3.14	35	35	0	0	0	35
14	Kenkor PRF	12.42	3.08	18	63	0	0	0	18
15	Mendukuli PRF	70.02	5.82	54	54	0	0	0	54
16	Bariabahal PRF	35.87	3.68	28	28	0	0	0	28
17	Pangam 'A' PRF	73.87	8.64	53	53	0	0	0	53
18	Pangam 'B' PRF	11.74	1.18	06	06	0	0	0	06
19	Siraguda PRF	37.80	10.00	83	83	0	0	0	83
20	Challanguda PRF	132.04	8.16	63	63	0	0	0	63
21	Singhguda PRF	21.31	3.30	35	35	0	0	0	35
22	Dalapatiguda PRF	34.43	6.88	41	41	0	0	0	41
23	Gangarajguma PRF	83.99	7.60	49	49	2	0	0	47
24	Jagannath PRF	22.16	1.72	23	23	0	0	0	23
25	Ghenaguda PRF	43.20	4.28	34	34	0	0	0	34
7	Dusanad PRF	57.86	3.90	28	28	0	0	8	20

BALIMELA RANGE									
1	Balimela PRF	4460.93	67.80	524	457	0	0	223	301
2	Tarlakota PRF	4982.90	24.0	378	378	05	0	366	07
3	Orkel PRF	64.18	3.16	27	20	27	0	0	0
4	Laktiguda PRF	113.56	9.94	62	62	02	0	60	0
5	Chimtapali PRF	42.69	2.74	23	23	0	0	23	0
6	Sadasibpur PRF	272.06	9.18	75	75	12	0	63	0
7	Kanangi PRF	455.06	19.08	183	184	0	0	183	0
8	Matumkonda PRF (P)	1663.12	30.72	199	0	29	10	54	106
KALIMELA RANGE									
1	Similibanchha, PRF	93.16	7.48	51	51	03	0	03	45
2	Matteru PRF	9.02	1.80	23	23	0	0	13	10
3	Chitrangipally, PRF	23.64	2.92	21	21	0	0	10	11
4	Marimetla, PRF	22.04	1.92	18	20	0	0	0	20
5	Singanguda,PRF	11.52	1.28	17	17	07	0	5	5
6	Marigata,PRF	12.27	3.14	40	40	0	0	10	30
7	Pedawada,PRF	1089.27	20.56	125	104	20	40	0	44
8	Pulimetla ,PRF	498.06	11.62	89	88	11	55	0	22
9	Teakguda Teak, PRF	15.78	2.18	26	26	0	0	0	26
10	Mandapally, PRF	1678.72	23.08	124	151	20	0	20	111
11	Pitakonda,PRF	164.38	6.20	37	37	0	0	0	37
12	ChinaPotteru, PRF	205.79	6.34	45	45	03	0	12	30
13	Patakhali, PRF	77.88	3.20	19	19	0	0	0	19
14	Kangurukonda, PRF	108.67	7.80	39	39	02	23	0	14
15	Tegadapally, PRF	5.10	1.08	13	13	05	0	03	05
16	Bodigatta (B), PRF	10.61	2.80	40	40	0	0	10	30
17	Sindhiguda, PRF	132.30	8.29	46	46	06	0	10	30

18	Battanwada B, PRF	97.22	6.78	83	83	23	20	05	35
19	Battanwada C, PRF	13.08	1.82	21	21	08	05	0	08
20	Sillakata, 'B' PRF	89.74	6.62	28	28	09	04	0	15
21	Telamiguda, PRF	22.20	3.58	39	39	0	38	01	0
CHITRAKONDA RANGE									
1	Mantriput P.R.F	289.57	7.90	55	55	20	15	20	0
2	Goudagurei P.R.F	74.03	3.42	35	35	5	0	29	01
3	Datunguda P.R.F	1886.3740	32.36	351	351	35	125	69	122
4	Bodakonda P.R.F	194.13	8.02	71	70	35	20	16	0
5	Bhimaram P.R.F	3156.67	39.30	223	223`	0	0	115	108
6	Bandhaguda PRF	1067.83	20.54	179	179	0	0	0	179
7	Ranginiguda P.R.F	1608.86	31.66	225	255	0	0	91	134
8	Jantri P.R.F	2254.42	20.30	167	167	0	0	67	100
9	Hillpahad P.R.F	48.54	4.58	53	58	19	15	17	02
10	Singaram P.R.F	2685.47	49.08	559	559	0	0	0	559
11	Sikpanasa P.R.F	2172.92	34.44	252	252	0	0	125	127
12	Motamkonda P.R.F(P)	3339.4646	41.72	272	0	48	41	59	124
MOTU RANGE									
1	Dupenkonda PRF	605.10	10.70	69	26	3	23	43	0
2	Manyamkonda PRF	731.57	19.72	105	125	0	74	31	0
3	Tamanpalli PRF	386.78	16.92	164	164	6	158	0	0
4	Kottaguda - B PRF	74.55	4.88	25	25	12	12	1	0

2.3.1.2 Abstract of Pillars Position

Table No. 2.16: Range wise Pillar position of RFs

Range	Category of Forest	Boundary Length in Km	Nos. of Total pillars as per map	Position			
				Good	Partly damaged	Fully damaged	Missing
Malkangiri	RF	19.74	108	23	0	25	60
Mathili	RF	100.58	728	250	210	61	207
Balimela	RF	53.56	557	74	31	161	291
Kalimela	RF	195.22	1327	229	210	245	643
Chitrakonda	RF	55.84	585	75	103	371	36
Motu	RF	141.40	806	163	404	0	239
Total		566.34	4111	814	958	863	1476

Table No. 2.17: Range wise Pillar position of PRFs

Range	Category of Forest	Boundary Length in Km	Nos. of Total pillars as per map	Position			
				Good	Partly damaged	Fully damaged	Missing Total
Malkangiri	PRF	221.07	1592	151	82	270	1089
Mathili	PRF	147.09	992	42	23	24	903
Balimela	PRF	166.40	1471	55	10	972	434
Kalimela	PRF	129.52	951	117	185	102	547
Chitrakonda	PRF	293.62	2442	162	216	608	1456
Motu	PRF	52.22	340	21	267	32	20
Total		1009.92	7788	548	783	2008	4449

Table No. 2.18: Range wise Pillar position of VF, RL, URL and UDPF

Range	Category of Forest	Boundary Length in Km	Nos. of Total pillars as per map	Position			
				Good	Partly damaged	Fully damaged	Missing Total
Malkangiri	VF			Not assessed			
	RL/URL			Not assessed			
	UDPF			Not assessed			
Mathili	VF			Not assessed			
	RL/URL			Not assessed			
	UDPF			Not assessed			
Balimela	VF			Not assessed			
	RL/URL			Not assessed			
	UDPF			Not assessed			
Kalimela	VF			Not assessed			
	RL/URL			Not assessed			
	UDPF			Not assessed			
Chitrakonda	VF			Not assessed			
	RL/URL			Not assessed			
	UDPF			Not assessed			
Motu	VF			Not assessed			
	RL/URL			Not assessed			
	UDPF			Not assessed			

On analysis of data it is observed that out of Total 11871 pillars, 1362 (11.47%) pillars are in good condition, 1741 (14.66%) pillars are partly damaged balance 8768 (73.86%) are either in damaged condition or missing. Over all it can be inferred as boundary is present but very difficult to find out the missing pillars. Detail verification for RL, URL, UDPF and VF may be taken up in a time bound manner.

2.3.1.3 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. 2.19: Boundary Maintenance cycle suggested for RF

Year	Range	Name of the Forest Blocks	Status	Boundary maintenance with pillars to be maintained (in Nos.)
2021-22 & 2026-27	Malkangiri	Akur	RF	35
	Mathili	Siroli	RF	18
		Dangarkhalli	RF	17
		Sarangapalli	RF(P)	48
		Tandiki RF	RF	41
		Sindhabela "A"	RF	19
		Sindhabela "B"	RF	19
	Balimela	Nuagaon	RF	46
		Chitapari	RF(P)	70
	Kalimela	Rajulkonda,	R.F	47
		Bapanpally,	R.F	82
		Yengulkonda,	R.F	77
		Gumuka Teak (B),	R.F	05
		Gumuka Teak (C)	R.F	34
		Kalimela ,	R.F	25
	Chitrakonda	Sileru-West	RF(P)	117
	Motu	Pusuguda	R.F	109
		Polluru	RF	86
2022-23 & 2027-28	Malkangiri	Jharapalli	RF	57
	Mathili	Putparbat	RF	54
		Malidanger	RF	53
	Balimela	Chitapari	RF(P)	70
		Teakguda	RF	44
	Kalimela	Venkatpalm	RF(P)	80
		Gompakonda ,	RF(P)	50
		Kawasiguda,	RF	15
		Koimetla	RF	25
		Mangipally	RF	31
		Udayagiri,	RF(P)	55
	Chitrakonda	Sileru-West	RF(P)	100
		Banguru	RF(P)	50
	Motu	Malavaram	RF	100
		Anantapalli(P)	RF(P)	70
2023-24& 2028-29	Malkangiri	Potrel- Teak	RF	16
	Mathili	Gotiguda	RF	71
		Chaulamendi	RF	38
	Balimela	Chitapari	RF(P)	80

	Kalimela	Mahadevpur	RF	45
		Venkatpalm	RF(B)	83
		Gompakonda ,	RF(B)	62
		Udayagiri,	RF(P)	50
		Teakguda Teak	RF	05
		Podia Teak	RF	11
		Supal 'A'	RF	26
	Chitrakonda	Sileru-West	RF(B)	67
		Banguru	RF(B)	63
		Limalori	RF(P)	30
	Motu	Anantapalli(P)	RF(P)	100
		Srikonda	RF	40
		Kottanpalli	RF	48
2024-25 & 2029-30	Malkangiri	-	-	-
	Mathili	Saradaput	RF	14
		Dasamantpur- Extn	RF	16
		Meka	RF	21
		Chedenga	RF(P)	87
	Balimela	Chitapari	RF(B)	48
		Gopiguda	RF(P)	70
	Kalimela	Udayagiri,	RF(P)	75
		Mutumguda	RF	50
		Kangrukonda	RF	26
		Kurty Teak	RF	20
		Nandiwada Teak-I	RF	07
		Eralgundi	RF	28
	Chitrakonda	Limalori	RF(P)	38
		Publiguda	RF	47
	Motu	Tadimetla	RF(P)	67
		Pendikonda	RF	28
		Motu	RF	16
		Motu Teak	RF	24
2025-26 & 2030-31	Malkangiri	-	-	-
	Mathili	Chedenga	RF(B)	100
		Mathili	RF	65
	Balimela	Chitapari	RF(B)	48
		Gopiguda	RF(B)	44
	Kalimela	Udayagiri	RF(B)	75
		Kaldapally	RF	22
		Kaldapally Teak	RF	22
		Nandiwada Teak-II	RF	13
		Kamarguda	RF	09
		Udayagiri "B"	RF	56

		Tanginiguda	RF	16
		Supal”B”	RF	39
	Chitrakonda	Limalori	RF(B)	30
		Gunthawada	RF	43
	Motu	Tadimetla	RF(B)	70
		Muraliguda ‘A’	RF	08
		Muraliguda ‘B’	RF	16
		Peta Teak	RF	08

Table No. 2.20: Boundary Maintenance cycle suggested for PRF

Year	Range	Name of the Forest Blocks	Status	Boundary maintenance with pillars to be maintained (in Nos.)
2021-22 & 2026-27	Malkangiri	Jhileriguda	PRF	44
		Sindrimal	PRF	119
		Girididongar	PRF	70
		Dharamdongar	PRF	51
		Pitatang PRF	PRF(P)	34
	Mathili	Pitatung	PRF(P)	51
		Godiali	PRF	33
		Dhobaguda	PRF	20
		Duraguda	PRF	70
		Kolab Teak	PRF	42
	Balimela	Balimela	PRF(P)	300
	Kalimela	Similibanchha,	PRF	51
		Matteru	PRF	23
		Chitrangipally,	PRF	21
		Marimetla,	PRF	18
		Singanguda,	PRF	17
	Chitrakonda	Mantriput	PRF	55
		Goudagurei	PRF	35
		Datunguda	PRF(P)	200
		Singaram	PRF(P)	100
	Motu	Manyamkonda	PRF(P)	55
		Kattaguda ‘B’	PRF	25
2022-23 & 2027-28	Malkangiri	Pitatang PRF	PRF(P)	23
		Tamasa	PRF	31
		Namkonda	PRF(P)	60
		Titiviry	PRF	25
		Kottamateru	PRF	43
		Allur	PRF	26

	Mathili	Koilipari	PRF(P)	50
		Pujariguda 'A'	PRF	43
		Pujariguda 'B'	PRF	27
		Champajharan	PRF	46
		Kurumpalli 'A'	PRF	56
		Kurumpalli 'B'	PRF	15
	Balimela	Balimela	PRF(P)	224
		Tarlakota	PRF(P)	100
	Kalimela	Marigata,	PRF	40
		Pedawada,	PRF	125
		Teakguda Teak,	PRF	26
	Chitrakonda	Datunguda	PRF(B))	151
		Bodakonda	PRF	71
		Bhimaram	PRF(P)	100
		Singaram	PRF(P)	100
	Motu	Manyamkonda	PRF(B)	50
2023-24 &2028-29	Malkangiri	Koilipari	PRF(B)	100
		Cheruguda	PRF	75
		Tumusapalli	PRF	58
		Kukudaguda	PRF	60
		Suliapadar	PRF	29
	Mathili	Kurumpalli 'C'	PRF	10
		Kurumpalli 'D'	PRF	29
		Atalguda	PRF	35
		Kenkor	PRF	18
		Mendukuli	PRF	54
		Bariabahal	PRF	28
	Balimela	Tarlakota	PRF(P)	278
	Kalimela	Pulimetla	PRF	89
		Mandapally	PRF	124
	Chitrakonda	Bhimaram	PRF(B)	123
		Bandhaguda	PRF	179
		Singaram	PRF(P)	100
	Motu	Tamanpalli	PRF(P)	84
2024-25 &2029-30	Malkangiri	Kukudaguda	PRF	65
		Kutiguda	PRF	21
		Mariwada'B'	PRF	32
		Bailapari- Tumusapalli Teak	PRF	31
		Tandikonda	PRF	63
		Koilipari	PRF(B)	63
		Korkonda	PRF(P)	60
	Mathili	Pangam 'A'	PRF	53

		Pangam 'B'	PRF	06
		Siraguda	PRF	83
		Challanguda	PRF	63
		Singhguda	PRF	35
	Balimela	Orkel	PRF	27
		Laktiguda	PRF	62
		Chimitapally	PRF	23
		Sadasibpur	PRF	75
	Kalimela	Pitakonda,	PRF	32
		ChinaPotteru,	PRF	45
		Patakhal,	PRF	19
		Kangurukonda,	PRF	39
		Tegadapally,	PRF	13
		Bodigatta (B),	PRF	40
	Chitrakonda	Ranginiguda	PRF	225
		Jantri	PRF	167
		Hill- Pahada	PRF	53
		Singaram	PRF(P)	59
	Motu	Tamanpally	PRF(B)	84
2025-26 &2030-31	Malkangiri	Korkunda	PRF(B)	72
		Baraja	PRF	60
		Guppakonda	PRF	15
		Katameta	PRF	64
		Kumadanger	PRF	90
	Mathili	Dalapatiguda	PRF	41
		Gangarajguma	PRF	49
		Jagannath	PRF	23
		Ghenaguda	PRF	34
		Dusanad	PRF	28
	Balimela	Kanangi	PRF	183
		Mutumkonda	PRF(P)	199
	Kalimela	Sindhiguda,	PRF	46
		Battanwada B,	PRF	83
		Battanwada C,	PRF	21
		Sillakata, 'B'	PRF	28
		Telamiguda,	PRF	39
	Chitrakonda	Singaram	PRF(B)	100
		Sinkpanas	PRF	252
		Mutumkonda	PRF(P)	272
	Motu	Dupenkonda	PRF	69

2.3.2 Inter-State Boundary: The Inter State Boundary separating Odisha and Andhra Pradesh is to the South and South-East, where as inter-State Boundary separating Odisha and Chhattisgarh is to the South and South-West in this Division. The total length of the interstate boundary passing through the Forest Blocks is nearly 34.5 Km.

The details of the interstate Boundary are given below:

Table No. 2.21: Details of the Interstate Boundary

Sl. No.	Name of the R.F./PRF	Length (in Kms.)
1	Pusugudem RF	3.75
2	Motu Teak RF	0.75
3	Tadimetla RF	1.75
4	Polleru RF	3.25
5	Anantapalli RF	2.5
6	Kumadangar PRF	1.75
7	Motu RF	3.25
8	Kotametar PRF	3.25
9	Sikpanasa PRF	6.25
10	Jantri PRF	7.00
11	Dupnikonda	1.00
	Total	34.5

Source: Field verification

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

2.4.1 Agriculture is the main occupation of the people of the tract of the Division with more than 90% of the work force directly depending on agriculture for their sustenance.

Approximately 40% of the land is put to agricultural use out of total geographical area of 5791 square kilometers. With the increase in population, the area under cultivation is likely to increase in future. If present land-use practices continue, additional land will be obtained by clearing existing forests. Thus, forest shall continue to shrink, if no remedial measures are

immediately taken. As the local economy grows and diversifies, demands for forestland and forest produce shall also grow. With rapid urbanization and increase in standard of living, the requirements of land, wood and other products, are also increasing. Moreover, the agricultural lands, near small towns, are being diverted for settlement and other commercial purposes. Likewise, many lands for development of roads, buildings and other communication facilities have also been taken from forests.

The trend of change in land use as well as population over last half a century in undivided Koraput District, of which the Malkangiri Division was a part, is shown in Table No. 1.12. This clearly shows the fact that with passage of time, there is decrease in forest area vis-à-vis increase in the crop area. In fact, density of population has almost tripled over last 60 years resulting in tremendous biotic pressure on the existing forests.

Table No. 2.22: Land Use Pattern of Malkangiri (in Hectare)

Year	Reporting Area for LUS	Classification of Reporting Area (in Ha)								Classification of Reporting Area (in Ha)			Net Area Sown	Cropped Area	Area Sown More Than Once
		Forests	Not Available for Cultivation			Other Uncultivated Land Excluding Fallow Land				Fallow Land					
			Area Under Non-Agricultural Uses	Barren and Unculturable Land	Total	Permanent Pasture and Other Grazing Land	Land Under Misc. Tree Crops and Groves not Included in Net Area Sown	Culturable Waste Land	Total	Fallow Lands Other Than Current Fallows	Current Fallow	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2011-12	423527	170056	24102	44873	68975	22096	576	5625	28297	17481	26492	43973	112226	119609	
2012-13	423527	164716	24990	48146	73136	20687	709	5148	26544	17338	29989	47327	111804	166865	
2013-14	423530	147641	29231	54128	83359	22372	897	3921	27190	17223	27964	45187	120153	127191	
2014-15	423532	155525	24871	51183	76054	22730	639	5157	28526	15304	23059	38363	125064	102302	
2017-18	423957	160000	26000	44000	70000	24000	1000	5000	30000	16000	33000	49000	114957	117231	
(Source: Land use Statistics, Ministry of Agriculture-Website and District Statistical Hand Book-2015)															

2.4.2 Change in Forest Cover:

Forest Survey of India, Dehradun conducts survey of Forest Cover change satellite imagery of all states and publishes the report in the 'India Survey Report' on every two years intervals. The report classifies the Forest Cover following categories on the basis of crown coverage.

Table No. 2.23: Change in Forest Cover

Sl. No.	Classification of Forest Cover	Canopy density
01	Very Dense Forest	70% & above
02	Moderately Dense Forest	40 to 70%
03	Open Forest	10 to 40%
04	Scrub	Less than 1%

The latest India State of Forest Report was published in the year 2015. The previous India State of Forest Report was published in the year 2017. On comparison of the Forest cover of Malkangiri Forest Division, of the Year 2017 to that of 2015, the following change of Forest Cover under various category is given below.

Table No. 2.24: Change in Forest Cover under Various Categories

Sl. No	Category of Forest Cover	Area as per report, 2015 in ha	Area as per report, 2017 in ha	Increase/ Decrease in cover
01	Very Dense Forest	15952.10	15993.67	+41.58
02	Moderately Dense Forest	76660.03	76550.17	-109.86
03	Open Forest	147617.44	149666.25	+2048.81
	TOTAL	240229.57	242210.09	+1980.52
	% of G.T.	40.46	40.79	+0.33
04	Scrub	4020.31	4416.83	+396.52
<i>Source: FITGC, Aranya Bhawan, Bhubaneswar</i>				

The land details excluding the Forest Cover of Malkangiri Forest Division stand as follows.

Table No. 2.25: Land details excluding the Forest Cover of Malkangiri Forest Division

Sl. No	Category of land	Area as per report, 2015 in ha	Area as per report, 2017 in ha	Increase/ Decrease in cover
01	Non-Forest	325895.37	327644.94	+1749.57
02	Water	23672.63	19546.02	-4126.61
<i>Source: FITGC, Aranya Bhawan, Bhubaneswar</i>				

On analysis, it is observed that in the Forest Cover is increased and Water level is negative trend.

2.4.3 Encroachment:

Encroachment in the form of shifting cultivation is the most common type prevalent in the Division. In the process small hamlets form a village. Encroachment is generally for homestead and agriculture purpose. Encroachment in the form of shifting cultivation is the most common type of temporary encroachment. All Ranges of this Division have been widely affected under shifting cultivation. In some forest blocks it presents a very devastated appearance due to fragmentation of the forests. Higher no. of fire incidence may also be attributed to site clearance and preparation of encroached land for cultivation. Due to massive encroachment resulting honeycomb structures in the forest, the contiguity of the patches is lost. On the other hand, the habitation of the Wild animal got fragmented and free movement has been checked. As a result, the population of many Wild animals is in danger.

2.4.3.1 Post 80 encroachments Surveyed in RF and PRF: The extent of encroachment including podu cultivation has led to fragmentation of the wildlife habitat besides opening up of the forest canopy at many places. This has not only resulted in change in crop composition vis-à-vis degradation but also increased man-animal conflict as well. Though the encroachment cases have been regularly registered, the damage continues to be done to the forests. However, the cases booked for these encroachments are shown in **Table: 2.26** which clearly imply the legal action taken by the forest personnel in reducing the extent of encroachment. But due to

negligible no of conviction by the Courts the problem of encroachment continues to be the bottleneck in proper implementation of the forest management practices.

Table No. 2.26: Legal Action Taken by the Forest Personnel in reducing the extent of Encroachment.

Sl. No	Name of the Range	Name of the Forest Block	Total nos. of encroachers	Area encroached (in ha)	Case No booked
1	Malkangiri	Tamasa PRF	3	1.7	45,46,47/2004-05
2	Mathili	Godiali PRF	6	0.71	32/2003-04, 48,57-,58/2009-10 and 68/2009-10
3	Mathili	Kolab-Teak PRF	1	0.25	167/2006-07
4	Mathili	Sindhabela RF	1	0.20	129/2009-10
5	Kalimela	Mutumguda RF	18	4.12	117,118,119,120,121,122,123, 124,125,126,127,129,130,131, 132,133,134,135/2009-10
6	Balimela	Chitapari RF	10	7.0	88/2003-04 & 89/2003-04
7	Balimela	Balimela PRF	9	3.7	91/2004-05,135,136/2005-06, &137/2005-06
		Total	48	17.68	

2.4.3.2 There are three types of encroachments noticed in the forest, firstly encroachment by podu/ shifting cultivation who do not have any other means of livelihood. There encroachments are temporary but gradually tending towards stable condition. Second category of encroachment is by agriculture to occupy more land and third one encroachment is by influential person, rich farmer and others. Infact, as per field verification carried out, there are number of unauthorized encroached villages already established in many forest blocks.

2.4.3.3 Regularization of Pre-1980 Encroachers: The Govt. of Orissa, vide their Letter No-21060 dated 04.05.2000 of the Revenue Department, have decided to regularize the pre 1980 encroachment existing over forest land which are eligible for such regularization as per guidelines of the Forest Conservation Act, 1980 to this effect. This regularization was a one-time affair for all pre-1980 encroachments.

The main criteria for treating a particular encroachment eligible for regularization are:

- (i) Encroachments proposed for regularization must have taken place prior to 25/10/1980.
- (ii) Encroachment must subsist on the field and the encroached land must be under continuous process of the encroachers and
- (iii) All such cases must fall under the eligible category, that is, such cases are those where the state Government had evolved certain eligibility criteria in accordance with local needs and conditions and had taken a decision to regularize such encroachments but could not implement their decision either wholly or partially before encroachment of the Forest Conservation Act on 25/10/1980.

2.4.3.4 Accordingly, forest block wise survey was made on encroachments and the proposal for regularization of eligible pre-1980 encroachments of erstwhile Jeypore Forest Division have already been submitted to the Principal Chief Conservator of Forests, Orissa, Bhubaneswar vide Letter No-2986 dtd 28.11.2000 of Collector, Koraput for onward transmission. The detail information on regularization of pre-80 encroachment of forest area for human settlement in respect in Malkangiri district is furnished in **Annexure- III**.

2.4.4 Right and Concession:

Right and concession in different legal types of forest have gradually evolved over time. All the rights, concessions and privileges are subject to the condition that if a forest resource is exhausted or detrimental to the general health of forests, all rights, concession or privileges shall cease to exist.

2.4.4.1 Right under Estate Rules: As per Rule 5 of the Jeypore Forest and Waste land rules, 1895 the bonafide hill ryots (also called “privilege holders”) had been allowed cutting of trees up to 3’ girth on free charge and without permit in Reserve lands for their consumption. Other persons, not being bonafide hill ryots but habiting the estate were allowed to use specified forest produce under “permit system” after payment of such fees as were prescribed in the Schedule of Rates for all timber and other produces.

2.4.4.2 As per amendment of the said rules in 1916 and notified in the year 1922, the “privilege holders” were also free of charges, the removal of Reserve class trees inclusive of Sal, Bija and Teak up to 3’ from Un-reserved land and Protected land for their own bonafide consumption. Besides this, they were allowed to graze their cattle and to remove the other forest produce. Further for non- “privilege holders”, another system was introduced during the year 1923. This was called was “Annual Royalty system” or locally called as the “Plough Tax” by virtue of which an annual Royalty of one half to one Rupee per plough was collected from the Tenant for allowing them to remove reserved class trees up to 3’ girth for making ploughs. This practice was discontinued in 1949.

2.4.4.3 Rights under Anchal Administration:

2.4.4.3.1 With the vesting of Ex-Jeypore estate with the State of Odisha vide Govt. Notification No.8231/R dtd.29.12.1951, the Protected Lands and Unreserved Lands continued to be right burdened as they were earlier. At the same time, a few rights such as right to use specified footpaths and cart-tracks, the right to worship at the specified shrines inside the Reserve Lands. These concessions were otherwise also allowed in accordance with rule 6 of the Koraput Forest Rules, 1956. Grazing was also allowed inside Reserve Lands on payment of a very nominal grazing fee of two Anna per buffalo, bullock, cow or pony, one Anna per calf and sheep and one and half Anna per goat, in case of permanent residents of the adjoining villages, and at twice these rates for outsiders.

The resident hill tribes were allowed to practice mass hunting in the Reserve lands adjoining their villages for the annual festival popularly known as “Chaitra-Bento Parab” during the summer season. This annual mass hunting of animals has significantly contributed to extermination of a large number of games.

Besides that, as per Notification No-6108-IX-114/55-E A, dated the 30th August 1956 of Govt. of Orissa, Revenue Department some specific rights and concessions were given to the privilege holders of Koraput District.

2.4.4.4 Right under Orissa Forest Act, 1972:

On implementation on Orissa Forest Act, 1972, number of Reserve Forests have been constituted where in rights and concessions of the local people have been duly inquired into by the Forest Settlement officers; and in most of the cases he has allowed some rights and concession as well as privileges in the relevant Govt. Notification issue u/s 21 of the said Act. However, some common rights, concessions or privileges admitted in different Reserve Forests are as follows:

- a.** The villagers are allowed to collect Firewood and Bamboos for their domestic needs and allowed to graze their cattle subject to payment of royalty and restrictions as may be impose by the Forest Department from time to time but the browsers and grazers are not allowed in the regeneration and plantation areas.
- b.** Right to collect and remove edible roots, fruits, minor forest produce such as Mohua, Kendu, Char, Sal seeds, Siadi leaves and other except Sandal Wood and Cashew nuts.
- c.** In Chitapari Forest Block the Muslims of Balimela Nagar were allowed a piece of land for their graveyard purpose. Besides that, in Kalimela Block the villagers of Ambaguda and Kalimela are allowed to worship Goddess Bhairambi.
- d.** Right to enjoy fruits of Horticulture plantation, permitted within the boundaries of Reserve Forest as may be decided by the Collector of the Dist., in consultation with the Divisional Forest Officer concerned would be available to the village community.
- e.** Rights to use specified roads, footpaths, boundary lines and cart tracks running across the specified Reserve forest to adjoining villages to their movements and collection of water from rivers and streams etc. subjected to such restriction as may be imposed by the competent Authorities.

2.4.4.5 The National Forest Policy, 1988: The National Forest Policy, 1988 prescribes that, enjoyment of rights and concession should be subjected to carrying capacities of forest, and availability of adequate quantities of relevant Forest products without jeopardizing regeneration of forests.

In view of the Ban on “green felling” in Malkangiri District since 1988 some of these rights such as removal of Poles and other timbers for house building have been affected. As per

the clarification, issued by the Principal Chief Conservator of Forests, Orissa vide his Memo No.8873(7) dated 06.4.1991, Timber for house building, for fire affected persons and for agriculture implements are to be supplied through M/s O.F.D.C. Ltd from their Depots as envisaged in the Govt. of Orissa, Forest and Environment Department Circular No.10488 dated 11.5.1990. In addition, Govt. in F & E Dept. have been pursuing since 1988 through Forest Protection Committee, a Policy encouraging people's participation in local forest management and evolving greater usufructuary rights on people. This is being done under J.F.M. programme through a Memorandum of Understanding (MoU), jointly agreed by the Forest Dept. and the interested local people.

Further as per the Govt. Policy of March, 2000 on MFPs, 68 Nos. of items now it is increased to 71 Nos. items transferred to Panchayats for their collection and disposal. The Forest Dept. does not charge any Royalty on 69 Nos. items.

2.4.4.6 Forest Right Act-2006:

Under Forest Right Act 2006, Forest right titles have been distributed in Malkangiri District from 2006 onwards. In Malkangiri Forest Division, **35616 Nos of** titles have been distributed to the ST individuals involving Revenue and Forest area of about 89659.97 ha. But it is observed that the Title holders are not properly sensitized about their duties and responsibilities as mentioned in the act towards forest conservation because of which there is loss in forest cover in some areas, in anticipation that cutting trees and clearing of land will vest them with inherent rights to get Forest rights titles. The details of the Forest rights titles land with regards to forest area is given below.

Table No. 2.27: Forest Right Titles Land with regards to Forest Area

Sl. No	No. of Title distributed			Area (is Acres)		
	Revenue Forest	Reserve Forest	Total	Revenue Forest	Reserve Forest (RF,PRF,RL,URL, UDPF)	Total Remarks
1	32119	3497	35616	76726.75	12933.22 or 5234.2041Ha	89659.97

N.B. Only 4001.1204 Ha areas diverted from RF, PRF, RL, URL under FRC out of 5234.2041 Ha and balance area 1233.0837 ha areas diverted from UDPF which are not included in this Working plan because except 1 UDPF others UDPF are not clearly marked in Topo Sheet.

2.4.4.7 Area diverted under Forest Conservation Act-1980:

In Malkangiri Forest Division during the implementation of outgoing Working Plan (2007-08 to 2016-17) the following area of Forest has been diverted for different non forestry works as per the provision of the Forest Conservation Act-1980.

Against the diversion of Forest land in the Division, the Compensatory Afforestation has been done 15.612 ha AR, 2.664 ha ANR & 32 ha CATP only over Forest land, Non-forest land including private land.

Table No. 2.28: Diversion of Forest Area for Non-Forestry Purpose

Sl. No.	Name of the Project	Name of the Forest Block from which diverted	Year of Approval	Area diverted (in Ha)
1	2	3		4
1	Construction of Potteru SHEP by Manager, OHPC, Kalimela	Gompkonda Village Forest (Revenue)	1993	11.760
2	Laying Iron Ore Slurry Pipeline from Boiladila to Visakhapatnam by M/s ESSAR Ltd	Banguru RF, Matumkonda PRF, Siadimal URL, Surkibandh UDPF, Tity very UDPF	2002	18.60
3	Middle Kolab Hydro Electric Project by Minakshi Power Limited, Hyderabad	Bada Jubgle Tentuligumma (Revenue)	2002	4.303
4	Setting up Saptadhara SHEP by M/S Abantika Power Projet Pvt. Ltd Hyderabad. (Bakuli)	Dasmantapur RL and Revenue Forest	2006	3.599
5	Construction of Camp by Anti Naxal Force at Village Pakhnaguda, Malkangiri	Pakhnaguda Patra Jungle (Revenue)	2011	0.950
6	Construction of Fortified Mudulipada Police Station of Malkangiri Dist.	Mudulipada Patra Jungle (Revenue)	2015	0.810
7	M/s IVRCL, Ltd. At Govindapalli Dist- Malkangiri for Establishment of stone quarry in village Saradaput.	Saradaput Gramya jungle (Revenue)	2017	2.994
8	Widening to two lane from 327/700 to 413/700 Km of N.H.-326(erstwhile Km	Darmagarh RL and Burdiguda RL	2018	6.646

	from 16/0 to 102/0 Km SH-25 Under Vijayawada- Ranchi route in Koraput and Mal;kangiri District of Odisha			
		Total		49.662

2.4.4.8: Only 10.1896 ha diverted from RF, PRF and RL out of 49.662 ha under Forest Conservation Act and remaining 39.4724 ha diverted from Revenue Forest which are not included in this plan. The details of forest area diverted out RF, PRF and RL is given below.

Table No. 2.29: Details forest area diverted out of RF, PRF and RL for non-forestry purpose.

Sl. No.	Name of the Project	Name of the Forest Block from which diverted	Year of Approval	Area diverted (in Ha)
1	2	3		4
1.	Laying Iron Ore Slurry Pipeline from Boiladila to Visakhapatnam by M/s ESSAR Ltd	Banguru RF,	2002	0.0672
		Matumkonda PRF,	2002	2.4654
2	Setting up Saptadhara SHEP by M/S Abantika Power Projet Pvt. Ltd Hyderabad. (Bakuli)	Dasmantapur RL	2006	1.0110
3	Widening to two lane from 327/700 to 413/700 Km of N.H.-326(erstwhile Km from 16/0 to 102/0 Km SH-25 Under Vijayawada- Ranchi route in Koraput and Mal;kangiri District of Odisha	Darmagarh RL,	2018	4.9980
		Burdiguda RL	2018	1.6480
Total				10.1896

2.5 Threat to the Forest: (Threat to Fauna)

2.5.1. Forest Fire:

Forest globally are considered as one of the major factors of climate change, bio-diversity loss and increase in global temperature due to production of biological carbon and greenhouse gasses. In the tropical deciduous forests of Malkangiri, fire is a recurrent phenomenon due to higher levels of water stress during summer. Traditional land use practices and changes in weather pattern have resulted in higher fire incidences in the tropical India. Forest fires in

Malkangiri are mostly anthropogenic in nature. Following are the major causes of fire which may be intentional as well as unintentional:

- (i) Burning of forest floor for good growth of Kendu stump and grass or in the next season
- (ii) Setting of fire under the crown of Tree for collection of Mahua flower and Sal seed
- (iii) Setting of fire for cleaning of forest floor for podu cultivation
- (iv) For Hunting of wild animals
- (v) Un-extinguished campfires, charcoal panniers of forest dwellers
- (vi) Un-extinguished cigarettes or bidi butts being thrown in the under bush etc.

Based on forest fire occurrence over last 6 years using satellite-based observations, the forest fire vulnerability of blocks was assessed for Malkangiri Division.

2.5.2. Illicit Felling:

Illicit felling is one of the most common injuries to the crop and is a major cause of depletion of forests. Some section of people resorts to illicit felling; to earn easy money by regular removal of old plantations and forest blocks in the vicinity of villages get reduced. The main reasons for illicit felling are as follows.

- (i) To meet requirement of firewood for daily cooking due to non-availability of alternative.
- (ii) To meet small timber, poles and bamboos for construction, house repair, agricultural implements.
- (iii) To meet the increasing demands in urban areas e.g. making furniture, construction, doors, windows etc.
- (iv) To earn easy money by supplying timber to bigger towns adjoining the areas.

The major Forest blocks which are prone to this kind of injury particularly illicit felling, grazing, clearing etc are Balimela PRF, Tarlakota PRF, Udayagiri RF, Pedawada PRF, Motu RF, Tadimetla RF, Dharmagarh RL, Dasmantpur RL, Pitatung PRF, Dangarkholi RF, Matumkonda PRF, Mantriput RF, Sileru (W) RF, Tumsapali PRF, Manusconda PRF, Goiparbat RL and Sindrimal PRF.

Besides regular staff duty i.e. Forest Guard and Foresters, the anti-poaching squad has been set up under CAMPA, CCYPS under State Plan and IPCEA comprising of daily wage staff to check illegal poaching, transportation, illicit felling in the Division.

2.5.3. Encroachment:

The Malkangiri district is dominated with Tribal particularly Primitive Tribal like Gondas, Kondhas, Bondas, Porajas and Koyas etc. inhabited in this great region constituting 57.87 % of the total population of the district. Further the dependency of Tribal and other Forest Dwellers in Malkangiri more than 80 %, they are supplanting their food with roots, shoots, tuners and fruits. They are also hunting wild animals during festivals, feast and sports. Subsequently in the later days, they were cultivating agriculture crops and other vegetables on stream banks. Though the lands were steep, no binding or terracing was followed as a result the top soils got washed during rain and the forests became vulnerable to soil erosion. Encroachment in the form of shifting cultivation is the most common type prevalent in the Division.

In the process small hamlets form a village. The Encroachment is generally for homestead and agriculture purpose. Encroachment in the form of shifting cultivation is the most common type of temporary encroachment. Mostly all the Ranges of the Division are widely affected by encroachment by the Tribes and other Forest dwellers. In some forest blocks it presents a very devastated appearance due to fragmentation of the forests. The present encroachment status on all forest blocks is to be collected.

2.5.4. Grazing:

Many tribal villages are located inside the Forest Blocks and/or close proximity to different forest blocks. All animals depend mainly on forest for grazing throughout the Division. Availability of grasses and fodder for their cattle is plenty in Forest area and scanty in villages, so forest is the only alternative source. The forests close to human habitation are most prone to heavy grazing. Grazing is a serious problem as it affects natural regeneration of several species. As result young recruits and saplings badly damaged due to concentrated and unregulated over grazing. Soil compacting and erosion are also caused due to heavy incidences of cattle grazing.

The District Veterinary Services started separately after formation of the new District in the year 1993. There are seven blocks in the District, each having a Veterinary Dispensary, four Second V. Ds and two D.N.K. V.Ds. and 50 Livestock Aid Centers and 1 District Diagnostic Laboratory are functioning in the District. As per the 2013 Census, Livestock population of Malkangiri is as mentioned below;

Table No. 2.30: Livestock population of Malkangiri (As per the 2013 Census)

Cattle		Buffalo	Sheep	Goat	Pig	Poultry	Duck	Total
Indigenous	Crossbred							
4,28,963	5,692	46,890	28,545	1,44,961	60,173	4,87,244	24,357	12,26,825

2.5.5. Mining:

Mining of major minerals in the Division is not a common feature, though forests areas are rich in Tin ore in Tulsi RL of Mathili Range and Quartzite in Challanguda and Mendukuli area of Mathili. This Division is receiving Prospecting License Application for Granite in Motu Area from Deputy Director, Mines, and Koraput. But till date no mining work has been started. Recently the Mining Department has approached this Division for DGPS Survey of Limestone area for mining purpose at Kotamateru, Uskalbag, Nandiguda and Daranpalli. Other minor mineral like murum and boulders are collected by the department and in some case private too on a regular basis, in some area by the local people also to earn their livelihood. This collection is destructive to forests and will accelerate erosion of top soil and damage habitat. The Divisional Forest Officer should keep a strict vigil to protect illegal collection of stones and boulders from forest areas in order to prevent erosion.

2.5.6. Poaching:

The main factor causing injury to wild animals are degradation in habitat due to grazing and shifting cultivation. Human interference is low, but podu cultivation severely affects fauna i.e. direct destruction, fragmenting the habitat as well as reducing the availability of food. This is the only major factor which poses challenge to the manager. Poaching of animals for its meat,

trophies, skins and other animal products are also other factors. There are no incidences of poaching of elephants in the Division. Natural death also takes place of animals.

Mass hunting during Chitra Parba is the major practice of threat to the Wild Animals of Malkangiri. During that time the Tribes i.e., Bonda, Didayi, Koya, Paroja, Kondha etc. and in some time other Forest dwellers of the District will enter in to the nearby Forest area for hunting of wild animals and the meat will be brought to villages. The Religious belief of the Tribal people is specific to each group. Among the most of the Tribes deities are believed to reside in sacred Groves and even the village Goddesses are worshipped under a Tree, and then the meat will be cooked.

The practices are found reduced now days. But in some places Gobindapali, Khairput, Pandripani, Padmagiri, Tarlakota, Chitrakonda, Kalimela and Motu area of the Division are observed now. The Staffs and Squad engaged under different schemes are being utilized to educate and make awareness among these Tribes on evil impact of this kind of Mass Hunting.

2.5.7 Maoist Movement:

Movement of Naxalist in the Forest area of Malkangiri Forest Division is regularly. So, protection of Forest may hamper as the staff will be reluctant to stay and patrol in the Forest.

2.6 Distribution of Different Forest Type:

As per the '*Champion and Seth's Revised Classification-1968*', the Forests of Malkangiri are mainly Two types;

- (i) Tropical Dry Deciduous Forest,
- (ii) Tropical Moist Deciduous Forest

Above all, to the height of 900 Mt above MSL, the Sal Forest in Govindpalli Ghats at 600 Mt. MSL for its quality, potentiality and ecological status, have special consideration and form local sub type. The low level Malkangiri Tract after Mathili supports the moist and dry deciduous forests type due to its physiographic and climatic conditions. The peculiar features of this Division are the **Ecotone zone** where from the Climax Sal Forest disappear in the south giving rise to Teak near Mathili.

According to *Champion and Seth's revised classification* the forest types based on physiognomy, floristic composition, physiographic, structure, function and habitat the following groups, sub groups and types of Forests are found in Malkangiri;

Major Group: Tropical Forests

Group: 2. Semi Evergreen Forest

Sub-Group: 2 B Northern Tropical Semi Evergreen Forest

Type: 2 B/C3 Orissa Tropical Semi Evergreen Forests

Group: 3. Moist Deciduous Forests

Sub Group: 3B Southern Tropical Moist Deciduous Forests

Type: 3 C/C2 Moist Sal Bearing Forests

Group: 5. Dry Deciduous Forests

Sub Group: 5A Southern Tropical Dry Deciduous Forests

Types: 5 A/C1 Dry Teak Bearing Forest

5 A /C3 Southern Dry Mixed Deciduous Forest

Sub Group: 5 B Northern Tropical Dry Deciduous Forests

Types: 5 B/C1 Dry Sal Bearing Forests

5 B / C2 Northern Dry Mixed Deciduous Forests

5B /E9 Dry Bamboo Breaks

Sub Group: 5 D

Type: 5 D/S1 Dry Deciduous Scrub Forests

Sub Group: 8A. Southern Sub Tropical Broad Leave Hill Forests

Type: 8A/C3 Central Indian South Tropical Hill Forests

These types are generally found on the hills at about 800 Mt and above the MSL and in the lower permanently moist valleys, including along perennial stream banks of areas.

Table No. 2.31: Classification of Forests According to Champion & Seth's Revised Classification of Forest Types in India.

Major Group: Tropical Forests			
Group	Sub-Group	Type	Sub-Type
2.Semi Ever Green Forests	2 B Northern Tropical Semi Ever Green Forests	2 B/C₃ Orissa Tropical Semi Ever Green Forests	-
3.Moist Deciduous Forests	3 B Southern Tropical Moist Deciduous Forests.	3 B/C₂ Southern Moist Mixed Deciduous Forests	-
	3 C Northern Tropical Moist Deciduous Forest	3 C/C₂ Moist Sal Bearing Forests	3 C / C_{2e} Moist Peninsular Sal Forests
			3 C / C_{2e(i)} Moist Peninsular High-Level Sal
			3 C / C_{2e(ii)} Moist Peninsular Low-Level Sal
5 Dry Deciduous Forests	5 A Southern Tropical Dry Deciduous Forests	5 A / C₁ Dry Teak Bearing Forests	-
		5 A / C₃ Southern Dry Mixed Deciduous Forests	-
	5 B Northern Tropical Dry Deciduous Forests	5 B / C₁ Dry Sal Bearing Forests	5 B / C_{1e} Dry Peninsular Sal Forests
		5 B / C₂ Northern Dry Mixed Deciduous Forests	-
		5 B / E₉ Dry Bamboo Breaks	-
	5 D	5 D / S₁ Dry Deciduous Scrub Forests	-
	8 A Southern Sub-Tropical Broad Leave Hill Forests	8 A / C₃ Central Indian South Tropical Hill Forests	-

2.6.1 In Fact, large tracts of dense forests of the Division are getting degraded towards open forest and open towards scrub forest due to continuous over increasing biotic interference. The concept of Joint Forest Management may help in rejuvenating the crop condition of the Division.

2.7. Tree Cover Outside Forest: -

For assessing TOF, geometrical rectified IRS P-6 LISS iv. (5.8 mt) or any higher version imageries may be procured from NRSC, Hyderabad. Forest area of this division area is masked out from them and classified map is generated having different strata namely, block plantation, linear trees, scattered trees, area with no trees, crop land etc. Stratified random sampling may be undertaken to assess the growing stock the potential area for extension of forestry outside forest and sustainable land use management within the Forest Division. This requires inter-spectral synergy and convergence. DFO may assign this work to ORSAC/NRSA for inventorying trees outside forest.

However, this Division has taken massive steps to increase green cover in terms increasing Tree outside Forest by distribution of seedlings among the people, Educational Institutions, NGOs, Govt. institutions etc. The details of year wise/Scheme wise No. of seedlings distributed during the out-going Plan period is given below:

Table No. 2.32: The Details of Year Wise/Scheme Wise No. Of Seedlings Distributed During the Outgoing Plan Period

Sl. No.	Year	Scheme	Component	Target (in Nos.)	Achievement (in Nos.)	Remarks
1	2009-10	RLTAP	Distribution of seedlings	180000	180000	
2	2010-11	RLTAP	Distribution of seedlings	500000	500000	
3	2012-13	13 th FC Grant	T.O.F.	500000	500000	
4	2013-14	13 th FC Grant	T.O.F.	740000	740000	
5	2014-15	State Plan	Agro Forestry	500000	500000	
		13 th FC Grant	T.O.F.	740000	740000	
6	2015-16	State Plan	Agro Forestry	850000	850000	

		13 th FC Grant	T.O.F.	740000	740000	
7	2016-17	State plan	Agro Forestry	650000	650000	
		13 th FC Grant	T.O.F.	300000	300000	
8	207-18	State plan	Agro Forestry	750000	Nil	
		13 th FC Grant	T.O.F.	650000	Nil	
9	2018-19	MGNREGS	TOF	60000	60000	
10	2019-20	MGNREGS	TOF	Nil	Nil	
		State Plan	IGC	110800	110800	
11	2020-21	State Plan	O.E.M.F	400000	400000	
		MGNREGS	Agro Forestry	600000	600000	
			T.O.F.	250000	250000	
	TOTAL		Distribution of seedlings(RLTAP)	680000	680000	
			Agro Forestry	3350000	2600000	
			T.O.F.	3980000	3330000	
			OEMF	400000	400000	
			IGC	110800	110800	
	G.Total			8520800	7120800	

2.8 Shifting Cultivation: Shifting cultivation in Malkangiri District is considered to be the earliest system of agriculture dating back to the 1950s. Shifting cultivation is practiced in some form but mostly slash and burn method in almost all the tribal areas of the District. A number of tribes inhabiting different areas of the District are practicing shifting cultivation. These tribes are Bonda, Didayi, Koya, Paroja, Kondha etc. and other Forest dwellers. Majority of these communities have been identified as Primitive Tribal Groups (PTGs).

The following statement reveals information on the tribes with reference to the area where shifting cultivation is practiced;

Table No. 2.33: Tribes of Malkangiri District

Sl.No.	Name of Tribe	Area of the District
1	Bonda	Bonda Ghati of Khairput Block
2	Didayi	Kudumulugumma area
3	Koya	Malkangiri subdivision
4	Paroja	Malkangiri subdivision
5	Kondha	Malkangiri subdivision

The problem of shifting cultivation is perhaps most acute in entire Odisha than any other State in the country. Although at present an accurate data on the areas under shifting cultivation is not available, yet some rough estimates are being made. Before 2003 when this Malkangiri Forest Division was formed, this was not a matter of much concern to the administration for the only locality where it was practiced was in the Bonda ghati and the tribes involved were only the Bonda and Kondh.

2.8.1 Evils of Shifting Cultivation:

The shifting cultivation is considered devastative and dis-advantageous as it not only causes harm to the eco system but also exerts negative impact on economy. Some of the evil effects of such cultivation are:

- i) It results in the springs to dry up.
- ii) results in soil erosion
- iii) destroys valuable timber
- iv) responsible for causing very heavy floods, and
- v) Silting of the tanks and fields and damage to crops.

2.8.2 Attempts to Check the Practice of Shifting Cultivation:

Strategy: Keeping in view the boosting re-growth in those area of shifting cultivation the Tribes of the District are educated through awareness programme with the following strategies;

- (a) To promote forestry on upper reaches with Silvi-Pasture development.
- (b) To break middle slope length for annual or perennial fruit trees and inter-crop.
- (c) The lower slopes will be put under agricultural crops.

The help from the Department in the District are also sought to fight against the Shifting cultivation particularly, Agriculture Department, Soil & Water Conservation, Horticulture and ITDA.

In the proposed Working Plan, the podu affected areas may be included in the rehabilitation working circle and the treatment of those areas can be done through Joint forest management.

CHAPTER 3

MAINTENANCE, CONSERVATION AND ENHANCEMENT OF BIODIVERSITY



3.1 Forest composition and distribution

3.1.1 The low level Malkangiri plain hardly varies from 300 to 600 mtrs from the sea level. The forest of this area due to low rainfall and high temperature supports mostly dry deciduous mainly miscellaneous species. The forests are also more or less covered with dry bamboo breaks and few isolated patches of Northern Sal Forests. Due to varying altitudinal, edaphic and climatic changes, there is the limiting zone of northern peninsular Sal forest in the State. Towards north of this land there is pure Sal or miscellaneous with Sal, whereas towards South the natural Teak is found. The Eco-tone line passes roughly 18° -27°N latitude about 70- Kms. from Jeypore and 30 Kms. from Malkangiri covering the Forest Blocks Sindhrimal, Monuskonda, Pitatung etc. The Sal forest is mainly in Dharmagarh RL, Dasmantpur RL, Sarangpalli RF, Pitatung PRF etc. of Mathili Range and limited to Akur RF, Jharapalli PRF of Malkangiri Range of Malkangiri Division.

3.1.2 The Miscellaneous Forests are mainly found in the forest blocks of low Malkangiri belt i.e. Malkangiri, Kalimela, Motu, Balimela and Chitrakonda Forest Rangers. The common species seen are *Terminalia tomentosa* (Asan), *Mangifera indica* (Ambo), *Anogeissus latifolia* (Dhouda), *Lagerstroemia parviflora* (Sidha), *Adina cordifolia* (Haldu), *Dillenia pentagyna* (Rai), *Schleichera oleosa* (Kusum), *Bridelia retusa* (Kasi) *Mallotus philippenensis* (Kamalagundi), *Careya arborea* (Kumbhi), *Combretum decandrum* (Atundi), *Bauhinia vahlii* (Siali) and *Milusa velutina* (Gandha Palas).

3.1.3 Some natural Teak forests can be seen in Malkangiri, Kalimela and Motu Ranges of this Division. The Blocks like Kurumpalli Teak, A, B, C and D etc. and some village forests as well as alluvial river banks supports natural Teak. Of course, at present situation most of the Teak forests have been brought under degraded condition due to massive illicit felling, podu cultivation, and continuous forest fire, resulting in physical and physiological dryness of the soil.

3.1.4 Bamboo occurs in almost all forest Blocks of the Malkangiri Division. The Salia Bamboo (*Dendroclamus strictus*) is seen in the hill slopes where as the Daba Bamboo (*Bambusa arundinacea*) is confined to narrow belts along streams and nallas. The Blocks like Tarlakota, Chitapari of Balimela Range, Banguru, Dantunguda, Limalori of Chitrakonda Range, middle of Sarangpalli of Mathili Range, Bhejangiwada and Mandapalli of Kalimela Range contains excellent quality of Salia Bamboo. However, the crop is very poor in many forest blocks like Ranginiguda, Singaram, and Bhimaram of Chitrakonda Range.

3.1.5: Forest Types and Floristic Composition (Orissa Tropical Semi Evergreen Forests)

Group	2	Semi-Evergreen forests
Sub-Group	2 B	Northern Tropical Semi Evergreen Forests
Type	2 B / C₃	Orissa Tropical Semi Evergreen Forests

3.1.5.1 These types of forests are generally found on the hills at about 800 mt. and above the MSL and in the lower permanently moist valleys, including along perennial stream banks of Mathili, Balimela and Chitrakonda areas of the Division. The top story trees are deciduous for short time only and simultaneously. Middle story is entirely evergreen in nature. It is also seen that it occurs where the conditions are suitable like fertile soil, rainfall between 1500mm to 2000mm. and high humidity. The characteristics of these types of forests are observed mainly in lower stories in few pockets due to edaphic post climax. The over wood consists of *Terminalia arjuna* (Arjun), *Anthocephalous Kadamba* (Kadamba), *Diospyros embryopteris*, *Diospyros melanoxylon* (Kendu), *Alstonia scholaris* (Chhatiana), *Ficus glomerata* (Dimiri), *Ficus cunia*, *Litsea nitida*, *Bridelia retusa*, *Dilenia pentagyna* (Rai), *Mangifera indica* (Ambo), *Michelia champaca* (Champa), *Saracca Indica* (Ashoka) etc. Also, wild banana is seen. The regeneration status of almost all the species is poor. In open area grass like *Imperata arundinacea*, locally known as Channa grass are found. Due to podu cultivation the lands are exposed leading to soil erosion and invasion by weeds mostly by Eupatorium in blank area.

3.1.6 Southern Moist Mixed Deciduous Forests

Group	3	Moist Deciduous Forests
Sub-Group	3 B	Southern Tropical Moist Deciduous Forests
Type	3 B / C ₂	Southern Moist Mixed Deciduous Forests

3.1.6.1 These types of forests are seen in Kondakamberu, Balimela, Chitapari, Nuagaon, Malidongar, Putuparbat, Sardaput, Dusanad, Ghenaguda, Chedenga blocks etc. of re-organized Malkangiri Forest Division, where the annual rainfall is 2000mm and height is above 4000mtrs. These forests are moderately dense and medium to good height including number of dominant species. In the middle story also, there are good number of species mostly of semi evergreen nature. The climbers are heavy and undergrowth is full of herbaceous vegetation.

3.1.6.2 The typical vegetation is *Dillenia pentagyna*, *Schleichera oleosa*, *Polyalthia cerasoides*, *Adina cordifolia*, *Bombax ceiba*, *Pterocarpus marsupium*, *Bridelia retusa*, *Xylocarpa xylocarpa*, *Terminalia tomentosa*, *Albizia chinensis* etc. *Emblica officinalis*, *Mallotus philippensis* and *careya arborea* forms the middle story, whereas *Combretum decandrum*, *Bauhinia Vahlia* are the climbers. *Dendroclamus strictus*, the Salia bamboo is found through out the area. Dry hill slopes are occupied by *Anogeissus latifolia*, *Cleistanthus collenus*, *Cochlospermum religiosa*, *Sterculia urens* etc. In encroached open degraded areas where the shifting cultivation was practiced in the past, the grasses like *Imperata arundinacea*, *Thysanolaena maxima* are seen.

3.1.6.3 The regeneration of many species is poor. However, the species *Xylocarpa xylocarpa* is doing well because of the soil condition and moisture availability in upper slopes. In many forest blocks, Bamboo (*Dendroclamus strictus*) is also doing well but needs protection against heavy biotic pressure for Karadi, the delicious food used by local tribals, the new sprouts of bamboo culms that are procured from bamboo forests. The systematic silvicultural inputs and protection against fire hazard as well as other biotic interferences may help in improving the bamboo forests of the locality.

3.1.7 Moist Peninsular Sal Forest

Group	3	Moist Deciduous Forests
Sub-Group	3 C	North Indian Tropical Moist Deciduous Forest
Type	3 C / C₂	Moist Sal Bearing Forest
Sub-Type	3 C / C_{2 e} 3 C / C_{2 e} (i) 3 C / C_{2 e} (ii)	Moist Peninsular Sal Moist Peninsular High-Level Sal Moist Peninsular Low-Level Sal

3.1.7.1 The High-Level Sal Forests are associated with species *Terminalia tomentosa* (Asan), *Terminalia belercia* (Bahada), *Adina cordifolia* (Haldu), *Xylia xylocarpa* (Tangini), *Pterocarpus marssupium* (Bija), *Anogeissus latifolia* (Dhaura), *Lagerostroemia Parviflora* (Sidha), *Dalbergia latifolia* (Sissoo) etc. whereas, the associates of the low level sal forest are *Syzigium cumini* (Jamun), *Terminalia Arjuna* (Arjuna), *Anogeissus latifolia* (Dhaura), *Ougeinia oogeinensis* (Bandhan) etc.

3.1.7.2 In some blocks of Mathili range it is also seen that the miscellaneous species like *Anogeissus latifolia* (Dhaura), *Diospyros melanoxylon* (Kendu), *Bechanania lanzan* (Char) etc. are taking place of Sal forest, which is now the characteristic feature of retrogradation of this sub-type. This is further evident from presence of phoenix grass implying even poor shallow soil. In many degraded and open patches, the species *Imperata arundinacea* locally Known as ‘Chana’ grass is found. Also, the grass like *Eupatorium* and *Lantana* invades the open ground.

3.1.7.3 The regeneration of the main species is very inadequate. Due to heavy biotic interference and common forest fire, the new recruits though adequate, hardly get an opportunity to establish themselves. The heavy illicit felling and grazing, particularly cattle, repeated hacking of sal shoots for toothbrush, charcoal making and fencing materials have led to further degradation of forests. Moreover, the regeneration of sal on the higher slopes on the hills is deficient or absent. After felling of grown up trees, there will be no successor to take their place. Tending and other cultural operation have remained neglected. Only in some RFs and PRFs under Selection- cum-Improvement and Rehabilitation Working Circle, cultural operations and gap planting have been attempted.

3.1.8 Dry Teak Bearing Forests

Group	5	Dry Deciduous Forests
Sub-Group	5 A	Southern Tropical Dry Deciduous Forests
Type	5 A / C ₁	Dry Teak Bearing Forests

3.1.8.1 The geological formation, loamy to black cotton soil and soil moisture condition has given rise to teak after Mathili forming Ecotone Zone. Of course, due to varying geological formation and soil moisture condition has restricted the teak to some specific area allowing mixed miscellaneous species to come up. This has further aggravated due to over exploitation of Teak and subsequent degradation of soil. Now this dry mixed deciduous forest is the climax of the region.

3.1.8.2 The Teak forests are seen in Kurumpalli A, B, C & D PRFs; Kolab teak PRF of Mathili Range: Teakguda, Gumka, Nandiwada and Podia Teak of Kalimela Range, Motu RF, Peta Teak and Muraliguda Teak A & B of Motu Range, Teakguda RF, Kanangi and Tarlakota PRFs of Balimela Range and Mantriput PRF, Matumkonda, PRF, Sileru East of Chitrakonda Range. Heavy biotic interferences, regular forest fire and illicit felling have lead to poor regeneration of teak.

3.1.9 Southern Dry Mixed Deciduous Forests

Group	5	Dry Deciduous Forests
Sub-Group	5 A	Southern Tropical Dry Deciduous Forests
Type	5 A / C ₃	Southern Dry Mixed Deciduous Forests

3.1.9.1 Forests of Northern and Southern type of flora are found in Malkangiri, Kalimela, Balimela, Chitrakonda and Motu Ranges of the reorganized Malkangiri Division. The rainfall varies from 1200mm to 1500mm. The mean temperature varies from 24 to 27 degree Celsius. The highest summer temperature recorded is 45 degree Celsius. The Geological formations are basic, soil loamy to black cotton.

3.1.9.2 The over wood consists of dry deciduous species. There is usually a thin shrubby under growth including some evergreen Xerophytic spp. In summer, the forest is entirely leafless and the soil is fully exposed. In monsoon season, almost luxuriant appearance is seen from the growth of ephemeral herbaceous vegetation. Grass is always present and gets burnt annually. Bamboo is found in hills of elevation 300mt. and above. Thus, mostly found in plains and low hills, associated with eroded hillsides and alluvial terraces. Considerable sites are older rocks both crystalline and sedimentary type. The species composition is *Acacia*, *Anogeissus latifolia*, *Boswellia serrata*, *Bombax ceiba*, *Lannea coromandelica*, *Hymenodictyon excelsum*, *Diospyros melanoxylon*, *Madhuca indica*, *Albizzia Spp.* *Terminalia tomentosa*, *T.chebula*, *T.belerica*, *Schleichera oleosa* (Kusum), *Sterculia urens* (Genduli), *Kydia calycina* (Barang) etc. *Dendroclamus strictus* (Salia Bamboo) *Cleistanthus collenus* is present through out and some patches it is pure crop.

3.1.9.3 The under growth is light inferior and very thick. The species like *Holarrhena antidysenterica* (Kurei), *Casaeria tomentosa* (Berimanji), *Woodfordia fruticosa* (Dhatuki), *Indigofera pulchella* (Girli), *Desmodium indica*, *Helicteres isora* (Mudimudika), *Phoenix spe.*, (Bana Khajuri), and *Flemengia chapper* (Panid atun) etc. Among grass, *Andropagan* and *Saccharum spontaneum* (Tandi Kasatandi) are common. The climbers found are *Spatholobus roxburgii* (Madha-mal), *Bauhinia vahlii* (Siali), *Acacia pinnata* (Danturi), *Ventilago madraspatana* (Petchurimal) *Zizyphus xylopyrus*, *Chloroxylon sweitenia*, *Gardenia latifolia*, *Randia undabarica* etc. Forest fire is common; regeneration is very poor and subjected to heavy biotic interference.

3.1.9.4 The natural regeneration of the main species has been affected adversely due to unscrupulous felling, regular fire and grazing. However, abstract of survey report carried out in Balimela RF, Chitapari RF, Gopiguda RF, Kanangi RF, Mahadevpur RF, Matamkonda RF, and Tarlakota RF of Balimela Range.

Table No. 3.1: Regeneration status of different species in Balimela RF of Balimela Range

Sl.No .	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	1.4			No
2	Amla	<i>Emblica officinalis</i>	1.2	0.7		Poor
3	Asan	<i>Terminalia Alata</i>	7.6	0.5	0.2	Good
5	Bahada	<i>Terminalia belerica</i>	1.7		0.2	Poor
6	Bandhana	<i>Ooginia oogenensis</i>	0.7	0.2		Poor
7	Bela	<i>Aegel marmalus</i>	0.2			No
8	Bhalia	<i>Semicarpus annacardium</i>	1.2			No
9	Bheru	<i>Cloroxylon swetenia</i>				No
10	Char	<i>Buchanania lanzan</i>	1.4	1.0		Poor
11	Dhaman	<i>Grevia tiliifolia</i>	3.3	0.5		Poor
12	Dhaura	<i>Anoguisus latifolia</i>	5.7	1.0		Poor
13	Haladu	<i>Adina cordifolia</i>				No
14	Harida	<i>Terminalia chebula</i>	1.2			No
15	Jamun	<i>Syzizium cumunii</i>	1.0			No
16	Kasi	<i>Bridelia retusa</i>	1.7	1.0		Poor
17	Kataka	<i>Strichonus potatorum</i>				No
18	Kendu	<i>Diospyros melanoxylun</i>	1.9	3.1	1.2	Good
19	Kumbhi	<i>Ceria arboria</i>	0.5	0.2		Poor
20	Kusuma	<i>Schelechera oliosa</i>	2.4			No
21	Mahul	<i>Madhuca indica</i>	0.2			No
22	Mai	<i>Lenia coromondolica</i>	2.9			No
23	Mundi	<i>Mitragyna parviflora</i>	4.8	0.2		Poor
24	Piasal	<i>Pterocarpus marsupium</i>	1.7			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Borsera serate</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>	1.0			No
29	Simili	<i>Bombax ceiba</i>	1.4			No
30	Sirisa	<i>Albezia lebback</i>	1.2	0.2		Poor
31	Sisoo	<i>Dalbergia latifolia</i>	1.2			No
32	Sunari	<i>Casia fistula</i>	0.5			No
33	Tangana	<i>Xylia xylocarpa</i>	15.7			No
34	Misc Spp		20.0	5.0	1.0	Good

Table No.3.2: Regeneration status of different species in Chitapari RF of Balimela Range

Sl. No	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>				No
2	Amla	<i>Emblica officinalis</i>	0.5	1.5		Poor
3	Asan	<i>Terminalia Alata</i>	11.5		0.5	Poor
5	Bahada	<i>Terminalia belerica</i>	2.0			No
6	Bandhana	<i>Ooginia oogenensis</i>	4.0	0.5		Poor
7	Bela	<i>Aegel marmalus</i>	0.5			No
8	Bhalia	<i>Semicarpus annacardium</i>	0.5			No
9	Bheru	<i>Cloroxylon swetenia</i>				No
10	Char	<i>Buchanania lanzan</i>	3.0	0.5		Poor
11	Dhaman	<i>Grevia tiliafolia</i>	1.0			No
12	Dhaura	<i>Anoguisus latifolia</i>	8.5	1.5		Poor
13	Haladu	<i>Adina cordifolia</i>	1			No
14	Harida	<i>Terminalia chebula</i>	1.0	0.5		Poor
15	Jamun	<i>Syzizium cumunii</i>	0.5	0.5		Good
16	Kasi	<i>Bridelia retusa</i>	4.0	0.5		Poor
17	Kataka	<i>Strichonus potatorum</i>				No
18	Kendu	<i>Diospyros melanoxylun</i>	7.0	4.0	1	Good
19	Kumbhi	<i>Ceria arboria</i>				No
20	Kusuma	<i>Schelechera oliosia</i>	2.0			No
21	Mahul	<i>Madhuca indica</i>				No
22	Mai	<i>Lenia coromondolica</i>	4.5			No
23	Mundi	<i>Mitragyna parviflora</i>	2.0	0.5		Poor
24	Piasal	<i>Pterocarpus marsupium</i>	1.5			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Borsera serate</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>	1.5			No
29	Simili	<i>Bombax ceiba</i>	1.0			No
30	Sirisa	<i>Albezia lebback</i>				No
31	Sisoo	<i>Dalbergia latifolia</i>	0.5			No
32	Sunari	<i>Casia fistula</i>	1.0			No
33	Tangana	<i>Xylia xylocarpa</i>	10.5			No
34	Misc Spp		28.0	6.0	0.0	Poor

Table No. 3.3: Regeneration status of different species in Gopiguda RF of Balimela Range

Sl No	Local Name	Botanical name	No. trees/ Ha	No. shrub/Ha	No. of herbs/ Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>				No
2	Amla	<i>Emblica officinalis</i>				NO
3	Asan	<i>Terminalia Alata</i>	30.0	10		Poor
5	Bahada	<i>Terminalia belerica</i>				No
6	Bandhana	<i>Ooginia oogenensis</i>	10.0			No
7	Bela	<i>Aegel marmalus</i>				No
8	Bhalia	<i>Semicarpus annacardium</i>				No
9	Bheru	<i>Cloroxylon swetenia</i>				No
10	Char	<i>Buchanania lanzan</i>				No
11	Dhaman	<i>Grevia tiliifolia</i>				No
12	Dhaura	<i>Anoguisus latifolia</i>				No
13	Haladu	<i>Adina cordifolia</i>				No
14	Harida	<i>Terminalia chebula</i>				No
15	Jamun	<i>Syzizium cumunii</i>				No
16	Kasi	<i>Bridelia retusa</i>				No
17	Kataka	<i>Strichonus potatorum</i>				No
18	Kendu	<i>Diospyros melanoxylun</i>		10.0		No
19	Kumbhi	<i>Ceria arboria</i>				No
20	Kusuma	<i>Schelechera oliosa</i>				No
21	Mahul	<i>Madhuca indica</i>				No
22	Mai	<i>Lenia coromondolica</i>				No
23	Mundi	<i>Mitragyna parviflora</i>				No
24	Piasal	<i>Pterocarpus marsupium</i>	10.0			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Borsera serate</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>				No
29	Simili	<i>Bombax ceiba</i>				No
30	Sirisa	<i>Albezia lebback</i>				No
31	Sisoo	<i>Dalbergia latifolia</i>				No
32	Sunari	<i>Casia fistula</i>	10.0			No
33	Tangana	<i>Xylia xylocarpa</i>				No
34	Misc Spp		20.0	0.0		No

Table No. 3.4: Regeneration status of different species in Konangi PRF of Balimela Range

Sl. No	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>				No
2	Amla	<i>Emblica officinalis</i>		3.3		No
3	Asan	<i>Terminalia Alata</i>	6.7			No
5	Bahada	<i>Terminalia belerica</i>	3.3			No
6	Bandhana	<i>Ooginia oogenensis</i>				No
7	Bela	<i>Aegel marmalus</i>				No
8	Bhalia	<i>Semicarpus annacardium</i>				No
9	Bheru	<i>Cloroxylon swetenia</i>				No
10	Char	<i>Buchanania lanzan</i>				No
11	Dhaman	<i>Grevia tiliifolia</i>				No
12	Dhaura	<i>Anoguisus latifolia</i>				No
13	Haladu	<i>Adina cordifolia</i>	3.3			No
14	Harida	<i>Terminalia chebula</i>				No
15	Jamun	<i>Syzizium cumunii</i>				No
16	Kasi	<i>Bridelia retusa</i>				No
17	Kataka	<i>Strichonus potatorum</i>				No
18	Kendu	<i>Diospyros melanoxylun</i>			3.3	No
19	Kumbhi	<i>Ceria arboria</i>				No
20	Kusuma	<i>Schelechera oliosia</i>		3.3		No
21	Mahul	<i>Madhuca indica</i>				No
22	Mai	<i>Lenia coromondolica</i>		3.3		No
23	Mundi	<i>Mitragyna parviflora</i>	3.3			No
24	Piasal	<i>Pterocarpus marsupium</i>	6.7			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Borsera serate</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>				No
29	Simili	<i>Bombax ceiba</i>				No
30	Sirisa	<i>Albezia lebback</i>	3.3			No
31	Sisoo	<i>Dalbergia latifolia</i>	3.3			No
32	Sunari	<i>Casia fistula</i>				No
33	Tangana	<i>Xylia xylocarpa</i>	3.3			No
34	Misc Spp		13.3	3.3	0.0	Poor

Table No.3.5: Regeneration status of different species in Mohadevpur RF of Balimela Range

Sl. No .	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/ Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>				No
2	Amla	<i>Emblica officinalis</i>				No
3	Asan	<i>Terminalia Alata</i>				No
5	Bahada	<i>Terminalia belerica</i>				No
6	Bandhana	<i>Ooginia oogenensis</i>				No
7	Bela	<i>Aegel marmalus</i>				No
8	Bhalia	<i>Semicarpus annacardium</i>				No
9	Bheru	<i>Cloroxylon swetenia</i>				No
10	Char	<i>Buchanania lanzan</i>				No
11	Dhaman	<i>Grevia tiliafolia</i>				No
12	Dhaura	<i>Anoguisus latifolia</i>				No
13	Haladu	<i>Adina cordifolia</i>	10.0			No
14	Harida	<i>Terminalia chebula</i>				No
15	Jamun	<i>Syzizium cumunii</i>				No
16	Kasi	<i>Bridelia retusa</i>				No
17	Kataka	<i>Strichonus potatorum</i>				No
18	Kendu	<i>Diospyros melanoxylun</i>				No
19	Kumbhi	<i>Ceria arboria</i>				No
20	Kusuma	<i>Schelechera oliosia</i>				No
21	Mahul	<i>Madhuca indica</i>				No
22	Mai	<i>Laanea coromondolica</i>				No
23	Mundi	<i>Mitragyna parviflora</i>				No
24	Piasal	<i>Pterocarpus marsupium</i>				No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Borsera serate</i>				No
27	Sataparadi a	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>				No
29	Simili	<i>Bombax ceiba</i>				No
30	Sirisa	<i>Albezia lebback</i>				No
31	Sisoo	<i>Dalbergia latifolia</i>				No
32	Sunari	<i>Casia fistula</i>	10.0			No
33	Tangana	<i>Xylia xylocarpa</i>				No
34	Misc Spp		0.0	0.0	0.0	No

Table No. 3.6: Regeneration status of different species in Matamkonda RF of Balimela Range

Sl.No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>		0.4		No
2	Amla	<i>Emblica officinalis</i>	2.7	0.2		Poor
3	Asan	<i>Terminalia Alata</i>	13.7		0.4	Poor
5	Bahada	<i>Terminalia belerica</i>	1.6		0.2	Poor
6	Bandhana	<i>Ooginia oogenensis</i>	1.6	0.4		Poor
7	Bela	<i>Aegel marmalus</i>	0.6			No
8	Bhalia	<i>Semicarpus annacardium</i>	1.2			No
9	Bheru	<i>Cloroxylon swetenia</i>				No
10	Char	<i>Buchanania lanzan</i>	2.0			No
11	Dhaman	<i>Grevia tiliifolia</i>	2.5	0.2		Poor
12	Dhaura	<i>Anoguisus latifolia</i>	16.9	0.4		Poor
13	Haladu	<i>Adina cordifolia</i>	0.4	0.4		Good
14	Harida	<i>Terminalia chebula</i>	1.0			No
15	Jamun	<i>Syzizium cumunii</i>	0.4			No
16	Kasi	<i>Bridelia retusa</i>	3.5	0.2		Poor
17	Kataka	<i>Strichonus potatorum</i>				No
18	Kendu	<i>Diospyros melanoxylun</i>	5.5	1.4	0.4	Good
19	Kumbhi	<i>Ceria arboria</i>	0.2			No
20	Kusuma	<i>Schelechera olosa</i>	4.9			No
21	Mahul	<i>Madhuca indica</i>	0.4			No
22	Mai	<i>Lenia coromondolica</i>	5.9			No
23	Mundi	<i>Mitragyna parviflora</i>	6.5			No
24	Piasal	<i>Pterocarpus marsupium</i>	10.8	0.2		Poor
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Borsera serate</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>	2.5			No
29	Simili	<i>Bombax ceiba</i>	2.4			No

30	Sirisa	<i>Albezia lebback</i>	6.1	0.2		Poor
31	Sisoo	<i>Dalbergia latifolia</i>	2.4			No
32	Sunari	<i>Casia fistula</i>	0.8	0.2		Poor
33	Tangana	<i>Xylia xylocarpa</i>	15.9			Poor
34	Misc Spp		22.9	3.1	0.4	Good

Table No. 3.7: Regeneration status of different species in Tarlakota of Balimela Range

Sl. No	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	0.7			No
2	Amla	<i>Emblica officinalis</i>	1.4	1.4		Poor
3	Asan	<i>Terminalia Alata</i>	3.4			No
5	Bahada	<i>Terminalia belerica</i>	0.3	0.3	1.7	Good
6	Bandhana	<i>Ooginia oogenensis</i>	1.4			No
7	Bela	<i>Aegel marmalus</i>	0.7	0.3		Poor
8	Bhalia	<i>Semicarpus annacardium</i>	0.7			No
9	Bheru	<i>Cloroxylon swetenia</i>				No
10	Char	<i>Buchanania lanzan</i>	1.4	0.3		Poor
11	Dhaman	<i>Grevia tiliifolia</i>	1.4	0.3		Poor
12	Dhaura	<i>Anoguisus latifolia</i>	5.2	0.3		Poor
13	Haladu	<i>Adina cordifolia</i>				No
14	Harida	<i>Terminalia chebula</i>		0.3		No
15	Jamun	<i>Syzizium cumunii</i>	0.3			No
16	Kasi	<i>Bridelia retusa</i>	0.7	0.3		Poor
17	Kataka	<i>Strichonus potatorum</i>	0.3			No
18	Kendu	<i>Diospyros melanoxylun</i>	1.0	1.0	0.3	Good
19	Kumbhi	<i>Ceria arboria</i>	0.7			No
20	Kusuma	<i>Schelechera olosa</i>	1.7			No
21	Mahul	<i>Madhuca indica</i>	1.7			No
22	Mai	<i>Lenia coromondolica</i>	2.1			No
23	Mundi	<i>Mitragyna parviflora</i>	2.1	0.3		Poor
24	Piasal	<i>Pterocarpus marsupium</i>				No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Borsera serate</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>				No
29	Simili	<i>Bombax ceiba</i>	1.0			No

30	Sirisa	<i>Albezia lebback</i>	1.7			No
31	Sisoo	<i>Dalbergia latifolia</i>	2.1			No
32	Sunari	<i>Casia fistula</i>	1.0			No
33	Tangana	<i>Xylia xylocarpa</i>	4.8			No
34	Misc Spp		16.2	2.8	0.3	Poor

3.1.10 Dry Peninsular Sal Forest

Group	5	Dry Deciduous Forests
Sub-Group	5 B	Northern Tropical Dry Deciduous Forests
Type	5 B / C ₁	Dry Sal Bearing Forests
Sub-Type	5 B / C _{1e}	Dry Peninsular Sal Forest

These dry peninsular Sal forests are locally divided into two sub-types.

- (i) Dry Plain Sal Forests
- (ii) Dry Hill Sal Forests

3.1.10.1 (i) Dry Plain Sal Forests: These types of Sal forests are found mostly in the plains of Jeypore Plateau and very limited in Govindapalli area of Mathili Range. The quantity of Sal is though good, the underground is covered with abundance of grasses. Sal constitute more than 90 % of the over wood having top height of 20 to 25 m. *Anogeissus latifolia* (Dhaura), *Madhuca indica* (Mohua), *Diospyros melanoxylon* (Kendu), *Terminalia tomentosa* (Sahaj), *Terminalia belerica* (Bahada), *Terminalia chebula* (Harida) are the associates of the Sal. *Embllica officinalis* (Amla), *Buchanania lanzan* (Char)-*Cassia fistula* (Sunari), *Gardenia turgid*, *G.gummifera*, *Zizyphus oenoplea*, *Indigofera pulchella* (Girli) etc are found in middle and ground story.

3.1.10.2 The grasses seen *Themeda*, *Imperata*, *Heteropogon contortus*, *Thysanalaena maxima*, *Cymbopogon citrates* etc. In poor dry rocky soil, *Phoenix acaulis* is predominant. The regeneration of Sal, in these localities is though poor, effective protection measures through JFM against forest fire, grazing and reckless illicit felling may improve in near future.

3.1.10.3 (ii) Dry Hill Sal Forests: This type of forests is recognized in hill slopes of Mathili, Chaulmendi, Sindhabeda A and B blocks of Mathili Range and Pitatung PRF of Malkangiri Range. Due to rocky out-crops, shallow soil depth and less water retaining capacity of the soil, the forests are characterized by presence of *Boswellia serrata* and *Xylia xylocarpa* in patches with 20 to 30 % Sal. Other dry deciduous species are *Terminalia tomentosa*, *Anogeissus latifolia*, *Diaspyros melanoxylon*, *Anogeissus accuminta*, *Andina cordifolia*, *Lagerostroemia parviflora* etc. with open ground. Trees are generally unsound and stunted.

3.1.10.4 The middle story comprises of *Emblica officinalis*, *Cassia fistula*, *Buchanania lanzan*, *Semicarpus anacardium*, *Morinda tinctoria*, *Chloroxylon sweitenia*, *Aegle marmelos* etc. The ground flora among others is *Nyctanthes arbortristis*, *Grewia tilaefolia*, *Phoenix acaulis* etc.

3.1.10.5 The total forest area under this category works out to be approximately 5836 Ha. Most of the area have been affected by annual fire and is the main factor of arresting the progress towards moist type. The regeneration of Sal is through fair, unable to get established due to heavy biotic interference as is seen from the regeneration data obtained from different forest blocks of these types. However adequate protection, soil and moisture conservation may improve the regeneration status of these forests.



Fig. 3.1 Dry Sal Forest in Mathili Range

3.1.11 Northern Dry Mixed Deciduous Forest

Group	5	Dry Deciduous Forests
Sub-Group	5 B	Northern Tropical Dry Deciduous Forests
Type	5 B / C ₂	Northern Dry Mixed Deciduous Forest

3.1.11.1 This type of forests occurs in Tondiki, Chaulmendi, Godiali, Pangam and Pujariguda blocks of Mathili Range. In fact, these blocks experience both the Northern and Southern type of dry forests. The Sal forests merged into teak forests. Of course, absence of more teak in this area is due to poor soil condition and want of basic geological formations. After over exploitation of teak and subsequent degradation of soil, the mixed miscellaneous forests, the climax of the region occur. The forests are open and dry due to repeated forest fire and biotic interference. The total area of this type works out to approximately 12552 Ha. forming 10 % of the plan area.

3.1.11.2 The top canopy in hill tops and slopes and out crops is full of *Terminalia tomentosa*, *Bursera serrata*, *Sterculia urens*, *Cochlospermum religiosum* and *Anogeissus latifolia*. As soil depth increases, presence of moist species likes *Dalbergia latifolia*, *Mellotus philippinensis*, *Mangifera indica*, *Gmelina arborea*, *Mitragyna parvifolia*, Bamboos and toll toll grasses of *Imperata*, *Themeda*, *Quadrivalvis* and *Bethriochoa* and other species become prominent. Ground floor includes *Phoenix acaulis*, *Holarrhena antidysenterica*, *Woodfordia fruticosa* are generally sparse except on *nallas* and lateritic patches.

3.1.11.3 The trees in these types of forests are generally hacked by the people either for their domestic uses or for earning their livelihood through illegal trading. The scattered trees and small patches of forest growth are the typical features of this category forests. The natural regeneration has been affected adversely.

3.1.12 Dry Bamboo Breaks

Group	5	Dry Deciduous Forests
Sub-Group	5 B	Northern Tropical Dry Deciduous Forests
Type	5 B / E ₉	Dry Bamboo Breaks

3.1.12.1 These types of forests occur over large area in forest blocks of Malkangiri, Kalimela, Motu, Chitrakonda and Balimela ranges of reorganized Malkangiri Forest Division. It is also been in dry hill slopes of Sal forests, where comparatively shallow soil with less moisture is the characterized feature. It is mostly due to adverse biotic and climatic factors resulting geological changes and one of the edaphic climax types just like *Boswellia serrata*, *Xylia xylocarpa* (Tangini), *Anogeissus latifolia* (Dhaura) etc. *Dendrocalamus strictus* (Salia Bamboo) occur in extensive patches with low mixture of dry deciduous species mainly *Bridelia retusa* (Kasi), *Anogeissus latifolia* (Dhaura), *Terminalia tomentosa*, *Xylia xylocarpa* (Tangini), *Chloroxylon swetenia* (Bheru), *Gardenia obtusifolia*, *Sterculia urens* (Genduli) etc. both in top as well as middle story. However, in few isolated patches however, bamboo is found to occur in almost in pure form hardly any association.

3.1.12.2 The condition of the bamboo in general is good in reorganized Malkangiri Division. In Jeypore plateau, due to constant removal of *Karadi* by local villagers, regular fire and over exploitation from accessible area has led the crop degraded and unproductive.

3.1.12.3 The forest blocks once rich with quantity I & II bamboo clumps have now degenerated to quality II and III. Also, in many places, the clumps have become congested. This is mainly due to over exploitation and lack of silvicultural operation in the past. In this respect, analysis has been made by laying out some sample plots in Chitrakona, Kalimela and Balimela Range of Malkangiri Forest Division. The analysis result shows that the negligible silvicultural inputs of the recent past have tremendous result both in quality and quantity. In order to increase the productivity of the bamboo and maintain the quality of the crop post silvicultural operation including gap plantation is required. The regeneration of other associate species is also not satisfactory. This show if suitable measures as discussed above and adequate measures against forest fire, grazing, over exploitation etc. are not taken, the bamboo forest will become unproductive in near future.

3.1.13 Dry Bamboo Breaks

Group	5	Dry Deciduous Forests
Type	5 / DS ₁	Dry Bamboo Breaks

3.1.13.1 This is the degraded type of dry deciduous forests of both Southern dry mixed deciduous and Northern dry deciduous forests. The main cause of such degradation is the confirmed biotic interference and is called as biotic climax type.

3.1.13.2 The main characteristic feature of this type is shrubby growth form rooted stocks and some trees is retarded condition. Since the forests under this category are of degraded stage of dry deciduous forests, the species composition is similar to the one found in type 5 B /C 1a. The growth is stunted, crooked and with callous formation. Sometimes the saplings are congested and choked by climbers.

3.1.13.3 The forests once rich with luxuriant growth have now reduced to this type. The total area of this type works out to approximately 1690 Ha, forming 1% of the plan area. Most of the forests blocks coming under this type are the result of continuous maltreatment in the form of illicit felling, frequent fire, uncontrolled grazing and lopping. The regeneration status of main species has become deficient and going to be vanished.



Fig. No. 3.2: Dry Bamboo Brakes in Sarangapalli B coupe

3.1.14 Central Indian Sub-Tropical Hill Forest

Group	8	Sub-Tropical Broad-Leaved Hill Forests
Sub-Group	8A	Southern Sub-Tropical Broad-Leaved Hill Forests
Type	8 A / C ₃	Central Indian Sub-Tropical Hill Forest

3.1.14.1 This type occurs on hilltops above 1000 mtrs. altitude. In fact, the complete destruction of original vegetation and retrogressions to grass land and some stunted growth left no sign of such type of forest now, some other area is invaded with *Xylia xylocarpa*, *Kydia calycina*, *Mangifera indica*, *Bombax ceiba* etc. The coppice growth of Sal is seen in rejuvenating stage on the 900 mtrs plateau and lower slopes.

3.2 Plant Species Diversity

- 3.2.1** i. The data which will be collected during enumeration such as the number of individuals of each species and the DBH of each tree are utilized to derive secondary attributes like basal area (BA, m²/ha), density (D, tree Per ha) and frequency (F, number of quadrates where trees are present in relation to total plots observed). Relative of BA, D and F will be calculated.
- ii. The **Importance Value Index (IVI)** is calculated by adding up relative dominance (RBAF), **relative density (RD)** and **relative frequency (RF)**.
- iii. However, in case of shrubs, herbs, saplings and for regeneration, the IVI is calculated on the basis of relative values, i. e. relative frequency and relative density.
- iv. It is assumed that the dominance of a species increases with an increasing importance value and that species with lowest importance value is the least dominant one.
- v. The maximum IVI value is 300 (100 each for RBA, RD and RF). Basal area and density of tree species should be converted to hectare basis.
- vi. To estimate the stand structure, all tree species should be grouped under different DBH classes. The total number of individuals belonging to each DBH class should be calculated for each species for each site.

$$D_s = \frac{\text{Total Number of individuals of Species}}{\text{Total area of quadrates studied}}$$

$$F_s (\%) = \frac{\text{Number of quadrates in which a species occurs}}{\text{Total number of quadrates studied}} \times 100$$

$$RD_s = \frac{\text{Density (D}_s\text{) of a species}}{\text{Total density of all species}} \times 100$$

$$RF_s = \frac{\text{Frequency (F}_s\text{) of a species}}{\text{Sum of frequencies of all species}} \times 100$$

$$RBAF_s = \frac{\text{Total basal area of a species}}{\text{Total basal area of all species}} \times 100$$

$$IVI_s = RD_s + RF_s + RBAF_s$$

(Where, 's' denotes a particular species for which these variables are calculated)

3.2.2 Species diversity is an expression of community structure and is unique to the community. The number of species in a community is referred to as species richness when Topography of compartment is homogeneous. The relative abundance of all species is called evenness. Species diversity includes both species richness and evenness. A community demonstrates a high species diversity if many equally or nearly equally abundant species are present. Communities with a large number of species that are evenly distributed /populated are the most diverse and communities with few species that are dominated by one species are the least diverse(i.e. a community is composed of only a few species .or only a few species are abundant ,then the species diversity is low). Species diversity indices like Shannon-Wiener Index (H) and Simpson's Index (λ) are calculated separately for trees, shrubs and herbs as their individuals differ in size and are sampled differently. Similarly, index (community coefficient) is

calculated for determining the number of species which are shared among the sites to assess the extent of variation in the species composition.

The **Orissa Remote Space Applications Center (ORSAC)**, Bhubaneswar has provided Grid Map and 488 Nos Sample Survey points to take up Biodiversity Survey in this Division.

3.2.3 Adopting the forest resource assessment methodology as per National Working Plan Code-2014 guideline, the sample plots are systematically laid out in the forest area on the basis of random sampling method, at the center of the grid, a square plot of 0.1Ha is laid out by measuring 22.36mt horizontal distance i.e half of the diagonal in all the four directions at 45° in north-east, at 135° in south-east, at 225° in south-west, and at 315° in north-west corners of the plot from true north. The dimension of the plot for all the sides is 31.62mt horizontal distance. Nested quadrates of size 3mx3m and 1mx1m will be laid out at a distance of 30 meters from the center of the central plot in all four directions along diagonals in non-hilly area and along trails in hilly areas for the enumeration of shrubs (including regeneration status) and herbs/grasses respectively. Along with the nested quadrates of size 3m x 3m and 1m x 1m, one more quadrate of size 5m x 5m at NE and SW direction, is laid out in the selected grid for the estimation of carbon stock subject. Based on the grid sampling method the sample point count for Malkangiri Forest Division was 488 Nos covering almost the forest blocks. Out of 488 No's of sample points, the survey for 457 No's of sample points were carried out. But, survey assessment for 31Nos of points could not be carried out due to naxal (Maoist) prone area and as few points were out side State boundary i.e in Chhatisgarh. The Range wise sample point exercises carried out is given in Table. 3.8. After completion all the field exercises the biodiversity assessment carried out as per the methodology mentioned above, in consistent with the sample size of the field survey in the prescribed plot size.

Basing on the above calculation, biodiversity assessment is done in sample plots of various Forest Blocks, the result of which is furnished in Table No 3.8.

Table No. 3.8: Details of Range Wise Sample Point Exercises Carried Out

Sl.No.	Name of the Range	Total No. of Sample Points	No. of Sample Points Surveyed	No. of Sample Points not surveyed
1.	Malkangiri	47	45	2
2.	Mathili	52	52	0
3.	Balimela	138	138	0
4.	Kalimela	100	100	0
5.	Chitrakonda	107	78	29
6.	Motu	44	44	0
Total		488	457	31

3.2.4 As summarized in Table. 3.8, in 31Nos of Sample Points, the vegetation survey work was not carried out. In Case of Chhitrakonda Range 29Nos of sample points were not surveyed which covered each 1 point in Bandhaguda PRF, Bhimaram PRF, 9 Nos points in Jantry PRF and each 6 points in Ranginiguda PRF, Sikhapanas PRF, Singaram PRF due to Maoist activities and cut off area. Similarly, 2 point survey work was not carried out in Malkangiri Range as 1 point in outside State i.e. in Chhatisgarh and other point is un-reachable path. The abstract of which is given in Table 3.9

Table No. 3.9: Abstract of Sample Points Not Surveyed

Sl. No	Range	Forest Blocks	No. of Sample Points Not Surveyed	Remarks
1	Chitrakonda Range	Bandhguda PRF	1	Maoist prone area
2		Bhimaram PRF	1	
3		Jantry PRF	9	
4		Ranginiguda PRF	6	
5		Sikhapanas PRF	6	

6		Singaram PRF	6	
9	Malkangiri Range	Namkonda PRF	1	Chhattisgarh boarder
10		Kukudaguda PRF	1	Not reachable point

3.2.5 The Range wise biodiversity analysis for trees, shrubs and herbs of the above sample points is given in Table No. 3.10,3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19, 3.20, 3.21, 3.22, 3.23, 3.24, 3.25, 3.26, 3.27, and the Forest Block Wise Biodiversity assessment is in **Appendix IIB.**

Table No. 3.10: Biodiversity Assessment of Trees Species in Balimela Range

SL No	Forest Block	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	BA (M ² /Ha)	RD	RF (%)	RBAF	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Balimela	Bhalia	14	147	1.17	1.38	0.37	0.95	8.16	0.0584	1.00	1.42	0.43	2.84	3.28	0.94
2	Balimela	Acacia	1	147	1.00	1.18	0.03	0.07	0.68	0.0065	0.07	0.12	0.05	0.24		
3	Balimela	Amba	8	147	1.60	1.89	0.21	0.54	3.40	0.1717	0.57	0.59	1.27	2.43		
4	Balimela	Amla	24	147	1.14	1.35	0.64	1.63	14.29	0.1331	1.71	2.48	0.98	5.17		
5	Balimela	Arjuna	6	147	1.20	1.42	0.16	0.41	3.40	0.0949	0.43	0.59	0.70	1.72		
6	Balimela	Asan	140	147	2.22	2.63	3.74	9.52	42.86	1.3995	9.98	7.43	10.34	27.75		
7	Balimela	Aswatha	6	147	1.00	1.18	0.16	0.41	4.08	0.1337	0.43	0.71	0.99	2.12		
8	Balimela	Babul	2	147	1.00	1.18	0.05	0.14	1.36	0.0229	0.14	0.24	0.17	0.55		
9	Balimela	Bahada	21	147	1.50	1.77	0.56	1.43	9.52	0.2297	1.50	1.65	1.70	4.85		
10	Balimela	Bandhan	24	147	1.50	1.77	0.64	1.63	10.88	0.3017	1.71	1.89	2.23	5.83		
11	Balimela	Bani	1	147	1.00	1.18	0.03	0.07	0.68	0.0048	0.07	0.12	0.04	0.22		
12	Balimela	Bara	2	147	1.00	1.18	0.05	0.14	1.36	0.0480	0.14	0.24	0.35	0.73		
13	Balimela	Barkoli	5	147	2.50	2.96	0.13	0.34	1.36	0.0323	0.36	0.24	0.24	0.83		
14	Balimela	Barun	3	147	1.50	1.77	0.08	0.20	1.36	0.0045	0.21	0.24	0.03	0.48		
15	Balimela	Batra	1	147	1.00	1.18	0.03	0.07	0.68	0.0048	0.07	0.12	0.04	0.22		
16	Balimela	Bela	7	147	1.00	1.18	0.19	0.48	4.76	0.0647	0.50	0.83	0.48	1.80		
17	Balimela	Benta	1	147	1.00	1.18	0.03	0.07	0.68	0.0065	0.07	0.12	0.05	0.24		
18	Balimela	Cashew	1	147	1.00	1.18	0.03	0.07	0.68	0.0113	0.07	0.12	0.08	0.27		
19	Balimela	Chadheigudi	1	147	1.00	1.18	0.03	0.07	0.68	0.0118	0.07	0.12	0.09	0.28		
20	Balimela	Char	26	147	1.73	2.05	0.69	1.77	10.20	0.1878	1.85	1.77	1.39	5.01		
21	Balimela	Chauli	1	147	1.00	1.18	0.03	0.07	0.68	0.0134	0.07	0.12	0.10	0.29		
22	Balimela	Damkuruda	1	147	1.00	1.18	0.03	0.07	0.68	0.0233	0.07	0.12	0.17	0.36		
23	Balimela	Dhalasiris	3	147	1.00	1.18	0.08	0.20	2.04	0.0384	0.21	0.35	0.28	0.85		
24	Balimela	Dhaman	33	147	1.22	1.45	0.88	2.24	18.37	0.2973	2.35	3.18	2.20	7.73		
25	Balimela	Dhaura	142	147	1.92	2.27	3.79	9.66	50.34	1.1378	10.12	8.73	8.41	27.25		
26	Balimela	Dhauranga	1	147	1.00	1.18	0.03	0.07	0.68	0.0062	0.07	0.12	0.05	0.23		

27	Balimela	Dimiri	3	147	1.00	1.18	0.08	0.20	2.04	0.0287	0.21	0.35	0.21	0.78
28	Balimela	Gamhari	22	147	1.57	1.86	0.59	1.50	9.52	0.2335	1.57	1.65	1.73	4.94
29	Balimela	Haldu	7	147	1.17	1.38	0.19	0.48	4.08	0.0848	0.50	0.71	0.63	1.83
30	Balimela	Harida	12	147	1.20	1.42	0.32	0.82	6.80	0.1840	0.86	1.18	1.36	3.39
31	Balimela	Jamu	8	147	1.14	1.35	0.21	0.54	4.76	0.0611	0.57	0.83	0.45	1.85
32	Balimela	Jari	1	147	1.00	1.18	0.03	0.07	0.68	0.0128	0.07	0.12	0.09	0.28
33	Balimela	Kangada	72	147	2.40	2.84	1.92	4.90	20.41	1.0882	5.13	3.54	8.04	16.71
34	Balimela	Kapasias	1	147	1.00	1.18	0.03	0.07	0.68	0.0048	0.07	0.12	0.04	0.22
35	Balimela	Karada	92	147	1.61	1.91	2.46	6.26	38.78	0.5823	6.56	6.72	4.30	17.58
36	Balimela	Karanj	1	147	1.00	1.18	0.03	0.07	0.68	0.0192	0.07	0.12	0.14	0.33
37	Balimela	Kasi	35	147	1.40	1.66	0.93	2.38	17.01	0.2409	2.49	2.95	1.78	7.22
38	Balimela	Katakala	1	147	1.00	1.18	0.03	0.07	0.68	0.0048	0.07	0.12	0.04	0.22
39	Balimela	Kendu	53	147	1.36	1.61	1.41	3.61	26.53	0.4788	3.78	4.60	3.54	11.91
40	Balimela	Khair	4	147	1.00	1.18	0.11	0.27	2.72	0.0815	0.29	0.47	0.60	1.36
41	Balimela	Kodala	4	147	1.00	1.18	0.11	0.27	2.72	0.0273	0.29	0.47	0.20	0.96
42	Balimela	Kumbhi	5	147	1.00	1.18	0.13	0.34	3.40	0.0548	0.36	0.59	0.40	1.35
43	Balimela	Kusum	44	147	1.38	1.63	1.17	2.99	21.77	0.5163	3.14	3.77	3.82	10.73
44	Balimela	Mahula	8	147	1.14	1.35	0.21	0.54	4.76	0.0942	0.57	0.83	0.70	2.09
45	Balimela	Mai	57	147	1.68	1.98	1.52	3.88	23.13	0.4283	4.06	4.01	3.16	11.24
46	Balimela	Mankada kendu	9	147	1.00	1.18	0.24	0.61	6.12	0.1159	0.64	1.06	0.86	2.56
47	Balimela	Mokha	4	147	1.33	1.58	0.11	0.27	2.04	0.0570	0.29	0.35	0.42	1.06
48	Balimela	Mundi	64	147	1.49	1.76	1.71	4.35	29.25	0.7951	4.56	5.07	5.88	15.51
49	Balimela	Mundica	2	147	1.00	1.18	0.05	0.14	1.36	0.0247	0.14	0.24	0.18	0.56
50	Balimela	Pahadi Sisoo	2	147	1.00	1.18	0.05	0.14	1.36	0.0268	0.14	0.24	0.20	0.58
51	Balimela	Palas	1	147	1.00	1.18	0.03	0.07	0.68	0.0019	0.07	0.12	0.01	0.20
52	Balimela	Panikusum	3	147	1.00	1.18	0.08	0.20	2.04	0.0240	0.21	0.35	0.18	0.74
53	Balimela	Patragundi	1	147	1.00	1.18	0.03	0.07	0.68	0.0134	0.07	0.12	0.10	0.29
54	Balimela	Phasi	5	147	1.25	1.48	0.13	0.34	2.72	0.0452	0.36	0.47	0.33	1.16
55	Balimela	Piasal	67	147	2.39	2.83	1.79	4.56	19.05	0.5269	4.78	3.30	3.89	11.97

56	Balimela	Rai	8	147	1.14	1.35	0.21	0.54	4.76	0.0549	0.57	0.83	0.41	1.80		
57	Balimela	Saguan	4	147	2.00	2.36	0.11	0.27	1.36	0.0503	0.29	0.24	0.37	0.89		
58	Balimela	Sahada	23	147	1.35	1.60	0.61	1.56	11.56	0.3095	1.64	2.00	2.29	5.93		
59	Balimela	Salai	1	147	1.00	1.18	0.03	0.07	0.68	0.0103	0.07	0.12	0.08	0.27		
60	Balimela	Sidha	20	147	1.82	2.15	0.53	1.36	7.48	0.1042	1.43	1.30	0.77	3.49		
61	Balimela	Simili	23	147	1.15	1.36	0.61	1.56	13.61	0.1868	1.64	2.36	1.38	5.38		
62	Balimela	Siris	41	147	1.58	1.86	1.09	2.79	17.69	0.2426	2.92	3.07	1.79	7.78		
63	Balimela	Sisoo	24	147	1.09	1.29	0.64	1.63	14.97	0.3649	1.71	2.59	2.70	7.00		
64	Balimela	Sunari	13	147	1.00	1.18	0.35	0.88	8.84	0.1302	0.93	1.53	0.96	3.42		
65	Balimela	Tangini	183	147	2.73	3.23	4.89	12.45	45.58	1.7770	13.04	7.90	13.13	34.07		
		Total	1403		84.58	100.00	0.00	95.44	576.87	13.5332	100.00	100.00	100.00	300.00	3.28	0.94

Table No. 3.11: Biodiversity Assessment of Shrub Species in Balimela Range

SL No	Forest Block	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Balimela	Amba	2	147	1.00	2.55	0.14	0.14	1.36	1.01	1.12	2.13	2.71	0.89
2	Balimela	Amla	12	147	1.09	2.79	0.85	0.82	7.48	6.06	6.18	12.24		
3	Balimela	Apamaranga	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
4	Balimela	Arjuna	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
5	Balimela	Asan	3	147	1.00	2.55	0.21	0.20	2.04	1.52	1.69	3.20		
6	Balimela	Bahada	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
7	Balimela	Banchakunda	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
8	Balimela	Bandhana	4	147	1.00	2.55	0.28	0.27	2.72	2.02	2.25	4.27		
9	Balimela	Bela	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
10	Balimela	Char	6	147	1.00	2.55	0.43	0.41	4.08	3.03	3.37	6.40		
11	Balimela	DhalaSiris	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
12	Balimela	Dhaman	4	147	1.00	2.55	0.28	0.27	2.72	2.02	2.25	4.27		
13	Balimela	Dhaura	10	147	1.43	3.65	0.71	0.68	4.76	5.05	3.93	8.98		

14	Balimela	Dimiri	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
15	Balimela	Gangasiuli	3	147	1.00	2.55	0.21	0.20	2.04	1.52	1.69	3.20		
16	Balimela	Gudamari	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
17	Balimela	Haldu	2	147	1.00	2.55	0.14	0.14	1.36	1.01	1.12	2.13		
18	Balimela	Harida	2	147	1.00	2.55	0.14	0.14	1.36	1.01	1.12	2.13		
19	Balimela	Jamu	2	147	1.00	2.55	0.14	0.14	1.36	1.01	1.12	2.13		
20	Balimela	Kangada	45	147	1.41	3.59	3.20	3.06	21.77	22.73	17.98	40.70		
21	Balimela	Kanteikoli	2	147	1.00	2.55	0.14	0.14	1.36	1.01	1.12	2.13		
22	Balimela	Karada	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
23	Balimela	Karanj	3	147	1.00	2.55	0.21	0.20	2.04	1.52	1.69	3.20		
24	Balimela	Kasi	7	147	1.17	2.98	0.50	0.48	4.08	3.54	3.37	6.91		
25	Balimela	Kendu	32	147	1.03	2.64	2.27	2.18	21.09	16.16	17.42	33.58		
26	Balimela	Khaira	2	147	1.00	2.55	0.14	0.14	1.36	1.01	1.12	2.13		
27	Balimela	Kumar chikni	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
28	Balimela	Kumbhi	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
29	Balimela	Kusum	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
30	Balimela	Mai	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
31	Balimela	Mankada kendu	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
32	Balimela	Mundi	3	147	1.00	2.55	0.21	0.20	2.04	1.52	1.69	3.20		
33	Balimela	Palasa	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
34	Balimela	Piasal	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
35	Balimela	Poksunga	33	147	1.03	2.63	2.35	2.24	21.77	16.67	17.98	34.64		
36	Balimela	Satavar	2	147	1.00	2.55	0.14	0.14	1.36	1.01	1.12	2.13		
37	Balimela	Siris	2	147	1.00	2.55	0.14	0.14	1.36	1.01	1.12	2.13		
38	Balimela	Sunari	1	147	1.00	2.55	0.07	0.07	0.68	0.51	0.56	1.07		
		Total	198		39.16	100.00	0.00	13.47	121.09	100.00	100.00	200.00	2.71	0.89

Table No. 3.12: Biodiversity Assessment of Herb Species in Balimela Range

SL No	Forest Block	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Balimela	Ankaranti	1	147	1.00	3.57	0.07	0.07	0.68	0.53	0.55	1.08	2.86	0.92
2	Balimela	Apamaranga	4	147	1.00	3.57	0.29	0.27	2.72	2.11	2.20	4.30		
3	Balimela	Arakha	2	147	1.00	3.57	0.15	0.14	1.36	1.05	1.10	2.15		
4	Balimela	Asan	4	147	1.00	3.57	0.29	0.27	2.72	2.11	2.20	4.30		
5	Balimela	Atundi	6	147	1.00	3.57	0.44	0.41	4.08	3.16	3.30	6.45		
6	Balimela	Bahada	7	147	1.00	3.57	0.51	0.48	4.76	3.68	3.85	7.53		
7	Balimela	Balunga	3	147	1.00	3.57	0.22	0.20	2.04	1.58	1.65	3.23		
8	Balimela	Banhaldi	4	147	1.00	3.57	0.29	0.27	2.72	2.11	2.20	4.30		
9	Balimela	Bantulasi	7	147	1.00	3.57	0.51	0.48	4.76	3.68	3.85	7.53		
10	Balimela	Bhuinimba	14	147	1.08	3.84	1.02	0.95	8.84	7.37	7.14	14.51		
11	Balimela	Bisalyakarani	8	147	1.14	4.08	0.58	0.54	4.76	4.21	3.85	8.06		
12	Balimela	Dhalasirisa	1	147	1.00	3.57	0.07	0.07	0.68	0.53	0.55	1.08		
13	Balimela	Duba grass	8	147	1.00	3.57	0.58	0.54	5.44	4.21	4.40	8.61		
14	Balimela	Gangasiuli	7	147	1.00	3.57	0.51	0.48	4.76	3.68	3.85	7.53		
15	Balimela	Ghodalanjia	2	147	1.00	3.57	0.15	0.14	1.36	1.05	1.10	2.15		
16	Balimela	Guguchia	8	147	1.00	3.57	0.58	0.54	5.44	4.21	4.40	8.61		
17	Balimela	Indrajai	2	147	1.00	3.57	0.15	0.14	1.36	1.05	1.10	2.15		
18	Balimela	Jhadu	5	147	1.00	3.57	0.36	0.34	3.40	2.63	2.75	5.38		
19	Balimela	Kendu	11	147	1.00	3.57	0.80	0.75	7.48	5.79	6.04	11.83		
20	Balimela	Kumar chikni	9	147	1.00	3.57	0.65	0.61	6.12	4.74	4.95	9.68		
21	Balimela	Lajkulilata	17	147	1.00	3.57	1.23	1.16	11.56	8.95	9.34	18.29		
22	Balimela	Mutha Grass	1	147	1.00	3.57	0.07	0.07	0.68	0.53	0.55	1.08		
23	Balimela	Nagairi	6	147	1.20	4.28	0.44	0.41	3.40	3.16	2.75	5.91		

24	Balimela	Phula jhadu	1	147	1.00	3.57	0.07	0.07	0.68	0.53	0.55	1.08		
25	Balimela	Poksunga	44	147	1.10	3.93	3.19	2.99	27.21	23.16	21.98	45.14		
26	Balimela	Sabai grass	3	147	1.50	5.35	0.22	0.20	1.36	1.58	1.10	2.68		
27	Balimela	Satavar	5	147	1.00	3.57	0.36	0.34	3.40	2.63	2.75	5.38		
		Total	190		28.02	100.00	0.00	12.93	123.81	100.00	100.00	200.00	2.86	0.92

Table No. 3.13: Biodiversity Assessment of Trees Species in Chitrakonda Range

SL No	Forest Block	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F (%)	BA (M ² /Ha)	RD	RF (%)	RBAF	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Chitrakonda	Piasal	37	69	1.06	2.14	1.61	5.36	50.72	0.2509	6.99	7.74	5.83	20.57	3.08	0.93
2	Chitrakonda	Acacia	3	69	1.00	2.02	0.13	0.43	4.35	0.0034	0.57	0.66	0.08	1.31		
3	Chitrakonda	Amba	25	69	1.19	2.41	1.09	3.62	30.43	0.7454	4.73	4.65	17.33	26.70		
4	Chitrakonda	Amla	21	69	1.11	2.23	0.91	3.04	27.54	0.0776	3.97	4.20	1.80	9.98		
5	Chitrakonda	Ankula	1	69	1.00	2.02	0.04	0.14	1.45	0.0011	0.19	0.22	0.03	0.44		
6	Chitrakonda	Asan	31	69	1.03	2.09	1.35	4.49	43.48	0.1725	5.86	6.64	4.01	16.51		
7	Chitrakonda	Bahada	2	69	1.00	2.02	0.09	0.29	2.90	0.0045	0.38	0.44	0.10	0.92		
8	Chitrakonda	Bandhan	12	69	1.09	2.21	0.52	1.74	15.94	0.2586	2.27	2.43	6.01	10.71		
9	Chitrakonda	Bara	2	69	1.00	2.02	0.09	0.29	2.90	0.1167	0.38	0.44	2.71	3.53		
10	Chitrakonda	Barkoli	3	69	1.00	2.02	0.13	0.43	4.35	0.0034	0.57	0.66	0.08	1.31		
11	Chitrakonda	Bela	6	69	1.00	2.02	0.26	0.87	8.70	0.0132	1.13	1.33	0.31	2.77		
12	Chitrakonda	Bhalia	2	69	1.00	2.02	0.09	0.29	2.90	0.0110	0.38	0.44	0.26	1.08		
13	Chitrakonda	Chakundi	1	69	1.00	2.02	0.04	0.14	1.45	0.0083	0.19	0.22	0.19	0.60		
14	Chitrakonda	Char	15	69	1.00	2.02	0.65	2.17	21.74	0.0573	2.84	3.32	1.33	7.49		
15	Chitrakonda	Chhuinpatali	1	69	1.00	2.02	0.04	0.14	1.45	0.0046	0.19	0.22	0.11	0.52		
16	Chitrakonda	Dhaman	4	69	1.00	2.02	0.17	0.58	5.80	0.0165	0.76	0.88	0.38	2.02		
17	Chitrakonda	Dhaura	30	69	1.20	2.43	1.30	4.35	36.23	0.2791	5.67	5.53	6.49	17.69		
18	Chitrakonda	Dimiri	3	69	1.00	2.02	0.13	0.43	4.35	0.0287	0.57	0.66	0.67	1.90		
19	Chitrakonda	Gamhari	20	69	1.11	2.25	0.87	2.90	26.09	0.1124	3.78	3.98	2.61	10.38		
20	Chitrakonda	Gangasiuli	1	69	1.00	2.02	0.04	0.14	1.45	0.0019	0.19	0.22	0.04	0.46		

21	Chitrakonda	Harida	10	69	1.00	2.02	0.43	1.45	14.49	0.0506	1.89	2.21	1.18	5.28		
22	Chitrakonda	Jamu	5	69	1.00	2.02	0.22	0.72	7.25	0.0684	0.95	1.11	1.59	3.64		
23	Chitrakonda	Kadamba	1	69	1.00	2.02	0.04	0.14	1.45	0.0201	0.19	0.22	0.47	0.88		
24	Chitrakonda	Karada	6	69	1.00	2.02	0.26	0.87	8.70	0.0262	1.13	1.33	0.61	3.07		
25	Chitrakonda	Karanj	2	69	1.00	2.02	0.09	0.29	2.90	0.0156	0.38	0.44	0.36	1.18		
26	Chitrakonda	Kasi	13	69	1.08	2.19	0.57	1.88	17.39	0.0779	2.46	2.65	1.81	6.92		
27	Chitrakonda	kendu	44	69	1.05	2.12	1.91	6.38	60.87	0.1927	8.32	9.29	4.48	22.09		
28	Chitrakonda	Kumbhi	1	69	1.00	2.02	0.04	0.14	1.45	0.0022	0.19	0.22	0.05	0.46		
29	Chitrakonda	Kusum	15	69	1.07	2.17	0.65	2.17	20.29	0.1530	2.84	3.10	3.56	9.49		
30	Chitrakonda	Mahula	8	69	1.00	2.02	0.35	1.16	11.59	0.0394	1.51	1.77	0.92	4.20		
31	Chitrakonda	Mankada kendu	4	69	1.00	2.02	0.17	0.58	5.80	0.0053	0.76	0.88	0.12	1.77		
32	Chitrakonda	Mundi	42	69	1.11	2.23	1.83	6.09	55.07	0.2699	7.94	8.41	6.27	22.62		
33	Chitrakonda	Mundica	6	69	1.20	2.43	0.26	0.87	7.25	0.0346	1.13	1.11	0.80	3.04		
34	Chitrakonda	Neem	4	69	1.00	2.02	0.17	0.58	5.80	0.0343	0.76	0.88	0.80	2.44		
35	Chitrakonda	Pahadi Sisoo	1	69	1.00	2.02	0.04	0.14	1.45	0.0041	0.19	0.22	0.10	0.51		
36	Chitrakonda	Panikusum	1	69	1.00	2.02	0.04	0.14	1.45	0.0037	0.19	0.22	0.09	0.50		
37	Chitrakonda	Rai	7	69	1.00	2.02	0.30	1.01	10.14	0.0209	1.32	1.55	0.49	3.36		
38	Chitrakonda	Saguan	11	69	2.20	4.45	0.48	1.59	7.25	0.0936	2.08	1.11	2.18	5.36		
39	Chitrakonda	Sahada	5	69	1.25	2.53	0.22	0.72	5.80	0.0617	0.95	0.88	1.43	3.26		
40	Chitrakonda	Salapa	4	69	1.00	2.02	0.17	0.58	5.80	0.0458	0.76	0.88	1.07	2.71		
41	Chitrakonda	Sidha	3	69	1.00	2.02	0.13	0.43	4.35	0.0138	0.57	0.66	0.32	1.55		
42	Chitrakonda	Siris	4	69	1.00	2.02	0.17	0.58	5.80	0.0227	0.76	0.88	0.53	2.17		
43	Chitrakonda	Sisoo	5	69	1.00	2.02	0.22	0.72	7.25	0.0506	0.95	1.11	1.18	3.23		
44	Chitrakonda	Sitaphal	1	69	1.00	2.02	0.04	0.14	1.45	0.0019	0.19	0.22	0.04	0.46		
45	Chitrakonda	Tangini	105	69	1.72	3.48	4.57	15.22	88.41	0.8210	19.85	13.50	19.09	52.43		
46	Chitrakonda	Tentuli	1	69	1.00	2.02	0.04	0.14	1.45	0.0041	0.19	0.22	0.10	0.51		
		Total	529	0	49.47	100.00	0.00	76.67	655.07	4.3014	100.00	100.00	100.00	300.00	3.08	0.93

Table No. 3.14: Biodiversity Assessment of Shrub Species in Chitrakonda Range

SL No	Forest Block	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Chitrakonda	Apamaranga	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69	2.37	0.87
2	Chitrakonda	Bana kolotho	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69		
3	Chitrakonda	Banchakunda	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69		
4	Chitrakonda	Bantulasi	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69		
5	Chitrakonda	Bhuinimba	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69		
6	Chitrakonda	Bisalyakarani	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69		
7	Chitrakonda	Char	2	69	1.00	4.55	0.18	0.29	2.90	1.69	1.69	3.39		
8	Chitrakonda	Chikini Kalachua	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69		
9	Chitrakonda	Dhaman	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69		
10	Chitrakonda	Dhatiki	3	69	1.00	4.55	0.28	0.43	4.35	2.54	2.54	5.08		
11	Chitrakonda	Gamhari	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69		
12	Chitrakonda	Gangasiuli	6	69	1.00	4.55	0.55	0.87	8.70	5.08	5.08	10.17		
13	Chitrakonda	Gudamari	2	69	1.00	4.55	0.18	0.29	2.90	1.69	1.69	3.39		
14	Chitrakonda	Kanteikoli	12	69	1.00	4.55	1.10	1.74	17.39	10.17	10.17	20.34		
15	Chitrakonda	Kendu	6	69	1.00	4.55	0.55	0.87	8.70	5.08	5.08	10.17		
16	Chitrakonda	Kurei	3	69	1.00	4.55	0.28	0.43	4.35	2.54	2.54	5.08		
17	Chitrakonda	Kusum	1	69	1.00	4.55	0.09	0.14	1.45	0.85	0.85	1.69		
18	Chitrakonda	Lajkulilata	13	69	1.00	4.55	1.20	1.88	18.84	11.02	11.02	22.03		
19	Chitrakonda	Mankada kendu	2	69	1.00	4.55	0.18	0.29	2.90	1.69	1.69	3.39		
20	Chitrakonda	Poksunga	27	69	1.00	4.55	2.49	3.91	39.13	22.88	22.88	45.76		
21	Chitrakonda	Satavar	4	69	1.00	4.55	0.37	0.58	5.80	3.39	3.39	6.78		
22	Chitrakonda	Siali	28	69	1.00	4.55	2.58	4.06	40.58	23.73	23.73	47.46		
		Total	118	0	22.00	100.00	0.00	17.10	171.01	100.00	100.00	200.00	2.37	0.87

Table No. 3.15: Biodiversity Assessment of Herb Species in Chitrakonda Range

SL No	Forest Block	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Chitrakonda	Poksunga	38	69	1.06	5.01	3.32	5.51	52.17	29.01	27.91	56.91	2.33	0.85
2	Chitrakonda	Ada (Ambakasi)	1	69	1.00	4.75	0.09	0.14	1.45	0.76	0.78	1.54		
3	Chitrakonda	Amla	4	69	1.00	4.75	0.35	0.58	5.80	3.05	3.10	6.15		
4	Chitrakonda	Anantamula	3	69	1.00	4.75	0.26	0.43	4.35	2.29	2.33	4.62		
5	Chitrakonda	Ankaranti	2	69	1.00	4.75	0.17	0.29	2.90	1.53	1.55	3.08		
6	Chitrakonda	Banhaldi	3	69	1.00	4.75	0.26	0.43	4.35	2.29	2.33	4.62		
7	Chitrakonda	Bantulasi	1	69	1.00	4.75	0.09	0.14	1.45	0.76	0.78	1.54		
8	Chitrakonda	Bhuinimba	14	69	1.00	4.75	1.22	2.03	20.29	10.69	10.85	21.54		
9	Chitrakonda	Bisalyakarani	8	69	1.00	4.75	0.70	1.16	11.59	6.11	6.20	12.31		
10	Chitrakonda	Duba grass	2	69	1.00	4.75	0.17	0.29	2.90	1.53	1.55	3.08		
11	Chitrakonda	Gandhara	1	69	1.00	4.75	0.09	0.14	1.45	0.76	0.78	1.54		
12	Chitrakonda	Gangasiuli	7	69	1.00	4.75	0.61	1.01	10.14	5.34	5.43	10.77		
13	Chitrakonda	Haladi	1	69	1.00	4.75	0.09	0.14	1.45	0.76	0.78	1.54		
14	Chitrakonda	Harida	4	69	1.00	4.75	0.35	0.58	5.80	3.05	3.10	6.15		
15	Chitrakonda	Lajkulilata	27	69	1.00	4.75	2.36	3.91	39.13	20.61	20.93	41.54		
16	Chitrakonda	Madanga	1	69	1.00	4.75	0.09	0.14	1.45	0.76	0.78	1.54		
17	Chitrakonda	Patalgaruda	1	69	1.00	4.75	0.09	0.14	1.45	0.76	0.78	1.54		
18	Chitrakonda	Phula jhadu	7	69	1.00	4.75	0.61	1.01	10.14	5.34	5.43	10.77		
19	Chitrakonda	Salaparni	1	69	1.00	4.75	0.09	0.14	1.45	0.76	0.78	1.54		
20	Chitrakonda	Satavar	4	69	1.00	4.75	0.35	0.58	5.80	3.05	3.10	6.15		
21	Chitrakonda	Sunari	1	69	1.00	4.75	0.09	0.14	1.45	0.76	0.78	1.54		
		Total	131		21.06	100.00	0.00	18.99	186.96	100.00	100.00	200.00	2.33	0.85

Table No. 3.16: Biodiversity Assessment of Trees Species in Kalimela Range

SL No	Forest Block	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	BA (M ² /Ha)	RD	RF (%)	RBAF	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Kalimela	Achhu	1	100	1.00	1.77	0.03	0.10	1.00	0.0045	0.12	0.15	0.04	0.31	2.99	0.93
2	Kalimela	Amba	1	100	1.00	1.77	0.03	0.10	1.00	0.0786	0.12	0.15	0.77	1.04		
3	Kalimela	Amla	4	100	1.00	1.77	0.14	0.40	4.00	0.0261	0.46	0.62	0.25	1.34		
4	Kalimela	Arjuna	3	100	1.50	2.66	0.10	0.30	2.00	0.0208	0.35	0.31	0.20	0.86		
5	Kalimela	Asan	125	100	1.60	2.84	4.26	12.50	78.00	1.6428	14.52	12.02	16.02	42.56		
6	Kalimela	Aswatha	1	100	1.00	1.77	0.03	0.10	1.00	0.0353	0.12	0.15	0.34	0.61		
7	Kalimela	Bahada	9	100	1.00	1.77	0.31	0.90	9.00	0.0981	1.05	1.39	0.96	3.39		
8	Kalimela	Bandhan	11	100	1.22	2.16	0.37	1.10	9.00	0.0875	1.28	1.39	0.85	3.52		
9	Kalimela	Bara	1	100	1.00	1.77	0.03	0.10	1.00	0.0204	0.12	0.15	0.20	0.47		
10	Kalimela	Barabakulia	12	100	1.00	1.77	0.41	1.20	12.00	0.1521	1.39	1.85	1.48	4.73		
11	Kalimela	Bela	2	100	1.00	1.77	0.07	0.20	2.00	0.0267	0.23	0.31	0.26	0.80		
12	Kalimela	Bhalia	2	100	1.00	1.77	0.07	0.20	2.00	0.0322	0.23	0.31	0.31	0.85		
13	Kalimela	Char	15	100	1.15	2.04	0.51	1.50	13.00	0.1599	1.74	2.00	1.56	5.31		
14	Kalimela	Damkuruda	4	100	1.00	1.77	0.14	0.40	4.00	0.0336	0.46	0.62	0.33	1.41		
15	Kalimela	Dhaman	9	100	1.00	1.77	0.31	0.90	9.00	0.0775	1.05	1.39	0.76	3.19		
16	Kalimela	Dhaura	102	100	1.57	2.78	3.48	10.20	65.00	1.1081	11.85	10.02	10.81	32.67		
17	Kalimela	Gamhari	5	100	1.00	1.77	0.17	0.50	5.00	0.0595	0.58	0.77	0.58	1.93		
18	Kalimela	Gangasiuli	1	100	1.00	1.77	0.03	0.10	1.00	0.0011	0.12	0.15	0.01	0.28		
19	Kalimela	Ghanta	1	100	1.00	1.77	0.03	0.10	1.00	0.0181	0.12	0.15	0.18	0.45		
20	Kalimela	Ghontol	1	100	1.00	1.77	0.03	0.10	1.00	0.0196	0.12	0.15	0.19	0.46		
21	Kalimela	Harida	3	100	1.00	1.77	0.10	0.30	3.00	0.0374	0.35	0.46	0.36	1.18		
22	Kalimela	Jamu	3	100	1.00	1.77	0.10	0.30	3.00	0.0230	0.35	0.46	0.22	1.03		
23	Kalimela	Kanchan	3	100	1.00	1.77	0.10	0.30	3.00	0.0411	0.35	0.46	0.40	1.21		
24	Kalimela	Kangada	1	100	1.00	1.77	0.03	0.10	1.00	0.0042	0.12	0.15	0.04	0.31		

25	Kalimela	Karada	34	100	1.26	2.23	1.16	3.40	27.00	0.2457	3.95	4.16	2.40	10.51		
26	Kalimela	Kasi	27	100	1.17	2.08	0.92	2.70	23.00	0.3305	3.14	3.54	3.22	9.90		
27	Kalimela	kendu	79	100	1.27	2.26	2.69	7.90	62.00	0.9735	9.18	9.55	9.50	28.22		
28	Kalimela	Khakada	2	100	1.00	1.77	0.07	0.20	2.00	0.0261	0.23	0.31	0.26	0.80		
29	Kalimela	Kochila	4	100	1.33	2.36	0.14	0.40	3.00	0.0413	0.46	0.46	0.40	1.33		
30	Kalimela	Kodala	2	100	1.00	1.77	0.07	0.20	2.00	0.0102	0.23	0.31	0.10	0.64		
31	Kalimela	Kumbhi	9	100	1.50	2.66	0.31	0.90	6.00	0.1870	1.05	0.92	1.82	3.79		
32	Kalimela	Kusum	38	100	1.15	2.04	1.30	3.80	33.00	0.5292	4.41	5.08	5.16	14.66		
33	Kalimela	Mahula	31	100	1.55	2.75	1.06	3.10	20.00	0.5584	3.60	3.08	5.45	12.13		
34	Kalimela	Mai	54	100	1.17	2.08	1.84	5.40	46.00	0.5306	6.27	7.09	5.17	18.53		
35	Kalimela	Mokha	7	100	1.17	2.07	0.24	0.70	6.00	0.0661	0.81	0.92	0.64	2.38		
36	Kalimela	Mundi	50	100	1.35	2.39	1.70	5.00	37.00	0.7022	5.81	5.70	6.85	18.36		
37	Kalimela	Pahadi Sisoo	2	100	2.00	3.54	0.07	0.20	1.00	0.0174	0.23	0.15	0.17	0.56		
38	Kalimela	Piasal	46	100	1.39	2.47	1.57	4.60	33.00	0.5602	5.34	5.08	5.46	15.89		
39	Kalimela	Rai	17	100	1.31	2.32	0.58	1.70	13.00	0.2721	1.97	2.00	2.65	6.63		
40	Kalimela	Saguan	1	100	1.00	1.77	0.03	0.10	1.00	0.0020	0.12	0.15	0.02	0.29		
41	Kalimela	Salai	2	100	1.00	1.77	0.07	0.20	2.00	0.0221	0.23	0.31	0.22	0.76		
42	Kalimela	Sidha	27	100	1.35	2.39	0.92	2.70	20.00	0.2600	3.14	3.08	2.54	8.75		
43	Kalimela	Simuli	6	100	1.00	1.77	0.20	0.60	6.00	0.0906	0.70	0.92	0.88	2.51		
44	Kalimela	Siris	3	100	1.00	1.77	0.10	0.30	3.00	0.0650	0.35	0.46	0.63	1.44		
45	Kalimela	Sisoo	6	100	1.00	1.77	0.20	0.60	6.00	0.0562	0.70	0.92	0.55	2.17		
46	Kalimela	Sunari	2	100	1.00	1.77	0.07	0.20	2.00	0.0043	0.23	0.31	0.04	0.58		
47	Kalimela	Tala	2	100	2.00	3.54	0.07	0.20	1.00	0.0115	0.23	0.15	0.11	0.50		
48	Kalimela	Tangini	90	100	1.43	2.53	3.07	9.00	63.00	0.8821	10.45	9.71	8.60	28.76		
		Total	861	0	56.46	100.00	0.00	86.10	649.00	10.2525	100.00	100.00	100.00	300.00	2.99	0.93

Table No. 3.17: Biodiversity Assessment of Shrub Species in Kalimela Range

SL No	Forest Block	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Kalimela	Lajkulilata	8	100	1.00	3.98	0.51	0.80	8.00	3.27	3.40	6.67	2.38	0.85
2	Kalimela	Asan	5	100	1.00	3.98	0.32	0.50	5.00	2.04	2.13	4.17		
3	Kalimela	Bajramuli	2	100	1.00	3.98	0.13	0.20	2.00	0.82	0.85	1.67		
4	Kalimela	Banhaldi	1	100	1.00	3.98	0.06	0.10	1.00	0.41	0.43	0.83		
5	Kalimela	Bantulasi	4	100	1.00	3.98	0.26	0.40	4.00	1.63	1.70	3.33		
6	Kalimela	Bhuinimba	10	100	1.00	3.98	0.64	1.00	10.00	4.08	4.26	8.34		
7	Kalimela	Bisalyakarani	7	100	1.00	3.98	0.45	0.70	7.00	2.86	2.98	5.84		
8	Kalimela	Char	5	100	1.00	3.98	0.32	0.50	5.00	2.04	2.13	4.17		
9	Kalimela	Dhatiki	3	100	1.00	3.98	0.19	0.30	3.00	1.22	1.28	2.50		
10	Kalimela	Dhaura	4	100	1.00	3.98	0.26	0.40	4.00	1.63	1.70	3.33		
11	Kalimela	Gangasiuli	11	100	1.00	3.98	0.70	1.10	11.00	4.49	4.68	9.17		
12	Kalimela	Haldigundi	2	100	1.00	3.98	0.13	0.20	2.00	0.82	0.85	1.67		
13	Kalimela	Jamu	1	100	1.00	3.98	0.06	0.10	1.00	0.41	0.43	0.83		
14	Kalimela	Kendu	39	100	1.00	3.98	2.49	3.90	39.00	15.92	16.60	32.51		
15	Kalimela	Khaira	1	100	1.00	3.98	0.06	0.10	1.00	0.41	0.43	0.83		
16	Kalimela	Khirkoli	5	100	1.00	3.98	0.32	0.50	5.00	2.04	2.13	4.17		
17	Kalimela	Kurei	30	100	1.00	3.98	1.92	3.00	30.00	12.24	12.77	25.01		
18	Kalimela	Kusum	9	100	1.00	3.98	0.57	0.90	9.00	3.67	3.83	7.50		
19	Kalimela	Mahala	2	100	1.00	3.98	0.13	0.20	2.00	0.82	0.85	1.67		
20	Kalimela	Mahula	3	100	1.00	3.98	0.19	0.30	3.00	1.22	1.28	2.50		
21	Kalimela	Mai	10	100	1.00	3.98	0.64	1.00	10.00	4.08	4.26	8.34		
22	Kalimela	Mundi	1	100	1.00	3.98	0.06	0.10	1.00	0.41	0.43	0.83		
23	Kalimela	Palasa	1	100	1.00	3.98	0.06	0.10	1.00	0.41	0.43	0.83		
24	Kalimela	Patalgaruda	1	100	1.00	3.98	0.06	0.10	1.00	0.41	0.43	0.83		

25	Kalimela	Poksunga	80	100	1.14	4.55	5.11	8.00	70.00	32.65	29.79	62.44		
		Total	245		25.14	100.00	0.00	24.50	235.00	100.00	100.00	200.00	2.38	0.85

Table No. 3.18: Biodiversity Assessment of Herb Species in Kalimela Range

SL No	Forest Block	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Kalimela	Banhaldi	3	100	1.00	5.19	0.19	0.30	3.00	1.20	1.24	2.44	2.19	0.84
2	Kalimela	Anantamula	5	100	1.00	5.19	0.32	0.50	5.00	2.01	2.07	4.07		
3	Kalimela	Asan	1	100	1.00	5.19	0.06	0.10	1.00	0.40	0.41	0.81		
4	Kalimela	Bantulasi	1	100	1.00	5.19	0.06	0.10	1.00	0.40	0.41	0.81		
5	Kalimela	Bhuinimba	69	100	1.01	5.26	4.37	6.90	68.00	27.71	28.10	55.81		
6	Kalimela	Bisalyakarani	15	100	1.00	5.19	0.95	1.50	15.00	6.02	6.20	12.22		
7	Kalimela	Char	3	100	1.00	5.19	0.19	0.30	3.00	1.20	1.24	2.44		
8	Kalimela	Dhatiki	3	100	1.00	5.19	0.19	0.30	3.00	1.20	1.24	2.44		
9	Kalimela	Duba grass	16	100	1.14	5.93	1.01	1.60	14.00	6.43	5.79	12.21		
10	Kalimela	Gangasiuli	12	100	1.00	5.19	0.76	1.20	12.00	4.82	4.96	9.78		
11	Kalimela	Gayatulasi	4	100	1.00	5.19	0.25	0.40	4.00	1.61	1.65	3.26		
12	Kalimela	Haldigundi	2	100	1.00	5.19	0.13	0.20	2.00	0.80	0.83	1.63		
13	Kalimela	Kendu	5	100	1.00	5.19	0.32	0.50	5.00	2.01	2.07	4.07		
14	Kalimela	Khirkoli	6	100	1.00	5.19	0.38	0.60	6.00	2.41	2.48	4.89		
15	Kalimela	Kurei	6	100	1.00	5.19	0.38	0.60	6.00	2.41	2.48	4.89		
16	Kalimela	Lajkulilata	38	100	1.12	5.80	2.41	3.80	34.00	15.26	14.05	29.31		
17	Kalimela	Poksunga	56	100	1.00	5.19	3.55	5.60	56.00	22.49	23.14	45.63		

18	Kalimela	Saptapheni	1	100	1.00	5.19	0.06	0.10	1.00	0.40	0.41	0.81		
19	Kalimela	Sunaragada	3	100	1.00	5.19	0.19	0.30	3.00	1.20	1.24	2.44		
		Total	249		19.28	100.00	0.00	24.90	242.00	100.00	100.00	200.00	2.19	0.84

Table No. 3.19: Biodiversity Assessment of Trees Species in Malkangiri Range

SL No	Range	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	BA (M ² /Ha)	RD	RF (%)	RBAF	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Malkangiri	Rohini	2	45	1.00	1.76	0.11	0.44	4.44	0.0113	0.58	0.83	0.18	1.59	3.18	0.94
2	Malkangiri	Amla	6	45	1.20	2.12	0.32	1.33	11.11	0.0263	1.74	2.07	0.42	4.23		
3	Malkangiri	Asan	27	45	1.23	2.16	1.45	6.00	48.89	0.8123	7.83	9.09	13.09	30.01		
4	Malkangiri	Aswatha	1	45	1.00	1.76	0.05	0.22	2.22	0.0252	0.29	0.41	0.41	1.11		
5	Malkangiri	Bahada	1	45	1.00	1.76	0.05	0.22	2.22	0.0017	0.29	0.41	0.03	0.73		
6	Malkangiri	Bandhan	5	45	1.00	1.76	0.27	1.11	11.11	0.1329	1.45	2.07	2.14	5.66		
7	Malkangiri	Bara	1	45	1.00	1.76	0.05	0.22	2.22	0.0109	0.29	0.41	0.18	0.88		
8	Malkangiri	Barabakulia	1	45	1.00	1.76	0.05	0.22	2.22	0.0017	0.29	0.41	0.03	0.73		
9	Malkangiri	Bela	1	45	1.00	1.76	0.05	0.22	2.22	0.0050	0.29	0.41	0.08	0.78		
10	Malkangiri	Char	13	45	1.86	3.28	0.70	2.89	15.56	0.0977	3.77	2.89	1.57	8.24		
11	Malkangiri	Dhaman	6	45	1.00	1.76	0.32	1.33	13.33	0.1684	1.74	2.48	2.71	6.93		
12	Malkangiri	Dhaura	36	45	1.57	2.76	1.94	8.00	51.11	0.5708	10.43	9.50	9.20	29.14		
13	Malkangiri	Dimiri	1	45	1.00	1.76	0.05	0.22	2.22	0.0092	0.29	0.41	0.15	0.85		
14	Malkangiri	Gamhari	3	45	1.00	1.76	0.16	0.67	6.67	0.0064	0.87	1.24	0.10	2.21		
15	Malkangiri	Harida	6	45	1.20	2.12	0.32	1.33	11.11	0.0632	1.74	2.07	1.02	4.82		
16	Malkangiri	Jamu	3	45	1.00	1.76	0.16	0.67	6.67	0.0408	0.87	1.24	0.66	2.77		
17	Malkangiri	Kanchan	2	45	2.00	3.53	0.11	0.44	2.22	0.0035	0.58	0.41	0.06	1.05		
18	Malkangiri	Karada	21	45	1.40	2.47	1.13	4.67	33.33	0.1944	6.09	6.20	3.13	15.42		
19	Malkangiri	Kasi	19	45	2.11	3.72	1.02	4.22	20.00	0.1933	5.51	3.72	3.11	12.34		
20	Malkangiri	kendu	46	45	1.84	3.25	2.48	10.22	55.56	0.8446	13.33	10.33	13.61	37.27		
21	Malkangiri	Khair	1	45	1.00	1.76	0.05	0.22	2.22	0.0017	0.29	0.41	0.03	0.73		

22	Malkangiri	Khakada	5	45	1.67	2.94	0.27	1.11	6.67	0.0780	1.45	1.24	1.26	3.95		
23	Malkangiri	Kodala	3	45	1.50	2.65	0.16	0.67	4.44	0.0305	0.87	0.83	0.49	2.19		
24	Malkangiri	Kumbhi	1	45	1.00	1.76	0.05	0.22	2.22	0.0279	0.29	0.41	0.45	1.15		
25	Malkangiri	Kusum	9	45	1.13	1.98	0.48	2.00	17.78	0.3298	2.61	3.31	5.31	11.23		
26	Malkangiri	Mahula	6	45	1.00	1.76	0.32	1.33	13.33	0.2537	1.74	2.48	4.09	8.31		
27	Malkangiri	Mai	20	45	1.33	2.35	1.08	4.44	33.33	0.4612	5.80	6.20	7.43	19.43		
28	Malkangiri	Mankada kendu	2	45	1.00	1.76	0.11	0.44	4.44	0.0059	0.58	0.83	0.10	1.50		
29	Malkangiri	Mokha	6	45	3.00	5.29	0.32	1.33	4.44	0.1750	1.74	0.83	2.82	5.39		
30	Malkangiri	Mundi	9	45	1.29	2.27	0.48	2.00	15.56	0.2319	2.61	2.89	3.74	9.24		
31	Malkangiri	Mundica	1	45	1.00	1.76	0.05	0.22	2.22	0.0017	0.29	0.41	0.03	0.73		
32	Malkangiri	Palas	2	45	1.00	1.76	0.11	0.44	4.44	0.0087	0.58	0.83	0.14	1.55		
33	Malkangiri	Panikusum	1	45	1.00	1.76	0.05	0.22	2.22	0.0017	0.29	0.41	0.03	0.73		
34	Malkangiri	Piasal	9	45	1.00	1.76	0.48	2.00	20.00	0.2514	2.61	3.72	4.05	10.38		
35	Malkangiri	Rai	2	45	1.00	1.76	0.11	0.44	4.44	0.0447	0.58	0.83	0.72	2.13		
36	Malkangiri	Sahada	1	45	1.00	1.76	0.05	0.22	2.22	0.0039	0.29	0.41	0.06	0.77		
37	Malkangiri	Sal	10	45	3.33	5.88	0.54	2.22	6.67	0.0604	2.90	1.24	0.97	5.11		
38	Malkangiri	Sidha	17	45	1.89	3.33	0.92	3.78	20.00	0.1337	4.93	3.72	2.15	10.80		
39	Malkangiri	Simili	4	45	1.00	1.76	0.22	0.89	8.89	0.0859	1.16	1.65	1.38	4.20		
40	Malkangiri	Siris	6	45	1.20	2.12	0.32	1.33	11.11	0.1355	1.74	2.07	2.18	5.99		
41	Malkangiri	Sisoo	4	45	1.00	1.76	0.22	0.89	8.89	0.0823	1.16	1.65	1.33	4.14		
42	Malkangiri	Sunari	3	45	1.50	2.65	0.16	0.67	4.44	0.0140	0.87	0.83	0.23	1.92		
43	Malkangiri	Tangini	22	45	1.47	2.59	1.18	4.89	33.33	0.5659	6.38	6.20	9.12	21.69		
		Total	345	0	56.70	100.00	0.00	76.67	537.78	6.2056	100.00	100.00	100.00	300.00	3.18	0.94

Table No. 3.20: Biodiversity Assessment of Shrub Species in Malkangiri Range

SL No	Range	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Malkangiri	Kendu	38	45	1.15	7.09	4.48	8.44	73.33	52.78	50.77	103.55	1.67	0.69
2	Malkangiri	Amla	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
3	Malkangiri	Bantulasi	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
4	Malkangiri	Dhaura	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
5	Malkangiri	Gangasiuli	7	45	1.00	6.16	0.82	1.56	15.56	9.72	10.77	20.49		
6	Malkangiri	Gangoi	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
7	Malkangiri	Jamu	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
8	Malkangiri	Kanchan	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
9	Malkangiri	Kurei	2	45	1.00	6.16	0.24	0.44	4.44	2.78	3.08	5.85		
10	Malkangiri	Kusum	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
11	Malkangiri	Lajkulilata	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
12	Malkangiri	Mahula	2	45	2.00	12.32	0.24	0.44	2.22	2.78	1.54	4.32		
13	Malkangiri	Mundi	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
14	Malkangiri	Poksunga	13	45	1.08	6.67	1.53	2.89	26.67	18.06	18.46	36.52		
15	Malkangiri	Rohini	1	45	1.00	6.16	0.12	0.22	2.22	1.39	1.54	2.93		
		Total	72		16.23	100.00	0.00	16.00	144.44	100.00	100.00	200.00	1.67	0.69

Table No. 3.21: Biodiversity Assessment of Herb Species in Malkangiri Range

SL No	Range	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Malkangiri	Lajkulilata	21	45	1.05	10.45	2.67	4.67	44.44	33.87	32.79	66.66	1.54	0.71
2	Malkangiri	Bahada	1	45	1.00	9.95	0.13	0.22	2.22	1.61	1.64	3.25		
3	Malkangiri	Banchakunda	1	45	1.00	9.95	0.13	0.22	2.22	1.61	1.64	3.25		
4	Malkangiri	Char	2	45	1.00	9.95	0.25	0.44	4.44	3.23	3.28	6.50		
5	Malkangiri	Duba grass	2	45	1.00	9.95	0.25	0.44	4.44	3.23	3.28	6.50		
6	Malkangiri	Gangasiuli	4	45	1.00	9.95	0.51	0.89	8.89	6.45	6.56	13.01		
7	Malkangiri	Kendu	1	45	1.00	9.95	0.13	0.22	2.22	1.61	1.64	3.25		
8	Malkangiri	Poksunga	26	45	1.00	9.95	3.30	5.78	57.78	41.94	42.62	84.56		
9	Malkangiri	Satavar	3	45	1.00	9.95	0.38	0.67	6.67	4.84	4.92	9.76		
10	Malkangiri	Sidha	1	45	1.00	9.95	0.13	0.22	2.22	1.61	1.64	3.25		
		Total	62	0	10.05	100.00	0.00	13.78	135.56	100.00	100.00	200.00	1.54	0.71

Table No. 3.22: Biodiversity Assessment of Trees Species in Mathili Range

SL No	Range	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F (%)	BA (M ² /Ha)	RD	RF (%)	RBAF	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Mathili	Achhu	3	60	1.00	1.65	0.13	0.50	5.00	0.0334	0.57	0.70	0.36	1.63	3.40	0.95
2	Mathili	Amba	5	60	1.25	2.06	0.22	0.83	6.67	0.2204	0.95	0.93	2.39	4.27		
3	Mathili	Amla	11	60	1.00	1.65	0.48	1.83	18.33	0.1106	2.08	2.56	1.20	5.84		
4	Mathili	Ankula	1	60	1.00	1.65	0.04	0.17	1.67	0.0126	0.19	0.23	0.14	0.56		
5	Mathili	Arjuna	1	60	1.00	1.65	0.04	0.17	1.67	0.0038	0.19	0.23	0.04	0.46		

6	Mathili	Asan	50	60	1.28	2.11	2.18	8.33	65.00	1.1996	9.47	9.09	12.99	31.55
7	Mathili	Bahada	7	60	1.00	1.65	0.30	1.17	11.67	0.2527	1.33	1.63	2.74	5.69
8	Mathili	Bandhan	2	60	1.00	1.65	0.09	0.33	3.33	0.0320	0.38	0.47	0.35	1.19
9	Mathili	Barabakulia	1	60	1.00	1.65	0.04	0.17	1.67	0.0013	0.19	0.23	0.01	0.44
10	Mathili	Barkoli	1	60	1.00	1.65	0.04	0.17	1.67	0.0170	0.19	0.23	0.18	0.61
11	Mathili	Bela	9	60	1.00	1.65	0.39	1.50	15.00	0.0711	1.70	2.10	0.77	4.57
12	Mathili	Bhalia	2	60	1.00	1.65	0.09	0.33	3.33	0.0359	0.38	0.47	0.39	1.23
13	Mathili	Char	9	60	1.29	2.12	0.39	1.50	11.67	0.0659	1.70	1.63	0.71	4.05
14	Mathili	Dhaman	8	60	1.33	2.20	0.35	1.33	10.00	0.1355	1.52	1.40	1.47	4.38
15	Mathili	Dhaura	29	60	1.21	1.99	1.26	4.83	40.00	0.5158	5.49	5.59	5.58	16.67
16	Mathili	Dimiri	2	60	1.00	1.65	0.09	0.33	3.33	0.0283	0.38	0.47	0.31	1.15
17	Mathili	Gamhari	8	60	1.00	1.65	0.35	1.33	13.33	0.1627	1.52	1.86	1.76	5.14
18	Mathili	Gangasiuli	3	60	1.50	2.47	0.13	0.50	3.33	0.0058	0.57	0.47	0.06	1.10
19	Mathili	Genduli	6	60	1.20	1.98	0.26	1.00	8.33	0.1514	1.14	1.17	1.64	3.94
20	Mathili	Haldu	7	60	1.17	1.92	0.30	1.17	10.00	0.1355	1.33	1.40	1.47	4.19
21	Mathili	Harida	9	60	1.29	2.12	0.39	1.50	11.67	0.1665	1.70	1.63	1.80	5.14
22	Mathili	Jamu	4	60	1.33	2.20	0.17	0.67	5.00	0.0618	0.76	0.70	0.67	2.13
23	Mathili	Kanchana Barada	1	60	1.00	1.65	0.04	0.17	1.67	0.0013	0.19	0.23	0.01	0.44
24	Mathili	Kangada	14	60	1.08	1.77	0.61	2.33	21.67	0.1637	2.65	3.03	1.77	7.45
25	Mathili	Karada	45	60	1.36	2.25	1.96	7.50	55.00	0.3969	8.52	7.69	4.30	20.51
26	Mathili	Karanja	1	60	1.00	1.65	0.04	0.17	1.67	0.0026	0.19	0.23	0.03	0.45
27	Mathili	Kasi	22	60	1.16	1.91	0.96	3.67	31.67	0.4123	4.17	4.43	4.46	13.06
28	Mathili	Kendu	43	60	1.16	1.91	1.87	7.17	61.67	0.9652	8.14	8.62	10.45	27.22
29	Mathili	Khair	1	60	1.00	1.65	0.04	0.17	1.67	0.0170	0.19	0.23	0.18	0.61
30	Mathili	Khajuri	2	60	2.00	3.30	0.09	0.33	1.67	0.0177	0.38	0.23	0.19	0.80
31	Mathili	Khakada	4	60	1.33	2.20	0.17	0.67	5.00	0.0511	0.76	0.70	0.55	2.01
32	Mathili	Kumbhi	4	60	1.00	1.65	0.17	0.67	6.67	0.0603	0.76	0.93	0.65	2.34
33	Mathili	Kusum	21	60	1.17	1.92	0.91	3.50	30.00	0.3579	3.98	4.20	3.87	12.05
34	Mathili	Mahula	7	60	1.17	1.92	0.30	1.17	10.00	0.0742	1.33	1.40	0.80	3.53
35	Mathili	Mai	16	60	1.14	1.88	0.70	2.67	23.33	0.3386	3.03	3.26	3.67	9.96
36	Mathili	Mankada	2	60	1.00	1.65	0.09	0.33	3.33	0.0243	0.38	0.47	0.26	1.11

		kendu														
37	Mathili	Mundi	19	60	1.19	1.96	0.83	3.17	26.67	0.4513	3.60	3.73	4.89	12.21		
38	Mathili	Pahadi Sisoo	5	60	1.00	1.65	0.22	0.83	8.33	0.1030	0.95	1.17	1.12	3.23		
39	Mathili	Palas	2	60	1.00	1.65	0.09	0.33	3.33	0.0043	0.38	0.47	0.05	0.89		
40	Mathili	Panigamhar	2	60	1.00	1.65	0.09	0.33	3.33	0.0530	0.38	0.47	0.57	1.42		
41	Mathili	Panikusum	1	60	1.00	1.65	0.04	0.17	1.67	0.0242	0.19	0.23	0.26	0.68		
42	Mathili	Phasi	5	60	1.67	2.75	0.22	0.83	5.00	0.0509	0.95	0.70	0.55	2.20		
43	Mathili	Piasal	20	60	1.25	2.06	0.87	3.33	26.67	0.3166	3.79	3.73	3.43	10.94		
44	Mathili	Rai	5	60	1.25	2.06	0.22	0.83	6.67	0.1476	0.95	0.93	1.60	3.48		
45	Mathili	Sahada	11	60	1.10	1.81	0.48	1.83	16.67	0.1828	2.08	2.33	1.98	6.39		
46	Mathili	Sal	46	60	2.42	3.99	2.00	7.67	31.67	0.9432	8.71	4.43	10.21	23.35		
47	Mathili	Sidha	6	60	1.00	1.65	0.26	1.00	10.00	0.0322	1.14	1.40	0.35	2.88		
48	Mathili	Simili	6	60	1.20	1.98	0.26	1.00	8.33	0.0782	1.14	1.17	0.85	3.15		
49	Mathili	Siris	5	60	1.00	1.65	0.22	0.83	8.33	0.0751	0.95	1.17	0.81	2.93		
51	Mathili	Sunari	1	60	1.00	1.65	0.04	0.17	1.67	0.0089	0.19	0.23	0.10	0.52		
52	Mathili	Tangini	22	60	1.10	1.81	0.96	3.67	33.33	0.3580	4.17	4.66	3.88	12.70		
		Total	528	0	60.69	100.00	0.00	88.00	715.00	9.2374	100.00	100.00	100.00	300.00	3.40	0.95

Table No. 3.23: Biodiversity Assessment of Shrub Species in Mathili Range

SL No	Range	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Mathili	Gangasiuli	2	60	1.00	8.06	0.15	0.33	3.33	1.12	1.55	2.67	1.21	0.62
2	Mathili	Karada	1	60	1.00	8.06	0.07	0.17	1.67	0.56	0.78	1.33		
3	Mathili	Kendu	82	60	1.49	12.01	6.13	13.67	91.67	45.81	42.64	88.45		
4	Mathili	Khirkkit	3	60	1.50	12.08	0.22	0.50	3.33	1.68	1.55	3.23		
5	Mathili	Kurei	2	60	1.00	8.06	0.15	0.33	3.33	1.12	1.55	2.67		
6	Mathili	Kusum	1	60	1.00	8.06	0.07	0.17	1.67	0.56	0.78	1.33		
7	Mathili	Mundi	1	60	1.00	8.06	0.07	0.17	1.67	0.56	0.78	1.33		

8	Mathili	Palasa	1	60	1.00	8.06	0.07	0.17	1.67	0.56	0.78	1.33		
9	Mathili	Piasal	1	60	1.00	8.06	0.07	0.17	1.67	0.56	0.78	1.33		
10	Mathili	Poksunga	74	60	1.42	11.46	5.53	12.33	86.67	41.34	40.31	81.65		
11	Mathili	Siali	11	60	1.00	8.06	0.82	1.83	18.33	6.15	8.53	14.67		
		Total	179	0	12.41	100.00	0.00	29.83	215.00	100.00	100.00	200.00	1.21	0.62

Table No. 3.24: Biodiversity Assessment of Herb Species in Mathili Range

SL No	Range	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Mathili	Poksunga	8	60	1.14	25.42	0.70	1.33	11.67	6.11	6.03	12.14	1.14	0.64
2	Mathili	Bisalyakarani	14	60	1.08	23.96	1.22	2.33	21.67	10.69	11.21	21.89		
3	Mathili	Lajkulilata	50	60	1.02	22.70	4.37	8.33	81.67	38.17	42.24	80.41		
4	Mathili	Duba grass	59	60	1.26	27.92	5.15	9.83	78.33	45.04	40.52	85.56		
		Total	131		4.50	100.00	0.00	21.83	193.33	100.00	100.00	200.00	1.14	0.64

Table No. 3.25: Biodiversity Assessment of Trees Species in Motu Range

SL No	Range	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	BA (M ² /Ha)	RD	RF (%)	RBAF	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Motu	Dhaura	66	44	2.06	3.22	2.44	15.00	72.73	0.8166	9.00	9.76	9.58	28.34	2.82	0.92
2	Motu	Amla	4	44	1.00	1.56	0.15	0.91	9.09	0.0500	0.55	1.22	0.59	2.35		
3	Motu	Arjuna	2	44	1.00	1.56	0.07	0.45	4.55	0.0571	0.27	0.61	0.67	1.55		
4	Motu	Asan	125	44	3.57	5.58	4.62	28.41	79.55	1.5904	17.05	10.67	18.65	46.37		
5	Motu	Bahada	10	44	1.67	2.61	0.37	2.27	13.64	0.0985	1.36	1.83	1.16	4.35		

6	Motu	Barkoli	2	44	1.00	1.56	0.07	0.45	4.55	0.0093	0.27	0.61	0.11	0.99
7	Motu	Bhalia	1	44	1.00	1.56	0.04	0.23	2.27	0.0086	0.14	0.30	0.10	0.54
8	Motu	Bheru	40	44	3.33	5.21	1.48	9.09	27.27	0.2195	5.46	3.66	2.57	11.69
9	Motu	Chakundi	2	44	2.00	3.13	0.07	0.45	2.27	0.0070	0.27	0.30	0.08	0.66
10	Motu	Char	39	44	2.29	3.59	1.44	8.86	38.64	0.2906	5.32	5.18	3.41	13.91
11	Motu	Chauli	4	44	1.00	1.56	0.15	0.91	9.09	0.0363	0.55	1.22	0.43	2.19
12	Motu	Dhaman	5	44	1.25	1.95	0.18	1.14	9.09	0.0410	0.68	1.22	0.48	2.38
13	Motu	Dimiri	1	44	1.00	1.56	0.04	0.23	2.27	0.0161	0.14	0.30	0.19	0.63
14	Motu	Gamhari	3	44	1.50	2.35	0.11	0.68	4.55	0.0239	0.41	0.61	0.28	1.30
15	Motu	Gandhaguria	3	44	1.50	2.35	0.11	0.68	4.55	0.0152	0.41	0.61	0.18	1.20
16	Motu	Gangasiuli	3	44	1.50	2.35	0.11	0.68	4.55	0.0286	0.41	0.61	0.34	1.35
17	Motu	Genduli	2	44	1.00	1.56	0.07	0.45	4.55	0.0117	0.27	0.61	0.14	1.02
18	Motu	Jamu	1	44	1.00	1.56	0.04	0.23	2.27	0.0300	0.14	0.30	0.35	0.79
19	Motu	Jida	2	44	1.00	1.56	0.07	0.45	4.55	0.0076	0.27	0.61	0.09	0.97
20	Motu	Kangada	2	44	2.00	3.13	0.07	0.45	2.27	0.0371	0.27	0.30	0.44	1.01
21	Motu	Karada	51	44	2.83	4.43	1.88	11.59	40.91	0.5449	6.96	5.49	6.39	18.84
22	Motu	Kasi	21	44	1.31	2.05	0.78	4.77	36.36	0.1999	2.86	4.88	2.34	10.09
23	Motu	kendu	61	44	2.26	3.53	2.25	13.86	61.36	0.7863	8.32	8.23	9.22	25.77
24	Motu	Khair	7	44	1.75	2.74	0.26	1.59	9.09	0.0738	0.95	1.22	0.87	3.04
25	Motu	Kusum	11	44	1.38	2.15	0.41	2.50	18.18	0.2054	1.50	2.44	2.41	6.35
26	Motu	Mahula	26	44	1.86	2.90	0.96	5.91	31.82	0.3760	3.55	4.27	4.41	12.22
27	Motu	Mai	51	44	1.96	3.07	1.88	11.59	59.09	0.7252	6.96	7.93	8.51	23.39
28	Motu	Mankada kendu	2	44	1.00	1.56	0.07	0.45	4.55	0.0082	0.27	0.61	0.10	0.98
29	Motu	Mokha	14	44	2.33	3.65	0.52	3.18	13.64	0.1548	1.91	1.83	1.82	5.55
30	Motu	Mundi	7	44	1.17	1.82	0.26	1.59	13.64	0.0406	0.95	1.83	0.48	3.26
31	Motu	Phasi	1	44	1.00	1.56	0.04	0.23	2.27	0.0040	0.14	0.30	0.05	0.49
32	Motu	Piasal	42	44	1.75	2.74	1.55	9.55	54.55	0.5950	5.73	7.32	6.98	20.02
33	Motu	Rai	1	44	1.00	1.56	0.04	0.23	2.27	0.0231	0.14	0.30	0.27	0.71
34	Motu	Rohini	1	44	1.00	1.56	0.04	0.23	2.27	0.0040	0.14	0.30	0.05	0.49
35	Motu	Sidha	11	44	1.38	2.15	0.41	2.50	18.18	0.1404	1.50	2.44	1.65	5.59
36	Motu	Simili	2	44	1.00	1.56	0.07	0.45	4.55	0.0383	0.27	0.61	0.45	1.33

37	Motu	Sisoo	3	44	1.00	1.56	0.11	0.68	6.82	0.0210	0.41	0.91	0.25	1.57		
38	Motu	Sunari	4	44	1.00	1.56	0.15	0.91	9.09	0.0129	0.55	1.22	0.15	1.92		
39	Motu	Tangini	99	44	4.30	6.73	3.66	22.50	52.27	1.1465	13.51	7.01	13.44	33.96		
40	Motu	Telei	1	44	1.00	1.56	0.04	0.23	2.27	0.0315	0.14	0.30	0.37	0.81		
		Total	733	0	63.96	100.00	0.00	166.59	745.45	8.5272	100.00	100.00	100.00	300.00	2.82	0.92

Table No. 3.26: Biodiversity Assessment of Shrub Species in Motu Range

SL No	Range	Species	S(in Nos)	SP (in Nos)	A(in Nos)	RA(%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Motu	Asan	1	44	1.00	7.11	0.13	0.23	2.27	1.75	2.17	3.93	1.61	0.73
2	Motu	Bheru	1	44	1.00	7.11	0.13	0.23	2.27	1.75	2.17	3.93		
3	Motu	Bhuinimba	1	44	1.00	7.11	0.13	0.23	2.27	1.75	2.17	3.93		
4	Motu	Bisalyakarani	2	44	2.00	14.22	0.26	0.45	2.27	3.51	2.17	5.68		
5	Motu	Char	1	44	1.00	7.11	0.13	0.23	2.27	1.75	2.17	3.93		
6	Motu	Dhatiki	1	44	1.00	7.11	0.13	0.23	2.27	1.75	2.17	3.93		
7	Motu	Haldigundi	5	44	1.67	11.85	0.66	1.14	6.82	8.77	6.52	15.29		
8	Motu	Kendu	1	44	1.00	7.11	0.13	0.23	2.27	1.75	2.17	3.93		
9	Motu	Kurei	19	44	1.19	8.44	2.52	4.32	36.36	33.33	34.78	68.12		
10	Motu	Patalgaruda	2	44	2.00	14.22	0.26	0.45	2.27	3.51	2.17	5.68		
11	Motu	Poksunga	23	44	1.21	8.61	3.05	5.23	43.18	40.35	41.30	81.66		
		Total	57		14.06	100.00	0.00	12.95	104.55	100.00	100.00	200.00	1.61	0.73

Table No. 3.27: Biodiversity Assessment of Herb Species in Motu Range

SL No	Range	Species	S (in Nos)	SP (in Nos)	A (in Nos)	RA (%)	Dm	D (Tree/Ha)	F(%)	RD	RF (%)	IVI	H'	λ
			1	2	3	4	5	6	7	8	9	10	12	12
1	Motu	Asan	1	44	1.00	9.42	0.15	0.23	2.27	2.38	2.94	5.32	1.69	0.79
2	Motu	Bantulasi	1	44	1.00	9.42	0.15	0.23	2.27	2.38	2.94	5.32		
3	Motu	Bhuinimba	1	44	1.00	9.42	0.15	0.23	2.27	2.38	2.94	5.32		
4	Motu	Bisalyakarani	6	44	1.50	14.13	0.93	1.36	9.09	14.29	11.76	26.05		
5	Motu	Gayas	1	44	1.00	9.42	0.15	0.23	2.27	2.38	2.94	5.32		
6	Motu	Haldigundi	5	44	1.67	15.70	0.77	1.14	6.82	11.90	8.82	20.73		
7	Motu	Kurei	11	44	1.38	12.96	1.70	2.50	18.18	26.19	23.53	49.72		
8	Motu	Poksunga	15	44	1.07	10.10	2.31	3.41	31.82	35.71	41.18	76.89		
9	Motu	Sidha	1	44	1.00	9.42	0.15	0.23	2.27	2.38	2.94	5.32		
		Total	42		10.61	100.00	0.00	9.55	77.27	100.00	100.00	200.00	1.69	0.79

3.3 Status of Biodiversity Conservation in Forest

3.3.1 Biodiversity is an umbrella term and refers to the variety and variability of all life in the planet. In practice it refers to all species of plants, animals and micro-organisms, the ecosystems and ecological process of which they are parts. Scientifically, biodiversity is considered at three different levels i.e Species diversity (this also includes the interactions between individuals of a species and between different species), Genetic diversity (variations in the genetic constitution of individuals of a species and between different species) and Ecosystem diversity (grasslands, forests aquatic bodies etc) In effect these three levels cannot be separated as a change at one level can bring changes at other levels. The important of diversity lies with the fact that it forms the resource base for agriculture, forestry, medicine and provides food, fodder, wood and fiber, many other utility materials to mankind and provide ecosystem services like pollination, nutrient cycling, air and water purification, climate modification, drought and flood control etc. and has recreational, aesthetic and spiritual value for man.

3.3.2 No systematic scientific study has been carried out in the past in the forests of Malkangiri Forest Division regarding the diversity of life forms. The natural forest possesses myriad of living organisms that are inter- dependent for their survival. So, depletion of one species will adversely affect the population of other species. Present management of forests is aimed at maintaining this symbiotic relationship.

3.3.3 The study conducted in this plan has aimed at knowing the species richness of different flora only. Therefore, it is more appropriate to say it Floristic Diversity instead of Bio-Diversity. With better understanding of interdependence of species, floristic diversity importance has been realized of late. Now each and every tree, herb, shrub, climber, fungi, algae etc. are equally waiting for the scientific research to prove it to be indispensable for the benefit of mankind. Hence emphasis has been laid on the floristic diversity studies in this Plan.

3.3.4 Biological diversity can be quantified in many different ways. The two main factors taken into account when measuring diversity are richness and evenness. Richness is a measure of the number of different kinds of organisms present in a particular area. For example, species richness is the number of different species present. However, diversity depends not only on

richness, but also on evenness. Evenness compares the similarity of the population size of each of the species present.

- **Richness:** It is a measure of the number of species found in a sample denoted by 'S'. The more species present in a sample, the 'richer' the sample, the number of species is divided by the square root of the individuals in the sample. This particular measure of species richness is known as R, the Menhinick's Index

$$R = \frac{S}{\sqrt{N}}$$

Where 's' equals the numbers of different species represented in the sample, and 'N' equals the total number of individual organisms in the sample.

Species richness as a measure on its own takes no account of the number of individuals of each species present. It gives as much weight to those species which have very few individuals as to those which have many individuals. Thus, one Sal Tree has as much influence on the richness of an area as 1000 Piasal Trees.

- **Evenness:** Evenness is a measure of the relative abundance of the different species making up the richness of an area. It is calculated by dividing Shannon's diversity index H by natural logarithm of species richness ln(S)

$$\text{Evenness (E)} = H' / \ln(S)$$

As species richness and evenness increase, so diversity increases. Simpson's Diversity Index is a measure of diversity which takes into accounts both richness and evenness.

Simpson's Index (D) measures the probability that two individuals randomly selected from a sample will belong to the same species (or some category other than species). There are two versions of the formula for calculating **D** either is acceptable, but be consistent.

$$D = \frac{n(n-1)}{N(N-1)} \qquad D = \sum (n/N)^2$$

D refers to Floral-diversity Index which is a ratio and varies from 0 to 1

n = the total number of organisms of a particular species

N = the total number of organisms of all species

The value of D ranges between 0 and 1

With this index, 0 represents infinite diversity and 1, no diversity. That is, the bigger the value of D , the lower the diversity. This is neither intuitive nor logical, so to get over this problem, D is often subtracted from 1 to give:

Simpson's Index of Diversity $1 - D$

The value of this index also ranges between 0 and 1, but now, the greater the value, the greater the sample diversity. This makes more sense. In this case, the index represents the probability that two individuals randomly selected from a sample will belong to different species.

Another way of overcoming the problem of the counter-intuitive nature of Simpson's Index is to take the reciprocal of the Index:

Simpson's Reciprocal Index $1 / D$

The value of this index starts with 1 as the lowest possible figure. This figure would represent a community containing only one species. The higher the value, the greater the diversity. The maximum value is the number of species (or another category being used) in the sample. For example, if there are five species in the sample, then the maximum value is 5.

3.3.5 In this present plan, sixty-five (50) Forest blocks were identified and floristic-diversity surveys have been undertaken in these forests, to develop quantitative baseline floral-diversity indices for these forests. These forest blocks represent all the above defined forest blocks i.e. a) Good Forests; b) Partially Degraded Forests; c) Highly Degraded Forests and d) Scrub Forests. This survey is expected to create a baseline data which could be improved in future. Moreover, this data would even act as a bench mark to study the impact of prescriptions of the current plan. The methodology adopted for carrying out the survey is explained in the foregoing paragraph.

Table 3.28: Floral Diversity Index in the Sampled Forest Blocks

S.No.	Range	Name of the Forest Block	Total No. of Individual Species	Total No. of Species in Sample Plots	Evenness	Richness	Dominance Value	Total Diversity Index
1	Balimela	Balimela	61	487	0.830965742	61	0.053805514	0.946194486
2	Balimela	Chitapari	48	260	0.841268719	48	0.056272189	0.943727811
3	Balimela	Konangi	18	22	0.973994061	18	0.066115702	0.933884298
4	Balimela	Matamkonda	70	790	0.792023530	70	0.053254286	0.946745714
5	Balimela	Tarlakota	64	215	0.893607686	64	0.033466739	0.966533261
6	Chitrokonda	Badakonda	9	17	0.978534578	9	0.121107266	0.878892734
7	Chitrokonda	Bandhuguda	10	10	1.000000000	10	0.100000000	0.900000000
8	Chitrokonda	Banguru	7	7	2.000000000	7	0.142857143	0.857142857
9	Chitrokonda	Bhimram	31	142	0.890524882	31	0.059908748	0.940091252
10	Chitrokonda	Dantunguda	19	95	0.869408745	19	0.095401662	0.904598338
11	Chitrokonda	Mantriput	13	22	0.959437521	13	0.095041322	0.904958678
12	Chitrokonda	Sileru West	44	254	0.864310725	44	0.054529109	0.945470891
13	Chitrokonda	Singaram	46	157	0.909222377	46	0.041097002	0.958902998
14	Kalimela	Bapanpalli	20	43	0.935980330	20	0.071930773	0.928069227
15	Kalimela	Gamphakonda	26	103	0.880310380	26	0.075501932	0.924498068
16	Kalimela	Mandapali	23	135	0.857595801	23	0.087078189	0.912921811
17	Kalimela	Mangipalli	14	35	0.938000889	14	0.095510204	0.904489796
18	Kalimela	Pedawada	20	68	0.924894688	20	0.074394464	0.925605536
19	Kalimela	Pulimetla	17	59	0.940781343	17	0.078425740	0.921574260
20	Kalimela	Udayagiri	52	626	0.833145215	52	0.051613265	0.948386735
21	Kalimela	Udayagiri-B	12	28	0.907522571	12	0.125000000	0.875000000
22	Kalimela	Venkatpalam	15	96	0.895075982	15	0.111328125	0.888671875

23	Kalimela	Yenugalkonda	24	66	0.920243593	24	0.068411387	0.931588613
24	Malkangiri	Akuru	8	16	1.833333333	8	0.312500000	0.687500000
25	Malkangiri	Cheruguda	9	17	0.911551355	9	0.162629758	0.837370242
26	Malkangiri	Jhileruguda	27	89	0.858270683	27	0.087236460	0.912763540
27	Malkangiri	Koilipari	20	54	0.900381471	20	0.085048011	0.914951989
28	Malkangiri	Korkunda	8	12	0.917209722	8	0.180555556	0.819444444
29	Malkangiri	Namkonda	8	21	0.939985966	8	0.160997732	0.839002268
30	Malkangiri	Giridhidangara	11	13	0.963938447	11	0.112426036	0.887573964
31	Malkangiri	Sindhimal	27	87	0.901270560	27	0.068304928	0.931695072
32	Mathili	Champajharna	12	17	0.951311834	12	0.107266436	0.892733564
33	Mathili	Chedenga	21	61	0.946343367	21	0.066917495	0.933082505
34	Mathili	Gotiguda	13	18	0.965407228	13	0.092592593	0.907407407
35	Mathili	Malidanger	18	33	0.966191572	18	0.067033976	0.932966024
36	Mathili	Pitatunga	44	291	0.864008503	44	0.052302169	0.947697831
37	Mathili	Putparbata	14	26	0.915250715	14	0.109467456	0.890532544
38	Mathili	Sarangapalli	44	406	0.823245254	44	0.069766313	0.930233687
39	Motu	Anantapalli	20	79	0.932673790	20	0.070982214	0.929017786
40	Motu	Dupenkonda	16	38	0.901583586	16	0.101108033	0.898891967
41	Motu	Kattanalli B	8	19	0.968435925	8	0.141274238	0.858725762
42	Motu	Mallavarham	9	33	0.892588004	9	0.171717172	0.828282828
43	Motu	Manyamkonda	20	36	0.958276972	20	0.063271605	0.936728395
44	Motu	Motu	16	64	0.797131859	16	0.149902344	0.850097656
45	Motu	Pendikonda	9	11	0.976614669	9	0.123966942	0.876033058
46	Motu	Poluru	6	16	0.864019727	6	0.250000000	0.750000000
47	Motu	Pusigudam	24	276	0.806781509	24	0.103287125	0.896712875
48	Motu	Serikonda	14	44	0.9338	14	0.09814050	0.90185950
49	Motu	Tadimetla	23	169	0.843117735	23	0.109134834	0.890865166
50	Motu	Tamanpalli	20	47	0.935585810	20	0.073789045	0.926210955

3.3.6 The floral diversity survey has been carried out based on the grid-based sampling method as discussed in the foregoing paragraph 3.2.3 Total number of sample plots for the purpose is not fixed for any forest blocks. The number and names of all the species were meticulously recorded. Recorded data included name of the species and its total enumeration subject to stage of establishment. All the trees having diameter 10cm and above were enumerated. For shrubs, individuals having a diameter 2 to 9.9cm were measured and recorded. In case of herbs, individuals below 2cm collar dia were measured and recorded. In fact, the counted species included trees, shrubs, herbs/grasses and climbers.

The identification of some of the species was undertaken with the help of knowledgeable local villagers, traditional healers and botanists. In all, total individual species identified and taken for the survey are 137(One hundred thirty-seven). The floral diversity index has been calculated taking in all 137 numbers of individual species.

3.3.7 The Species diversity survey results for those 50 (Fifty) forest blocks along with dominance value of individual enumerated species forest block wise is reflected at **Appendix IIB**. In fact, the dominance value of a particular species in the sampled forest block has been calculated by taking average of that species occurred in all the sample plots of that forest block. Accordingly, even the floral diversity index of the said sample forest block has been calculated. However, forest block wise floral diversity survey and Index is summarized in Table No. 3.28. Further, an average baseline Floral-Diversity Index has also been prepared for the entire division. The result of this analysis is reflected below in Table No. 3.29.

Table No. 3.29: Floral Diversity Index in the Entire Division

S.No.	Name of the Species	Number of Individual Species (n i)	Dominance Value (ni /N) ²	S.No.	Name of the Species	Number of Individual Species (n i)	Dominance Value (ni /N) ²
1	Acacia	0.28	1.72507E-07	70	Jhadu	0.12	3.22072E-08
2	Achhu	2.05	9.15559E-06	71	Jida	1.50	4.92367E-06
3	Ada (Ambakasi)	0.08	1.29485E-08	72	Kadamba	0.05	4.52128E-09
4	Amba	3.19	2.22147E-05	73	Kanchan	1.57	5.37106E-06

5	Amla	8.20	0.00014729	74	Kanchana Barada	0.03	2.60202E-09
6	Anantamula	0.61	8.10391E-07	75	Kangada	5.40	6.3753E-05
7	Ankaranti	0.17	6.58378E-08	76	Kanteikoli	2.51	1.38099E-05
8	Ankula	0.11	2.71595E-08	77	Kapasia	0.02	8.4133E-10
9	Apamaranga	0.54	6.33759E-07	78	Karada	34.33	0.002579216
10	Arakha	0.07	1.04081E-08	79	Karanja	1.21	3.22041E-06
11	Arjuna	1.35	4.00022E-06	80	Kasi	14.97	0.000490415
12	Asan	63.51	0.008825359	81	Katakala	0.03	2.60202E-09
13	Aswatha	0.78	1.32993E-06	82	kendu	73.95	0.011966538
14	Atundi	0.15	4.60896E-08	83	Khaira	4.11	3.6948E-05
15	Babul	0.06	7.43582E-09	84	Khajuri	0.09	1.80851E-08
16	Bahada	4.60	4.63963E-05	85	Khakada	2.54	1.4068E-05
17	Balunga	0.09	1.90969E-08	86	Khirkkit	1.00	2.1883E-06
18	Bana kolotho	0.05	4.52128E-09	87	Khirkoli	0.18	6.9161E-08
19	Banchakunda	0.21	9.46013E-08	88	Kochila	0.63	8.77751E-07
20	Bandhan	4.18	3.82963E-05	89	Kodala	1.72	6.44796E-06
21	Banhaldi	1.49	4.84268E-06	90	Kumar chikni	0.32	2.28498E-07
22	Bani	0.03	2.60202E-09	91	Kumbhi	1.25	3.42494E-06
23	Bantulasi	1.60	5.58127E-06	92	Kurei	11.48	0.000288382
24	Bara	0.18	7.46278E-08	93	Kusum	20.46	0.000915723
25	Barabakulia	1.56	5.30202E-06	94	Lajkulilata	14.10	0.000435324
26	Barkoli	1.51	4.97828E-06	95	Madanga	0.08	1.29485E-08
27	Barun	0.06	7.57197E-09	96	Mahala	0.04	4.32257E-09
28	Batra	0.02	1.24053E-09	97	Mahula	15.34	0.000514955
29	Bela	2.34	1.19852E-05	98	Mai	23.52	0.001211003
30	Benta	0.03	2.60202E-09	99	Mankada kendu	1.28	3.57453E-06
31	Bhalia	1.94	8.22376E-06	100	Mokha	4.30	4.03677E-05
32	Bheru	13.44	0.000395542	101	Mundi	23.29	0.001187405
33	Bhuinimba	9.88	0.000213581	102	Mundica	0.41	3.73744E-07
34	Bija	0.05	5.47075E-09	103	Mutha Grass	0.03	2.60202E-09
35	Bisalyakarani	4.42	4.27527E-05	104	Nagairi	0.13	3.95597E-08
36	Chadheigudi	0.03	2.60202E-09	105	Neem	0.31	2.07176E-07
37	Chakundi	0.30	1.95826E-07	106	Pahadi Sisoo	1.10	2.62492E-06
38	Char	22.45	0.001103248	107	Palasa	1.30	3.70218E-06
39	Chauli	0.58	7.45382E-07	108	Panigamhar	0.07	1.04081E-08
40	Chhuinpatali	0.08	1.29485E-08	109	Panikusum	0.31	2.12184E-07
41	Chikini	0.05	4.52128E-09	110	Patalgaruda	0.72	1.13372E-06

	Kalachua						
42	Damkuruda	0.12	3.33071E-08	111	Patragundi	0.03	2.60202E-09
43	Dhalasiris	0.44	4.26576E-07	112	Phasi	0.42	3.85496E-07
44	Dhaman	5.54	6.70571E-05	113	Phula jhadu	0.38	3.12993E-07
45	Dhatiki	0.86	1.63394E-06	114	Piasal	24.33	0.001295692
46	Dhaura	45.12	0.00445519	115	Poksunga	44.90	0.004411046
47	Dhauranga	0.03	2.60202E-09	116	Rai	3.63	2.88822E-05
48	Dimiri	1.58	5.46642E-06	117	Rohini	1.67	6.07861E-06
49	Duba grass	10.59	0.000245376	118	Sabai grass	0.06	7.57197E-09
50	Gamhari	5.21	5.93279E-05	119	Sahada	1.40	4.26432E-06
51	Gandhaguria	2.00	8.75319E-06	120	Sal	3.32	2.4056E-05
52	Gandhara	0.05	4.52128E-09	121	Salai	0.08	1.3632E-08
53	Gangasiuli	9.91	0.000214969	122	Salapa	0.31	2.07176E-07
54	Gayas	0.50	5.47075E-07	123	Salaparni	0.08	1.29485E-08
55	Gayatulasi	0.07	9.72577E-09	124	Saptapheni	0.02	1.08064E-09
56	Genduli	1.80	7.12635E-06	125	Satavar	2.15	1.01254E-05
57	Ghanta	0.17	6.07861E-08	126	Siali	3.93	3.37412E-05
58	Ghodalanjia	0.04	4.12509E-09	127	Sidha	8.74	0.00016716
59	Ghontol	0.14	4.46592E-08	128	Simuli	4.25	3.94537E-05
60	Gudamari	0.19	7.76141E-08	129	Siris	3.21	2.25358E-05
61	Guguchia	0.59	7.59798E-07	130	Sisoo	5.80	7.34892E-05
62	Haladi	1.00	2.1883E-06	131	Sunaragada	0.24	1.30758E-07
63	Halda	0.33	2.43144E-07	132	Sunari	3.91	3.33982E-05
64	Haldigundi	2.24	1.0944E-05	133	Tala	0.04	4.32257E-09
65	Haldu	0.78	1.31464E-06	134	Tangini	49.33	0.005324578
66	Harida	3.45	2.60311E-05	135	Teak	0.65	9.17795E-07
67	Indrajai	0.06	7.43582E-09	136	Telei	0.33	2.43144E-07
68	Jamu	1.58	5.49442E-06	137	Tentuli	0.17	6.16392E-08
69	Jari	0.03	2.60202E-09		Total	675.92	0.047279557

(Source: Field Data and Analysis)

3.3.8: The Divisional Floral Diversity Index is calculated as follows: -

Number of Individual Species = 137 (i varying from 1 to 137)

Total of All Species (N) =1132

Total Dominance Value $(n_i / N)^2 = 0.014646469$

Divisional Floral Diversity Index **(D)** = $1 - [\sum (n_i / N)^2]$

$$D = 1 - 0.014646469$$

$$D = 0.985353531$$

3.3.9 Analysis of the Floral Diversity Indices of the Sampled Forest blocks at Table No: 3.28 reveal that the floral diversity is maximum in Tarlakota RF which is a partly degraded forest with majority miscellaneous species. Similarly, in case of Akur RF, the diversity index is the least. This forest block is degraded and plantation was taken up in this area under CAMPA during 2013-14. On detail examination of the growing stock of these two forest blocks, it is found that the species Sal is in Akur RF resulting in less diversity index of different species in the said block where as number of miscellaneous species are evenly distributed in Taralakota RF & hence, higher floral diversity index in the said block is justified. In case of species evenness Banguru RF stands top as compared to other forest blocks with very low richness, where as in Matumkonda PRF the species richness is very high.

3.3.10 Another observation is that high biodiversity index is observed in different degraded forest blocks such as Singaram PRF, Udayagiri RF, Pitatung PRF, Matumkonda PRF, Balimela PRF & Sileru- West RFetc. Partially degraded and completely degraded forest blocks have open canopy at many places. This open canopy helps in the availability of ample sunlight that has resulted in the growth of number of weeds, grasses, and thorny species besides draught hardy and other light demanding species. Because of the presence of such species, the diversity index is observed to be high in all these forests. However, the continued unchecked biotic interference ultimately leads to drastic reduction in the diversity of the forest area affecting both the floral & faunal structure. In fact, the ever-increasing uncontrolled biotic pressure has resulted in decline in the overall biodiversity of the Division. It needs to be checked forthwith.

3.4 Status of Species Prone to Over Exploitation:

3.4.1 The Malkangiri Forest Division has medicine plants of important subjected to over exploitation. Important among them were Lodha, Bhuineem, and Patalgaruda etc. No species will be preferred at the cost of any other species. All species are to be given equal importance for conservation of species biodiversity and development of the Forest. The emphasis of management is on conservation of balanced forest in which the natural selection of species will be encouraged. The fruit bearing and important NTFP species such as Mahula, Anla, Kendu, Harida, Bahada, Tamarind, Chara and Bela will not be felled.

Suggestion of the Gram Panchayat where Biodiversity Management Committees shall be constituted under biodiversity Act, 2002 and Biodiversity Rules 2004 should be taken up. Step should be taken to constitute Biodiversity management Committees where it is not constituted.

Table No. 3.30: Details of Biodiversity Management Committee Member List of GPs of Malkangiri District

Sl No	Name of Block	Sl No	Name of Gram Panchayat	Details member list of BMC	Remarks
1	Korukonda	1	Korukonda	Yes	
2		2	Tarлакota	Yes	
3		3	Chitapari-iii	Yes	
4		4	Potrel	Yes	
5		5	Tumusapalli	Yes	
6		6	Dudameta	Yes	
7		7	Kamwada	Yes	
8		8	Nilakamberu	Yes	
9		9	Old-Chimtapalli	Yes	
10		10	Mariwada	Yes	
11		11	Samnathpur	Yes	
12		12	Nakamamudi	Yes	
	Total		12	12	12/12
13	Malkangiri	1	Birlaxmanpur	Yes	
14		2	Markapalli	Yes	
15		3	Serpalli	Yes	
16		4	Pedakonda	Yes	
17		5	Jharapalli	Yes	
18		6	Padmagiri	Yes	
19		7	Udupa	Yes	
20		8	Sindrimala	Yes	
21		9	Goudaguda	Yes	

22		10	Tamasa	Yes	
23		11	Pandripani	Yes	
24		12	Gongola	Yes	
25		13	Pedawada	Yes	
26		14	Sikhapalli	Yes	
27		15	Gorakhunta	Yes	
28		16	Matapaka	Yes	
29		17	Tandapalli	Yes	
30		18	Tandiki	Yes	
31		19	Chalanguda	Yes	
	Total		19	19	
32	Kalimela	1	Motu	Yes	
33		2	Pusuguda	Yes	
34		3	Bhubanpalli	Yes	
35		4	Tandabai	Yes	
36		5	Maharajpalli	Yes	
37		6	Malavaram	Yes	
38		7	Lugel	Yes	
39		8	Tigal	Yes	
40		9	Manyamkonda	Yes	
41		10	Telrai	Yes	
42		11	Nalagunthi	Yes	
43		12	Kalimela	Yes	
44		13	Koimetla	Yes	
45		14	Bodigeta	Yes	
46		15	Venkatpalam	Yes	
47		16	Chintalwada	Yes	
48		17	Gumuka	Yes	
49		18	Chitrangpalli	Yes	
50		19	Bodili	Yes	

51		20	Mandapalli	Yes	
52		21	Gompakonda	No	
53		22	Bhejangiwada	No	
54		23	Kangurukondaa	No	
		Total	23	20	20/23
55	Mathili	1	Kartanpalli	Yes	
56		2	Salimi	Yes	
57		3	Bhejaguda	Yes	
58		4	Chaulmendi	Yes	
59		5	Dhungiaput	Yes	
60		6	Pangam	Yes	
61		7	Kianga	Yes	
62		8	Dalapatiguda	Yes	
63		9	Ambaguda	Yes	
64		10	Kamarpalli	Yes	
65		11	Mahupadar	Yes	
66		12	Nayakguda	Yes	
67		13	Mathili	Yes	
68		14	Chedenga	Yes	
69		15	Mecca	Yes	
70		16	Kotapalli	Yes	
71		17	Bhandari Pangam	Yes	
72		18	Kutunipalli	Yes	
73		19	Temurupalli	Yes	
74		20	Udulibeda	Yes	
	Total		20	Yes	20/20
75	Podia	1	Niliguda	Yes	
76		2	Materu	Yes	
77		3	Podia	Yes	
78		4	Bapanpalli	Yes	

79		5	Kaldapalli	Yes	
80		6	Similibanchha	Yes	
81		7	Girkanpalli	Yes	
82		8	Undrukonda	Yes	
	Total		8	8	8/8
83	Chitrakonda	1	Andrapalli	Yes	
84		2	Kapatuti	Yes	
85		3	Kurmanur	Yes	
86		4	Gajalmamudi	Yes	
87		5	Gunthawada	Yes	
88		6	Chitrakonda	Yes	
89		7	Tunnel-camp	Yes	
90		8	Doraguda	Yes	
91		9	Dhuliput	Yes	
92		10	Nuaguda	Yes	
93		11	Papulur	Yes	
94		12	Papermetla	Yes	
95		13	Badapada	Yes	
96		14	Badapadar	Yes	
97		15	Jantri	Yes	
98		16	Jodambo	Yes	
99		17	Ralegada	Yes	
100		18	Panasput	No	
		Total	18	17	17/18
101	Khairput	1	Badadural	Yes	
102		2	Govindpalli	Yes	
103		3	Kadamguda	Yes	
104		4	Khairput	Yes	
105		5	Madkapadar	Yes	
106		6	Kudukulugumma	Yes	

107		7	Parkanmala	Yes	
108		8	Rasabeda	Yes	
109		9	Andrahal	No	
110		10	Mudulipada	No	
111		11	Podaghat	No	
		Total	11	8	8/11
	Grand Total		111	104	104/111

3.5 Conservation of Genetic Resources: -

3.5.1 The genetic resource of the forest is an invaluable asset that needs to be studied in details. The documentation of the flora and fauna of the Division should be taken at the earliest with the help of experts in the field. The Research Wing of the Department needs to identify areas of high biodiversity in collaboration with the Territorial Wing and to carry out research and documentation of the species available.

The Forest of Malkangiri Division contains large number of species which yield a variety of Non –Timber Forest Produce (NTFPs). The huge demand for a few varieties of NTFPs is resulting unsustainable and destructive exploitation of these resources by the primary collectors which is abetted by Traders and local purchasers. No systematic study has been done in the past in the Division to assess the potentiality production of various NTFPs and to ascertain impact of collection of such NTFPs on sustainability of Forest.

There is no identified Medicinal Plants Conservation Area in Division of Malkangiri. Medicinal plants are site specific and adapted to particular Climate zone. The Medicinal properties of these plants and their uses, regarding various ailments are known to the traditional healers. The State Medicinal Plantation Board, Odisha has taken up many projects for the Conservation and propagation of medicinal plants, creation of proper market linkage between primary cultivators /collectors and pharmaceutical industry. The important Medicinal Plants are Amla, Harida, Bahada, Patal Garuda, Aswagandha, Bhuin neem, Gudmari, Satabari, and Gheekuanri etc. The Plantation Manual 1977 shall be followed while carrying out this plan.

3.6 Fauna and Their Habitats

3.6.1 Malkangiri Division is one of the new Divisions in Odisha, which was managed from October, 2003 onwards. The forest of this Division was safe habitat for varieties of wild life in the past, since human population was minimum. It was once the abode of several carnivorous and herbivorous animals. Due to continuous traditional shifting cultivation, increase in population, tree removal, construction of new roads, poaching, fire, wild life population is depleting fast. Wildlife population is also decreasing due to many other reasons i.e. increase in encroachment, demand on forests for fuel-wood, inadequacy of forest staff to combat poaching, lack of awareness among local people.

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 implement these special habitats especially in the areas coming under the Selection working Circle.

However, some habitat still exists as paradise of wild animals. These habitats are ideal for many wild animals like Leopard, Sloth Bear, Barking deer, Hyena, jackel, Fox, Wild boar, Porcupine, Pangolin, Rabbits, Rats and others. The detail list of wild animals i.e, Mammals, Aves, Fishes, and Reptiles of this division is given in glossary.

3.6.2 Habitats and Microhabitats of flagships wild species: A wild habitat has four basic components viz; food, covers, water and space.

- **Food:** Food is essential pre-requisite for any organism. Food availability in a habitat changes with season. Herbivores depend on the plant materials for their sustenance where as carnivores survive on the availability of prey animals. The quantity, quality and the spatial distribution of food are very important in a habitat.
- **Cover:** It can be considered as a variation seen in a habitat, which affords protection to animals from weather, predators by offering a better vantage point. Various type of cover could be refuge cover, ambush cover, loafing cover, breeding cover and roosting cover for birds.

- **Water:** Water replenishment is essential for all wild animals. Presence of abundant food in a habitat is rendered useless, if water is not available in close proximity. A habitat becomes poor from the wildlife point of view if it is devoid of water source.
- **Space:** Animals require physical space to live; its day to day requirements like procurement of food, cover, water and mates are met from this space.

Microhabitats: Habitat richness is dependent upon the size of the forest stands or the types of habitat which come together in the edge area. An edge is the place of contact between plant communities or successional stages. Habitat richness is also closely linked with the amount of contrast seen in an edge; more the contrast, greater will be the animal richness. Such a contrast can be very significant if an early successional stage is combined with a later one in a habitat. Snags are extremely important in wildlife management, since they are used by many wild animals in their day to day activity. Many species of fungi, mosses and lichens use decayed wood as a substratum for growth; invertebrates use the space, which are present in between the bark and timber, as a habitat. Birds excavate cavities, or use the existing ones for nesting, roosting or even perching. Mammals use them as dens or as escape cover; sometimes, they are also used by bats for their roosting. Each stage of snag succession is of importance to a particular wild animal in a habitat. The dead and down woody materials, on the floor of a forest, has many valuable functions in a wildlife habitat. The trunks of dead and downy trees constitute a source of food for certain birds like wood-peckers; the branches may be used as perches by some birds, and in case they are hollow, these cavities are used for nesting purposes also by many arboreal species. The root portion is also used by many partridges for nesting; small vertebrates and invertebrates use the space between the bark and the woody materials as a habitat. Many wild animals use the fallen logs for a number of purposes; generally, they take shelter using covers sometimes, use them as sites for feeding or reproduction. Some habitats are unique in the sense that they are constituted by certain geomorphic apart from plant communities. These unique habitats are usually constituted talus and caves. Cliffs provide considerable physical protection and concentrated large number of birds, reptiles and mammals. If a cliff is located at a considerable height, it is considered as more suitable. Many fissures may be used by bats for roosting, reproduction or hibernation. Shallow caves are used by many animals, mammals; many carnivores, including tiger, use such caves as the shelter and reproduction;

lizards and snakes also prefer them for the purpose of hibernation and feeding. These features get an added value if they are in vicinity of the permanent water source. Many raptorial birds depend on the presence in cliffs for their survival. Caves provide total darkness. Some bats survive because presence of caves, which serve as their breeding habitat. Large concentration seen in the talus and they include snakes, birds and small mammals. Sufficiently large to provide enough living space for the animals should be needed and also have considerable depth, because some animals may prevent occupying it while seeking the right conditions of humidity and temperature. They move down forest site that harbour diverse avian fauna, constitutes an important biodiversity and riparian.

3.6.2.1 The life form description of wild animals is furnished below.

Table No. 3.31: Reproduction and Feeding Habit of Wild Animals

Sl. No.	Reproduction	Feeding	Species
01	Underground burrows	On ground or below it	Porcupine, fox, field mice
02	In burrows	On ground, trees, water of air	Birds-King Fisher
03	In dens	On ground	Sloth bear, Jackel, Hyena, leopard
04	Cliffs, overhangs, caves	On ground or air	Bats, reptiles, lizards, birds
05	On the Ground	On the Ground	Barking deer, Wild boar, Jungle cats, jungle fowl, peafowl, snakes and lizards
06	On the Ground	On the Ground & trees	Rhesus monkey, Langur, Birds
07	On the trees among branches	On the ground, trees, water or air	Squirrels, Birds
08	On the trees in natural hollows or ground	On ground, trees	Lizards, birds-Owl, Snakes, hornbills
09	On trees in own excavated cavities	On ground, trees or air	Birds-woodpeckers
10	On trees in cavities excavated by other species	On ground, trees or air	Birds-mynas, parakeets
11	Marshy area, water banks	On ground, or water	Aquatic birds

3.6.3 Division Census Reports:

3.6.3.1 The Division has conducted the census of different animals like leopard, Sloth bear, barking deer and birds in different years. The details of the census conducted of different animals are given below.

Table No. 3.32: Details of the Wildlife Census Conducted from 2010 to 2016

Sl No	Year	Name of the Animals	Numbers	
			Direct Sign	Indirect Sign
1	2010	Bear	85	0
2		Hyena	80	0
3		Monkey	305	0
4		Longur	459	0
5		Fox	471	0
6		Rabbit	270	0
7		Wild Pig	35	0
8		Deer	81	0
9		Peacock	55	
		Total	1841	0
1	2014	Bear	27	286
2		Hyena	02	23
3		Fox	32	138
4		Wild Pig	151	15
5		Wolf	10	60
6		Porcupine	04	0
7		Deer	11	0
8		Wild dog	4	0
9		Monkey	1256	0
10		Wild cat	61	0
		Total	1558	522
1	2016	Bear	30	270
2		Hyena	04	25
3		Fox	40	140
4		Wild Pig	55	20
5		Wolf	15	70
6		Rabbit	325	0
7		Deer	20	0
8		Wild dog	03	0
9		Monkey	1352	0
10		Wild cat	40	0
		Total	1884	525

3.6.3.2 Bird Census: The Malkangiri Forest Division has done survey of birds in different wet lands of the Division i.e mainly Six Water body. The name of the six water bodies are Satiguda Dam of Malkangiri Range, Shibasagar Pond of Mathili Range, Fishery pond of Kalimela Range, Balimela Reservoir of Balimela Range, Balimela Reservoir-II of Chitrakonda Range and Saberi River of Motu Range. It seems that in the survey the numbers of birds sighted are very poor except few categories compared to the availability in the Division. The result of the survey is given in the Table No-3.33.

Table No. 3.33: Result of Bird Census in Malkangiri Forest Division

Sl No	Species	Year									
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
01	Indian Shag	00	00	44	00	325	256	276	967	1073	915
02	Little Cormorant	180	96	389	128	167	1142	327	785	531	771
03	Great Cormorant	35	186	45	23	05	98	86	138	206	182
04	Indian Pond Heron	153	251	224	187	286	269	139	287	224	316
05	Cattle Egret	113	70	75	56	18	36	57	147	110	102
06	Little Egret	803	732	338	659	158	202	47	40	38	28
07	Lesser Whistling Duck	80	70	269	46	175	54	50	56	48	323
08	Common Sandpiper	00	00	00	08	19	21	16	00	00	00
09	River lapwing	01	00	00	00	00`	06	02	00	00	02
10	White breasted kingfisher	00	00	27	10	04	00	00	00	15	00
11	Purple Swamp hen	00	00	135	48	67	105	58	00	00	00
12	Marsh Sandpiper	00	00	42	00	00	02	15	166	188	96

13	Great Crested Grebe	00	00	00	00	00	00	00	00	12	09
14	Little Grebe	708	190	785	309	141	980	1020	441	458	520
15	Black-necked Grebe	00	00	00	00	00	00	24	00	115	104
16	Red-necked Grebe	00	00	70	00	00	02	00	1222	1028	574
17	Water Cock	623	540	00	520	08	00	72	06	36	00
18	Black ibis	15	02	20	23	20	14	46	45	69	11
19	Black strok	00	00	00	25	00	00	15	00	06	00
20	Black-necked strok		00	00	00	00	00	00	00	08	73
21	Great Egret	127	10	320	61	54	606	409	172	265	166
22	Intermediate Egret	05	12	00	00	00	00	172	349	328	114
23	White breasted water hen	00	678	632	657	42	00	43	21	08	00
24	Common Crane	00	00	00	08	65	00	14	16	12	03
25	Red Wattled Lapwing	00	00	00	00	00	07	00	32	24	32
26	Black –necked Crane	00	00	00	00	00	00	07	135	78	00
27	Blue king fisher	00	00	00	04	01	00	00	00	5	00
28	Demoiselle Crane	00	00	00	00	00	00	00	00	118	104
29	Common Snipe	04	00	00	09	00	00	50	14	55	05
30	White Strok	00	00	00	00	00	79	60	126	138	89
31	Large Whistling Duck	00	27	00	00	00	00	38	182	134	323
32	Mallard	00	00	00	00	00	00	32	00	27	22
33	Grey Heron	53	80	00	10	10	00	02	00	18	00

34	Brown Crane	00	00	00	00	00	00	00	00	64	46
35	Common Poached	08	06	00	29	32	00	38	28	32	42
36	Purple Heron	82	51	00	30	35	20	04	17	00	07
37	Black-headed (white) ibis	00	00	00	00	00	06	00	00	00	11
38	Bar-headed Geese	10	00	00	00	00	08	00	00	00	00
39	Common coot	47	109	138	25	17	00	00	00	00	00
40	Common Shellduck	71	65	40	65	12	00	00	00	00	00
41	Indian Common Teal	77	149	30	70	04	00	00	00	00	00
42	Northen Shovler	12	09	00	00	06	00	00	00	00	00
43	Great White Telicom	00	00	00	00	08	00	00	00	00	00
44	Glossy ibis	00	05	00	00	00	00	00	00	00	00
45	Pheasant-tailed jacana	27	23	00	00	00	00	00	00	00	00
46	Sarasa	00	35	00	00	00	00	00	00	00	00
47	Northern pintail	05	07	00	00	00	00	00	00	00	00
48	Oriental Darter	15	00	00	00	00	00	00	00	00	00
49	Painted strok	34	00	00	00	00	00	00	00	00	00
50	Asian Open Bill	00	00	22	00	00	00	00	00	00	00
	G.Total	3308	3468	3645	3010	1685	3913	3139	5424	5471	4074

3.6.3.3 Tiger and Leopard Census: This census was conducted in the Division during the year 2004, 2010, 2012 and 2016. The results are given in the Tables.

Table No. 3.34: Tiger/Leopard Census Report during the Year 2006

Name of the Range	Beat	Species	Pugmarks	Total	
Malkangiri	Sindrimal	Leopard 1 no & 1no Cub	Direct Sign	2	
	Padmagiri	Leopard		1	
Kalimela	Kalimela	1			
Mathili	Badadural	1			
Balimela	Nilakamberu	Leopard		1	
	Chitapari	Leopard		1	
	Kanangi	Leopard		1	
	Somanathpur	Leopard		1	
	Dyke-I	Leopard		1	
	Balimela	Leopard		2	
	Dyke-II	Leopard		1	
	Chitrkonda	Jantapai		Tiger	1
				Leopard	1
Papermetla		Tiger		1	
		Leopard		1	
Panasput		Tiger		1	
		Leopard		1	
G.Total				19	

Table No. 3.35: Tiger/ Leopard Census Report During the Year 2010

Name of the Range	Beat	Species	Pugmarks	Total
Mathili	Mudulipada	Leopard	Direct Sign	1
	Godiali	Leopard		1
Kalimela	Sudhakhunta	Leopard		1
	Sabulur	Leopard		1
Balimela	Nilakamberu and Dyke-III	Leopard		1
	Chitapari	Leopard		1
	Parkanmal	Leopard		1
	Somanathpur	Leopard		1
G.Total				8

Table No. 3.36: Tiger/Leopard Census Report during the Year 2014

Name of the Range	Beat	Species	Pugmarks	Total
Mathili	Mudulipada	Leopard	Indirect Sign	1
	Godiali	Leopard		1
Kalimela	Sudhakhunta	Leopard		1

	Sabulur	Leopard		1
Balimela	Nilakamberu	Leopard		1
	Somanathpur	Leopard		1
Chitrakonda	Jantapai	Leopard		1
	Masuriguda	Leopard		1
G.Total				8

Table No. 3.37: Tiger/ Leopard Census Report During the Year 2016

Name of the Range	Beat	Species	Pugmarks	Total
Mathili	Mahupadar	Leopard	Direct Sign	1
	Nunkhari	Leopard		1
Kalimela	Sudhakhunta	Leopard		1
Chitrakonda	Papermetla	Leopard		1
	Masuriguda	Leopard		1
G.Total				5

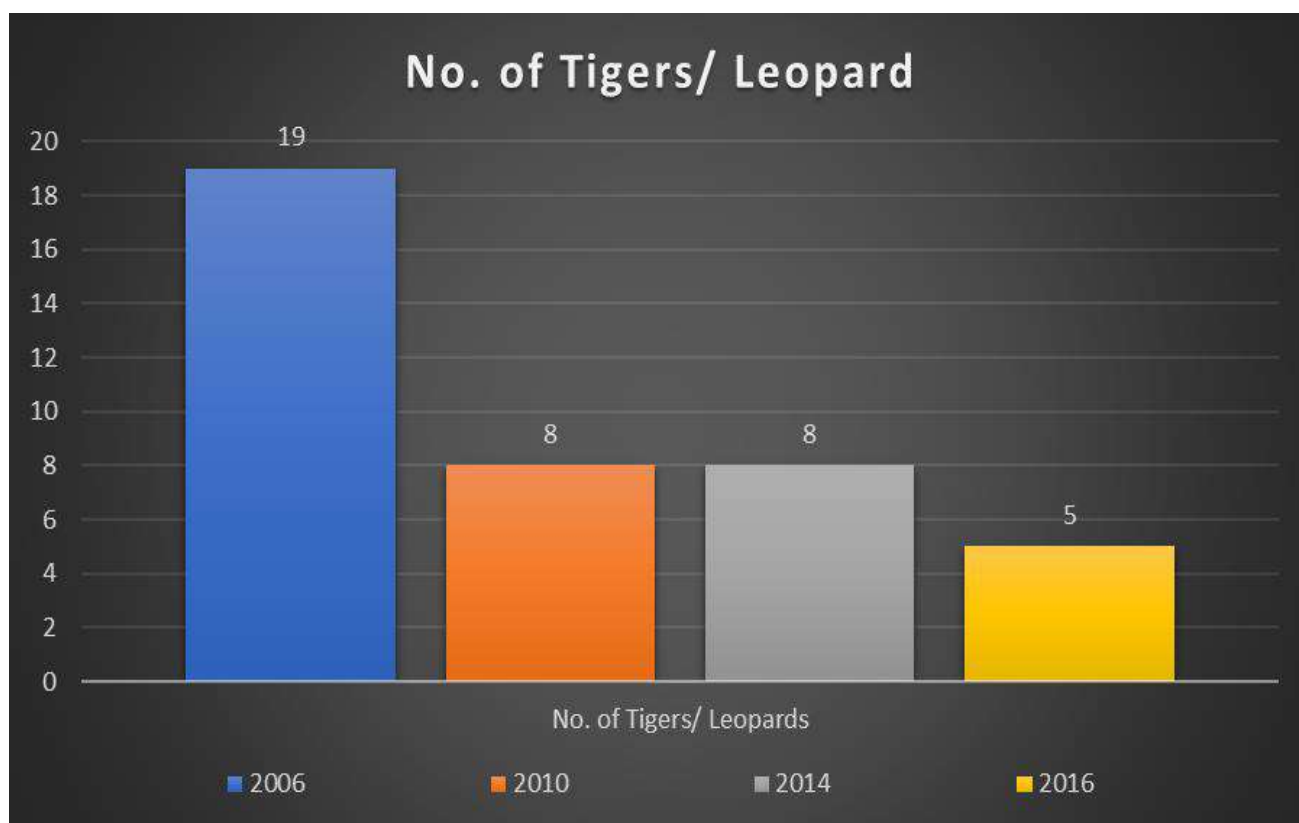


Fig. No. 3.3: Trends of Nos. of Tigers/ Leopard over the Years

3.7 Threats and Challenge to Wildlife:

3.7.1 Human interference: The main factor causing injury to wild animals are degradation in habitat due to grazing and shifting cultivation. Human interference is low, but podu cultivation severely affects fauna i.e direct destruction, fragmenting the habitat as well as reducing the availability of food. This is the only major factor which poses challenge to the manager. Poaching of animals for its meat, trophies, skins and other animal products are also other factors.

Mass hunting during Chaitra Parba is the major practice of threat to the Wild Animals of Malkangiri. During that time the Tribes i.e, Bonda, Didayi, Koya, Paroja, Kondha etc. and in some time other Forest dwellers of the District will enter in to the nearby Forest area for hunting of wild animals and the meat will be brought to villages. The Religious belief of the Tribals is specific to each group. Among the most of the Tribes deities are believed to reside in sacred Groves and even the village Goddesses are worshipped under a Tree, and then the meat will be cooked.

The practices are found reduced now days. But in some places Gobindapalli, Khairput, Pandripani, Padmagiri, Tarlakota, Chitrakonda, Kalimela and Motu area of the Division, the practices are observed till now.

3.7.1.2 Illegal Trade of Wildlife: Wild animals, birds and reptiles (snakes) have become income generating sources by some people. Also, many people are using animals and birds as their pets for aristocracy and pleasure. Besides, the past use to keep wild animal trophies as a mark of their royal status, unscrupulous traders use to engage middlemen to lure the wild animals near forest areas so as to capture and kill such animals for their body parts. There are no incidences of poaching of elephants in the Division. Natural death also takes place.

Poaching of wildlife also for ivory, horn, fur, feather, hides, claws, bones etc. have directly affected the decline in population of the wildlife. With the advent of modern arms and better roads & mobility, the poaching has become easier and unintentional injuries to the animals have been caused.

Methods of poaching the wild animals vary from place to place in this Division depending upon even the type of animal being poached. Shooting is the common method to kill animals and birds. However, poisoning of big carnivores, herbivores, trapping and snaring mammals like deer and some other small animals. During the summer, when natural streams become dry and due to non availability of sufficient food and water in the forest so, the animals generally enter into the human habitation in search of food and so the cases of poaching goes undetected for many reasons.



Fig No. 3.4: Accused Arrested for Poaching a Wild Boar inside the Forest of mathili Range

3.7.1.3 Disease: The livestock from the villagers in the regularly frequent the forests and share space and resources, water borne (contagious disease) disease are passed from livestock to wild animals. Most frequent is foot and mouth disease. Other diseases which may occur are (1) Anthrax (2) Rabies (3) HS (Haemorrhagic Septicaemia) (4) Canine distemper. FMD has a potential to wipe out large populations, while rinderpest, anthrax and rabies are highly infectious and lead to certain death.

Sharing the forest area with disease affected domestic animals often compromises health of the herbivore population. Outbreaks of contagious diseases like Foot nad Mouth Disease drastically reduce the herbivore population.

3.7.1.4 Fire and Habitat Damage: Frequent fire damages the wildlife habitat, and animals become vulnerable to poaching. Similarly, habitat disturbances of different types create diverse kinds of stress having adverse impact on the wildlife.

Fires are major culprit reducing food availability for the herbivores very drastically. Thus, wild animal habitats are very adversely affected due to recurrence of fires every year.

3.7.2 Man-Animal Conflict

The conflict between the man and wild animals is considered to be age old, because of the simple reason that the wild animals are straying out of their habitats in search of food, fodder and prey animals. It is a grave situation, which result in death of human being by the attack of wild animals and vice versa. The main reason of the wild life attacking in the human habitat in search of food and water is the degradation of the habitat owing to want of sufficient fodder for the Herbivorous and prey animals for Carnivorous. Several cases of depredation reported in this Division due to wild animals resulting in death/ injury to human beings and damaged to farmlands. In turn several casualties of wild animals like Bear, Wolves, barking deer and Wild Boar are reported due to poisoning and trap.

3.7.2.1 Special habitats are biological in origin and provide habitat functions for small wild animals. Habitat shall be developed with the co-operation of local people and silvicultural technique. The aim should be to provide more food, water for wild life so as to even reduce the man –animal conflict. It is also required adequate Forest cover to different wild animals within their habitats is necessary for shelter and protection of wild animals from Weather, Predators and enemies. Keeping in view this aspect, it has been prescribed in Selection Working Circle not to fell trees near water holes, wallows and salt licks to maintain cover water body, fruit bearing tree plantation & artificial caves.

3.7.2.2 Human Injury/Kill:

The available census data shows that the bear population in the division is high and is on the increasing trend. Every year there are several incidences of human kills and injury to human beings. The details of human kills due to Wild bear are given in the Table No. 3.38 & 3.39

respectively. These data are also annexed in **Annexure IV**. The human casualties are on the increasing trend, this may be due to decrease in the habitat for the wild animals and of late, the awareness is increasing and hence more and more cases are being brought to limelight. Many steps are required to be taken to tackle the problem of man animal conflict. The details of these steps are discussed in wild life overlapping working circle.

Table No. 3.38: Human Kill & Compensation paid during 2006-07 to 2020-21.

Sl No .	Year	Name of Range	Name of the Victims and village	Date of Occurrence	Wild Animal involved (Specify Separately)	Type of Depradation	Amount of Compassionate Payment in Rs.
1	2	3	4	5	6	7	8
1	2006-07	Malkangiri	Karuna Makal of MV-101	15.07.2006	Sloth Bear	Death	100000/-
2	2007-08	Mathili	Mangala Khilla	04.01.2007	Sloth Bear	Death	100000/-
3	2008-09	Mathili	Hari Khara	19.10.2008	Sloth Bear	Death	100000/-
4	2011-12	Malkangiri	Sibasankar Madkami of Khaliaguda	01.05.2011	Sloth Bear	Death	200000/-
5	2011-12	Mathili	Ghena Nayak of Bandhguda	29.06.2011	Sloth Bear	Death	200000/-
6	2012-13	Balimela	Arjun Khemudu of old Chitapari	01.04.2012	Sloth Bear	Death	200000/-
7	2013-14	Chitrakonda	Bhima Khilla of Thatmaguda	20.04.2013	Wild Boar	Death	200000/-
8	2013-14	Mathili	Dinabandhu Malali of Chaulmendi	03.10.2013	Sloth Bear	Death	200000/-
9	2015-16	Kalimela	Purna Khara of Karkatpally	11.09.2015	Sloth Bear	Death	300000/-
10	2015-16	Mathili	Samandha Nayak of Mathili	19.03.2015	Sloth Bear	Death	300000/-
11	2016-17	Kalimela	Rama Podiami of Tumkimadha	28.11.2016	Sloth Bear	Death	300000/-
12	2017-18	-Nil-					
13	2018-19	-Nil-					
14	2019-20	-Nil-					
15	2020-21	Mathili	Mangala Pujari	18.8.2019	Sloth Bear	Death	400000/-

			S/o-Damu Pujari of Jhariguda				
16	2020-21	Chitrakonda	Kapilash ch. Majhi	28.8.20	Sloth Bear	Death	400000/-

Table No. 3.39: Human Injury & Compensation paid during 2007-08 to 2020-21

Sl No.	Year	Name of Range	Name of the Victims	Date of Occurrence	Wild Animal involved (Specify Separately)	Type of Depradation	Amount of Compassionate Payment in Rs.
1	2	3	4	5	6	7	8
1	2007-08	Mathili	Saniya Pujari	08.07.2007	Sloth Bear	Temporary	2000/-
2	2008-09	Mathili	Samara Khara	04.06.2008	Sloth Bear	Temporary	2000/-
3	2008-09	Mathili	Chitrananda Sahu	22.06.2008	Sloth Bear	Temporary	2000/-
4	2008-09	Mathili	Hari Khara	08.06.2008	Sloth Bear	Temporary	2000/-
5	2008-09	Mathili	Krushna Badami	30.07.2008	Sloth Bear	Temporary	2000/-
6	2008-09	Mathili	Khagapati Pujari	02.07.2008	Sloth Bear	Temporary	2000/-
7	2008-09	Balimela	Binod Mandal	25.09.2008	Sloth Bear	Temporary	2000/-
8	2008-09	Mathili	Hari Gurutali	09.02.2009	Sloth Bear	Permanent	33330/-
9	2010-11	Mathili	Budrapadiami	23.09.2010	Sloth Bear	Temporary	2000/-
10	2010-11	Balimela	Guru Pangi of Mahulaguda	09.10.2010	Sloth Bear	Permanent	33330/-
11	2010-11	Chitrakonda	Deba Khemudu of Madhumal	02.11.2010	Sloth Bear	Permanent	33330/-
12	2011-12	Malkangiri	Tapas Debanath of MV-30	21.11.2011	Sloth Bear	Permanent	75000/-
13	2011-12	Malkangiri	Erama Podiami of Marneguda	25.09.2011	Sloth Bear	Permanent	75000/-
14	2011-12	Malkangiri	Anil Murmu of MV-2	01.05.2011	Sloth Bear	Temporary	5000/-
15	2011-12	Malkangiri	Bisnu Soren of	01.05.2011	Sloth Bear	Temporary	5000/-

16	2011-12	Malkangiri	Moti Murmu of MV-2	01.05.2011	Sloth Bear	Temporary	5000/-
17	2011-12	Malkangiri	Mahesh Murmu of MV-2	01.05.2011	Sloth Bear	Temporary	5000/-
18	2011-12	Malkangiri	Dhanapati Golari of Sarguguda	17.09.2011	Sloth Bear	Temporary	5000/-
19	2012-13	Malkangiri	Dhana kabasi of Podavata	29.06.2012	Sloth Bear	Temporary	5000/-
20	2012-13	Mathili	Sukra Mandra of Dantapada	23.05.2012	Sloth Bear	Permanent	75000/-
21	2012-13	Mathili	Nakula Dalapati of Dalapatiguda	07.04.2012	Sloth Bear	Temporary	5000/-
22	2012-13	Mathili	Ramakrushna Khara of mathili	12.05.2012	Sloth Bear	Temporary	5000/-
23	2012-13	Malkangiri	Bangu Putia of Limaguda	06.08.2012	Sloth Bear	Temporary	5000/-
24	2012-13	Mathili	Parbati Pujari of Kutunipalli	25.12.2012	Sloth Bear	Permanent	75000/-
25	2012-13	Malkangiri	Bhima Kuduku of Pradhaniguda	31.07.2012	Sloth Bear	Temporary	5000/-
26	2012-13	Balimela	Bhagaban Bate of Sindhiguda	08.06.2012	Sloth Bear	Temporary	5000/-
27	2012-13	Balimela	Lachhmi Pataka of Chitapari	04.06.2012	Sloth Bear	Temporary	5000/-
28	2012-13	Balimela	Budra Nali of Naliguda	04.06.2012	Sloth Bear	Temporary	5000/-
29	2012-13	Balimela	Sanyasi kope of Chitapari	04.06.2012	Sloth Bear	Temporary	5000/-
30	2012-13	Malkangiri	Anda madi of Rampur	08.08.2012	Sloth Bear	Temporary	5000/-
31	2012-13	Malkangiri	Sadasiv Rout of Khilaguda	30.01.2012	Sloth Bear	Temporary	5000/-
32	2012-13	Mathili	Udhaba Behera of	26.01.2013	Sloth Bear	Permanent	75000/-

			Mathili Adivasi Colony				
33	2012-13	Kalimela	Rabindranath Mallick of MV-64	17.02.2013	Sloth Bear	Temporary	5000/-
34	2013-14	Mathili	Krushna Khara of Pakhanaguda	06.05.2013	Leopard	Temporary	5000/-
35	2013-14	Mathili	Kousalya Khara of Pakhanaguda	06.05.2013	Leopard	Temporary	5000/-
36	2013-14	Chitrakonda	Ratan khara of Padmaur	27.08.2013	Sloth Bear	Temporary	5000/-
37	2013-14	Motu	Jaga Podiami of Tigal	27.07.2013	Sloth Bear	Temporary	5000/-
38	2013-14	Motu	Raba Ganga of Tigal	15.11.2013	Sloth Bear	Permanent	75000/-
39	2013-14	Mathili	Prafulla Challan of Dhaudaguda	28.08.2013	Sloth Bear	Temporary	5000/-
40	2013-14	Mathili	Liki Bhumia of Singaguda	14.10.2013	Sloth Bear	Temporary	5000/-
41	2013-14	Mathili	Sada Pangi of Godiali	10.06.2013	Sloth Bear	Temporary	5000/-
42	2013-14	Mathili	Guru majhi of Kamalapadar	23.09.2013	Sloth Bear	Temporary	5000/-
43	2013-14	Mathili	Samara Dulomi of Rouliguda	08.08.2013	Sloth Bear	Temporary	5000/-
44	2013-14	Malkangiri	Lalmohan Biswas of MV-34	30.10.2013	Sloth Bear	Temporary	5000/-
45	2013-14	Balimela	Sanu Ranguda of Padalput	08.03.2014	Sloth Bear	Temporary	5000/-
46	2013-14	Kalimela	Dhanapati Mali of Bhejengi wada	03.10.2013	Sloth Bear	Permanent	75000/-
47	2013-14	Kalimela	Mangal Gouda of Chintalwada	20.08.2013	Sloth Bear	Permanent	75000/-
48	2013-14	Malkangiri	Laka Madkami of	31.01.2014	Sloth Bear	Temporary	5000/-

			Darmaguda				
49	2014-15	Mathili	Siba Pujari of Ramaguda	07.06.2014	Sloth Bear	Temporary	5000/-
50	2014-15	Mathili	Jayram Kirsani of Kadamguda	10.05.2014	Sloth Bear	Permanent	75000/-
51	2014-15	Mathili	Mangal Kirsani of Baunsapada	27.01.2014	Sloth Bear	Temporary	5000/-
52	2014-15	Mathili	Chandra Burudi of Bhaluguda	31.03.2014	Sloth Bear	Temporary	5000/-
53	2014-15	Mathili	Madhab khara of Patraput	14.08.2014	Sloth Bear	Temporary	5000/-
54	2014-15	Malkangiri	Mukunda Hantala of Patraput	14.08.2014	Sloth Bear	Temporary	5000/-
55	2014-15	Malkangiri	Irma padkami of Koilipari	14.08.2014	Sloth Bear	Temporary	5000/-
56	2014-15	Mathili	Madhu Katia of Kulabeda	16.07.2014	Sloth Bear	Temporary	5000/-
57	2014-15	Motu	Bhima Madhi of Bhubanpally	8.10.2014	Sloth Bear	Temporary	5000/-
58	2014-15	Kalimela	Sanjay Kumar of Gompakonda	27.01.2015	Sloth Bear	Temporary	5000/-
59	2014-15	Malkangiri	Jasada madhi of Dangarguda	27.01.2015	Sloth Bear	Permanent	100000/-
60	2015-16	Kalimela	Mangala Gouda of Parluguda	13.02.2010	Sloth Bear	Permanent	75000/-
61	2015-16	Malkangiri	Rama kabasi of Naikguda	26.06.2014	Sloth Bear	Temporary	5000/-
62	2015-16	Mathili	Jaysingh Majhi of Mathili	19.02.2015	Sloth Bear	Temporary	5000/-
63	2015-16	Mathili	Dinabandhu Sisa of Basalmeta	17.09.2015	Sloth Bear	Temporary	5000/-
64	2015-16	Mathili	Laichhan gutta of Tankamunda	03.09.2015	Sloth Bear	Temporary	5000/-

65	2015-16	Kalimela	Sunadhar Behera of Addaguda	16.05.2015	Sloth Bear	Permanent	100000/-
66	2015-16	Malkangiri	Bhagat Gouda of Khairakadiguda	11.09.2015	Sloth Bear	Temporary	5000/-
67	2015-16	Malkangiri	Bhima Madkami of Iralgundi	15.09.2015	Sloth Bear	Temporary	5000/-
68	2015-16	Malkangiri	Ganga Madhi of Champanagar	18.02.2016	Sloth Bear	Permanent	100000/-
69	2015-16	Kalimela	Phulmati Mandal of MPV-21	30.09.2015	Sloth Bear	Permanent	100000/-
70	2015-16	Kalimela	Susmita Paik	16.01.2016	Sloth Bear	Permanent	100000/-
71	2015-16	Kalimela	Bhima Sodi	11.11.2015	Sloth Bear	Temporary	5000/-
72	2015-16	Kalimela	Rama madkami	08.10.2015	Sloth Bear	Temporary	5000/-
73	2016-17	Kalimela	Sanyasi Khara of Kamalapadar	19.10.2016	Sloth Bear	Permanent	100000/-
74	2016-17	Malkangiri	Rama kabasi of Naikguda	17.03.2016	Sloth Bear	Temporary	5000/-
75	2016-17	Malkangiri	Sumitra Gouda of Mundaguda	11.08.2016	Sloth Bear	Temporary	5000/-
76	2016-17	Malkangiri	Irma Kabasi of Nuaguda	15.03.2016	Sloth Bear	Temporary	5000/-
77	2016-17	Malkangiri	Pijus Gharami of MV-23	16.01.2017	Sloth Bear	Permanent	100000/-
78	2017-18	Mathili	Mamata Dalapati of Dalapatiguda	07.05.2017	Sloth Bear	Permanent	100000/-
79	2017-18	Mathili	Pratap Golari of Dabuguda	07.05.2017	Sloth Bear	Temporary	5000/-
80	2017-18	Mathili	Mangala Patra of Limaguda	16.10.2017	Sloth Bear	Temporary	5000/-
81	2017-18	Mathili	Arjun Khara of Ronji	06.04.2017	Sloth Bear	Temporary	5000/-
82	2017-18	Kalimela	Unga Madkami of	18.07.2017	Sloth Bear	Permanent	100000/-

			Sindhiguda				
83	2017-18	Mathili	Sanya badnaya of Similiguda	10.10.2017	Sloth Bear	Permanent	100000/-
84	2017-18	Balimela	Samara kuldip of Khemuduguda	25.09.2017	Sloth Bear	Permanent	100000/-
85	2017-18	Mathili	Gopinath majhi of Andhari	14.12.2017	Sloth Bear	Temporary	5000/-
86	2017-18	Balimela	Bhanu Disari of Tarlakata Colony	15.12.2017	Sloth Bear	Permanent	100000/-
87	2017-18	Mathili	Brunda Muduli of Barihabahal	04.05.2016	Sloth Bear	Temporary	5000/-
88	2017-18	Mathili	Guru Hantala of ChampaJharan	15.05.2017	Sloth Bear	Temporary	5000/-
89	2017-18	Kalimela	Sandhyarani haldar of MV-65	18.02.2018	Sloth Bear	Permanent	100000/-
90	2018-19	Kalimela	Muka Madhi of Alasiguda	16.05.2018	Sloth Bear	Permanent	100000/-
91	2018-19	Kalimela	Muka Podiami of Gomphakonda	26.05.2018	Sloth Bear	Permanent	100000/-
92	2018-19	Kalimela	Dayanidhi hantala of Kosalkonda Colony	21.02.2018	Sloth Bear	Permanent	100000/-
93	2018-19	Mathili	Raila Kirsani of Kadamguda	16.04.2018	Sloth Bear	Permanent	100000/-
94	2018-19	Kalimela	Sukula madkami of Gomphakonda	26.05.2018	Sloth Bear	Permanent	100000/-
95	2018-19	Mathili	Sukri Sisa of Bandiguda	14.08.2018	Sloth Bear	Temporary	5000/-
96	2018-19	Balimela	Sanyasi Pangi of Butiguda	17.08.2018	Sloth Bear	Permanent	100000/-
97	2018-19	Malkangiri	Kishore Biswas of MV-48	19.09.2018	Sloth Bear	Temporary	5000/-
98	2018-19	Malkangiri	Muna nayak of	02.10.2018	Wild Boar	Temporary	5000/-

			Mundaguda				
99	2018-19	Balimela	Ramesh Ch Swain of Balimela Post Office line	22.11.2018	Sloth Bear	Temporary	5000/-
100	2019-20	Mathili	Khagapati Pujari of Mendukuli	06.06.2019	Sloth Bear	Permanent	100000/-
101	2019-20	Mathili	Sombari Dora of Challanpada	13.07.2019	Sloth Bear	Permanent	100000/-
102	2019-20	Mathili	Chakra Pujari of Baliguda	11.08.2019	Sloth Bear	Temporary	5000/-
103	2019-20	Mathili	Pitam Eibek of Doraguda	13.05.2019	Wild Bear	Temporary	5000/-
104	2019-20	Mathili	Damburu Nayak of Jhulnibahal	25.07.2019	Sloth Bear	Temporary	5000/-
105	2019-20	Malkangiri	Bhima Madkaninof Namelguda	28.10.2016	Sloth Bear	Temporary	5000/-
106	2020-21	Malkangiri	Kosa Podiami of Mundaguda	07.08.2018	Sloth Bear	Temporary	5000/-
107	2020-21	Balimela	Rahul Barik of Kalapalli	17.08.2018	Sloth Bear	Temporary	5000/-
108	2020-21	Balimela	Bhagat Khilla of Tarlakota	20.08.2019	Sloth Bear	Temporary	5000/-
109	2020-21	Balimela	Samara Khilla of Puruna orkel	28.11.2019	Sloth Bear	Temporary	5000/-
110	2020-21	Mathili	Laichan Nayak of Kadamguda	12.01.2020	Sloth Bear	Temporary	5000/-
111	2020-21	Mathili	Chaitanya Gouda of Amliput	20.08.2020	Sloth Bear	Temporary	5000/-
112	2020-21	Balimela	Sri Raghu Madri of Bandhaguda	7.10.2020	Sloth Bear	Temporary	5000/-
113	2020-21	Mathili	Basanta Ganda of Mathili	16.11.2020	Sloth Bear	Temporary	5000/-

3.8 Protection and Management of Fauna:

The Staff and Squad engaged under different schemes are being utilized to educate and make awareness among these Tribes on evil impact of this kind of Mass Hunting. By taking preventive measures such as providing them sufficient fodder, food and grass by cultivation of grasslands inside the wildlife habitat. Water facilities need to be provided by digging game tanks, Water Harvesting structure etc. The Divisional Forest Officer should take long-term measures through habitat development to put the wild animals inside their territory without staying to human habitation so that the conflict between the human and wild animals can be minimized to a considerable extent. Similarly, adequate compensation needs to be paid to the people who have been affected badly due to depredation of wild life such as loss of human life, paddy lands and farm lands.

3.8.1 Wildlife Rules

3.8.1.1 In the past, the management of Forest was timber oriented and preservation of wild life could not find its place in the Forest Policy of 1894, there exist already the Wild Birds (Protection) Act of 1887 enacted by British Government. It was only the Birds and Animals (Protection) Act (**Central Legislature III of 1912**) promulgated, which was more or less a repetition of the Wild Birds (Protection) Act, 1887. This Act prescribed for observance of 'close time', penalties confiscation in respect of some birds and animals. Birds included the scheduled Bustard, Duck, Jungle fowl, Partridge, Peafowl, Pheasant, Pigeon, Sand groove, Painted snipe, Spur fowl, Heron, Woodcock, Egret, Rollers, King fisher and animals covered under the Act were Antelope, Ass, Bison, Elephant, Deer, Goat, Hare, Ox, Rhinoceros and sheep.

3.8.1.2 Rules relating to wild life in force in the early days were as follows;

1. The Bihar and Orissa Government Reserved Forest shooting Rule 1930 (as per clause I and j of subject 1 of section of IFA 1927).
2. Rules to regulate hunting, shooting, fishing etc. in Angul and Puri districts (As per clause j of section-3 of 1927).

3. Rules regulating the grant of license to capture (framed under section 6 of the Elephant Preservation Act of 1879).

Through the above Rules and Acts were good beginnings satisfactory so far as conservation was concerned. A good number of animals continued to get killed legally and illegally every year.

3.8.1.3 The All India Conference on wildlife, 1935 felt that other step necessary for preservation of wildlife in various provinces. Accordingly, when forest policy of 1952 was formulated; emphasis was laid on the protection of animal, particularly the rare species, which were fast disappearing also prescribed for regulating the wild life by special law and to set up National Parks and Sanctuaries. For the purpose, a Central Board on Wild Life was constituted in 1952.

3.8.1.4 After independence, there was a growing realization to provide better protection to fauna in general and rare and endangered species in particular, it was also recognized that wildlife could not be effectively protected unless state's stakes were clearly defined and legal status of these forests was comprehensively articulated. The All India Silviculture Conference recommended, inter alia, that "Whereas Wild life is an integral part of our forests and its preservation is admitted to be an urgent necessity, suitable forest of adequate extent be set apart in each State for preservation and perpetuation of wild life". Moreover, in 1969, the JUCN, at New Delhi conference, emphasized for an urgent need for a uniform law in India. With such initiatives, a comprehensive legislation was brought about in 1972, when the **Wild Life (Protection) Act 1972** was promulgated.

3.8.1.5 A nos of Acts and Rules have been framed by the Government from time to time such as Wild Life Protection Act 1972, Wildlife (Stock Declaration) Rule 1974, Wild Life Transaction and Taxidermy Rule 1974 by Government of India. The Govt. of Orissa also framed the Orissa Forest Shooting Rule, 1973 under section 82 of the Forest Act, 1972 and The Wild Life (Protection) Rules, 1974. These Acts and Rules were amended as the Wild Life (Protection) Amendment Act, 2002, The Wild life- Stock Rules, 2003 has come up with details procedure to be adopted by the individuals and the communities in possession of wild animals.

3.8.1.6 In addition, the Government of Orissa has prescribed the following procedures.

1. Procedures for compassionate payment on account of human killings by tigers, panthers, elephant, Bear etc have been ammended. In 2014 vide Forest Dept. Notification No. - 13505/8F (WL) 6/2014 F & E dated 22nd July, 2014. As per the amendment, the amount of compensation for human killing is increased to Rs. 4,00, 000/- The compensation for permanent injury is increased to Rs. 1,00,000/- and for temporary injury there would be free medical treatment in the government hospital with compensation of RS. 5000/-.

As per Notification No.- 6380/8F (WL) 1/12 F & E dated 11th April 2012, in case of crop damage by wild animal specified in rule 45-AA as well as by Deer and antelope compassionate payment of Rs. 10,000/- only per acre for crop like paddy and cereals made of damage of vegetables. Cash crops like Banana the compassionate amount of RS. 12,000/- only shall be paid to the victim.

2. Procedures for regulation of fishing inside Sanctuary in 1976 Orissa Gazetted Part III No.-41 dated 08.10.76.

3. Trade or commerce in wild animal articles Orissa Gazetted part- II No. dated 14.07.78.

4. Rewards for destruction of wild animals etc in 1978 Orissa Gazette Part –III No.-45 dated 10.11.78.

Table No. 3.40: Present Rates of Compensation

Sl No	Particulars	Amount to be paid
1	Cow, Buffalo, Bullock	75% of the market price or Rs. 10000/- whichever is less
2	Sheep, Goat, other livestock	75% of the market price or Rs. 3000/- whichever is less
3	Cow, Buffalo, Bullock became permanently handicapped	50% of the market price or Rs. 3000/- whichever is less
4	Injury to Cow, Buffalo, Bullock, Goat	Treatment cost. (Govt. or ZP Hospital) 25% of the market price or Rs. 1000/- whichever is less

Quick Disposal, 5T (Mo Sarkar)

On receipt of the report from the Forest Range Officer, the Divisional Forest Officer (Wildlife) or the Divisional Forest Officer (Territorial), as the case may be, shall sanctioned payment of appropriate compassionate amount within 15 (Fifteen) days from the date lodging the First Information Report under rule 45-HH.

3.8.2 Other Measures taken

3.8.2.1 The Division has also tried to create awareness among the Villagers by conducting VSS Meetings, celebration of Wildlife Weeks, World Environment Day, World Forestry day and by publishing through newsletters, signboards, hoardings etc.



Fig. No. 3.5: Creation of Awareness by Celebrating Different District Level Fuctions

3.8.2.2 The Division has also been deployed two nos Wildlife squad for taking of protection of Wild animals and to prevent wildlife depredation.

3.8.2.3 Creation of Waterbodies:

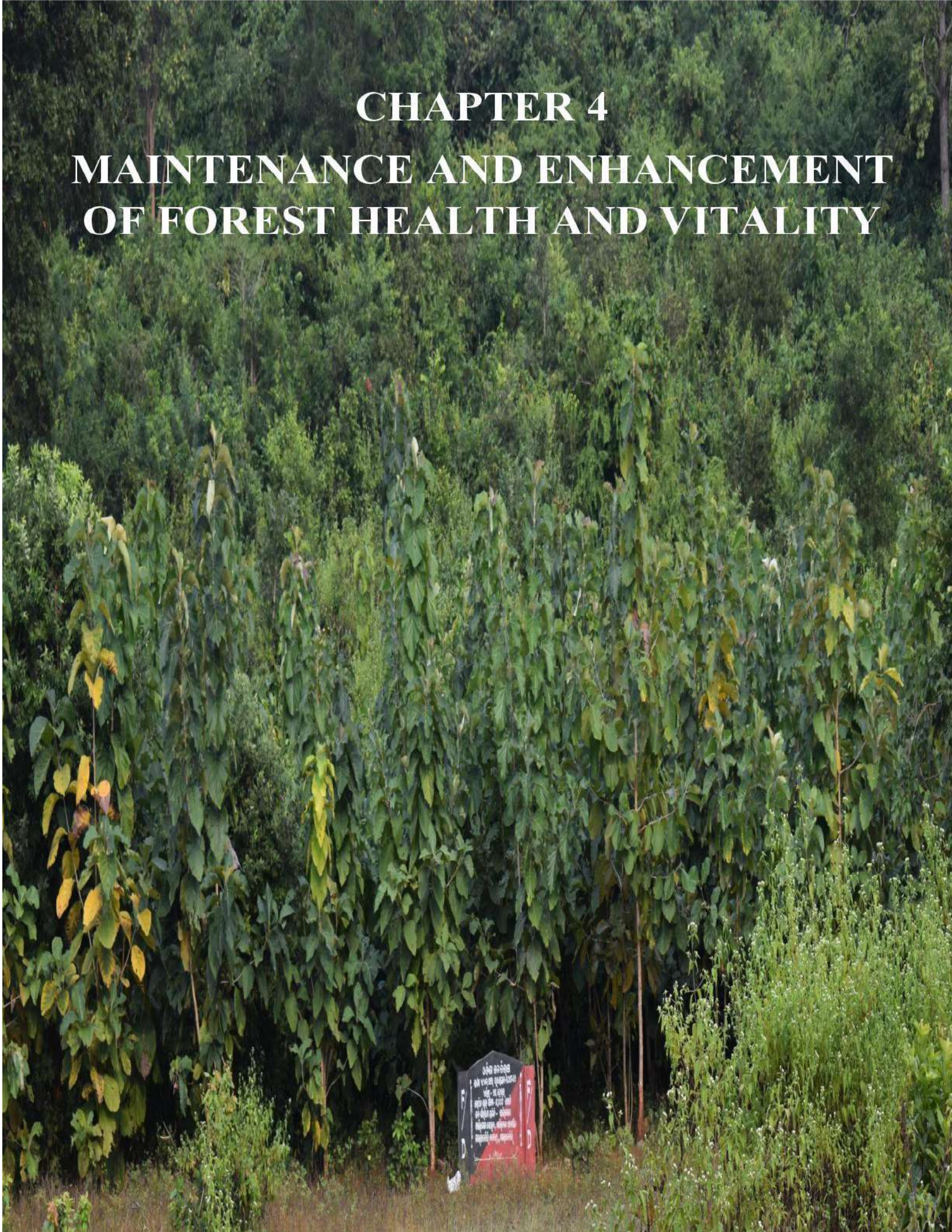
The division has a nos. of existing natural water sources like perenial nala, streams, rivers, water holes and other waterbodies. The rivers are Saberi, Sileru, Kolab, Saptadhara

Gariagar and Poteru etc and Balimela Dam (Reservoir) and Satiguda Dam is the main water sources, which are being used by the wildlife. Besides that, nos of water bodies/WHS are being constructed under different scheme by the Department in interior pockets of the forest to meet the water scarcity of the wildlife.

A good number of water bodies have been created for use of human habitats as well as wildlife has been discussed in Chapter No.5.

CHAPTER 4

MAINTENANCE AND ENHANCEMENT OF FOREST HEALTH AND VITALITY



The maintenance of forest health and vitality is dependent upon the ability of the ecosystem's functions and processes to recover from or adapt to disturbances. While many disturbance and stress events are natural components of forest ecosystems, some may overwhelm ecosystem functions, fundamentally altering their patterns and processes and reducing ecological function. Decline in forest ecosystem health and vitality may have significant economic and ecological consequences for society including a loss of forest benefits and the degradation of environmental quality. Information gained on the impacts of biotic and abiotic processes and agents may inform management strategies to minimize and mitigate risk. The maintenance of forest ecosystem health and vitality is the foundation of sustainable forest management.

4.1 Status of Regeneration: In the current Working Plan assessment of regeneration status has been done as per the prescription of the National Working Plan Code -2014. Accordingly, young plants of the species up to 10cm diameter are taken into consideration for assessment of regeneration status of the particular species as practiced in National Forest Inventory by FSI. Data collected from the square plots of 3x3m for saplings/adults and from the square plots of 1x1m for seedlings will be used to assess the regeneration status of species in the management unit. Based on the phytosociological data from plot level enumeration, the regeneration status of the sampled species may be assessed in the following categories.

4.1.1 Crop Condition as Per Base Year Assessment: In the outgoing plan the regeneration survey has been conducted only for tree species in forest blocks with representation from forest blocks under different stages of degradation so as to get the actual picture of the regeneration status. The survey is done by taking a sample plot of 20 m x 20 (0.1ha) along the already laid grid lines for growing stock enumeration in such forest blocks. The regeneration seedlings are classified into Established, Woody, Whippy and Recruits. They are enumerated and scored. This exercise is limited to only 19 (Nineteen) species for which even the growing stock enumeration has been carried out and the remaining species have been clubbed under

miscellaneous category. In this plan, the crop condition of 62 forest blocks has been studied from the sample point enumeration taken. The assessment is done by taking the no. of tree species present in the 31.62mX31.62m plot (main plot). Out of 50 Forest blocks in few Forest blocks like Sarangapalli RF, Mathili RF, Dusanad PRF Species like Sal, Dhaura and Asana have developed to pole crop from Established Stage.

4.1.2 For the present working Plan though all most all forest Blocks has taken for sample point enumeration. Total 85 Forest Blocks, where 457 no. of Sample survey carried out from all the Ranges have taken to assess Regeneration status. The Saplings and Seedlings of tree species from 3mX3m and 1mX1m quadrants and Adult from Main plot of 31.67mX31.67m plot have taken into account for assessment of Regeneration status. Total 33 no. of Tree species has been taken for assessment and rest are kept as Misc. Species. The result of regeneration survey and analysis is at **Appendix- IIC**.

4.1.3 Assessment of Regeneration Status:

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 3mX3m for saplings (2cm to 10 cm collar diameter) and from the square plots of 1m X1m for seedlings will be generally used to assess the regeneration status of species in the management unit (compartment, village or any other unit). Based on the phytosociological data from plot level enumeration, the regeneration status of the sampled species may be assessed in the following categories:

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

Table No.4.1: Range wise Forest blocks taken for assessment of Regeneration Survey

Sl.No.	Name of the Range	Name of the Forest Block	Legal status	No. of Sample plots enumerated	No. of Tree species involved
1	Balimela	Balimela	PRF	42	61
2		Chitapari	RF	20	48
3		Konagi	RF	03	18
4	Balimela and Chitrakonda	Matumkonda	PRF	51	70
5	Balimela	Taralakota	PRF	29	64
6	Chitrakonda	Badakonda	PRF	02	09
7		Bandhaguda	PRF	01	10
8		Banguru	RF	01	07
9		Bhimaram	PRF	13	31
10		Datunguda	PRF	09	19
11		Mantriput	PRF	02	13
12		Sileru -West	RF	22	44
13		Singaram	PRF	13	46
14	Kalimela	Manyamkonda `	PRF	05	24
15		VenkatPalam	RF	06	15
16		Udayagiri 'B'	RF	02	12
17		Udayagiri	RF	45	52
18		Pulimetla	RF	05	17
19		Pedawada	PRF	06	20
20		Mangipalli	RF	03	14
21		Mandapalli	RF	10	23
22	Malkangiri	Akur	RF	01	08
23		Cheruguda	PRF	02	09
24		Jhileruguda	PRF	06	27
25		Koilipari	PRF	07	20
26		Korkunda	PRF	02	08
27		Namkonda	PRF	02	08
28		Sindhrial	PRF	09	27
29	Mathili	Champajharan	PRF	01	12
30		Chedenga	RF	03	21
31		Gotiguda	RF	01	13
32		Malidanger	RF	02	18
33	Mathili/Malkangiri	Pitatung	PRF	22	44
34		Putparbat	RF	02	14
35		Sarangapalli	RF	29	44
36	Motu	Manyamkonda	PRF	02	20
37		Motu	RF	02	16
38		Pendikonda	RF	01	09

39		Pusigudam	RF	13	24
40		Sirkonda	RF	03	14
41		Tadimetla	RF	09	23
42		Tamanpalli	PRF	03	20

To categories the seedlings, saplings and adults; the following criteria is followed.

Table No. 4.2: Category of Regeneration

Sl. No.	Category	Specification
01	Seedlings	<2cm collar dia
02	Saplings	2-5cm collar dia/dbh
03	Adults	5-9.9 cm collar dia/dbh

The lower categories of regeneration such as established, un- established (whippy, and sub whippy), recruits, etc. giving value to each category and calculating total regenerative percentage may be required. In case, above classifications are absent or insufficient to indicate regeneration status. The description of such category of regeneration is furnished as below.

Table No.4.3: Description of Regeneration

Sl No.	Category of regeneration	Description
01	Established	Height should be 2.5 m. or more and d.b.h. 10 cm
02	Woody shoot	It is established, large, vigorous which are expected to become established early and height varies from 1.0 m. to 2.5 m.
03	Whippy	Its height varies from 50cm to 1 m.
04	Sub-Whippy	Its height is less than 50cm.
05	Recruit	Current year seedlings

Table No.4.4: Regeneration status of different species in Balimela PRF of Balimela Range

Sl. No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	1.4			No
2	Amla	<i>Emblica officinalis</i>	1.2	0.7		Good
3	Asan	<i>Terminalia tomentosa</i>	7.6	0.5	0.2	Good
5	Bahada	<i>Terminalia belerica</i>	1.7		0.2	Poor

6	Bandhana	<i>Ooginia oogenensis</i>	0.7	0.2		Poor
7	Bela	<i>Aegel marmelos</i>	0.2			No
8	Bhalia	<i>Semicarpus annacardium</i>	1.2			No
9	Bheru	<i>Chloroxylon swietiana</i>				No
10	Char	<i>Buchanania lanzan</i>	1.4	1.0		Poor
11	Dhaman	<i>Grewia tiliifolia</i>	3.3	0.5		Poor
12	Dhaura	<i>Anogesisus latifolia</i>	5.7	1.0		Poor
13	Haladu	<i>Adina cordifolia</i>				No
14	Harida	<i>Terminalia chebula</i>	1.2			No
15	Jamun	<i>Syzygium cumunii</i>	1.0			No
16	Kasi	<i>Bridelia retusa</i>	1.7	1.0		Poor
17	Kataka	<i>Strychnos potatorum</i>				Poor
18	Kendu	<i>Diospyros melanoxylon</i>	1.9	3.1	1.2	Good
19	Kumbhi	<i>Careya arborea</i>	0.5	0.2		Poor
20	Kusuma	<i>Schleichera oleosa</i>	2.4			No
21	Mahul	<i>Madhuca indica</i>	0.2			No
22	Mai	<i>Lenea coromondolica</i>	2.9			No
23	Mundi	<i>Mitragyna parviflora</i>	4.8	0.2		Poor
24	Piasal	<i>Pterocarpus marsupium</i>	1.7			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Boswellia serrata</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>	1.0			No
29	Simili	<i>Bombax ceiba</i>	1.4			No
30	Sirisa	<i>Albezia lebback</i>	1.2	0.2		Poor
31	Sisoo	<i>Dalbergia latifolia</i>	1.2			No
32	Sunari	<i>Cassia fistula</i>	0.5			No
33	Tangana	<i>Xylia xylocarpa</i>	15.7			No
34	Misc Spp		20.0	5.0	1.0	Poor

Table No. 4.5: Regeneration status of different species in Sileru –West RF of Chitrakonda Range

Sl. No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	0.9			No
2	Amla	<i>Emblica officinalis</i>	0.9			No
3	Asan	<i>Terminalia tomentosa</i>	5.5			No
5	Bahada	<i>Terminalia belerica</i>	0.5			No
6	Bandhana	<i>Ooginia oogenensis</i>				No
7	Bela	<i>Aegel marmelos</i>				No
8	Bhalia	<i>Semicarpus annacardium</i>	0.5			No
9	Bheru	<i>Chloroxylon swietiana</i>				No
10	Char	<i>Buchanania lanzan</i>	2.7			No
11	Dhaman	<i>Greiwa tiliifolia</i>	0.5	0.5		Good
12	Dhaura	<i>Anogeissus latifolia</i>	5.5			No
13	Haladu	<i>Adina cordifolia</i>				No
14	Harida	<i>Terminalia chebula</i>	0.9			No
15	Jamun	<i>Syzygium cumunii</i>	0.9			No
16	Kasi	<i>Bridelia retusa</i>	0.9			No
17	Kataka	<i>Strychnos potatorum</i>				No
18	Kendu	<i>Diospyros melanoxylon</i>	4.5	1.4		Good
19	Kumbhi	<i>Careya arborea</i>				No
20	Kusuma	<i>Schleichera oleosa</i>	1.4	0.5		No
21	Mahul	<i>Madhuca indica</i>	0.9			No
22	Mai	<i>Lenea coromondolica</i>				No
23	Mundi	<i>Mitragyna parviflora</i>	6.4			No
24	Piasal	<i>Pterocarpus marsupium</i>	4.5			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Boswallia serrata</i>				No

27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>				No
29	Simili	<i>Bombax ceiba</i>				No
30	Sirisa	<i>Albezia lebback</i>				No
31	Sisoo	<i>Dalbergia latifolia</i>	0.9			No
32	Sunari	<i>Cassia fistula</i>				No
33	Tangana	<i>Xylia xylocarpa</i>				No
34	Misc Spp		14.5	3.6	0.0	Poor

Table No. 4.6: Regeneration status of different species in Udayagiri of Kalimela Range

Sl. No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	0.2			No
2	Amla	<i>Emblica officinalis</i>	0.7			No
3	Asan	<i>Terminalia tomentosa</i>	11.6	0.9		Poor
5	Bahada	<i>Terminalia belerica</i>	0.9			No
6	Bandhana	<i>Ooginia oogenensis</i>	0.9			No
7	Bela	<i>Aegel marmelos</i>	0.2			No
8	Bhalia	<i>Semicarpus annacardium</i>	0.2			No
9	Bheru	<i>Chloroxylon swietiana</i>				No
10	Char	<i>Buchanania lanzan</i>	2.0	0.2		Poor
11	Dhaman	<i>Grewia tiliifolia</i>	0.7			No
12	Dhaura	<i>Anogeissus latifolia</i>	13.8	0.4		Poor
13	Haladu	<i>Adina cordifolia</i>				No
14	Harida	<i>Terminalia chebula</i>	0.4			No
15	Jamun	<i>Syzygium cumunii</i>	0.2	0.2		Poor
16	Kasi	<i>Bridelia retusa</i>	3.6			No
17	Kataka	<i>Strychnos potatorum</i>				No
18	Kendu	<i>Diospyros</i>	6.4	2.7	0.2	Good

		<i>melanoxyln</i>				
19	Kumbhi	<i>Careya arborea</i>	1.3			NO
20	Kusuma	<i>Schleichera oliosa</i>	2.2	0.2		Poor
21	Mahul	<i>Madhuca indica</i>	3.3	0.7		Poor
22	Mai	<i>Lenea coromondalica</i>	6.4	0.2		Poor
23	Mundi	<i>Mitragyna parviflora</i>	4.4			No
24	Piasal	<i>Pterocarpus marsupium</i>	6			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Boswallia serrata</i>	0.4			No
27	Sataparadia	<i>Dalbergia paniculata</i>	1.8			No
28	Sidha	<i>Lagerstormia parviflora</i>	4.2			No
29	Simili	<i>Bombax ceiba</i>	0.2			No
30	Sirisa	<i>Albezia lebback</i>	0.2			No
31	Sisoo	<i>Dalbergia latifolia</i>	0.2			No
32	Sunari	<i>Cassia fistula</i>	0.2			No
33	Tangana	<i>Xylia xylocarpa</i>	7.1			No
34	Misc Spp		8.9	2.4	1.6	Poor

Table No.4.7: Regeneration status of different species in Sindhirimal PRF of Malkangiri Range

Sl. No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>				No
2	Amla	<i>Emblia officinalis</i>		1.1		No
3	Asan	<i>Terminalia tomentosa</i>	3.3			No
5	Bahada	<i>Terminalia belerica</i>				No
6	Bandhana	<i>Ooginia oogenensis</i>				No
7	Bela	<i>Aegel marmelos</i>				No
8	Bhalia	<i>Semicarpus annacardium</i>				No

9	Bheru	<i>Chloroxylon swietiana</i>				No
10	Char	<i>Buchanania lanzan</i>	5.6			No
11	Dhaman	<i>Grewia tiliifolia</i>	2.2			No
12	Dhaura	<i>Anogeissus latifolia</i>	3.3			No
13	Haladu	<i>Adina cordifolia</i>				No
14	Harida	<i>Terminalia chebula</i>				No
15	Jamun	<i>Syzygium cumunii</i>	1.1	1.1		Poor
16	Kasi	<i>Bridelia retusa</i>	2.2			No
17	Kataka	<i>Strychnos potatorum</i>				No
18	Kendu	<i>Diospyros melanoxyl</i>	6.7	6.7	1.1	Good
19	Kumbhi	<i>Careya arborea</i>				
20	Kusuma	<i>Schleichera olosa</i>	1.1	1.1		Poor
21	Mahul	<i>Madhuca indica</i>	2.2			No
22	Mai	<i>Lenea coromondalica</i>	2.2			No
23	Mundi	<i>Mitragyna parviflora</i>	4.4			No
24	Piasal	<i>Pterocarpus marsupium</i>	2.2			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Boswallia serrata</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>	5.6			No
29	Simili	<i>Bombax ceiba</i>				No
30	Sirisa	<i>Albezia lebback</i>				No
31	Sisoo	<i>Dalbergia latifolia</i>	1.1			No
32	Sunari	<i>Cassia fistula</i>	1.1			No
33	Tangana	<i>Xylia xylocarpa</i>	10			No
34	Misc Spp	<i>Mangifera indica</i>	11.1	2.2	1.1	Poor

Table No. 4.8: Regeneration status of different species in Sarangapalli RF of Mathili Range

Sl. No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	1.7			No
2	Amla	<i>Emblica officinalis</i>	2.1			No
3	Asan	<i>Terminalia tomentosa</i>	9.7			No
5	Bahada	<i>Terminalia belerica</i>	2.4			No
6	Bandhana	<i>Ooginia oogenensis</i>	0.3			No
7	Bela	<i>Aegel marmelos</i>	1.4			No
8	Bhalia	<i>Semicarpus annacardium</i>				No
9	Bheru	<i>Chloroxylon swietiana</i>				No
10	Char	<i>Buchanania lanzan</i>	0.3			No
11	Dhaman	<i>Grewia tiliifolia</i>	2.4			No
12	Dhaura	<i>Anogeissus latifolia</i>	2.4			No
13	Haladu	<i>Adina cordifolia</i>	1.7			No
14	Harida	<i>Terminalia chebula</i>	1.0			No
15	Jamun	<i>Syzygium cumunii</i>	0.7			No
16	Kasi	<i>Bridelia retusa</i>	2.1			No
17	Kataka	<i>Strychnos potatorum</i>				No
18	Kendu	<i>Diospyros melanoxylm</i>	8.6	14.8		Good
19	Kumbhi	<i>Careya arborea</i>	1.4			No
20	Kusuma	<i>Schleichera olosa</i>	2.1			No
21	Mahul	<i>Madhuca indica</i>	1.0			No
22	Mai	<i>Lenea coromondalica</i>	0.7			No
23	Mundi	<i>Mitragyna parviflora</i>	1.4			No
24	Piasal	<i>Pterocarpus marsupium</i>	3.4	0.3		Poor
25	Sal	<i>Shorea rubosta</i>	11.0			No

26	Salai	<i>Boswallia serrata</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>				No
29	Simili	<i>Bombax ceiba</i>				No
30	Sirisa	<i>Albezia lebback</i>	1.4			No
31	Sisoo	<i>Dalbergia latifolia</i>	1.7			No
32	Sunari	<i>Cassia fistula</i>				No
33	Tangana	<i>Xylia xylocarpa</i>	4.1			No
34	Misc Spp		17.2	0.0	0.0	No

Table No.4.9: Regeneration status of different species in Pusigudam RF of Motu Range

Sl. No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>				No
2	Amla	<i>Emblica officinalis</i>				No
3	Asan	<i>Terminalia tomentosa</i>	26.9	0.8	0.8	Fair
5	Bahada	<i>Terminalia belerica</i>	0.8			No
6	Bandhana	<i>Ooginia oogenensis</i>				No
7	Bela	<i>Aegel marmelos</i>				No
8	Bhalia	<i>Semicarpus annacardium</i>				No
9	Bheru	<i>Chloroxylon swietiana</i>	9.2	0.8		Poor
10	Char	<i>Buchanania lanzan</i>	1.5			No
11	Dhaman	<i>Grewia tiliifolia</i>				No
12	Dhaura	<i>Anogeissus latifolia</i>	17.7			No
13	Haladu	<i>Adina cordifolia</i>				No
14	Harida	<i>Terminalia chebula</i>				No
15	Jamun	<i>Syzygium cumunii</i>	0.8			No
16	Kasi	<i>Bridelia retusa</i>	6.2			No
17	Kataka	<i>Strychnos potatorum</i>				No
18	Kendu	<i>Diospyros melanoxyl</i>	15.4	0.8		Poor

19	Kumbhi	<i>Careya arborea</i>				No
20	Kusuma	<i>Schleichera olosa</i>	0.8			No
21	Mahul	<i>Madhuca indica</i>	2.3			No
22	Mai	<i>Lenea coromondalica</i>	16.9			No
23	Mundi	<i>Mitragyna parviflora</i>				No
24	Piasal	<i>Pterocarpus marsupium</i>	10.8			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Boswallia serrata</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>	0.8		0.8	Poor
29	Simili	<i>Bombax ceiba</i>				No
30	Sirisa	<i>Albezia lebback</i>				No
31	Sisoo	<i>Dalbergia latifolia</i>				No
32	Sunari	<i>Cassia fistula</i>				No
33	Tangana	<i>Xylia xylocarpa</i>	45.4			No
34	Misc Spp	<i>Mangifera indica</i>	24.6	0.8	1.5	Poor

(Source: Field Survey & Analysis)

4.1.4 The species wise regeneration status for each Range has also been assessed. This has been calculated by Summing up the numerical value of total regeneration seedlings of each enumerated species in all the sample plots and then divided by the total no. of sample point worked out. As per the guideline of National Working Plan Code 2014 the Regeneration Status of the dominant and predominant tree species of the division which counts to 33 in number has been taken into account and rest of the species found during the survey taken as Misc. species. The Range wise Regeneration Status is given in **Table.4.10 to 4.15.**

Table No. 4.10: Regeneration status of different species in Balimela Range

Sl.N o.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	0.5	0.1		Poor
2	Amla	<i>Emblica officinalis</i>	1.6	0.8		Poor
3	Asan	<i>Terminalia</i>	9.5	0.2		Poor

		<i>tomentosa</i>				
4	Bahada	<i>Terminalia belerica</i>	1.4	0.1		Poor
5	Bandhana	<i>Ooginia oogenensis</i>	1.6			No
6	Bela	<i>Aegel marmelos</i>	0.5	0.1		Poor
7	Bhalia	<i>Semicarpus annacardium</i>	1.0			No
8	Bheru	<i>Chloroxylon swietiana</i>				No
9	Char	<i>Buchanania lanzan</i>	1.8	0.4		Poor
10	Dhaman	<i>Grewia tiliifolia</i>	2.2	0.3		Poor
11	Dhaura	<i>Anogeissus latifolia</i>	9.7	0.7		Poor
12	Haladu	<i>Adina cordifolia</i>	0.5	0.1		Poor
13	Harida	<i>Terminalia chebula</i>	0.8	0.1		Poor
14	Jamun	<i>Syzygium cumunii</i>	0.5	0.1		Poor
15	Kasi	<i>Bridelia retusa</i>	2.4	0.5		Poor
16	Kataka	<i>Strychnos potatorum</i>	0.1			No
17	Kendu	<i>Diospyros melanoxylm</i>	3.6	2.2		Poor
18	Kumbhi	<i>Careya arborea</i>	0.3	0.1		Poor
19	Kusuma	<i>Schleichera olosa</i>	3.0	0.1		Poor
21	Mahul	<i>Madhuca indica</i>	0.5			No
22	Mai	<i>Lenea coromondalica</i>	3.9	0.1		Poor
23	Mundi	<i>Mitragyna parviflora</i>	4.4	0.2		Poor
24	Piasal	<i>Pterocarpus marsupium</i>	4.6	0.1		Poor
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Boswallia serrata</i>	0.1			No
27	Sataparadi a	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>	1.4			No
29	Simili	<i>Bombax ceiba</i>	1.6			No
30	Sirisa	<i>Albezia lebbback</i>	2.8	0.1		Poor
31	Sisoo	<i>Dalbergia</i>	1.6			No

		<i>latifolia</i>				
32	Sunari	<i>Cassia fistula</i>	0.9	0.1		Poor
33	Tangana	<i>Xylia xylocarpa</i>	0.1			No
34	Misc Spp	<i>Mangifera indica</i>	20.4			No

Table No. 4.11: Regeneration status of different species in Chitrakonda Range

Sl. No	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	3.6			No
2	Amla	<i>Emblica officinalis</i>	3.0		0.6	Poor
3	Asan	<i>Terminalia tomentosa</i>	4.5			No
5	Bahada	<i>Terminalia belerica</i>	0.3			No
6	Bandhana	<i>Ooginia oogenensis</i>	1.7			No
7	Bela	<i>Aegel marmelos</i>	0.9			No
8	Bhalia	<i>Semicarpus annacardium</i>	0.3			No
9	Bheru	<i>Chloroxylon swietiana</i>				No
10	Chara	<i>Buchanania lanzan</i>	2.2	0.3		Poor
11	Dhaman	<i>Grewia tiliifolia</i>	0.6	0.1		Poor
12	Dhaura	<i>Anogeissus latifolia</i>	4.3			No
13	Haladu	<i>Adina cordifolia</i>				
14	Harida	<i>Terminalia chebula</i>	1.4		0.6	Poor
15	Jamun	<i>Syzygium cumunii</i>	0.7			No
16	Kasi	<i>Bridelia retusa</i>	1.9			No
17	Kataka	<i>Strychnos potatorum</i>				No
18	Kendu	<i>Diospyros melanoxylon</i>	6.4	0.9		Poor
19	Kumbhi	<i>Careya arborea</i>	0.1			No
20	Kusuma	<i>Schleichera oliosa</i>	2.2	0.1		Poor
21	Mahul	<i>Madhuca indica</i>	1.2			No
22	Mai	<i>Lenea coromondalica</i>				No
23	Mundi	<i>Mitragyna parviflora</i>	6.1			No
24	Piasal	<i>Pterocarpus marsupium</i>	5.4			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Boswallia serrata</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>	0.4			No
29	Simili	<i>Bombax ceiba</i>				No

30	Sirisa	<i>Albezia lebback</i>	0.6			No
31	Sisoo	<i>Dalbergia latifolia</i>	0.7			No
32	Sunari	<i>Cassia fistula</i>			0.1	No
33	Tangana	<i>Xylia xylocarpa</i>	15.2			No
34	Misc Spp	<i>Mangifera indica</i>	12.9	1.3	1.0	Poor

Table No. 4.12: Regeneration status of different species in Kalimela Range

Sl.No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	0.1			No
2	Amla	<i>Emblica officinalis</i>	0.4			No
3	Asan	<i>Terminalia tomentosa</i>	12.5	0.5	0.1	Good
5	Bahada	<i>Terminalia belerica</i>	0.9			No
6	Bandhana	<i>Ooginia oogenensis</i>	1.1			No
7	Bela	<i>Aegel marmelos</i>	0.2			No
8	Bhalia	<i>Semicarpus annacardium</i>	0.2			No
9	Bheru	<i>Chloroxylon swietiana</i>				No
10	Char	<i>Buchanania lanzan</i>	1.5	0.5	0.3	Good
11	Dhaman	<i>Grewia tiliifolia</i>	0.9			No
12	Dhaura	<i>Anogeissus latifolia</i>	10.2	0.4		Poor
13	Haladu	<i>Adina cordifolia</i>				No
14	Harida	<i>Terminalia chebula</i>	0.3			No
15	Jamun	<i>Syzygium cumunii</i>	0.3	0.1		Poor
16	Kasi	<i>Bridelia retusa</i>	2.7			No
17	Kataka	<i>Strychnos potatorum</i>				No
18	Kendu	<i>Diospyros melanoxyl</i>	7.9	3.9	0.5	Good
19	Kumbhi	<i>Careya arborea</i>	0.9			No
20	Kusuma	<i>Schleichera oliosa</i>	3.8	0.9		Poor
21	Mahul	<i>Madhuca indica</i>	3.1	0.3	0.3	Good
22	Mai	<i>Lenea coromondalica</i>	5.4	1.0	1.0	Good
23	Mundi	<i>Mitragyna parviflora</i>	5.0	0.1	0.1	Good
24	Piasal	<i>Pterocarpus marsupium</i>	4.6			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Boswallia serrata</i>	0.2			No
27	Sataparadia	<i>Dalbergia paniculata</i>	1.2			No
28	Sidha	<i>Lagerstormia parviflora</i>	2.7			No
29	Simili	<i>Bombax ceiba</i>	0.6			No
30	Sirisa	<i>Albezia lebback</i>	0.3			No
31	Sisoo	<i>Dalbergia latifolia</i>	0.8			No

32	Sunari	<i>Cassia fistula</i>	0.2			No
33	Tangana	<i>Xylia xylocarpa</i>				No
34	Misc Spp	<i>Mangifera indica</i>				No

Table No. 4.13: Regeneration status of different species in Malkangiri Range

Sl. No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>				No
2	Amla	<i>Emblica officinalis</i>	1.3	0.2		No
3	Asan	<i>Terminalia tomentosa</i>	6.0			No
5	Bahada	<i>Terminalia belerica</i>	0.2		0.2	Poor
6	Bandhana	<i>Ooginia oogenensis</i>	0.2			No
7	Bela	<i>Aegel marmelos</i>				No
8	Bhalia	<i>Semicarpus annacardium</i>				No
9	Bheru	<i>Chloroxylon swietiana</i>	2.9		0.4	Poor
10	Char	<i>Buchanania lanzan</i>	1.3			No
11	Dhaman	<i>Grewia tiliafolia</i>	8.0	0.2		Poor
12	Dhaura	<i>Anogeissus latifolia</i>				No
13	Haladu	<i>Adina cordifolia</i>	1.3			No
14	Harida	<i>Terminalia chebula</i>	0.7	0.2		Poor
15	Jamun	<i>Syzygium cumunii</i>	4.2			No
16	Kasi	<i>Bridelia retusa</i>				No
17	Kataka	<i>Strychnos potatorum</i>	10.2	8.4	0.2	Good
18	Kendu	<i>Diospyros melanoxylon</i>	0.2			No
19	Kumbhi	<i>Careya arborea</i>	2.0	0.2		Poor
20	Kusuma	<i>Schleichera oliosa</i>	1.3	0.4		Poor
21	Mahul	<i>Madhuca indica</i>	4.4			No
22	Mai	<i>Lenea coromondalica</i>	2.0	0.2		Poor
23	Mundi	<i>Mitragyna parviflora</i>	2.0			No
24	Piasal	<i>Pterocarpus</i>	2.2			No

		<i>marsupium</i>				
25	Sal	<i>Shorea rubosta</i>	0.2			No
26	Salai	<i>Boswallia serrata</i>	3.8		0.2	Poor
27	Satapara dia	<i>Dalbergia paniculata</i>	0.9			No
28	Sidha	<i>Lagerstormia parviflora</i>	1.3			No
29	Simili	<i>Bombax ceiba</i>	0.9			No
30	Sirisa	<i>Albezia lebback</i>	0.7			No
31	Sisoo	<i>Dalbergia latifolia</i>	4.9			No
32	Sunari	<i>Cassia fistula</i>	12.7	2.0	0.9	No
33	Tangana	<i>Xylia xylocarpa</i>				No
34	Misc Spp	<i>Mangifera indica</i>				No

Table No. 4.14: Regeneration status of different species in Mathili Range

Sl. No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>	0.8			No
2	Amla	<i>Emblica officinalis</i>	1.8			No
3	Asan	<i>Terminalia tomentosa</i>	8.3			No
5	Bahada	<i>Terminalia belerica</i>	1.2			No
6	Bandhan a	<i>Ooginia oogenensis</i>	0.3			No
7	Bela	<i>Aegel marmelos</i>	1.5			No
8	Bhalia	<i>Semicarpus annacardium</i>	0.3			No
9	Bheru	<i>Chloroxylon swietiana</i>				No
10	Char	<i>Buchanania lanzan</i>	1.5			No
11	Dhaman	<i>Grewia tiliafolia</i>	1.3			No
12	Dhaura	<i>Anogeissus latifolia</i>	4.8			No
13	Haladu	<i>Adina cordifolia</i>	1.2			No
14	Harida	<i>Terminalia chebula</i>	1.5			No
15	Jamun	<i>Syzygium cumunii</i>	0.7			No
16	Kasi	<i>Bridelia retusa</i>	3.7			No
17	Kataka	<i>Strychnos potatorum</i>				No

18	Kendu	<i>Diospyros melanoxylon</i>	7.2	13.7		Poor
19	Kumbhi	<i>Careya arborea</i>	0.7			No
20	Kusuma	<i>Schleichera oliosa</i>	3.5	0.2		Poor
21	Mahul	<i>Madhuca indica</i>	1.2			No
22	Mai	<i>Lenea coromondalica</i>	2.7			No
23	Mundi	<i>Mitragyna parviflora</i>	3.2	0.2		Poor
24	Piasal	<i>Pterocarpus marsupium</i>	3.3	0.2		Poor
25	Sal	<i>Shorea rubosta</i>	7.7			No
26	Salai	<i>Boswallia serrata</i>				No
27	Satapara dia	<i>Dalbergia paniculata</i>	0.2			No
28	Sidha	<i>Lagerstormia parviflora</i>	1.0			No
29	Simili	<i>Bombax ceiba</i>	1.0			No
30	Sirisa	<i>Albezia lebback</i>	0.8			No
31	Sisoo	<i>Dalbergia latifolia</i>	2.7			No
32	Sunari	<i>Cassia fistula</i>	0.2			No
33	Tangana	<i>Xylia xylocarpa</i>	3.7			No
34	Misc Spp	<i>Mangifera indica</i>	20.2	0.7	0.0	Poor

Table No. 4.15: Regeneration status of different species of Motu Range.

Sl.No.	Local Name	Botanical name	No. trees/Ha	No. shrub/Ha	No. of herbs/Ha	Regeneration Status
1	Amba	<i>Mangifera indica</i>				No
2	Amla	<i>Emblica officinalis</i>				No
3	Asan	<i>Terminalia tomentosa</i>	75.0			No
5	Bahada	<i>Terminalia belerica</i>				No
6	Bandhana	<i>Ooginia oogenensis</i>				No
7	Bela	<i>Aegel marmelos</i>				No
8	Bhalia	<i>Semicarpus annacardium</i>				No
9	Bheru	<i>Chloroxylon swietiana</i>	70			No
10	Char	<i>Buchanania lanzan</i>	55.0			No
11	Dhaman	<i>Grewia tiliifolia</i>				No
12	Dhaura	<i>Anogeissus latifolia</i>	25.0			No
13	Haladu	<i>Adina cordifolia</i>				No

14	Harida	<i>Terminalia chebula</i>				No
15	Jamun	<i>Syzygium cumunii</i>				No
16	Kasi	<i>Bridelia retusa</i>	5.0			No
17	Kataka	<i>Strychnos potatorum</i>				No
18	Kendu	<i>Diospyros melanoxyl</i>	15.0			No
19	Kumbhi	<i>Careya arborea</i>				No
20	Kusuma	<i>Schleichera olosa</i>				No
21	Mahul	<i>Madhuca indica</i>	10.0			No
22	Mai	<i>Lanea coromondalica</i>	5.0			No
23	Mundi	<i>Mitragyna parviflora</i>	5.0			No
24	Piasal	<i>Pterocarpus marsupium</i>	5.0			No
25	Sal	<i>Shorea rubosta</i>				No
26	Salai	<i>Boswallia serrata</i>				No
27	Sataparadia	<i>Dalbergia paniculata</i>				No
28	Sidha	<i>Lagerstormia parviflora</i>				No
29	Simili	<i>Bombax ceiba</i>				No
30	Sirisa	<i>Albezia lebback</i>				No
31	Sisoo	<i>Dalbergia latifolia</i>				No
32	Sunari	<i>Cassia fistula</i>				No
33	Tangana	<i>Xylia xylocarpa</i>				No
34	Misc Spp	<i>Mangifera indica</i>	30.0	0.0	0.0	No

Analysis: - From the survey, it is found that the regeneration status of species like *Terminalia tomentosa*, *Buchanania lanzan*, *Diospyros melanoxylon*, *Lanea coromandelica*, *Mitragyna parvifolia* is good in some of the surveyed places, whereas in Kalimela Forest Range, it shows good regeneration as compared to other Ranges of Malkangiri Forest Division. A Good numbers of mature trees species are found without regenerating phases which is example of discontinuous population structures. Most of the tree species are absent at their regeneration stage at the study area. On analysis of the regeneration data of the Division, it is observed that the regeneration is poor. This is an alarming situation that is needed to be tackled head on.

4.2 Area affected by forest fire:

4.2.1 Fire constitutes by far the greater dangerous to the Forests and is responsible for loss for soil fertility and destruction of regeneration. The danger from the sources occurs from March to 2nd week of June. In many cases fire spreads from the adjoining village lands and frequently the villagers set fire to forests for obtaining ash manure which is washed down to the adjoining cultivation by rain water. The Fire Case details are given in **Appendix XII**.

4.2.2 Causes of Forest Fire:

Forest fires are caused by Natural as well as Manmade causes: -

- Natural causes- Many forest fires start from natural way such as lightning and electric spark. However, rain extinguishes such fires without causing much damage. High atmospheric temperatures and dryness (low humidity) offer favorable condition for forest fire.
- Manmade causes- Fire is caused when a source of fire like cigarette or bidi, with inflammable material. Forest dwellers while passing through the forest in night use fire torch with them. Tribal collecting MFP like Mohua flower, clear the leaf litters under the tree by setting fire for easy collection. Hunters set fire to scars Wild animal.

4.2.3 Classification of Forest Fire:

Forest fire can broadly be classified into three categories;

- Natural forest fire.
- Forest fires caused by heat generated in the litter and other biomass in summer through carelessness of people (human neglect) and
- Forest fires caused by local inhabitants with an ill intention.

4.2.4 Types of Forest Fire: There are three basic types of forest fires

- **Crown fires:** Burn the trees up to entire length up to top. These are the most intense and dangerous forest fires.

- **Surface fires:** Burn only surface litter and duff. These are the easiest fires to put out and cause the least damage to the forest.
- **Ground fires:** Sometimes called underground or subsurface fires, occur in deep accumulations of humus, peat and similar dead tree that become dry enough to burn. These fires move very slowly, but difficult to extinguish or suppress. Occasionally, during prolonged drought, such fires can smolder all winter underground and then emerge at the surface again in spring.

4.2.5 Preparedness and Mitigation Measures

Forest fires are usually seasonal. They usually start in the dry season and can be prevented by adequate precautions. Five Year Plans have provided funds for forests fighting. Fire is prevented in the summer through removal of forest litter all along the forest boundary. This is called "Forest Fire Line" This line used to prevent fire breaking into the forest from one compartment to another. The collected litter is burnt in isolation. Generally, the fire spreads if there is continuous dry vegetation along its path. The best way to control a forest fire, to prevent it from spreading, which can be done by creating firebreaks in the shape of small clearings of ditches in the forests.

All the DFOs have been asked to make registration of the mobile phone numbers for fire alert along with the Range Officers so that a quick alert of FSI can be disseminated to field. The IT & GIS cell of Office of PCCF, Odisha is facilitating the details of KMZ file relating to different divisions received from FSI to Forest divisions with geo- coordinates up to Forest Block level for field inspection by ground staff. The field Officials then take adequate measures for extinguishing the forest fire and report back to the higher authority. The flow chart of the total mechanism is given below.

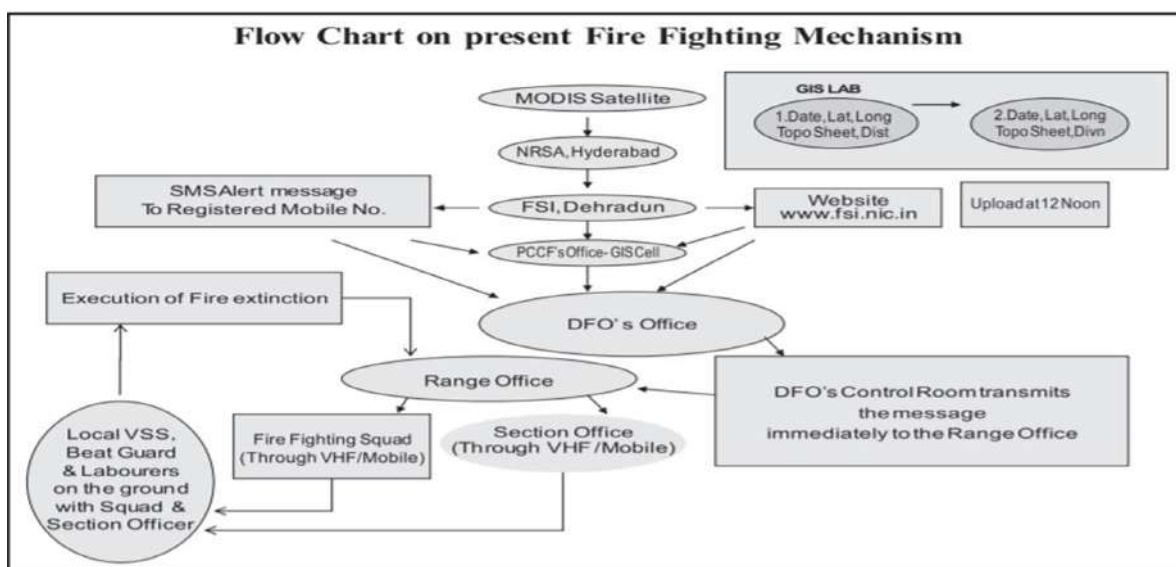


Fig. 4.1 Flow Chart on Present Fire Fighting Mechanism

4.2.6 Precautions: -

The followings are the important precautions against fire:

- To keep the source of fire or source of ignition separated from combustible and inflammable material.
- To keep the source of fire under watch and control.
- Not allow combustible or inflammable material to pile up unnecessarily and to stock the same as per procedure recommended for safe storage of such combustible or inflammable material.
- To adopt safe practices in areas near forests viz. factories, coal mines, oil stores, chemical plants and even in household kitchens.
- To incorporate fire reducing and firefighting techniques and equipment while planning a building or coal mining operation.
- In case of forest fires, the volunteer teams are essential not only for firefighting but also to keep watch on fire inside Forest.
- To arrange firefighting drills frequently.



Fig 4.2 Fire Squad at Simagudi of Malkangiri Range

4.2.7 Impacts of Forest Fires on Environment

4.2.7.1 Forest fires also pose serious health hazards by producing smoke and noxious gases. The burning of vegetation gives off not only carbon dioxide but also a host of other, noxious gases (Greenhouse gases) such as carbon monoxide, methane, hydrocarbons, nitric oxide and nitrous oxide, that lead to global warming and ozone layer depletion. In the tropical deciduous forests of Odisha, fire is a recurrent phenomenon due to higher levels of water stress during summer. Traditional land use practices and changing in weather pattern have resulted in higher fire incidences. Consequently, thousands of people suffered from serious respiratory problems due to these toxic gases. Recent measurement suggests that biomass burning may be a significant global source of methyl bromide, which is an ozone depleting chemical. Forest fires in India are mostly anthropogenic in nature. Following are the major causes of forest fire which may be intentional as well as accidental.

Forest fires globally are considered as one of the major factors of climate change, biodiversity loss and increase in global temperature due to production of biological carbon and greenhouse gasses. In the tropical deciduous forests of Orissa, fire is a recurrent phenomenon

due to higher levels of water stress during summer. Traditional land use practices and changes in weather pattern have resulted in higher fire incidences in the tropical India. Forest fires in India are mostly anthropogenic in nature. Following are the major causes of forest fire which may be intentional as well as accidental:

- (i) Burning of forest floor for good growth of Kendu stump and grass or in the next season
- (ii) Setting of fire under the crown of Tree for collection of Mahua flower and Sal seed
- (iii) Setting of fire for cleaning of forest floor for podu cultivation
- (iv) For Hunting of wild animals
- (v) Un-extinguished campfires, charcoal panniers of forest dwellers
- (vi) Un-extinguished cigarettes or bidi butts being thrown in the under bush etc.

The most fire prone area of the Division as per the analyze of the MODIS data received from the office of the Principal Chief Conservator of Forest, Odisha during the fire season i.e. February to May (from the year 2009-10 to 2019-20) is detailed below;

1. Mathili Range: Dharmagarh RL, Dasmantpur RL, Tulasi UDPF and Bonda Ghati Forest area under Revenue
2. Malkangiri: Goiparbat RL, Sindhrimal PRF, Koilipari PRF, Guppakonda PRF
3. Balimela: Balimela PRF, Taralakota PRF,
4. Chitrakonda: Dantunguda PRF, Sarkubandh RF, Jantri PRF, Kondakamberu PRF.
5. Kalimela: Bejanguwada RL

Table No. 4.16: Year wise Forest Fire incident of Malkangiri Forest Division

Year	No. of Incidents	Area Burnt (in Ha.)	Remarks
2007-08	-	-	On receipt of GIS information, the staff squad engaged are put their full effort to fight and restore the forest fire down.
2008-09	-	-	
2009-10	51	18.21	
2010-11	3	3.3	
2011-12	78	33.0	
2012-13	91	22.3	
2013-14	67	92.9	
2014-15	62	44.37	
2015-16	139	114.75	
2016-17	157	95.8	
2017-18	1238	712.29	
2018-19	1178	523.53	
2019-20	1378	361.40	
2020-21	1040	230.392	

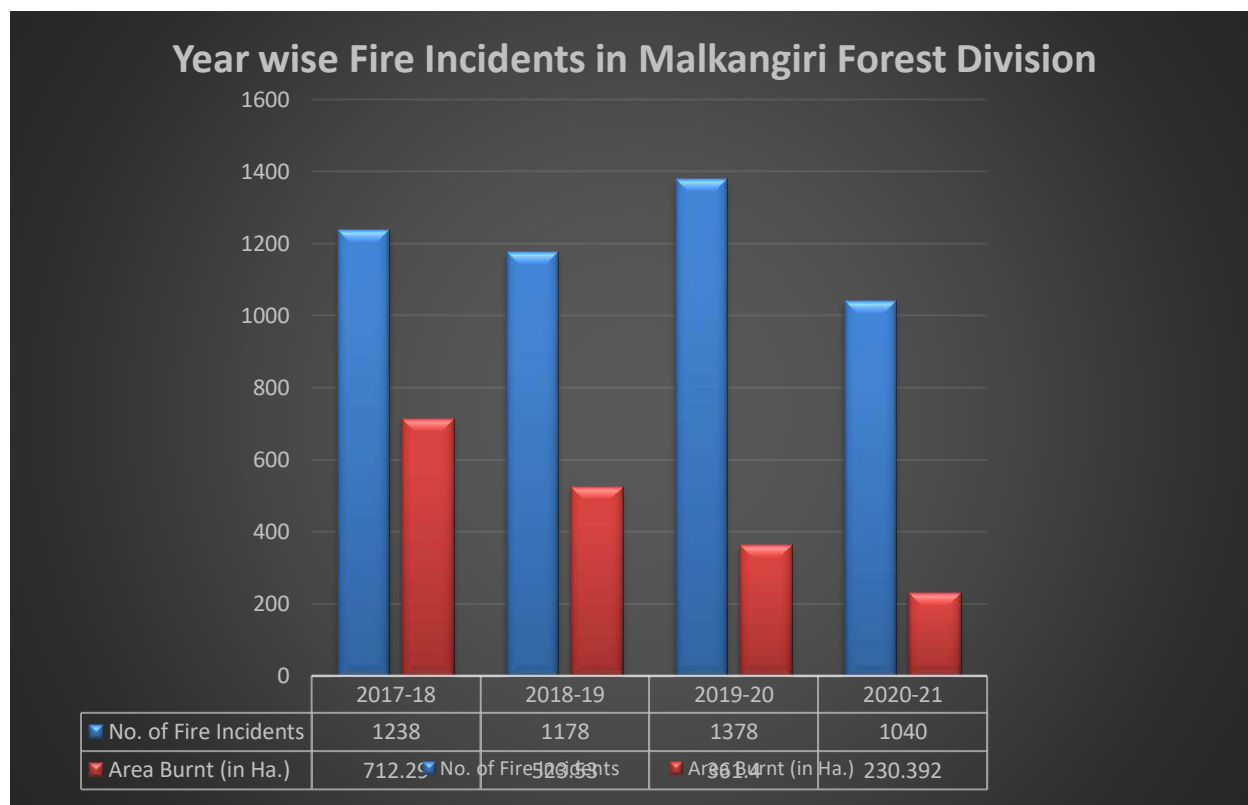


Fig. 4.3 Year wise Fire Incidents in Malkangiri Forest Division

4.3 Area damaged by natural calamities: Drought, flood, cyclone and frost are some of the climatic factors, which cause injury to the forests. Droughts have a profound effect on young plantations and natural regeneration. Though the Odisha faced two Nos of Natural calamity e.g. cyclone in the recent past but the Hudhud cyclone had a great impact in Malkangiri District particularly in Forest point of view. Hudhud originated from a low pressure system that formed under the influence of an upper-air cyclonic circulation in the Andaman Sea. Hudhud underwent rapid deepening in the following days and was classified as a Very Severe Cyclonic Storm by the IMD. Shortly before landfall near Visakhapatnam, Andhra Pradesh, on October 12, Hudhud reached its peak strength with three minute wind speeds of 185 km/h (115 mph.) The heavy wind during Hudhud had resulted in falling many trees in Malkangiri District particularly Chitrakonda and Mathili area.

Table No. 4.17: The Details of Impact of Hudhud Cyclone on Forest

Year/session	Type of natural calamity	Frequency of natural calamity (incidences)	Forest area affected and level of impact	Intervention made	Impact of intervention
2014	Cyclone Hudhud	First time	254 Nos of Trees has been uprooted in Malkangiri	221 Nos. trees have been salvaged and handed over to OFDC.	---

Other natural calamity i.e., Flood which is uncommon as the areas in the Division does not have much low-lying areas. Drought in the area is experienced sporadically.

4.4 Area protected from grazing: Grazing is a problem to the forests adjoining the village and more in Sarangapalli RF, Gotiguda RF, Mathili RF, Mecca RF, Motu RF, Chitapari RF, Sileru East RF, Akur RF. All animals depend mainly on forest for grazing throughout the Division. Availability of grasses and fodder for their cattle is plenty in Forest area and scanty in villages, so forest is the only alternative source. However, the VSS are taking care of these forests to reduce the impact of grazing by domestic cattle and it is found to be successful. The Orissa Forest (Grazing of Cattle) Rules 1980 has been enacted which is in force, but its implementation is not at all satisfactory. Unauthorized grazing is rampant but no offence case for such acts has been booked. Stringent measures are needed to control grazing with encouragements for stall feeding including growing edible grass in agricultural fields involving the co-operation of Veterinary Department.

The District Veterinary Services started separately after formation of the new District in the year 1993. There are seven blocks in the District, each having a Veterinary Dispensary, four Second V. Ds and two D.N.K. V.Ds. and 50 Livestock Aid Centers and 1 District Diagnostic Laboratory are functioning in the District.

Table No.4.18: Livestock population of Malkangiri as per 2013 Livestock Census

Cattle		Buffalo	Sheep	Goat	Pig	Poultry	Duck	Total
Indigenous	Crossbred							
4,28,963	5,692	46,890	28,545	1,44,961	60,173	4,87,244	24,357	12,26,825

4.5 Lopping Practices: Grazers lop the trees to feed the leaves to cattle. Also, bamboo clumps are lopped. Even easy collection of fire wood trees is lopped/ pruned. Lopping of branches of standing trees is common in lean period particularly during summer when grazing materials become scarce. No such systematic suggested for collection of NTFP. So, the NTFP collectors are damaging the branches of trees due to lack of awareness Lopping is resorted by grazers to open canopy to facility growth of grass.

4.6 Area Infested by Invasive Weed Species in Forests: Weeds chokes the establishment of regeneration valuable young plants due to competition for food and light. Eupatorium and Lantana are common weeds in this Division and these weeds are essential for eradication from plain forests. There are 173 No. of Invasive exotic species found in India. Some of the identified invasive species present in Malkangiri Division is given in **Table. 4.19**

Table No.4.19: Invasive Species present in Malkangiri Division

SL. No.	Name of the species		Family	Origin	Habit	Habitat	Uses
	Local	Scientific					
1	Gokhura	<i>Acanthospermum hispidum</i>	Asteraceae	Brazil	Herb	Wasteland	Medicinal
2	Pokosungha	<i>Ageratum conyzoides</i>	Asteraceae	Central America	Herb	Wasteland	Medicinal
3	Odosamari	<i>Argemone Mexicana</i>	Papaveraceae	South America	Herb	Cultivated field	Medicinal
4	Punarnaba	<i>Boerhavia diffusa</i>	Nyctaginaceae	Tropical Africa	Herb	Wasteland	Medicinal
5	Akanda	<i>Calotropis gigantean</i>	Apocynaceae	Tropical Africa	Shrub	Wasteland	Medicinal
6	Arakha	<i>Calotropis procera</i>	Apocynaceae	Tropical Africa	Shrub	Wasteland	Medicinal
7	Ghodachakunda	<i>Cassia occidentalis</i>	Fabaceae	South America	Herb	Wasteland	Medicinal
8	Sana chakunda	<i>Cassia tora</i>	Fabaceae	South America	Herb	Wasteland	Medicinal
9	Akanabindhi	<i>Cissampelos pareira</i>	Manispermaceae	South America	Climber	Wasteland	Medicinal
10	Bana sorisa	<i>Cleome viscosa</i>	Cleomaceae	Central America	Herb	Wasteland	Medicinal
11	Bana haladi	<i>Corchorus aestuans</i>	Cleomaceae	Central America	Herb	Wasteland	Medicinal
12	Nirmuli	<i>Cuscuta reflexa</i>	Convolvulaceae	Mediterranean	Climber	Parasites	Medicinal
13	Duba	<i>Cynodon dactylon</i>	Poaceae	Tropical Africa	Grass	Wasteland	Medicinal
14	Mutha grass	<i>Cyperus rotundus</i>	Cyperaceae	Europe	Grass	Wasteland	Medicinal
15	Kala dudura	<i>Datura metel</i>	Solanaceae	Central America	Shrub	Wasteland	Medicinal
16	Dudura	<i>Datura stramonium</i>	Solanaceae	Central America	Shrub	Wasteland	Medicinal
17	Bhrungaraj	<i>Eclipta alba</i>	Asteraceae	Central America	Herb	Wasteland	Medicinal
18	Amari	<i>Ipomoea carnea</i>	Convolvulaceae	Central America	Shrub	Wasteland	not known
19	Naga airi	<i>Lantana camara</i>	Verbenaceae	Central America	Shrub	Wasteland	Medicinal
20	Lajakoli	<i>Mimosa pudica</i>	Fabaceae	Brazil	Herb	Wasteland	Medicinal
21	Bana tulasi	<i>Ocimum canum</i>	Lamiaceae	Central America	Herb	Wasteland	Medicinal
22	Amliti	<i>Oxalis corniculata</i>	Oxalidaceae	Europe	Herb	Wasteland	Vegetable
23	Chitaparu	<i>Plumbago zelanica</i>	Plumbaginaceae	Africa	Herb	Wasteland	Medicinal
24	Bilati babul	<i>Prosopis juliflora</i>	Fabaceae	Central America	Tree	Wasteland	not known
25	Kasatandi	<i>Saccharum spontaneum</i>	Poaceae	Tropical West Asia	Grass	River bed	not known
26	Bana ganjai	<i>Scoparia dulcis</i>	Plantaginaceae	Central America	Herb	Wasteland	not known

27	Bajramuli	<i>Sida acuta</i>	Malvaceae	Central America	Herb	Wasteland	not known
28	Nunununia	<i>Solanum nigrum</i>	Solanaceae	Central America	Shrub	Wasteland	Medicinal
29	Dantari	<i>Accacia pennata</i>	Solanaceae	Central America	Shrub	Wasteland	Medicinal
30	Pokosunga	<i>Eupatorium odoratum</i>	Asteraceae	Central America	Shrub	Wasteland	Medicinal

4.6.1 During the year CAMPA APO-2009-10 initiation has been taken to eradicate the invasive weeds from some Forest Block under CAMPA fund. The details of the area are given in Table No-4.20.

Table No.4.20: Eradication of Weeds in Malkangiri Division

Sl No	Name of the Range	Name of the Site	Name of the forest Block	Area covered (in Ha)
1	Balimela	Rasabeda	Balimela RF	38
2		Teakguda	Teakguda RF	53
3		Nilakamberu	Matumkonda PRF	38
4	Chitrakonda	Chitrakonda	Sileru-West RF	38
5	Kalimela	Pedawada	Pedawada PRF	43
6	Mathili	Muduliguda	Gotiguda RF	43
7		Markapalli	Malidanger RF	43
8	Malkangiri	Rampur	Sidrimal PRF	43
9		Kambeda	Kambeda	43
10		Dangaskhal	Dangaskhal	48
11		Tangapalli		38
18		Sindrimal	Sindrimal PRF	103
		Total		571

4.6.2 In Malkangiri Forest Division the most threatened invasive species are *Lantana camara*, *Eupatorium oderatum*, *Accacia pennata*, *Prosopis juliflora*, and *Mimosa pudica*. So many measures have been taken in the past to eradicate the above invasive species but it gave a very poor result.

4.6.3 Climbers: Light to medium climbers are found in some forest blocks like Sarangapalli RF, Pitatung PRF, Malidanger RF, Gotiguda RF, Chitapari RF, Sileru-West RF, Udayagiri RF etc which causes unsoundness of the trees around. They are even found to have damaging effect on the growth of young seedlings as well. Common climbers are *Bauhinia vahlii* (siali), *Butea superb*

(*noipalas*), *Butea parviflora* (*marada*), *Millettia auriculata* (*ganj*), *Smilax macrophylla* (*muthuri*), *Combretum decandrum* (*atundi*), and *Acacia pinnata* (*dantari*)

4.6.4 Though Weeding is a measure part of plantation of activity, due to speedy growth, high reproduction capacity, vegetative propagation, seed dispersal through air, the invasive species come up very quickly and obstruct the growth of plants. It is very difficult for the field functionaries to raise a successful plantation in the open patches.

4.7 Incidences of pest and diseases: The pests significant to the Indian forests in the recent past are the Sal borer, leaf gall of Eucalyptus, Shisham mortality, etc. interestingly, these pest phenomena cover both natural forests as well as plantations, Based on generalized symptoms (spots, wilt, etc.) and signs (mushroom like fruiting bodies); nature of pathogen-whether fungi, bacteria, nematode, plant parasite, etc. ; Pathogen survival especially in relation to weeds; photographic documentation of problem and their confirmation through internet sources and expert advice; mapping of disease distribution may be done. Such details are very vital for timely diagnosis and effective management of the problem. Role of silvicultural practices that can reduce the pest problem; knowledge of species phenology to collect healthy seeds from the trees before they fall off on forest floor; scientific felling to reduce the standing tree damage as injury serves as an infection court for many heart rotes, etc., nutrient status of the soil governing the susceptibility/resistance of the host in many cases; identification and selection of superior individuals also as a source for resistance against the disease; identification and evolution of lesser known species (and weeds) of an area for their biochemical profiling including bio-pesticide properties, etc. can be an effective , eco-friendly, economical and easily available for pest/disease management.

As per the Malkangiri Forest Division concerned there is no Forest Disease or Pest has been reported in the recent past. The Forest area of Malkangiri Are Mixed dry Deciduous Forest the epidemic of Forest Disease and Pest are minimum and do not creating any major havoc to the Forest Department.

Thus, any major is not been noticed, but it is necessary to constitute a Divisional level Research Team with Forest Scientist and Field Staff to monitor the epidemic of Pest and Disease and also to take up research on Entomology in Malkangiri. Some insects are emphasized as below.

4.7.1 Pathogenic fungi: Fungal diseases have also been noticed in varying degrees in these forests. They cause decay and rot the trees. Though no study has been done to quantify the damage, the common fungi found in the forests of the Division are dealt herewith.

4.7.2 *Fomes caryophylli* (Root & Stem Rot): Decay due to it is commonly known as ‘gauji’ or ‘Sambhar ankhi’ because of the characteristic appearance of pink knots, which look like the eyes of Sambhar deer. It is heart rot of Sal and is commonly seen in all the forest patches where Sal is predominant species as in blocks like Sarangapalli RF, Pitatung PRF etc. It attacks when the bark gets opened up, may be because of tapping of Sal resin. In early stages of its attack, heartwood is stained & then ring rot is caused. Later on, the decayed wood becomes spongy and after causing appreciable decay, fungus emerges through the sound sapwood into the bark in the form of pink knots. Bark in the region of eye (knot) is gradually shed off.

4.7.3 *Hymenochaete rubiginosa* (Canker and Heart rot): White-pocket-rot is caused by this fungus. Affected parts become fibrous and look white. White patches are usually surrounded by brown wood. This is commonly seen in moist Sal forests of Sarangapalli RF and Pitatung PRF wherein it even attacks the associates of Sal like Piasal as well.

4.7.4 *Hypoxylon annulatum*: It is a root fungus usually attacks Eucalyptus trees. Heartwood does not develop and decay may develop as white spongy rot as. ***Polyporus shoreae* (Root & Collar Rot):** It is a root fungus of Sal and affects the damper portion. It causes death and drying of healthy Sal trees by destroying their root system and making them incapable of drawing nutrients and water from the soil.

4.7.5 *Olivea tectonae* (leaf rust of Teak): This fungus attacks leaves of teak. The colour of lower surfaces of leaves changes from green to bright yellow/orange and the upper surface gives a grayish appearance. This is commonly noticed in Motu RF, Matumkonda PRF, Balimela PRF and Sileru-west RF. Another fungus viz ‘Powdery mildew of teak’ is also observed in these forests affecting the leaves, which gives bluish colour to the upper surface of such leaves where even powder substance appears. Due to these fungi, growth is normally hampered.

4.7.6 *Loranthus scurrula*: Loranthus mainly attacks Sal poles and trees. The extent of damage it causes to the host tree has not yet been exactly assessed. It does not cause mortality in Sal but is

believed to be responsible for the unsoundness of the host tree. It is also found to affect Char and Mahul trees.

4.7.7 Insects and Borers Damages caused to the forests by insects & borers are not as serious as the damages caused by pathogenic fungi. However, the main species found affecting the crop are summarized briefly in the following paragraphs

4.7.7.1 *Hoplocerambyx spinicornis* insect is the main cause of damage to Sal forest. The larvae of this borer form tunnel in the heartwood and cause noticeable damage. Other insects like *Aeolesthes holosericea* and *Xyleborus glabratus* that attack dead and fallen Sal trees. These are commonly known as lenticel beetle & pinhole borer respectively and are more common in the stacked timbers.

4.7.7.2 Teak skeletonisers are noticed in Balimela PRF, Mantriput PRF & Matumkonda PRF. This is caused by *Hapalia machaeralis* where as *Hyblaea puera*, the teak defoliator, also affects the teak leaves in almost all the plantation areas.

4.7.7.3 Termites are a menace in plantations, especially Eucalyptus and also in the timber depots because of long storage.

4.8 Forest degradation and its drivers: The forests of Malkangiri Forest Division are vulnerable to injuries mostly due to biotic and abiotic factors. The important biotic factor being the Human beings, Animals, Insects, Climbers, weeds etc, whereas Abiotic factor being Forest fire, natural calamities like flood, drought etc. are responsible for degradation. The most governing injuries are implicated by human beings. Irrecoverable damages are inflicted for conversion of forest land to homestead, mostly by human beings.

Increasing population crisis is the main causes for degradation of forests. Illicit felling encroachment, fire and consequent soil erosion are result of Human Population which is in the rise.

The forests close to human habitation are most prone to heavy grazing. Grazing is a serious problem for degradation of forest. As result young recruits and saplings badly damaged due to concentrated and unregulated over grazing.

Mostly all the Ranges of the Division are widely affected by encroachment by the Tribes and other Forest dwellers. In some forest blocks it presents a very devastated appearance due to fragmentation of the forests.

Mining of major minerals in the Division is not a common feature, though forests areas are rich in Tin ore in Tulsi RL of Mathili Range and Quartzite in Challanguda and Mendikuli area of Mathili. Other minor mineral like murum and boulders are collected by the department and in some case private too on a regular basis, in some area by the local people also to earn their livelihood. This collection is destructive to forests.

4.9 Pollution control and protection of Environment: Environmental pollution is biggest problem; we are facing now. Environmental pollution comes in various forms such as air pollution, water pollution, soil pollution, Light pollution, littering, noise pollution, plastic pollution, radioactive contamination, thermal pollution, visual pollution. Air pollution causes significant damage to our environment and ecosystem. Ground level ozone damages agriculture crops, forest and plants, reducing their growth rates.

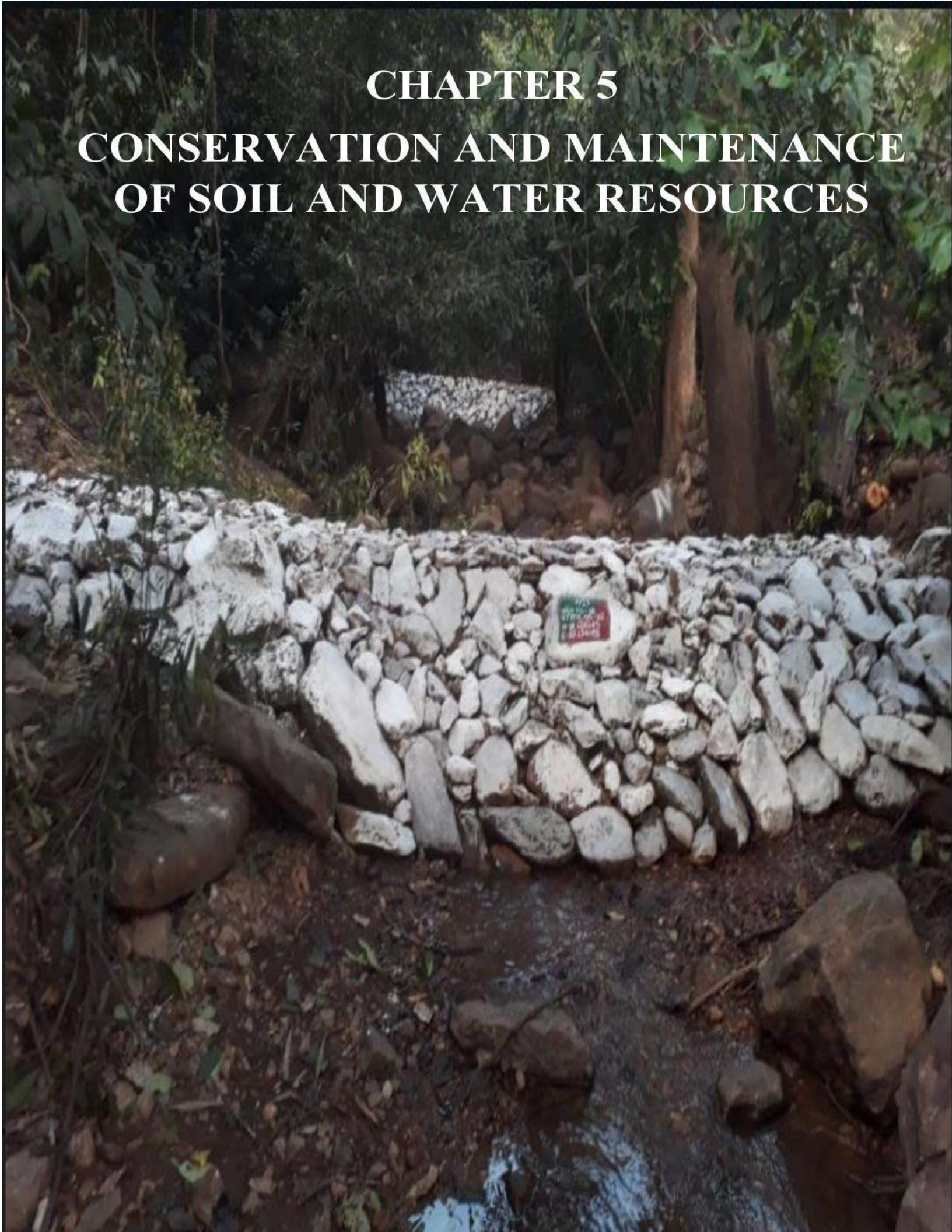
In Malkangiri Forest Division polluted reasons for deforestation, fuel wood collection, agricultural/ pastoral encroachment, forest fire, leased out for stone quarry and other developmental projects.

Everyone is a stakeholder as we are all inhabitants of this one and only mother earth. Each person can contribute something to advance environmental pollution mitigation measures. Environmental protection means caring for our resources and subsequently for ourselves and ensuring a sustainable future for generations to come will have a better environment.

For promoting awareness among the people on environment protection and conservation, the Government has instituted “Prakruti Mitra” and “Prakruti Bandhu” awards to encourage voluntary organization/ Villages/ Institution/ Individuals to work on protection of environment.

CHAPTER 5

CONSERVATION AND MAINTENANCE OF SOIL AND WATER RESOURCES



5.1 Area Treated Under Soil and Water Conservation Measures

Heavy rains and rapid run-off severely affect not only the top fertile soil but leads to formation of gullies within forest areas. Suitable management imperatives need to be formulated to stop forest degradation due to natural causes and calamities. Apart from silvicultural operations, it is also necessary to take appropriate measures for conservation of soil and water in the forest areas. Areas susceptible to soil erosion such as steep slopes and areas in the vicinity of perennial streams etc. should be focused for soil and water conservation interventions with the provision of an overlapping working circle.

Sheet erosion is noticed all over the forest area of the Division. The top layers of soil which store organic matter and nutrients etc, on which plants feed are lost in the process. It decreases soil fertility, lower sub-soil water level and water holding capacity of the soil. The Organic Carbon content of the soil is negatively affected due to the soil erosion.

The exact areas treated under soil conservation are not to be assessed as no special work for soil conservation alone is carried out but SMC works form part of the plantation works. In the Division, in the last 10 years **9729.04** ha have been taken up for plantation and can safely be presumed that this area is treated for soil conservation. However, in the last three years, in view of the AJY project, large areas are being treated specifically for soil and water conservations in the table below.

Table No. 5.1: Soil and water conservation in Malkangiri Forest Division

Name of Division	Name of Range	Year	Area in Ha	Soil Conservation Measures taken up		Remarks
				No. of Staggered Trench	No. of L.B.C.D.	
1	2	3	4	5	6	7
Malkangiri	Malkangiri	2016-17	2742.04	164522	59	SMC work has been taken up in plantation area with RF and PRF areas.
	Chitrakonda	2016-17	1587	95220	31	
	Mathili	2017-18	100	6000	8	
	Balimela	2017-18	900	54000	180	
	Mathili	2018-19	400	24000	--	
	Balimela	2018-19	1600	96000	--	
	Mathili	2019-20	500	6000	--	
	Kalimela	2019-20	1000	12000	--	
	Motu	2019-20	500	6000	--	
	Mathili	2020-21	800	53700	195	
	Balimela	2020-21	70	3250	60	
	Kalimela	2020-21	1255	72000	152	
	Motu	2020-21	1115	65328	131	
	Chitrakonda	2020-21	227	12365	196	
	Malkangiri	2020-21	280	26000	87	
		Total:-	13076.04	696385	1099	

5.1.1 Forest management practices can affect both the quantity and quality of water, with impacts varying across areas, forest and treatment types, soils, climate, and harvesting intervals. As an example of effects on quantity, canopy removal during harvesting can reduce evaporation transpiration levels, increasing water yield. This effect is usually transient, however, as the re-growth of young forest, eventually results in a decrease of water yield. With respect to water quality, disturbances to soil during forest management activities could result in greater sediment delivery to surface waters. Recognition of the links between forest management practices and water resources has led to the development of best management that focus on minimizing or eliminating deleterious effects.

5.1.2 Soil Erosion: The word ‘erosion’ literally means to wear away. In soil erosion, fertile soil surfaces are detached and removed from their original places and are deposited at some other places. According to Fox (1950), “the term soil erosion covers a wide range of physical and

chemical actions, such as removal of soluble matters, chemical changes, disintegration by frost or by rapid changes of temperature, attrition by dust charged wind, scouring by silt laden currents, alternate impact and succession by storm waves, landslides and so on". Thus, soil erosion is the removal of soil from its upper part.

There are two main types of erosions, namely:

- ❖ **Normal Erosion:** When the top soils are gradually removed under normal conditions of physical, biotic and hydrological equilibrium it is called normal erosion. Sometimes, it is also called geologic erosion. It is very slow process in which complete equilibrium is maintained between soil removing and soil forming processes. The normal erosion tends to produce wavy or undulating land surface with alternating ridges and depressions. This is accomplished chiefly by means of slow migration of soil particles from soil surface in successive rains. In arid region, wind during the long dry season is an important factor for normal erosion.
- ❖ **Accelerated Soil Erosion:** When the removal of soil does not keep harmony with the soil formation and it is much faster than the latter, it is called accelerated soil erosion.

5.1.2.1 Agencies Causing Soil Erosion:

Soil erosion is caused by the following two agencies:

- (A) Climatic.
- (B) Biotic.

A. Climatic Agencies Causing Erosion of Soil

These are water and wind.

- **Water:** Water is an important factor in soil erosion. Snow and melting ice also remove the top soil to considerable extents. Soil is directly affected by heavy rainfall, rapidly running water and by wave action.

Erosion caused by water may be of the following types:

- (i) **Sheet erosion:** Uniform removal of a thin layer of soil from large area is called sheet erosion. It is affected by run-off effect of rain water.
 - (ii) **Rill erosion:** In this type of soil erosion, heavy rainfall and rapidly running water produce finger-shaped grooves or rills over the entire field.
 - (iii) **Gully erosion:** It is more prominent type of erosion in which heavy rainfall, rapidly running water and transporting water may result in deeper cavities or grooves called gullies. Gullies may be 'V' shaped or 'U' shaped. Gullies cut the fields into small fragments and make them uncultivable. Continuous flow of water through gullies further deepens the grooves and may ultimately result in ravines. Ravines are 15 to 30 meter in deep and with steep vertical sides.
 - (iv) **Landslides or slip erosion:** This type of soil erosion is caused by heavy rainfall and it occurs in sloppy lands, such as mountains and hills. In this type of erosion when the running water percolates through the crevices of rocks great masses of soils and loose rocks lying on the steep slopes slip downward.
 - (v) **Stream bank erosion:** On the banks of swollen rivers it is most active. During the rainy season when fast running water streams take turn in some other directions, they cut the soil and make caves in the banks. As a result of this, quite often large masses of soils become detached and washed away from the banks and are deposited at places in course of streams.
- **Wind Erosion:** Removal of soil by wind is called wind erosion. Stormy winds carry the soil particles to distant places and sometimes form sand-dunes. Wind currents usually remove the top soil which is fertile and frill of humus and minerals. Wind causes the following three types of soil movements, viz.,
- (i) **Siltation:** Under the influence of direct pressure of stormy wind small soil particles of 1 to 1.5 mm diameters move up from the soil surface, generally in vertical direction. Major part of wind carried soil is moved in a series of bounces, called siltation.

- (ii) **Suspension:** In this, fine soil particles (diameter less than 1 mm) are suspended in air. These suspended particles are kicked up when particles of siltation strike on the soil. The soil particles are deposited at distant places.
- (iii) **Surface creep:** In this, there are larger particles ranging from 5 to 10 mm in diameter. Because they are too heavy to move in siltation, they creep on surface of soil.

B. Biotic Agencies Causing Soil Erosion

Excessive grazing, deforestation, undesirable forest biota, and mechanical practices by man are important factors which cause soil erosion. Deforestation is the commonest factor which is responsible for soil erosion. Grazing is yet another destructive biological factor for the soil erosion. Cattle and sheep during the summer graze the forest vegetation and make the soil bare.

Wendell Berry a famous environmental activist quoted

“The soil is the great connector of lives, the source and destination of all. It is the healer and restorer and resurrector, by which disease passes into health, age into youth, death into life. Without proper care for it we can have no community, because without proper care for it we can have no life.”

5.1.2.2 Some Other Causes of Soil Erosion:

- ❖ Uneven distribution of rainfall.
- ❖ As discussed, in chapter-2, Shifting cultivations are usually noted in the hills and mountains which are geographically young and degraded into soil easily and the whole of the land is covered with a thick mantle of tropical forest vegetation. The removal of the forest or bush cover by felling and burning for shifting cultivation and the resulting exposure of the bare soil to rains and sun, cause enormous soil losses especially on hill slopes. Both surface layer of the soil and large quantity of plant nutrients are washed away

under the influence of intense rainfall. Fields on steep slopes are cultivated and top soil is washed away by rains. The loss of soil is too much and the fields become uncultivable.

- ❖ Forest fires are responsible for burning down forest trees on huge scale.
- ❖ Faulty agricultural methods, sometimes farmers do not care towards leveling and terracing of their upland fields. Rainfall washes away the top soil and results in erosion.
- ❖ Over-grazing by cattle causes removal of vegetational cover of the soil.

5.2 Duration of Water Flow in the Selected Seasonal Streams

This Division is also bounded with perennial River Kolab in the North and Northwest, Sileru in the East and Sabari in the West. Generally, there is no dearth of water from July to December. However, scarcity is felt from January to June, when most of the seasonal nallahs and streams dry up. Hence, it is necessary to create waterholes and check dams on the higher slopes across nallahs to improve water availability during summer.

The entire division is traversed by a number of perennial streams. From the field data the streams found in Malkangiri Division are summarized in the **Table No. 5.2** below.

Table No. 5.2: Perennial Rivers and Streams in Malkangiri Forest Division

Name of the Range	Name of the River	Name of the stream/Nala
Malkangiri	Sabari	Satiguda
Mathili	Sapthadhara, Kolab	Gariakond, Dangapakan
Kalimela	Poteru, Sabari	Tagel,udichi,poteru
Motu	Sileru, Sabari	
Chitrakonda	Sileru	Baiguda,Stepanguda,Palam,Badliguda Petal, Tangari and Nanamanjari
Balimela	-	Bandhaguda,Domanichua, Khadikajodi,

5.3 Wetlands in Forest Areas

Wetlands are transitional areas between aquatic and terrestrial ecosystem where the water level is usually near the surface or land is covered by shallow water. Wetlands provide suitable

habitat for birds and act as winter resort for varieties of migratory birds being very good source of food, fodder and other biological products.

The check- dams have been created in all ranges of the Division in the form of water body. The water body found in Malkangiri Division is summarized in the **Table No. 5.3** below.

Table No. 5.3: Water Body in Malkangiri Forest Division

Name of the Range	Name of the Forest	Nos of waterbody created
Malkangiri	Laxmanpur URL	15
	Kutiguda PRF	
	Goiparbat RL	
	Puneruguda URL	
	Jharapalli RF	
	Kambada RL	
	Sindrimal RF	
	Munuskonda PRF	
	Singrajkonda PRF	
	Jagannathpalli RL	
	Pititung PRF	
	Tamasa PRF	
Mathili	DasmantpurRL	14
	Godiali RF	
	Gotiguda RF	
	Dhungiaput RF	
	Chaulmendi RF	
	Talapads URL	
	Mendukuli PRF	
	Bariabahal PRF	
	Putparbat RF	
Kalimela	Pedawada RF	9
	Silakota RL	
	Undrokonda PRF	
	Telerai URL	
	Eralgundi RF	
	Udaygiri RF	
Motu	Padampur URL	08
	Malavaram RF	
	m.v-127 URL	
	Lachipeta URL	
	Tamanpali PRF	
	Murliguda RF	
	Pusuguda RF	
Chitrakonda	Sileru West PRF	16
	Matamkonda PRF	
	Bandhaguda PRF	

	Badakonda PRF	07
	Goudagurei PRF	
	Banguru RF	
Balimela	Balimela PRF	
	Chitapari RF	
	Matamkonda PRF	



Fig.5.1 Bapanpally water Body



Fig.5.2 Iralgundi water Body



Fig.5.3 Muraliguda water Body



Fig.5.4 Telerai water Body

Besides that, there are six water bodies are found in six Ranges where the birds census has been taken up since last 10 years as details below.

Table No. 5.4: Water Bodies for Birds Census

Sl. No.	Name of the Range	Name of the Water body
1	Malkangiri	Satiguda Dam
2	Mathili	Sibasagar Mathili
3	Balimela	Balimela Reservoir near Dyke -I
4	Kalimela	Fishery Tank Kalimela and Undrukonda pond
5	Chitrakonda	Balimela Reservoir
6	Motu	Sileru and Saberi River

5.3.1 Management of Wetlands and Unique Habitats: The existing wetlands in these forest areas and inhabitant flora and fauna would be studied. These wetlands are the abodes of aquatic fauna such as fish, aquatic birds and migratory birds which visit these wetlands. The nesting sites should be identified and protected without disturbances and for this purpose planting of suitable species shall be taken up along the boundaries of wetlands. Unique habitats like caves, cliffs would be studied and protected from the management point of wild animals.



Fig. 5.5 (i) Bird Census of Malkangiri Range



Fig. 5.5 (ii) Bird Census of Malkangiri Range

5.4 Water Level in the Wells in the Vicinity (Up To 5km) Forest Area

Generally, there is no water level problem of well from July to December. But during summer, water tables of wells go down to 19 to 21 meters in this Division. As such many wells get dry up towards last part of May. The water tables of wells in different places are furnished below.

Table No. 5.5: Summer Water Table in Malkangiri District

Name of the Block	Minimum	Maximum
Malkangiri	10.50mtr.	13.50mtr.
Korukunda	12.00mtr.	13.50mtr.
Kalimela	10.50mtr.	13.50mtr.
Khairput	12.00mtr.	13.50mtr.
Podia	10.50mtr.	13.50mtr.
Chitrakonda(Kudmulgumma)	12.00mtr.	13.50mtr.
Mathili	12.00mtr.	13.50mtr.

(Source –RWSS, Malkangiri)

Groundwater is a natural resource with both ecological and economic value and is of vital importance for sustaining life, health and integrity of ecosystems. The resource is increasingly threatened by over-extraction which has insidious long-term effects. Scarcity and misuse of groundwater pose a serious threat to sustainable development and livelihood. Groundwater is one amongst the State's most important natural resources. There is significant freshwater deficit in

many areas of the State. Human health welfare and food security are at risk unless the ground water resources are managed more effectively and efficiently by the community.

It would also be necessary to plan and control the use of groundwater under the prevailing conditions. Publication and distribution of annual reports and related programmes for creating awareness among the community and for educating them will have to undertake regularly. This will enable avoiding scarcity as well as the hectic activity and excessive expenditure that have become characteristic of summer months.

5.4.1 Status of Ground Water Development (Block wise)

It is basically a tribal district and occupied by hard crystalline rocks. Development of ground water is feasible through dug wells. The Net ground water resource of the district is assessed to be 33598 HM and the gross annual draft for domestic, industrial, and irrigation uses is 2942 HM. The average stage of ground water development in the district is 8.76 %, the lowest being Kudumulguma at 4.57% and highest being at Khairput at 13.38%.

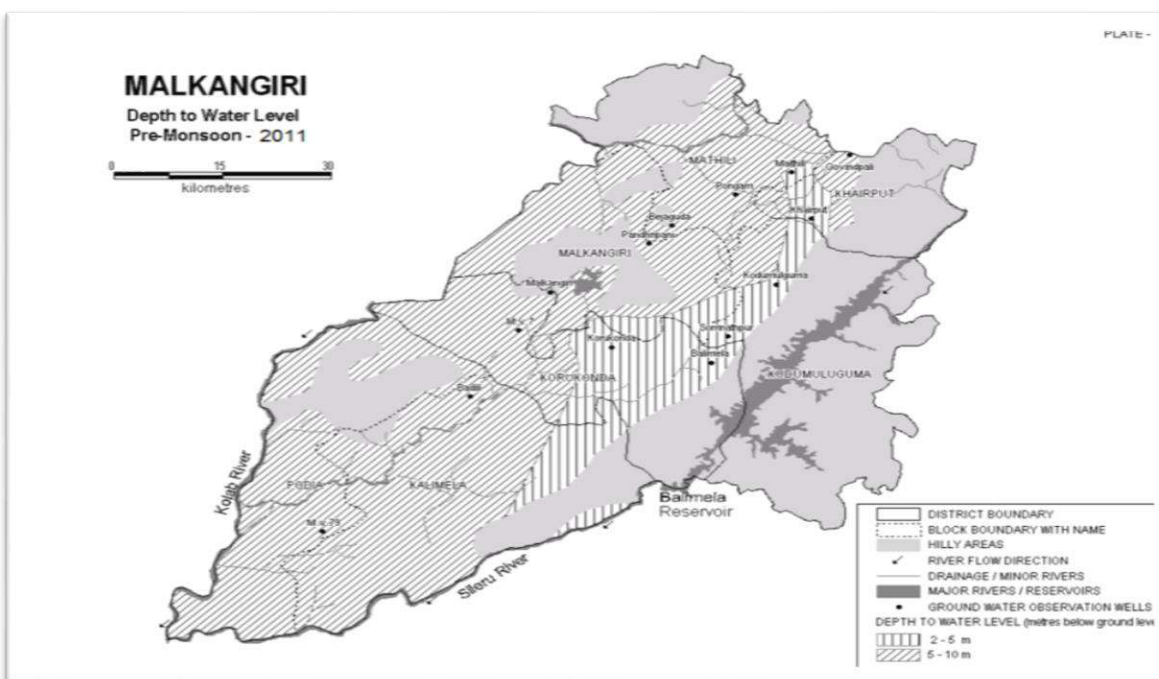


Fig. 5.6: Water Level Map of Malkangiri

5.4.2 Ground Water Management Strategy

5.4.2.1 Ground Water Development: Ground water development in the district is mainly through dug wells, Dug-cum-bore wells and bore wells. Ground water is mainly used for domestic and irrigation purpose and in limited scale for industrial purposes.

The district has a net shown area of 117823 ha out of the total geographical area of 439080 ha. However only about 46000 ha area in the district is presently irrigated from both surface and groundwater sources, leaving more than 60% of the net shown area without irrigation facilities. This vast area has rainfed agriculture. For augmenting food-grains production this area has to be brought under the strings of irrigation. Considering the low stage of ground water development in the district, there remains ample scope for further groundwater exploitation which will expand the irrigated agriculture.

Dug well - It is the most common groundwater abstraction structure in the district. Dug wells are feasible in Padi plain areas. In hilly tracts it is feasible only in the intermontane valleys. The design of the dug wells depends upon hydro-geomorphological and hydro-geological set up, depth to water table, seasonal water table fluctuation. The dug wells should be located preferably in topographic low and should tap maximum thickness of the weathered zone. The dug wells should be of 10 m to 18 m depth and 4.5 m to 6 m in diameter. All the wells should be energized for optimal utilization of their potentials. Tentatively a total of 27189 additional wells are feasible in the district. The wells may be fitted with 1.5 to 2 HP. centrifugal pumps. The wells may sustain yield maximum up to 3 LPS.

Dug-cum-Borewell - The dug cum borewell can be constructed in the areas where the weathered zone is more than 15 m deep. The vertical bores drilled within dug well increase the yield of the well. The bore well within the dug well should be 25 m to 30 m in depth from ground level. The wells should be fitted with 2 HP. centrifugal / submersible pumps may sustain yield up to 3 LPS

Bore Wells - Lineaments or structurally weak zones in the hard rocks present favourable sites for borewells. Borewells have not met with success in Korukonda block. Borewells located in the vicinity of lineaments are likely to be successful. Wells drilled in Granite and Gneisses are likely

to be more successful than in other formations. Borewells should be 100 m to 150 m deep and of 150 mm to 200 mm diameter. The borewells may be fitted with submersible pump sets of 2-3 HP depending upon the well discharge and depth to water level.

The district is predominantly inhabited by weaker section of the society and the majority of the farmers have small and marginal land holdings. In such a background sinking of groundwater structures viz. dug-wells and bore-wells which require small capital investments and less maintenance cost will be a better alternative for the poor farmers as compared to the major and medium irrigation projects. The financial institutions may provide loans on easy terms for the construction of these wells. The wells should be sunk at the hydro-geologically favorable sites. For this purpose, the expert guidance can be sought from the State Groundwater Organization. Agricultural extension services may educate the farmers in adopting suitable cropping pattern, so as to fully utilize the newly created potentials. Energization of the wells will ensure optimal utilization of these yield potentials. Programme may also be launched for the construction of percolation tanks, check dams, contour bounding which will conserve rain water and facilitate additional recharge to the groundwater reservoirs.

For the population of Malkangiri district particularly in the hilly areas, groundwater is the only sustainable and safe source of drinking water, particularly during summer season, when water scarcity becomes acute. As part of the Technology Mission programme in Malkangiri district, borewell sites were pin pointed through hydrogeological investigations aided by Remote Sensing Studies. The water scarcity in the district may be effectively mitigated through scientific management and judicious utilization of groundwater resources.

While targeting ground water structures for irrigation use or for heavy industrial establishment utmost care should be taken in maintaining the safe distance between ground water structures to avoid well interference. This will facilitate optimal utilization of resources without any appreciable drawdown interference. The distance between any two dug wells/ dug cum bore wells fitted with pump set should be kept at least 100m. The distance between two bore wells may be kept between 150-200m.

5.4.2.2 Water Conservation & Artificial recharge

Malkangiri district is mostly traversed by Precambrian consolidated formations. The depth to water level varies from 2 – 5 mbgl in major part of the district during post monsoon and the average depth of water table in Chitrakonda is 5.03 mbgl and that of Motu is 5.63 mbgl. In these areas special studies may be taken up to evaluate the scope for artificial recharge. Deeper water level conditions in these areas may be due to prevailing topographic conditions and water table gradient, which facilitates flow of ground water through nalas and rivers and streams as base flows. To arrest the rapid decline of water table in these areas special studies may be taken up to pin point the areas where water scarcity problems are more pronounced during post monsoon and pre monsoon period. In these pockets suitable sites are required to be pin pointed to adopt artificial recharge techniques and rain water harvesting methods based on site specific conditions. This artificial recharge will also help in increase in storage and also in improving the quality of water etc. The most feasible artificial recharge and rain water harvesting structures are percolation tanks, nala/contour bunding, small check dams/weirs, renovation of old tanks to percolation tanks, subsurface dykes, water spreading, gully plugging, gabion structures etc.

5.4.3 Ground Water Related Issues & Problems

The ground water problems mainly are in the form of Ground Water Depletion,

5.4.3.1 Ground Water Pollution: Based on the chemical analyses of water samples collected from different aquifers, it is observed that almost all chemical constituents are well within the permissible limit for drinking as well as irrigational purposes, excepting at some localized patches where high nitrate values have been observed. As such there is no ground water pollution in the district.

5.4.3.2 Ground Water Depletion: The stage of ground water development in different blocks varies from 3.08 % (Kudmulguma) to 13.70 % (Khairput) with the overall stage of development 6.02% in the district. The fall of water levels are shown by 46% of the total and maximum fall is recorded to the tune of 0.1.113 m (MV-64 in Kalimela block) with the majority of the values

resting with in 10cm. From the perusal of water level over a period of 10 years, it has been observed that there is a significant decline in the trend ground water level.

5.4.4 Special Studies:

Special studies in the district has been taken up in the field of drinking water source finding under Rajiv Gandhi Technology Mission on Drinking Water

5.4.4.1 Technology Mission on Drinking Water

Kalimela block of Malkangiri District covered under the programme of Technology Mission on Drinking Waters. CGWB carried out scientific source finding for 14 no-source villages. A multi-disciplinary approach was adopted for identification of sustainable water sources. It included a study of the remote sensing maps which depicted lineaments and geomorphic units showing favorable locations of ground water. The hydro geological characteristics and yield potentials of formations were studied through spot hydro geological surveys and sites for suitable groundwater structures were pin pointed for each village. In Kalimela block 14 no-source villages were covered under source finding mission. Bore wells were recommended in 7 villages and sanitary wells in 7 others.

5.4.5 Recommendations

- a. Large scale planning for Ground Water Resources development should be preceded by intensive hydrogeological and geophysical survey aided by Remote Sensing studies and ground truth data.
- b. Existing dug wells should be deepened to tap the maximum saturated thickness of the weathered mantle or vertical bores maybe drilled to enhance the yield of the well where normally the dug wells get dried up.
- c. Energization of wells should be stepped up to ensure optimal utilization of the ground water resources to create additional irrigation potential.
- d. The State Ground Water Organization should render expert guidance for siting ground water structures in favorable hydro geological settings.
- e. The farmers should be educated through agricultural extension services, Mass Awareness and water management training programme to adopt suitable cropping pattern,

conservation of ground water and irrigation practices especially for drought tolerant crops for optimal utilization of available ground water resources.

- f. Programme for artificial recharge may also be taken up in areas where deeper water table condition coupled with high fluctuation is observed for augmentation of ground water resources through construction of percolation tanks, subsurface dykes, check dams, nala bunding and contour bunding and other site specific favourable artificial recharge structures.
- g. In areas of shallow water table lying within 0 to 5 mbgl during post monsoon period, surface water bodies like local ponds, farm ponds and small earthen dam along small streams may be constructed to hold water for long duration and for replenishment of soil moisture.
- h. Proper maintenance of reservoirs, tanks and spring channel by periodical de-siltation should be carried out so that the precious water resource could be judiciously utilized after monsoon.
- i. For augmentation of drinking water supply to the major towns and villages near the major rivers, infiltration galleries or collector wells may be constructed in suitable locales to fruitfully harness the base flow /subsurface flow which otherwise goes as waste.
- j. Network hydrograph stations in the canal command areas should be strengthened and periodical water level measurements continued to monitor any alarming rise of water table
- k. Growing of sugarcane and cash crops may be encouraged along the thin linear alluvial patches lying adjacent to major rivers where prolific ground water is available throughout the year.

5.5 Status of Aquifers:

5.5.1 Aquifer

An aquifer is a large underground storage space for water. They can be located right at the ground surface or very deep underground where they are impossible to access. They can be very large (e.g. some aquifers can span a province) or quite small. Aquifers can have high permeability, so water can flow easily in this layer. There is always a barrier below an aquifer that will not let water pass through to lower layers. This barrier, called an aquitard, is a layer with very low

permeability. It is very difficult for water to pass through an aquitard, so it helps contain the water in the aquifer. Every aquifer has an aquitard below it and many also have an aquitard above. When an aquifer has an aquitard on top of it, it is called a confined aquifer. If an aquifer only has an aquitard below it and does not have an aquitard above then it is called an unconfined aquifer. Unconfined and confined aquifers are shown in Figure 5.7.

5.5.1.1 Unconfined Aquifers

These are directly connected to the surface. When water infiltrates into the ground it passes through the unsaturated zone. The unsaturated zone has mostly air in it and is highly permeable. When the water passes the unsaturated zone, it reaches the saturated zone. The saturated zone is filled with water. The boundary between the saturated zone and the unsaturated zone is called the water table. When water seeps into the earth it will travel down the soil layers until it reaches the water table. The water table moves up and down depending on how much water is in the unconfined aquifer. Since unconfined aquifers are connected to the surface, they recharge quickly, and are prone to contamination.

5.5.1.2 Confined Aquifers

These are confined because they have an aquitard above and below the aquifer. These aquifers do not recharge quickly because it takes a long time for water to pass through the top aquitard. In some cases, confined aquifers contain high quality water because they are not directly impacted by human activity on the surface. Confined aquifers can contain groundwater that is very old. Water can stay in a confined aquifer for several millennia.

Aquifer

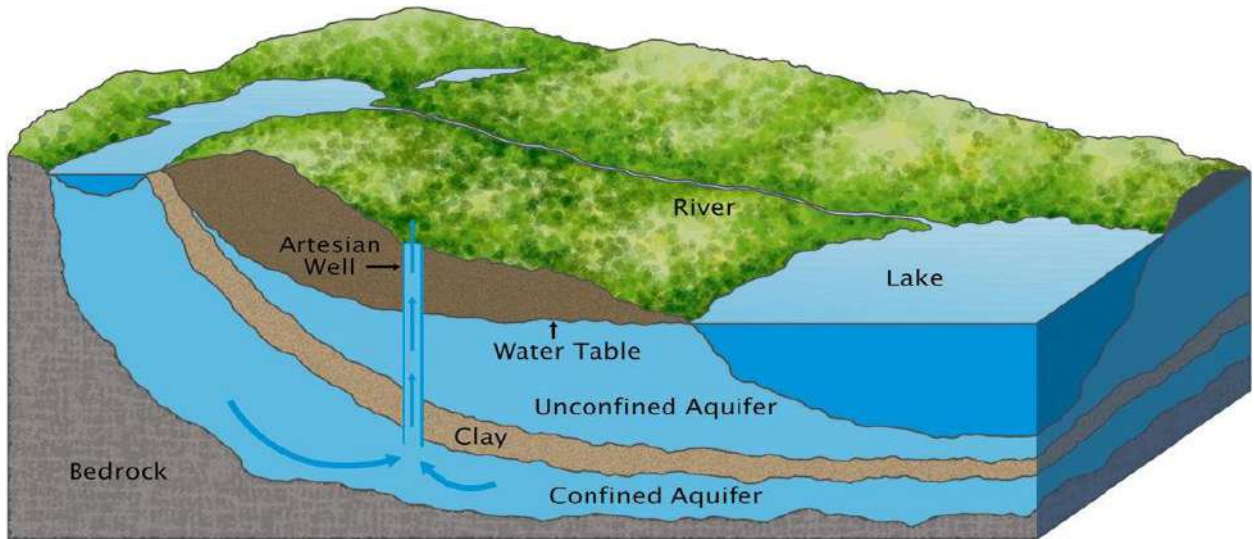


Fig. 5.7: Unconfined and Confined Aquifers

The details of aquifers are given below:

Table No. 5.6: List of Aquifers

Name of the Forest Block	Name of Stream	Origin from
Sarangapalli RF	Goriakond	Sarangapalli RF
Sarangapalli RF	Dangapakan	Sarangapalli RF
Sileru West RF	Baiguda	Sileru West RF
Sileru West RF	Stepanguda	Sileru West RF
Jantri PRF	Tangari	Jantri PRF
Jantri PRF	Nanamanjari	Jantri PRF
Matumkonda PRF	Badliguda	Matumkonda PRF
Matumkonda PRF	Petal	Matumkonda PRF
Goudagurei PRF	Palam	Goudagurei PRF
Balimela PRF	Khadikajodi	Balimela PRF
Balimela PRF	Domanichua	Balimela PRF
Tarlakota PRF	Bandaguda	Tarlakota PRF
Sindhimal PRF	Satiguda	Sindhimal PRF

5.5.2 Drainage Pattern

The general drainage pattern in the district is dendritic to sub-parallel. The Kolab river along with its tributaries, the Potteru and Sileru River is the most prominent river of the region. The Kolab River issues from the Sinkaram hills and follows a south westerly course after passing over Malkangiri district. The river joins the Godavari River in Khammam district of Andhra Pradesh.

The hills and forests cover almost seventy six percent of the total geographical area of the district as per the classification of the forest area by legal status in Malkangiri district as on 2005, which include reserve forests, demarcated-protected forests, un-demarcated forests, unclassified forests and other forests. Only limited areas are utilized for agricultural purposes. The net area under cultivation is only twenty six percent of the total geographical area.

The major surface water bodies are reservoirs, rivers, streams and ponds etc. The river Potteru which is a tributary of Kolab is generally perennial in nature with a sufficient flow during summer months. The Balimela reservoir is the major irrigation project and its canal command is around 61034 Ha. There are substantial numbers of tanks, ponds and water harvesting structures exist in the district, which hold considerable quantity of surface water as storage which serve the purpose for irrigation, bathing, drinking and industrial purposes.

5.5.3 Geological Mapping by CGWB

The geological mapping of the area was carried out by Sri H. Crookshank (1938). Shri F. Ahmed, Geologist of G.S.I conducted investigations on the geo-hydrological conditions in parts of the area in 1959. Parts of the area were covered by S/Sri S. K. Guha & P. N. Nag of G.S.I through systematic hydrogeological surveys (Malkangiri Zone, Dandakaranya Project) during 1966-67. The district was covered through systematic hydrogeological surveys by Sh. M. V. Rao, STA (Hydrogeology) CGWB during 1975-76. Reappraisal hydrogeological surveys were also carried out by S/Sh. G. Y. Setty (1987-88) and S. Suresh (1990-91). Further CGWB has drilled 8 (eight) Exploratory Well and 2 (two) Observation wells in the district to delineate the potential deeper aquifers.

Ground water monitoring is being done through 29 numbers of permanent hydrograph network stations and 4 piezometers four times in a year and water samples are collected once in a year during pre-monsoon for complete chemical analysis.

5.5.3.1 Ground Water Quality

The quality of groundwater in Malkangiri district has been assessed based on chemical analysis of water samples collected during the hydrogeological survey groundwater monitoring and exploratory drilling. The general ranges of different chemical constituents are as below.

Table No. 5.7 Groundwater Quality of Malkangiri District as Per CGWB

Chemical Constituents	Shallow Aquifers	Deeper Aquifers
pH	7.17 – 8.21	6.86 – 8.18
Specific conductance ($\mu\text{S} / \text{cm}$ at 25°C)	214 - 1664	156 – 1103
Chloride (mg/L)	14 - 255	7.1 – 50
Calcium (mg/L)	18 - 110	14 – 62
Magnesium (mg/L)	36 - 54	1.8 – 47
Bicarbonates (mg/L)	79 - 409	85 – 543
Total Hardness as CaCO_3 (mg/L)	75 - 495	45 – 260
Sodium (mg/L)	10 - 161	13 – 140
Potassium (mg/L)	12 - 62	1.2 – 12
Sulphate (mg/L)	-	1 – 41
Iron (mg/L)	-	0.14 – 0.53

5.5.3.2 Conclusion

Aquifers are the important resource for the district and the forests, in particular, which need to be recharged and enhanced. Based on CGWB data, it is pertinent that Malkangiri aquifers are still safe and not over exploited. However, steps must be taken by forest department, especially in forest areas and nearby villages to implement SMC and ground water recharge works for the betterment of the water regime in the forest areas and the District as well.

CHAPTER 6

MAINTENANCE AND ENHANCEMENT OF FOREST RESOURCE PRODUCTIVITY



6.1 Growing stock of wood: Analysis of growing stock is necessary to know the capacity and potential of the forest to have tree growth and also to calculate harvestable yield in the Working plan as also for future management to maintain the forest in the similar condition as a production forest. As the objective of forest management is gradually shifting towards regular flow of income and ecosystem services to local community keeping conservation and ecological security as the larger objective, the harvestable yield and increment of the forest has to be considered to arrive at crucial decision of sustainable management.

6.1.1 From the enumeration/field data, species wise distribution of trees in each diameter class will be generated for compartment/village/any other management unit. This data would be used for population structure and to identify the old group forest. The growing stock of trees must be so managed that it regularly provides the greatest possible quantity of the desired products including intangible benefits. Ratio method of estimation will be used for estimating the growing stock of important tree species using local volume tables developed by FRI/FSI or under previous working plans. Fresh local volume tables may be prepared, if required. Adding the growing stock all compartments, the growing stock of the block will be estimated, will be again integrated up to range level and further at Divisional level. Stratification developed by FSI based on forest type, density, land use using GIS can be used for increasing the precision of the estimate.

6.1.2 Methodology: The forest growing stock (GS), is a key parameter in the context of forest resource management and global change issues. The GS characteristics which are also referred to as species composition, forest structure, tree height, tree age, stem volume or bole volume of living trees, represent the volume of the tree stems for all living species per unit area, including bark but excluding branches and stumps. The growing stock volume is a major predictor for assessing the above-ground biomass and is central for estimating compartment or total above-ground biomass, which is a fundamental variable for estimating the net carbon dioxide exchange between the land surface and the atmosphere.

6.1.3 The methodology adopted for enumeration exercise have already been discussed in Chapter-3, at Para 3.2.4. The selection of blocks for sampling has been done duly considering the degrees of degradation & intensity of biotic interference. Moreover, the number of sample blocks per Range has been decided in proportion to the extent of the forest area available in the respective Ranges. These criteria have been adopted to have true representation of the forests by these sample units so as to get more accurate picture of the entire Division through statistical analysis. However, all those blocks/compartments in which the timber yield regulation is prescribed have also been covered with this enumeration exercise and included in the above 457 number of sample units. The enumeration includes number of tree species under various girth classes for different species inside each sample point. The measurement of girth has been done at the breast height for all the trees of & above 30 cm. In addition, regeneration and bio-diversity surveys have also been carried out. The results of these surveys are already reflected and discussed in Chapter 3. The bamboo enumeration has also been carried out & is dealt later in this chapter at para: 6.2.

6.1.4 Trend analysis is often used to predict future events; it could be used to estimate uncertain events in the past for collecting information and attempting to spot significant & prolonged change of a pattern. Growing stock (Stem) of Malkangiri Forest Division has been calculated for 164 No. of Forest Blocks and compared with the outgoing plan growing stock assessment as given in Table. 6.1

Table No. 6.1: Trend Detection in Growing Stock (Stem) of Malkangiri Forest Division

Girth class in cm	30-60	60-90	90-120	120-150	150 & above
Outgoing W.P.	2261217	3621846	3289649	1590644	1702461
Present W.P.	1862109	1544926	1390702	827035	1095271
Change (+/--)	-399108	-2076920	-1898947	-763609	-607190
Trend	Decreased	Decreased	Decreased	Decreased	Decreased

6.2 Growing stock of bamboo: In the outgoing working plan 10 no. of Felling Series covering 21 Forest Blocks were included with an area of 39446.77 Ha of Forest land under Bamboo overlapping working circle. In the last working plan prescription, it is seen that there are some Forest Blocks which are devoid of Bamboo growth and also are unproductive. Sometime the

working agency i.e. M/s OFDC Ltd reported that some of the Bamboo Coupes are economically not-viable. There is problem of LWE existence in the District also hinder the working of bamboo coupes.

During 2011-12, the revision of Working Plan for Malkangiri Forest Division for the year 2007-08 to 2016-17 has been approved for one year only. Under this plan the bamboo overlapping Circle covers only areas under RF/PRF only as per 1st P.W.P.R Meeting and does not cover area under R.L/U.R. L/ P.F. The Bamboo working area under this plan covers, 20 Forest Blocks, 10 cutting cycles, 40 annual coupes over an area of 39,446.77 Ha. Annual estimated yield in these Bamboo coupes ranges fall 4792 S.U to 6643 S.U per year with an average of 5706.5 S.U. per year.

Later, another scheme for working of bamboo areas of Malkangiri Forest Division which was carved out of Jeypore Division in 2003 was prepared by Divisional Forest Officer, Malkangiri for the cutting cycle 2005-06 to 2008-09 after detail survey of Bamboo area as per stipulation given by Government of India while approving Working Scheme for Bamboo Forest of Orissa (2004-05 to 2008-09) as it was then expected that revision of working plan would take another 2 to 3 years, The scheme was extended to 2010-11 as the revision of working plan was not completed. This scheme covers 12 Forest Block, 17 cutting series, and 68 Annual coupes covering area 1, 14, 874.0876 Ha Covering, R.L/ U.R.L. / P.F. Average production in the coupes worked under this scheme comes to 25,392, S.U. per year.

Further the bamboo scheme prepared for 2011-12 to 2016-17 over an area 81639.9749 Ha due to excluded unproductive/non-economical Bamboo Forest Blocks from the existing Bamboo overlapping working circle. The areas may be treated with intensive SSO work a part from higher protection and extensive SMC works. Thus, total area suggested under this current Working Plan is **110551.5823** Ha in this working circle including with Bamboo Scheme area.

6.2.1 At the time of carrying out the growing stock enumeration, the bamboo clumps wherever available have also been enumerated. The enumeration has been done in two stages.

Stage-1

In this stage, species wise number of clumps occurring in sampling unit is fixed according to the % of sampling which have been enumerated along with average height of the clumps. The

bamboo forests have been classified into three qualities depending on the culm height as per the criteria shown in table: 6.2.

Table No. 6.2: Different Quality Classes for Bamboo Clumps

Quality Class	Criteria
Quality Class-I	Culm height of 9 meters and above
Quality Class-II	Culm height between 6 meters to 9 meters
Quality Class-III	Culm height less than 6 meters

Stage-2.

In the second stage, number of culms in individual clumps have been counted duly differentiating & recording the culms age into 1st year; 2nd year; 3rd year & up. The enumeration data has been duly reflected in the respective compartment history.

The perusal of enumeration data clearly reveals that majority of Bamboo forests in the Division comprises mainly of Salia bamboo (*Dendrocalamus strictus*). The Salia bamboo is the most dominant species, which occurs almost in every area, is covering the forests of Chitrakonda, Balimela, Kalimela and some area in Mathili, Malkangiri and Motu Ranges. Besides, the large occurrence of Salia bamboo, the Daba bamboo (*Bambusa arundaneaceae*) does also occur but is confined along the Nallahs & Streams. Moreover, Chitrakonda and Kalimela Forest Ranges have better bamboo crop both in terms of quality & quantity. However, majority of the bamboo forests is of Quality-II. Due to anthropogenic pressure bamboo crops experiences the deterioration in both quality and quantity.

6.2.2 An attempt has been made to estimate the total growing stock of the Bamboo forests by adopting the standard statistical methods. The total number of clumps enumerated has been divided by the total area of enumeration to get number of clumps per hectare. This has been subsequently multiplied by the total bamboo forests area of the Division to estimate total number of clumps in the entire Division (Bamboo forest has been taken as that forest which contains at least 5% of bamboo). The second stage enumeration data has been similarly used to assess the

number of culms per clump. The total number of clumps in the Division when multiplied by number of culms per clump gives the total number of culms in the entire Division.

6.2.3 Further analysis of the data has been done and the total bamboo growing stock of the Division is estimated in terms of Sale Unit (SU). Though the quality classes of the Bamboo forests are varying from Q.I to Q.III, the average height of culms has been taken as 7.5 meters for the purpose of the present calculations since majority of the clumps have quality-II (Culm height in between 6m to 9m & thus average length is 7.5m). The total number of culms in the Division when multiplied with average length of a culm gives total length of the culms of all the estimated Bamboo clumps of the Division in RMT (Running Meters). It is then divided by 2400RMT to get total growing stock of the bamboo in terms of the standard Sale Units since one standard SU is equal to 2400 RMT. The abstract of growing stock of bamboo is given in table 6.3.

Table 6.3: Abstract of Growing Stock of Bamboo in Malkangiri Forest Division

Total Bamboo Area in the Division (In Ha)	110367.5123
Bamboo Area Enumerated (Ha)	21
Total Bamboo Clumps Enumerated (In No.)	446
Total Culms in the Enumerated Area (In No.)	16056
Average Clumps Per Hectare in Enumerated Area (In No.)	21.238
Average Culms Per Clump in Enumerated Area (In No.)	36
Total Clumps in the Entire Bamboo Forest (In No.)	2343985.2262
Total Culms in the Entire Bamboo Forest (In No.)	84383468
Average Height of the Culms (In Meters)	7.5
Total Culm Length in the Division (In Meters)	632876010
One Sale Unit (SU) of Bamboo (In Meters)	2400
Total Sale Units of the Bamboo Forest (In SUs)	263698.33

6.2.4 Classification of Bamboo: Before working of Bamboo coupes, a Treatment Map will be prepared on the topo map in 1:25,000 scale indicating Salia and Daba Bamboo areas separately. Treatment type to be distinguished in the first stage shall be based on the assessment of the standard Salia bamboo quality classes and actual clump condition. In both these cases areas less than 4ha will be taken. For Salia Bamboo areas the following Treatment Types have to be identified.

Treatment Type A - Areas with healthy and well stocked Bamboo Clumps consisting of

Clump Quality I – Culm height of Bamboos 9m and up.

Clump Quality II- Culm height of Bamboos between 6 to 9m.

Clump Quality III- Culm height of Bamboos below 6m.

Treatment Type B – Areas with well-stocked but degraded, damaged, congested and /or fire burnt clumps.

Treatment Type ‘C’ – Areas wherein Bamboo clumps are sparse and scattered. Sporadic and gregarious flowering should also be recorded for specific areas.

Secondly before taking up treatment the following factor are to be considered.

1. Total number of culms per clump
2. Number of culms of current year (1 year) (Karadi)
3. Number of culms of previous year (2 years) (Kasi)
4. Number of culms of third years and older ... (Pakala)
5. Average Diameter of young culms.
6. Average height of young culms.

6.3 Increment in volume of identified timber species: The Forest Survey of India, Central Zone Nagpur has developed Local Volume Table Equation for different species of the state mainly Phulabani, Sambalpur and Koraput District as per their sampling for Orissa state. The local volume equation for different species used in this Working plan is shown in Table No. 6.4. In this equation “D” denotes for over bark diameter at breast height in Meter (m), “V” denotes for volume under bark in meter cube (m³) of trees, inclusive of all branches up to 5 cms over bark diameter at thin end.

Table No. 6.4: Local Volume equation of Different Tree Species

Local Volume Regression Equations		
Name		Local Volume
Local	Botanical	Equation
Kurum	<i>Adina cordifolia</i>	$V = 0.08507 + 0.19669D + 7.16812 D^2$
Dhaura	<i>Anogeissus latifolia</i>	$V = 0.13928 - 2.87067 D + 20.22404 D^2 - 13.80572D^3$
Semul	<i>Bombax ceiba</i>	$V = 0.02834 + 4.68381 D^2$
Salai	<i>Boswellia serrata</i>	$V = 0.36432 - 1.32768 \sqrt{D} + 9.48471 D^2$
Kasi	<i>Bridelia retusa</i>	$\sqrt{V} = 0.11620 + 4.12711 D - 1.08508\sqrt{D}$
Sisoo	<i>Dalbergia latifolia</i>	$V = -0.00965 + 0.58546 D - 2.56050 D^2 + 24.342125 D^3$
Kendu	<i>Dyospyros melonxylon</i>	$\sqrt{V} = 0.06728 + 4.06351 D - 0.99816 \sqrt{D}$
Pitamai	<i>Bursera serrata</i>	$V = -0.09144 + 1.48588 D - 5.53172D^2 + 24.04851 D^3$
Sidha	<i>Lagersatroemia parviflora</i>	$V = 0.07199 - 1.25923 D + 9.28416 D^2$
Mai	<i>Linnea coromondelica</i>	$V = -0.01071 - 0.66528 D + 9.54478 D^2 - 4.58876 D^3$
Mahul	<i>Madhuca indica</i>	$V = 0.10423 - 1.38429 D + 8.39379 D^2$
Mundi	<i>Mitragyna parviflora</i>	$V = 0.08444 - 1.26801 D + 8.75274 D^2$
Piasal	<i>Pterocarpus marsupium</i>	$\sqrt{V} = -0.16276 + 2.82002D + 0.04034 \sqrt{D}$
Sal	<i>Shorea robusta</i>	$\sqrt{V} = 0.19994 + 4.57179D - 1.56823 \sqrt{D}$
Jamun	<i>Syzigium cumini</i>	$\sqrt{V} = 0.30706 + 5.12731 D - 2.09870 \sqrt{D}$
Bahada	<i>Terminalia belerica</i>	$V = -0.14823 + 2.44138 D - 6.86434 D^2 + 18.05444 D^3$
Asan	<i>Terminalia tomentosa</i>	$V = 0.05061 - 1.11994 D + 8.77839 D^2$
Misc	<i>Miscellaneous species</i>	$\sqrt{V} = 0.06063 + 3.43666 D - 0.75571 \sqrt{D}$
Source: FSI, Central Zone, Nagpur		

6.3.1 Growth is important because it tells us how much crop is to be harvested or cut, what the condition of the site is and what the comparative efficiency of different species is. Moreover, it is important for making judgments about various silvicultural practices being done or to be done.

Important factors affecting growth in natural forests includes:

- regeneration density and treatment
- spatial distribution
- silvicultural treatment
- artificial thinning
- site conditions
- climatic conditions

Each year in each growing season, the trees put a new layer on all of its parts (i.e. stem, branches, and roots). In other words, every entity increases its size and volume within a due course of time. However, in Forest management, the interest lays in the growth of diameter, girth, volume and basal Area i.e. the increment

6.3.2 It is a fact that total age of the natural forest is not known. In order to determine the increment in volume of identified timber species age factor of the tree species necessary.

Increment Types

- **Current Annual Increment (CAI):** The increase in growth that takes place in a particular year is called CAI. But practically it is very difficult to measure increment annually. So, CAI is measured over a certain period of time called Periodic Annual Increment (PAI).

If the period is very short, PAI and CAI will be very close to each other.

- **Mean Annual Increment (MAI):** An average annual rate of growth up to any given date is called MAI. It is an average rate of growth representing the total growth or yield at a given age distributed or spread over the period.

MAI = Total increment up to a given age divided by that age

= $(V_x - V_o)/x$ where V_x = Volume at the end of x year

V_o = Volume at the beginning

CAI Curves:

CAI and MAI can be represented graphically as;

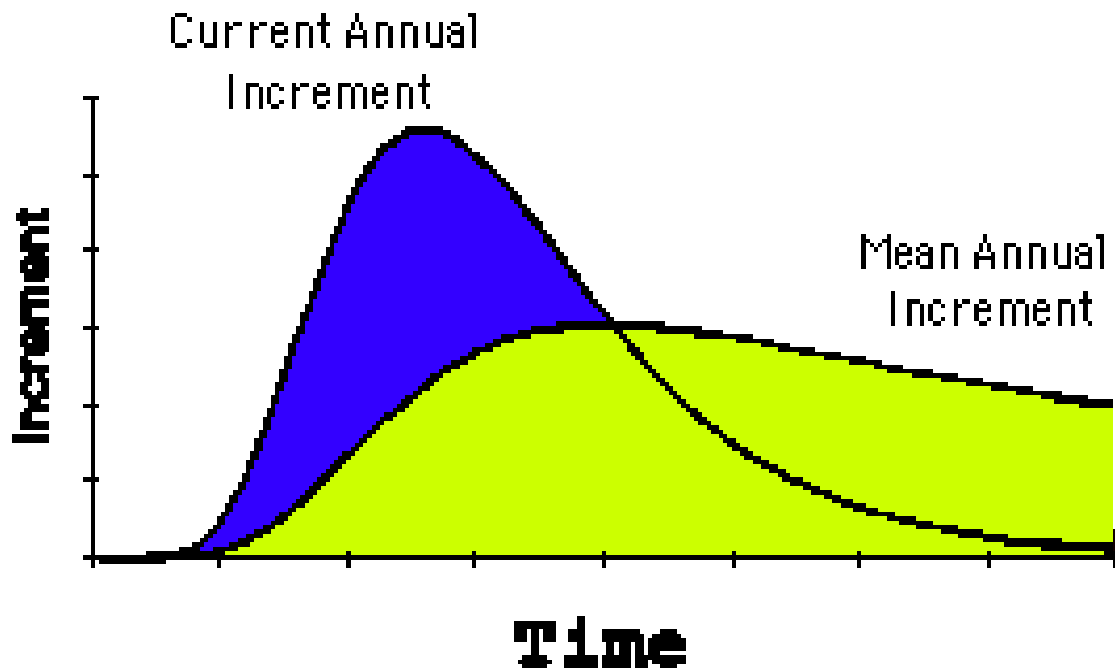


Fig 6.1: CAI and MAI Curve

The meeting point (Culmination) of CAI and MAI curves determines the rotation of maximum volume production. Owing to the absence of any research activities for assessment of rate of growth of different species and other aforesaid reasons it would be very difficult to assess the mean annual increment as the past enumeration data, year wise for last 20 years are not available. Illicit felling is regular features in most Forest Blocks. As such illicit removal of timber from the forest would make the calculation of M.A.I. even more difficult task.

6.4 Efforts towards Enhancement of Forest Productivity through Quality Plantation

Activities: To enhance the productivity of the forests to stock the blank areas by planting with

improved planting material. Efforts are to be put to increase the growing stock of the forest area to the maximum. In the process of doing so, plantations were carried out over different areas under different working circles under this division as per the prescription of the outgoing working plan.

6.4.1 Plantation: Plantations have been raised in different Forest Blocks and outside forest area of Malkangiri Forest Division. In the outgoing plan it was described 11922.18 ha under Rehabilitation Working Circle and 2976.94 ha under plantation Working circle. Year wise plantations taken up in the division in the plan period are given in the **Table.6.5**.

Table.6.5: Year wise plantations taken up from 2007-08 to 2019-20

Year	Plantation target achieved during the year in ha	Achievement inside the P.W.C in ha	Achievement in outside plantation working circle in ha	Total	Remarks
2007-08	250.50	-	115	115	Plantation could not be taken up during the year 2007-08 to 2011-12 inside the Plantation Working Circle due to pending approval of the plan. But plantations have been taken up in Rehabilitation Working Circle
2008-09	239.20	-	239	239	
2009-10	284.61	-	280	280	
2010-11	285.62	-	365	365	
2011-12	289.68	-	50	50	
2012-13	301.32		65	65	
2013-14	272.08	235	60	295	
2014-15	341.16	220	190	410	
2015-16	270.00	270	450	720	
2016-17	332.42	0	225	225	
2017-18	250.50	0	275	275	
2018-19	239.20	0	315	315	
2019-20	284.61	170	413	583	
2020-21	285.62	130	211	341	
Total	3926.52	1025	3253	4278	

6.4.2 Blank areas under different working circles have also been identified where restocking by plantation activities are to be carried out over the period of this working plan, details of regeneration areas to be accomplished in the forthcoming years have been enumerated in Part II of this Working Plan.

6.5 Carbon Stock:

6.5.1 Forest carbon stock is the amount of carbon that has been sequestered from the atmosphere and is now stored within the forest ecosystem. The total carbon stock of the country was estimated at 7124 million tons, which is an increase of 42.6 million tons from the last assessment. It implies that India is on the right track to achieve its Paris Agreement commitment of 2.5 -3 billion carbon sinks. The management of terrestrial carbon sinks is of paramount importance to contain and arrest the carbon dioxide from the atmosphere as it is one of the main greenhouse gases contributing to global warming. Thus, forests play a very important role in the dynamics of the global carbon cycle. This issue is dealt with in this working plan is very important for the policy makers for framing of policies to combat climate change.

6.5.2 Classification of Carbon Stock:

In forests enormous carbon is stored which is classified into 5 pools by Good Practice Guide of IPCC (Intergovernmental Panel on Climate Change). Both living and dead organic matter of the biomass is classified into two pools each: -

1. above Ground Biomass
2. below Ground Biomass
3. Dead wood
4. Litter
5. Soil organic matter

Table No. 6.6 Carbon Pools in a Forest

Category	Pools	Description
Living Biomass	Above Ground Biomass	All living biomass above the soil which includes stumps, branches, bark, fruits, flowers, seeds and Foliage.
	Below Ground Biomass	All living biomass of roots. Fine roots of less than 2mm dia are excluded as they cannot be empirically distinguished from soil organic carbon or litter.
Dead Organic Matter	Deadwood	Includes all non-living biomass not included in litter either standing or lying on the ground. Also includes dead wood above 5 cm in diameter.
	Litter	Includes all non-living biomass having diameter less than 5cm (FSI), lying dead in various states of Decomposition on ground.
Soil	Soil Organic Matter	Includes organic carbon in mineral and organic Soils in the plot

6.5.3 Above Ground Biomass

Estimation of above ground biomass (AGB) has traditionally been based on the use of algometric equations developed for forest trees, using the pan-tropical model by Chave et al. (2014). Algometric equations for biomass usually include information on trunk diameter at DBH (in cm), total height H (in cm) and wood density ρ (in g/cm³).

6.5.4 Below Ground Biomass

One of the most common description of the relationship between root (below-ground) and shoot (above-ground) biomass is the root-to-shoot ratio, which has become the standard method for estimating root biomass from the more easily measured shoot biomass. Below ground biomass estimation is much more difficult and time consuming than estimating above ground biomass. Measurements of root biomass are indeed highly uncertain, and the lack of empirical values for this type of biomass has for decades been a major weakness in ecosystem models (Geider et al. 2001). For estimating below-ground biomass Mokany et al. (2006) root-to-shoot ratio model is adopted.

6.5.5 Basing on the inventory data obtained from the field the carbon stock assessment has been done using the above literatures. The total carbon stock of this division is estimated to be 610.2326 tons/ Ha. The carbon stock assessment based on forest type is in Table No. 6.7 and Carbon Map in Fig. 6.2.

Table No. 6.7: The carbon stock assessment based on forest types of India

S. No.	Forest Type Stratum	Area in sq km	AGB	BGB	Dead Wood	Litter	SOC	(*000 tonnes)
								Total
1.	Tropical Wet Evergreen Forests	20,170	1,46,982 (72.87)	54,379 (26.96)	3,569 (1.77)	8,764 (4.34)	1,30,952 (64.92)	3,44,646 (170.86)
2.	Tropical Semi-Evergreen Forests	71,807	2,48,659 (34.63)	54,733 (7.62)	2,504 (0.35)	21,432 (2.98)	3,91,665 (54.54)	7,18,993 (100.13)
3.	Tropical Moist Deciduous Forests	1,35,834	4,16,660 (30.67)	91,713 (6.75)	7,128 (0.52)	37,087 (2.73)	7,66,982 (56.47)	13,19,570 (97.15)
4.	Littoral and Swamp Forests	5,527	16,310 (29.51)	6,034 (10.92)	160 (0.29)	382 (0.69)	32,786 (59.33)	55,672 (100.74)
5.	Tropical Dry Deciduous Forests	2,90,724	5,93,848 (20.43)	2,49,439 (8.58)	4,796 (0.16)	28,622 (0.98)	12,81,417 (44.08)	21,58,122 (74.23)
6.	Tropical Thorn Forests	14,552	14,659 (10.07)	6,154 (4.23)	132 (0.09)	1,298 (0.89)	54,395 (37.38)	76,638 (52.67)
7.	Tropical Dry Evergreen Forests	858	2,689 (31.35)	1,129 (13.17)	198 (2.30)	119 (1.39)	3,427 (39.95)	7,562 (88.15)
8.	Subtropical Broad leaved Hill Forests	31,993	1,14,599 (35.82)	48,132 (15.04)	913 (0.29)	7,233 (2.26)	2,73,023 (85.34)	4,43,900 (138.75)
9.	Subtropical Pine Forests	17,619	75,562 (42.89)	20,409 (11.58)	609 (0.35)	2,047 (1.16)	1,26,534 (71.81)	2,25,161 (127.79)
10.	Subtropical Dry Evergreen Forests	184	1,040 (56.54)	437 (23.75)	5 (0.28)	6 (0.35)	1,281 (69.67)	2,769 (150.58)
11.	Montane Wet Temperate Forests	20,653	69,081 (33.45)	18,652 (9.03)	2,832 (1.37)	4,335 (2.10)	2,60,850 (126.30)	3,55,750 (172.25)
12.	Himalayan Moist Temperate Forests	26,184	2,75,685 (105.29)	74,432 (28.43)	6,795 (2.60)	6,661 (2.54)	2,04,222 (77.99)	5,67,795 (216.85)
13.	Himalayan Dry Temperate Forests	5,565	63,519 (114.12)	18,420 (33.09)	1,734 (3.12)	808 (1.45)	36,786 (66.09)	1,21,267 (217.88)
14.	Sub-Alpine Forests	14,184	1,13,005 (79.67)	32,769 (23.10)	3,946 (2.78)	1,536 (1.08)	1,51,081 (106.51)	3,02,337 (213.15)
15.	Moist Alpine Scrub	1,975	4,046 (20.48)	1,173 (5.94)	72 (0.37)	147 (0.75)	9,752 (49.37)	15,190 (76.9)
16.	Dry Alpine Scrub	2,006	11,855 (59.12)	3,438 (17.14)	49 (0.24)	211 (1.05)	5,980 (29.82)	21,533 (107.37)
17.	Plantation/TOF	52,414	88,336 (16.85)	19,384 (3.70)	402 (0.08)	7,214 (1.38)	2,72,439 (51.98)	3,87,775 (73.98)
Total		7,12,249	22,56,535 (31.68)	7,00,827 (9.84)	35,844 (0.50)	1,27,902 (1.80)	40,03,572 (56.21)	71,24,680 (100.03)

(Source: ISFR,2019, FSI)

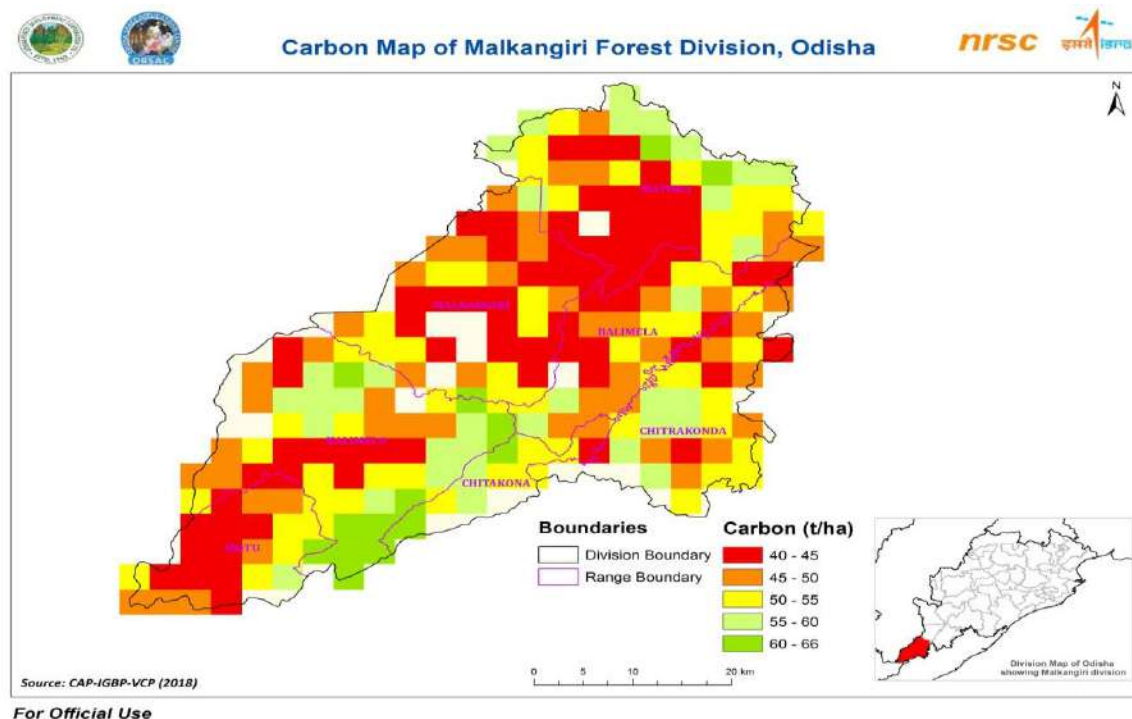


Fig. 6.2: Carbon Map of Malkangiri Forest Division

6.5.6 Carbon Stock Estimation: Estimation of carbon stocks in forestry sector, present in biomass and soil, is based either on IPCC guidelines or through use of actual conversion and other factors starting from the growing stock (GS) data of forest inventories. Forest Survey of India is primary source of these data in the country. However, some other sources such as FAO, and research papers complement these inventories. The study of carbon for the assessment of forest carbon stocks uses primary data for the soil carbon pool and secondary data of growing stock from various sources for estimating the biomass carbon (Brown and Lugo, 1984; Houghton, et al. 1985; Dadhwal and Nayak, 1993). Approach of the study being a combination of primary and secondary data with large number of samples for assessment of soil organic carbon (SOC) makes it more reliable for carbon pool estimates. Mathematically, assessment of forest carbon stocks in the study can be represented as:

$$C_{\text{Carbon}} = C_{\text{Biomass}} + C_{\text{Soil}}$$

Where,

C_{Carbon} = Total available carbon in the forest i.e. in the vegetation and in soil.

C_{Biomass} = Total available carbon in the above and below ground biomass of all forest vegetation.

C_{Soil} = Total available soil organic carbon (SOC) up to 30cm depth in the forest.

The total Carbon stock of forests in the State including the TOF patches which are more than 1 ha in size is 432.29 million tons (1,585.06 million tons of CO equivalent) which is 6.07% of total forest carbon 2of the country. Pool wise forest carbon in Odisha is given in the following table.

Table No. 6.8: Carbon Stock of Odisha In Different Pools. (in 000' Tons)

AGB	BGB	Dead Wood	Litter	SOC	Total
1,26,656	39,066	1,647	9,062	2,55,857	4,32,288
<i>Source: ISFR 2019, FSI</i>					

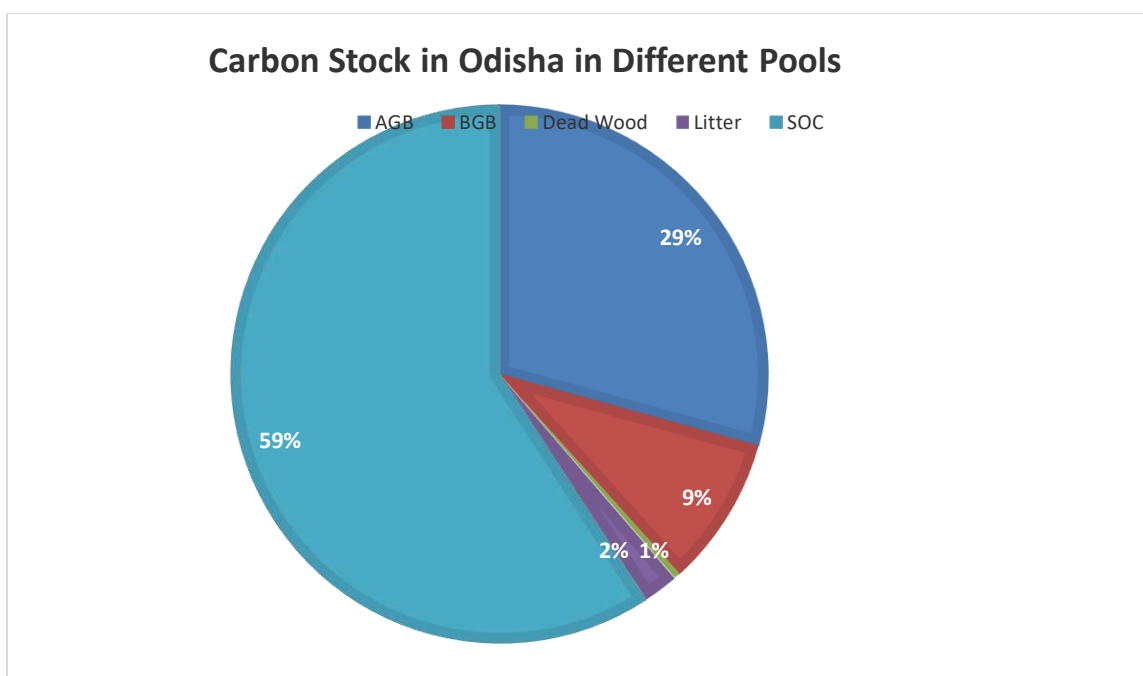


Fig: 6.3: Carbon Stock of Odisha in Different Pools

6.6 Carbon sequestration and mitigation: Forests and wood products can effectively reduce the process of climate change in several ways. Growing trees absorb carbon dioxide from the atmosphere and store the carbon so efficiently that about half the dry weight of a tree is carbon. This carbon remains locked up in the form of wood and wood products. Sustainably grown and harvested wood (and other biomass) also provides a renewable alternative to fossil fuels and enhance carbon storage. Enhanced carbon sequestration through recognized and innovative silvicultural practices, eco-restoration of degraded/mined out forestlands, improved biomass productivity, etc. will help in improving forest health and vitality. Forest soil must be kept healthy and fertile. The growth of forest crops must be kept vigorous to attain the most desirable level of biomass production within an optimal time scale.

6.6.1 Deforestation and forest degradation: Whether due to human activities or natural causes, deforestation and forest degradation result in carbon stock reductions and greenhouse gas emissions, as well as loss or impairment of other forest goods and services, threatening livelihoods, environmental functions and other socio-economic values. Forest conservation endeavors to rectify such deleterious impacts that cause forest degradation, and ultimately deforestation.

Forest threats include fires, pests and diseases, poor management and harvesting, overexploitation, grazing and other disturbances etc. Management measures must be adapted to the specific threats of the site. Forest management activities that conserve carbon stocks in forests include:

- a. sustainable practices of forest management and use;
- b. integrated fire management;
- c. management of forest health and vitality;
- d. management of forest biodiversity;
- e. management and extension of protected areas.

6.6.1.1 Sustainable practices of forest management can ensure that productive or multipurpose forests continue to store carbon and maintain their capacity to provide other goods and services for the benefit of current and future generations. Management practices need to be actively planned, tailored to each specific ecosystem and evolving situations, so as to avoid overexploitation and forest degradation. Forest management plans and practices will also need to be adapted to modifications caused by climate change, both gradual and abrupt. Adaptive forest management will be essential to address arising challenges and reduce forest vulnerability. Adaptation measures include, for example,

- Selection of pest-resistant or drought-tolerant varieties,
- Use of stocks from a range of provenances,
- Under planting of genotypes of species adapted to expect new climate conditions, or assisted natural regeneration of functional species.

The measures need to be adapted to forest conditions (primary, secondary, degraded) and the specific site.

6.6.1.2 Integrated fire management: Wild fires are a significant source of greenhouse gas emissions, and their incidences are likely to increase because of climate change. Integrated fire management is essential for forest conservation and as a part of climate change adaptation strategies. Strengthening capacities to prevent wildfires or to reduce risk of large disastrous wildfires can contribute to protecting storage and sequestration of carbon in natural or artificial forests. With the increased risk of wildfires, integrated fire management is a key component of

both climate change mitigation and adaptation strategies. Fire management practices will need to be intensified and adapted as the context evolves with climate change.

6.6.1.3 Management of forest health and vitality: Increased temperatures and levels of atmospheric carbon dioxide as well as changes in precipitation and in the frequency and severity of extreme weather events are having notable impacts on the condition of the world's forests, for example by making winters warmer or affecting the length of growing seasons. Climate change, particularly extreme weather events, can affect forest pests and the damage they cause by directly impacting their development, survival, reproduction and spread; altering host defenses and susceptibility; and indirectly impacting ecological relationships such as changing the abundance of competitors, parasites and predators. Insects and diseases may be the first indicators of climate change, and there are already numerous examples where insect and pathogen lifecycles or habits have been altered by local, national or regional climatic changes. Research has suggested that insect outbreaks can significantly affect the carbon sink or source status of a large landscape. Thus, preventing and reducing pest impacts on forests may also provide an opportunity to mitigate climate change. Management of pests and prevention of their spread ensure that forests remain healthy, reducing the risk of forest degradation and increasing resilience to climate change.

6.6.1.4 Management of forest biodiversity: Biodiversity is key to resilience of forest ecosystems to climate change, and therefore for conservation of forest carbon stocks. Forests are among the most important repositories of terrestrial biological diversity. Together, tropical, temperate and boreal forests offer very diverse habitats for plants, animals and micro-organisms. Biological diversity is the basis for a wide array of goods and services provided by forests. In their great variety, forest trees and shrubs have a vital role in the daily life of rural communities in many areas, as sources of wood and non-wood products, as contributors to soil and water conservation, and as repositories of aesthetic, ethical, cultural and religious values. In forests, biological diversity, in particular genetic diversity, allows species to adapt continuously to evolving environmental conditions (including climate change), to maintain the potential for selection and improvement to meet future needs and changing end-use requirements, and to support ecosystem functions. However, inadequate information and knowledge is generally an

obstacle in identifying issues, needs and priorities for action in conservation of biodiversity in the context of climate change, at national and global levels.

6.6.1.5 Management and Extension of Protected Areas: Management of protected areas is among the most important tools for forest and wildlife conservation. Accordingly, improved management, and possibly expansion, of protected areas is considered one of the REDD+ mitigation options. Climate change is greatly adding to human-induced pressures on wildlife and protected areas (e.g. the unsustainable and often illegal hunting and trade in wildlife and its products) by modifying habitats and increasing the prevalence of threats such as fire, pests and pathogens. Wise management of wildlife and protected areas is critical for successful conservation and sustainable use of wild animals in the prospects of a changing climate. Priority activities includes:

- Developing adapted strategies, policies and legislation;
- Setting up long-term monitoring and reporting schemes for indicator plant and animal species;
- Trans boundary cooperation;
- Better involvement of local people;
- Implementing measures that help to reduce non-climate related, human induced pressures, e.g. from habitat loss or degradation and illegal hunting and trade, and thus overall vulnerability to climate change;
- Expanding or shifting protected area boundaries for conservation of forest ecosystems and species at risk from climate change;
- Improving habitat connectivity and providing migration corridors and seasonal feeding areas for migratory species;
- Integrating carbon sequestration and storage, along with other ecosystem services, into management and finance plans.

6.6.2 Management of Fragile Forest Ecosystems: Some forest ecosystems are particularly vulnerable to climate change:

- Mountain forests and watersheds;

- Dry land forests;

These ecosystems, with their unique features and resources, also have an important role for climate change mitigation on both local and on a global scale, as well as providing many other environmental, economic, social and cultural functions. Management measures are often critical to reduce their vulnerability and facilitate their adaptation to climate change.

6.6.2.1 Management of mountain forests and watersheds: Mountains are among the regions most affected by climate change. The expected increase in temperature and extreme weather events will amplify hazards in mountains worldwide and change the hydrological cycle, in which mountains play a key role. Climate change will alter precipitation and runoff patterns. For large parts of the world, this will mean reduced availability of water when it is most needed. Sound forest management and afforestation of degraded areas reduce erosion, increase slope stability and hence contribute to the provision of essential environmental services such as a regulated water flow and protection against natural hazards. Sustainable mountain development and collaborative and integrated approaches to watershed management are therefore vital for climate change mitigation and adaptation.

6.6.2.2 Management of Dry Land Forest: Land use and management practices to sequester SOC (Soil Organic Carbon) include afforestation with appropriate species, soil management on cropland, pasture management on grazing land, and restoration of degraded soils and ecosystems through afforestation and conversion to other restorative land uses. Tree species suitable for afforestation in dry land ecosystems include Mesquite, Acacia, Neem and others. Recommended soil management practices include application of biosolids (e.g., manure, sludge), which enhance activity of soil macro fauna (e.g., termites), use of vegetative mulches, water harvesting, and judicious irrigation systems.

6.6.3 This plan has to put a minimum of 6197.38 Ha under Plantation Working Circle and during the period of implementation of the plan, it is expected that an area of 5111.76 Ha would be treated/ regenerated under natural regeneration. This will add to the forest cover of the district and contribute significantly to the Carbon sequestration of the forest and forest plantation. Natural

regeneration will add biomass and carbon in the form of vegetation due to protection. As the plan prescribes for the controlled opening of the canopy under SC1 working circle, the growth of young crop because of this opening will boost the carbon sequestration from the atmosphere as young crop sequesters more carbon.

CHAPTER 7

OPTIMIZATION OF FOREST RESOURCE UTILIZATION

Latitude: 18.141562
Longitude: 81.685782
Elevation: 217.1 m
Accuracy: 1.7 m
Azimuth: 218° (SW)
Pitch: -1.8° (3.5°)
Time: 09-14-2020 14:14

Note: survey demarcation and collating work T/C udaygiri R.F. Group no. 4, compartment number 4 kurty section K

Powered by AngleCam

Note: survey demarcation and collating work T/C udaygiri R.F. Group no. 4, compartment number 4 kurty section K

Time: 09-14-2020 14:14
Pitch: -1.8° (3.5°)
Azimuth: 218° (SW)
Accuracy: 1.7 m
Elevation: 217.1 m

Powered by AngleCam

OPTIMIZATION OF FOREST RESOURCE UTILIZATION PRODUCTIVITY

7

7.1 Recorded removal of Timber: Timber is required for both rural and urban people for construction of houses, agricultural implements such as ploughs, carts etc. In town the timber is generally used for beams, doors and windows and plank sizes. Also, with changing life style, the demand of furniture wood is much more than the past. The important timber species available in the Division and their uses for different purposes are elaborated in Table No. 7.1.

Table No. 7.1: List of Principal Timber Species and Their Uses

SL No	Local Name of the species	Botanical name	Uses	Remarks
1	Arjuna	<i>Terminalia arjuna</i>	House building purpose like rafter and beam	Bark is used for tanning. Tassar being reared on these plants. Plant part is having medicinal use.
2	Asan	<i>Terminalia tomentosa</i>	For building materials not in contact with ground. House building, Rafters and beams.	Tassar cultivation is done on the leaves and leaves are used for leather tanning and dying, locally a good substitute for sal.
3	Bandhan	<i>Ougeiniao oojeinensis</i>	Cart wheels and agricultural implements	It is large straight timber used locally.
4	Bija	<i>Pterocarpus marsupium</i>	Furniture, planks and door panels	Locally used
5	Bali Sissoo	<i>Dalbergia sissoo</i>	Furniture, ornamental wood works	It is recognized as the best furniture wood, stands water logged area, locally used
6	Dhaura	<i>Anogeissus latifolia</i>	Axles of cart, Axle handle, plough	Locally used
7	Gamhar	<i>Gmelenia arborea</i>	Cart yokes, Furniture	Locally used
8	Kurum	<i>Adina</i>	Planks, Furniture packing	Locally used

		<i>cordifolia</i>	box wood and ceiling	
9	Kala siris	<i>Albezzia lebbek</i>	Agricultural implements, packing box, planks and furniture	Locally used
10	Karada	<i>Cleistanthus collinus</i>	Rafters	Used locally
11	Kasi	<i>Bridelia retusa</i>	Furniture and Agricultural implements	It is resistant to white ants and fire
12	Kusuma	<i>Schleichera oleosa</i>	Agricultural implements	Seeds are used for oil extraction
13	Mango	<i>Mangifera indica</i>	House building materials, used in plywood industries and for manufacturing match splints	Fruits used for pickles making, ripened fruits are edible and kernels are also used locally as alternate food of tribal
14	Mundi	<i>Mitrgyna parviflora</i>	Planks, Furniture packing box wood and ceiling	Locally used
15	Pahadi Sissoo	<i>Dalbergia latifolia</i>	Furniture, ornamental wood works	It is recognized as the furniture wood, locally used
16	Sal	<i>Shorea rubusta</i>	Railway sleepers, house building door and windows, frame, rafters, ploughs, boats, centering for bridges, strong and durable wood.	Sal leaves are used for food plates, Seeds are used for extraction of oil, Sal sticks are used for country tooth brush, The resin have medicinal value
17	Sidha	<i>Lagerstroemia parviflora</i>	House poles and rafters	Used locally
18	Simili	<i>Bombax ceiba</i>	Match splints, packing box	Exported for match sticks
19	Teak	<i>Tectona grandis</i>	House building, Furniture, decorative wood works	It resists destructive action of water and is not attacked by termites and white ants

The timber requirement for the entire Division has been assessed based on the F.S.I Report 1996 of fuel wood, timber and fodder from forest of India. The population of the Division as per 2011 census is 613,192 comprising urban Population 49,528 and rural population 563,664 (Directorate of Census Operation, Odisha). The per capita requirement for different activities like housing, furniture and agriculture implements have been calculated by FSI in 1996 those per capita data, the total requirement is worked out as follows.

Table No. 7.2: Requirement of Timber

Purpose	Type	Per Capita consumption in cum	Annual requirement (in cum) as per 2011 Census
Housing & Allied uses	Rural	0.040	22,546.56
	Urban	0.047	2,327.816
Furniture	Rural	0.008	4,509.312
	Urban	0.015	742.92
Agriculture implements	Rural	0.053	29,874.192
Total requirement			60,000.80

The current schedule of rates of timber is given in **Appendix VI**. Consequent on imposition of ban on tree felling by Govt. of Orissa there is no coupe working in the Division Since 1992-93 to 2006-07. The revision of working plan for Malkangiri Forest Division for the year 2007-08 to 2016-17 has been approved lately and during 2011-12 Timber coupe work started. The year wise details of seized and salvaged timbers procured from the year 2005-06 to 2019-20 furnished in Table No. 7.3 and details of Timber Coupe production is given in Table No. 7.4 and the Production from Timber coupes is annexed in **Annexure VI**.

Table No. 7.3: Production of Timber through Salvage and Seized Materials

Year	No of cases			Timber in cum	Salvaged timber in cum	Total Timber in cum
	OR	UD	TOTAL			
2005-06	2508	163	2671	115.7481	0	115.7481
2006-07	2399	162	2561	151.7002	586.7014	738.4016
2007-08	1778	87	1865	92.5667	542.0718	634.6385
2008-09	1238	83	1321	64.587	303.4937	368.0807
2009-10	1046	80	1126	66.9419	390.3693	457.3112
2010-11	855	46	901	36.4211	358.0993	394.5204
2011-12	1286	88	1374	128.8313	327.8259	456.6572
2012-13	1111	234	1345	115.4932	31.6314	147.1246
2013-14	1114	110	1224	91.7057	16.5835	108.2892

2014-15	1018	96	1114	67.7129	272.9705	340.6834
2015-16	1037	65	1102	94.8632	99.2383	194.1015
2016-17	955	61	1016	47.8087	21.3553	69.164
2017-18	1140	72	1212	66.1072	131.7889	197.8961
2018-19	1027	38	1065	50.7841	135.7181	186.5022
2019-20	963	24	987	58.7214	121.5980	180.3194
2020-21	897	33	930	35.5402	19.7523	55.2925

Table No. 7.4: Production of Timber from Timber Coupe

Year	Nos of tree felled	Volume of Timber(cum)
2007-08	Nil	Nil
2008-09	Nil	Nil
2009-10	Nil	Nil
2010-11	Nil	Nil
2011-12	38	17.3872
2012-13	64	52.7310
2013-14	39	28.5360
2014-15	38	37.6660
2015-16	61	28.8539
2016-17	177	190.9393
2017-18	138	183.9735
2018-19	--	--
2019-20	193	248.0018
2020-21	76	147.8455

7.1.2 Removal of Timber: Improved tools like cross cut saws, trimming axe iron and wooden wages should be used while carrying out cutting of trees in the forest to avoid wastage of valuable timber. Now power saws are available for cutting of trees. Efforts should be made to fell the trees in uphill side and pruning should be done to the trees having large crown and bigger branches to

avoid damage to the nearby trees. Traditionally the people use axe to fell the trees and even for logging thereby, nearly 30cm length of log is being wasted unnecessarily, whereas by using saw only a few mm length of log is wasted. Further using saw for felling or logging adds value to the timbers there by fetching more value. In some cases, the OFDC Ltd. has to carryout redressing of each log at the depot before the timber are put to auction sale for better revenue. They should be preferably as long as possible i.e. up to 14' to 18' length. The section may be preferably at 4'-6", 6'-0", 7'-0" and 10'-6" length, so that they can be used mainly for door, window frame and shutters. In case of valuable timbers like Teak, Piasal, Kasi Gamhar etc., any convenient section of logging can be given without wasting any timber at all. Care should be taken to fell the trees on the uphill side or along the contour so that no crack is developed on the logs and the trees fall slowly in the desired direction without damaging the side trees. Construction of long network of extraction path should be avoided to prevent damage to forest area and acceleration of soil erosion.



Fig. 7.1 Timber Coupe working

7.2 Recorded removal of fuel wood: The sources of fuel/ fire wood are the forest, agricultural wares and cow-dung cakes. The rural people use the firewood for cooking their foods and getting themselves warmed during winter. They collect the firewood from the nearby forests and stands

by hacking dry branches. In urban areas, most of the people have the access of L.P.G, coal and solar system and limited of the people depend upon the firewood for cooking their foods. The local tribes, who do not have regular cultivation and of marginal nature, use to convert firewood illegally from forests and sale nearby township. They use to bring as head-load, bhar load and by bi-cycle from all the side to mitigate the requirement of towns and urban population. Thus, there is tremendous pressure on the existing forests. As per 1996 FSI report, the firewood requirement of the Division is shown in Table No-

Table No. 7.5: Requirement of firewood (in M.T.)

Division	Type	Per capita consumption in kgs	Annual requirement in M.T.
Malkangiri	Rural	168	69,050.016
	Urban	140	4,845.40
Total		308	73895.416

The firewood is legally supplied to the people through Depots of O.F.D.C. Ltd at Mathili on retail sale. Practically the firewood is supplied to the O.F.D.C.Ltd by the Forest Department after salvaging the dead, wind fallen, and uprooted trees. However, the firewood production from different sources is given In Table No. 7.6 and firewood production from timber coupe is furnished in Table No. 7.7.

Table No. 7.6: Production of firewood through Salvage and Seized Materials

Year	No of cases			Firewood in cum	Salvaged firewood in cum	Total Firewood in cum
	OR	UD	TOTAL			
2005-06	2508	163	2671	1135.94	--	1135.94
2006-07	2399	162	2561	1476.05	193.56	1669.61
2007-08	1778	87	1865	654.99	2004	2658.99
2008-09	1238	83	1321	703.65	2736	3439.65
2009-10	1046	80	1126	195.26	2016	2211.26
2010-11	855	46	901	235.65	1158	1393.65
2011-12	1286	88	1374	290.0	1476	1766
2012-13	1111	234	1345	619.98	180	799.98
2013-14	1114	110	1224	390.36	300	690.36
2014-15	1018	96	1114	580.56	300	880.56
2015-16	1037	65	1102	785.0	69	854
2016-17	955	61	1016	1064.2	30	1094.2
2017-18	1140	72	1212	634.65	0	634.65
2018-19	1027	38	1065	463.15	0	463.15

2019-20	963	24	987	378.3	--	378.3
2020-21	897	33	930	402.65	0	402.65

Table No. 7.7: Production of Firewood from Timber Coupe

Year	Nos of tree felled	Volume of firewood (Stack)
2007-08	Nil	Nil
2008-09	Nil	Nil
2009-10	Nil	Nil
2010-11	Nil	Nil
2011-12	38	20
2012-13	64	20
2013-14	39	10
2014-15	38	12.5
2015-16	61	10.5
2016-17	177	38
2017-18	138	56
2018-19	-	-
2019-20	193	43
2020-21	76	49

7.3 Recorded removal of bamboo/rattans: Bamboo is treated as poor man's timber as well as an important of M.F.P. It provides the means of livelihood for tribal, marginal farmers and other rural communities. Major demand for bamboo is from the paper industries, handicrafts, bamboo artisans and local consumers for various purposes.

The Bamboo Salia (*Dendroclamus strictus*) occur throughout the Division but found more concentrated in Balimela, Chitrakonda and Kalimela Range. The other species Daba (*Bambusa arundinacea*) is also available in this Division. In the past, bamboo was commercially exploited in irregular manner for its uneconomic working cost. Since bamboo is the nationalization forest produced in 1988, the State Government decides the Agency for working of bamboo coupe i.e. OFDC Ltd and the royalty for the same was fixed by the State Government from time to time. Accordingly, the bamboo bearing Forest are worked by OFDC ltd Raw Materials Procurers (RMP) with 4 years felling cycles for both Salia and Daba Bamboo. The year wise production

Industrial Bamboos (Sale Unit) and Commercial Bamboos (in Nos) are furnished in Table No. 7.8. The year wise details of Bamboo Coupe Works are given in **Annexure VII**.

Table No. 7.8: Production of Bamboo from Bamboo Coupe

Year of production	Target area in Ha	Achievement area in ha	Production	
			IB (in SU)	CB (in Nos)
2007-08	29016.2515	23836.6069	27015.101	29330
2008-09	28321.2237	24212.7103	18461.9620	12156
2009-10	28921.7892	22874.3700	16170.1961	6733
2010-11	28802.6383	22941.6338	18997.3379	4870
2011-12	29016.8335	16701.1596	21160.303	12620
2012-13 (plan) Scheme	9761.5000	0	0	0
	19405.3558	1719.9750	0	2560
2013-14 (Plan) Scheme	11487.0900	0	0	0
	20869.5655	0	0	0
2014-15(Plan) Scheme	9619.3800	0	0	0
	19771.56	0	0	0
2015-16(Plan) Scheme	8578.56	0	0	0
	21593.854	0	0	0
2016-17(Plan) Scheme	9761.74	0	0	0
	21594.76	1843.81	1.6	115000
2017-18	33035.5576	5614.5702	275.349	96666
2018-19	28937.8914	1715.3200	15.34	104410
2019-20	29407.4375	5184.207	--	81600
2020-21	29474.9700	6256.2640	-	78774

7.4 Recorded removal of locally important NTFPs including MAPs: The forests of this Division are also valued for a variety of non-timber forest products. The rural poor mainly tribes living in and around the forest earn their livelihood by collecting edible fruits and roots. They also

preserve Mohua flower, Kendu and Sal seeds for rainy season. The Kendu leaves, Mohua flowers and Sal seeds are the Major MFPs in the Division and direct source of income Tamarind, Sal resin, Myrobalans, Hill brooms, Siali leaves are the other important NTFPs.

As per Odisha Gram Panchayat Minor Forest Produce Administration Rules, 2002, the collection of 68 MFP items are regulated by Panchayat. Now, there is no need of payment of any royalty to the State Government except the registration fees. The main idea behind the Rule 2000 is to create competition among purchasers implying better price to primary collectors but it seems no improvement on the desired goal. The Range wise important NTFPs available in this division are given in Table No. 7.9.

Table No. 7.9: Range Wise Availability of NTFPs

Sl No	Name of the Range	Major NTFPs item available
1	Malkangiri	Mahua flower & seeds, Tamarind. Siali leaves & fibre, Myrobalans, Genduli gum, Kendu leaves & fruits, Bhuin neem, Medha & Phanphania bark, Banatulasi, Ganga Siulietc
2	Mathili	Bhuin neem, Medha bark, Mango kernel, Mahua flower & seeds, Tamarind, Hill broom, Sal leaves and seeds, Kendu leaves, Myrobalans, Kamalgundi, Genduli gum, Banatulasi, Ganga Siuli, Resin etc.
3	Balimela	Mahua flower & seeds, Tamarind. Hill broom, Siali leaves & fibre, Myrobalans, Kamalgundi, Mango kernel, Kenduleaves, Gangasiuli etc.
4	Kalimela	Bhuin neem, Nux vomica, Arrow root, Banatlasi, Mahua flower & seeds, Tamarind, Siali leaves & fibre, Myrobalans, Kamalgundi, Genduligum, Ganga siuli, etc.
5	Chitrakonda	Mahua flower/seeds, Tamarind, Hill broom, Siali leaves & fibre, Myrobalans, Mango, Kamalagundi, Genduli gum, Ganga siuli etc.
6	Motu	Mahua flower/seeds, Tamarind, Siali leaves & fibre, Myrobalans, Gangasiuli, Kendu leaves, Nux vomica,

7.4.1 A study on NTFP was conducted in Malkangiri Division during the year 2012-13 and 2013-14. Sample points 100 numbers with GPS coordinates given to each Range. Assessment on availability of NTFP in the existing Forests and their utilization has been made by taking sampled

households in the adjacent villages where the NTFP survey made. From the above survey analysis has been made on production and consumption and also marketing of NTFP. The details of which is given in Table 7.10.

Table No. 7.10: NTFP Survey carried out in Malkangiri Division during 2012-13 to 2013-14

Sl.No	Name of the Range	No. of Sample point taken	No. of Forest Block involved	No. of village surveyed	Total no. of house hold	No. of house hold sampled
1	Malkangiri	100	31	69	4988	961
2	Mathili	100	48	90	4418	910
3	Balimela	100	04	0	0	0
4	Kalimela	100	26	72	3489	670
5	Chitrakonda	100	17	63	1740	215
6	Motu	100	16	51	4239	871
	Total	600	142	345	18874	3627

7.4.2 The details of production, consumption and marketing of NTFP in the above sampled area is given Range wise in tabular form below. The values assessed are ocular.

Table No. 7.11: NTFP Collection & Marketing of Malkangiri Range

Name	Scientific name	Product (kg)	Total Consumption (kg)	Total Sold (kg)	Price per Unit	Value of total consumption	Value of total Sold	Total Value of the Produce
Amla	<i>Emblica officinalis</i>	13	-	13	25/-	-	325/-	325/-
Mahula	<i>Madhuca indica</i>	580862	155759	425103	15/-	2336385/-	6376545/-	8712930/-
Mahua Seeds		45776	26931	18845/-	18/-	484758/-	339210/-	823968/-
Siali	<i>Bauhinia vahili</i>	12040	12040	-	24/-	288960/-	-	288960/-
Tamarind	<i>Tamarindus indica</i>	24470	14990	9480	12/-	179880/-	113760/-	293640/-
Jhuna (Resin)		2	2	-	100/-	200/-	-	200
		652363	209722	62319	TOTAL	3290183	6829840	10120023

Table No. 7.12: NTFP Collection & Marketing of Mathili Range

Name	Scientific name	Product (kg)	Total Consumption (kg)	Total Sold (kg)	Price per Unit	Value of total consumption	Value of total Sold	Total Value of the Produce
Amla	<i>Emblica officinalis</i>	100	10	90	20.25	202.50	1822.50	2025/-
Bahada	<i>Terminalia belerica</i>	500	100	400	14	1400	5600	7000
Hill broom	<i>Thysanolaena maxima</i>	1500	200	1300	35.50	7100	46150	53250
Char	<i>Buchanania lanzan</i>	50	0	50	48	0	2400	2400
Harida	<i>Terminalia chebula</i>	350	50	300	25.75	1287.50	7725	9012.50
Cashew	<i>Anacardium occidentale</i>	250	0	250	80.0	0	20000	20000
Jamukoli	<i>Eugenia jambulana</i>	270	200	70	8	1600	560	2160
Kendu	<i>Diospyros melanoxylon</i>	750	250	500	10	2500	5000	7500

Kusuma	<i>Schleicheraoleosa</i>	260	60	200	15	900	3000	3900
Mahul	<i>Madhucaindica</i>	145286	16300	128986	12.50	203750	1612325	1816075
Mango	<i>Mangiferaindica</i>	12400	200	12200	10	2000	122000	124000
Sal Leaf	<i>Shorearobusta</i>	3200	200	3000	32.50	6500	97500	104000
Sal seeds	<i>Shorearobusta</i>	1200	0	1200	22	0	26400	26400
Siali leaf	<i>Bauhinia vahilii</i>	630	0	630	33	0	20790	20790
Siali	<i>Bauhinia vahilii</i>	2400	0	2400	28	0	67200	67200
Siali Fiber	<i>Bauhinia vahilii</i>	310	10	300	25	250	7500	7750
Tentuli	<i>Tamarindusindica</i>	16507	5224	11283	15	78360	169245	247605
		173613	22624	150989	TOTAL	304255	2093825	2398080

Table No. 7.13: NTFP Collection & Marketing Balimela Range

Name	Scientific name	Product (kg)	Total Consumption (kg)	Total Sold (kg)	Price per Unit	Value of total consumption	Value of total Sold	Total Value of the Produce
Amla	<i>Emblica officinalis</i>	465	198	267	25	4950	6675	11625
Bahada	<i>Terminalia belerica</i>	551	214	337	30	6420	10110	16530
Char	<i>Buchananialanzan</i>	81.5	39.5	42	10	395	420	815
Harida	<i>Terminalia chebula</i>	485	205	280	30	6150	8400	14550
Bela	<i>Aegle marmelos</i>	845	450	395	30	13500	11850	25350
Kendu	<i>Diospyros melanoxylon</i>	9658	343	9315	50	17150	465750	482900
Kusuma	<i>Schleicheraoleosa</i>	288	180	108	20	3600	2160	5760
Mahula	<i>Madhucaindica</i>	52070	12710	39360	20	254200	787200	1041400
Siali Leaf	<i>Bauhinia vahili</i>	2370	157	2213	20	3140	44260	47400
Tamarind	<i>Tamarindusindica</i>	35010	17945	17065	15	269175	255975	525150
		101823.5	32441.5	69382	TOTAL	578680	1592800	2171480

Table No. 7.14: NTFP Collection & Marketing of Kalimela Range

Name	Scientific name	Product (kg)	Total Consumption (kg)	Total Sold (kg)	Price per Unit	Value of total consumption	Value of total Sold	Total Value of the Produce
Amla	<i>Emblica officinalis</i>	1450	0	1450	80	0	116000	116000/-
Mahula	<i>Madhucaindica</i>	1245620	364203	881417	20	7284060	17628340	24912400/-
Mahula seeds	<i>Madhucaindica</i>	8784	2920	5864	30	87600	175920	263520/-
Tentuli	<i>Tamarindusindica</i>	24470	14990	9480	12	179880	113760	293640
		1280324	382113	898211	TOTAL	7551540	18034020	25585560

Table No. 7.15: NTFP Collection & Marketing Chitrakonda Range

Name	Scientific name	Product (kg)	Total Consumption (kg)	Total Sold (kg)	Price per Unit	Value of total consumption	Value of total Sold	Total Value of the Produce
Amla	<i>Emblica officinalis</i>	569	54	515	25	1350	12875	14225
Bahada	<i>Terminalia belerica</i>	182	29	153	20	580	3060	3640
Bhuin Neem	<i>Andrographis paniculata</i>	23	5	18	20	100	360	460
Bela	<i>Aegle marmelos</i>	197	37	160	35	1295	5600	6895
Bhalia	<i>Semicarpus anacardium</i>	390	74	316	80	5920	25280	31200
Char	<i>Bauchanania lanzan</i>	247	52	195	50	2600	9750	12350
Harida	<i>Terminalia chebula</i>	147	17	130	30	510	3900	4410
Jhadu	<i>Thysanolaena maxima</i>	207	35	172	105	3675	18060	21735
Jambu(Jamu)	<i>Syzygiumcumini</i>	131	32	99	10	320	990	1310
Kendu	<i>Diospyros melanoxylon</i>	659	174	485	20	3480	9700	13180
Kusuma	<i>Schleicheraoleosa</i>	287	49	238	20	980	4760	5740

Mahula	<i>Madhucaindica</i>	470	64	406	25	1600	10150	11750
Sialifibre	<i>Bauhinia vahili</i>	5	2	3	35	70	105	175
Siali leaf	<i>Bauhinia vahili</i>	568	95	491	35	3325	17185	19880
Tamarind seeds	<i>Tamarindusindica</i>	220	8	212	5	40	1060	1100
Tamarind	<i>Tamarindusindica</i>	1722	379	1343	17	6443	22831	29274
		6024	1106	4936	TOTAL	32288	145666	177324

Table No. 7.16: NTFP Collection & Marketing of Motu Range

Name	Scientific name	Product (kg)	Total Consumption (kg)	Total Sold (kg)	Price per Unit	Value of total consumption	Value of total Sold	Total Value of the Produce
Mahula	<i>Madhucaindica</i>	179800	86160	93640	15	1292400	1404600	2697000
Mahua Seeds	<i>Madhucaindica</i>	75590	34050	41540	12	510750	498480	1009230
Charkoli	<i>Buchnanialanzan</i>	37635	1490	36145	60	22350	2168700	2191050
		293025	121700	171325	TOTAL	1825500	4071780	5897280

7.4.3 In recent times, there is even increased demand of the NTFPs as a raw material for many industries like cosmetics, confectionary, drugs etc. The dominance of market of certain NTFPs is over riding the concept of ecological sustainability leading to unsustainable harvest of the NTFPs from the forest.

7.5 Demand and supply of Timber and import non-timber forest produce: - Man is the primary consumer of all forest produce. The ever-increasing population, rise in income level and changing pattern of use of timber and other forest produce have enhanced the demand of forest and forest lands. The rapid growth of population, urbanization, and organized timber smuggling activities also put pressure on the forest. The rural people habitually go to forest for fuel wood. Also standing trees in side R. Fs, P.R. Fs and other protected areas get girdled, debarked, lopped, felled and converted into poles, logs, firewood, and charcoal etc. according to their needs as and when required. The main species illicitly removed from the forest and transported to outside the Division are Sal, Teak, Sissoo, and Bija as the illegal trade of forest produce become very lucrative business for the local people.

The OFDC Ltd. is the only authorized source for supply of timber and fire wood I n the region. The bamboo coupes were worked out by OFDC Ltd a Raw Materials Procurement Agency i.e. M/s Sewa Papers Ltd (Built Paper Mill), Jeypore. Now the bamboo coupes are worked out by Om Namah Enterprise through OFDC ltd. Previously the industrial demand mainly of Ballarpur Industries limited (Bilt, Unit of Sewa) at Gaganpur, jeypore with production capacity of 72,000 M.T.is furnished below in Table No. 7.17.

Table No. 7.17: Annual requirement of raw materials in Odisha

Raw Materials	Annual requirement in M.T.	Supplied in M.T.
Bamboo	80,000	50,000
Wood	1,40,000	62,000

Balance raw materials are full from neighboring Madhya Pradesh, Chhatishgarh, Andhra Pradesh, Uttar Pradesh and West Bengal. Thus, the production and supply of major forest product is not commensurate with the demand and it is hardly within 10% of the demand.

Medicinal plant: The Forest of this Division have full of medicinal plants and their derivatives. There is no specific research / study on the market potential and prices of the product. With the advent of modern science, the old system of medicine like Ayurveda and use as herbs gradually got neglected. But the tribes and forest-based communities still derive

benefits from these herbs. Due to un-scientific means of exploitation of some species they are becoming scarce and getting critically endangered in the area. Keeping in view the importance of scientific cultivation technique and the exploitation of medicinal wealth, the National Medicinal Plant Board was formed during the year 2006 in our State. The State Medicinal Plant board has the major objective to preserve, protect, and develop the medicinal plants in the state.

Some of the main medicinal plants & their derivatives being exploited in the Division for the Drug & Pharmaceutical Industry are listed source wise in **Table No. 7.18**.

Table 7.18: Important Medicinal Plants for Drug Industry

Local Name	Botanical Name	Family	Source
Gangasuili	<i>Nyctanthus arbortristis</i>	Oleaceae	Wild
Patalagaruda	<i>Rauwolfia serpentina</i>	Apocynaceae	Wild
Katak	<i>Strychnos potatorum</i>	Strychnaceae	Wild
Sunari	<i>Cassia fistula</i>	Caesalpinaceae	Wild
Kochila	<i>Strychnos nux-vomica</i>	Strychnaceae	Wild
Banatulasi	<i>Ocimum gratissimum</i>	Lamiaceae	Weed
Khokali	<i>Acalypha indica</i>	Euphorbiaceae	Weed
Arakha	<i>Calotropis gigantia</i>	Asclepiadaceae	Weed
Talmuli	<i>Curculi goorchiodes</i>	Hypoxidaceae	Weed
Chavuldhua	<i>Erythrina variegata</i>	Fabaceae	Ornament/Avenue
Neem	<i>Azadirachta indica</i>	Meliaceae	Ornament/Avenue
Anla	<i>Emblica officinalis</i>	Euphorbiaceae	Medicinal Cultivation
Ghee Kuanri	<i>Aloe vera</i>	Liliaceae	Medicinal Cultivation

The medicinal plant species represent a variety of life forms (habit) ranging from lichen, algae, herbs, shrubs, climbers & trees. However, the maximum value medicinal plants in the sent day context belong to herbs & trees.

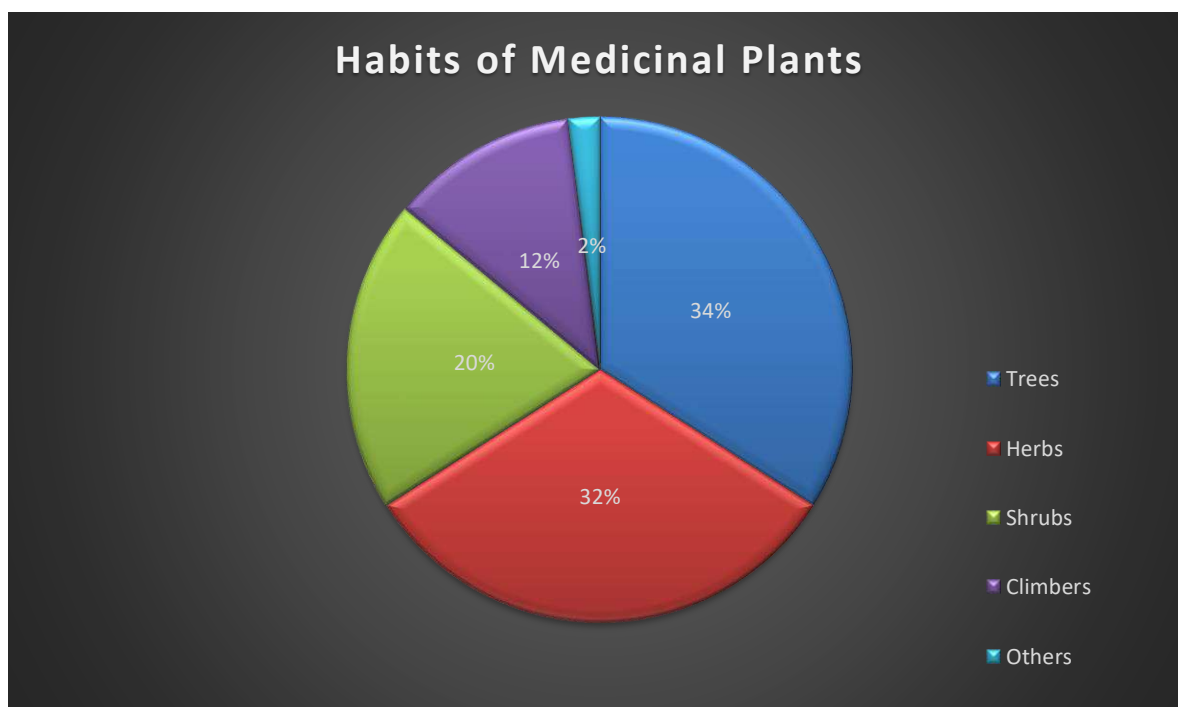


Fig. 7.2 Habits of Medicinal Plants

7.5.1 The list of some important medicinal plants of different habits of the Division is given in Table No. 7.19.

Table.7.19: Some Medicinal Plants of Different Habits in Division

Local Name	Botanical Name	Family	Habit
Dhatura	<i>Datura stramonium</i>	Solanaceae	Shrub
Gudamari	<i>Gymnema sylvestre</i>	Asclepiadaceae	Climber
Khair	<i>Acacia catechu</i>	Mimosaceae	Tree
Hari-Harika	<i>Euphorbia hirta</i>	Euphorbiaceae	Herb

7.5.2 The plant parts used for medicinal properties range from leaves, bark, root to even whole plants. The pie Fig: 7.2 show the details of such source wise raw material for medicinal purpose.

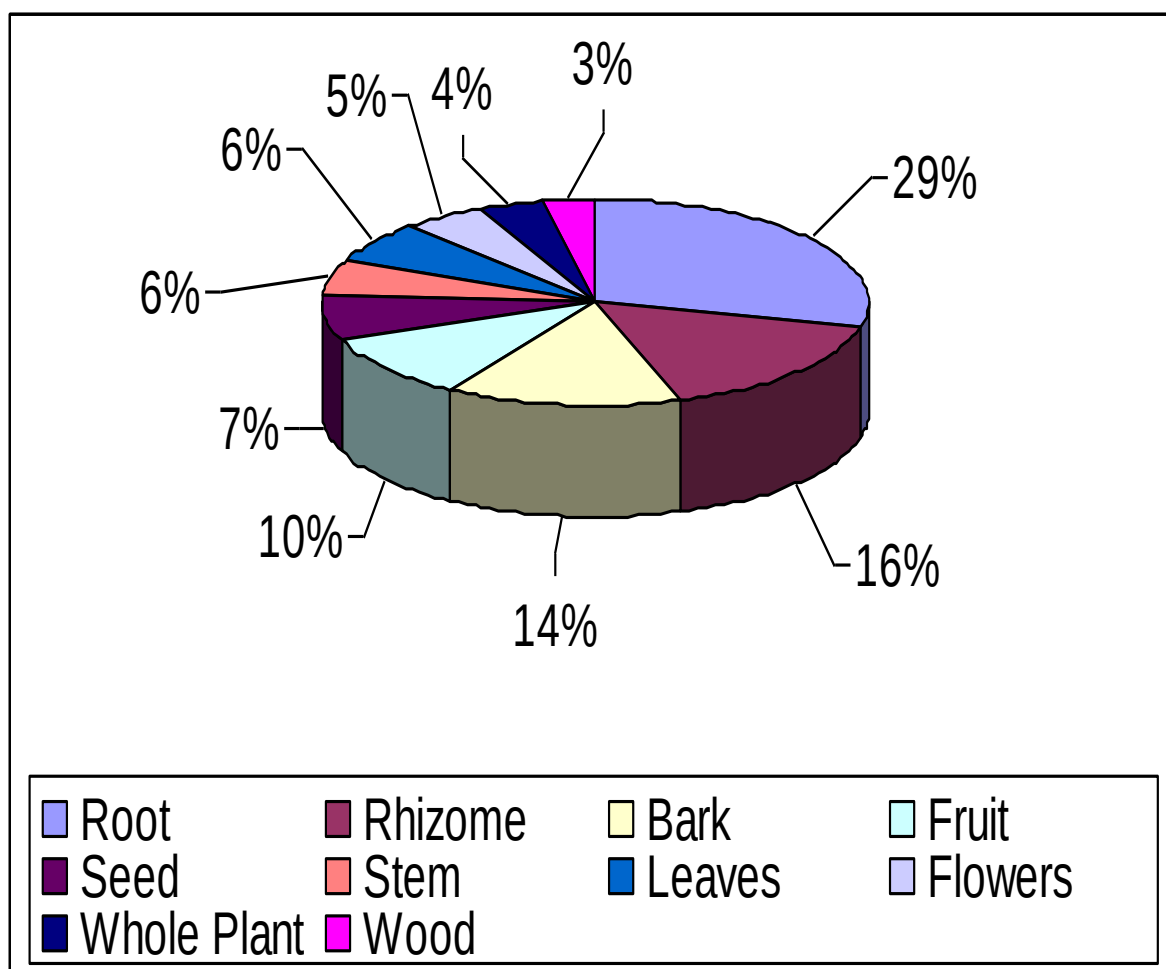


Fig. 7.3 Plant parts used for Medicine

Table No. 7.20: Some Medicinal Plants with Category of Parts Used

Local Name	Botanical Name	Family	Part Used
Chintamani	<i>Uraria gopodiodes</i>	Fabaceae	Whole plant
Parsukedar	<i>Zingiber zerumbet</i>	Zingiberaceae	Rhizome
Apamaranga	<i>Achyranthus aspera</i>	Amaranthaceae	Root
Ankula	<i>Alagium salvifolium</i>	Alangiaceae	Leaf
Dhatiki	<i>Woodfordia fruticosa</i>	Lythraceae	Flower
Sabitri	<i>Trachyspermum roxburghianum</i>	Apiaceae	Fruit
Bhalia	<i>Semecarpus anacardium</i>	Anacardiaceae	Seed
Piasal	<i>Pterocarpus marsupium</i>	Fabaceae	Bark
Lajalu	<i>Neptunia oleracea</i>	Mimosaceae	Stem

7.5.3 Though no assessments of the consumption, potential and requirement of these medicinal plants have been done, the Division continues to provide substantial supply for the traditional use and the industry as can be seen from the collection figures of some such items included in the list of NTFPs and reflected In Table No.7.8 to 7.16.

7.6 Import and export of wood and wood products: So far as market is concerned, the forest products of these tracts are disposed at Malkangiri, Balimela, Kalimela, and Govindapalli. Small timber and fire wood are of much demand everywhere, particularly at Malkangiri.

Among marketable products like Teak, Sal and Bija are the main timber species for export. The teak fetches twice as much as that of Sal. Now Sal is the major species in the tract for marketing. The other valuable timber species are Sissoo, Gamhar, bandhan, Mundi, Kurum, Dhaura, Asan, Jamu, and Arjuna etc.

The forest products of this Division are transported through roads to outside the District. There is no railway link inside this Division. The nearest railway stations are Jeypore and Koraput situated 100 Kms and 130 Kms away from Malkangiri respectively. Many of the forest products like timber, poles, mohua flowers, sal seeds, and kendu leaves are transported from jeypore and Koraput road station. Most of the forest products are also transported by truck from Malkangiri to other Districts and States.

In the past, Railway, Defense and other Government Agencies were the main purchasers of timbers. Also, large quantities of round and swan sizes were supplied to various timber merchants at Andhra Pradesh, Madhya Pradesh and D.G.S & D. After imposition of ban on green felling by State Government vide letter No-23614 dt.13.10.1988, only the dead, fallen and uprooted trees were departmentally collected from forest floor and delivered to the M/s OFDC Ltd for supply to the public. Such collection and production are hardly commensurate to that of demand. The Divisional Manager, OFDC Ltd was operating Saw Mill at Mathili during 1965. The Saw Mill at Mathili was in defective condition and again the saw Mill is functioning from 2006-07 and running.

The salvaged and seized timber during the ban period was not sufficient to feed Saw Mill and most of the time was remaining idle. However, the ban period on green tree felling has been lifted from 2005-06 and the regular coupe work out from 2011-12 as per prescription of Working Plan 2007-08 to 2016-17.

7.7 Import and export of NTFPs: A number of NTFP items are available in this Division. Apart from what is consumed by the local public, the remainder of the NTFP is either consumed in local market or exported to outside. For many NTFP items, the markets are not well developed. However, NTFP like Tamarind, Hill Brooms and Bamboo are in great demand in Andhra Pradesh and Chhatishgarh. Bidi leaves (kendu leaves) sold in periodical auction/ tender sale by M/s OFDC Ltd are exported to Warrangal of A.P. Bangalore of Karnataka, West Bengal, Chhatishgarh, Uttar Pradesh and many other state of the country. Good quality bidi leaves are also exported to outside of the country i.e Srilanka, Pakistan, Bangladesh, Myanmar and Arabian countries etc.

Prior to the year 2000, the N.T.F.P. items were leased out the corporate sector bodies like O.F.C./ O.F.D.C. Ltd, T.D.C.C Ltd and other private agencies such as Utkal products, Sambalpur Preeti Oil Mill, Rengali etc. There were 28 MFP items leased out in favour of M/s Utkal Products Ltd. The leased-out items were Neem, Bana Tulasi, Karanja, Benachera, Chakunda, Ban Kulathi, Kamalagundi, Kusum seeds, Palas Chirangi Dana, Indrjaha, Marda seeds, Chara seeds, Guba, Jute seeds, Siali leaves etc.

The local tribes and forest fringe dwellers generally collected the myrobalans. Hill brooms are collected by the tribal people are sold in local market as well as it is supplied to traders. Mahua flowers and seeds are also important forest product. People use them as food items and part of the produce is sold to the local traders. Now authorized traders have to register with the Grama Panchayat and storage of Mahua flower for trading purpose is regulated under Excise Law. In March 2000 the Govt. of Orissa announced the new NTFP policy focuses in livelihood for forest fringe dwellers rather than earning of revenue. The ownership of 68 MFP items in the scheduled area has been vested with the Grama Panchayat. Now the MFP items increase from 68 to 71 nos. Any person who is interested in trading with NTFP has to register with the Panchayat. Subsequently a rule was framed in November, 2002 by Government of Orissa Panchayatraj Department namely Orissa Grama Panchayat (Minor Forest Produce Administration) Rule 2002. As per these Rule the Panchayat Samiti fixes the minimum procurement price for each item available in the Panchayat area. The procurement price is to be fixed by district level price fixation committee.

The penal provisions for violation of coordination have also been spelt out in the Rule. However, some important NTFPs are described here under.

Sal Seed and Sal leaves: These items have gained in market during in last decades after commercial use as raw materials for oil used in soap making and it was a nationalized forest produce and worked out in yearly basis through OFDC Ltd. In this Division Sal seeds are collected mainly from Mathili Range and Partly from Malkangiri Range. At present it is being collected through Grama Panchayat. Sal leaves also NTFP item of this Division and are collected only Mathili Range. Leaf plates find ready market in in the Weekly Haat of Mathili Range.

7. 8 Removal of Fodder: Cattle, Cow, Buffalo, Sheep and Goat the domestic animal their population in Malkangiri District is 12, 26,825 nos. The usual practice of their feeding is by mass grazing through herdsman in nearby forest from morning to evening. The annual requirement of fodder for the cattle population is calculated upon the field observations and the report of Forest Survey of India (FSI). It is observed that a cow takes a food @2 to 3% of its bodyweight or on average a cow consumes of 5kg of fodder per day approximately. FSI investigation shows that nearly 30% of the fodder requirements are met from forest. A buffalo consumes fodder of two female cows and sheep and goat consume half that of the cow. By and large, the fodder requirement is met from RFs, PRFs, DPFs, Village Forests and Revenue Forests. Sometimes fodder requirements also met from Agriculture fields up to February.

7.9 Valuation of the product: The schedule of rates of royalty to be charged for different kinds of forest produce is to be adopted as per the details outlined in Orissa Forest Department Code. But this schedule of rate does not indicate the actual market price. The Orissa Schedule of Rates for Forest Produce Rule, 1977 needs revision as the market rate has gone up considerably due to rapid urbanization and industrialization.

M/s OFDC Ltd. continued working of Forests subjected to the policy of State Government in force. As per the guide lines of previous working plan, after demarcation of the annual coupes, the trees are marked by staffs of the Territorial Division. This operation as usually continues by the end of May and the royalty discussion among the Divisional Manager OFDC Ltd. concerned and Divisional Forest Officer completes in between June to October. After settlement of royalty, the coupes are handed over to OFDC Ltd. which works within the legal frame works of the Orissa Forest Contract Rules, 1966.

Table No. 7.21: The year wise royalty fixed for regular coupes, irregular lots, poles and fire wood.

ROYALTY FIXED ON REGULAR COUPE / IRREGULAR LOTS / POLES AND FIREWOOD FROM 2006-07 TO 2019-20								
Year	Royalty for regular coupes per unit (in Rs.)	Royalty for lots (in Rs.)		Royalty for poles (in Rs.)			Firewood (in Rs.)	
		Round Timber (per Cft.)	Sawn Timber (per Cft.)	Sal (Per Pole)	Tea k (Per Pole)	Othe r (Per Pole)	Casua rina per Quinta l	Other per Stack (12'x3'x3')
2006-07	930/-							
2007-08	1040/-	150/-	195/-	30/-	25/-	20/-	120/-	300/-
2008-09	1040/-	150/-	195/-	30/-	25/-	20/-	120/-	300/-
2009-10	1080/-	157/-	204/-	35/-	30/-	25/-	130/-	330/-
2010-11	1135/-	167/-	217/-	40/-	35/-	25/-	140/-	365/-
2011-12	1200/-	180/-	234/-	42/-	37/-	25/-	140/-	365/-
2012-13	1296/-	198/-	258/-	44/-	39/-	25/-	140/-	375/-
2013-14	1387/-	212/-	276/-	47/-	40/-	27/-	140/-	385/-
2014-15	1456/-	220/-	286/-	50/-	40/-	30/-	150/-	385/-
2015-16	1514/-	230/-	299/-	52/-	42/-	31/-	150/-	385/-
2016-17	1605/-	244/-	317/-	55/-	45/-	32/-	150/-	385/-
2017-18	1717/-	261/-	339/-	55/-	48/-	32/-	155/-	397/-
2018-19	1803/-	274/-	356/-	55/-	48/-	32/-	155/-	397/-
2019-20	1929/-	293/-	381/-	55/-	48/-	32/-	155/-	397/-
2020-21	2006/-	305/-	397/-	60/-	50/-	35/-	155/-	405/-

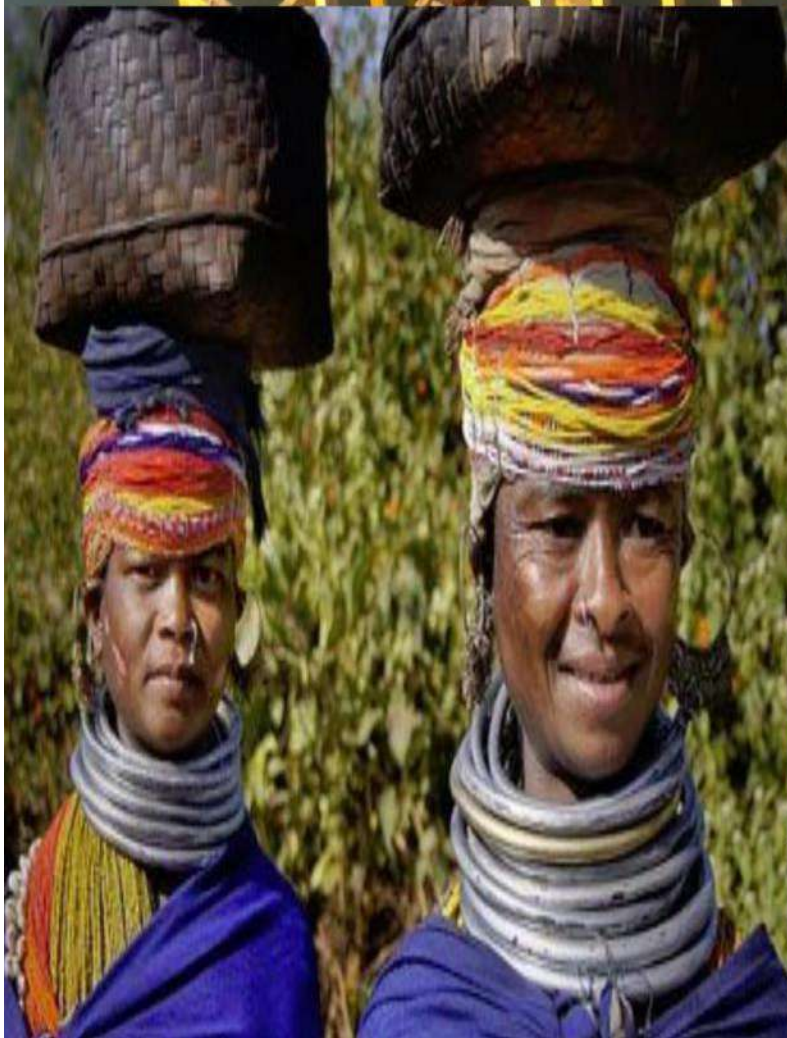
Table No. 7.22: Year wise Royalty realized from OFDC Ltd in respect of this Division

Sl.No.	Year	Royalty from regular lots	royalty from irregular lots
1	2006-07	0	35440232
2	2007-08	0	4265497
3	2008-09	0	0
4	2009-10	0	1371629
5	2010-11	0	6117225
6	2011-12	64200	3250699
7	2012-13	191160	900909
8	2013-14	85730	739183
9	2014-15	132853	2574691

10	2015-16	200984	1815667
11	2016-17	832194	1574061
12	2017-18	107313	1690499
13	2018-19	740132	1564994
14	2019-20	-	1680137
15	2020-21	674016	500875

CHAPTER 8

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



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8.1 Number of JFM committees and area(s) protected by them: Forest is one of the complex eco-system. The role of the forest in the maintenance of environment and economic prosperity of mankind is well established. Economic growth and environmental protections are inextricably linked for serving in the earth. We ought to live in the harmony with nature. Odisha has 51,619 sq. kms forest area; which is 33.15% of its geographical area. The open and such forests are increasing at the cost of the dense forest. At present 50% of the reserved forest are under degradation. Degradation of forests is on account of over use of the forest due to increasing pressure by the human and animal population. Forests are basically a local resource. The society has addressed itself with urgency to the regeneration and rehabilitation of the degraded forests. The problem can be tackled effectively at the local level with active involvement and participatory of the adjoining village communities. Participatory management of the public forests involving the Government and local communities for regeneration of the degraded forests through effective protection of the forests, sharing of the forest produce and improving the livelihood opportunities of forest dependent communities was initiated by the Forest Department.

Joint Forest Management has proved to be a successful strategy to protect and improve the valuable forest wealth of our country. One of the features of the National Forest Policy, 1988 was that it prescribed for active involvement of the people in protection, conservation and management of the forests. Joint Forest Management is not only a tool for forest regeneration, but also a means of employment regeneration, and social empowerment of forest fringe dwellers. The scope of the above resolution was enlarged in December 1990 to include the protected forests and it was also laid down that Village level forest protection committee. (VFPC) should be constituted by convening meetings in the concerned villages. To make the forest people interface, more effective and transparent the Government of Orissa in F & E Department issued a Resolution No-16700-10-F(PRON)-20/93/F&E dt. 03.07.1993. This Resolution dealt in exhaustive manner the involvement of the local people (Community) in protection of the adjoining forests, formation of Vana Samrakshyan Samities (VSS), duties and responsibilities of the VSS, their Executive Committees and the role of Grama Panchayats and preparation of the Forest Management Plan, usufructuary benefits for the VSS and provision of M.O.U etc. Subsequently the policy has changed to some extent vide

Resolution dtd. 30.9.1996 of Government of Orissa, F&E Department where the Government conferred some specific rights in favour of the VSS relating to various forests produces.

While implementing the previous Working Plan, as per prescription, there are 515 Nos. VSS are listed in this Division which are formed adjoining to different Forest Blocks of this Division to protect plantation and other degraded areas and conserve the forest and to uplift the economic status of local people in order to reduce the anthropological pressure. The details list of the VSS is given in **Appendix XI**.

8.2 Status of empowerment of JFMCs: (i) The State Govt. vide Resolution No. 17240 dt.01.08.1988 and No.13638 dt.01.10.1988 introduced the concept of Joint Forest Management (JFM) in the state for the protection degraded Reserve forest by communities. Subsequently, another resolution was issued by Govt. vide No. 29825 dt.11.12.1990, which envisages protection of Reserved Forest and Protected Forests by community and sharing of usufructs. By virtue of the said resolution, they were granted certain concessions as per section-24 of the Orissa Forest Act, 1972 to meet their bona fide requirement of firewood and small timber.

The concept of participatory Forest Management, a modified form of the JMFC, was introduced vide Govt. Resolution No. 16700 dt.03.07.1993. Emphasis was laid on formation of Vana Samrakshyana Samiti (VSS) in each village(s) adjoining the forests. As per the said resolution the VSS members are required to protect and manage the degraded forests through JFM. In turn, they were granted usufruct rights for collection of royalty free small timber and firewood along with 100% of the intermediate yield and 50% of the final harvest. Incentives to villagers for protection of forests and conferment vide Resolution No. 22180/F & E dt.30.09.1996.

The National Forest Policy 1988, envisaged co-operation of the people in conservation and development of forests. In keeping with this policy Govt. of Odisha adopted Joint Forest Management of the forest wealth. JFM has not only a tool for forest regeneration but also a means of employment generation and yield empowerment of the forest fringe dwellers.

The State Govt. enacted the Orissa Village Forest Rule 1985, were envisaged preparation of management plan for every village forest and shortage operation of the community in protection of this forest. In 1988, the State Govt. passed a resolution to formally introduce a scheme of protection of peripheral Reserved Forest areas with

participation of the adjoining Villagers by forming a village level Forest Protection committee. To make the forest people interface more effective, the Govt. of Odisha in Forest & Environment Department issued a resolution dt.03.07.1993. The resolution deal in a fairly exhaustive manner, the involvement of the communities in protection of adjoining forest, formation of Vana Samrakshyana Samiti (VSS), duties & for the VSS and responsibilities of the VSS and their executive committees and role of forest department and Gram Panchayat, preparation of joint Forest Management Plans, usufruct benefits for the VSS and provision of MOU etc. some these resolution in the past didn't cover the mangrove wet lands and the protection areas of the state i.e. National Parks and sanctuaries and participatory mandating of management are needed their too, the 2008 resolution was issued to extend participatory approach to all types of forests. Eco development was adopted strategy in order to improve the livelihood of local people and there by securing support for conservation.

Participatory Forest Management in JFM mode is an evolving encompassing ecological, Socio-Cultural and Economic dimension. People played an important role in protection and re-generation of forests all over the State of Odisha. Villagers have either formed VSS or as per JFM resolution or Community Forest Management groups outside the existing JFM framework.

The community forest resource has been defined under state Schedule Tribes God other Traditional Forest Dwellers (Reorganization of Forest Right's) act 2006 (popularity known as Forest Right Act's). As per the said act, Community Forest Resource means customary common Forest Land within the traditional and customary boundary of the village and seasonal use of the landscape in case of past communities etc. The minor Forest Produce has been defined under the Forest protection Act which includes all Non-timber Forest Produce of plant origin such as banned brushwood, stumps, Cane, Tasser, Cocoons, Honey, Wax, Lac, Kenduleaf, Medicine Plants and herbs, roots, tubers and the like.

Whereas the Ministry of Environment & Forests, Govt. of India have under SAMANWIT GRAM VANIKARAN SAMIRDDHI YOJANA (SGVSY) SCHME adopted an integrated approach for forest conservation and the development of communities living in the forest fringes be ensuring a convergence in the flow of forest under the various Central Sector and centrally sponsored scheme in the forestry sector through Forest development Agencies constituted in every Forest Division.

AND, whereas the Government of Orissa have decided to constitute Forest Development Agencies (FDAs) in every Territorial Forest Division of the state for implementation of the integrated forestry development programmed under the SAMANVIT GRAM SAMIRDDHI YOJANA.

A study on status of empowerment of JMFCs was taken up on the following criteria in few Forest Divisions.

- Extent of forest area under effective control, protection and management of V.S.S.
- Regularity and frequency of holding meetings of the General Body and Executive Committee of the V.S.S. proper attendance in these meetings deliberation of vital issues, and record keeping.
- Improved status of forest Protection.
- Quality control, exercise by the V.S.S. on day to day management of the forest.
- Resolution of conflicts.
- Sustainable collection and control of forest fire.
- Reduction in day-to-day dependency on the produce of the forest.
- Effectiveness in-implementation of Afforestation, soil moisture conservation measures and silvicultural operations.
- Equity and gender equity.

8.3 Labour Welfare: Malkangiri Forest Division has been providing direct employment to labourers while executing various developmental works under different scheme. The labourers were paid minimum wages as per Govt. Notification modified from time to time, the minimum wages in force in Odisha during various period of time in current working plan. With respect to the welfare scheme and expenditure no specific welfare scheme was in operation the current working plan period. No cases pending in the labour courts. With respect to provisions of drinking water, children first aid etc. the labourers are being provided as a matter of right in case of scheme under MGNREGS. However, for other departmentally funded scheme no systematic facility is available.

Table No. 8.1: Different wage rates notified for Unskilled Workers

Year	Wage Rate
2007-08	70
2008-09	70
2009-10	90
2010-11	90
2011-12	90
2012-13	150
2013-14	150

2014-15	150
2015-16	200
2016-17	200
2017-18	280
2018-19	280
2019-20	286.30
2020-21	298

8.4 Use of indigenous knowledge: The field survey on indigenous Knowledge and documentations of this has not been done in the division. No Biodiversity Management Committees (BMC) as per Biodiversity Act has been formed in the division.

8.5 Extent of cultural/ sacred groves: An area with particular types of trees dedicated to local deities or ancestral spirits are protected by local communities through social traditions and taboos incorporation spiritual and ecological values are called as sacred groves.

8.5.1 Important of Scared Groves:

- *Sacred Groves provide shelter to thousands of species of other plants animals.
- *Scared Groves have great powers to heal body spirit.
- *Sacred Groves are important reservoirs of biodiversity.
- *These are store houses of Medicinal Plants valuable to village communities as well as modern pharmacopoeia.
- *Sacred Groves help in keeping the water cycle in local areas.
- *These improve soil stability, prevent top-soil erosion and provide irrigation for agriculture in drier climates.

8.5.2 Need for Conservation of Sacred Groves:

The sacred Groves are the history of our culture. In the past, protection and conservation of the sacred Groves were closely linked with the religious beliefs and traditional cultural heritage survived through generation, but unfortunately the religious beliefs taboos that were in the Centre of scared grove preservation are now fast eroding due to change in social set up, increase consumerism for better living and change in the belief system of the people attributable to modern system of education. Therefore, it is extremely difficult to protect sacred grove only in the basis of religious belief. There is a need to revitalize the age-old ethos of culture of traditional societies by supplementing with scientific knowledge about the crucial role of sacred grove in conserving biodiversity and providing

large number of valuable goods and vital ecological service to the people living around the sacred grove. Therefore, urgent interventions are required for the conservation of the sacred grove.

8.6 Ecotourism Areas and Activities:

Eco-tourism is derived from two words” Ecosystem” and “Tourism”. Ecosystem” is the system in which we live- the system which include the earth, the water, the sky and of course the living and non-living objects in all these systems. It is dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit and tourism means- ‘the practice of traveling for pleasure. Thus, any tourism that contains a visit to an Ecosystem is known as Eco-Tourism. Basically, Eco-tourism means “Tourism involving travel to areas of natural or ecological interest, typically under the guidance of a naturalist, for the purpose of observing wildlife and learning about the environment and at the same time focus on wildlife and promotion of understanding and conservation of the environment. This is a conscientious form of tourism and tourism development, which encourage going back to natural products in every aspect of life and helps preserve nature. It is also the key to sustainable ecological development.

The tribes in Malkangiri are original inhabitants and it is found that a number of tribes who are cradle of tribal culture offer a harmonious blend of tribal diversity. The fascinating life style of Bondas, Koyas, Duruas and Sauras who have their own culture, customs, traditions, practices and life style have become another major source to develop Eco-Tourism in the District which give rise to form Eco-tourism in the District. At present there are three Nos of Eco-Tourism created in this Division namely

1. Eco-Tourism, Satiguda in Talaguda VSS of Malkangiri Range
2. Eco-Tourism, Jaduguda in Jaduguda VSS of Malkangiri Range and
3. Eco-Tourism, Chitrakonda in Maa Bhandaragharani VSS of Chitrakonda Range.

Eco- tourism should be encouraged in all potential areas in order to create awareness and increase revenue. The DFO shall select Eco-scouts from local people to guide the tourist. Buildings for accommodation/ lodges may be constructed at Malkangiri Range and Chitrakonda Range. The VSS and EDC should be encouraged to provide decent catering services to visitors. The Range Officer will give training in consultation with the Tourism Department. Nature trail, interpretation centers, hiking, picnicking, trekking shall be

organized and monitored in each Range. This activity should be a livelihood base program for rural people.

8.7 Social Customs: - Social customs and traditions or standards of behaviors vary across nations and cultures. Customs may also vary within society, different social groups and different regions may have different customs. Social customs keep us together and unified. It is something society does as a rule to adhere to.

The culture of Malkangiri District is displayed by the song and dance programs of its tribal people, the major portion of the District's population. The chief's tribes seen here are Bondas, Gadabas, Kondhs and Koyas. Music is the chief amusement of these tribes and during the festival's seasons, it becomes their favorite pastime. A variety of crude instruments are used in playing their music. Though each tribe has its own distinctive music and musical instruments, the making and manipulation of some of these instruments are done with such skill that, extremely simple though they are, it becomes almost impossible to emulate them. In each tribe, different types of music are prescribed. Women sing in chorus when working in the fields, men and boys while away the lonely hours of watching cattle by warbling to them.

Dancing is one activity about which all men and women are passionately fond of dancing. During festivals, dancing parties begin at nightfall, last the whole night and continue even through the following day. Each tribe has its own particular dance and practices different types of music for different seasons and occasions. The Koyas have an interesting dance, in which the men tie buffalo or bison horns on their heads and engage in mimic fights, their women's also dancing prettily in a ring with their hands on each other's shoulder. The Parojas dance and the dances of the Gadabas are simple but no less spirited. Many entertainments and cultural programmes were organized by the officials working in Dandakaranya projects. Public Relation officers of Dandakaranya Projects also arranged film shows in villages.

The Pus Parab and Chaiti Parab of almost all tribes of this region are recognized as main festivals. Their important festivals are discussed below.

8.7.1 Chaiti Parab: The whole month of Chaitra is celebrated as a holiday by the tribes of this region. The month is spent in feasting, nightlong dancing and singing and in expeditions into the forests together. Men and boys go into the forest for hunting. With depletion of forest and restrictions imposed on it, the scope of hunting has declined in course of time.

8.7.2 Pus Parab: Pus Parab is observed in the month of Pausha in which men, women and children participate. After the rituals and sacrifices are made in front of a heap of wood is lit and people sing and dance encircling the fire.

8.8 Status of compliance of Forest Right Act (FRA): - The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 was passed by the Parliament of India and the assent to this Act was received from the President of India on 29th December, 2006. The said Act was notified in the Gazette of India on 2nd January 2007. For implementation of the said Act, the Central Government notified the Rules for Recognitions of Forest Rights on 1st January 2008. These Rules were further amended by the Central Government vide notification dated 6th September 2012.

8.8.1 Salient Provision of the Forest Rights Act, 2006

- (I) Section 3(1): The following rights which secure individual or community tenure of both shall be the forest rights under the Act. They are:
- (a) Right to hold and live in the forest land under the individual or common occupation for habitation or for self-cultivation for livelihood by a member of a forest dwelling Scheduled Tribe or other traditional forest dwellers;
 - (b) Community rights such as nistar, by whatever name called, including those used in erstwhile princely States, Zamindari or such intermediary regimes;
 - (c) Right of ownership, access to collect use, and dispose of minor forest produce which has been traditionally collected within or outside village boundaries;
 - (d) Other community rights of uses or entailments such as fish and other products of water bodies, grazing and traditional seasonal resource access on nomadic or pastoralist communities;
 - (e) Rights including community tenures of habitat and habitation for primitive tribal groups and pre-agricultural communities;
 - (f) Rights in or over disputed lands under any nomenclature in any State where claims are disputed;
 - (g) Rights for conservation of pattas or leases or grants issued by any local authority or any State Government on forest lands to titles;

- (h) Rights for conservation of pattas or lease rights issued by any local authority or any State Government on forest lands to little;
 - (i) Right to protect, regenerate or conserve or manage any community forest resource which they have been traditionally protecting and conserving for sustainable use;
 - (j) Rights which are recognized under any State law or laws of any Autonomous District Council or Autonomous Regional Council or which are accepted as rights of tribe under any traditional or customary law of the concerned tribes of any State;
 - (k) Rights of access to biodiversity and community right to intellectual property and traditional knowledge related to biodiversity and cultural diversity;
 - (l) Any other traditional right customarily enjoyed by the forest dwelling Scheduled Tribes or other traditional forest dwellers, as the case may be, which are not mentioned in clauses (a) to (k) but excluding the traditional right of hunting or trapping or extracting a part of the body of any species of wild animal;
 - (m) Right to in situ rehabilitation including alternative land in cases where the scheduled tribes and other traditional forest dwellers have been illegally evicted or displaced from forest land of any description without receiving their legal entitlement to rehabilitation prior to the 13th day of December, 2005.
- (II) Section 3 (2): Notwithstanding anything contained in the Forest (Conservation) Act, 1980. The Central Government shall provide for diversion of forest land for the following facilities managed by the Government which involve felling of trees not exceeding 75 trees per hectare, namely:
- (a) School
 - (b) Dispensary or Hospital
 - (c) Anganwadis
 - (d) Fair price shops
 - (e) Electric and telecommunication lines
 - (f) Tanks and other minor water bodies
 - (g) Drinking water supply and water pipelines

- (h) Water or rain water harvesting structures
- (i) Minor irrigation canals
- (j) Non-conventional source of agency
- (k) Skill Up gradation or vocational training centers
- (l) Roads and
- (m) Community centers.

Provide that such diversion of forest land shall be allowed only if, the forest land to be diverted is less than one hectare in each case; and the clearance of such developmental projects shall be subject to the condition that the same are recommended by the Gram Sabha.

- (III) Section 5: the holders of any forest right, Gram Sabha and village level institutions in areas where are holders of any forest right under this Act are empowered to (a) protect the wildlife. Forest and biodiversity; (b) ensure that adjoining catchment area, water sources and other ecological sensitive areas are adequately protected; (c) ensure that the habitat of forest dwelling Scheduled Tribes and other traditional forest dwellers in preserved from any form of destructive practices affecting their cultural and natural heritage; (d) ensure that the decision taken in the Gram Sabha to regulate access to community forest resource and stop any activity which adversely affects the wild animals, forest and the biodiversity are complied with.
- (IV) Section 6(1): The Gram Sabha shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both that may be given to the forest dwelling Scheduled Tribes and other traditional forest dwellers within the local limits of its jurisdiction under this Act by receiving claims, consolidating and verifying them in such manner as may be prescribed for exercise of such rights and the Gram Sabha shall, the pass a resolution to that effect and thereafter forward a copy of the same to the Sub-Divisional Level Committee.
- (V) Section 6(3): The state Government shall constitute a Sub-Divisional Level Committee to examine the resolution passed be the Gram Sabha and prepare the record of Forest right and forwarded it through the Sub-Divisional Officer to the District Level Committee for a final decision.

- (VI) Section 6(5): The State Government shall constitute a District Level Committee to consider and finally approve the record of Forest rights prepared by the Sub-Divisional Level Committee.
- (VII) Section 6(6): The decision of the District Level Committee on the record of forest rights shall be final and binding.
- (VIII) Section 11: The Ministry of the Central Government dealing with Tribal Affairs or any officer of authority authorized by the Central Government in this behalf shall be the nodal agency for the implementation of the provisions of this Act.

8.8.2 The detailed information on individual Claims under Forest Right Act 2006 in respect of Malkangiri Division is given in Table. The report is given Panchyat Samittee wise.

Table No. 8.2: List of the Individual Claims under Forest Rights Act, 2006 in Malkangiri Forest Division.

Name of the Block	Application Received				Individual Claims Approved by SDLC	Individual Claims Approved by DLC		Community Claims Approved		Total Claims Approved			Titles Distributed		Claims Rejected		
	Indv	Com (Form B)	Com (Form C)	Total	No of Claims	No of Claims	Area (in Hc.)	No of Claims	Area (in Hc.)	Indv	Com	Total	Indv	Com	Indv	Com	Total
1	2	3	4	5	6	7	7	8	9	10	11	12	13	14	15	16	17
CHITRAKONDA	4160	47	0	4207	3621	3621	2805.981	47	509.467	3621	47	3668	3508	45	506	0	506
KALIMELA	4714	21	11	4746	4650	4648	6237.676	14	577.602	4648	14	4662	4565	9	50	0	50
KHAIRPUT	4958	71	71	5100	4420	4026	3644.817	1	0.865	4026	1	4027	3959	1	832	0	832
KORUKONDA	6040	55	43	6138	5524	5437	5644.327	12	63.587	5437	12	5449	5358	11	533	0	533
MALKANGIRI	8315	24	21	8360	7826	7826	8761.050	3	1.844	7826	3	7829	7816	2	475	0	475
MATHILI	9016	27	16	9059	8359	8359	5683.225	11	105.587	8359	11	8370	7962	6	487	0	487
PODIA	2643	19	19	2681	2489	2489	3966.724	1	11.524	2489	1	2490	2489	0	154	0	154
GRAND TOTAL	39846	264	181	40291	36889	36406	36743.8	89	1270.476	36406	89	36495	35657	74	3037	0	3037

The detail, of Titles issued to the individuals in Forest Land as well as in Revenue Forest, is given in Table 8.3. Out of 36406 numbers of approved titles 35657 numbers of individual titles has been issued. The rest 749 numbers of titles are pending with Collector, Malkangiri. No titles are pending in this Division.

Table No. 8.3: Details of Certificate of Titles Distributed in Revenue Forest and Reserve Forest Area Involved in Malkangiri Division

Sl. No	Name of the District	No. of Certificate of titles distributed			Area in Acres		
		Revenue Forest	Reserve Forest	Total	Revenue Forest	Reserve Forest(RF, PRF,RL, UDPF)	Total
1	2	3	4	5	6	7	8
1	Malkangiri	32160	3497	35657	76756.42	12933.22	89689.64

Regarding Community Forest Right 445 claims has been received and 89 numbers of claims has been approved. Total 74 numbers of titles have been issued and the rest 15 no of claims are pending with Collector, Malkangiri.

8.9 Other Rights and Concession:

The right and concession of the local people will be in accordance with the provisions of the Orissa Forest Act 1972 and relevant mode there under the Govt. policies in vogue. The concessions & rights have locality with the enactment of some legislation. They are:

1. Panchayats (Extension to the Scheduled Areas) (PESA) Act, 1996

The PESA Act has been an important legislative framework to be enacted by the state legislatures for the tribal to have their control and rights over natural resources and conserve and preserve their identity and culture and that too in a participatory manner through the institution of gram Sabha. As per the PESA Act the ownership of the minor forest produce is with Gram Panchayat in scheduled areas. Similarly, the forest rights act revises the right of ownership, access to collect; use and dispose of minor forest produce which have been traditionally collected within or outside village boundaries to many boundaries. The act also gives the right to protect, regenerate or conservation any community forest resources which have been traditionally protect conserving for sustainable use. As per this act the extraction of MFP from for wetland falling within the community forest rights granted, will be the right of the communities provided the management plans prescribe the sustainable level of extraction areas. However, at present the CFR title holders or communities have not yet prepared any management plan.

2. Orissa Gram Panchayats (Minor Forest Produce Administration) Rules 2002

As per the 2002 Rules of Odisha Gram Panchayat (Minor Forest Produce Administration), the Govt. had liberalized the control on extraction of MFP of 68 items and placed some powers to regulate procurement and trading of MFP. Therefore, the GPs had the power to register traders & issue permits for extraction & transport of understood here that there was no method of controlling the extraction within the sustainable limits. The working plan prescriptions could not be enforced on the Gram Panchayats. Also, no information was available on the number of traders registered, the quantity of MFP extracted, yearly etc. as such reports were not supplied to the DFO.

3. JFM Resolution of Govt. of Odisha

As per the JFM resolutions and the current being the 2011, of the Govt. of Odisha, the VSS had the right to collect & use sell the MFP items from that can be collected. This shall be done with due regard to the carrying capacity, productivity and biodiversity of the local Eco-System. The draft micro plan prepared by the executive committee (EC) will be scrutinized by the Forest Range Officer from the technical, financial and legal point of view. After that the same shall be placed before the General Body for deliberation and approval.

As per the Joint Forest Management Resolution, 2011: the VSS/EDC shall be entitled to the usufructuary benefits from the assigned forest as under: -

- Usufructs like fallen leaves, fodder grasses, thatch grass, broom grass, fencing materials, brushwood, fallen lops, and twigs to be used as fuel shall be available to the members free of cost.
- 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/EDC for 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 the 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 bonfire domestic use and they agree to pay the proportionate cost of harvesting.



Fig 8.1: VSS Performance Assessment Meeting at Chidipalli and Damaguda

8.10 Dependency of local people on NTFPs:

8.10.1 Government of Orissa Forest and environment Department RESOLUTION No. 5503/F&E Dated 31st March 2000. BBSR

According to the policy, procured by the Government of Odisha about the trade of NTFPs in resolution no.5503/F&E dated 31st march, 2000, it is mentioned that the Gram Panchayats have the authority to regulate the purchase and get hold of trade of NTFPs including 68 items of MFPs. It is bought up to assure that the primary gatherers will get fair price for their collection of NTFPs.

Panchayats are empowered to fix procurement price to be paid to primary collectors in respect of each of the NTFP items listed in the resolution. Traders are required to register themselves with the Gram Panchayat for purchase of any NTFP items. No permits are required to cover transit of any of the NTFP items within the state. No royalty is to be paid or deposited with the Government in respect of procurement of NTFP items. Government of Odisha, brought up a resolution on 12th October 2001 concerned to price fixation mechanism of NTFP, so that the primary collectors should get legitimate price. It was an alteration of an earlier notified resolution dated 9th July 2001, in which the state level price fixation committee was dissolved and in place of it a district level price fixation committee was set

up. In accordance with this resolution the district collector has the power to decide the minimum procurement prices of NTFPs including 68 MFPs. For further discussion regarding this, the collector should consult DFO (Territorial), District Panchayat Officer, District Welfare Office, local representative of TRIFED, the local representative of Odisha Forest Department Corporation Ltd and the local representative of the Women and Child Development Department.

The foremost reason behind making these policies is that the poor livelihood dependent on NTFPs can get some income. Usually the middle man gets the higher profit during trade so Government of Odisha has made these policies for the benefit of primary collector. These policies would also check illegal trade of NTFPS without over exploitation of the forest and nationalize some important NTFPS like bamboo, kendu leaves, etc. It also gives emphasis on storage, transportation, processing and marketing of NTFPs and checks the impact of private monopolies on Government revenue and the revenue of primary collectors.

Table 8.4: Common NTFP Trade Names.

Sl. No.	Common Trade name of the item of forest produce	Sl. No.	Common Trade name of the item of forest produce
1.	Tamarind, de-seeded Tamarind, Tamarind seed	2.	Bana Kolatha
3.	Mahua Flower	4.	Gaba
5.	Hill Broom	6.	Basil
7.	Thorn Broom (Jhadu or GhodaLanji)	8.	Makhana seed
9.	PhulaJhadu	10.	Tala Makhana seed
11.	Broom Grass	12.	Baidanka Seeds
13.	Nux Vomica (Kochila seeds)	14.	Baghanakhi seeds
15.	Harida.	16.	Kamala Gundi Fruit
17.	Bahada	18.	LandaBaguli
19.	Amla	20.	Bela
21.	Soap Nut (RithaPhala)	22.	Chireita (Bhui Neem)
23.	Marking Nut (Bhalia)	24.	Khajuripata
25.	Cleaning Nut (Nirmala)	26.	Rohini Fruit
27.	Honey	28.	Bhusanga Leaves
29.	Siali Leaves	30.	Rasna Root
31.	Sabai Leaves	32.	Phenaphena Fruit
33.	Mango Kernel	34.	Sidha Fruit
35.	Thatch Grass	36.	Sathabari
37.	Simul Cotton	38.	Katha lai
39.	Arrow Root (Palua)	40.	Atundi Lai
41.	Dhatuki Flower	42.	Khelua Lai
43.	Putrani	44.	Suam Lai
45.	Sikakai	46.	Eksira Fruit
47.	Jangal Jada or Gaba	48.	Katha Chhatu (Mushroom)
49.	Palasa Seed	50.	Mat Reed (Sapa Masina Grass)
51.	Suaku seed	52.	Ananta Mula

53.	Indra Jaba (Korai Seed)	54.	AntiaPata
55.	Gila (Seed and Coat)	56.	Nageswar Flower
57.	Benachera	58.	MabjadKendu
59.	Banahaladi	60.	Atundi Fruit

Table No. 8.5: Other items under NTFPs

1	Mahula seed
2	Kusum seed
3	Karanja seed
4	Neem seed
5	Char seed
6	Chakunda seed
7	Babul seed
8	Any other items(s) as may be notified by Government.

Items covered under Para-4(b)

1. Sal leaves
2. Sal resin (Jhuna)
3. Gum (Dharua Gum, Babul Gum, Genduli Gum, Bahada Gum, Palas Gum etc.
4. Khaira and Catechu
5. Barks of trees / climbers (Sunari, Lodha, Medha, Phanphania, Arjuna.
6. Roots of Patala Garuda (RS roots)
7. Sandal wood
8. Tassar cocoon
9. Canes.

8.10.2 Government of Orissa, Forest and Environment Department RESOLUTION No. 5F-C-62/2000. 13285/F&E, Dated Bhubaneswar 23.08.2000

In partial modification of this Department Resolution No. 5503/F&E 31.03.2000 in the matter of policy on procurement and trade of Non-Timber produce, the State Government have been pleased to transfer the following seven seed items mentioned in Table No. 8.6 appended to the said Resolution for inclusion of the same as Minor Forest Produce items under Table No. 8.5 to be regulated Gram Panchayats henceforth.

1. Mahua Seed
2. Kusum Seed
3. Karanja Seed
4. Neem Seed
5. Char Seed
6. Chakunda Seed
7. Babul Seed

The guidelines laid down in the aforesaid Resolution for disposal of the above seven oil seed items shall be treated as ineffective.

8.10.3 Government of Orissa, Panchayat Raj (G.P) Department Notification No. SRO No. 934/2002 – Dated Bhubaneswar the 14.11.2002.

The state government made these rules in November 2002, which has following salient features. The GP shall have the power to regulate procurement and trading of MFP, whether produced in government lands and forest areas within the limits of Grama or collected from the Reserved Forests and brought into the Grama.

- Priority would be given to the VSS and its members for collection and trading of MFP.
- Price fixation would be done by the Panchayat Samiti (PS) in September and would be circulated to different offices of district administration and to all the GPs.
- The Gram Sabha would ratify prices fixed and necessary changes can be made based on the local needs.
- If Panchayat Samiti fails to fix the price then the District Collector would call a meeting of PS preferably in October to fix up the minimum procurement prices.
- The trader registered to procure MFP from the GP shall furnish monthly return and also annual return on a prescribed format.
- The GP shall furnish an annual return on the procurement and sale to the Forest Range Officer.
- In case of violation of payment of minimum procurement prices by the registered traders, the Sarapanch shall conduct an inquiry and then it shall be discussed in the GP meeting and then GP shall resolve to cancel the registration of the trader. If the trader after cancellation of the registration continues to procure MFP from the GP area then the Sarapanch or Secretary shall lodge complaint before the DFO. The MFP seized by the DFO from the trader shall be publicly auctioned and the sale proceeds thereof be deposited under the appropriate head of account under the Orissa Forest Act.
- If a trader is engaged in procurement of MFP without registering with the GP then the Sarapanch or Secretary shall lodge complaint before the DFO for taking appropriate action.

Table No. 8.6: List of Minor Forest Produces

Sl.No	Common Trade name of MFP	Sl.No	Common Trade name of MFP
1	Tamarind/deseeded Tamarind & Seed	35	Tala Makhana seed
2	Mahua Flower	36	Baidanka Seeds
3	Hill Broom	37	Baghanakhi Seeds
4	Thorn Broom (Jhadu or GhodaLanji)	38	Kamala Gundi Fruit.
5	PhulaJhadu.	39	LandaBaguli.
6	Broom Grass	40	Bela.
7	Nux Vomica (Kochila seeds)	41	Chireita (BhuiNeem)

8	Harida.	42	Khajuripata
9	Bahada.	43	Rohini Fruit
10	Anla	44	Bhursunga Leaves.
11	Soap Nut (Ritha Phala)	45	Rasna Root.
12	Marking Nut (Bhalia)	46	Phanaphania Fruit.
13	Cleaning Nut (Nirmala)	47	Sidha Fruit.
14	Honey	48	Sathabari.
15	Siali Leaves.	49	Katha lai
16	Sabai Grass	50	Atundi Lai
17	Mango Kernel	51	Khelua Lai
18	Thatch Grass.	52	Suam Lai
19	Simul Cotton.	53	Eksira Fruit
20	Arrow Root (Palua)	54	Katha Chhatu (Mushroom)
21	Dhatuki Flower.	55	Mat Reed (Sapa Masina Grass)
22	Putrani	56	Ananta Mula.
23	Sikakai	57	AntiaPata.
24	Jangaljada or Gaba	58	Nageswar Flower
25	Palasa Seed	59	MankadaKendu.
26	Suaku Seed	60	Atundi Fruit.
27	Indra jaba (Korai Seed)	61	Mahula Seeds
28	Gila (Seed and Coat)	62	Kusuma Seeds
29	Benachera.	63	Karanja Seeds
30	Banahaladi.	64	Neem Seeds
31	Bana Kolatha.	65	Char Seeds
32	Gaba	66	Chakunda Seeds
33	Basil	67	Babul Seeds
34	Makhana seed	68	Baibiranga Seeds

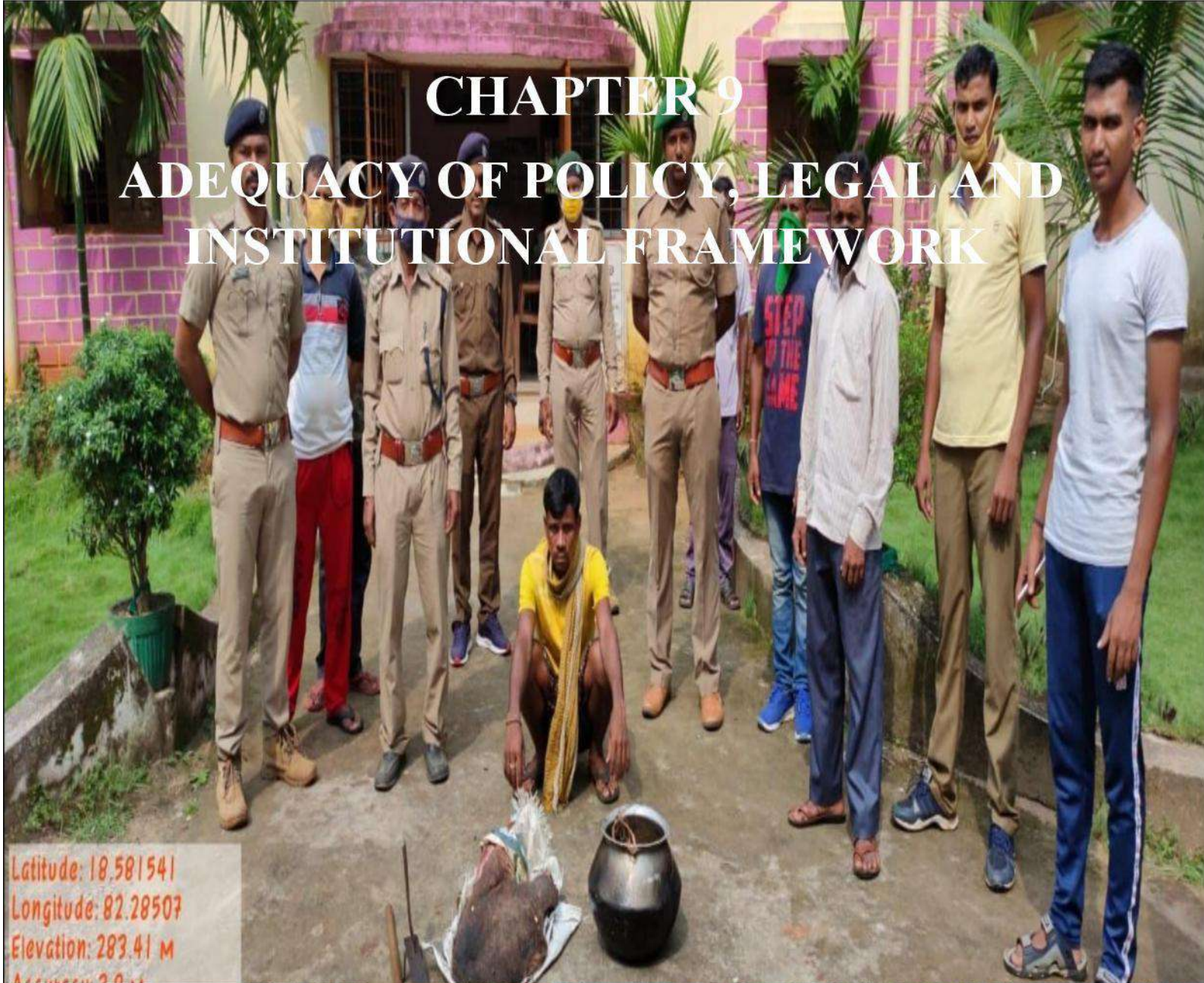
Further one NTFP item transferred to control of Gram Panchayat vide Resolution No.3695 dt.02.03.2006 in Forest & Environment Department i.e Sal Seed which is item No.69

8.11 Other aspects

In Malkangiri Forest Division there are no Grazer communities or the out sliders allowed for grazing. However, the villagers are allowed to collect firewood for their domestic needs and allowed to graze their cattle subject to restrictions as may be imposed by the Forest Department from time to time. However, the browsers and grazers are not allowed in the regeneration and plantation areas to encourage regeneration and growth of plantation.

CHAPTER 9

ADEQUACY OF POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK



9.1 Existing Policy and Legal Framework and Their Compliance

9.1.1 National Forest Policy-1988: The principal aim of Forest Policy must be to ensure environmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animal and plant. The deviation of direct economic benefit must be subordinated to this principal aim.

9.1.1.1 Essential of Forest Management:

- * Existing Forests and Forests land should be fully protected and their productivity improved.
- * Diversion of good and productive agricultural lands to forestry should be discouraged in view of the need for increased food production.
- * Provision of sufficient fodder, fuel and pasture, especially in areas adjoining forest in necessary in order to prevent depletion of forest beyond the sustainable limit.
- * Minor Forest produce provides sustenance to tribal population and to other communities residing, in and around the forests. Such produce should be protected, improved and their production enhanced with due regard to generation of employment and income.
- * Diversion of Forests land for any non-forest purpose should be subject to the most careful examinations by specialists from the stand point of social and environmental costs and benefits.

9.1.2 The Biological Diversity Act 2002 and Rules 2004:

The Biological Diversity Act 2002 is a law meant to achieve three main objectives;

- * The Conservation of Biodiversity.
- * The sustainable use of biological resources.
- * Equity in sharing benefits from such use of resources.

It is keeping in mind that we need to look at some provisions directly relevant to local communities, the most critical of them being the Biodiversity Management Committee (BMC), Section 41 of the Act states: Every Local Body shall constitute a Biodiversity Management Committee (BMC), within its area for the purpose of promoting conservation, sustainable use and documentation of land races, folk varieties and cultivators, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity.

9.1.3 Panchayat (Extension to the Scheduled Areas) Act 1996:

The 73rd amendment Act 1992 had made constitutional provisions for the three tier panchayats all over the country. The salient provisions of PESA Act are:

- In the Scheduled areas, every village will have Grama Sabha conducted persons whose names are included in the electoral rolls for the Panchayats the village level.
- In the Scheduled areas, there will be minimum of 50% seats reserved for Scheduled Tribes (STs) at all the tiers of Panchayats.
- If the -areas have different tribal communities, the reservation of different caste communities shall be on the basis of proportion to their population.
- The chairpersons at all levels of the panchayats in Scheduled areas shall be reserved for STs.
- If there are no ST members at intermediate or district level panchayats the state government shall nominate such under represented STs by maximum of **one-tenth** of the total elected members of the panchayats.
- Every legislation on the panchayats in scheduled areas shall be in conform with the customary law, social and religious practices and tradition management practices of the community resources.

Grama Sabha and Panchayat have right to regulate the:

- * Ownership of minor forest produce;
- * To prevent alienation of land;
- * To manage village markets,
- * To exercise control over money lending.

- * To exercise control over institutions and functionaries in all social sectors.
- * To control over local plans and resources for such plans including tribal sub-plans.
- * Planning and management of minor water bodies shall be entrusted to panchayat at appropriate level.

Thus, PESA Act has been an important legislative frame work to be enacted by the state legislatures for the tribal people to have their control and rights over natural resources and conserve and preserve their identity and culture and that too in participatory manner through the institution of **Gram Sabha**.

9.1.4 The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 & Rules, 2008:

Notwithstanding anything contained in any other law for the time being in force; and subjected to the provisions of this Act; the Central Government hereby recognizes and vests forest rights in-

- The forest dwelling Scheduled Tribes in States or areas in states where they are declared as Scheduled Tribes in respect all forest right as mentioned in Section 3 of the said Act.
- The Other traditional forest dwellers in respect of all forest right s as mentioned in Section 3 of the said Act.

NB: Other traditional forest dwellers means any member or community who has for at least three generations prior to the 13th day of December, 2005 primarily resided in and who depend on the forest or forest land for bona fide livelihood needs. Generation means a period comprising of twenty- five years.

- Notwithstanding anything contained in the Forest (Conservation) Act,1980 the Central Government shall provide for diversion of forest land for the following facilities managed by the Government which involve felling of trees not exceeding seventy-five trees per hectare namely (a) School (b) dispensary (c) telecommunication lines (d) fair price shop (e) electric and telecommunication lines (f) tanks and other minor water bodies (g) drinking water supply and water

pipelines (h) water and rain water harvesting structures (i) minor irrigation canals (j) non- conventional source of energy (k) skill up gradation or vocational training center (l) Roads and (m) community centers.

Provided that such diversion of forest land shall be allowed only if,

- The forest land to be diverted for the purposes mentioned in this sub-section is less than one hectare in each case, and
- The clearance of such developmental projects shall be subject to the condition that the same is recommended by the Grama Sabha.

9.1.5 Orders of Hon'ble Supreme Court of India:

Hon'ble Supreme Court passed an Order in Writ petition (202 of 1995) in the matter of "Godavarman Thirumalkpad" Vs. "Union of India". The order speaks about the felling of trees in all forests is to remain suspended except in accordance with the working plans of the state Government as approved by Central government.

Hon'ble Supreme Court passed an Order on dt.22.09.2000 in Inter-Locutory application No-424 saying that regeneration of forest should be commensurate with felling carried out under a working plan. To achieve this, it must be ensured that no felling be carried out without allocating necessary fund to regenerated the felled areas. In the event of failure in regeneration or any shortfall in carrying out regeneration operation no further felling shall be undertaken until the failure/ shortfall is made up.

Following the direction of Hon'ble apex court in their order dt.22.09.2000 in IA No.424 a core group was constituted to decide the extent of felling. As per these orders, felling is to be carried out by the State Governments only after obtaining the permission from core group constituted by the Ministry of Environment and Forests, New Delhi, which is compiled by the department.

9.1.6 The Orissa Forest Act, 1972.

9.1.7 The Forest (Conservation) Act, 1980 & Rules, 2004.

9.1.8 The Orissa Forest (Detection, Enquiry and Disposal of Forest Offences) Rules, 1980.

9.1.9 The (Orissa Rewards for Detection, of Forest Offences) Rules, 2004.

9.1.10 The Orissa Saw Mill and Saw Pits (Control) Act, 1991 & Rules, 1993.

9.1.11 The Orissa Timber and Other Forest Produce Transit Rules, 1980.

9.1.12 The Wild life (Protection) Act, 1972 & Rules, 1974.

9.1.13 The Wild life (Stock Declaration) Rules, 1974.

9.1.14 3rd National Wildlife Action Plan- 2017-2031

The key focus areas of this plan include integration of climate change into wildlife planning, conservation of coastal and marine ecosystem, mitigation of human-wildlife conflict, focus on wildlife health among others.

Climate Change impact: It is first wildlife action plan to recognize concerns related to climate change impact on wildlife. It has stressed on integrating actions for its mitigation and adaptation into wildlife management planning processes.

It recommended assisted migration of wildlife and anticipatory planting along ecological gradients, as climate change may result in die-offs of certain tree species that are unable to adapt to newer environmental conditions.

Approach: It adopts landscape approach in conservation of all wildlife – uncultivated flora and fauna that have an ecological value to ecosystem and to mankind irrespective of where they occur. It gives special emphasis to recovery to threatened species of wildlife while conserving their habitats which include inland aquatic, coastal and marine ecosystems. Wildlife health and disaster management have received due attention in this plan.

Human-Animal Conflict Concerns: It addresses rising human-animal conflict owing to shrinkage, fragmentation and deterioration of habitats generating animosity against wild animals and protected areas.

People's Support: It underscores increasing need for people's support for conservation of wildlife. It recommends eco-development, education, innovation, training, extension, and conservation awareness and outreach programs.

Participation of Private Sector: It underlines increased role of private sector in wildlife conservation. It lay down that Government will ensure that adequate and sustained funding including Corporate Social Responsibility (CSR) funds are made available for implementation of plan.

9.1.15 National Forestry Action Programme

Having about 2.5% of world's geographic area, India at present is supporting 16% of world's human population and 18% of cattle population. About 41% of forest cover of the country has already been degraded and dense forests are losing its crown density and productivity continuously. A large number of India's livestock population graze in the forests causing serious damage to soil, ground flora, including regeneration, and productivity of the forests. The use of forests beyond its carrying capacity and encroachments are the main cause of continuous degradation of forests. To reverse the process of degradation and for sustainable development of forests, the Government of India has prepared National Forestry Action Plan (NFAP), a comprehensive strategic programme.

These programmes are as follows:

- i. Protect Existing Forest Resources
- ii. Improve Forest Productivity
- iii. Reduce Total Demand of Forest Produce
- iv. Strengthen Policy and Institutional Framework
- v. Expand Forest Area

Strategies:

- i. For sustainability and productivity of forests, the production to be increased at least 3 to 5 m per ha per year by promoting appropriate silvicultural treatments.
- ii. Hygiene of forests to be improved through suitable silvicultural practices.
- iii. Efforts to be made to bring one-third geographic area of the country under forest and tree cover by plantations on all categories of wastelands and Agro-forestry.
- iv. Plantations on non-forest wastelands to be done mostly with fuel wood species as 70% of the wood produced from forests are used as fuel wood. Species of pulpwood and other industrial wood may be encouraged in farm forestry.

All the Forestry Activities undertaken in Malkangiri Forest Division is accordance with National Forest Policy 1988 and in accordance with all the Forest laws in operation.

9.2 Status of Approved Working Plan and Compliance:

Working Plan sanctioned is implemented but not fully due to various reasons like lack of funds, unavailability of area due to forest cover etc.

9.2.1 Summary of Prescription of Approved Working Plan:

The Summary of prescription of approved working plan is furnished in Chapter No.13 of Part-II.

9.2.2 Deviations in implementation of the outgoing working plan:

The deviation noticed during implementation of the outgoing working plan is furnished in Table No. 9.1 as follows.

The deviations are mainly due to non-availability of suitable plantation sites.

Table No. 9.1: Deviation Noticed During Implementation of the Outgoing Working Plan

Year	Plantation target achieved during the year in ha	Achievement inside the P.W.C in ha	Achievement in outside plantation working circle in ha	Total	Remarks
2007-08	250.50	-	115	115	Plantation could not be taken up during the year 2007-08 to 2011-12 inside the Plantation Working Circle due to pending approval of the plan. But plantations have been taken up in Rehabilitation Working Circle
2008-09	239.20	-	239	239	
2009-10	284.61	-	280	280	
2010-11	285.62	-	365	365	
2011-12	289.68	-	50	50	
2012-13	301.32	-	65	65	
2013-14	272.08	235	60	295	
2014-15	341.16	220	190	410	
2015-16	270.00	270	450	720	
2016-17	332.42	0	225	225	
2017-18	250.50	0	275	275	
2018-19	239.20	0	315	315	
2019-20	284.61	170	413	583	
2020-21	285.62	130	211	341	
Total	3926.52	1025	3253	4278	

9.3 Number of forest offence

The details of forest offence cases registered & case booked under Section 56 of the Orissa Forest Act, 1972 during the period from 2007-08 to 2019-20 are given in Table No-9.2 & Table No-9.3 respectively.

Table No. 9.2: Offence Cases Booked in Malkangiri Forest Division

No. of Cases				Materials seized					
Year	O.R.	U.D.	Total	Timber in cum	Fire wood in Qtl.	Pole	Bamboo	Charcol in (Qtl)	K.L. in (Qtl)
1	2	3	4	5	6	7	8	9	10
2007-08	1778	87	1865	92.5667	378.00	23048	6852	11.8	-
2008-09	1238	85	1321	64.587	291.85	20249	5795	22.04	
2009-10	1046	80	1126	66.9419	265.99	15827	5097	0.55	
2010-11	855	46	901	36.4211	142.70	9369	2539	0.25	
2011-12	1286	88	1374	128.8313	796.55	14865	3921	6.21	
2012-13	1111	234	1345	115.4932	858.33	10377	4379	0.75	-
2013-14	1114	110	1224	91.7057	955.42	13173	3886	5.1	-
2014-15	1018	96	1114	67.7219	683.05	15073	4127	13.35	-
2015-16	1037	65	1102	94.8632	859.45	16260	1320	3.5	-
2016-17	955	61	1016	47.8087	688.50	12354	823.5	0.9	-
2017-18	1140	72	1212	66.1072	623.89	14047	631	0.4	-
2018-19	1027	38	1065	50.7841	463.15	10155	816	-	-
2019-20	963	24	987	58.7214	378.3	8052	572	-	-
2020-21	897	33	930	35.5402	402.65	7908	785	3.24	-

Table No. 9.3: Cases Booked and Disposed of Under Section 56 OFA, 1972

Year	No. of cases booked	No. of cases disposed of	Balance for Disposed of	Type of Vehicles Involved			
				Motorized	Cycle	Cart	Boat
1	2	3	4	5	6	7	8
2006-07	1	1	-	1	-	-	-
2007-08	2	1	1	2	-	-	-
2008-09	1	1	-	1	-	-	-
2009-10	1	1	-	1	-	-	-
2010-11	3	3	-	3	2	-	-

2011-12	3	3	-	3	-	-	-
2012-13	3	3	-	3	-	-	-
2013-14	3	2	1	2	-	-	3
2014-15	2	2	-	2	-	-	-
2015-16	1	1	-	1	-	-	-
2016-17	4	4	-	4	-	-	-
2017-18	2	-	2	2	-	-	-
2018-19	5	2	3	5	-	-	-
2019-20	2	-	2	2	-	-	-
2020-21	4	-	4	5	-	-	-

9.4 Status of research and development:

No much research or development work is being carried out in the Division. But the Silvicultural Division Rayagada has been created which started functioning w.e.f. 18th October; 2003. The jurisdiction of the Division extends over the entire undivided KBK District of the State. There are four research ranges under this Division namely Rayagada, Koraput, Bhawanipatna and Bolangir.

9.5 Human resource capacity building efforts

Training of the staff is being done in the Division under various Schemes. This training relates to technical Forest matters, Forest Laws and Computer knowledge. The training imparted under different categories during the period from 2007-08 to 2017-18 is furnished in Table No. 9.4.

Table No. 9.4: Details about Training Taken by Field Staff/ Ministerial Staff/ Officers of Malkangiri Forest Division from The Year 2007-08 To 2019-20

Years	Name of Trainees	Subject	Duration of Training	Training Institution
01	02	03	04	05
2007-08	4 Forest Guard	Induction Training Course	10/04/2007 to 09/10/2007	OFRC, Angul
	1 Forester	One-week short term Refresher course	6/8/2007 to 10/08/2007	OFRC, Angul
	1 Forester	Two weeks general refresher course	20/8/2007 to 01/9/2007	OFRC, Angul
	1 Forester	One-week short term Refresher course	10/9/2007 to 14/9/2007	OFRC, Angul

	1 Forest Guard	Two weeks general refresher course	17/9/2007 to 29/9/2007	OFRC, Angul
	4 Forest Guard	Induction Training Course	19/11/2007 to 18/05/2008	OFRC, Angul
	1 Forester	Two weeks general refresher course	19/11/07 to 1/12/07	OFRC, Angul
	1 Range Officer	One-week short term Refresher course	17/12/07 to 21/12/07	OFRC, Angul
	1 Range Officer	One-week short term Refresher course	24/12/07 to 29/12/07	OFRC, Angul
	4 Forest Guard	Induction Training Course	07/07/2008 to 06/12/2008	OFRC, Angul
Total	19 nos			
2008-09	1 Forester and 1 Forest Guard	One-week short term Refresher course	3/11/08 to 07/11/08	OFRC, Angul
	1 Forest Guard	Two weeks general refresher course	20/10/08 to 1/11/08	OFRC, Angul
	1 Forester	Two weeks general refresher course	12/1/09 to 24/1/09	OFRC, Angul
Total	4 nos			
2009-10	1 Forester and 1 Forest Guard	Annual Training programme for the year 09-10 HRD	19/10/09 to 23/10/09	OFRC, Angul
	1 Forester and 1 Forest Guard	One-week short term Refresher course	07/12/09 to 11/12/09	OFRC, Angul
	1 Jr. Clerk and 1 Revenue Inspector	Annual Training programme for the year 09-10 HRD	19/10/09 to 23/10/09	OFRC, Angul
Total	6 nos			
2010-11	1 Forest Guard	Two weeks general refresher course	2/8/10 to 15/8/10	FTS, G. Udayagiri
	1 Forest Guard	Two weeks general refresher course	16/8/10 to 29/8/10	FTS, G. Udayagiri
	1 Forester	Two weeks general refresher course	23/8/10 to 5/9/10	OFRC, Angul
	1 Forest Guard	Two weeks general refresher course	6/9/10 to 19/9/10	OFRC, Angul
	1 Forest Guard	Two weeks general refresher course	20/9/10 to 03/10/10	OFRC, Angul
	1 Forest Guard	Two weeks general refresher course	15/11/10 to 28/11/10	OFRC, Angul
	1 Forest Guard	Two weeks general refresher course	6/12/10 to 19/12/10	FTS, G. Udayagiri
	1 Forester	Two weeks general refresher course	13/12/10 to 26/12/10	OFRC, Angul
Total	8 nos			
2011-12	1 Forester	Short term training course under s/p, HRD		
	1 Forester	Induction Training course after recruitment	18-10-2010 to 17-10-2011	OFRC, Angul

	1 Forester	Induction Training course after recruitment	18-10-2010 to 17-10-2011	BBSR
	Sri Umasankar Swain,Fr		15-12-10 to 17-10-11	BBSR
	3 Forester and 2 Forest Guard	Workshop on positive attitudinal charges amongst forest officials	14/11/11 to 15/11/11	Rayagada
	1Range Officer	One weeks training under s/p,scheme HRD	16/1/12 to 20/1/12	OFRC,Angul
	1 Forest Guard	One week short term Refresher course	13/2/12 to 17/2/12	OFRC,Angul
Total	11 nos			
2012-13	1 Junior Clerk	Basic computer Application course	16/7/12 to 21/7/12	OFRC,Angul
	1Forest Ranger	One week short term Refresher course	9/7/12 to 13/7/12	OFRC,Angul
	1Forest Guard	One week short term Refresher course	5/11/12 to 9/11/12	OFRC,Angul
	2Forest Guard	Two weeks general refresher course	13/8/12 to 26/8/12	FTS,Champua
	1Forest Ranger	One week training under s/p,scheme HRD	21/8/12 to 25/8/12	OFRC,Angul
Total	6 nos			
2013-14	1 Forest Guard	Refresher course for front line staff	Two weeks	F.T.S.G.Udayagiri
	1 Forester	Refresher course for front line staff	Two weeks	O.F.R.C. Angul
	1 Forest Guard	Refresher course for front line staff	Two weeks	O.F.R.C. Angul
	5 Forester and Forest Guard	G.P.S. Training	One day	FRH, Koraput
Total	8 nos			
2014-15	1 Junior Clerk	Basic Computer application training under HRD	6 days	O.F.R.C. Angul
	1 Forester and 1Dy Ranger	Human Resources Development Programme	5 days	O.F.R.C. Angul
	1 Dy. Ranger	Human Resources Development Programme	5 days	O.F.R.C. Angul
	20 Forest Guard and Forester	Capacity Building Training of the front line	One day	D.R.D.A. Conference hall, Malkangiri
	1 Forest Guard	Refresher course for front line staff	Two weeks	N.F.T.S, Champua
	1 Forest Guard	Refresher course for front line staff	Two weeks	O.F.R.C. Angul
Total	25 nos			
2015-16	6 Forest Guard	Induction Training course after recruitment	04/05/2015 to 03/11/2015	G.Udayagiri
	2 Forest Guard	Induction Training course after recruitment	04/05/2015 to 03/11/2015	OFRC,Angul

	2 ACF, 2FR, and 2 Forester	Van vigyan kendra-cum-work shop	03/11/2015 to 07/11/2015	Koraput
	7 Forest Guard	Induction Training course after recruitment	10/11/2015 to 09/05/2016	OFRC,Angul
	1 Forest Guard	Induction Training course after recruitment	17/11/2015 to 16/11/2016	NFS,Champua
	3 Forester	Induction Training course after recruitment	25/11/2015 to 24/11/2016	OFRC,Angul
Total	25 nos			
2016-17	2 Forester	Induction Training course after recruitment	1Year	FTS,Ghatikia
	4 Forester	Induction Training course after recruitment	27/5/2016 to 26/10/2016	NFS,Champua
	2 Foester	Induction Training course after recruitment	25/07/2016 to 24/07/2016	FTS,Ghatikia
	4Forest Guard	Induction Training course after recruitment	19/09/2016 to 18/03/2017	
	1 Forest Guard	Induction Training course after recruitment	01/10/16 to 2/03/17	OFRC,Angul
	1 Forester	Induction Training course after recruitment	1-12-2016 to 30-11-2017	OFRC,Angul
	1Forest Ranger	General Refresher course(5days)	22/8/16 to 26/8/16	OFRC,Angul
	1Forester	General Refresher course(5days)	17/10/16 to 21/10/16	OFRC,Angul
	1Forest Guard	General Refresher course(5days)	6/2/17 to 10/2/17	FTS,G.Udayagiri
	1 Junior Clerk	Basic computer Application course	13/2/17 to 18/2/17	OFRC,Angul
	2 Forester, 2 Forest Guard and 1 Data entry Operator	Master Trainer training programme of using field GIS survey of GPS PDA application in forestry app	14/2/17 to 18/2/17	CTTC,BBSR
	3 Forest Ranger, 1Dy Ranger, 3 Forester and 8 Forest Guard	Capacity Building implementation of soil and moisture conservation programme in Hilly forest block	16/2/17 to 17/2/ 17	Nabarangpur
	1 Forester	One week short term Refresher course	13/2/17 to 18/2/17	OFRC,Angul
	1 Forest Guard	One week short term Refresher course	06/3/17 to 11/03/17	OFRC,Angul
	1 ACF, 1Forest Ranger, 1Forest Guard and 1 NGO staff	Planting stock improvement Agro forestry & carbon sequestration in plantation	28/2/17 to 01/03/17	Koraput
Total	44 nos			
2017-18	1Deputy Ranger	One week short term Refresher course	23/10/17 to 28/10/17	FTS,G.Udayagiri
	5Forest Guard	Induction Training course	1/11/2017 to	NFTS,Champua

			30/04/2017	
	1 Forest Guard	Induction Training course	1/11/2017 to 30/04/2017	FTS,G.Udayagiri
		Training of untrained promote Forester	15/11/17 to 14/3/18	FTS, Ghatikia
Total	7 nos			
2018-19	3 Forest Guard	Induction Training course	14/5/18 to 13/11/18	FTS,G.Udayagiri
	2 Forest Guard	Induction Training course	15/11/18 to 14/5/19	NFTS,Champua
	2 Forester and 10 Forest Guard	4 days Training Programme	19/8/18 to 22/8/18	DPMU,Koraput
	1 Forester and 11 Forest Guard	Refresher Training under CAMPA APO 2016-17	26/8/18 to 31/08/18	DPMU,Koraput
	1 Forester , 5 Forest Guard, 1 DEO and 1 AJY Co-ordinator	Training on GPSPDA Synchronise and maintenance of GPSPDA	17/9/18 to 19/9/18	Koraput
	3 Jr. Accountant., 1 Jr. Clerk, 2 Data Entry Operator (DEO)	Training Programme of all module HRMS ,CAMPA Tracker ,TT Permit and FAMA	19/11/18 to 21/11/18	Koraput
	1 ACF, 1 Dy Ranger, 1 Forester and 1 Forest Guard	Two days training on root trainer nursery technology	12/3/19 to 13/3/19	Rayagada
	6 Forester and 4 Forest Guard	2 days training programme under Human Resources Development Programme	19/3/19 to 20/03/19	Koraput
	5 Forester and 5 Forest Guard	2 days training programme under Human Resources Development Programme	26/03/19 to 27/03/19	Koraput
Total	67 Nos			
2019-20	1 Forester	Induction Training course	01/6/19 to 30/5/20	FTS,Ghatikia
	1 Forest Guard	Induction Training course	01/6/19 to 30/11/19	FTS,G.Udayagiri
	1 Forester & 3 Forest Guard	Rain water harvesting an efficient utilization through modern irrigation technique	19/8/19 to 20/8/19	ICAR-IISWGRC Sunabeda,Koraput
	3 Forest Guard	Rain water harvesting an efficient utilization through modern irrigation technique	16/9/19 to 23/9/19	ICAR-IISWGRC Sunabeda,Koraput
	2 Forest Guard	Organic farming for soil health management	14/10/19 to 21/10/19	ICAR-IISWGRC Sunabeda,Koraput
	3 Forest Guard	One week Thematic course	14/10/19 to 21/10/19	FTS,G.Udayagiri
	1 Dy Ranger	Different Course of training	18/11/19 to 23/11/19	OMFED,BBSR

	1 Foerster	Different Course of training	25/11/19 to 27/11/19	OMFED,BBSR
	1 Forest Ranger	Different Course of training	25/11/19 to 27/11/19	OMFED,BBSR
	1 Foerster	Different Course of training	14/11/19 to 16/11/19	OMFED,BBSR
	1 Dy Ranger	Different Course of training	2/12/19 to 7/12/19	OMFED,BBSR
	1 Forest Guard	One week Thematic course	2/12/19 to 7/12/19	FTS,G.Udayagiri
	1 Forest Ranger	Forest fire and Disaster	9/12/19 to 14/12/19	OMFED,BBSR
	1 Forest Guard	Different Course of training	9/12/19 to 14/12/19	FTS,Champua
	1 Foerster	Different Course of training	9/12/19 to 14/12/19	OMFED,BBSR
	1 Forest Guard	Different Course of training	5/12/19 to 07/12/19	OMFED,BBSR
	1 Forest Guard	SMC Measure	16/12/19 to 21/12/19	G.Udayagiri
	1 Foerster	Odisha forest Act.1972	9/12/19 to 14/12/19	FTS,BBSR
	1 Forest Guard	GPS &GIS Application forestry App	5/12/19 to 07/12/19	NFTS,Champua
	1 Foerster	Odisha Forest Act.1972 and other relevant Act.	9/12/19 to 14/12/19	NFTS,Champua
	1 Foerster	Different Course of training	26/12/19 to 28/12/19	NFTS,Champua
	1 Forest Guard	GPS &GIS Application forestry App	26/12/19 to 28/12/19	G.Udayagiri
Total	31 nos			
2020-21	1Forester(Contr.)	Induction Training course	15.07.2020 to14.07.2021	FTS,Ghatika, BBSR
	1Forester	Refresher Induction Training course (4 month)	15.02.2020 to14.06.2020	FTS, G.Udayagiri
	1Forester	Refresher Induction Training course (4 month)	27.07.2020 to26.11.2020	FTS, G.Udayagiri
Total	3 Nos			

However, the feedback received from the field is that PDAs are being used mostly as mobiles phones. There are also problems related to the lack of coverage for the use of internet for immediate sending of information as required. There is a need to further train the guards in the use of the GPS PDA and to ensure full use of the technology.

9.6 Forest Resource Accounting:

9.6.1 Tangible Benefits: The tangible benefits obtained from Forest include the Timber & Fire wood extracts and NTFP produce. During the period of the field work, the values of different NTFPs have been obtained during Socio Economic Survey of fringe villagers.

9.6.1.1 Kendu Leaf: Jeypore Kendu leaf Division is working for collection of kendu leaves. The purchase price of KL, no of pluckers, Man-days generated and production in Quintals in respect of Malkangiri Sub-Division is furnished in Table No-9.5 as below.

Table No. 9.5: Production of Kendu leaf

Year	Purchase Price of KL in Rs	No of pluckers	Mandays Generated	Production in Qtl.
2007-08	54999828.5	42828	57231	33846.05
2008-09	60225891.46	59155	57300	34316.86
2009-10	62045466.94	49743	57300	32915.37
2010-11	71451231.88	49559	57300	32330.88
2011-12	75638573.5	48062	56400	33247.72
2012-13	84830092	50131	56400	32626.96
2013-14	138128580	54963	56400	35417.58
2014-15	121955034	52509	5088	29413.51
2015-16	146613408	43784	55600	37554.72
2016-17	121154719	38166	55600	26627.41
2017-18	89072088	39171	55600	17129.25
2018-19	114842932	36268	55600	17668.14
2019-20	159354220	44872	49650	24516.03

9.6.1.2 Timber and Fire wood:

The Timber and Fire wood delivered during the previous plan period is furnished in Table No-9.6 as follows

Table No. 9.6 Timber and Firewood Delivered

Year	Total Round Timber in cum	Sawn sizes (in Cum)	Fire wood in Stacks/Qntl.	Royalty received in Rs.
2007-08	-	-	-	
2008-09	-	-	-	
2009-10	-	-	-	

2010-11	-	-	-	
2011-12	498.0354	17.0984	84.5/5	3250699
2012-13	112.8284	13.1226	30	900909
2013-14	106.7000	7.6491	37	739183
2014-15	318.3591	22.2350	14/10.8	2574691
2015-16	141.2879	7.0349	11.5	1815667
2016-17	139.8878	8.1600	21.5	1574063
2017-18	214.1531	14.2911	1.5	1690499
2018-19	186.8174	0.6651	6.3	1564994
2019-20	126.6146	2.3773	-	1149256
2020-21	44.8955	2.2734	0	500875

9.6.1.3 Bamboo:

The Bamboos produced during the previous plan period is furnished in Table No-9.7 as follows.

Table No. 9.7: Production of Bamboos(Plan area)

Year of working	Target area in Ha	Achievement area in ha	Production (Industrial Bamboo) in SU.	Production (Commercial Bamboo) in Nos.	Royalty paid by OFDC ltd.	Reason for no working
1	2	3	4	5	6	7
2007-08	5878.56	0	0	0	0	Due to late approval of Working plan
2008-09	9761.74	0	0	0	0	-do-
2009-10	11789.13	0	0	0	0	-do-
2010-11	9317.34	0	0	0	0	-do-
2011-12	5878.56	0	745.128	1450	0	
2012-13	9761.74	0	0	0	0	
2013-14	11789.13	0	0	0	0	

2014-15	9317.34	0	0	0	0	
2015-16	5878.56	0	0	0	0	
2016-17	9761.74	0	0	0	0	
2017-18	11789.13	0	0	0	0	
2018-19	9317.34	0	0	0	0	
2019-20	5878.56	0	0	0	0	
2020-21	9761.74	0	0	0	0	

9.6.1.4 NTFPs: No recorded information is available as regards to the collection of NTFPs. During Socio- economic survey of fringe villages, some trends was available. All possible effort has to be made to quantify the collection of various NTFPs.

Though the forests serve as a storehouse of wood used for various purposes, but there are also equally important non-wood products that are obtained from the forests. The botanical and other natural products, other than timber extracted from the forest system are referred to as Non-Timber Forest Products (NTFPs). These are also referred as all the resources/products that may be extracted from forest ecosystem and are utilized within the household or are marketed or have social, cultural or religious significance (FAO, 1990). These include plants and plant materials used for food, fuel, storage and fodder, medicine, cottage and wrapping materials, biochemical, as well as animals, birds, reptiles and fishes, for food and feather. Unlike timber-based products, these products come from variety of sources like: fruits and vegetables to eat, leaves and twigs for decoration, flowers for various purposes, herbal medicines from different plant parts, wood carvings and decorations, etc. People have been using NTFPs since many years and it forms an important part of local and regional economics. The values of NTFPs per hectare when calculated might not be very high, but these products are of critical importance as source of income and employment for rural people living around the forest regions, especially when crop growing season is not there.

9.6.2 Intangible benefits:

No effort has been made to quantify intangible benefits. Progressive and positive efforts should be made to quantify intangible benefits i.e. carbon sequestration, study on water table, analysis of water quality, Surface flow level of water level, pollution level, physical parameters etc.

9.7 Budgetary allocations to the forestry sector:

The data on budgetary allocations to the forest sector of Malkangiri Forest Division is provided in Table No-9.8 as follows.

Table No. 9.8: Budgetary Allocations to the Forestry Sector

Year	Establishment Expenditure		Total Establish ment	Works expenditure				
	Salary	Others		2406-Non Plan	2406-State Plan	2406-C. S Plan	Total works exp.	G. Total
1	2	3	4	5	6	7	8	9
2007-08	14332084	392000	14724084	4760000	703310	787500	6250810	20974858
2008-09	16286999	962280	17249279	5861500	1787700	456000	8105200	25354479
2009-10	22161402	1003000	23164402	2321630	4096620	456000	6874250	30038652
2010-11	28852386	1764000	30616386	5891000	4361000	660500	10912500	41528886
2011-12	24273490	1508673	25782163	4701000	10034675	9375	14745050	40527213
2012-13	25726175	1488400	27214575	4310270	29551133	-	33861403	61075978
2013-14	32787810	1475046	47542856	30892684	14674663	1027200	46594547	94137403
2014-15	39929530	913925	40843455	28046230	24514767	-	52560997	93404452
2015-16	43223344	1479525	44702869	3444500	39593265	-	43037765	87740734
2016-17	49634960	1511396	51146356	4841050	44088880	-	48929930	100076286
2017-18	60865167	1582054	62447191	3312450	23056086	-	26368536	88815727
2018-19	58170491	1662318	59832809	3046050	27902757	3011483	33960290	93793099
2019-20	58520303	1727511	60247814	2600050	19214066	4097606	25911722	86159536
2020-21	55769265	1064891	56834156	2712150	179521023	-	182233137	239067329

9.8 Existence of monitoring, assessment and reporting mechanism:

The control forms have been prescribed for monitoring, assessment and reporting mechanisms for all prescriptions/ Suggestions under respective working circles to be monitored, assessed and reported on annual basis during the period of the Working Plan. Control forms should be prepared to include each of this prescription.

9.8.1 Control Forms

General prescriptions of the working plan should be written in such a way that it is quite clear as to what constitutes a performance norm for each prescription. The Control forms provide for performance parameters /targets /annotations /norms for all prescriptions

/suggestions for every working circle will be monitored, assessed and reported on annual basis during the period of the working plan. Control forms will be prepared to include each of these prescriptions.

Draft set of control forms to monitor all the important operations prescribed and suggested in working plan such as different types of felling, thinning, plantation works, subsidiary silvicultural operations, rotational lopping, soil and water conservation works, controlled /regulated grazing, fire protection, NTFP harvesting practices, bamboo harvesting, boundary pillars, spring recharge, lantana /weed eradication, reducing degradation, removal of firewood, etc., These forms will then be submitted to the CCF/APCCF (WP) for approval and preparation of final sets. There shall be separate set of control forms for each working circle. In this regard, help will be taken from suggested reporting formats for sustainable management of forests.

Three permanent sets of control forms will be prepared in the office of the Divisional Forest Officer and one set each is to be sent to CCF/APCCF (WP), head, territorial circle.

9.8.2 Examples of Control Forms:

9.8.2.1 Silvicultural Control Form: For the control of all silvicultural operations such as felling, subsidiary cultural operations, cleanings, thinning, burnings, etc., which will be prescribed or suggested to be carried out in a given management unit for the duration of the working plan.

Working Circle – periodic block		Felling series Cutting Section	Localities prescribed Localities suggested				Coupe control form		
			As carried out				Coupe No.		Page
Prescription in brief	W.P. Para	Year Due	Year	Block/ Comptt.	Area	Volume	Excess (+) or deficit (-)		Remarks and Sanction
							Area	Volume	
1	2	3	4	5	6	7	8	9	10

9.8.2.2 Felling Control Form: For controlling and maintaining the record of all trees marked for felling and trees retained.

Working Circle – periodic block		Felling series Cutting Section		Localities prescribed Localities suggested (with areas)				Coupe Form	Control
Range wise	Area	Species	Diameter class	Trees marked	Unit facto	Volume marked	Trees retained	Coupe No.	Page
								% Trees retained	Remarks
1	2	3	4	5	6	7	8	9	10

9.8.2.3 NTFP Control Form: For controlling and maintaining a record of all NTFPs harvest so as to make the removal/harvest of NTFPs remain sustainable.

Working Circle – periodic block		Felling series – Cutting-section – collection area	Localities prescribed Localities suggested					Coupe control form		
Prescription and brief	Working Plan para	Year due	As Carried out					Coupe No.		Page
			Year	Block/ Comptt .	Area	Name of NTFP with scientific name of species	Vol. / Qty.	Excess (+) or deficit (-)		Remarks and Sanction
								Area	Vol. / Qty.	
1	2	3	4	5	6	7	8	9	10	11

9.9 Public awareness and education:

There are so many international, national and state level programs are observed in this division to raise public awareness about values, importance and significance of natural resources like forests, wildlife, Planting of trees etc.

Public awareness and education are being organized in Malkangiri Forest Division through conduction of Essay competition, drawing competition, during world Environment day celebration, World Forestry day, Wildlife day celebration, Vanamohastav celebration with the active participation of the local people. Some of the important observation days are given below.

9.9.1 World Forestry Day

The World Forestry Day was established in the year 1971 at the 23rd General Assembly of European Confederation of Agriculture. And it was decided to be celebrated as an annual event celebration on 21st of March by the United Nations Food and Agriculture

Organization. World Forestry Day was established in the conference of States members of Food and Agriculture Organization by voting to establish it. This event was originated in a well-planned manner to give support in contributing towards the public awareness about the importance of the forests.

World Forestry Day or International Day of Forests is celebrated worldwide every year on 21st of March at the international level in order to increase the public awareness among communities about the values, significance and contributions of the forests to balance the life cycle on the earth.

Similarly, the day has been observed and celebrated every year in the Division with an aim to meet the above objectives.

9.9.2 World Environment Day

World environment day is a day especially celebrated to know and solve all the environmental issues. It is also known as the Environment Day, Eco Day or WED. It is a great annual even focusing on the issues of environment and trying to solve them completely. It is being celebrated worldwide for years with lots of creative activities and enthusiasm to bring positive changes in the environment. It aims to protect the natural environment forever on the earth for the healthy possibility of life.

It is celebrated annually on 5th of June since 1973 however declared in 1972 by the United Nations General Assembly during the opening of conference on Human Environment to raise the global awareness about the declining condition of the environment as well as tell people about the importance of healthy and green environment on earth. The annual celebration of it depends on the particular theme on the year (declared by the UN) which focuses on implementing some new and effective plans to save the environment.

9.9.3 Vana Mahotsava:

Vana Mahotsava is an annual week long tree planting festival being celebrated in India, observed in the month of July. The day is dedicated to the public awareness on three key strategies: increasing tree cover by plantation of more and more trees, protection and conservation of existing forests with the support of community to improve biodiversity.

This was started in the 1950s immediately after independence by the then Union Minister for Agriculture, Mr. K.M. Munshi and since then it has been an annual event.

In this Division Vana Mahotsava has always been celebrated right from the grass roots level in the first week of July ensuring greater participation in awareness among the people for receiving overall positive impact on forests and their biodiversity.

9.9.4 Wildlife Week

Wildlife Week is celebrated in the Division in the month of October from 2nd to 8th October every year with the view to preserve the fauna of India. It was first started in the year 1952 with the great vision of saving the life of animals by taking some critical steps. The Indian Government has established an Indian Board of Wild Life which works to improve the awareness as well as the consciousness of the Indian people towards the wildlife preservation. Wildlife week is being celebrated every year in this Division with much gusto to create awareness among the public. The above dates & purpose informed to public & educational institutions by leaf load speakers in public place /markets etc. Banners /posters hoardings are given for protection of forest & wild life from fire etc. Drawing /Essay / Debate competitions have been organized among the school students within the ambit of the Division.

The public awareness programmes celebrated during 2010-11 to 2019-20 is furnished in Table No-9.9 as follows

Table No. 9.9: Forestry / Environment Awareness Programmes

Year	Type of the programme	Locations	Activities under taken
2010-11	World Forestry Day. Celebrated every year on 21 st March.	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment
	World Environment day. Celebrated every year on 5 th June.	Division/Range level	Awareness programmes on global warming & climate change
	Vanamahotsava week. Celebrated every year 1 st Week of July.	Division/Range level	Conduct of essay & debate competitions in school level and distribution prizes and certificates
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution prizes and certificates, mobilization of public regarding wild life and protection
2011-12	World Forestry Day. Celebrated every year on 21 st March	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment
	World Environment	Division/Range	Awareness programs on global

	day. Celebrated every year on 5 th June.	level	warming & climate change
	Vanamahotsava week. Celebrated every year 1 st Week of July.	Division/Range level	Conduct of essay & debate competitions in school level and distribution prizes and certificates
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution prizes and certificates, mobilization of public regarding wild life and protection
2012-13	World Forestry Day. Celebrated every year on 21 st March	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment
	World Environment day Celebrated every year on 5 th June.	Division/Range level	Awareness programs on global warming & climate change
	Vanamahotsava week. Celebrated every year 1 st Week of July.	Division/Range level	Conduct of essay & debate competitions in school level and distribution prizes and certificates
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution prizes and certificates, mobilization of public regarding wild life and protection
2013-14	World Forestry Day Celebrated every year on 21 st March	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment
	World Environment day. Celebrated every year on 5 th June.	Division/Range level	Awareness programs on global warming & climate change
	Vanamahotsava week. Celebrated every year 1 st Week of July.	Division/Range level	Conduct of essay & debate competitions in school level and distribution prizes and certificates
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution prizes and certificates, mobilization of public regarding wild life and protection
2014-15	World Forestry Day. Celebrated every year on 21 st March	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment
	World Environment day. Celebrated every year on 5 th	Division/Range level	Awareness programs on global warming & climate change

	June.		
	Vanamahotsava week. Celebrated every year 1 st Week of July.	Division/Range level	Conduct of essay & debate competitions in school level and distribution prizes and certificates
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution prizes and certificates, mobilization of public regarding wild life and protection
2015-16	World Forestry Day. Celebrated every year on 21 st March	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment
	World Environment day. Celebrated every year on 5 th June.	Division/Range level	Awareness programs on global warming & climate change
	Vanamahotsava week. Celebrated every year 1 st Week of July.	Division/Range level	Conduct of essay & debate competitions in school level and distribution prizes and certificates
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution prizes and certificates, mobilization of public regarding wild life and protection
2016-17	World Forestry Day. Celebrated every year on 21 st March	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment
	World Environment day. Celebrated every year on 5 th June.	Division/Range level	Awareness programmes on global warming & climate change
	Vanamahotsava week. Celebrated every year 1 st Week of July.	Division/Range level	Conduct of essay & debate competitions in school level and distribution prizes and certificates
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution prizes and certificates, mobilization of public regarding wild life and protection
2017-18	World Forestry Day. Celebrated every year on 21 st March	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment
	World Environment day. Celebrated every year on 5 th June.	Division/Range level	Awareness programs on global warming & climate change
	Vanamahotsava	Division/Range	Conduct of essay & debate

	week. Celebrated every year 1 st Week of July.	level	competitions in school level and distribution prizes and certificates
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution prizes and certificates, mobilization of public regarding wild life and protection
2018-19	World Forestry Day. Celebrated every year on 21 st March.	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment.
	World Environment day. Celebrated every year on 5 th June.	Division/Range level	Awareness programs on global warming & climate change
	Vanamahotsava week. Celebrated every year 1 st Week of July.	Division/Range level	Conduct of essay & debate competitions in school level and distribution prizes and certificates
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution prizes and certificates, mobilization of public regarding wild life and protection
2019-20	World Forestry Day. Celebrated every year on 21 st March.	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment.
	World Environment day. Celebrated every year on 5 th June.	Division/Range level	Awareness programs on global warming & climate change
	Vanamahotsava week. Celebrated every year 1 st Week of July.	Division/Range level	Planted trees Range wise and
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Sit and drawing competition were organized in the school level and distribution of prizes and certificates, mobilization of public regarding wild life and protection.
2020-21	World Forestry Day. Celebrated every year on 21 st March.	Division/District Hqs	Awards & prizes for outstanding contribution in the field of Forest, Wildlife and environment.
	World Environment day. Celebrated every year on 5 th June.	Division/Range level	Awareness programs on global warming & climate change
	Vanamahotsava week. Celebrated every year 1 st Week	Division/Range level	Celebrated Vanamahotsava with planting trees and mobization of public regarding planting of trees.

	of July.		
	Wildlife week. Celebrated every year from 2 nd October to 8 th October.	Division/Range level	Mobilization of public regarding wild life and protection.

On occasion of celebration of World Environment Day of 5th June every year, there is provision of Prukruti Mitra and Prakruti Bandhu awards for each civil Sub-division and each revenue Block since 2008-09. Prakruti Mirtra award is given for outstanding contribution in environment to a community & Prakruti Bandhu award is given for outstanding contribution in environment to an individual. A list of Prakruti Mirtra & Prakruti Bandhu award winners of different Blocks is furnished in **Table No. 9.10 as below.**

Table No. 9.10: List of Prakruti Mirtra& Prakruti Bandhu Award Winners of Malkangiri District.

Year	Block	Prakruti Mirtra	Prakruti Bandhu
2007-08	Malkangiri	Jawanpalli P.U.P. School	Prahallad Chhatoi, H.M.Udulibeda U.P.School
2008-09	Kalimela	Kutbanpalli U.P. School	J.N.Mallick, Jawanpalli P.U.P. School
	Malkangiri	U.G.U.P.School, Markapalli	Kishore Ch. Pradhan
	Khairput	Govt. High School, Khairput	S.R.Swain, H.M. High School Khairput
	Mathili		Jayanta Ku Jena, Baldiaguda High School
2009-10	Podia	M.V.-79 High School	
	Kalimela	Patakhali Colony U.P. School	Dhruba Charan Nayak Kutbanpalli
	Malkangiri	U.P. School MV-27	
			Prakash Chandra Nayak
2010-11	Kalimela	-	Ramesh Ch. Praddhan, HM, Manyamkonda High School
	Podia	-	Nrusingh Ch. Paikraj HM, Saber Bidya Bhuasan
			Chitaranjan Samal, Education Colony
2011-12	Malkangiri	Jaganathpalli High School Malkangiri	-
	Mathili	Dardurguda VSS	Mohan Pradhan VSS, President Dhungiaput
	Kalimela	-	Prasanta Parida HM,U.P School, Matumguda
2012-13	Kalimela	Chitrangpalli, PUP Shool	Bidhan Biswas, MPV-42 PUP School

	Malkangiri	-	Keshab Ch. Nayak, Reporter, 119- Colony Malkangiri
	Kudmulguma	Gandhiji Seva Parisad, K.Gumma	-
2013-14	Malkangiri	Sri Swadhinata Sangrami Gangadhar Jhala High School, Thapaguda	Banavihari Dash, Teacher, J.N. Vidyalaya, Malkangiri
	Kurkonda	UGME School Pitakota	Smt. Sadhana rani Mandal HM, MV-16 PUP School
	Podia	Netaji Memorial Bidya Bhawan	Jaladhar Behera, HM
	Kalimela	Govt. High School Kalimela	Jasmita Mohanty HM, MV-90 PUP School
	Mathili	-	Prahallad Chhattoi(Ret.) Teacher Udulibeda
2014-15	Malkangiri	High School, MV-19	Ganesh Ch Biswal HM, SSGJ High School
	Kurkonda	Netaji High School Pitakota	Gadadhar Sethi, MV-12 PUP School
	Podia	Nabin Chandra High School	Kamala lochan Behera, HM Netaji memorial Bidya Bhawan
	Kalimela	Doraguda U.P. School	Amitadevi Panda, Asst. Teacher Chitrangapalli PUP School
	Khairput	Pragati Parisd	Atma Prakash Nayak Jr. Lecturer, SSD, High School, Govindaplli
2015-16	Malkangiri	Ex.-Board UP School Malkangiri	Rnjan Ku. Swain, Lecturer, Malkangiri College
	Kurkonda	Old Chitapari PUP School, Chitapari	Ranjan Ku. Parida, HM, Pitakota Netaji High school
	Kalimela	PUP School MV-90	Akshya Ku. Panda, HM, PUP School MV-90
	Khairput	-	Pramod Ku. Charchi HM, PUP School Tankamunda
			Prafulla Ku. Pradhan, HM, Ramakrushna High School, MV-9
2016-17	Malkangiri	Jawahar Navodaya Vidyalaya, Gondiaguda Malkangiri	Ranjanikanta Nayak, HM, Govt. Upgraded High school , Krushuguda
	Kurkonda	Project UP School, MV-16	Dilip Ku Ojha, HM PUP School, Nilakamberu
	Kalimela	PUP School MPV-60	
	Khairput	Tankamunda Project UP School, Tankamunda	
2017-18	Malkangiri	Ashram School, Udupa	Ranjan Ku Swain, Lecturer, Jr. College Malkangiri
	Kurkonda	Govt. High School,	Bijay Ku Padhi, HM, Old

		Taralakota	Chitapari PUP School
	Kalimela	Govt. High School MPV-21	Nirmal Adhikari, HM, MV-65 PUP School
	Khairput	Ashram School, Khairput	
	Mathili		Manoranjan Jena, HM, Temurpalli UG High School
2018-19	Malkangiri	Govt. Girls High School (KGBV), Sindhirimal	Sri Ganesh Ch. Mazumdar, HM, Govt. UP School, Tandapali.
	Kurkonda	Govt. High School, Malimela.	Smt. Basanti Agasti, HM, Primary School, Chitapari II
	Kalimela	Primary School, Potakhal	-
	Khairput	Primary School, Baliguda.	-
	Mathili	UGH School, Udulibeda.	-
	Podia		Sri Paramananda Mohapatra, Principal, Regional Jr. College, Podia.
2019-20	Malkangiri	Utkala Sahitya Sansad	Sri Jitendra Ku Tripathy, HM, Govt. UP School, Bailapari.
	Kurkonda	Ashram School, Potrel	Smt. Kalyani Swain, Primary School, Tarlakota.
	Kalimela	MPV- 15 Govt. UP School	Smt. Jasmita Mohanty, HM, Govt. UGH School (KGBV), Kangurukonda
	Khairput		L. Ramnath, HM, Primary School, Kenduguda.
	Mathili		Sri Pratap Ku. Ray, HM, Govt. SSD Girls High School, Pangam.
	Podia	Govt. UP School, Niliguda	
	Chitrakonda	Govt. SSD High School, Panasput	Sri Sudarshan Swain, HM, Govt. Prahallad High School, Apanmala
2020-21	Korkunda	P.U.Primary School, Chitapari-III	Sri Karunakar Mallik, HM, Govt. High School Tarlakota
	Kalimela	P.U.Primary School,	Sri Ashok Ku. Parida, HM, Dr. Ambedkar High School MV-88
	Malkangiri	Higher Secondary College, Malkangiri	Smt. Pratima Nayak, H.Miss, Govt. UGHS/KGBV Sidrimal
	Chitrakonda	Govt. Primary School, MV-38	-
	Mathili	Govt. UGHS, Kartanpalli	Sri Madhusudan Nayak, HM, Sargiguda Primary School.
	Podia	Govt.U. P. School, Irralgundi	-
	Khairput	Govt. High School, Khairput	Smt. Santilata Panda, H. Miss Pry. School, Baliguda

9.10 Adequate Manpower in Forest Division

9.10.1 Sanctioned Staff:

The sanctioned strength of Malkangiri Forest Division under various posts, vacancy positions as on 30.11.2020 is furnished in Table No.-9.11 as below. The list of DFOs served in Malkangiri Division is given in **Appendix X**.

Table No. 9.11: Sanctioned Strength of Malkangiri Forest Division

Sl No.	Category of post	Sanctioned Strength	Men in position	Vacancy	Remarks
1	2	3	4	5	6
1	D.F.O.	1	1	0	
2	A.C.F.	3	3	0	
3	Forest Ranger	6	4	2	
4	i)Deputy Ranger (Striking Force)	1	1	0	
	ii)Deputy Ranger (Second Officer)	5	5	0	
5	i)Forester (Enf.)	1	1	0	
	ii) Forester (Affn.)	6	6	0	
	iii) Forester (Ch.)	1	1	0	
	iv)Forester (Section)	18	22	-4	
	v)VFW merged in Forester cadre	14	2	12	
6	i.Forest Guard(Beat)	116	74	42	
	ii. Forest Guard(Ch)	8	0	8	
	iii.Forest Guard (Enf/Affn)	6	0	6	
7	Head Clerk	1	1	0	
8	Jr. Acct.	8	8	0	
9	Jr. Clerk	9	1	8	
10	Jr. Steno	1	0	1	
11	Driver (LV)	2	0	2	
12	Rev. Inspector	1	1	0	
13	Office peon	1	1	0	
14	Office Chowkidar	1	1	0	
15	Mali	1	0	1	
16	Sweeper	1	0	1	
17	Watcher	3	1	2	
	Total	215	134	81	

The present staff strength is quite inadequate. It is suggested that the staff position should be filled up quickly with a view to smooth management of ongoing departmental work and to strengthen the protection activities.

9.10.2 Temporary & Seasonal staff: The position of temporary and seasonal staff is furnished in Table No. 9.12 as follows

Table No. 9.12: List of Engagement of Forest Squad Under Different Schemes

Name of the Range	Scheme	Name of the squad	Nos. engaged	Period of engagement
Malkangiri	CAMPA	Para protection squad	10 Nos	Whole year
	Programme Expenditure	IPCEA	10 Nos	Whole year
	CAMPA	Fire Watcher	10 Nos	Feb to June
	CSS (FPM)	Fire Watcher	10 Nos	Feb to June
Mathili	CAMPA	Para protection squad	10 Nos	Whole year
	CAMPA	Wildlife squad	10 Nos	Whole year
	CSS (FPM)	Fire Watcher	10 Nos	Feb to June
	CAMPA	Fire Watcher	10 Nos	Feb to June
Balimela	CAMPA	Para protection squad	10 Nos	Whole year
	CAMPA	Wildlife Tracker	2 Nos	Whole year
	CAMPA	Fire Watcher	10 Nos	Feb to June
	CSS (FPM)	Fire Watcher	10 Nos	May to June
Kalimela	CAMPA	Para protection squad	10 Nos	Whole year
	CAMPA	Fire Watcher	10 Nos	Feb to June
	CSS (FPM)	Fire Watcher	10 Nos	May to June
Chitrakonda	CAMPA	Para protection squad	10 Nos	Whole year
	CAMPA	Wildlife squad	10 Nos	Whole year
	CAMPA	Fire Watcher	10 Nos	Feb to June
	CSS (FPM)	Fire Watcher	10 Nos	Feb to June
Motu	CAMPA	Para protection squad	10 Nos	Whole year
	CAMPA	Fire Watcher	10 Nos	Feb to June
	CSS (FPM)	Fire Watcher	10 Nos	May to June

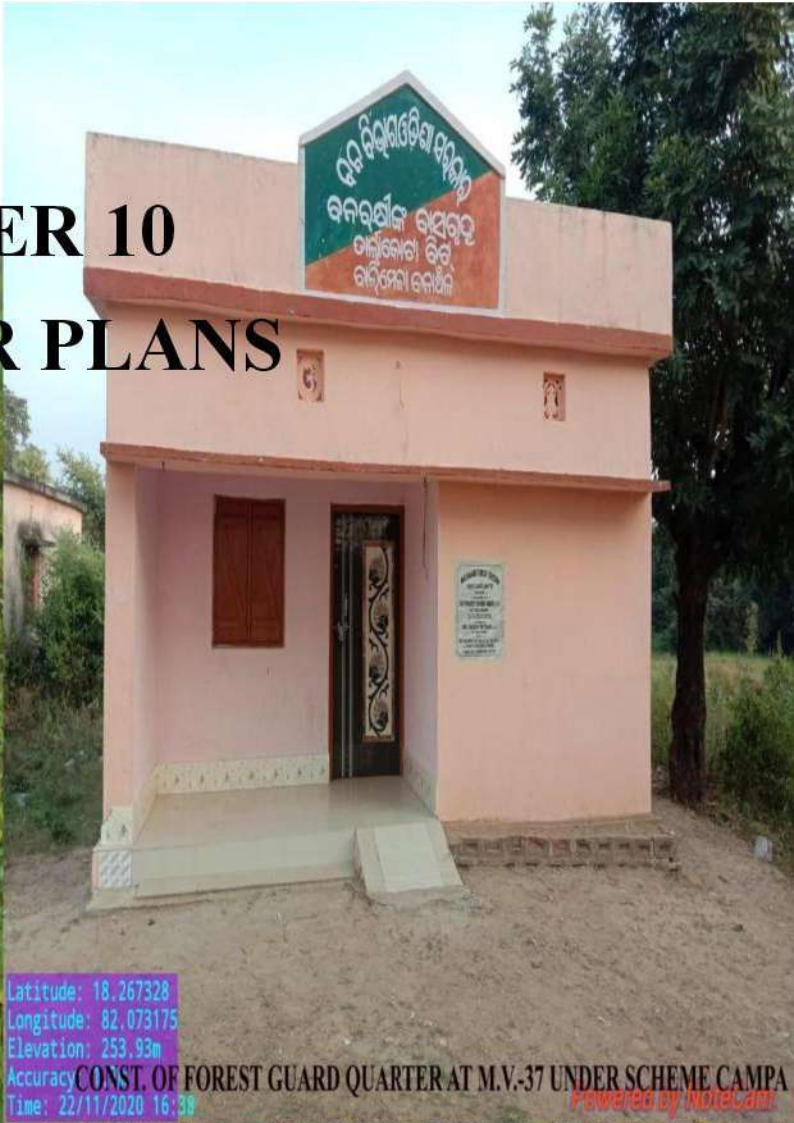
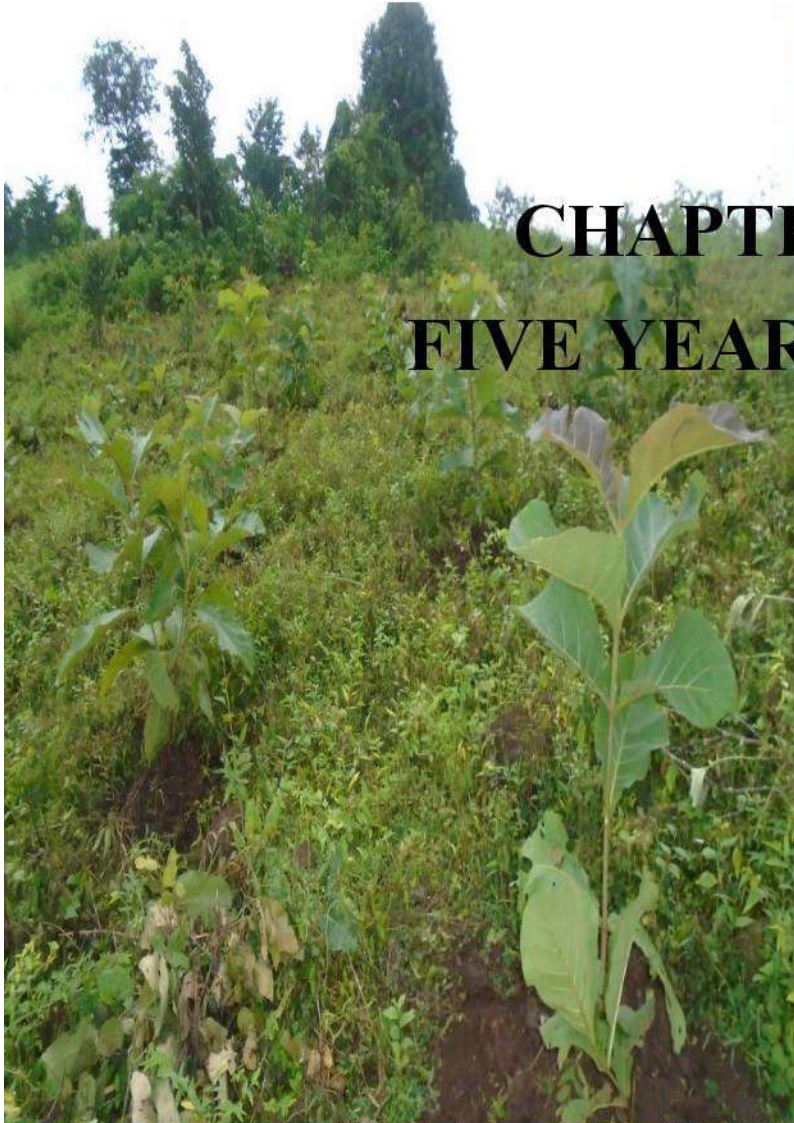
9.10.3 Rates of past and present wages: The wage rate for the period from 2006-07 to 2018-19 is furnished in Table No. 9.13 as below.

Table No. 9.13: Minimum Wage Rate (Rs)

Year	Minimum wage rate (Rs)	Year	Minimum wage rate (Rs)
2007-08	70/-	2014-15	150/-
2008-09	70/-	2015-16	200/-
2009-10	90/-	2016-17	200/-
2010-11	90/-	2017-18	200/-
2011-12	90/-	2018-19	286.30/-
2012-13	150/-	2019-20	286.30/-
2013-14	150/-	2020-21	298/-

CHAPTER 10

FIVE YEAR PLANS



Latitude: 18.267328
Longitude: 82.073175
Elevation: 253.93m
Accuracy: 10m
Time: 22/11/2020 16:38

CONST. OF FOREST GUARD QUARTER AT M.V.-37 UNDER SCHEME CAMPA
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Since independence, regular Five-Year Plans have been made for planned economic development of the country, aiming not merely at raising the standard of living of the people, but also opening out to them new opportunity for a richer and a more varied life. This is fifth year of the 10th Five Year Plan (2002-03 to 2006-07).

10.1 The 1st Five- Year Plan (1951-52 to 1955-56)

10.1.1 The ‘First Five-Year Plan 1951-1956’ initiated the process of planned economic development during April 1951 with a higher priority to agriculture and power sector, as there was a large –scale import of food grains in between. The forest policy Resolution of 12th May 1952 suggested that, India as a whole should aim at maintaining one third of its total land area under forest. It also suggested for 60% area in hilly terrain like Himalayas, Deccan and mountain tracts and 20% in plain area where denudation due to erosion is normally not a serious factor should come under forest cover. Thus, the plan had suggested for balanced & complementary land use by way of:

- (i) Afforestation as a measure to prevent soil erosion.
- (ii) Extension of tree lands.
- (iii) Establishment of village plantations.

The outlined priorities that had been given in development of the forest are:

- (i) Strengthening of forest Administration where large territories had been merged or private forests had been transferred to public ownership as a result of abolishing Zamindari System.
- (ii) Renovation of areas, which had been over exploited to meet war requirements.
- (iii) Afforestation where large-scale erosion has occurred.
- (iv) Development of Forest Communication.
- (v) Development of village plantations to ease the fuel supply position.

10.1.2 The state plans provided Rs. 959.5 lakhs in addition to Rs.2.0 Crore for central schemes besides Rs. 39 lakhs for soil erosion conservation, 29 Lakhs for village plantations

and Rs. 104 Lakhs for development of communication. During this period, except bringing the management under District Collector, no significant steps have been taken up for development of the Forests of this Division.

10.2 The 2nd Five- Year Plan (1956-57 to 1961-62)

10.2.1 The second Five-Year Plan 1956-57 to 1961-62 'laid emphasis on Industrialization, as there was acute shortage of steel products in the country. As a policy of conserving steel and replacing it by timber, there was clear instruction for utilization of wood by way of improving durability and strength through seasoning, preservation, treatment, lamination and timber engineering. However, the plan had proposed continuity of schemes started in the First Five- Year Plan in addition to

- (i) afforestation and improvement of poorer areas in the forests and extension forestry,
- (ii) formation of plantations of species of commercial and industrial value,
- (iii) promotion of methods for increased production and availability of timber and other forest produce in the immediate future,
- (iv) conservation of wild life,
- (v) amelioration of the condition of the staffs and labourer in the forests,
- (vi) increased tempo of forests research,
- (vii) increased provision of technical personnel and
- (viii) central co-ordination and guidance in the implementation of plant development schemes all over the country.

The Forestry Programme of 2nd Five-Year Plan also included establishment of eighteen National Parks and Game Sanctuaries including Model Zoological Park in New Delhi.

10.2.3 During the Second Five-Year Plan period, Rs 19.3 Crores had been spent for development of the forests. The schemes undertaken directly by the Central Government are Forests Research, Forests Education and Preservation of Wild Life. Large tracts of Forests situated in the former Zamindari Estates came under Government control. Also, demarcation of such areas including preparations of maps was also undertaken. For improving the

economic value of the forests, lost during Second World War due to over exploitation were rehabilitated by introducing economic species. The Jeypore Forests Rules, 1922 got modified and new rule called The Management of Koraput Division Forests and Wastelands Rules, 1956 and the Rules to Regulate Hunting and Shooting in the Koraput District were notified on dated 30.08.1956. Also, the Forests were transferred and brought under the control of the State Forest Department with effect from dated. 15.11.1957. The new Forest Divisions, Jeypore and Rayagada under the administrative control of the Conservator of Forests, Berhampur Circle were constituted which got effective from dated. 15.12.1958. After reorganization of the Forest Department, a new circle at Jeypore started functioning w.e.f. dated 21.10.1959. On the other hand, for bringing the large tracts of forests of the Estate period into systematic management practice, a scheme was written for the period 1960-1970 by former Assistant Conservator Forests, Sri T. Das. Thus, it was the great achievement for the Department towards systematic and scientific forest management.

10.3 The 3rd Five-Year Plan (1961-62 to 1965-66):

10.3.1 In forestry sector, special emphasis has been given on measures, which will help in meeting the long-term requirements of the country and ensure more economic and efficient utilization of the available forest products including inferior timber and wood residues. The plan provided outlay of Rs. 51 Crores for various development programs including Rs. 6.7 Crores for central and centrally sponsored schemes. The programmes included are:

- (i) Economic Plantations: The plantation not only includes traditional species of Long gestation period but also comparatively short rotation.
- (ii) Village and Extension Forestry, plantation of tree by *Panchayat Samittees* and *Panchayats* in village common land along roadsides, contour bunds, irrigation tanks, national and state highways, canal banks and railway tracts.
- (iii) Promotion of methods for increased production.
- (iv) Development of minor forests produces.
- (v) Survey and demarcation of areas outside reserve forests.
- (vi) Development of pasture and grazing lands.
- (vii) Training of technical personal through different institutes.
- (viii) Nature conservation – Development and establishment of five Zoological Parks, five National Parks, ten Wild Life Sanctuaries.

- (ix) Amenities for forest labour – State Plan provided for schemes for housing, medical aid, and water supply and primary education for forest laborers.
- (x) Soil Conservation.

10.3.2 In pursuance to the plan, B- Economic plantations have been raised in order to increase the economic value of the forests by cleaning inferior species in open forests. Forests officials have been provided with basic amenities like quarter, tube wells for drinking water etc. For production of Minor Forest Produce like Kendu leaf, the Orissa Kenduleaves (Control of Trade) Act, 1961, Orissa Kenduleaves (Control of Trade) Rules, 1962 have been framed.

10.4 The 4th Five-Year Plan (1969-70 to 1974-75):

10.4.1 In Forestry Sector, emphasis has been given to meet the immediate and long-term agricultural and industrial requirements, since the demand for various forest products i.e. timber, domestic fuel and raw materials for industries had rapidly increased. For this, the Fourth Five-Year Plan aimed at large scale plantations of valuable quick growing species and species of economic and industrial importance. The basic principle of Government policy was that, the minor forest produce, pasture and grazing grounds must be managed in the interest of the population of the tract and particularly to serve their requirements of fuel and fodder that has long been recognized. The physical programme for Forest Development was:

- (i) Plantation of quick growing species.
- (ii) Economic plantation for industrial and commercial uses.
- (iii) Farm forestry-cum-fuel wood plantation.
- (iv) Communication.

10.4.2 During the first four Five-Year Plans, there was a huge investment by the public sector besides substantial investment by the private sector in tree planting in farms, homesteads and communal lands. The summary of investment estimates for four Five Year Plans for the State and the Central sectors and for the State of Orissa have been given separately in following tables.

Table No. 10.1: Programme Wise Summary of Investment Estimates for 20 years (Rs. In Million)

Programme	State Sector	Central Sector	Total	Area to be regenerated/planted (Million Ha.)
Protect Existing Resources	170058.6	44313.6	214372.2	-
Improve Forest Productivity	391479.9	21437.6	412917.5	26.43
Reduce Total Demand	15492.4	12246.1	27738.5	-
Strengthening Policy and Institutional Framework	249684.8	22595.7	272280.5	-
Expand Forest Area	40560.5	6113.6	411719.1	21.80
Total	1232321.2	106760.6	1339027.8	48.23

Source: National Forestry Action Programme on the basis of proposals in SFAPs.

Table No. 10.2: Programme Wise Summary Details of Odisha- Investment Estimates (Rs. In Million)

Sl. No.	Programme	First 5 Year Plan	Second 5 Year Plan	Third 5 Year Plan	Fourth 5 Year Plan	Total 20 Years	Phy. Target (Million Ha.)
(i)	Protect Existing Resources	1560.7	2010.0	2523.0	3187.0	9280.7	-
(ii)	Improved Forest Productivity	3090.0	3110.0	3130.0	3150.0	12480.0	0.16
(iii)	Reduce Total Demand	0.0	0.0	0.0	0.0	0.0	-
(iv)	Strengthening Policy and Institutional Framework	212.1	301.4	373.5	475.5	1362.5	-
(v)	Expand Forest Area	859.2	970.0	1030.0	1170.0	4029.2	0.28
	Total	5722.0	6391.4	7056.4	7982.5	27152.3	0.44

Source: National Forestry Action Programme on the basis of proposals in SFAPs.

However, the Forest Division has raised plantations of both fuel wood and economic species under E-Sowing & Planting and B-Economic plantations schemes.

10.5 The 5th Five-Year Plan (1974-75 to 1979-80)

10.5.1 In the forestry sector, special programmes for Social Forestry and Economic Plantations have been given high priority. Also, thrust had been given for Project Tiger, development of National Parks and research in forestry sector.

10.5.2 During the period, plantations have been raised in gaps and of low economic value forest area for increasing the economic value of the forests. Simultaneously, the extraction paths including forest roads have been developed for the better communication required for systematic management of the forests. Also, significant steps have been taken for demarcation and notification of different forest blocks under Orissa Forest Act, 1972. In 1973, the minor Forest Produce, Kenduleaves got nationalized and the Department started collection and marketing of the produce through Forest Corporation, thereby increase in production vis-à-vis increase in economic standard of the primary collectors. Thus, the programme ultimately helped in achieving self-sufficiency and increase in consumption standard of the rural poor.

10.6 The 6th Five-Year Plan (1980-81 to 1985-86)

10.6.1 The ‘Sixth Five-Year Plan’ had aimed at providing basic needs of life i.e. food, fuel, shelter and employment etc. to the larger section of our population. This would be possible only when our natural resources like land, soil, water, forests, wild life etc. are properly managed; maintaining their health and integrity. Otherwise, condition arising out of poverty and under- development may cause serious environmental problems.

10.6.2 During the plan period, emphasis has been given in management of various eco-systems, creation of biosphere reserve for maintaining diversity and integrity of biotic community of plants and animals within natural eco-system and to safe guard the genetic diversity. This concept has been drawn up from UNESCO’s ‘Man and Bio-sphere Programme’. About 19 National Parks and 202 numbers of Wild Life Sanctuaries have come up in the country. For proper liaising of the environmental issues, Department of Environment (D.O.E) started functioning at the Centre. Also, Forest Conservation Act, 1980 have been up for checking the large-scale diversion of forestlands for non-forestry purpose. The Social Forestry Projects started in 1981-82 for a period of five years under foreign aid for fulfilling the requirements of villagers in terms of fuel, fodder and minor forest products etc. Also, the villagers were involved from the base level planning and implementation of the programmes including usufructs benefits arising out of these plantations.

10.6.3 The large-scale denudation of the forests of the Division arising out due to over exploitation in the past, encroachment, fuel wood, grazing, forest fire, diversion of forest land for various multipurpose hydroelectric project and shifting cultivation in hilly terrain mainly in Boipariguda, Malkangiri and Kalimela Ranges of undivided Jeypore Forest Division had left the land unproductive and vulnerable to soil erosion. Though actions have been taken for motivation to settled-cultivation and modern method of agriculture like terracing, none except few have left the old practice. The Division has also raised plantations of economic species in the degraded forestlands for increasing the economic value of the forest and more out turn in future. For meeting the fuel, fodder and minor forest and more out turn in future. For meeting the fuel, fodder and minor forest products of local people, plantations have been raised under Social Forestry Projects in community lands under people's participation including sharing of usufructs too.

10.7 The 7th Five-Year Plan (1985-86 to 1989-90):

10.7.1 The thrust areas in the 'Seventh Five-Year Plan' period was Pollution Monitoring & Control, Environmental Impact Assessment, Natural living Resources Conservation, Eco-development, Environmental Research Promotion, Environmental Education, Training and Awareness including Strengthening of Organizational Structures.

10.7.2 The National Forest Policy, 1988 was formulated in December 1988 with the principle aim of ensuring environmental stability and maintenance of ecological balance. Also, the forest conservation Act 1980 got amended in 1988 to plug certain loopholes and stricter implementation. For promoting Forest Research, Education and Training; Indian Council of Forestry Research and Education has been constituted. Under the council, various Research and Education Institution have been established including I.I.F.M. Bhopal and I.G.N.F.A, Deheradun for providing high-class education in Forestry and Environment. Also, Forest Survey of India got recognized and Ten Point National Wildlife Action Plan (N.W.A.P.) has been started.

10.7.3 Under Afforestation Programme, National Wastelands Development Board was set up in June 1985 for reclaiming wastelands by raising plantations through people's participations. The programme includes:

- (i) Establishment of decentralized nurseries.

- (ii) Block plantations, especially on community land and lands of S.Cs/ S.Ts and people living below poverty line.
- (iii) Pasture development through people's institutions and involvement.
- (iv) Assistance in implementation of the Tree Patta Schemes.

10.7.4 In 1988, the Government of Odisha, for the first time recognized the people's participation in forest protection, passed the resolution and introduced a scheme of protection at peripheral degraded Reserve Forest areas with participation of adjoining villagers. In 1990, another resolution has come up; extending the scope of protection to P.F areas on constitution of F.P.C in village level. In return, villagers had been entitled small timber & firewood for Bonafede use by paying fees as royalty.

10.7.5 The scheme decentralized people's nurseries was initiated in 1986-87 to encourage seedling productivity by farmers, especially small and marginal farmers to establish small, dispersed nurseries to cater local needs of planting and provide income generation activities to the beneficiaries. So also, the plantation activities under Social Forestry Projects initiated in 1981-82 were also continued.

10.7.6 Besides various national schemes like N.R.E.P, R.L.E.G.P etc. launched where 25% of the funds for forestry sector came from Rural Employment Schemes under Social Forestry component. The 8th Plan-outlay for Environment and Ecology, Prevention and Control of Air and Water Pollution including Ganga Action Plan was for Rs.427.91 Crores, which is 1.09% of total outlay for the country.

10.7.7 During the plan period, substantial amount received by the Division for afforestation activities, intensive protection measure, maintenance of boundary, regeneration, showing and planting, demarcation of forests, rural fuel wood plantation and forest extension from the Department and other Department as well. The plantations have been raised in N.R.E.P, R.L.E.P, B.Economic and other Schemes. Also, under Social Forestry Project, the plantations have been raised under Forest Farming for Rural Poor (F.F.R.P), Village Woodlot and Energy Plantation Schemes etc. in community and other private lands.

10.8 The 8th Five-Year Plan (1992-93 to 1996-97):

10.8.1 By that time there had been an increasing awareness that protecting the environment is necessary for sustaining the economic and special progress of a country and this was reflected at Earth Summit in Rio-de-Janeiro in June 1992 where more than a hundred Heads

of Government adopted a Global Action Plan called agenda-21 aimed at integrating environmental imperatives with developmental aspirations. Also, there has been Policy towards Forestry, Abatement of Pollution, National Conservation Strategy, Environment and Development. The country became the signatory to the convention on Biological Diversity, Montreal Protocol and Basel Convention. The poverty alleviation programmes have been launched wherein family planning and welfare become the major focus.

10.8.2 Due to over increasing population and live stock pressure on the existing forests, there has been shrinkage of area as well as biomass. The National Forest Policy 1988 has envisaged a minimum of one-third of the total land area should be under forest cover. This will be possible only if the local stakeholders like farmers, the tribal, the women, the NGOs and the Panchayat Raj Institutions to be involved.

10.8.3 The plan had also emphasized on conservation of biological diversity through protected areas including National Parks, Sanctuaries and Biosphere Reserves, the result being the amendment to the Wild Life Protection Act, 1972 in the year 1991, banning of hunting of all the species of wild life for commerce or pleasure.

10.8.4 The Eco-Clubs has been launched in various schools of the country for imparting environmental education to school children and mobilizing them to participate in various environmental preservation efforts in their locality. The modern forest fire control methods in India that was during Seventh Five-Year Plan with UNDP assistance continued. In 1992, The National Wasteland Development Board got bifurcated and the National Afforestation and Eco-development Board was constituted under the MoE&F, Govt. of India. The areas adjoining to forest and fragile ecosystem were brought under NAEB. The various afforestation schemes under NAEB are:

- (i) Integrated Afforestation and Eco-Development Projects scheme.
- (ii) Fuel wood and Fodder Project Scheme.
- (iii) Non-Timber Forest Produce Scheme.
- (iv) Grant-in-Aid Scheme.
- (v) Scheme of Aerial Seedlings.

10.8.5 For Successful execution of the Schemes, the Joint Forest Management Committee Concept was developed. The formation of *Van Surakhya Samittee* / Forest Protection

Committees under Joint Forest Management was made mandatory and Participatory Rural Appraisal (PRA) followed by micro-plan should be a must in any plantation project. In the State level, Govt. of Odisha, Forest and Environment Department passed the Resolution No. 16700-10F (Pron) 1/94-14292 /F&E dt.4.8.1994 and No 10 F (T.R) – 1/94, 22716/F&E (Policy & Law) dated Bhubaneswar 7th Dec 1994, for creating desired impact in generating people's participation in forest protection where the people have been entitled for 50% share in final harvest of the crop including intermediate yield on free of cost. Besides that, the technology extension, monitoring and evaluation become the part of the proposal.

10.8.6 For development of the Wastelands, Integrated Wastelands Development Projects Scheme (IWDP) on the basis of watershed approach was launched which was bottom up approach and user groups / self-help groups decided their work programme integrated at District level.

10.8.7 The Division has formed (Jeypore: 268 + Malkangiri: 11649.59) of Forest lands both degraded and high forests for protection, management and sharing of usufructs among members of the Committee as per guideline laid down in Resolution No 16700-10 F (Pron) 20/93 F & E 3rd July 1993 of Govt. of Odisha. Also raised 2675 Hectors of Plantations under different schemes like B-Economics, E.A.S., J.R.Y. and other Central Sector Plans.

10.9 The 9th Five-Year Plan (1997-98 to 2001-02):

10.9.1 The 'Ninth Five-Year Plan' was set up to ensure environmental sustainability of the development process through social mobilization and participation of people at all levels. In environment sector, it has recognized the symbiotic relationship between the tribal people and the forest and has given special focus to the tribes and other weaker sections living in and around the Forests. The strategies are:

- (i) Participation of people in the management and sharing of usufructs through Joint Forest Management.
- (ii) Involvement of NGOs in areas of awareness building, community education and act as interface between people and development.
- (iii) All-round development of the tribal villages in and around the Forests.
- (iv) Survey and demarcation of the Forest area including posting of boundary pillars.
- (v) Training the staff to combat methods against smugglers, poachers etc.

- (vi) Taking advantage of various Employment Generation Schemes of Rural Development Department to supplement funds for plantation activities.

10.9.2 In Sector Specific Programme, the conservation of representative ecosystems under Biosphere Reserve, Conservation of Mangroves, Wet-lands etc. have been give priority. In Forestry, Wild Life and Afforestation sector, there has been no change in Schemes except greater focus and improved implementation. Also, under wastelands development, there has been no change in Schemes besides reservation of wasteland and through massive afforestation and social forestry to release pressure on the exciting forests.

10.9.3 The major scheme implemented during this plan period is the Long-Term Action Plan (RLTAP), launched during January 1999 in undivided Koraput, Kalahandi and Bolangir District mostly known as K.B.K. District with an objective of Socio-economic upliftment of the poor people, especially tribal people living in this tract. The other Schemes implemented are Intensification of Forest Management, Rural Fuel wood Mixed Plantation, National Afforestation Programme under F.D.A. Integrating the schemes like Integrated Afforestation and Eco-Development Project, Area Oriented Fuel Wood and Fodder Project, Association of S.T. and Rural poor in regeneration in degraded forest on contract basis and Non-Timber Forest Produce including Bamboo and Medicinal Plantation. The Plantations included Soil and Moisture Conservation including Entry Point Activities for development of conducive environment between the villagers and the Department. So also, the food security has been created through World Food Programme including assets creation.

10.10 The 10th Five-Year Plan (2002-03 to 2006-07):

10.10.1 The '10th Five-Year Plan' aimed at improvement of growth rate, provide minimum life support services to a larger section of population and deal with the problems of poverty and unemployment. At the same time, attention is to be paid towards conservation of natural resources and improvement of status of environment.

10.10.2 The Forest plays an important role in environmental and economic sustainability. They provide numerous goods and services and maintain life support systems essential for life on earth. Some of these life support systems of major economic and environmental importance are:

- Supply of timber, fuel wood, fodder and a wide range of NTFPs.
- Natural habitat for bio-diversity and repository of genetic wealth.

- Provision of recreation and opportunity for eco- tourism playing an integral part of the watershed to regulate the water regime, conserve soil and control floods.
- Carbon sequestration and carbon sink. The Forests have been constantly undervalued in economic and social terms. The contribution of Forestry Sector to GDP was only 1% in 1996-97 where as the latest estimate is 2.37%.

10.10.3 Strategies for 10th Five-Year Plan:

10.10.3.1 As stipulated in National Forest Policy regarding percentage of Forest cover required for the country, the plan prescribed for bringing the Forest cover to 25% of the Geographical Area during the Plan period and 33% by end of 11th Plan period. Also, the strategies proposed are:

- Watershed approach in maintenance and development of forest for soil and moisture conservation, improving ground water recharge and water regime and mitigate adverse impact of drought.
- To meet the demands for various forest-Produce i.e. Food, Fodder, Fuel, Fertilizers, Timber, Bamboo, Medicinal plants etc.
- To give increased thrust on JFM for regeneration of degraded Forests.
- Special Programme for forest fringe village for providing alternative source of income.
- To meet the vast requirement of raw materials to forest based industries either from community lands degraded forest or private farmlands.
- To encourage Agro Forestry by promoting technology, extension and training, credit support and marketing infrastructure etc. The constraints in felling, transport and marketing of such produce for private holdings must be streamlined.
- The greening programme under Food for Work Schemes to be implemented to ensure productive employment and food security.
- The fragile eco-systems to be protected in order to sustain the livelihood of a large number of people apart from ecological benefits.
- Afforestation to be carried out for sequestering atmospheric carbon.
- To promote growing of Medicinal Plants as it can ensure affordable health care, employment generation and conserving bio-diversity.
- Harvesting of extensive Bamboo flowering area, there by utilization of the produce as mat board, mat roofing sets and laminates etc.

- To promote bio-diesel by planting *Jatropha curcas* and *Pongamia piannata* for solution to the problems arising out of fossil fuel starvation and environmental impact vis-à-vis enhancement of livelihood opportunities and income generation for rural masses.
- To strengthen forest product resource, i.e. value addition through processing, reduction in wastage, recycling and new product development.

10.10.4 Actions Proposed:

10.10.4.1 Natural Forests

- Good forests must be brought under scientific management to enhance productivity, density and health by investment suitable amount.
- Open forests having natural rootstock to be regenerated through proper protection and replenishment of gapes by planting fuel wood, fodder and timber species.
- To cover the Forest fringe villages under JFM through Forest Development Agency, the structure of which is Micro-Planning, Watershed Approach, and Decision making at the Community Level in selection of species for Afforestation, Entry Point Activities to mobilize the community participation.
- Proper management of the fragile eco-systems such as coastal areas (Mangroves and coral reefs) hills and mountains, wetlands, shifting cultivation.
- Improvement in performance of Forest Plantation in terms of survival, growth and yield.
- For improving productivity and success of Plantations, appropriate site selection, site-specific species, planting of elite clones, proper maintenance and protection, timely tending, thinning, irrigation, and application of manures and pesticides.
- Reduction in harvest and post harvest losses by adopting improved technology.

The fragile eco-systems should be properly managed in order to safeguard the livelihood of millions of people.

10.1.4.2 Joint Forest Management:

- Suitable forest patches to be entrusted to well define user groups with a transparent memorandum of understanding on roles and responsibility of Joint Forest Management Committee and Forest Department.

- Security tenures as well as access to the benefits from the resources must be assured to the beneficiaries.
- Silviculture prescriptions must be sustainable and stakeholders have a voice in decision-making.
- Legal back up to Joint Forest Management Committee.
- Appropriate institutional and financial mechanism.
- Linkage of Village Protection Committee within industries for sale of Joint Forest Management Produce.
- Food for Work Schemes to be launched to ensure food accessibility and employment generation for Joint Forest Management members.
- Area, bio-diversity hot posts etc. to safeguards the livelihood of millions of people.

10.10.4.3 NTFP & Medicinal Plants Development:

- In situ conservation of Medicinal Plants in protected areas.
- Harvesting of Bamboo flowering area and bringing the Bamboo area under scientific Management.
- NTFPS should be properly regenerated, harvested, processed and marketed for improving economic of forest dwellers.

10.10.4.4 Forest Based Industries:

Initiation of modernization of technology, reduction recycling of waste, regulation of use of treated materials to be encouraged.

10.10.4.5 Forest Plantations:

Improvement of the productivity of the plantation by creating new forest resources, even by encouraging private sector participation.

10.10.4.6 Agro-Forests:

- Commercial Agro Forestry should be practiced where irrigation facilities are there for species like Acacia, Bamboo, Casuarinas, Eucalyptus, and populus etc.
- High-tech modern nurseries to be established for quality planting materials.
- All restriction on felling of trees, logging, transport and marketing of the produce to be removed.
- Market information system to be developed.

10.10.4.7 Greening India Programme

- 15 M Hectar of degraded forestlands to be covered under Joint Forest Management.
- 10 M Hectar irrigated lands to be brought under commercial Agro Forestry.
- 10 M Hectar of rain failed area to be brought under subsistence Agro Forestry.

The Programme should be implemented through Food for Work Scheme, which will ensure meeting of basic needs of people, environmental protection, food accessibility and productive employment generation to 10 Crore people, specially tribes, Dalits, backward classes and other backwards classes, land less and women.

10.10.4.8 Forest Research, Education & Training:

The scope of Forestry Research covers not only biological and technological aspects but also wide spectrum of economic, environmental, sociological and policy research. ICFRE, Indian Council of Forestry Research and Education (ICFRE), Indian Plywood Industries Research and Institute (IPIRI), Indian Institute of Forest Management (IIFM), Indira Gandhi National Forest Academy etc are acting in this field.

10.10.4.9 Forest Survey of India (FSI):

Forest Survey of India should improve in State of Forest Reports in assessment of forest cover and forest resources. It should also train forest officials in Remote Sensing Skills and Geographical Information System (GIS), Inventory and Data Processing Technique in Forestry.

10.10.4.10 Wild Life:

The strategies for the '10th Five Year Plan' period are:

- Strengthening and enhancing the protected areas net work.
- Effective management of protected areas.
- Conservation of wild and endangered species.
- Restoration of degraded habitats outside protected areas.
- Control of poaching and illegal trade in wild animals and plant species.

10.10.5 Actions for the Plan:

10.10.5.1 Development of National Parks and Sanctuaries: Development of National Parks and Sanctuaries is an umbrella scheme encompassing components of protection, habitat improvement, settlement of rights, eco-development, infrastructure development, capacity building including research and training, eco-tourism, education and awareness etc.

10.10.5.2 Project Tiger and Project Elephant: In Tiger reserve and Elephant reserve, there is need to emphasize on anti poaching camps, mobile squad, capacity building of frontline staffs in intelligence gathering, detection and successful prosecution of cases and providing necessary infrastructure to them. Also, there is need of protecting existing elephant habitat from further degradation and fragmentation: identifying and protecting corridors to reduce the human elephant conflict and crop raid by Elephant.

10.10.5.3 Wild Life Institute of India: The institute should cover not only the wildlife research and training but also the socio-economic aspects of the wildlife conservation.

10.10.5.4 Central Zoo Authority: the emphasis has been given in developing better avenue for capacity building of zoo staffs, better housing, upkeep and health care of zoo animals along with rescued animals and strengthening of facilities to the existing veterinary institutes.

10.10.5.5 Bio- Diversity: The sustainable use of Bio- diversity is fundamental to ecologically sustainable development. The loss of Bio- Diversity stems from destruction of the habitat, extension of agriculture, filling of wet lands, conversion of rich bio-diversity sites for human settlement and industrial development, destruction of coastal areas and uncontrolled commercial exploitation etc. are enormous. The steps taken for conservation of bio-diversity are;

- Establishment of a protected area network of 88 National Parks and 490 Wild Life Sanctuaries.
- Programme of eco-development involving local communities.
- Implementation of Biosphere Reserve.
- Specific programme for the conservation of wetlands, Mangroves and coral reefs
- Centrally sponsored programme of National Lake Conservation launched in 1993.

- The Wild Life Protection Act, 1972 is being revised.
- Project Tiger initiated in 1973 has created 27 Tiger Reserves.
- Project Elephant initiated, in 1991-92 ensured Elephants in their natural habitat.
- Six wetlands have been declared as Ramsar sites under Ramsar convention.

10.10.5.6 The forestry sector has so far got only 0.67% of the total plan outlay through the forest constitute 23.57% geographical area of the country & contribute 2.37% of GDP (Source: 10th Five-Year Plan). The percentage share of forestry sector outlay changed from 0.32% of the total outlay in First Five-Year Plan to 0.94% in the 8th Five-Year Plan. The highest allocation was in the Seventh Five-Year Plan, i.e. 1.09% for the sustainable development of the sector, allocation to the forestry sector should be raised to about 4 to 5% of the total outlay of the country. Similarly, the outlay towards forestry sector of the State is also 1.15% only, when the forest area is 31.06% of the geographical area of State.

Table No. 10.3: Year Wise State Outlays (in Crore)

Year	State Outlay	Forestry Sector	Percentage
1998-1999	2426.75	23.87	0.98
1999-2000	2553.13	34.54	1.35
2000-2001	2555.25	39.62	1.55
2001-2002	2300.00	25.45	1.11
2002-2003	2550.00	19.37	0.76
2003-2004	2714.00	30.45	1.12
2004-2005	3250.00	60.83	1.87
2005-2006	3000.00	30.42	1.01
2006- 2007	3500.00	71.80	2.05

Source: Statistical Abstract of Orissa 2002, Orissa Forest Status Report 2003-04, Odisha Budget 2004-05, 205-06 & 2006-07 and State Govt. Official Website)

10.10.5.7 The outgoing Working Plan and intervening period has passed through Six Five- Year Plans in addition to two Annual Plans 1990-91 and 1991-92, including the current 10th Five-Year Plan. During the plan period, in order to increase the economic value of the forests and full filling the requirement of local people in terms of small timber, firewood, bamboo, N.T.F.P etc. with a larger goal of supporting the rural livelihood and to restore the

degraded forests through appropriate treatment, large scale plantations have been taken up. The abstract of Five-Year Plan wise of Plantations raised in the Division is furnished in the Table No.10.4. The abstract of last five, Five-Year Plan wise amount spent under different schemes is furnished at Table No. 10.5.

Table No. 10.4: Abstract Five-Year Plan Wise Plantations Raised:

Five Year Plans		Malkangiri Forest Division	
		No. of Plnt. Sites	Area in Ha.
Fourth Plan	(1969-74)	10	96.80
Fifth Plan	(1974-79)	19	253.12
	(1979-80)	10	254.00
Sixth Plan	(1980-85)	9	186.00
Seventh Plan	(1985-90)	44	858.00
	(1990-92)	19	352.00
Eighth Plan	(1992-97)	11	350.00
Ninth Plan	(1997-02)	113	5230.00
Tenth Plan	(2002-07)	268	7276.93

Source: D.F.O., Jeypore & Malkangiri Forest Division

Table No. 10.5: Abstract of Five-Year Plans (in Rs. Lakhs):

Five Year Plan	Period	Amount Spent
7 th Five-Year Plan	1985-86 to 1989-90	287.46
Two Annual Plans	1990-91 to 1991-92	98.66
8 th Five-Year Plan	1992-93 to 1996-97	510.10
9 th Five-Year Plan	1997-98 to 2001-02	1293.28
10 th Five-Year Plan	2002-03 to 2005-06	1701.93

Source: D.F.O., Jeypore & Malkangiri Forest Division

10.10.5.8 From the above table it is seen that, there is abnormal increase in plan outlay/ expenditure in Forestry Sector from 9th Five Year Plan particularly from 1995 after launching of LTAP/ RLTA in the Division. Also, the launching of Orissa Forestry Sector Development Projects 2006 in which the reorganized Jeypore Forest Division is one of the areas of intervention with an object to restore degraded Forests and improve the income level of villagers by promoting sustainable forest management including JFM Plantation and Community/ Tribal development, thereby improving environment and alleviating poverty.

The Plan is for 7 years starting from 2006-07 to 2012-13. As this is limited to Jeypore Forest Division only and the RLTAAP scheme is going to be completed by 2007, continuity of such schemes is very much essential for the development of the natural forest wealth including bamboo forests of the Division on sustainable basis.

10.11 The 11th Five-Year Plan (2007-08 to 2011-12):

Ministry of Environment and Forests had an approved out lay of 10,000 corers for the 11th 5year plan, 2007-12 with the following

- 1) To increase the forest cover by 5% of the total geographical area. This would require an additional cover of about 16 million ha. The Tenth Five Year Plan target for forest cover was 25%.
- 2) Monitor able target in Air Quality should be to achieve WHO standards of air quality in all major cities by 2011-12.
- 3) No untreated sewage should be drained into rivers by 2011-12.
- 4) To reduce the energy intensity per unit of GDP by 20% over the Plan period or by 2016–17. I

III. Plan Outlay for Environment Protection and Climate Change

- The amount of Rs. 5,945 crores were allocated to the MoE&F for the Tenth Five Year Plan with a sectoral focus on National River Conservation Directorate (28%) and Forestry and Wildlife (27%). However, in the Eleventh Five Year Plan, allocation for the Ministry has increased by 68% compared to previous plan period with cumulative five years outlays (FY 2007-12) of Rs. 10,005 crores. The Central Sector Scheme accounts for 23% of total plan outlays for the Ministry and CSS on the other hand constitute 77% of plan outlays for the Ministry.
- The Annual Plan 2008-09 of the Ministry has been approved at Rs. 1,500.00 crore, implying an increase of 11.03% over the 2007-08 plan outlay. The approved outlay comprises of Rs. 601.38 crore in the environment and ecology sector and Rs. 898.62 crore in the forestry and wildlife sector. In the approved outlay of the Eleventh Five Year Plan, the CSS, NRCP comprises a total of 55.46% of total outlays for the environment and ecology sector and another CSS, NAP constitutes 32% of total plan allocation for the expenditure head of the forestry and wildlife sector.

- The Eleventh Five Year Plan has introduced a new CSS, Social Forestry with Communities (*Panchayat Van Yojana*) with an approved outlay of Rs. 900 crores.

10.12 The 12th Five-Year Plan (2012-13 to 2016-17):

The twelfth plan document, approved by the National Development Council on 27th December, 2012 has the basic theme of “faster, Sustainable and more inclusive growth’ and lays out major targets, key challenges to meet them and the broad strategy that may be followed to achieve the stated objectives. Minister of Environment & Forests has been allocated an out lay of 17,874 corers which work out to 0.41% of the plan allocation across various Ministries/ Departments as against a share of 0.42% or Rs.9231 corers in the Eleventh Plan. At current prices, the enhancement in this Ministry’s twelfth plan out lay over the Eleventh plan out lay, however, works out to 109%.

The Ministry of Environment and Forests is responsible for meeting the above-mentioned challenges. It has developed its vision, mission, objectives and functions aligned with national environmental goals while at the same time conserving and improving the environment, providing clean air and water, protecting forest and wildlife, ensuring chemical safety and cleaning up polluted sites without coming in conflict with industrialization and infrastructure development required to provide a decent standard of living to the people of India.

Vision:

Conservation of environment and natural resources for the present and future generations in a manner consistent with the aspirations of the country for growth and development.

Mission: To plan, promote, coordinate and oversee the implementation of environmental and forestry programmes in order to protect the environment and maintain a balance between conservation and development activities

Objectives:

- I. Increase the forest and tree cover to 33% of the geographical area of the country (Afforestation and regeneration of degraded Forests)
- II. Conservation of the existing forests, wildlife and water resources and survey of various areas for identification of new species

(Protection of Forests, Conservation of rivers, Biodiversity Conservation, Conservation of Wetlands, Wildlife Conservation, Conservation of resources in the eco-sensitive zone, Capacity building, training and research in classical and molecular taxonomy)

III. Control of Pollution (Air, Water, Noise and Industrial pollution)

(Better ambient water quality, Management of hazardous substances and Better Environmental governance)

Functions:

The major functions of the Ministry include:

1. Formulation of national policies on management of environment, forests and wildlife;
2. Implementation of provisions of related legislations on forests, environment and wildlife, control of pollution of air and water, etc.
3. Survey and exploration of natural resources particularly of forests, flora, fauna, ecosystems, etc.
4. Bio-diversity conservation including that of lakes and wetlands;
5. Conservation, development, management and abatement of pollution of rivers.
6. Environmental research and development, education, training, information and awareness;
7. Regulation of diversion of forest land for non-forestry purposes;
8. Environmental Impact Assessment;
9. Wildlife conservation, preservation, protection planning, research, education, training and awareness;
10. Afforestation and eco-development;
11. Prevention of cruelty to animals;
12. Administration and Management of subordinate and autonomous institutions of the Ministry; and
13. Monitoring of implementation of central sector and centrally sponsored schemes funded by the Ministry.

Twelfth plan has identified 13 monitorable socio- economic targets for this ministry. These targets are as follows;

Environment & Climate Change

1. Assess and remediate 12 identified contaminated sites with potential from water contamination by 2017.

2. Clean 80% of critically polluted stretches in river by 2017 and 100% by 2020.
3. States to meet national ambient air quality standards in urban areas by 2017.
4. To reduce emission intensity of GDP in the line with the target of 20 to 25% reduction over 2005 levels by 2020.

Forest & Livelihood

- Greening 5 million hectares under GIM including 1.5 million hectare of degraded lands, Afforestation & Eco-Restoration of 0.9 million hectare of ecologically sensitive areas.
- Technology based monitoring of forest cover, bio-diversity and ground stock including change- monitoring on periodical basis through dedicate satellite by 2017 and establishment of open web-based national and environment information system for research and public access by 2015.
- Engagement of village green guards/ community foresters for JFM village by 2016.
- Established forestry seedbank in forest circles and model nursery in each District with information on public portal by 2014.
- Improve forest productivity and sustainable management for bio-diversity.
- Restore and intensity forest range lands/ grazing land managing establish community grazing land around forest fringe villages.
- Build capacity of JFMCs for management of forest resources including tourism.

Wild life, Eco-Tourism & Animal Welfare

- 20% of veterinary professionals in the country will be trained in wildlife.
- Integrated Eco-tourism district plans covering 10% of all potential areas by 2017.
- Promoting participation of private sector, civil societies and Philanthropists in animal welfare.
- Reducing and managing human –wildlife conflict.
- Commercialization of permissible marine products rich in poly, fatty acids, vitamins and so on.
- Promotion of ecotourism and participatory eco-development livelihood of local population.

Eco-System and Bio-diversity

- Restore 0.1 million hectares of wet lands/ inland lakes/ waterbodies by 2017.

The Ministry is currently operating thematic schemes in 22 thematic areas. These schemes cover the main budgetary requirements for the Ministry. The names of the schemes and their outlays in the 11th Five Year Plan and the projected budget outlays (with 20% increase) for the 12th Five Year Plan (2012-13 to 2016-17) are given in the Table below:

Table No. 10.6: Budget Outlays for Environment, Forests & Wildlife

Sl. No.	Name of the scheme	11 th plan (Rs crores)	12 th plan (Rs crores)
	Environment & Ecology		
1	Environmental monitoring and governance	216.00	259.20
2	Pollution Abatement	235.00	282.00
3	Research & Development for Conservation & Development	250.00	300.00
4	Conservation of Natural Resources and Ecosystems	600.00	720.00
5	Environment Information, Education & Awareness	295.00	354.00
6	Environmental Management in Heritage, Pilgrimage and Tourist Centers Including Taj Protection	0.01	0.012
7	International Co-operation Activities	80.00	96.00
8	National Coastal Management Programme	10.00	12.00
9	National River Conservation Plan (NRCP)	2100.00	2520.00
	Total Environment & Ecology	3786.01	4543.212
	Forestry & Wildlife		
10	Grants in aid to F & WL institutions	450.00	540.00
11	Capacity building in forestry sector	110.00	132.00
12	Gregarious Flowering of Muli (<i>Melacanna baccifera</i>) Bamboos	37.00	44.40
13	Intensification of Forest Management	600.00	720.00
14	Strengthening Forestry Division	100.00	120.00
15	Strengthening of Wildlife Division	150.00	180.00
16	Integrated development of Wildlife Habitats	800.00	960.00
17	Project Tiger	615.00	738.00
18	Project Elephant	81.99	98.388
19	National Afforestation & Eco-development Board (NAEB)	250.00	300.00
20	National Afforestation Programme	2000.00	2400.00
21	Social Forestry with communities (Panchayat Van Yojana)	900.00	1080.00
22	Animal Welfare	120.00	144.00
	Total Forestry & Wildlife	6213.99	7456.788
	Grand Total Environment, Forests & Wildlife	10000.00	12000.00

Plantations: A number of Plantations have been raised with a view to improve the growing stock by enrichment planting and gap planting to fill up blank spaces with variety of species including economic species like teak. Some good patches of old Teak plantations are identified in this Division and a special management plan has been prescribed. The schemes under which substantial areas have been covered with plantation are State Plan, Non Plan, AJY, CAMPA, NBM, OBDA, MGNREGA ETC. However, scheme wise details of plantations raised in the Division are provided in **Annexure VIII**.

Table No. 10.7: Abstract Five-Year Plan Wise Plantations Raised

Five Year Plans		Malkangiri Forest Division	
		No. of Plantation Sites	Area in Ha.
Eleventh Plan	(2007-08 to 2011-12)	133	4165.272
Twelfth Plan	(2012-13 to 2016-17)	277	7615.00

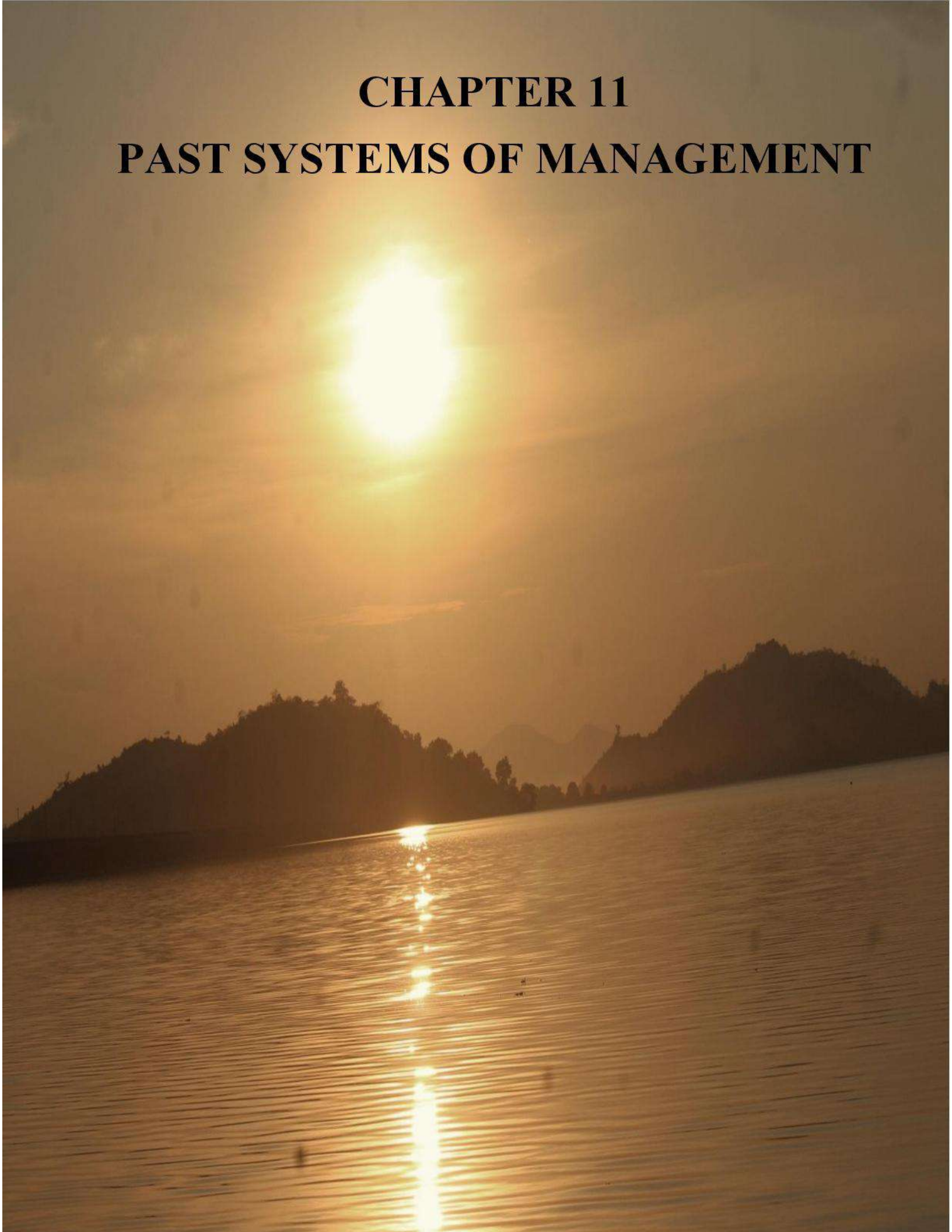
Source: D.F.O., Malkangiri Forest Division

Table No. 10.8: Abstract of 11th and 12th Five-Year Plans (in Rs. Lakhs):

Five Year Plan	Period	Amount Spent
11 th Five-Year Plan	(2007-08 to 2011-12)	32142760
12 th FiveYear Plan	(2012-13 to 2016-17)	239729692

CHAPTER 11

PAST SYSTEMS OF MANAGEMENT



11.1 General History of the Forests: The tract included in this Forest Division was once the part of the great forest region. It was also included in the 'Atavika Kingdoms' in the time of Ashoka in third century B.C. Aboriginal tribes like Gondas, Kondhas, Bondas, Porojas, and Koyas etc. inhabited in this great forest region. They were practicing shifting cultivation locally known as Podu was supplementing their food with roots, shoots, tubers and fruits. They were also hunting wild animals during festivals, feast, and sports. Subsequently in the later days, they were cultivating paddy, Tobacco, Chillies, Kajanas, Lin seeds and vegetables on stream banks. Though the lands were steep, no binding or terracing was followed as a result the top soils got washed during rain and the forests became vulnerable to soil erosion. In the 3rd century A.D when the samudra Gupta ruled over the large tract of central India, this Koraput, Kalahandi tract was known as 'Mahavana' or 'Mahakantaro' territory ruled by a King known as 'Vyagharaja'. This King, 'Vyagharaja' was defeated by Samudra Gupta around 350 A.D, but the period reign was short lived. In 15th century A.D this reign was believed to be under the control of 'Nala Kingdom' of Nishada tribe. Their capital was called 'Pushkari' including Bastar region of Chattisgarh. From the 6th to 12th century the Gangas and Nagas ruled over this tract. Then the ruling of this tract passed to the king of Solar Dynasty from Nandapur. In the late half of the 16th century, the Nandapur Kingdom came under the Muslim domination, when the force of Sultan of Golkonda defeated in the 4th ruler and as per treaty of King used to send the annual tribute to the Sultan. In the middle of 17th century the capital was shifted to present Jeypore then to Narayanpatna and again brought back to Jeypore.

In the year 1775 the British occupied this tract by defeating the King Vikram Deo. Here, the Raja of Vizianagaram helped Captain Richard Mathews of East India Company to fight with Raja Vikram Deo. However, in the year 1793 the Raja of Jeypore was granted Permanent settlement of Jeypore Estate for an annual *peskash* of Rs. 25000/- which was subsequently reduced to Rs. 16000/- during the year 1802-03. This time of entire Vizianagaram District was settled and according to the terms of settlement, the forest of the tract also belonged to the

Maharaja. However, the British Government took over the Management of the Estate temporarily under the agency rule, as Sri Vikram Deo-III was then a minor. Subsequently, the Estate was handed back to him and he ruled up to 1920. After his death Ram Chandra Deo-IV and thereafter Vikram Deo-IV succeeded to the throne and continued till 1951. Thereafter the management of the Estate went to the court of Wards, as his adopted son was a minor. In the December 1952, after the abolition of Zamindari under the provisions of the Estate Abolition Act 1951, the Jeypore Estate was vested to the Government of Odisha; as a result, the Government becomes the owner of the entire forests.

11.1.2 Beginning of the Forest Conservancy & Administration:

The authentic information about the Forest Conservation effort and its use by the local inhabitants before the Jeypore Estate came under direct administration of British ruler was not there. It is believed that the Tribal Communities, those who were living in these tracts were used to forest liberally. They were clearing the Forests freely for *Kumri* or *Podu* cultivation. Even though the forests of the tracts were used for many purposes, it was given least priority and value.

First time it was Mr. H.G. Turner, the then Special Assistant Agent responsible for the direct administration of the Jeypore Estate, who realized the immediate need of conservation of forest against reckless habit and forests use practice of the hill tribes. In the year 1872, he drew the attention of Govt. of Madras; under the direction of erstwhile Govt. of Madras, Lt. Col. R.H. Beddome, Conservator of Forests and Captain Blaxland critically explore forests of the Jeypore Zamindari. While submitted the report of his assessment about the nature and quantum of destruction due to podu (dated 29th March 1877), Col. Beddome, gave detail description of forest flora of the Jeypore Estate. He also stressed on the immediate need of conservation of the existing valuable forest wealth. His expression is reproduced here.

*“I have nowhere in India seen this **Kumri** cultivation so systematically carried out, but considering how very sparse the population is, it would cause little inconvenience to the people if 1/4th or 1/5th of the forest tracts is to be reserved against the ruinous system of felling and burning. Mr. Turner proposed to parcel the country into Muthas and to prohibit extension of Podu cultivation in hills. Something ought to be done and that to speedily’.*

He also suggested that the Madras Forest Act to be extended to the Zamindari of Jeypore. Accordingly, the Madras Forest Act 1882, got extended to Jeypore vide Notification No. 268 dt.23.6.1891 on the application of the Guardian to the minor Raja of Jeypore. Thus, the Colonel Beddome's report acted as the first step towards Conservation of Forests of the Jeypore tract.

Therefore, Jeypore Forest Wasteland Rules 1897 was framed under Section 26 of the said Madras Forest Act. This rule authorized the Agent of Agency tracts to constitute and declare the Reserve Land in order to enable them to protect against Podu cultivation and other destructions. Also, the seigniorage rates of the different forest products were published in the First St. George Gazette, dt.5.9.1892.

In subsequent period when Sri Vikram Deo-II was the ruler, the British officers continued to manage the affairs of the estate under an agreement. The forest gates and checking station were established and notified on dt.11.5.1900. Mr. Eber Hardic was posted as Chief Forest Officer from 1901-1907. Many forest blocks were constituted in the reserve lands and different rates were published for collection of different forest produces through the check gates. During this period, Forest Administration was organized. Also, during this period, except removal of forest produce by local inhabitant no major exploitation of forest was going on and as such, the collection through seigniorage rate for removal of forest produce by local people was the only source of forest revenue.

The amendment made to the Jeypore Forest Rules in the year 1916, helped in constitution of protected lands. The estate officials were also given powers, with the consent of Agent to prohibit removal of forest product from Reserve Lands and Protected Lands. The ultimate aim of policy was to give complete protection to the Reserve Lands and Protected Lands against podu/shifting cultivation, encroachment on Reserve Lands and Protected Lands through the penal provisions. Also, there were lacking in implementation of the provisions. The compounding rules were also acted up Jeypore Estate was vested with to the Estate of Odisha in accordance with the provisions of Zamindari Abolition (Odisha) Act, 1951.

The administration of the Forests of these Jeypore tracts was vested in the *Anchala Sasan* under the overall control to the Collector, Koraput from December 1952 to dt.15.11.1957, after which it was transferred to the control of the Forest Department on dt.15.11.1957. The Jeypore Estate was constituted as the Jeypore Forest Division on dt.15.12.1958 under the jurisdiction of

the Conservator of Forests, Berhampur Circle at Berhampur. After the reorganization of the Department in 1959, a new circle with head quarter at Jeypore, now the Koraput circle was created in 1959.

11.1.3 Forest Exploitation during Estate Period

When the Forest Department was organized by the Maharaja of Jeypore, the infrastructural facilities like roads, communication and transportation were very poor. So also, the population of the tract was very sparse. Many forests of the Estate were not easily accessible. This market for timber and other forest produce were not well developed. The forests were primarily for local use either for their settlement or for shifting cultivation and also for collection of foods like roots, shoots, tuber and fruits and for hunting places during festivals, feasts and sports. Therefore, the forests were perceived a resource of low value and there was not systematic management practice.

As discussed in section ‘Rights and Concession’ in Chapter – VIII under the Provisions of Jeypore Forest Rules 1922, the privilege holders were allowed to remove reserves trees like Sal, Bija etc. on free of charge up to three feet girths from Protected Lands for their domestic use. Also unreserved trees and firewood were removed by adjoining villagers from Protected Lands. In addition, free grazing to the cattle and collection of non-timber forest products were granted to some specified tribes living in and around the forests. Thus, there were no restrictions or checking on the liberal use of the various forest products by the local people. Of course, there were some defects policies. The privilege holders were removing the trees arbitrarily without considering the Silvicultural aspect of the forests. Also, in the absence of marking, the verification regarding whether the trees have been fallen down in the unreserved or reserved land was extremely difficult. The people were cutting the trees wherever they like and even for fencing very valuable poles and saplings of Sals, Bija, and Teak were used without considering the economic value. As a result, there was adverse impact on the establishment of natural regeneration of these species. Also, the surplus NTFP materials were battered or sold, benefitting the business people. The encroachment of the forest land became easy and undisturbed. Thus, it has resulted serious depletion of the forests.

In order to regulate the access to forests by non-privilege holders, mainly from higher castes and nearby peoples in 1923 the Maharaja has introduced the commutation system or

annual royalty system. Annual royalty of one half to one rupee per plough was levied on the tenants. In return, they were allowed to cut the reserve trees like Sal, Bija etc. upto 3' girth for their domestic consumption like house construction, plough and other agricultural implements. They were also allowed to collect firewood for cooking their foods.

The maharaja granted the first timer lease in 1917 to M/s H.Deer and Co. of Madras for supplying railway sleepers for five years from 1.10.1917 to 30.9.1922. Here, the above 6' girth from reserve and 4 ½' girth in unreserved lands were felled and converted to sleepers. Later on, it was extended for an additional period of 25 years. But in between in the year 1944 the lease was cancelled and again a fresh lease was granted for another 6 years i.e. from dt.1.7.1944 to dt.30.6.1951. These leases were renewed up to 20th December 1960. Another lease was also granted to M/s Notu Industries for 10 years from 1937 for working of timber like Teak, Bija, Haldu, Sisoo, etc. over 4' girth in Malkangiri, Motu, and Ramagiri Ranges. The lease was granted for very low price i.e. 5 or 6 annas per cft. The lease was cancelled in the year 1944 and fresh lease was granted for another 15 years from 1.3.1944 to 28.2.1959. This lease was terminated in 1954. Besides that, few other contractors were also granted lease from 1957 to 1960. Thus, the uncontrolled felling and non-fixing of upper girth limit has led to over exploitation and wasteful removal.

Though in the year 1935, the fresh agreement came into force and there was increase in royalty rate but there was hardly any impact on the contractor / lessee.

11.1.4 Forest Management after Abolition of Estate/ Zamindari

The forest of the Jeypore Estate was vested to the Government of Odisha and the Government acquired full ownership over the forests after the abolition of Zamindari under the provision of the Estate Abolition Act, 1951. An *Anchal* Forest Officer assisted to the District Collector, Koraput in the forest administration. The Koraput District Forest & Westland Rules, 1956 and Koraput District Hunting and Shooting Rules, 1956 were framed and notified on dtd.30.8.1956. The Wild Birds & Animals Protection Act was extended to the district in 1957. The forests were worked mainly for revenue without giving any attempt on improvement of health and hygiene of it. Though some forest blocks were demarcated and reserved, no eye-catching works were undertaken against forest fire and other forest conservancy.

On dt.15.11.1957, the forests of Jeypore Estate were brought under the administrative control of Forest Department and two Forest Divisions were initially created, one in the name of Jeypore Forest Division with headquarter at Jeypore and another as Rayagada Forest Division with headquarters at Rayagada; under the administrative control of the Conservator of Forests, Behrampur Circle, Berhampur for management of these forests.

The forests of the newly created Jeypore Forest Division were managed under the Madras Forest Act, 1882 and the Koraput District Forests & Wasteland Rules, 1956; the modified form of the Jeypore Forest Rules. After reorganization of the Forest Department and creation of a new circle at Jeypore w.e.f. 21.10.1959, the forest management got the real shape. The first Working Scheme for scientific management and harvest of the forest products was prepared by Sri. T. Das, ACF during 1957-59, which got effective from 1960. The scheme was simple and preliminary for ten years in 1960-61 to 1969-70.

11.2 Past System of Management and Their Results

11.2.1 The First Working Scheme by Sri T. Das, ACF (1960-61 to 1970-71):

The aim of the 1st Scheme was to begin with the scientific management in the form of improvement felling and cultural operations, so that a conducive health and condition can be brought to the forests for management under appropriate silvicultural systems according to the prescription of the Working Plan. It was not possible to deal with such vast tracts of forests within the scheme period due to lack of proper communications and limited scope of the Scheme. There were eight working Circles to achieve the objectives.

1. Sal Interim Improvement Working Circle
2. Sal Selection Working Circle
3. Miscellaneous Selection Working Circle
4. Coppice Working Circle
5. Bamboo Working Circle
6. Khair Working Circle
7. Protection Working Circle
8. Plantation and Afforestation Working Circle

1. Sal interim improvement Working Circle: The objective of this Working Circle was (i) to exploit old and over matured trees, (ii) to remove the dead and un-sound trees infected by borers or fungi etc. (iii) to improve the condition of the forest by cleaning and thinning (iv) to obtain good regeneration. This Forest Blocks allotted to this circle were Dharmagarh and Dasamantpur, which together constituted about 70,000 Acres. Practically two method of felling i.e. (i) improvement felling and (ii) selection felling were followed.

In improvement felling the dead, dying, and disease trees were removed. As there were no sufficient trees of exploitable girth class i.e. 150 Cm. to 180 Cm, the crop of the forests included here were of varying age class of high forests.

Results: The silvicultural operations like thinning and cleaning in the following year of operations could not met, as a result the objective of giving conducive environment to the young re-generation for establishment could not be achieved. In the non-worked coupes, the dead, dying and diseased trees left as it attracted more borer and fungal attacks to the old crops. Thus, the very purpose of the objective could not be fulfilled.

2. Sal Selection Working Circle:

The Circle included the rest of the Sal Forest of the Division mainly of hills and un-accessible areas. The Block includes in this Working Circle is Sarangpalli. The Sal forest is of the lower quality than the Improvement Working Circle. The exploitable diameter was 60 cm basing on site quality.

Results: The arbitrary felling in the past had not left the scope of sound and mature tree in future of 20-year Cycle. The Coupes were not worked systematically resulting incomplete of the area within plan period. The culture operation was also not carried in that time, resulting failure achieving the sufficient natural regeneration.

3. Miscellaneous Selection Working Circle:

The forest area includes in this Working Circle is the vast area of Malkangiri and Motu Ranges. Most of the forest is lying on high hills and inaccessible area. Also, in hilly tracts, the forests are subjected to podu/shifting cultivation.

Results: Most of the coupes except for Teak became un-economical. Therefore, only submersible area of Balimela dam was worked out by OFDC. The Teak in reserved lands was very scarce and facing complete destruction.

4. Coppice Working Circle:

The Coppice Working Circle is not included in Malkangiri Division, but the Blocks like Khuntrukhal, Phampuni and Boipariguda were managed under the Working Circle of Jeypore Forest Division.

5. Bamboo Working Circle:

The Bamboo Working Circle comprises of whole of the Sal and miscellaneous forests where Bamboo occurs. The Bamboo forest of Malkangiri and Kalimela Ranges were worked out by two Paper Mills i.e. M/s Bengal Paper Mills up to 1966 and M/s Orient Paper Mills from 1967 to 1969. The bamboo forests were badly managed. Also, the cost of extraction considering the lead of nearest railway head becomes uneconomical and most of the parts were left unworked.

6. Khair Working Circle:

The species was occurring sporadically in the Division and treatment through separate Circle was only for academic interest.

7. Protection Working Circle:

The ultimate aim of this Working Circle was to provide protection against biotic interference including fire and grazing. But due to weak legal status of the forest blocks combined with paucity of funds and shortage of staff made the task failure. Most of the forest Block suffered from heavy encroachment and other biotic interference.

8. Plantation & Afforestation Working Circle.

The aim of the Working Circle was to enhance the capital value of the forests by planting Economic species like Teak in poor miscellaneous forest. Though 1087 Ha. of plantation have

been raised during the scheme period, hardly any attempt has been made for subsequent tending operations like thinning, cleaning etc.

Results: The prescriptions were simple but implementation of these remain far from satisfactory due to various reason, like lack of proper communication and allied facilities, vast area of cover and full of staffs and above all failure of law to enforce adequate protection.

11.2.2 Working_Plan from (1970-71 to 1991-2-92) and Scheme (from 1971-72 to 1980-81) by Sri N.C. Patnaik, B.Sc., A.I.F.C.

The First Working Plan for the 50 Reserve Lands and 14 Protected Lands comprising an area of 1998.88 Sq. Kms and Working Scheme for 5 Unreserved Lands comprising an area of 765.19 Sq. Kms was prepared by Sri N.C. Patnaik, B. Sc., A.I.F.C., the then Working Plan Officer, Koraput Circle, and Koraput. The management practices prescribed was for 20 years in Working Plan area and 10 years in Scheme area. The objective of management of these forests under this Plan was in consonance with the National Forest Policy. 1952. The specific objectives outlined in the plan were:

- (i) to meet the requirement of local population in consonance with preservation and perpetuation of the forest growth.
- (ii) to maintain adequate forest cover on hill slopes, catchment of rivers and denuded lands for protection against soil erosion, regulation or floods and soil and moisture conservation.
- (iii) to obtain sustained yield of various forest products and get maximum revenue in perpetuity
- (iv) to improve the condition and composition of forest to achieve the condition of normal forests.

In order to achieve the aforesaid objectives, the following six Working Circles were prescribed in the Working Plan and Two Working Circles in the Scheme.

Working Plan Area

1. The Sal Selection Working Circle
2. The Selection Working Circle for Miscellaneous species.
3. The Bamboo (Over lapping) Working Circle
4. The Teak Plantation Working Circle
5. The Protection-cum-Rehabilitation Working Circle.
6. The Minor Forest Produce Working Circle.

Working Scheme Area

1. The Selection Working Circle
2. The Bamboo Working Circle

1. The Sal Selection Working Circle

The special objectives of management were

- (i) to convert the Sal Forest of the plain area into uniform high forest
- (ii) to obtain maximum yield of large size timber without compromising the sound management principles and silvicultural operations
- (iii) to carry out suitable silvicultural operation to bring the forest to normality.

The total of the Working Circle was 623.78 Sq. Kms. The silvicultural system followed was conversion to uniform system. There were four felling series. Due to lack of sufficient mature crop, the clear felling was not prescribed with a hope to allot P.B.-I after 20 years.

As such, the prescriptions for these areas were similar to PB-II and PB-Inter of conversion-working circle. Also due to heavy fungal attack to Sal of over matured trees (over 60cm) warranted felling and classified as type Ib. The rest of the areas were classified as Ia and were given treatment as IB- Inter.

The Type-II Sal Forests were mainly on high slopes and inter-pockets with large –scale biotic interference such as grazing, fire and encroachment etc. The blocks were involved were part of Dharmagarh, Sarangapalli, Pitatung and Akur and (Dhondrakhol, Sindhigaon, Ghodaghat). The approximate area of this category of forest was 446.36 Sq. kms. The forests were over exploited in the past and there was no sufficient established regeneration.

- (i) The Sal forest areas were of quality class II to IV. The average quality was quality III. The increment put by these trees after 5' girth was negligible and negative. Also, there was heavy root fungus and heart root rot after 6' girth. The other principal species were Teak, Bija, Gamhar, Kurum, Sissoo, Bandhan, Mundi, Sahaj, Barangi, Mango, Tangini and Simul etc. The exploitable girth was fixed at 153 Cm. for Sal, Simul, Tangini, Jamu, Kasi etc.
- (ii) The exploitable girth fixed for Teak, Bija, Sahaj, Kurum, Mundi, Mango, Barangi etc. was 183 cms. Both type Ia, II and 1b. For Gambhar
- (iii) The exploitable girth fixed for Gambhar and Sissoo it was 138 and 153 cms. In type 1a, II and IV.
- (iv) Similarly, for Bandhan 122 Cm. in type Ia, II and 138 in Ib and all other species were fixed at 153 and 183 cms. In type Ia, II and type Ib.

Due to insufficient mature and over matured trees combined with high mortality rate on account of Sal root fungus and heart root, the felling cycle was fixed coinciding with the plan Period. Also, the coupes were made equ-productive considering the quality and density of the crop. The subsequent silvicultural operation like, cleaning, thinning, climber cutting, (Sowing and planting) etc., followed the main felling and fire protection and control of grazing too was prescribed.

The aforesaid prescriptions were followed up to 1989-90, but the clear felling in Ib area could not be done due to Government ban on tree felling with effect from 1990. The silvicultural operations were supposed to be carried out after main felling, could not be carried out for the aforesaid facts.

Results: It is well inferred that by and large many prescriptions related to Sal Selection WC could not be implemented systematically due to various reasons. However, during this period many Forest Blocks have been declared as RF and PRF under OFA 1972 which in other ways has improved legal status of the Forest Blocks. Besides that, large-scale Plantation had also been undertaken in degraded area.

2 The Selection Working Circle for Miscellaneous species.

This Working Circle was constituted comprising all forest Blocks of miscellaneous nature of Malkangiri and Kalimela Ranges. The important feature of the forest is the presence of teak. The Sal disappears and natural Teak comes as the salinity increases towards South. The associates are Sahaja, Bija, Sissoo, Gamhar, Dhaura, Tangini, Harida, Bahada, Sirisa etc. The species are found in both dry and moist deciduous type including bamboo brakes. The *Dendroclamus strictus* occur gregariously whereas *Oxytenanthera monostigma* was confined to nalla banks. The main objective of the Circle was (i) to harvest maximum sustained yield of large size Timber (ii) to improve the regeneration and growth of Forest (iii) to maintain permanent vegetation cover on this tract. The gross area of the Working Circle was 1099.12 Sq. Kms. The area was divided into 12 felling series and each felling series further divided into 20 Annual Coupes.

The remoteness of the locality, difficulty communication facilities and distance from the rail head, the system of management adopted was selection system and treatment prescribed was as same as to the type Ia and II of sal Selection Working Circle. There was heavy exploitation of mature trees in 1960 without considering the silviculture of the forests. The exploitable girth for beautiful forest of Kondakamberu and the poor-quality forest of the blocks were fixed therefore separately.

- (i) The exploitable girth was fixed 183 cms. For Teak, Kurum, Mundi, Bija, Sahaj, Barangi & Mango of Kondakamberu Forest Block whereas for other Blocks it was 153 cms.
- (ii) The exploitable girth was fixed 153 and 138 cms. for Jamun, Kasi, Simul, Tangini of Kondakamberu Forest Block and another Forest Block respectively.

- (iii) Similarly, 130 cms for Sisoo and Gambhar in Kondakamberu and 122 cms for other areas.
- (iv) The Bandhan was fixed at 122 cms. In Kondakamberu whereas 107 cms. In other areas.

As it discussed in the above paras, due to lack of sufficient matured trees, the selection cum improvement felling was taken up from 1974-75 in some of the coupes. The vast area of the circle remained un-worked, resulting growth of unwanted weeds and climbers. Also, the silvicultural operations like cleaning, sowing and planting in gaps following the main felling, thinning of new shoots of teak on third year, fire protection up to 5th year and closure of grazing 5th could not be taken up in time.

Results: The natural regeneration could not be established properly on its own due to repeated incident of the ground fire, and grazing. In Kondakamberu, Balimela Chitapari blocks there was a lot of encroachment under podu cultivation. Thus, the purpose of harvesting of big size timber and maintenance of permanent cover of vegetation has failed.

2. The Bamboo (Over lapping) Working Circle

The area allotted to this Working Circle was 1370.83 Sq. kms and divided into 20 felling series. The Bamboo cutting cycle was 4 years and system followed was Culm selection method with clump improvement. The main objective of the Working Circle was:

- (i) to ensure systematic and perpetuated exploitation of Bamboo Forests
- (ii) to satisfy local demand including paper pulp industry.

The main species is **Salia Bamboo (*Dandrocalamus strictus*)** found in Dry hilly slopes and undulating ground of Malkangiri and Kalimela Range whereas the Pani Bans (*Oxytenanthera albociliata*) found in lower most slopes of Chitrakonda and Malkangiri Ranges.

Results: The long-term lease of Bamboo forests i.e. 1960 to 1970 leads to over-exploitation and unsystematic treatment. The Forests of Malkangiri and Kalimela Ranges were subjected to severely hacking and maltreatment. There was some specific Bamboo cutting Rules for keeping

Bamboo Forest intact and free from biotic interference. But due to over exploitation of bamboo forest either by the lessee or by the local public, the bamboo forests of many coupes have become degraded.

While approving the working Scheme for Bamboo forest of Orissa (2004-05 to 2008-09) the Govt. of India, Ministry of Environment & Forest have laid down certain stipulations. Accordingly, the harvesting of Bamboo has been made in reorganized Malkangiri Forest Division during 2004-05 and 2005-06.

Table No.11.1: Reconciliation of Production of bamboo during the period 2003-04 to 2004-05 as on April 2006 of Malkangiri Forest Division

Names of the Bamboo Coupes	Production during 2004-05				Production during 2005-06 up to April,2006			
	Area in ha	F.B.	H.B	C.B.	Area in ha	F.B.	H.B	C.B.
Kondakamberu A	1843.81	49808	170	-	-	-	-	-
Kondakamberu B	--	-	-	-	1978.89	81000	-	-
Janbai A	3500.65	14710	-	-	-	-	-	-
Janbai B	-	-	-	-	3990.34	35988	12	-
Tarlakata(S) A	1879.54	45674	2844	1224	-	-	-	-
Tarlakata C	-	-	-	-	1719.97	210000	-	-
Tarlakata(N) B	-	-	-	-	1538.87	15541	3106	-
Tarlakata(S)	-	-	-	-	648.53	15300	650	-
Sileru(E) B	2201.56	36226	-	-	-	-	-	-
Sileru(E) C	-	--	-	-	2460.57	42000	14	4050
Sileru(W) B	1845.43	15749	-	-	-	-	-	-

Sileru(W) C	-	-	-	-	1651.17	16000	-	-
Gunametpada B	1299.89	21066	-	-	-	-	-	-
Gunametpada B	-	-	-	-	1327.41	112000	-	-
Pancha B	1719.97	50145	04	-	-	-	--	-
Tagarkota B	1667.36	297619	-	-	-	-	-	-
Signakhunta B	1570.23	209147	-	-	-	-	-	-
Signakhunta C	-	-	-	-	1388.12	108000	-	-
Sudhakunta B	1537.86	68804	-	-	-	-	-	-
Sudhakunta C	-	-	-	-	2076.11	283000	-	20000
Balimela B	1554.45	30762	125	-	-	-	-	-
Balimela C	-	-	-	-	1713.90	29000	50	-
Allurkota C	-	-	-	-	1440.73	3000	-	-

3. The Teak Plantation Working Circle

The Plantation Working Circle was constituted taking parts of some blocks, where natural Teak were found in addition to the other miscellaneous species. The change in soil pH from acidic to alkalinity with high calcium content, coarse loamy soil of Chitrakonda, Malkangiri and Kalimela Range was suitable for raising Teak plantation. The gross area of this Working Circle was 6641.395 Ha. The special objects of this Working Circle were to enhance the value of the forests by replacing the existing poor miscellaneous crop by Teak, which had great economic and commercial importance.

Results: The prescriptions of the Working Plan in the Teak Plantation Working Circle, Simultaneous Cleaning Operation like Pruning, Climber Cutting, Thinning and other cultural activities could not be achieved in due course of implementation of the plan.

4. The Protection-cum-Rehabilitation Working Circle: The Working Circle comprises areas where no systematic Working was prescribed. The total area of this Working Circle was 88.13 Sq. Kms. The object of management was:

- (i) To provide effective protection against grazing, fire and hacking to minimize retrogression.
- (ii) To maintain adequate forest cover on open and blank areas of both plain and hills.
- (iii) To enrich the forest growth either by natural process or by artificial plantation of fuel, MFP and ornamental plants and simultaneously to cater the need of local people.

Results: No silvicultural system was suggested except removal of dead and uprooted trees of five-year cycle basis. The other prescriptions suggested for those forests are complete closure to grazing, stringent fires protection, cleaning and singling out of coppice shoots regularly and soil working to boost the regeneration.

5. The Minor Forest Produce (Over lapping) Working Circle:

All the forests under Sal and Miscellaneous Working Circle, including Protection Working Circle were included in the Working Circle. The main objective of the Circle is to involve the mechanism for optimum collection vis-à-vis utilization of such produces, which will not only help in Forest Administration but also create employment opportunity to the poor tribal.

The MFP items like Kenduleaf, Sal Seeds, Genduligum, Myrobalans, Mohua flowers, Tamarind, Broom Grass etc, had been discussed. But no specific principle working system was suggested. However, the Nationalization of Kenduleaf in the year 1972-73 and collection by the Department has put the Trade big advantage towards harvesting the potentiality. The collection of Kenduleaf in the intervening period in the Division has gone up to 89000 Qtls. in 2003 and 2004, thereby provided employment opportunity in the lean period.

Results: The economic situation has also been strengthened. The collection of Sal seed was good in good seed year and was dealt through T.D.C.C. Ltd. and O.F.D.C. Ltd. after Nationalization. But due to lack of proper planning, the prescription could not adhere to.

11.2.3 Working Scheme (1971-72 to 1980-81)

This Scheme was prepared with the sole objective of management of some major unreserved forest blocks, where there were prospects of exploitation for 10 years i.e. 1971-72 to 1980-81. The Forest Blocks involved were Bhejangiwada, Sileru, Poleru, Balimela and Tulasi, which all together is 765.18 Sq. Kms. The objective of management was to introduce regular working in systematic manner together with meeting the local demand.

1. The Selection Working Circle: This area includes all the Forest Blocks with capable of producing large size timber and was divided into 6 felling series and the felling cycle was fixed at 20 years. The Teak, Sal, Bija, Sisoo, Kurum, Mundi, Sahaj, Tangini and Mahaneem were the principal species. Besides this Gambhar, Bandhan, Simul, Khair, Borangi are the reserved species under Koraput District Forest Rules. Similarly, Harda, Bahada, Kusum, Mahul, Kamalagundi, Tentuli, Arjun, Sidha, Dhoura, Kendu, Karanja, Muktamunja, Sonhan, Bheru, Panasa etc. were the secondary species.

- (i) The exploitable girth fixed was 183 cms for Sal, Teak, Kusum, Bija, Mundi, Sahaj, Baranga, Mango
- (ii) The exploitable girth fixed was 153 cms. For Jamu, Kasi, Simul and Tangini.
- (iii) The exploitable girth fixed was 138 cms. For Gambhar and Sisoo, 122 cms. for Bandhan and 153 cms. for all others.

Method of felling: Removal of timber by the right and privilege holders up to the girth of 3' was on free of cost. Also, all the prescription under Selection Working Circle, regular Working Plan area including protection against annual fire and grazing were suggested.

2. Bamboo Working Circle: All the Forest areas of the Scheme were included under this Circle. The Special objectives were: -

- (i) To fulfill the demand of the local people in addition to trade and Paper pulp industry
- (ii) To improve the quality and quantity Bamboo products.

The Bamboo Forest was divided into 11 felling series and the management practice prescribed was to that of Bamboo (Overlapping) Working Circle of the Plan area. The forests were over exploited due to ever increasing population pressure and regular annual ground fire crippled with heavy grazing incidence.

Results: It is well inferred that by and large many prescriptions related to Sal Selection WC could not be implemented systematically due to various reasons. The Bamboo working particularly the demarcation and extraction of bamboo culms and maintenance production data has not been recorded. However, during this period many Forest Blocks have been declared as RF and PRF under OFA 1972 which in other ways has improved legal status of the Forest Blocks. Beside that large-scale of plantation have also been taken in degraded area.

11.2.4: The Working Plan of Sri Mahadev Bodaik, OFS-I (2007-08 to 2016-17)

In order to achieve the aforesaid general objectives of management, an approach for management of the Forests of Malkangiri Divisions has been prescribed by **Sri Mahadev Bodaik, OFS-I (2007-08 to 2016-17)** after considering the ground realities.

In consistence with the provisions of the National Working Plan Code, 2014 and the recommendations and approval of the Working Plans' Committee, the following 08 (eight) working circles have been constituted for the management of the forest area covered under this revised Plan.

1. The Selection-cum-improvement Working Circle.
2. The Rehabilitation Working Circle.
3. The Plantation Working Circle.

4. The Protection Working Circle
5. The J.F.M. (Overlapping) Working Circle.
6. The N.T.F.P. (Overlapping) Working Circle.
7. The Bamboo (Overlapping) Working Circle.
8. The Wild life (Overlapping) Working Circle.

Allocation of Area to Different Working Circles:

The total working plan area was **89160.53** hectares (as per Topo depicted area) is spread over 71 RF Blocks and 93 PRF Blocks and comprising of 213 compartments. The position with regards to maintenance of Compartment history files was very poor. No Compartment/Block files have been updated.

Table No. 11.2: Range-wise Area Allotted to Different Working Circles in Malkangiri Division

Working Circle		Mathili	Malkangiri	Balimela	Chitrakonda	Kalimela	Motu	Total
Sel-cum-imp WC		6512.99	6727.14	11811.45	4943.31	7928.58	1401.41	41061.92
Reha. WC		2198.49	5819.05	581.24	2278.16	1088.44	0	11922.18
Pltn. W.C		600.18	196.11	246.09	1391.34	387.57	155.65	2976.94
Prot.	Eco	1394.31	617.69	734.87	12627.91	6277.73	11511.98	33199.49
W.C	Bio	9486.35	12567.61	14332.62	8612.81	9404.59	1557.06	55961.04
W.P Area		10705.97	13359.99	13373.65	22934.56	15717.32	13069.04	89160.53
J.F.M O.W.C		4159.56	6239.37	2244.08	1958.72	3419.14	1696.76	19717.67
N.T.F.P O.W.C		6903.06	15150.90	14332.62	8612.81	9404.59	1557.06	55961.04
Bamboo O.W.C		4287.20	4729.55	13505.29	68043.2069	26622.6290	3839.87	121027.7459
Wildlife O.W.C		10705.97	13359.99	13373.65	22934.56	15717.32	13069.04	89160.53

1. Selection-cum-Improvement Working Circle:

In this Working Circle the total area was allotted 41061.92 Ha.

The special objectives of this working circle as prescribed in working plan are as follows:

- To improve the density of the Forest Crop as well as stand structure by suitable Silvicultural Operation.
- To remove the mature and silvicultural available Trees before they became unsound.
- To boost the density and composition of Forest crop.
- To encourage natural regeneration through the interventions like silvicultural operation in time and soil and moisture conservations.
- To remove only dead and uprooted trees to facilitate the hygienic condition in the Forest.
- To carry out the subsidiary silvicultural operation, so that conducive situation can be created for better growth of existing crop and natural regeneration.
- To do the thinning operation wherever requires to remove the congestion of coppice crops by providing a conducive situation for better growth of existing growth and upcoming natural regeneration.

Selection-cum-improvement Working Circle Prescription:

It is prescribed for improving the growing stock and creating gaps for natural regeneration. The trees above exploitable diameter i.e. silvicultural available are to be cut in order to manipulate the canopy, allowing the sunlight to hit the forest floor aiding in natural regeneration of the species. The exploitable girth is fixed 150 cm for Sal and other miscellaneous species for sound trees and 120 cm. for unsound trees.

Implementation:

Table No. 11.3: Range wise Nos of Tress As per Approachable and Exploitable Girth Class

S.No	Range	Stand		Stock		Remarks
		Approach (120 cm – 150 cm)	Exploitable (150 cm to 300 cm)	Approach (120 cm – 150 cm)	Exploitable (150 cm to 300 cm)	
1	Mathili	297323	233815	343765	369730	
2	Malkangiri	182031	128402	213102	207908	
3	Balimela	247873	172442	302296	294220	
4	Chitrakonda	387969	287191	465163	475647	
5	Kalimela	148590	148797	177919	241526	
6	Motu	74084	70313	88399	113430	

Table No. 11.4 : The Details of Timber Coupe Production

YEAR	Tree felled (Nos)	Volume of Timber (cum)	Fire Stack (stack)
2007-08	Nil	Nil	Nil
2008-09	Nil	Nil	Nil
2009-10	Nil	Nil	Nil
2010-11	Nil	Nil	Nil
2011-12	38	17.3872	20
2012-13	64	52.7310	20
2013-14	39	28.5360	10
2014-15	38	37.6661	12.5
2015-16	61	28.8539	10.5
2016-17	177	190.9393	38

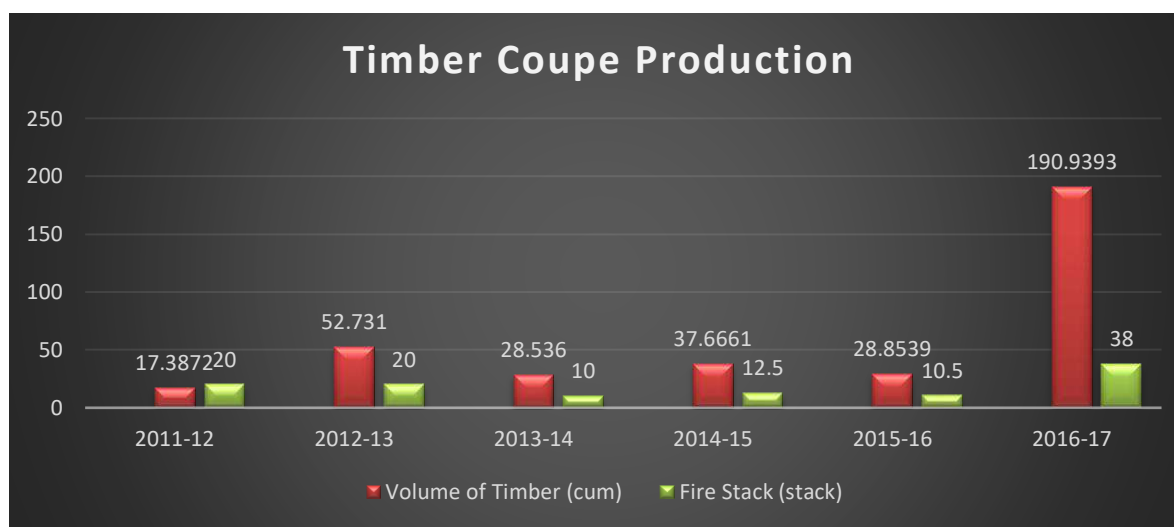


Fig. 11.1 Timber Coupe Production during Last Plan Period

Analysis of the results of Past WP

- ❖ In this working circle there is wide variation in the crop composition with many blocks having silvicultural mature trees and coppice crop. These working circles are mostly constituted with Sal and other mixed deciduous Forest having trees of mixed age classes. In some of the Forest Blocks the young coppice crops is congested and hence requires tending operation to boost further regeneration.
- ❖ In the past management system of this working circle it is observed that in some of the Forest Blocks have not been worked out due to the existence of LWE activities even though the mature crops are available which needs to be included in the next working plan for removal of exploitable girth class die trees.
- ❖ A balanced and site-specific prescriptions and the Growing Stock estimation has not been given proper to cover all the Forest Block of the Division, so as to select the felling and improve the existing stocks.
- ❖ The prescriptions and area allotment for the felling series is not constant with field condition.
- ❖ In the Timber Coupe after felling of marked Trees, a sites specific prescription for taking up SSO timber should be given and more fund with enhanced cost norm to be provided to carry out the SSO in more scientific and extensive manner.

- ❖ A separate site-specific prescription for SMC work such as staggered trench percolation pits and loose boulder check dam (LBCD) needs to be prescribed under this working circle.
- ❖ While working of Timber Coupe the interference due to LWE reasons has not been considered.

Remarks & suggestions:

It is proposed to retain this working circle for next plan period, but the number of trees to be marked should be fixed after careful study of growing stock & pressure of local biotic pressure. The local prevailing problem of LWE may also be taken into considered working of Timber coupe.

Gap planting is suggested along with SSO works. Coupe area should be digitized. Forest right area to be excluded from regular coupe working and separate procedure for extraction along with the benefit sharing has to be devised for the JFM areas as per the provision of the Odisha Joint Forest Management resolution-2011.

2. Rehabilitation Working Circle:

The special objectives of this working circle as prescribed in working plan are as follows:

- To improve the quality of existing Forest Cover through appropriate cultural operation.
- To enhance soil productivity through moisture and soil conservation measures.
- To boost up the existing natural growth by appropriate cultural operation.
- To restock up the degraded and barren area through proper management technique artificial regeneration with most desirable species.
- To meet the bona fide requirement of local inhabitant of major and minor produce from restocking of area and ensuring active participation of such communities in the entire process of management through the concept of JFM.

- To improve the economic condition of the local people by creating employment opportunity in the process of management of Forest

In this working circle total area allotted 11,922.18 Ha. The Forest Blocks which are badly damaged or degraded due to relentless biotic interference such as illicit felling, repeated fire, uncontrol grazing, encroachment etc. are included to this working circle. Further the Forest Blocks which can be improved by cultural operation supplemented by artificial generation are included in this working circle. The Forests under this circle are open mixed miscellaneous Forest with poor natural regeneration.

Table No. 11.5: The target and achievement under Rehabilitation WC during the last plan period

Year	Target (in Ha)	Achievement (in Ha)	Component	Remarks
2007-08	1309.24	155	ANR work	Out of 7476.76 ha ANR work, only 4868.76 ha has been taken in Rehabilitation WC area.
2008-09	1046.55	1190	ANR work	
2009-10	1147.51	520	ANR work	
2010-11	1321.55	1556.76	ANR work	
2011-12	1224.04	50	ANR work	
2012-13	1598.52	265	ANR work	
2013-14	1249.67	1130	ANR work	
2014-15	957.79	555	ANR work	
2015-16	1071.14	1570	ANR work	
2016-17	996.09	00		
	11922.10	4868.76		

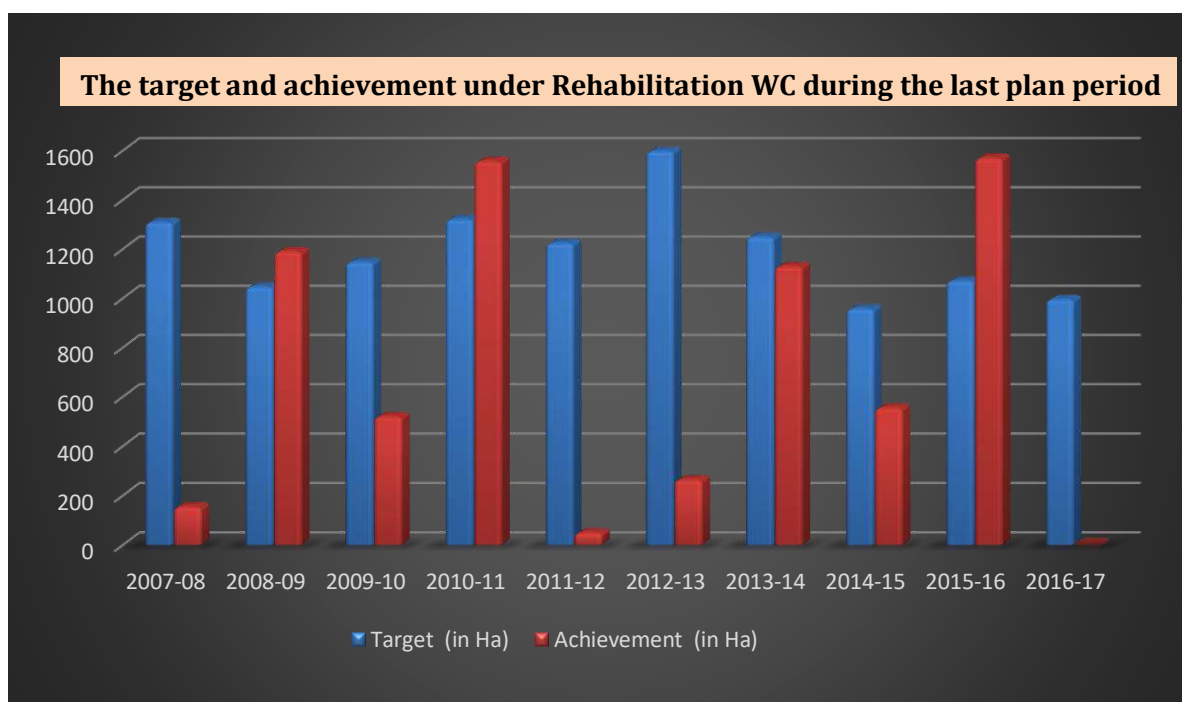


Fig. 11.2 The Target and Achievement Under Rehabilitation WC During the Last Plan Period
Implementation and Analysis:

An area of 11, 922.18 Ha has been allotted to this working circle which is approximately 13.38% of the total forest area covered in the Revised Plan. It shows most of the degraded area of the Division has not been considered for rehabilitation. At same time but very negligible area of about 1750.00 Ha could only be achieved during the plan period. The analysis on implementation of Rehabilitation WC is detailed below;

- ❖ This Division could not take up the ANR and SMC works in the Rehabilitation WC during the year 2007-08 to 2010-11, due to pending approval of the Plan and non-receipt of target.
- ❖ Prior to the year 2012, the area allotted in this working circle was not completely treated due to shortage of fund. The ANR with gap plantation, SMC work and RDF cleaning work were carried out only from the 2012.
- ❖ The biotic interference over the Forest Blocks was not controlled due to unmanaged pressure on Forests by the local inhabitants for their daily needs.

- ❖ To restock the existing growth in the Forest Blocks sufficient fund is required for taking up cultural operation such as cutting of high stump, singling out of the multiple coppice shoots and necessary thinning and gap plantation.
- ❖ Some of the Rehabilitation WC area has been covered under Block Plantation during the year 2013-14 to 2015-16, due to non-availability of area in Plantation WC and to cover the area under Rehabilitation with plantation.
- ❖ During the year 2014-15, 500 Ha of RDF cleaning State Plan has been taken up and in the year 2015-16, 500 Ha of ANR with gap plantation under CAMPA APO-2013-14 will be carried out in Rehabilitation WC of the Malkangiri Forest Division. This will give impact to the improvement of Forest Blocks of the Rehabilitation WC.
- ❖ Therefore, in the proposed Working Plan a target of ANR or RDF with funding may be included, so as to cover the entire area under Rehabilitation WC.

Suggestion for Proposed Working Plan:

- (i) Degraded and Podu affected area should be identified in each forest block and Range accordingly '*Rehabilitation area treatment Map*' should be prepared.
- (ii) For every area site specific treatment plan showing the map, plan for SMC, existing vegetation and the measures proposed to be taken are to be mentioned before taking up any plantation activities.
- (iii) Though this Division has 269 Nos. of VSSs, but priority should be given to the degraded area for formation of VSS since most of the areas are in vicinity to the habitation.
- (iv) While preparing the micro plan for VSS, SMC structure should be prepared keeping in mind, the drainage line of the area and the type of plantation to be taken up should be mention in the micro plan after consultation with the villagers. If necessary, drainage map should be procured and it should be shown in RWC area which will help in drainage line treatment.
- (v) Thinning potential should be carefully studied and thinning plan should be prepared for category 1 areas and it should be mentioned in the micro plan of all the VSS for

better establishment of young recruits.

- (vi) Special plantation scheme is to be prepared for podu affected area with live fencing facility.

3. Plantation Working Circle:

This Working Circle includes all the forest blocks, which have permanent large sized gaps and blanks without much vegetative growth. These areas have generally no forest growth due to many factors including illicit felling, grazing and soil conditions. These areas cannot be easily restocked through natural regeneration methods within a reasonable time frame since these areas require intensive artificial regeneration measures.

The special objectives of this working circle as prescribed in working plan are as follows:

- To restock the barren and degraded area including encroached once through Artificial Regeneration preferably with quick growing, indigenous, site specific as well as locally available specie with special emphasizes on NTFP yielding species.
- To maintain and tend the Plantation which has been raised in the presiding years.
- To harvest the mature plantations in order to meet the requirement both the local people and industry followed by necessary replanting as per the silvicultural requirements.
- To augment fodder, fuel wood and small timber requirement of the local people.
- To take affective measures to conserve soil and moisture thereby enhancing the land productivity.

Achievements:

The total area allotted to this circle is 2, 976.94 Ha. It comprises of both the plantable area as well as existing plantations. The Forest Blocks which have permanent blanks and barren lands subjected to continuous biotic interference are included in this working circle. This Forest Blocks are devoid of any rootstock.

Table No. 11.6: The target and achievement under Plantation WC during the last plan period

Year	Target (in Ha)	Achievement (in Ha)	Component	Remarks
2007-08	250.50	115	AR Block Plantation	
2008-09	239.20	239	AR Block Plantation	Out of 390 Ha, only 239 Ha has been raised in Plantation WC
2009-10	284.61	280	AR Block Plantation	Out of 320 Ha, only 284 Ha has been raised in Plantation WC
2010-11	285.62	285	AR Block Plantation	Out of 376.76 Ha, only 285 Ha has been raised in Plantation WC
2011-12	289.68	50	AR Block Plantation	
2012-13	301.32	65	AR Block Plantation	
2013-14	272.08	300	AR Block Plantation	
2014-15	341.16	270	AR Block Plantation	
2015-16	270	270	AR Block Plantation	
2016-17	332.42	0	AR Block Plantation	
	2976.94 Ha	1874 Ha		Out of 3640.9 Ha 2044 ha has been taken in Plantation WC

Analysis of the result of past working plan and suggestion:

- ❖ This Division could not take up the Plantation works during the year 2007-08 to 2011-12, due to pending approval of the Plan and non-receipt of target.
- ❖ Under various schemes plantation have been taken up in the barren lands of this working circle but not in continuous manner for which all the barren lands have not been treated in the past working plan.
- ❖ This Division has not received Plantation Target during the year 2018-9 to 2011-12. But from the year 2012-13 to 2015-16 the Plantation activities are being carried out in Plantation WC area under different scheme.

- ❖ In the existing Plantation Working Circle having the total area of 2, 976.94 Ha could not be taken up for block plantation within last 09 years due to presence of coppice growth and presence of vegetation.
- ❖ All these area under plantation working circle are not fit for block plantation hence entire area could not be taken under plantation.
- ❖ Since some of the barren lands are situated in the high slopes the plantation programme are not taken up in the existing cost norm as it was cost effective.
- ❖ There are patches of plantation raised by the Afforestation Wing of the Department in RF/PRF area as well as outside WP area, are not included in this working circle which has not been treated under tending due to non-allotment of special fund.

Remarks & Suggestions:

- I. At present condition most of the lands are encroached; titles are distributed under Forest Right Act which leaves very less land for plantation and creates legal complicacies like encroachment of title land by forest department for plantation. So, these areas are to be carefully delineated and removed from plantation working circle areas and included in JFM working circle.
- II. Special schemes to be prepared for reforestation of podu affected areas.
- III. Some areas are hilly and not suitable for plantation and maintenance of plantation becomes difficult and gives very little choice of species to be planted so these areas should be removed from plantation working circle and included in protection working circle.
- IV. Some areas in Donkarai, Janbai, Bejangiwada, Polleru, Podia, Salimi are not accessible due to LWE (naxal) problem because of which planting and further monitoring of the plantation becomes very difficult.
- V. In the next prescription tending operation such as pruning, singling out of coppice shoots, branch cutting and climber cutting may be suggested for better growth of the old existing plantation.

4. Protection Working Circle:

The special objectives of this working circle as prescribed in working plan are as follows:

- To protect these Forests from further degradation by providing effective Forest protection against illicit felling, Forest fire, Grazing, Encroachment and Shifting Cultivation.
- To maintaining the adequate Forest Cover on the eco-fragile areas.
- To arrest further degradation and enhance the natural regeneration adopting appropriate silvicultural intervention including soil and moisture conservation measures to even check siltation downstream.

Implementation:

In this WC, it was suggested that to assist in taking up operation like maintenance of boundary to prevent encroachment, road repair to ensure regular patrolling in vulnerable Forest Area, anti-smuggling squad operation to check all illegal activities in planned and systematic manner and will help in tackling protection of 'Hot spots'. Accordingly, after detail field verification, the WC areas has been divided into 6 Nos of Ecological Protection Series for non-overlapping area and 6 No's of biotic Protection Series for the overlapping area.

Achievement:

The area allotted to this working circle is 89,160.53 Ha, which is the Total Working Plan area of the Division. In fact, this circle includes all the ecologically fragile areas and those situated in catchments of Major Rivers, Kolab, Gariagad, Sileru, Sabari, Saptadhara and Poteru besides the one existing Balimela Reservoir. Due to regular biotic interference led to decreasing in vegetative cover leading to high run of and frequent flash floods.

All the Ecological Protection Series covering 55 Nos. of Forest Block in 6 Ranges have been covered by the Protection Squad from the year 2011-12 only under the CAMPA APO 2010-11 by engaging Para Staff in all Ranges. Further the Malkangiri Forest Division has received Protection Squad under different scheme which have been engaged in protection purpose;

1. Intensive Protection of Critically Endangered Area –IPCEA squad (State Plan),
2. Cadre of Community You for Protection – CCYP (13th FC),
3. Forest Protection Squad under CAMPA,
4. Fire Protection Squad under CAMPA,
5. Anti-Poaching Squad under CAMPA,
6. Anti-Depredation Squad under CAMPA.

The above squads are mainly used for:

- ❖ Each squad will be constituted with 10 members of local youths.
- ❖ The squad will be engaged where ever require based on the extent vulnerability of threat to Forest and Wildlife.
- ❖ They will be provided with uniform and Protection camp equipment.
- ❖ They will be deployed in the interior theft prone and vulnerable Beats to assist the local front-line staffs.
- ❖ They will help for collection of intelligence and information.
- ❖ They will help and assist the local Forest Guard and Forester for booking offence cases.

Table No. 11.7: Offence Case Position From 2007-08 to 2016-17

Year	Compounding Cases	PR Cases
2007-08	1778	20
2008-09	1239	15
2009-10	1046	40
2010-11	855	6
2011-12	1286	8
2012-13	993	3
2013-14	1129	12
2014-15	1007	9
2015-16	1026	8
2016-17	942	9

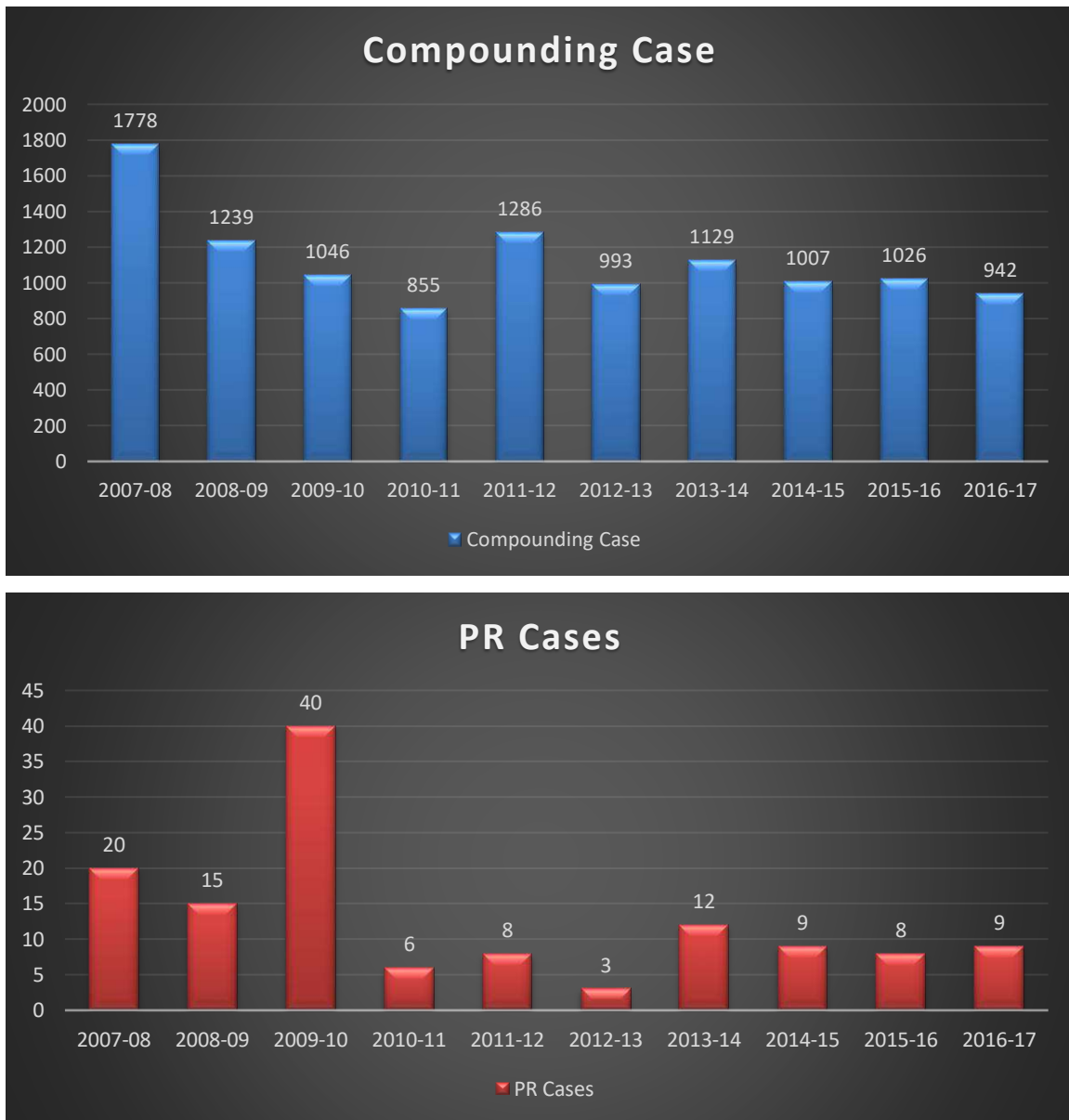


Fig. 11.3 Offence Case Position From 2007-08 to 2016-17

Forest Fire:

In the tropical deciduous forests of Malkangiri, fire is a recurrent phenomenon due to higher levels of water stress during summer. Traditional land use practices and changes in weather pattern have resulted in higher fire incidences in the tropical India. Forest fires in Malkangiri are mostly anthropogenic in nature. The major causes of Forest fire are burning of forest floor for good growth of Kendu stump and grass or in the next season, setting of fire under

the crown of Tree for collection of Mahua flower and Sal seed, Setting of fire for cleaning of forest floor for podu cultivation, Un-extinguished campfires, charcoal panniers of forest dwellers.

Table No. 11.8: The year wise Forest Fire incident and area affected in Last Plan Period

Year	No of Incidents	Area burnt (in Ha)	Remarks
2007-08	-	-	
2008-09	-	-	
2009-10	51	18.21	
2010-11	3	3.3	
2011-12	78	33.0	
2012-13	91	22.3	
2013-14	67	92.9	
2014-15	62	44.37	
2015-16	141	114.75	
2016-17	157	95.8	

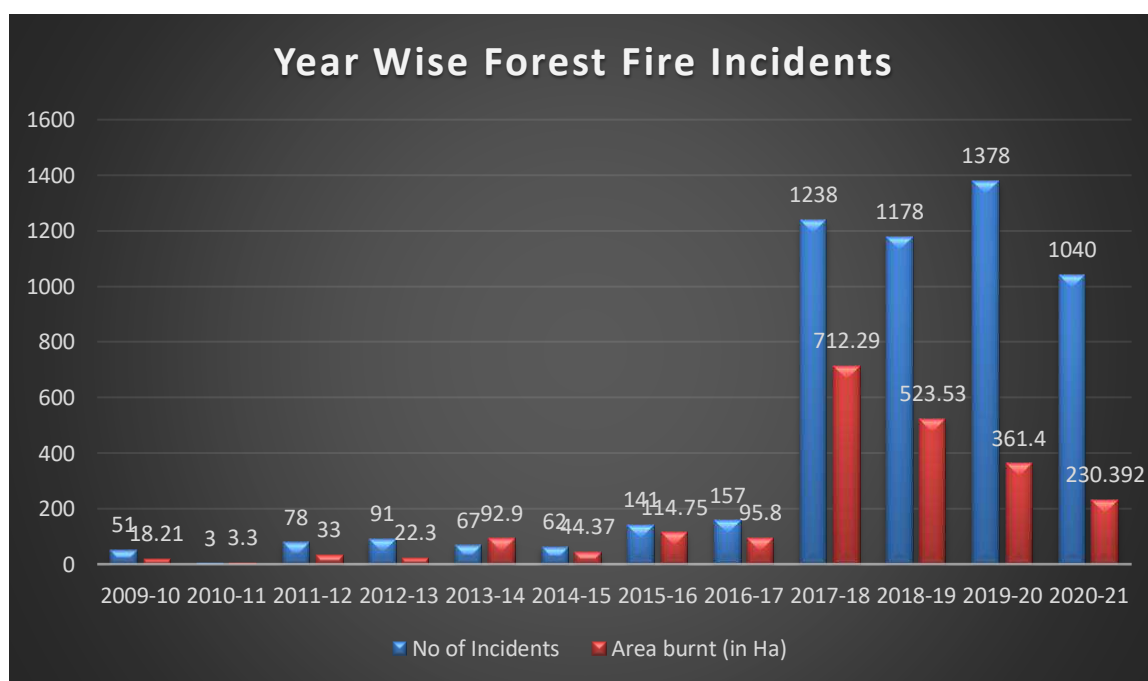


Fig. 11.4: Year Wise Forest Fire

Analysis of the result of past working plan and suggestion:

- ❖ The area included in the Protection WC is total Plan area of the Division. Though it is not an overlapping working circle, including the entire Plan area in this WC is not required. Only the areas which are prone to degradation and other biotic pressure may be included.
- ❖ The area included in this working circle is devoid of any appreciable vegetation covered. The detailed analysis and valuation of crop has not been undertaken.
- ❖ Since there was no special provision of fund for taking up protection measures, the area allotted to this circle is not treated properly.
- ❖ Necessary fund provision may be sought from the Department in order to treat the area under Protection WC and bring up the Green cover.

Suggestion:

- (i) Funds should be allocated for revamping the VHF stations at-least at Divisional level with additional VHF base station at Range level if required which is now defunct due to LWE (naxal) movement.
- (ii) Vulnerable location, exist point and movement of wild animal inside the sanctuary should be mapped.
- (iii) Fire map should be prepared for all range. Fire map showing the details fire occurrence for the Division should be prepared.

5. Bamboo (Over Lapping) Working Circle:

The special objectives of this working circle as prescribed in working plan are as follows:

- To ensure systematic and scientific exploitation of the Bamboo forest,
- To ensure regular Silvicultural operation to prevent determination of the growing stock.
- To ensure maximum yield from each clump by strengthening scientific cutting rules during Bamboo working.
- To improve the production to meet the bona fide requirements of local Bamboo artisans, local people and Bamboo based industries.
- To rehabilitate exhausted Bamboo bearing Area of Bamboo Forest Blocks through appropriate measures like tending, soil working, soil moisture conservation and Bamboo plantation.
- To create employment for the Forest fringe poor people.

Implementation:

The total area allotted in the ongoing Bamboo over lapping working circle is 39, 446.77 Ha, which comes as 44% of the total working plan area of the Division. This working circle is an overlapping working circle comprising of 18 No's of Forest Blocks which have more than 20% of Bamboo crop. The Bamboo Forest of this Division mainly comprises of *Dentrocalamus strictus* (the Salia Bamboo) and *Bambusa arundinacea* (Dhaba Baunsa). As per the Field verification the bearing Forest are constituted with 10 No's of Felling Series. They are Sarangapali, Malkangiri, Gomphakonda, Kalimela, Tarlakota (N), Tarlakota (S), Chitapari, Balimela, Motu and Chitrakonda.

Since the Bamboo is the Nationalized Forest Produce, the State Government decides the Agency for working of Bamboo coupe i.e, OFDC Ltd. Accordingly the above bamboo bearing Forest are worked by OFDC Raw Material Procurers (RMP) with 4 years Felling Cycle for both Salia and Daba bamboo. These each felling series has been divided into 4 annual coupes that is A, B, C and D.

Achievement:

In the outgoing Working Plan, the Bamboo area was treated under 10 felling series. This circle overlaps with the Bamboo Forest area with another Forest of the other working circle. The majority of the Bamboo Forest is found mainly under Selection-cum- improvement working circle and partly in the rehabilitation working circle in the ongoing plan. In the ongoing plan the production of Bamboo is drastically decreased due to excessive removal of Bamboo culms not only by the local inhabitants but also in the process of working of the working of such Forest Block by the Forest Corporation through Raw Material Agency. The bamboo clumps have been heavily degraded due to other biotic interference such as removal of young rhizomes and faulty method of extraction of Bamboo by the local inhabitants. This has led to gradual regeneration and degradation of Bamboo in the lower slopes while congestion in the upper slopes remained as such. In order to regenerate Bamboo in the existing Forest Blocks systematic and scientific management is necessary.

Table No. 11.9: Year Wise Production Industrial Bamboo (Sale Unit) and Commercial Bamboo (In Nos.) For Last Plan Period

Year of production	Target Area (in Ha)	Achievement (in Ha)	Production	
			IB (in S U)	CB (in Nos)
2007-08	5878.56	0	0	0
2008-09	9761.74	0	0	0
2009-10	11789.13	0	0	0
2010-11	9317.34	0	0	0
2011-12	5878.56	0	745.128	1450
2012-13	9761.74	0	0	0
2013-14	11789.13	0	0	0
2014-15	9317.34	0	0	0
2015-16	8578.56	0	0	0
2016-17	9761.74	0	0	0

Analysis of the result of past working plan:

- ❖ As per field inspection and analysis of Bamboo coupe working, it appears that out of the 10 Felling Series only 2 No's of coupes have been worked and remaining Bamboo Coupes were surrendered by the OFDC Ltd. During the working period the Bamboo coupes having poor quality of Bamboo have not been worked out by the OFDC due to poor stock and in-accessibility, local LWE problem, due to skilled labour problem etc. On this account of the reason the Forest Corporation either surrendered fully or some portions of the coupe left un-worked. The coupe wise & year wise production of Bamboo is given in **Annexure-VII**.
- ❖ Due to late approval of Working Plan, the Bamboo working in Bamboo WC has not been carried out during 2007-08 to 2010-11.
- ❖ During the year 2011-12 the Bamboo working was carried out by the OFDC, Jeypore (C)-KL Division through Raw Material Agency, only in Balimela A Coupe of Baliemela FS and harvested 745.128 SU of Industrial Bamboo and 1450 no's of Industrial Bamboo.
- ❖ The OFDC Ltd has not carried out the Bamboo working during the year 2012-13 and 2013-14 due to Labour Problem and local LWE problem. In some Bamboo coupe they have reported as unproductive and economically not viable, i.e Pusigudam RF of Motu felling series, Sileru-W RF of Chitrakonda FS, Mandapali PRF of Gomphakonda FS, Rajulkonda RF of Kalimela FS, Chitapari RF of Chitapari FS etc.
- ❖ But the OFDC Ltd has taken up the Bamboo extraction work from Approved Bamboo Scheme Area from 2007-08 to 2012-13. They may be encouraged to take up the possible area of Bamboo Coupe in order to make productive rather to leave the coupe area by futile reasons.

Suggestion:

1. On analysis of the out turn from the coupes, it is suggested that these un-productive and inaccessible coupes may be stopped for working and allowed for extensive subsidiary silvicultural operation at least for next 4years.
2. The unproductive coupes of existing working plan shall be excluded and the same shall be included in the Rehabilitation working circle.

3. In un-productive coupe extensive SSO should be allowed for 4 years.
4. Area should be protected for grazing and fire, for which the incentive may be given to the people.
5. Bamboo plantation may also be taken at podu area during SSO operation by providing gabion for each plant.
6. Separate scheme should be prepared for bamboo flowering areas and those areas should be closed for grazing

Bamboo Scheme for Working of Bamboo Coupes outside Working Plan Area in Malkangiri Forest Division:

The Forest area outside Working Plan area of Malkangiri i.e. DPF, UDPF, RL, Revenue Forest are also restraining good growth of Bamboo brakes which are being managed with Approved 'Bamboo Working Scheme' with the period of 5 years.

1st working scheme of management and exploitation for forests under Jeypore Forest Division was prepared by Sri T. Das, ACF. The scheme was effective from 1960-61 to 1969-70. Later, Sri N.C. Pattanaik, AIFC prepared first working plan to provide new direction in scientific management of forest. Accordingly, to plan prepared by him for 1971-72 to 1990-91 and scheme for 1971-72 to 1980-81, the forest under the present Malkangiri Division were managed including harvesting of bamboo to meet demand for local as well as demand for industry. The plan scheme was extended initially to 1992-93 and then finally up to March 2000.

Due to delay in revision of working plan, non-working of bamboo coupes not only resulted in local people living in and around forest jobless also effected scientific management of bamboo forest and supply of raw materials to industries. This was scenario not only for Jeypore Division (the present Malkangiri Division has been carved out from Jeypore Division) but also for other 15 undivided forest Divisions in which working plan had expired. Keeping these facts in to consideration, scheme was prepared by Sri Vinod Kumar, IFS the then Director (O), OFDC limited for exploitation of bamboo in all 16 undivided Forest Divisions including undivided Jeypore Division at the request of Forest and Environment Department.

Later, another scheme for working of bamboo areas of Malkangiri Forest Division which was carved out of Jeypore Division in 2003 was prepared by Divisional Forest Officer, Malkangiri for the cutting cycle 2005-06 to 2008-09 after detail survey of Bamboo area as per stipulation given by Government of India while approving Working Scheme for Bamboo Forest of Orissa (2004-05 to 2008-09) as it was then expected that revision of working plan would take another 2 to 3 years, The scheme was extended to 2010-11 as the revision of working plan was not completed. This scheme covers 12 Forest Block, 17 cutting series, 68 Annual coupes covering area 1, 14, 874.0876 Ha. covering R.F/P.R.F., R.L/U.R.L./P.F. Average production in the coupes worked under this scheme comes to 25,392, S.U. per year.

During 2011-12, the revision of Working Plan for Malkangiri Forest Division for the year 2007-08 to 2016-17 has been approved for one year only. Under this plan the bamboo overlapping Circle covers only areas under RF/PRF only as per 1st P.W.P.R Meeting and does not cover area under R.L/U.R.L/ P.F. The Bamboo working area under this plan covers, 20 Forest Blocks, 10 cutting cycles, 40 annual coupes over an area of 39,446.77 Ha. Annual estimated yield in these Bamboo coupes ranges fall 4792 S.U to 6643 S.U per year with an average of 5706.5 S.U. per year, large bamboo potential area lying in R.L/ U.R.L/ P.F has been left out in the present working plan.

Objective of the present Bamboo scheme:

Special objective of management of the coupes not covered in the present working plan area is within the scope of general objective of forest management and policies.

- i. To ensure silvicultural operation to prevent deterioration of the growing stock.
- ii. To ensure scientific exploitation to maximum yield to satisfy growing demand for public and industries.
- iii. To rehabilitate exhausted/degraded forest
- iv. To generate employment to local people.
- v. To meet the requirement of raw material to local industry.

Types of Bamboo Forests:

Though no systematic clump and culm analysis is made in the bamboo areas not covered under present revised plan prior to writing of the scheme, it is observed from the field in course

recent field working that. In almost all coupes average Culm height ranges from 6m to 9m and thus quality to be classed under class II and III. From the field observation, bamboo operation can be taken up in 'A' type area (Clumps density 40 or more per hectare) as clumps are healthy and can be worked with retaining minimum. No felling is to be taken in treatment type 'B' (clump density 20 or more per hectare) and type 'C' (clumps density less than 20 per hectare) of the coups. Classification of areas not covered under the present working plan as per clump and culm analysis done at the time of previous working scheme is given as under in tabular form.

Block wise details of the Area Covered under the Scheme:

The scheme covers 4 nos. of blocks namely Kondakamberu, Paleru, Sileru & Bejngiwada.

Table No. 11.10: The Treatment Type of the Area and Quality Class Based on Study of 2004-05 by the then D.F.O

S.L No.	Name of the Block	Total Area (Ha)	Allotted Area in Scheme	Treatment Type.	Quality Class.
1	Kondakamberu	27766.31	27766.31	A	II
2	Paleru	5329.0896	5329.0896	C	III
3	Sileru.	16835.52	9453.7920	A	II
4	Bejangiwada.	39090.782	39090.782	A	II
	Total area	89021.7016	81639.9736		

The compartments 1 to 4 under Sileru Block has not allotted to any bamboo working circle as part of the compartment as 1 & 2 is included in the working plan in Chitrakonda cutting series and remaining part Compartment 1, 2 and whole compartment 3 & 4 have no potential bamboo area.

Past Management of Bamboo Forests under Present Scheme

Bamboo Forest in Malkangiri Division was worked departmentally in past. Later some areas were entrusted to be worked by Raw Material Procurement Agency i.e M/s Sewa

Papers Ltd. As per the Govt. of India, that the Bamboo became nationalized product, work of the bamboo operation was entrusted to Orissa forest Development Corporation in 1988-89. Since 1992 RMP system was introduced was introduced.

Silvicultural system practiced since 1990 was culm selection cum clump improvement. The production for last six years in the coupes covered under the expired scheme from the year 2007-08 to 2016-17 is given below.

Table No. 11.11: Bamboo Production for the year 2007-08 to 2016-17 of Malkangiri Forest Division

Year of production	Target area in Ha	Achievement area in ha	Production	
			IB (in SU)	CB (in Nos)
2007-08	29016.2515	23836.6069	27015.101	29330
2008-09	28321.2237	24212.7103	18461.9620	12156
2009-10	28921.7892	22874.3700	16170.1961	6733
2010-11	28802.6383	22941.6338	18997.3379	4870
2011-12	29016.8335	16701.1596	21160.303	12620
2012-13 (plan) Scheme	9761.5000	0	0	0
	19405.3558	1719.9750	0	2560
2013-14 (Plan) Scheme	11487.0900	0	0	0
	20869.5655	0	0	0
2014-15(Plan) Scheme	9619.3800	0	0	0
	19771.56	0	0	0
2015-16(Plan) Scheme	8578.56	0	0	0
	21593.854	0	0	0
2016-17(Plan) Scheme	9761.74	0	0	0
	21594.76	1843.81	1.6	115000

Main Threats to Bamboo Forests

Bamboo Forests outside Working Plan area are facing threats due to following activities;

- Indiscriminate felling
- Fire

- Excessive grazing
- Over felling/Improper Working
- In sufficient silvicultural operations.

The requirement highly skilled labour for harvesting, hesitation by the local villagers and existing LWE problem are some of the problem for execution of bamboo coupe working in Malkangiri.

6. NTFP (Over Lapping) Working Circle:

The special objectives of this working circle as prescribed in working plan are as follows:

- To ensure Sustainable production, management and utilization of NTFP items with the National Forest Policy-1988 and other State Govt. Policy.
- To protect the NTFP trees by way of sustainable harvesting and promote their regeneration.
- To promote value addition and trade thereby to create employment opportunity and income generation capability of the local people.
- To involve the local people for sustainable collection, extraction, utilization and value addition of NTFP items by formulation of VSS.
- To facilitate regeneration capacity of NTFP item trees in order to restock the Forest growth.
- To develop NTFP base industries in an around the Division in order to strengthen the marketing opportunity of NTFP item.
- To engage the local people in sustainable management of NTFP item in order to create employment.

Achievement:

This working circle over laps the entire area of the working plan except the area under the protection working circle. The area included in the working circle is 55961.04 Ha. Since there was no such substantial inventorization of NTFP was carried out due to want of fund and unavailability of skilled person in the forgoing plan and only on the basis of Sample Survey, the details of area of NTFP availability in this circle has mentioned. This Division has verities of

NTFPs like fruits, leaves, roots, flowers etc. of many species and the rural population constitutes about 86% and the depending of these people on NTFP items is extensive. In this Division NTFP items are one of the major sources of income generation and large population of tribal are dependent of these natural resources for their consumption and for sale to enhance their livelihood.

Analysis of NTFP Inventorization:

An NTFP inventorization study in this division has been carried out from 2011-12 to 2013-14 by covering all the 6 Ranges of the Division by sample survey method. 100 sample points are laid out in each Range so the total sample points in this division come around 600. After classification, enumeration study, regeneration study, coppicing study, household consumption study has been carried out; the major NTFP Tree species available in the District are mentioned below:

Table No. 11.12: Major NTFP Tree Species Available in the District

Sl.No	Name of the NTFP	Scientific Name
1	Charkoli	<i>Buchnanian lanzan</i>
2	Kusuma	<i>Shleacichera oleosa</i>
3	Mahula	<i>Madhhuca indica</i>
4	Amla	<i>Emblica officinalis</i>
5	Harida	<i>Terminalia chedula</i>
6	Bela	<i>Aegel marmalus</i>
7	Bahada	<i>Tenminialia bellrica</i>
8	Jamu koli	<i>Syzygium cumini</i>
9	Tamarind	<i>Tamarindus indica</i>

Analysis of the result of past working plan:

- ❖ No such systematic and substantial work has been carried out in the past plan due to want of fund and un-availability of skilled person to assess the potentiality vis-a-vis availability of various NTFP items and to ascertain impact of collection etc of such NTFPs on sustainability of Forest. However, during the year 2011-12 in Mathili

Rang, 2012-13 in Malkangiri and Motu Range and 2013-14 in Chitrakonda, Balimela and Kalimela that the detail NTFP study was conducted under 13th FC scheme in this Division by taking 100 sample plots method in each Range.

- ❖ As per Govt. policy 2000 on NTFP, 69 items are regulated by Gram Panchayat as such the Forest Department is no been informed by the concern Department about the collection, procurement, marketing and sale value of NTFP. Due to non-receipt of any information from the Gram Panchayat, it is not possible to maintain the data on NTFP at Division level. There is need to prescribe a mechanism to streamline the regulation of the NTFP. The department must ensure the control over the trade of NTFP carried out by Gram Panchayat.

Suggestion:

- I. Though the Department carried out the detail Inventrisation at Divisional level as Range is unit, but a Special wing on Inventorisation of NTFP in the Organization should be carried out at the Division level.
- II. Special training for sustainable harvesting, collection and value addition of NTFP item should be taken up frequently in consultation with major NTFP based industries such as Dabur, Himalayan etc., in order to encourage sustainable collection and proper marketing among the Tribal and other Forest Dwellers.
- III. Inventorization of NTFP is done in all the ranges of this division and should have to be shown in the map.
- IV. Separate plan for conservation and sustainable harvesting and management of the NTFP can be added in this working circle.
- V. No data available on the materials transported with strength of GP permit.
- VI. Potential area under VSS is already identified through grids, in the JFM areas and that area can be planted with NTFP species. Same has to be replicated for other JFM areas where the study has not been done.

7. Wildlife (Overlapping) Working Circle:

The special objectives of this working circle as prescribed in working plan are as follows:

- To conserve, protect and improve the existing wildlife habitat.
- To protect of wildlife in general and endangered species in particular.
- To create awareness to enhance peoples' participation.
- To promote Eco-tourism
- To support the community involvement in protection of wildlife species.
- To increase the biodiversity and wildlife population.

This working circle overlaps with the entire area of the working plan. Moreover, this Circle covers the entire Geographical Area of the Division are allotted to this working circle is 579100 Ha. The bio-diversity of flora and fauna has been adversely affected due to considerable degradation of Forest over the years. This is mainly due to following reasons:

1. Increasing incidence of encroachment and shifting cultivation in the Forest, this leads to habitat destruction and fragmentation.

The main causes include;

- Increasing demand for fuel wood, timber, fodder and other non-timber Forest products.
- Lack of awareness.
- Frequent Forest fire.
- Insufficient Man Power to combat the Mass Hunting associated with local festival (*Chaitra –Benta Parba*) and Poaching for meat that lead the problem of Wildlife Management in the Division.

However, this Division still has variety of Wild Animal which needs proper management practices.

Analysis of the result of past working plan and suggestion:

- ❖ A special tranquilizing team needs to be kept in this Division frequently faces the problem of Wild Bear depredation in throughout the Division. Sometime cue and cry of the depredation issue in the public led to Law and Order issue. Therefore, a special

Monitoring team may be allotted to this Division to Monitor and track the Wild Bear and its habitat.

- ❖ Division to control the man animal conflict particularly for Wild Bear.
- ❖ The other species like herbivore i.e Barking Deer, Sāmbhar are scattered distributed in the Forest Block of the Division which needs special care for their existence.
- ❖ Specific wildlife management prescription is to be prepared with the help of modern technology.
- ❖ Specific fund and expertise need to be provided to tackle Bear and another wild animal.
- ❖ A reserve fund is to be provided to the Division to meet exigency in tackling severe situation during killing of human being by Bear or by other wild animals.
- ❖ Special drive for fodder species plantation and scope for creation of water harvesting structure (WHS) and water body.

8. Joint Forest Management (Over Lappin) Working Circle:

The Special Objectives of This Working Circle as Prescribed in Working Plan Are as Follows:

- To involve the local people in Regeneration and Protection of the Forest by Formation of VSSs in each village adjoining to the degraded Reserves and Proposed Reserved Forest.
- To improve the Crop Condition of these areas, which will in turn fulfill the demands of the local people in terms of Small Timber, Fire Wood, and NTFP etc.
- To make the Villagers financially sound for future maintenance and management of the assigned Forest Area.

The entire area of the Circle has been stock mapped and the stock map has been kept in the Compartment History File. The average density of this area is 0.25. The area included in this WC is mostly degraded forest and subject to varies degree degradation. The main reason that contributed to this situation is illicit felling, forest fire, grazing and many more. However due people participation in regeneration and protection, forest some of the blocks have positively

changed in their crop condition and structure. Though the regeneration of the main species is generally poor, few patches of the Coppice Block along with scattered mature Trees are also seen in the Forest Block i.e. Jharapali RF, Kalimela RF etc.

Analysis of the result of past working plan and suggestion:

- ❖ On analysis of list of VSSs constituted in the Division, some of the VSSs are not in active condition which needs to be reconstituted.
- ❖ In some cases, the VSSs are formed to involve them in planting activity and protect the Plantation in future e.g., NAP scheme of FDA. In such a case only the Plantation area of the degraded forest has been allotted not the entire degraded forest area.
- ❖ As per the amendment of JFM Resolution-2011, the concerned Forester of the Section may be continued as the Member-Secretary rather than the Forest Guard.
- ❖ In the previous Working Plan, it was included the area of 51 No's Village Forest also in the JFM working circle, which was extraneous to this Working Circle as per management point of view.

JFM is always an effective way of managing the forest so this working circle has to be retained with few more detailed descriptions of degraded areas, if possible, map can also be attained from ORSAC to identify the degraded areas over the period of time. These areas should be treated under JFM.

11.2.4 Management under Annual Working Scheme: The outgoing plan expired on 31st March, 2017. 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. The scheme was prepared by Dr.Smarat Gowda I.F.S. for two years i.e 2017-18 & 2018-19 and approved vide Letter No-8(31)12/2017/FCE dt.25.07.2017 of Govt. of India, MoEF, Eastern Regional Office, Chandrasekharpur, Bhubaneswar . Subsequently the scheme was prepared by Sri Pradeep Mirase I.F.S for 2019-20 and approved vide Letter No-8(31)12/2017/FCE dt.14.10.2019 of Govt. of India, MoEF, Eastern Regional Office, Chandrasekharpur, Bhubaneswar and 2020-21 scheme also approved vide Letter No-8(31)7/2017/FCE dt.19.08.2020 of Govt. of India, MoEF, Eastern Regional Office,

Chandrasekharpur, Bhubaneswar The target & achievement under annual working Schemes are furnished below.

Table No.11.13: Target & achievement under annual working schemes from 2017-18 to 2020-21.

Year wise Target and Achievement Report									
Sl. No	Activities approved (Annual Scheme)	Target for the Year in Ha				Achievement in Ha			
		2017-18	2018-19	2019-20	2020-21	2017-18	2018-19	2019-20	2020-21
1	Selection-cum-Improvement W.C.	4058.76	3683.87	3846.29	3736.23	508.82	165.87	1401.27	1422.76
2	Rehabilitation W.C.	1309.64	1046.59	1147.51	1321.59	60.00	500.00	500.00	800.00
3.	Plantation W.C.	250.05	239.20	284.61	287.62	275.00	0	170.00	100.00
4.	Ecological Protection W.C.	6232.73	6458.47	5802.09	6439.83	0	0	0	0
	Biological Protection W.C.	10581.90	13099.41	10870.66	10877.13	0	0	0	0
5.	Bamboo (O) W.C.	33035.5580	28937.8914	29407.4375	29474.9700	5614.5702	1715.32	3384.207	6256.2640
6.	N,T.F.P (O) W.C.	0	0	0	0	0	0	0	0
7.	J.F.M.(O) W.C.	0	0	0	0	0	0	0	0
8.	Wild life (O) W.C.	0	0	0	0	0	0	0	0

11.3 Special work of improvement undertaken:

11.3.1 Special improvement like Fire protection measures, wildlife protection measures, infrastructure development measures have been taken during the outgoing plan under different schemes. The main Schemes are CAMPA, OFSDP, SFDA, NBM, OBDP, OBDA and MGNREGA. During 2015-16 a new Scheme AJY-CAMPA was also introduced in this Division. The Special works of Improvement are as follows.

11.3.1. Fire Protection Measure:

During the summer fire occurs in the forest floors by local people for different reasons such as for collection of Mahua flower, for collection of other NTFP products like Amla, Harida, Bahada, Kusuma, Char etc. and for shifting cultivation and sometime for no reason trespassers set fire inside the Forest. Fire also occurs in non-forest land for different reasons like podu cultivation, collection of Mahua flowers, burning of agricultural residue etc. Fire protection

efforts are highly inadequate. During the year from 2005-06 to 2010-11 Fires are generally put out by beating with green branches. Even those villagers and forest dwellers who derive substantial benefits from forests, do not willingly, co-operate with forest personnel in fighting forest fires. When CAMPA Scheme came into being, from the year 2010-11 the measures taken for Fire control became nearer to Satisfaction. Sufficient Firefighting squad and vehicles have been provided to each and every Range. In addition to this the FSI forest fire alert system made easier to fight the forest fire up to some extent. The detail of expenditure incurred for firefighting measures under all schemes is given in table.

Table No. 11.14: Range Wise And Year Wise Expenditure (In Rs.) Incurred on Fire Protection in Outgoing Plan

Sl. No.	Year	Balimela	Chitrakonda	Kalimela	Malkangiri	Mathili	Motu	Division Total
1	2007-08		59310		27530	6300	5460	98600
2	2008-09		45460		5000	106740	5000	162200
3	2009-10		46400	13100	95344	42450	62120	259414
4	2010-11	111600	54000	47850	316700	207500	60000	797650
5	2011-12	101600	381000	73500	252850	58860	60000	927810
6	2012-13	184500	580750	38000	332000	32400	33000	1200650
7	2013-14	275000	363750	395000	431000	547660	472500	2484910
8	2014-15	518500	545500	1033500	605500	184500	523500	3411000
9	2015-16	829500	625500	836000	647500	54000	244000	3236500
10	2016-17		883775	840060	887500	137460	1191000	3939795
	Total	2020700	3585445	3277010	3600924	1377870	2656580	16518529

11.3.2 Protection Measures and Management of Wildlife: During the outgoing working plan, special works of improvement for protection of wild life i.e., creation of waterbodies, creation of artificial salt licks and conducting awareness programmes etc. the year wise expenditure incurred there in under all schemes is given in Table.11.14.

Table No. 11.15: Expenditure Incurred for Wildlife Protection and Management Under All Scheme

Sl.No.	Year	Expenditure of Division Total
1	2007-08	-
2	2008-09	6000
3	2009-10	39300
4	2010-11	126500
5	2011-12	530250
6	2012-13	1018660
7	2013-14	929600
8	2014-15	2523000
9	2015-16	3686000
10	2016-17	3923314
Total		12782624

11.4 Past Yield Revenue and Expenditure:

Table No. 11.16: The Details of Past Yield, Revenue and Expenditure

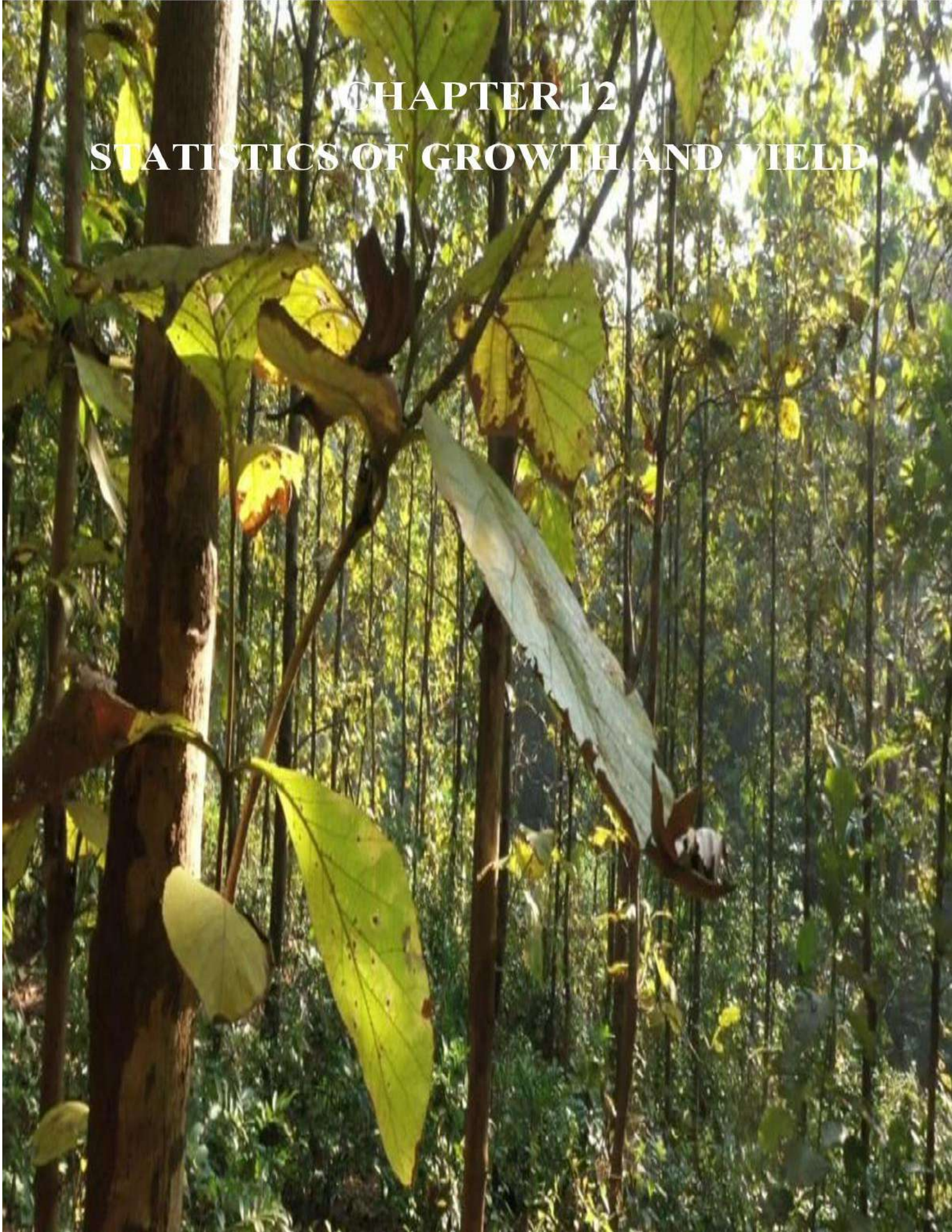
Year	Revenue	Non - Plan	State- Plan	CAMPA	OFSDP	Total
2007-08	2720000	4760000	703310	0	8512109	13975419
2008-09	2383892	5861500	1787700	0	7127976	14777176
2009-10	257895	2321630	4096620	17667603	1246000	25331853
2010-11	3493618	5891000	4361000	11559000	156375	21967375
2011-12	1812993	4701000	10034675	14226578	1348110	30310363
2012-13	9958057	4310270	29551133	27821865	5355688	67038956
2013-14	1899122	30892684	14674663	45656916	3567355	94791618

2014-15	3387671	28046230	24514767	78122336	15371718	146055051
2015-16	4482574	3444500	39593265	77042740	11403896	131484401
2016-17	2336077	4841050	44088880	43952991	7622178	100505099

11.4 Under the revision of this plan already four years has been passed way. For the last four years the different works carried out in this division by preparing Annual Action Plan, i.e. Annual Scheme. Four nos. of Schemes has been prepared for the last four years i.e. 2017-18, 2018-19, 2019-20 and 2020-21. The Revenue and expenditure of last four years under the revision of the working plan is given in the **Table No. 11.16**.

Table No. 11.17: Revenue and Expenditure of Malkangiri Forest Division during the Revision of the Working Plan

Year	Revenue	Non - Plan	State-Plan	CAMPA	OFSDP	AJY
2017-18	2416032	3312450	23056086	80640202	16161905	32800389
2018-19	5788703	3046050	27902757	84454016	32755449	59182305
2019-20	3318994	2600050	23311672	56948099	46685768	55510053
2020-21	3113010	2712150	20320562	115782461	46961618	39818000

A photograph of a forest scene. In the foreground, a tree branch with large, green and yellowing leaves is visible. The background is filled with many thin, vertical tree trunks and a dense canopy of green and yellow leaves, suggesting an autumn setting. The lighting is bright, with sunlight filtering through the trees.

CHAPTER 12

STATISTICS OF GROWTH AND YIELD

General Considerations and Available Statistics

The statistics of growth & yield are not only required for assessment of the exploitable quantum of produce in a given area but also to arrive at growing stock of the area. Further statistics help in analysis of outcome of any prescription. For calculation of stand volume of growing stock, the previous plan/scheme relied mainly on local volume equation developed by Forest Survey of India, Central Zone, Nagpur and used in their report of the year 1989 on the Forest Resources of Koraput District. These equations are shown in Table No. 12.1.

Table No. 12.1: Local Volume Regression Equations

Name		Local Volume
Local	Botanical	Equation
Kurum	<i>Adina cordifolia</i>	$V = 0.08507 + 0.19669D + 7.16812 D^2$
Dhaura	<i>Anogeissus latifolia</i>	$V = 0.13928 - 2.87067 D + 20.22404 D^2 - 13.80572D^3$
Semul	<i>Bombax ceiba</i>	$V = 0.02834 + 4.68381 D^2$
Salai	<i>Boswellia serrata</i>	$V = 0.36432 - 1.32768 \sqrt{D} + 9.48471 D^2$
Kasi	<i>Bridelia retusa</i>	$\sqrt{V} = 0.11620 + 4.12711 D - 1.08508\sqrt{D}$
Sisoo	<i>Dalbergia latifolia</i>	$V = -0.00965 + 0.58546 D - 2.56050 D^2 + 24.342125 D^3$
Kendu	<i>Dyospyros tomentosa</i>	$\sqrt{V} = 0.06728 + 4.06351 D - 0.99816 \sqrt{D}$
Pitamai	<i>Bursera serrata</i>	$V = -0.09144 + 1.48588 D - 5.53172D^2 + 24.04851 D^3$
Sidha	<i>Lagersatroemia</i>	$V = 0.07199 - 1.25923 D + 9.28416 D^2$

	<i>parviflora</i>	
Mai	<i>Lannea coromondelica</i>	$V = -0.01071 - 0.66528 D + 9.54478 D^2 - 4.58876 D^3$
Mahul	<i>Madhuca indica</i>	$V = 0.10423 - 1.38429 D + 8.39379 D^2$
Mundi	<i>Mitragyna parviflora</i>	$V = 0.08444 - 1.26801 D + 8.75274 D^2$
Piasal	<i>Pterocarpus marsupium</i>	$\sqrt{V} = -0.16276 + 2.82002D + 0.04034 \sqrt{D}$
Sal	<i>Shorea robusta</i>	$\sqrt{V} = 0.19994 + 4.57179D - 1.56823 \sqrt{D}$
Jamun	<i>Syzigium cumini</i>	$\sqrt{V} = 0.30706 + 5.12731 D - 2.09870 \sqrt{D}$
Bahada	<i>Terminalia belerica</i>	$V = -0.14823 + 2.44138 D - 6.86434 D^2 + 18.05444 D^3$
Asan	<i>Terminalia tomentosa</i>	$V = 0.05061 - 1.11994 D + 8.77839 D^2$
Misc	<i>Miscellaneous species</i>	$\sqrt{V} = 0.06063 + 3.43666 D - 0.75571 \sqrt{D}$
‘D’ is denoting for over bark diameter in Meters(M) at breast height and ‘V’ is Denoted for under bark volume in M ³ of the tree inclusive of all branches up to 5 cms’ over bark diameter at thin end		

Local volume equations are applicable for a small forest or land area and are based on only one variable, i.e. DBH. The basic assumption is that trees of a given species, at a given location, with the same DBH, will have the same height and form. This assumption is only valid as long as site conditions are homogenous.

Methodology Adopted

Enumeration has been carried out in total 164 numbers of forest blocks with total 488nos of sample units. The enumeration has been done by adopting the systematic random sampling methodology over 457 sample points out of 488 no’s sample point due to LWE affect area. The selection of blocks for sampling has been done irrespective the degrees of degradation &

intensity of biotic interference. This criterion has been adopted to have true representation of the forests by these sample units so as to get more accurate picture of the entire Division through statistical analysis. However, all those blocks/compartments in which the timber yield regulation is prescribed have also been covered with this enumeration exercise and included in the above 457 number of sample units. Thus, in all total 457 Nos of sample points were covered and forwarded to the NRSA Hyderabad for further analysis.

The 0.1Ha (31.62 mt.x31.62mt.) sample units have been laid first on the already made stock map of the block/compartment and their direction (Bearing) & length. Once these gridlines are traced out on the stock map, the same are transferred & actually laid down in the field with reference to the depiction on those maps. The enumeration carried out included number of tree species under various diameter classes for different species inside each such sample unit. The measurement of diameter has been done at the breast height for all the trees of & above 10cms girth at breast height. In addition, bio-diversity and regeneration surveys have also been carried & the results of these surveys are already reflected and discussed in Chapter 3 & 4 respectively. The bamboo enumeration has also been carried out & is separately dealt later in this chapter.

With the objectives as referred to above, the standard statistical methods have been used to estimate the tree growth per hectare species wise under different diameter classes for individual sampled forest blocks (For blocks having more than one sample unit, the average of all these units have been taken for the purpose of calculating the growing stock of that forest block). This data has also been used to estimate range wise different species composition besides calculation for the entire Division. The estimates have been done both by number of stems as well as stand volume species wise & diameter class wise. In this current plan the calculation of stand volume of the growing stock has been done using the general volume regression equations developed by the Forest Survey of India, Central Zone, Nagpur and used in their report of the year 1989 on the Forest Resources of Koraput District. These equations are shown in Table No. 12.2.

Table No. 12.2: General Volume Regression Equations

Name		General Volume
Local	Botanical	Equation
Asan	<i>Terminalia tomentosa</i>	$V = 0.001254 + 0.361631 D^2H - 0.001864(D^2H)^2$
Bandhan	<i>Ougeiniaoojeinensis</i>	$V = 0.003980 + 0.384313 D^2H.$
Bahada	<i>Terminalia belerica</i>	$V = -0.093639 + 7.384277 D^2 + 0.070648D^2H$
Dhaura	<i>Anogeissuslatifolia</i>	$V = -0.009211 + 0.500013 D^2H - 0.022211(D^2H)^2$
Jamu	<i>Syzigiumcumini</i>	$\text{Log } V = 0.842866 + 2.412125 \text{ Log } D + 0.521065 \text{ Log } H$
Karada	<i>Cleistanthuscollinus</i>	$\text{Log } V = 0.594183 + 2.267380 \text{ Log } D + 0.562626 \text{ Log } H$
Kasi	<i>Brideliaretusa</i>	$\text{Log } V = 0.794669 + 2.315417 \text{ Log } D + 0.534416 \text{ Log } H$
Kenkat	<i>Garugapinnata</i>	$\text{Log } V = 0.262489 + 2.277143 \text{ Log } D + 0.686867 \text{ Log } H$
Kendu	<i>Dyospyrostomentosa</i>	$V = -0.007106 + 0.445716 D^2H - 0.005929(D^2H)^2$
Haldu	<i>Adina cordifolia</i>	$V = -0.117924 + 1.041595 D + 0.256368 D^2H$
Mahula	<i>Madhucaindica</i>	$V = 0.001526 + 0.391284 D^2H.$
Mai	<i>Linnea coromondelica</i>	$V = -0.055367 + 0.422394D + 0.338742 D^2H$
Mundi	<i>Mitragynaparviflora</i>	$\text{Log } V = 0.097172 + 2.050903 \text{ Log } D + 0.678458 \text{ Log } H$
Piasal	<i>Pterocarpus marsupium</i>	$V = -0.014390 + 1.33284 D^2 + 0.328477 D^2H$
Sal	<i>Shorearobusta</i>	$V = -0.001775 + 0.338574 D^2H$
Salai	<i>Boswellia serrata</i>	$V = 0.004783 + 0.301536 D^2H + 0.021818 (D^2H)^2$
Semal	<i>Bombax ceiba</i>	$V = -0.004022 + 0.311630 D^2H.$
Sidha	<i>Lagerstroemia parviflora</i>	$V = 0.009491 + 0.352882 D^2H + 0.015283 (D^2H)^2$
Sisoo	<i>Dalbergia latifolia</i>	$V = 0.009238 + 0.376711 D^2H + 0.016492 (D^2H)^2$
Misc	<i>Miscellaneous species</i>	$V = 0.002909 + 0.376517 D^2H.$
‘D’ is over bark diameter in Meters (M) at breast height and ‘V’ is under bark volume in M ³ of the tree inclusive of all branches up to 5 cms over bark diameter at thin end and 'H' is the height of the species.		

General volume equation is an even broader equation and covers the full distribution of the species. It is normally based on two variables such as DBH and height as obtained from inventory assessment report of worked sample plots. The current plan aims at providing reliable estimates of number of stems and stand volumes, by species and by girth-class, per hectare in sampled forest blocks besides total stems & stand volume in the entire Division. It also aims at creating a benchmark against which the future inventory assessments can be better compared; conditions of future crops can be objectively assessed and reliable estimates of growth potential, MAI and yield can be ascertained

The quality classes of Sal, as laid in the ‘All India Yield and Stand Tables for Sal’ and shown in Table no. 12.3 have been adopted in this Plan. Majority of the Sal forests as of now, are found is mostly confined to foothills & valleys. The quality of Sal is generally poor ranging from Q.III to Q.V though Q.III Sal is seen in some patches of Sarangapalli RF, Dasamantapur Extension RF, Chaulmendi RF Pitatung PRF (Part), Duasanad PRF of Mathili Range and found in Akur RF, Pitatung PRF(Part), and Kotameta PRF of Malkangiri Range.

Table No. 12.3: Quality Classes of Sal adopted in the Plan

Quality Class	Average height of the Mature Crop in Meters
<i>Quality – I</i>	<i>Localities where the height of mature crop is over 33 m</i>
<i>Quality – II</i>	<i>Localities in which height of the mature crop is 27 m to 33 m</i>
<i>Quality – III</i>	<i>Localities where height of the mature crop is 21 m to 27 m</i>
<i>Quality – IV</i>	<i>Localities where height of mature crop is 15 m to 21 m</i>
<i>Quality – V</i>	<i>Localities where height of mature crop is less than 15 m</i>

(Source: Standard Literature on Sal Forest)

Analysis of Enumeration Data

In order to ascertain the number of trees per hectare, species-wise and girth class-wise in the given forest block, the total number of trees enumerated in all sample plots of the particular sample forest block have been added up and then divided by the total area of the enumeration

carried out in the said block. This sample mean (X) of each enumerated forest block has been taken as sample point (X_i), and the number of blocks where partial enumeration was taken up, has been taken as sample size (N), to estimate population mean i.e. species-wise and diameter class-wise number of trees/ha in individual Ranges and also for Division. Population mean (Y); Standard Deviation (S_y) and the Population Standard Deviation (Standard Error of Mean) species wise & diameter class wise per hectare have been computed using the following formulae for each Range & entire Division.

$$(i) \text{ Population Mean } = Y = \Sigma X_i / N$$

$$(ii) \text{ Standard Deviation } = S_y = \sqrt{(\Sigma (X_i - Y)^2) / (N - 1)}$$

$$(iii) \text{ Population Standard Deviation (Standard error of Mean) } = \hat{E} = S_y / N$$

The population means (Y) is multiplied by the respective net forest areas of the Ranges (Pre-reorganized) and reorganized Forest Divisions to estimate the total number of stems in the Ranges & the Divisions. The total number of stems of different species and girth classes Range wise and Division wise is reflected in Table No. 12.4.

There are total over 4976641 numbers of trees estimated to be existing in the working plan area of Malkangiri Forest Division. The lower girth class trees have preponderance over the higher girth class trees. The quality of forests vis-à-vis forest density is much better in Malkangiri Forest Division.

Table No. 12.4: Range Wise Estimated Number of Stems of Malkangiri Division

Range	30-60 cm	60-90 cm	90-120 cm	120-150 cm	>150 cm	Total
Balimela	147668	121465	161300	105294	228258	763985
Chitrakonda	433554	329771	125181	76648	46399	1011553
Kalimela	43566	182207	325442	148401	145084	844700
Malkangiri	230427	98540	48827	63421	45690	486905
Mathili	156031	125308	163093	114259	111474	670165
Motu	551817	359511	205218	59723	23064	1199333
Total	1563063	1216802	1029061	567746	599969	4976641
<i>Source: Analyzed Data of NRSC, Hyderabad.</i>						

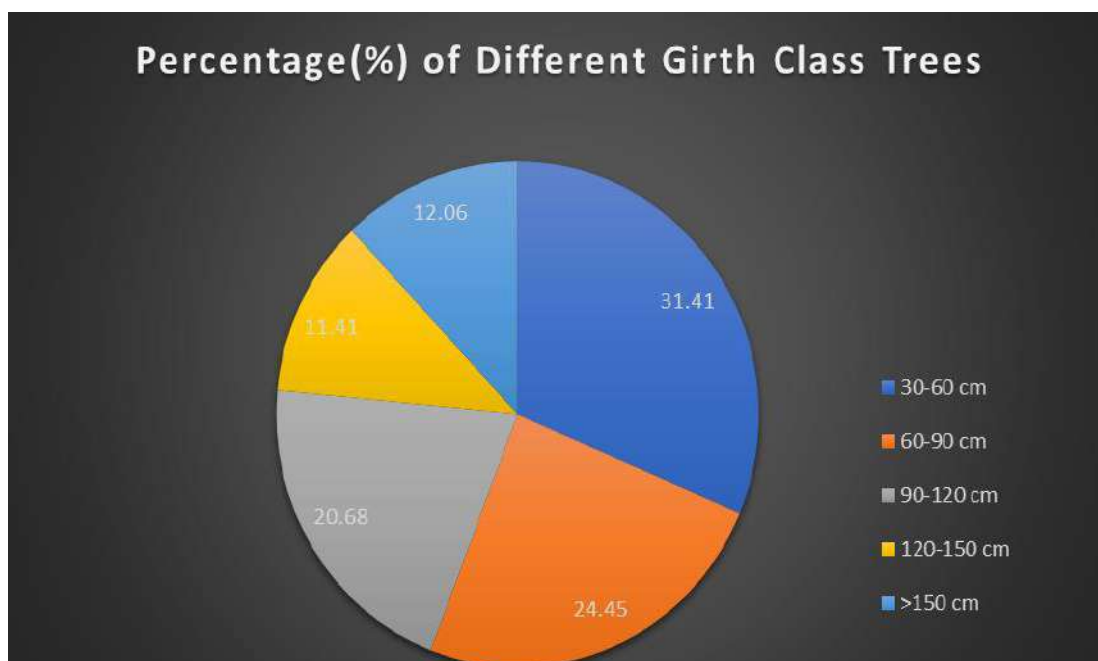


Fig. 12.1: Percentage of Different Girth Class Trees of Malkangiri Forest Division.

Table No. 12.5: Range Wise Estimated Volume (in Cum) of Malkangiri Division

Range	30-60 cm	60-90 cm	90-120 cm	120-150 cm	>150 cm	Total
Balimela	15408	38795	126039	130794	574398	885434
Chitrakonda	44650	156789	82670	84342	104742	473193
Kalimela	5671	61703	267609	207410	358535	900928
Malkangiri	15208	35994	38330	88255	139868	317655
Mathili	13358	41713	116248	145348	289784	606451
Motu	87186	118317	138506	76764	47576	468349
Total	181481	453311	769402	732913	1514903	3652010
<i>Source: Analyzed Data of NRSC, Hyderabad.</i>						

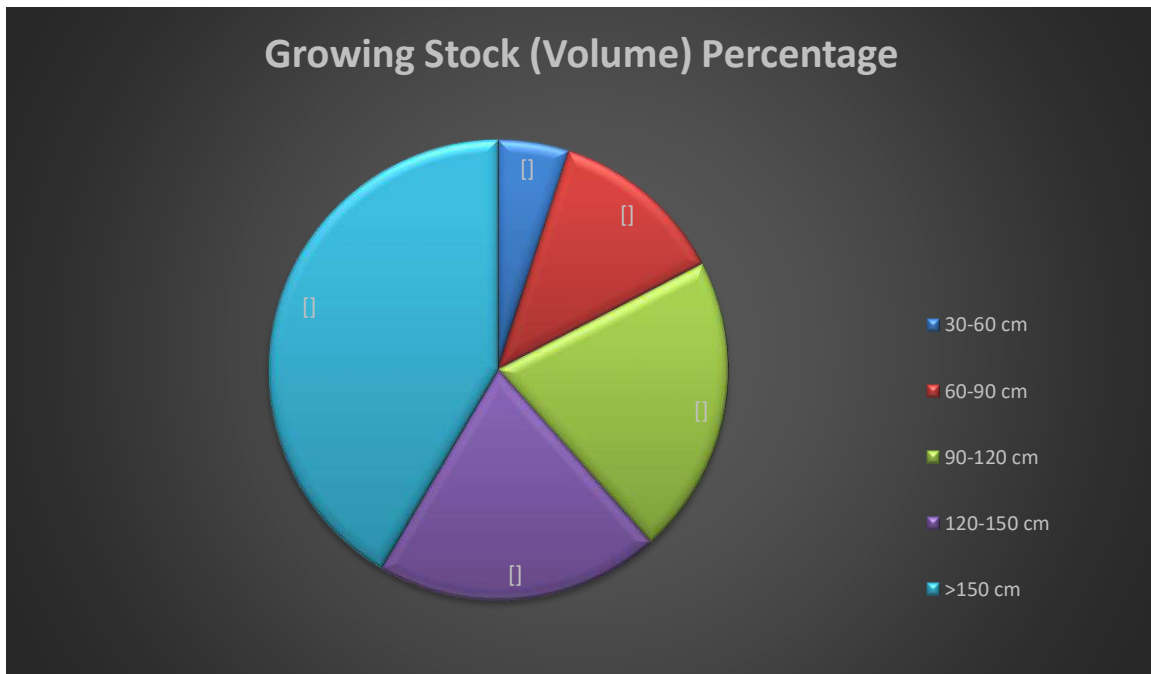


Fig. 12.2: Growing Stock (Volume) Percentage of Malkangiri Division

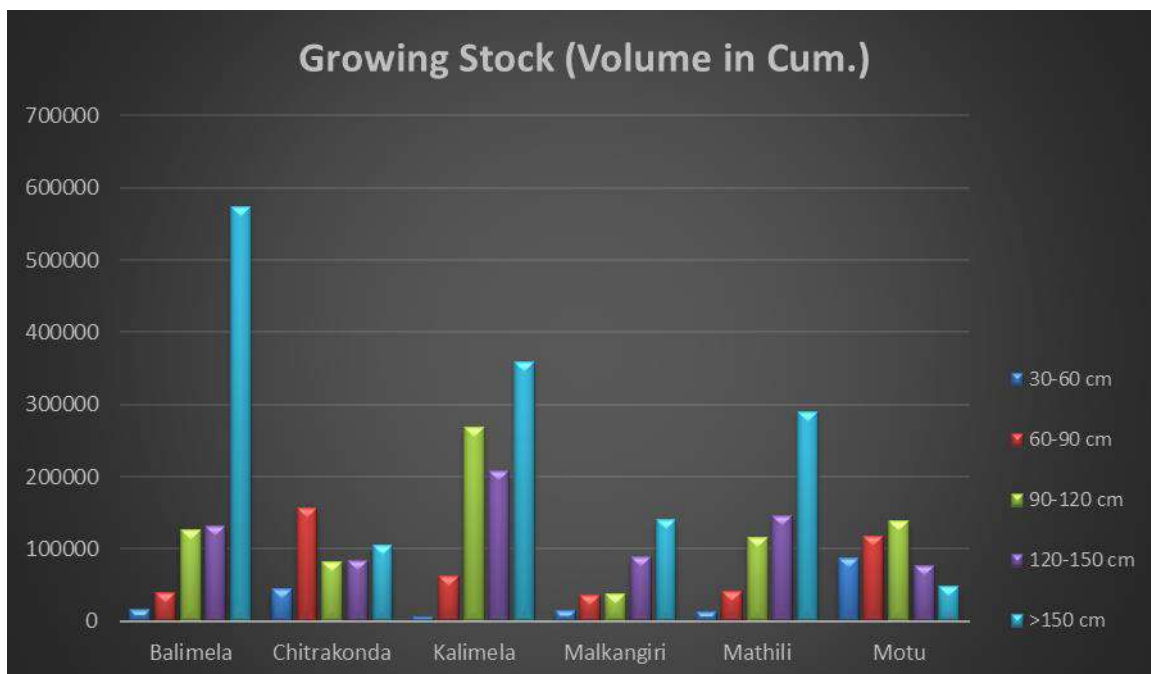


Fig. 12.3: Growing Stock (Volume) of Different Ranges of Malkangiri Division

The total timber volume of the growing stock in Malkangiri Forest Division has been estimated to be over 3652010 cum. The perusal of this estimation reveals preponderance of lower girth class trees in the forest ‘Stand’ of this Division. It is even evident from Fig: 12.3. However, as even stated above at paragraph no:12.3.5. Moreover, Kalimela Range in Malkangiri Division contributes maximum volume of timber to the growing stock of the respective Divisions.

The above analysis of enumerated data goes much beyond traditional use of this laborious exercise mainly to calculate annual yield. This analysis has helped to estimate number of trees of different species of diverse diameter classes and thus given a better picture of the nature of the forest crop as is evident from the above diagrammatical presentations. This has also helped in estimating species-wise; girth class-wise, volume of growing stock in different ranges as already shown in Table No. 12.5. In the next cycle of revision, this analysis will help to compare quantitative and qualitative changes in the composition, structure and volume of growing stock.

12.1 Statistics of Forest Carbon Stock.

In the Outgoing plan no estimation of carbon stock has been carried out. On the basis of forest type the best predictive allometric equation was used for calculation of carbon stock.

12.1.1 Calculation of carbon stock in live Standing Tree.

To estimate the plant carbon stock in a plot, the above ground biomass is calculated using the pan-tropical model by Chave et al. (2014) (Eq-1)

$$AGB = 0.0673 \times (\rho D^2 H)^{0.976} \text{-----} (Eq-1)$$

Where, Accounting for wood density (ρ), DBH (D), and height (H).

Wood density is assumed to be 0.6 g/m³ for all trees.

Calculation Steps: -

- I. For each tree in the plot, the AG biomass is calculated using the selected allometric (Eq-1)

- II. Convert biomass in kilograms to biomass in tons, if applicable. The units of biomass used in allometric equations are often kg dry biomass, in which case conversion to tons requires multiplying by 0.001.
- III. Sum the biomass per hectare of all trees across all nests in each plot.
- IV. Convert estimates of biomass to carbon:

$$Cp=DM*CF$$

Where:

Cp = carbon stock in plot (t C ha⁻¹)

DM = dry biomass in plot (t dry matter ha⁻¹)

CF = carbon fraction (t C t⁻¹ dry matter).

For tree vegetation, use the Carbon Fraction 0.47 t C t⁻¹ dry matter or species-specific values from the literature (per IPCC 2006 GL, V4, Ch4, Table 4.38).

- V. Calculate the mean AG and BG carbon pools for the stratum
- VI. Belowground biomass is calculated applying appropriate root: shoot ratio by following Monkany et al (2006)

$$BGB = AGB \text{ (t c/ha)} * 0.235 \text{ -----(Eq-2)}$$

12.1.2 Little Layer Mass

Because a sample of the litter layer is collected in a determined plot, the coefficient for converting the sampling area per hectare need to be determined. Where 150 grams of dry weight of litter layer is obtained in a 50mx50m square, litter layer mass per hectare value is calculated as follows.

$$\begin{aligned} \text{Litter layer mass per hectare} &= \text{litter layer mass in the plot (g)} * (10000 / \text{sampling area in sq mt}) \\ &= 150 * (10000 / 0.25) \\ &= 150 * (40000) \end{aligned}$$

$$= 6000000 \text{ g}$$

$$= 6000 \text{ kg.}$$

12.1.3 Calculation of dead wood mass:

To estimate dead wood mass, the volumes of each dead wood piece need to be calculated. Then, convert the volume to dry mass using wood densities based on decomposition class. Some literature values are useful to adopt estimation of dead wood mass.

12.1.3.1 Stump:

Volume of stump be calculated can be calculated using the Huber's formula.

$V=A*L*100$ where V is volume (cm^3), A is the sectional area at the middle(cm^2), and L is the height of the stump(m). If the cutting end is shaped like an ellipse, the sectional area is calculated using the following equation:

$A = (d_1/2)*(d_2/2)*\pi$, where d_1 & d_2 are the two orthogonal diameters. For example, for a stump that has 64 cm and 70 cm as the orthogonal diameters and 0.7 m height the volume is calculated as follows.

$$V=A* L* 100 = (64/2)*(70/2)* \pi*0.7*100=246.301 \text{ cm}^3.$$

If the stump has “class 2” decomposition class, the mass will be calculated as follows.

$$\text{Mass}= \text{Volume} * \text{wood density (decomposition class 2)}$$

12.1.3.2 Standing dead trees:

Volume of standing dead trees be calculated can be calculated using the Huber's formula.

$V=A*L*100$ where V is volume (cm^3), A is the sectional area at the middle (cm^2), and L is the height of the stump (m). The area of breast height of standing dead trees is a substitute for the sectional area of middle (A) in some cases. For example, for a dead tree that has a DBH of 25.6 cm and a height of 6.5 mt, the volume is calculated as follows.

$$V = A*L*100 = (25.6/2)^2* 6.5 * 100=334.567 \text{ cm}^3.$$

If the stump has “class 2” decomposition class, the mass will be calculated as follows.

Mass = Volume*Wood density (Decomposition class 2)

If the dead tree has “class 2” decomposition class, the mass will be calculated as follows.

Mass =Volume*wood density (decomposition class 2)

12.1.3.3 Fallen Trees:

The volume of fallen trees, V can be calculated using Smalian’s formula as follows.

$$V = \frac{L[\pi(D_{1/2})^2 + \pi(D_{2/2})^2]}{2}$$

Where L (m) is the length of the piece of the fallen tree, and D is the diameter (cm) at either end. For example, for a fallen log that has 20 cm and 10 cm at either end or a length of 1.8 m the volume is calculated as follows.

$$V = \frac{100 * 1.8 / \pi (20/2)^2 + \pi (10/2)^2}{2}$$

$$= 180 * (314.2 + 78.5) / 2 = 35343 \text{ cm}^3.$$

If the fallen log has “class 2” decomposition class the mass will be calculated as follows.

Mass=Volume* wood density (decomposition class 2)

For a fallen log that has rectangular cross-sections with 20 cm and 10 cm on sides at both ends and 1.8 m in length, its volume and mass (“class 2” decomposition class) are simply calculated as follows.

$$= V = 100 * 1.8 * 20 * 10 = 36000 \text{ cm}^3.$$

Mass=Volume*wood density (decomposition class 2)

12.1.4 Calculation of dead wood mass:

Similar to AGB, dead wood mass also needs to be reported as per hectare estimate. If the total amount of dead wood is 800 kg in a 0.16 ha plot, the per hectare estimate of dead wood mass is calculated as follows.

Dead Wood Mass=800*(1/0.16) = 5000 kg=5.00 Mg ha

12.1.5 Conversion from biomass to carbon stock.

To estimate carbon stock of biomass and dead wood mass, “carbon fraction of dry matter” defined by IPCC 2006 GPG will be used.

IF AGB is 125 Mg ha⁻¹ in a sample plot, carbon stock can be calculated as follows.

Carbon Stock=AGB*CF=125*0.47=58.75 Mg C ha⁻¹.

12.1.6 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 NRSC. The growing stock has been assessed. The relevant portion is furnished below to indicate the growing stock position in Malkangiri Division.

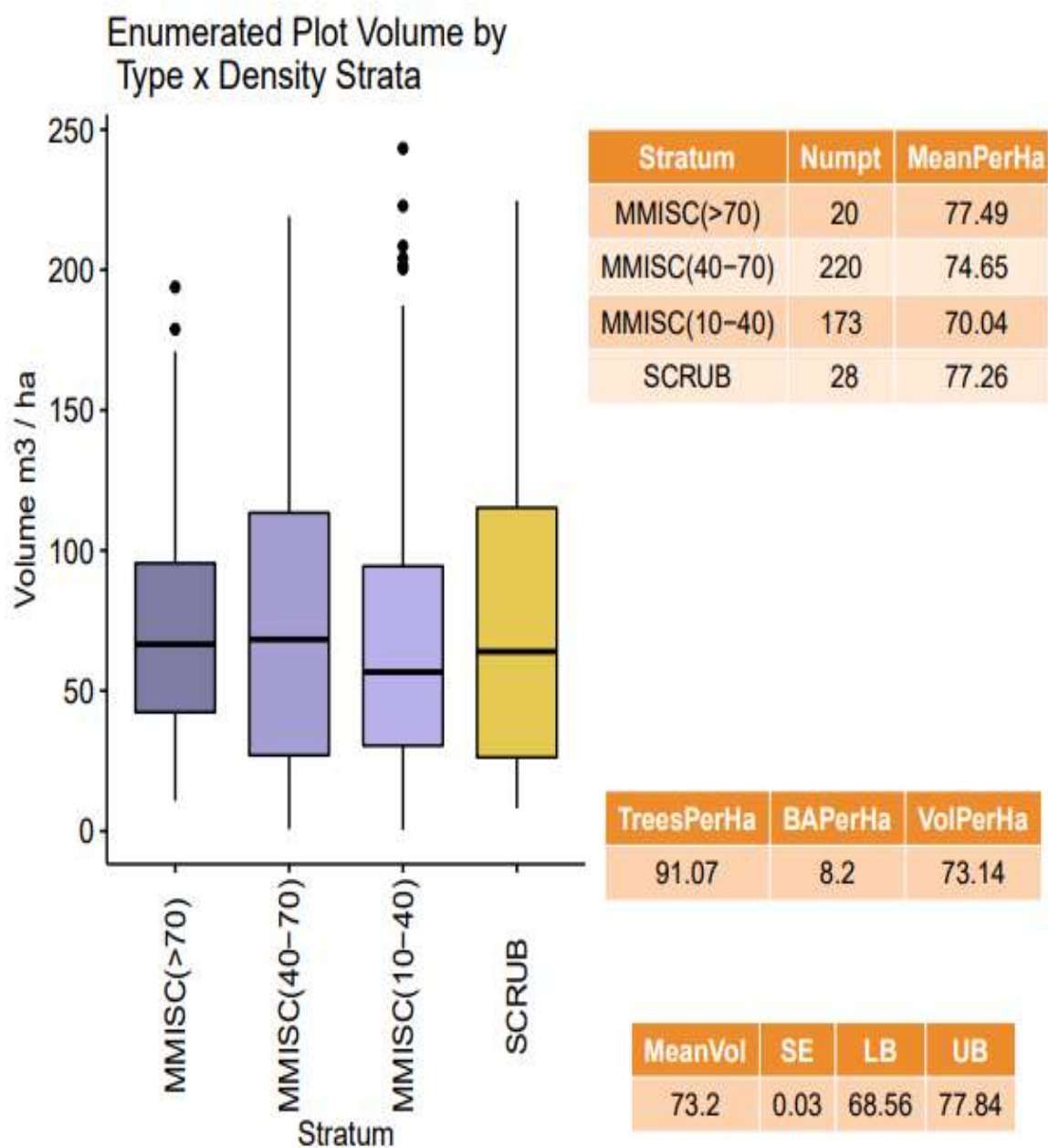


Fig. 12.4 : Statistic of Carbon Stock

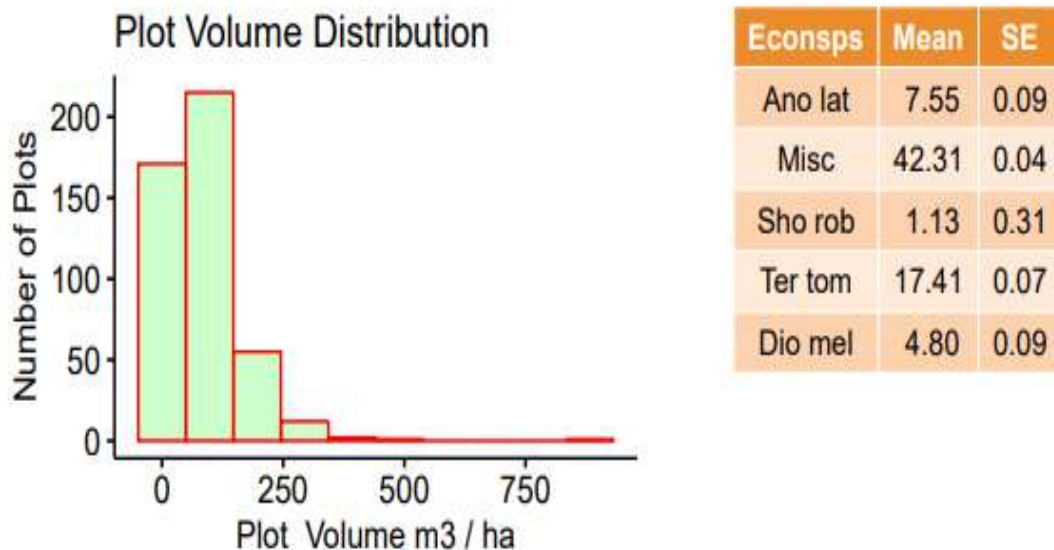


Fig. 12.5 : Statistic of Carbon Stock (Plot volume distribution).

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

Table No 12.6: Stand volume parameters – Malkangiri Division.

Criteria						
No. of trees/ ha	Basal Area per Ha (M³)	Volume per Ha (M³)	Mean Volume (M³)	Standard Error	LB (in M³)	UB (in M³)
95.51	9.22	83.05	73.2	0.03	68.56	77.84

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

Table 12.7 Distribution of Forest area vis a vis density class

Crop Density	Area in Ha	Percentage of Forest Area	Remarks
>70%	2800.41	5.14%	Dense Forest
40-70%	21808.29	40.04%	Moderately Dense Forest
10-40%	28359.64	52.07%	Degraded Forest
<10%	21127.17	38.79%	Open Forest
Total	54467.51		

12.2 Forest Block Wise Carbon Stock:

There are Reserved Forests and PRF in the division. The total area under natural forest is 87124.73ha. The carbon Stock of each Forest block is furnished below.

Table No. 12.8 Forest Block wise Carbon Stock

Sl. No.	Name of the Forest Block	Area under this Plan in ha.	Growing Stock Cum/ Ha	Wood Density	Growing Stock in 10	Carbon Equivalent (10 ³ T)	Carbon Dioxide Equivalent (10 ³ T)
1	2	3	4	5	6	7	8
1	Jharapalli	538.489	73.2	0.7	27592.18	10.76	39.46
2	Akur	128.86	73.2	0.4	3773.021	1.47	5.40
3	Patrel Teak	33.006	73.2	0.4	966.4157	0.38	1.38
4	Jhileriguda	1125.908	73.2	0.7	57691.53	22.50	82.50
5	Sindrimal	2294.294	73.2	0.7	117559.6	45.85	168.12
6	Girididongar	337.43	73.2	0.7	17289.91	6.74	24.73
7	Dharamdongar	105.72	73.2	0.7	5417.093	2.11	7.75
8	Pitatang	3296.77	77.84	0.75	192465.4	75.06	275.24
9	Tamasa	72.63	73.2	0.4	2126.606	0.83	3.04
10	Namkonda	357.25	77.84	0.75	20856.26	8.13	29.83
11	Titiviry	24.02	73.2	0.1	175.8264	0.07	0.25
12	Kottamateru	186.22	73.2	0.4	5452.522	2.13	7.80
13	Allur	32.19	73.2	0.4	942.5232	0.37	1.35
14	Koilipari	1813.372	73.2	0.7	92917.18	36.24	132.88
15	Cheruguda	161.62	77.84	0.75	9435.376	3.68	13.49
16	Tumsapalli	115.76	73.2	0.1	847.3632	0.33	1.21
17	Kukudaguda	458.19	73.2	0.7	23477.66	9.16	33.57
18	Suliapadar	64.14	73.2	0.7	3286.534	1.28	4.70
19	Kutiguda	33	73.2	0.7	1690.92	0.66	2.42
20	Mariwada	22.04	73.2	0.1	161.3328	0.06	0.23
21	Bailapari-Tumsapalli Teak	67.25	73.2	0.4	1969.08	0.77	2.82
22	Tandikonda	78.2	73.2	0.7	4006.968	1.56	5.73
23	Korukonda	490.19	73.2	0.7	25117.34	9.80	35.92
24	Boraja	74.22	73.2	0.4	2173.162	0.85	3.11
25	Katameta	71.65	73.2	0.7	3671.346	1.43	5.25
26	Guppakonda	415.37	73.2	0.7	21283.56	8.30	30.44
27	Kuma dangar PRF	599.64	73.2	0.7	30725.55	11.98	43.94

28	Siroli	51.62	73.2	0.75	2833.938	1.11	4.05
29	Dangarkhalli	73.92	73.2	0.7	3787.661	1.48	5.42
30	Sarangapalli	4287.2	77.84	0.7	233601	91.11	334.07
31	Tandiki	141.5	77.84	0.75	8260.77	3.22	11.81
32	Putparbat	376.275	73.2	0.4	11017.33	4.30	15.76
33	Malidangar	399.26	73.2	0.7	20458.08	7.98	29.26
34	Gotiguda	438.61	73.2	0.7	22474.38	8.77	32.14
35	Chaulmendi	94.6	73.2	0.7	4847.304	1.89	6.93
36	Sindhabela 'A'	12.94	73.2	0.4	378.8832	0.15	0.54
37	Sindhabela 'A'	12.85	73.2	0.4	376.248	0.15	0.54
38	Saradaput	15.88	73.2	0.4	464.9664	0.18	0.66
39	Dasmanpur Extn	16.492	73.2	0.7	845.0501	0.33	1.21
40	Meca	70	73.2	0.7	3586.8	1.40	5.13
41	Mathili	73.85	73.2	0.4	2162.328	0.84	3.09
42	Chedenga RF	796.65	77.84	0.75	46508.43	18.14	66.51
43	Pititung (Part)	2408.6	73.2	0.4	70523.81	27.51	100.85
44	Godiali	211.99	73.2	0.7	10862.37	4.24	15.53
45	Dhobaguda	34.38	73.2	0.4	1006.646	0.39	1.44
46	Duraguda	44.63	73.2	0.4	1306.766	0.51	1.87
47	Kolab Teak	31.07	73.2	0.4	909.7296	0.35	1.30
48	Pujariguda A	152.81	73.2	0.7	7829.984	3.05	11.20
49	Pujariguda B	43.46	73.2	0.7	2226.89	0.87	3.18
50	Champajharan	141.05	73.2	0.7	7227.402	2.82	10.34
51	Kurumpalli A	31.5	73.2	0.4	922.32	0.36	1.32
52	Kurumpalli B	8.53	73.2	0.4	249.7584	0.10	0.36
53	Gangarajguma	83.99	73.2	0.4	2459.227	0.96	3.52
54	Dalapatiguda	34.43	73.2	0.4	1008.11	0.39	1.44
55	Atalguda	18.44	73.2	0.4	539.9232	0.21	0.77
56	Kenkor	12.42	73.2	0.7	636.4008	0.25	0.91
57	Mendukuli	70.02	73.2	0.7	3587.825	1.40	5.13
58	Bariabahal	35.87	73.2	0.1	262.5684	0.10	0.38
59	Dusanad	57.86	73.2	0.7	2964.746	1.16	4.24
60	Pangam A	73.87	73.2	0.4	2162.914	0.84	3.09
61	Pangam B	11.74	73.2	0.4	343.7472	0.13	0.49
62	Siraguda	37.8	73.2	0.4	1106.784	0.43	1.58
63	Challanguda	132.04	73.2	0.7	6765.73	2.64	9.68
64	Singhguda	21.31	73.2	0.4	623.9568	0.24	0.89
65	Kurumpalli C	6.74	73.2	0.4	197.3472	0.08	0.28
66	Kurumpalli D	12.56	73.2	0.4	367.7568	0.14	0.53
67	Jagannath	22.16	73.2	0.7	1135.478	0.44	1.62

68	Ghenaguda	43.2	73.2	0.4	1264.896	0.49	1.81
69	Chitapari	2121.355	77.84	0.75	123844.7	48.30	177.11
70	Nuagam	198.78	73.2	0.7	10185.49	3.97	14.57
71	Gopiguda	266.49	73.2	0.7	13654.95	5.33	19.53
72	Teakguda	81.03	73.2	0.7	4151.977	1.62	5.94
73	Mahadevpur	68.35	73.2	0.7	3502.254	1.37	5.01
74	Balimela	4460.93	77.84	0.75	260429.1	101.57	372.43
75	Tarлакota	4983.111	73.2	0.7	255334.6	99.58	365.15
76	Orkel	64.18	73.2	0.4	1879.19	0.73	2.69
77	Laktiguda	113.56	73.2	0.4	3325.037	1.30	4.76
78	Chimtapali	12.98	73.2	0.4	380.0544	0.15	0.54
79	Sadasibpur	272.06	73.2	0.4	7965.917	3.11	11.39
80	Kanangi	455.06	73.2	0.7	23317.27	9.09	33.35
81	Matumkonda (Part)	1663.116	77.84	0.75	97092.71	37.87	138.85
82	Rajulkonda	440.71	73.2	0.7	22581.98	8.81	32.29
83	Bapanpally	473.31	73.2	0.7	24252.4	9.46	34.68
84	Yengulkonda	1056.51	77.84	0.75	61679.05	24.06	88.21
85	Venkatpallam	460.82	73.2	0.7	23612.42	9.21	33.77
86	Gumuka Teak B	2.41	73.2	0.4	70.5648	0.03	0.10
87	Gumuka Teak C	16.68	73.2	0.4	488.3904	0.19	0.70
88	Kalimela	64.61	73.2	0.7	3310.616	1.29	4.73
89	Gompakonda	730.847	77.84	0.7	39822.39	15.53	56.95
90	Kawasiguda	14.1	73.2	0.4	412.848	0.16	0.59
91	Koimetla	42.11	73.2	0.7	2157.716	0.84	3.09
92	Mangipally	251.89	73.2	0.7	12906.84	5.03	18.46
93	Udayagiri	6136.12	77.84	0.75	358226.7	139.71	512.29
94	Teakguda Teak II	2.75	73.2	0.7	140.91	0.05	0.20
95	Mutumguda	114.24	73.2	0.7	5853.658	2.28	8.37
96	Kaldapally	25.64	73.2	0.4	750.7392	0.29	1.07
97	Pegedapally	130.28	73.2	0.7	6675.547	2.60	9.55
98	Tangarkonda	67.52	73.2	0.7	3459.725	1.35	4.95
99	Kurty Teak	15.25	73.2	0.1	111.63	0.04	0.16
100	Nadiwada Teak	3.07	73.2	0.4	89.8896	0.04	0.13
101	Podia Teak (A)	4.75	73.2	0.1	34.77	0.01	0.05
102	Kaldapally Teak	47.52	73.2	0.4	1391.386	0.54	1.99
103	Nandiwada Teak II	14.76	73.2	0.1	108.0432	0.04	0.15
104	Kamarguda Teak	7.5	73.2	0.4	219.6	0.09	0.31

105	Udayagiri B	151.7	73.2	0.7	7773.108	3.03	11.12
106	Podia Teak B	3.98	73.2	0.4	116.5344	0.05	0.17
107	Eralgundi	11.38	73.2	0.4	333.2064	0.13	0.48
108	Tanginiguda	29.03	73.2	0.4	849.9984	0.33	1.22
109	Supal A	61.19	73.2	0.7	3135.376	1.22	4.48
110	Supal B	68.87	73.2	0.7	3528.899	1.38	5.05
111	Similibanchha	93.16	73.2	0.7	4773.518	1.86	6.83
112	Matteru	9.02	73.2	0.4	264.1056	0.10	0.38
113	Chitrangipally	23.64	73.2	0.7	1211.314	0.47	1.73
114	Marimetla	22.04	73.2	0.4	645.3312	0.25	0.92
115	Singanguda	11.52	73.2	0.4	337.3056	0.13	0.48
116	Marigata,	12.27	73.2	0.4	359.2656	0.14	0.51
117	Pedawada	1089.27	77.84	0.75	63591.58	24.80	90.94
118	Pulimetla	498.06	73.2	0.7	25520.59	9.95	36.50
119	Teakguda Teak	15.78	73.2	0.7	808.5672	0.32	1.16
120	Mandapally	1678.72	73.2	0.7	86017.61	33.55	123.01
121	Pitakonda	164.38	73.2	0.7	8422.831	3.29	12.05
122	ChinaPotteru	205.79	73.2	0.7	10544.68	4.11	15.08
123	Patakkal	77.88	73.2	0.7	3990.571	1.56	5.71
124	Kangurukonda	108.67	73.2	0.7	5568.251	2.17	7.96
125	Tegadapally	5.1	73.2	0.7	261.324	0.10	0.37
126	Bodigatta B	10.61	73.2	0.4	310.6608	0.12	0.44
127	Sindhiguda	132.3	73.2	0.7	6779.052	2.64	9.69
128	Battanwada B	97.22	73.2	0.4	2846.602	1.11	4.07
129	Battanwada C	13.08	73.2	0.4	382.9824	0.15	0.55
130	Sillakata B	89.74	73.2	0.4	2627.587	1.02	3.76
131	Telamiguda	22.2	73.2	0.4	650.016	0.25	0.93
132	Pusugudam	3679.524	77.84	0.75	214810.6	83.78	307.19
133	Poluru	407.49	73.2	0.75	22371.2	8.73	31.99
134	Mallavaram	169.11	73.2	0.7	8665.196	3.38	12.39
135	Anantapalli	818.48	77.84	0.75	47782.86	18.64	68.33
136	Sirikonda	347.83	73.2	0.75	19095.87	7.45	27.31
137	Katanpalli A	27.08	73.2	0.7	1387.579	0.54	1.98
138	Katanpalli B	1014.63	73.2	1.7	126260.6	49.24	180.56
139	Pendikonda	87.71	73.2	0.7	4494.26	1.75	6.43
140	Motu Teak	48.31	73.2	0.4	1414.517	0.55	2.02
141	Motu	716.27	77.84	0.75	41815.84	16.31	59.80
142	Tandimetla	3702.47	77.84	0.7	201740.2	78.68	288.50
143	Muruliguda Teak-A	3.75	73.2	0.4	109.8	0.04	0.16
144	Muruliguda Teak-B	16.25	73.2	0.4	475.8	0.19	0.68
145	Peta Teak A	12.79	73.2	0.1	93.6228	0.04	0.13

146	Dupenkonda	605.1	73.2	0.75	33219.99	12.96	47.51
147	Manyamkonda	731.57	73.2	0.7	37485.65	14.62	53.61
148	Tamanpalli	386.78	73.2	0.7	19818.61	7.73	28.34
149	Kottaguda - B	74.55	73.2	0.4	2182.824	0.85	3.12
150	Sileru West	1550.963	77.84	0.7	84508.87	32.96	120.85
151	Banguru	285.1758	73.2	0.4	8349.947	3.26	11.94
152	Limalori	302.93	73.2	0.7	15522.13	6.05	22.20
153	Pabliguda	91.27	73.2	0.7	4676.675	1.82	6.69
154	Gunthawada	34.08	73.2	0.7	1746.259	0.68	2.50
155	Mantriput	289.57	73.2	0.4	8478.61	3.31	12.13
156	Goudagurei	74.03	73.2	0.7	3793.297	1.48	5.42
157	Datunguda	1886.374	77.84	0.7	102784.7	40.09	146.99
158	Bodakonda	194.13	73.2	0.7	9947.221	3.88	14.23
159	Bhimaram	3156.67	77.84	0.7	172000.6	67.08	245.97
160	Bandhaguda	1067.83	73.2	0.75	58623.87	22.86	83.84
161	Ranginiguda	1608.86	73.2	0.75	88326.41	34.45	126.31
162	Jantri	2254.42	77.84	0.75	131613	51.33	188.22
163	Hillpahad	48.54	73.2	0.7	2487.19	0.97	3.56
164	Singaram	2685.473	77.84	0.75	156777.9	61.15	224.20
165	Sikpanasa	2172.92	73.2	0.7	111340.4	43.42	159.22
166	Motamkonda	3339.464 6	77.84	0.75	194957.9	76.04	278.80
	TOTAL	87124.73			4717401	1839.859828	6746.214033

Table No. 12.9: The carbon stock assessment based on forest types of India

('000 tonnes)

S. No.	Forest Type Stratum	Area in sq km	AGB	BGB	Dead Wood	Litter	SOC	Total
1.	Tropical Wet Evergreen Forests	20,170	1,46,982 (72.87)	54,379 (26.96)	3,569 (1.77)	8,764 (4.34)	1,30,952 (64.92)	3,44,646 (170.86)
2.	Tropical Semi-Evergreen Forests	71,807	2,48,659 (34.63)	54,733 (7.62)	2,504 (0.35)	21,432 (2.98)	3,91,665 (54.54)	7,18,993 (100.13)
3.	Tropical Moist Deciduous Forests	1,35,834	4,16,660 (30.67)	91,713 (6.75)	7,128 (0.52)	37,087 (2.73)	7,66,982 (56.47)	13,19,570 (97.15)
4.	Littoral and Swamp Forests	5,527	16,310 (29.51)	6,034 (10.92)	160 (0.29)	382 (0.69)	32,786 (59.33)	55,672 (100.74)
5.	Tropical Dry Deciduous Forests	2,90,724	5,93,848 (20.43)	2,49,439 (8.58)	4,796 (0.16)	28,622 (0.98)	12,81,417 (44.08)	21,58,122 (74.23)
6.	Tropical Thorn Forests	14,552	14,659 (10.07)	6,154 (4.23)	132 (0.09)	1,298 (0.89)	54,395 (37.38)	76,638 (52.67)
7.	Tropical Dry Evergreen Forests	858	2,689 (31.35)	1,129 (13.17)	198 (2.30)	119 (1.39)	3,427 (39.95)	7,562 (88.15)
8.	Subtropical Broad leaved Hill Forests	31,993	1,14,599 (35.82)	48,132 (15.04)	913 (0.29)	7,233 (2.26)	2,73,023 (85.34)	4,43,900 (138.75)
9.	Subtropical Pine Forests	17,619	75,562 (42.89)	20,409 (11.58)	609 (0.35)	2,047 (1.16)	1,26,534 (71.81)	2,25,161 (127.79)
10.	Subtropical Dry Evergreen Forests	184	1,040 (56.54)	437 (23.75)	5 (0.28)	6 (0.35)	1,281 (69.67)	2,769 (150.58)
11.	Montane Wet Temperate Forests	20,653	69,081 (33.45)	18,652 (9.03)	2,832 (1.37)	4,335 (2.10)	2,60,850 (126.30)	3,55,750 (172.25)
12.	Himalayan Moist Temperate Forests	26,184	2,75,685 (105.29)	74,432 (28.43)	6,795 (2.60)	6,661 (2.54)	2,04,222 (77.99)	5,67,795 (216.85)
13.	Himalayan Dry Temperate Forests	5,565	63,519 (114.12)	18,420 (33.09)	1,734 (3.12)	808 (1.45)	36,786 (66.09)	1,21,267 (217.88)
14.	Sub-Alpine Forests	14,184	1,1,3005 (79.67)	32,769 (23.10)	3,946 (2.78)	1,536 (1.08)	1,51,081 (106.51)	3,02,337 (213.15)
15.	Moist Alpine Scrub	1,975	4,046 (20.48)	1,173 (5.94)	72 (0.37)	147 (0.75)	9,752 (49.37)	15,190 (76.9)
16.	Dry Alpine Scrub	2,006	11,855 (59.12)	3,438 (17.14)	49 (0.24)	211 (1.05)	5,980 (29.82)	21,533 (107.37)
17.	Plantation/TOF	52,414	88,336 (16.85)	19,384 (3.70)	402 (0.08)	7,214 (1.38)	2,72,439 (51.98)	3,87,775 (73.98)
Total		7,12,249	22,56,535 (31.68)	7,00,827 (9.84)	35,844 (0.50)	1,27,902 (1.80)	40,03,572 (56.21)	71,24,680 (100.03)

(Source: ISFR, 2019, FSI)

Table No. 12.10: Forest Types and Density Wise Carbon Stock of Odisha under Different Carbon Pools ('000 tons)

Forest Type Stratum	Density	Area in Km ²	AGB	BGB	Deadwood	Litter	SOM	Total	C Stock Ha (Tonnes)
Tropical Semi Evergreen-Eastern Deccan	VDF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tropical Semi Evergreen-Eastern Deccan	MDF	174.1	706.6	145.3	6.1	303.8	892.2	2054.1	118.01
Tropical Semi Evergreen-Eastern Deccan	OF	184.7	468.2	96.3	4.9	258.2	638.7	1466.2	79.39
Tropical Moist Deciduous Forests	VDF	418.6	1184.8	243.7	49.0	106.9	2875.3	4459.6	106.54
Tropical Moist Deciduous Forests	MDF	13645.3	32628.4	6711.0	1124.5	4132.8	67515.3	112110.4	82.16
Tropical Moist Deciduous Forests	OF	7109.0	12354.8	2541.1	284.3	1144.4	32492.7	48817.3	68.67
Littoral & Swamp Forests	VDF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Littoral & Swamp Forests	MDF	187.7	835.0	288.8	0.4	12.7	1066.4	2203.4	117.36
Littoral & Swamp Forests	OF	67.5	96.6	33.4	0.1	2.6	223.0	355.8	52.69
Tropical Dry Deciduous Forests	VDF	119.4	742.6	291.6	5.5	78.3	650.4	1768.3	148.09
Tropical Dry Deciduous Forests	MDF	13415.6	78975.4	31010.4	197.8	854.0	58000.6	169038.2	126.00
Tropical Dry Deciduous Forests	OF	12474.2	18502.5	7265.2	164.1	578.4	51051.2	77561.4	62.18
Plantations/ TOF	VDF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Plantations/ TOF	MDF	233.3	283.9	58.4	8.3	40.8	1517.4	1908.8	81.82
Plantations/ TOF	OF	344.6	308.9	63.5	0.0	27.9	938.1	1338.4	38.84
TOTAL		48,374.0	1,47,087.7	48,748.8	1,845.0	7,540.6	2,17,859.7	4,23,081.8	87.46

Source: Carbon Report, FSI, Dehradun.

In Odisha, Littoral & Swamp Forests has Maximum Carbon Stock of 100.28 tonnes per Ha followed by Tropical semi Evergreen- Eastern Deccan (98.12 tonnes), Tropical Dry Deciduous Forests (95.49 tonnes) and Tropical Moist Deciduous Forests (78.12 tonnes). The contribution of different carbon pools in total Carbon stock is, SOC 51% followed by AGB 35%, BGB 12%, and Litter 2% and Deadwood is negligible.

Table No.: 12.11: Carbon Stock (in 000' Tons) In Odisha In Different Pools.

AGB	BGB	Dead Wood	Litter	SOC	Total
1,26,656	39,066	1,647	9,062	2,55,857	4,32,288

Source: ISFR 2019, FSI

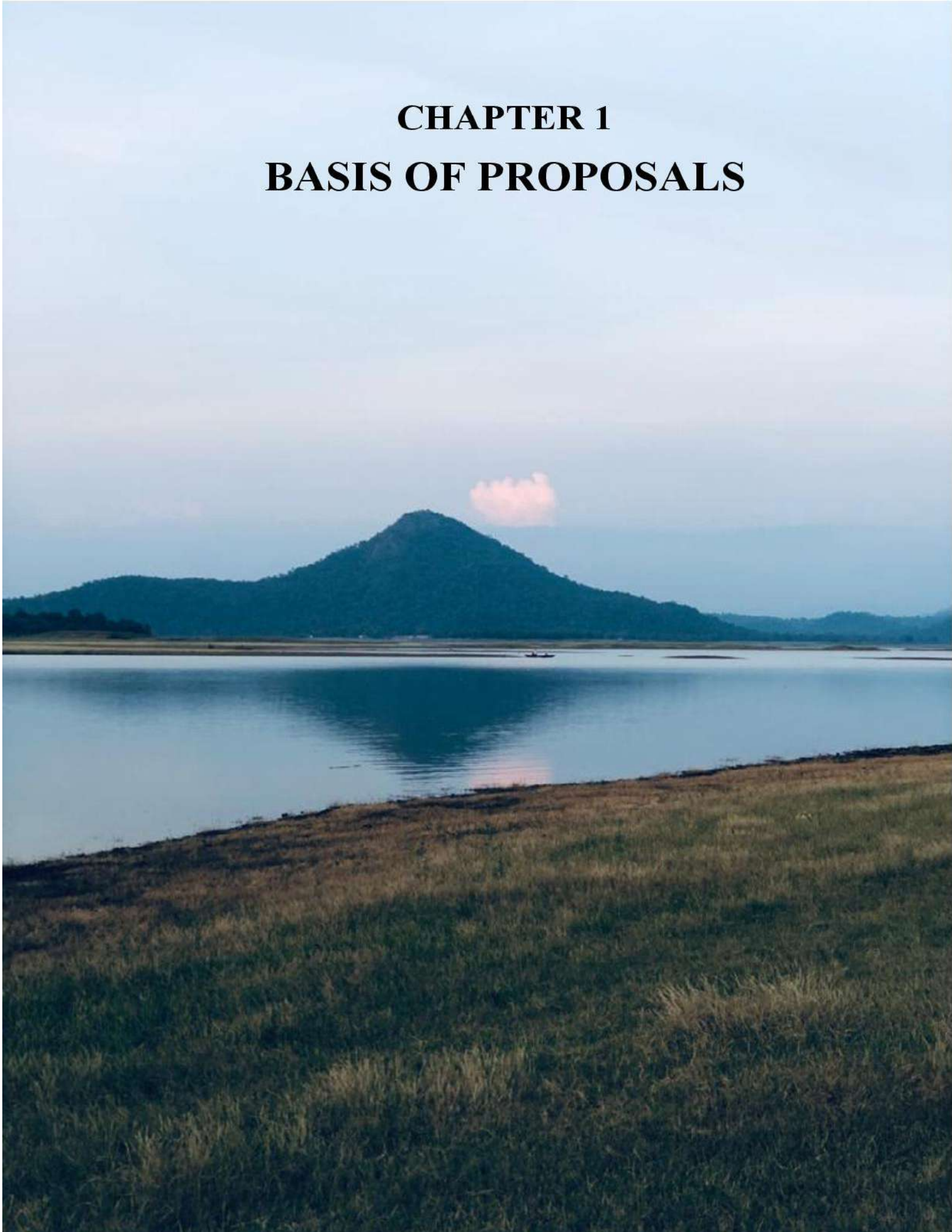


PART II

FUTURE MANAGEMENT

CHAPTER 1

BASIS OF PROPOSALS



1.1 Objectives of Management:

Various policies and programmes were considered while formulating proposals under various Working circles for future engagement of forests of Malkangiri Forest Division.

- a. National Forest Policy 1998
- b. National Forestry Action Programme
- c. National Wildlife Action Programme (NWAP 2017-31)
- d. National Bamboo Mission (NBM)
- e. National Medicinal Plant Board
- f. Forest Policy of Odisha
- g. Odisha Ecotourism Policy

1.1.1 National Forest Policy 1998:

The National Forest policy of 1988 aims at increasing the productivity of forests to meet the growing needs of essential goods and environmental services that the forests provide. Such benefits from the forests have however been subordinated to the basic aim of environmental stability and ecological balance. The emphasis is that forests should be managed primarily to maintain environmental stability through the preservation of the natural vegetation and wherever necessary by restocking of depleted forests. Thus, the forests are to be treated as a renewable resource, which should provide in a sustainable manner to the extent possible the needs of the society without depleting itself and its ability to provide environmental stability and ecological balance. This vital natural resource should be managed with the active involvement of the people living in the vicinity of the forests in a conservation-oriented approach. The policy also expresses the following objectives of managing the States forests:

- a. To manage forests as a renewable natural resource and to protect and enhance these national assets for the general well being of the people and of the nation

- b. To increase forests and vegetal cover on hill slopes and in catchments of rivers, lakes and reservoirs
- c. To enhance forest cover and site productivity through application of scientific and technical inputs.
- d. Not to look upon forest as a source of revenue
- e. To conserve natural heritage and to maintain biodiversity
- f. To meet the requirement of fuel wood, small timber, fodder and other non-timber forest produce of the people
- g. To actively involve the people in general, women and weaker sections in particular, in the process of forest management.

1.1.1.1 Odisha Forest Sector Ecotourism Policy

1.1.1.2 Background

The state of Odisha with its rich natural and cultural heritage is one of the most attractive tourist destinations in the country. The tourists, who know Odisha for its temples, crafts and dance, deserve greater exposure to its hinterland of hills, forest and wildlife. Well-endowed with vast forest areas, rivers, coast line, beaches, lakes and lagoon, the state provides unique opportunities for ecotourism in the state.

Odisha has about 31% of its land covered with forests, supporting around 86 species of Mammals, 473 species of birds, 110 species of Reptiles, more than 3000 species of Plants including 132 species of orchids, 60 species of Mangrove Plants and 350 species of Medicinal Plants. The rich biodiversity of the state is conserved mainly through a network of protected areas comprising 2 National Parks and 18 Sanctuaries. This network is complemented by wilderness areas, wetlands and other bio diverse sites along the coasts including mangroves and turtle rookeries. Elephants, tigers, leopards, blackbucks, crocodiles, Olive ridley turtles, Irrawaddy dolphins and migratory birds provide special attraction to the tourists.

Ecotourism, distinguished from other forms of tourism in terms of its minimal impact on the visited areas, is defined as: “Responsible travel to natural areas that conserves the environment and improves the welfare of local people.” (TIES, 1991)

Ecotourism offers an opportunity to showcase the state’s unique natural and associated cultural heritage to visitors while enhancing the livelihood options for the local people.

1.1.1.3 Vision

Ecotourism will promote responsible travel to natural areas and provide opportunities for visitors to experience firsthand, understand and ‘quietly’ enjoy state’s natural and cultural heritage. This will lead to conservation of nature, sustaining of ecological processes, increased respect for local culture and traditions and tangible improvement in the local economy.

1.1.1.4 Goal

To provide recreation and promote understanding about nature and wildlife conservation with income generation and employment opportunity to local people while according priority to bio-diversity conservation, ecosystem functioning and socio-economic development.

1.1.1.5 Objectives

The above will be achieved through the following objectives:

Objective 1 Promote amongst all stakeholders, awareness, experiential learning and understanding of the values and principles of sustainable and responsible community-based tourism, particularly in relation to the state’s protected areas and other areas of wilderness.

Objective 2 Develop, brand and market an Odisha style of visitor experience, particularly with respect to promoting a ‘quiet’ enjoyment of its natural heritage.

Objective 3 Invest in appropriate and eco- friendly infrastructure for ecotourism for tourists.

Objective 4 Establish partnerships between all stakeholders to develop and promote destinations and activities in accordance with defined principles, standards and legal requirements of community-based ecotourism.

Objective 5 Build capacities of all stakeholders in natural and cultural heritage interpretation, hospitality, business and communication skills to successfully and sustainably manage tourist traffic.

1.1.1.6 Guiding Principles for Ecotourism

a. Development of ecotourism action plan for important destinations:

Ecotourism policy should be the guiding principle for promotion of ecotourism and immediate steps should be taken for development of ecotourism action plan for important destinations within the state. Three important thrust areas for ecotourism remain (i) Simlipal, (ii) Satkosia and (iii) Bhitarkanika. These are to be planned and developed for the tourists from within and outside state and the procedure for online advance booking for accommodation and entry into the sanctuary should be streamlined and made simple. The tourist accommodations in the peripheral locations outside the Protected Areas and Forests can be developed by Tourism Department/ OTDC Ltd. /OFDC Ltd on its own or in PPP mode.

b. Infrastructure Development: Development of infrastructure, improvement of facilities, and tourist circuits within the Protected Areas should be the function of the Wildlife Wing of Forest Department in accordance with the rules and regulation for protected areas.

The destination development for other potential forest areas outside the sanctuary should be carried out by the principal CCF (Odisha). While implementing the policy and developing and operating ecotourism at ecotourism destinations, the prevailing Acts and Rules shall be adhered to.

c. Eco-tourist facilitation: The facilitation of the ecotourists, tour packages, route management / development and movement need to be carried out by some outside agency in coordination with the Protected Area manager or DFO concerned. For the present, Odisha Forest Development Corporation Ltd. can take up this responsibility. It should provide one-stop solution such as obtaining permission to visit the designated places from competent authority, provide accommodation, facilitate transport arrangements with the help of bus/ taxi operators etc. OFDC

Ltd. may raise internal resources or avail assistance from the Tourism Department for developing infrastructure and building their staff capacity.

d. Ecotourism Principles: Ecotourism will be promoted and developed in accordance with the above vision, goal and objectives, based on the following core set of principles:

Principle 1 Nature Area Focus - provide visitors with the opportunity to directly experience nature.

Principle 2 Interpretation - provide opportunities to visitors to experience nature in ways that lead to greater understanding, appreciation and enjoyment.

Principle 3 Environmentally Sustainable Practice – ensure environmentally sustainable practices within carrying capacity of the area.

Principle 4 Promotion of Conservation and Benefits to Local Communities – ensure promotion of conservation and tangible returns to the local communities.

Principle 5 Respect Culture - be sensitive to understand oral local culture

Principle 6 Strategic Marketing for Customer Satisfaction – To market and promote effectively so that realistic customer expectations are achieved.

1.1.1.7 Implementation Strategy

The objectives will be achieved through the implementation of a strategy based on the following key initiatives.

Strategy 1 The unique values (Unique Selling Points) of Odisha will be identified and agreed through a participatory, consensus-building process involving all stakeholders such as key Government Departments, non-government organizations, private sector entrepreneurs and the community concerned. This will provide the basis for establishing an Odisha brand and responsible marketing of sustainable tourism, in which community-based ecotourism in and around protected areas will play a significant role. Outputs from this participatory process will include:

- Strategy for marketing a responsible and sustainable tourism in Odisha, of which community-based ecotourism will comprise the core.

- Establishment of partnership between the stakeholders namely Tourism, Industry, Forest Department and local communities, to steer and coordinate the development of community-based ecotourism in and around protected areas and other wilderness areas.
- The income generated from eco-tourism activity shall be ploughed back for the welfare of the community managing eco-tourism and for provision of eco-development and eco-tourism facilities.

Strategy 2 Capacity in the designing, establishment and management of ecotourism initiatives including destinations, will be strengthened and developed by:

- Establishment of a center of excellence for responsible tourism to build capacity within the local communities, government and private sector to take responsibility for achieving sustainable tourism, and to create better places for people to live in and for people to visit.
- In-house training in responsible and sustainable tourism within public sectors (tourism, culture, forests, wildlife, etc.).
- Responsible and sustainable tourism will be reinforced through eco-clubs and Green Volunteers.
- Customised training courses for those engaged in community-based ecotourism enterprises; in natural and cultural heritage interpretation, hospitality, business management, communication skills etc.
- Preparation and promotion of best practices guidelines, codes, standards, audits, accreditation schemes and models concerned with different aspects of ecotourism.

Strategy 3 A website will be established to promote, and coordinate the marketing of quality ecotourism initiatives in Odisha. The web site will promote ecotourism by:

- Explaining the concept of ecotourism and its principles, with examples of best practices.
- Highlighting Odisha's special values, thereby encouraging potential visitors to explore the website (and its links) further for potential destinations.
- Providing information on/ links to ecotourism destinations, eco-lodges, home-stays and other facilities in Odisha, including on-line booking.

- Providing a transparent and objective audit of ecotourism enterprises that indicates the extent to which eco-lodges, home-stays and other ventures meet a predefined set of best practice criteria. This will enable the responsible traveler to make an informed choice of their destination/accommodation facility, while also encouraging enterprises to adopt and develop best practice.

Strategy 4 The ecotourism market will be promoted by investing in the development of a network of prime ecotourism destinations, having good, reliable means of access and ecolodges (and home-stays) that demonstrate best practice in the use of renewable resources (materials, energy etc.), community management and experiential learning and quiet enjoyment for the visitors. Destination outputs will:

- Promote use of renewable and biodegradable resources.
- Management by registered (Divisional level) ecotourism societies comprising Joint forest Management Committees.
- Promotion of non-motorized forms of transports as far as possible.
- Activities will be of an experiential nature, enabling the visitor to learn and see from ‘doing’. Trained and knowledgeable local instructors and guides will be available to lead/facilitate/interpret such activities.
- Promotion of eco-friendly waste disposal methodologies.

Strategy 5 Research and monitoring will inform the outcomes and effectiveness of policy implementation, and the future development of ecotourism will be determined by environmental impact assessment, socioeconomic evaluation and its contribution to environmental conservation as well as the availability of benefits to the local community. In particular;

- Ecotourism will be monitored with respect to (a) visitor impacts on the environment and local communities, and (b) the conservation message conveyed to visitors. Eco tourism plan shall be an integral part of the Wild life Management Plan of Protected Areas.
- Research will focus on generating new knowledge, insights and modalities for sustainable ecotourism.

- Potential impacts of projects including construction and development of visitor facilities will be assessed.
- Monitoring of eco tourism as per the carrying capacity in Protected Areas (PAs) and delineation of tourism zone in PAs would be done by the CWLW.

Strategy 6 The Forest and Environment Department, Government of Odisha shall be the Nodal Department to promote ecotourism in the state.

- The department shall constitute the Odisha Ecotourism Development Board (OEDB) to act as the nodal agency.
- It shall be the Board's mandate to ensure the attainment of the objectives and goals set forth in this policy.
- The Board shall develop necessary systems and standards for the purpose.
- The Board shall be equipped with the required technical and financial resources.
- In case of any dispute, management of Protected Areas, Wildlife and Bio diversity shall take precedence over tourism.

Strategy 7 In Protected Areas where registered Eco-tourism and Eco-development Societies are functioning, the eco tourism will be managed / promoted by the same society. In the areas, where no such society has been formed, the eco tourism will be managed / promoted by involving the Local Advisory Committee (LAC) under the chairmanship of the collector of the district concerned. The LAC will have the following mandate and composition.

Mandate of LAC:

- To oversee the working of the State Ecotourism Strategy with respect to the concerned area and make recommendations to the State Government whenever necessary.
- To advise local and state government on issues relating to development of ecological tourism in non-forest areas, ecological-tourism zones etc.
- To ensure that at least 50% revenue from eco tourism flows to the local community.

In case of Protected Areas:

- To ensure site specific restrictions on buildings and infrastructure in private areas in close proximity to core / critical wildlife habitat / National Park / Sanctuary or buffer zone, keeping in mind the corridor value.
- Regularly monitor all tourist facilities falling within 5 km of a Protected Area vis-a-vis environmental clearance, area of coverage, ownership, type of construction etc. for suggesting mitigation / retrofitting measures, if needed.
- Regularly monitor the activities of tour operators to ensure that they do not cause disturbance to the flora and fauna while taking visitors into the Protected Areas.

Composition of LAC:

- District collector (Chairman)
- Forest Range Officer in charge of the site (Member Secretary)
- Territorial DFO concerned
- Honorary Wildlife Warden (if present)
- Official of State Tourism Department
- Block Development Officer
- Members of local Panchayats (2)
- Wildlife Expert (1)
- Local conservationists (2)
- Representatives from Civil Society Institution (1)

Strategy 8 The Government will promote establishment of tourism facilities especially within 5 km of the boundary of the ecotourism area in a Public-Private- Community (PPC) partnership mode. The local community will be engaged for providing the services in such projects. The communities will be entitled to at least 30% of the net profit of such project run through PPC partnership.

Strategy 9 Govt. may levy a “Local conservation cess” as a percentage of turnover (to be determined by the Government), on all privately-run tourist facilities within 5 km of the boundary of the ecotourism area. The funds thus collected will be earmarked to fund the ecotourism area management, conservation and livelihood development. The rationale for a local

conservation cess will be explained to the public at large, including through clear signage at local tourist facilities.

Strategy10 Development of private Guest Houses and tourist lodges enroute and outside the Protected Area/ Forests limits should be planned and developed by the OFDC Ltd / OTDC Ltd/ Private Operators for facilitation of ecotourism in compliance with the guidelines issued by Ministry of Environment and Forestry in this regard.

Strategy 11 The forest staff posted in the Protected Areas should be sensitized and trained to interact and facilitate the eco-tourists and explained about the various aspects of conservation and development of wilderness, forests & wildlife and natural resource. Good literature, Souvenir shops & signage etc. should also be developed to make the eco-tourism more attractive.

1.1.2 Objectives of Forest Management and planning:

The Working Plan is prepared for the scientific management of plants and wildlife of Malkangiri Forest Division, which covers the whole of the Malkangiri district a little part of Koraput district. The primary objective for the forests of Malkangiri Division is to treat forest as per the requirement of site so as to optimize the growing stock and in a manner as mentioned in the succeeding chapters.

The detail Objectives of Forest Management and planning are mentioned below according to National Working Plan Code-2014.

Keeping the result of outgoing Working Plan prescription it is important to suggest proposal for next working plan prescription for effective management of existing Forest Blocks in this Division without affecting biodiversity. Basically the following objectives are to be kept in mind while preparations of next Working Plan.

The foremost priority must be given for conservation and protection of flora and fauna of the Forest Blocks.

- To maintain the ecological balance in order to get favorable environment for survival of the living organisms.

- To maintain hydrological cycle and to check soil erosion by increasing green coverage on the hill slopes.
- To improve the condition composition and productivity of the Forests by appropriate scientific management.
- To increase the green coverage on the barren and degraded Forest land by appropriate silvicultural prescription.
- To create employment opportunities for rural people by proper mechanism of collection, value addition and marketing of NTFP.
- To involve the local people for protection and conservation of Forest based natural resources by formulating JFM communities.
- To protect and conserve the wild life resources by way of scientific management and new technology.

The above Objectives of Forest Management and planning will be achieved by keeping the following aspects as detailed in Chapter –II of the national Working Plan Code-21014.

1.1.2.1 Soil & Water Conservation.

Heavy rains and rapid run-off severely affect not only the top fertile soil but leads to formation of gullies within forest areas. Suitable management imperatives need to formulate to stop forest degradation due to natural causes and calamities. Apart from silvicultural operations, it is also necessary to make appropriate for conservation of soil and water in the forest areas. Areas susceptible to soil erosion such as steep slopes and areas in the vicinity of perennial streams etc. should be focused for soil and water conservation interventions with the provision of an overlapping working circle.

1.1.2.2 Water Resource Management.

The forests are also sources of water (surface, sub-surface and ground water). Over exploitation of the ground water resources results in declining ground water levels; there is an urgent need to augment the ground water resources through suitable management interventions. It is desirable to have forest management practices dovetailed with the principle of watershed based development approach especially in the source of water. Such areas should have

restrictions on tree felling but there should be operations to improve the water regimes and natural regeneration. As such, special provisions should be made in the working plan to sustain water resources and livelihood issues of the people living in and around natural inland water sources.

1.1.2.3 Biodiversity Conservation & Development: -

Forests provide habitat for many plant and faunal species. The contribution of individual species to the overall diversity within a community or ecosystem varies to a great extent. The coexistence of organism that differs widely from each other contributes more to overall diversity than the coexistence of very similar species. Functional diversity is considered to be one of the main factors determine the long term stability of an ecosystem and its ability to recover from major disturbances. Assessment of the status of plant and faunal species and their periodic monitoring can be helpful in formulating strategies for conservation, maintenance and enhancement of overall biodiversity through sustainable management and use practices. Assessment of biodiversity especially the lower forms of like (algae, fungi, lichens, epiphytes, parasites, etc.) of a Forest Division must be made an on-going programme with the support from State Biodiversity Board as it may be difficult for the working plan officer (WPO) to do it within two years, the normal time allotted for writing the plan. All these assessments will help in updating and enriching the people's Biodiversity Resister (PBRs) as provided in Biodiversity Act, 2002.

1.1.2.4 Forest & Climate Change.

Climate is an active factor in the physical environment of all living things. Climate change and variability are impacting forest ecosystem processes and functioning. Response time of forest ecosystem to disturbances ranges from a very short duration to decades and even centuries, depending on the condition of the system and type, intensity and duration of the external stimuli. The actual state of forest ecosystem largely depends on processes and practices of the past. Therefore, forests are extremely complex to understand their functioning. Climate change further magnifies those complexities and adds more uncertainties. Forests are linked to climate change in three ways, i) they are source of greenhouse gas (GHG) emission, ii) they offer mitigation opportunities to stabilize GHG concentrations, iii) they are impacted by climate

change. Impacts of climate change on forest ecosystem are getting manifested as species range shifts, changing biodiversity, physiological changes in plant life cycle, forest growth pattern of species, changing boundaries of ecosystems and other biotic and biotic responses/ stresses. There are evidences of increase in the frequency and severity of forest fires, changing water regimes and expanding forest insect infestation. Since forest ecosystems operate on large temporal scales, long observational studies are necessary to identify the key changes. Accordingly, grid-based sampling is designed to provide relevant information to cover the characteristic time scales.

1.1.2.5 Carbon Sequestration & Mitigation.

Forests and wood products can effectively reduce the process of climate change in several ways. Growing trees absorb carbon dioxide from the atmosphere and store the carbon so efficiently that about half the dry weight of a tree is carbon. This carbon remains locked up in the form of wood and wood products. Sustainably grown and harvested wood (and other biomass) also provides a renewable alternative to fossil fuels and enhance carbon storage. Enhanced carbon sequestration through recognized and innovative silvicultural practices, eco-restoration of degraded/mined out forestlands, improved biomass productivity, etc. will help in improving forest health and vitality. Forest soil must be kept healthy and fertile. The growth of forest crops must be kept vigorous to attain the most desirable level of biomass production within an optimal time scale.

1.1.2.6 Application of modern technology.

(a) Geometrics (Remote sensing, GIS and GPS) has got a wide range of applications in forest management. One can find application of geometrics in almost every forest management practice e.g. forest cover mapping in different canopy density classes, change detection (degradation as well as improvement), forest fire detection, burnt area mapping, biodiversity mapping, afforestation planning, wildlife habitat suitability mapping, boundary demarcation, encroachment mapping and so on. For many these applications, there are no practical alternatives to geometrics-based method.

(b) A spatial database on forest in GIS is a set of geo-referenced layer of spatial data of area on different themes relevant to forest management along with related text and statistical data. In each spatial layer, attribute data with every feature appearing as point, line or polygon (e.g. a forest patch, compartment, village, plantation, etc.) can be attached for analyzing management alternatives, creating scenarios, building queries or general database applications. Spatial database of a forest division with spatial layer will be of immense use in preparation of working plan and later in day-to-day forest management decision for the forest division.

(c) Further, there is a need for standardized framework of spatial database at national level for capturing, storing and managing all spatial and non- spatial data using modern technology under the aegis of Forest Survey of India. The purpose is to integrate the Divisional level information at state level and further at national level in a standardized framework. FSI and its centers will be provided requisite support including capacity building and relevant software for WP data processing to SFDs so that WPO is provided with ready to use thematic layers for forest planning. Every WPO must also be equipped with GIS Cell/Lab.

(d) Multi-dated satellite image may be used by the GIS Cell/Lab. For change analysis and preparation of change matrix. Change matrix describes the change in forest cover of the division over the period of last plan or between any other two assessments by showing the areas changing from one class of land/forest cover to another. This qualitative information may be used during forest resource assessment for identifying the drivers of change. If necessary, institutional sources like FSI may be approached by the GIS Cell/Lab for procurement of forest cover layer of the required period.

1.1.2.7 Joint Forest Management: -

Joint forest management is sharing of responsibilities, authority and usufructs between the village community or the forest user group and the forest department on the basis of a memorandum of understanding (MoU) between the two. The management of the jointly managed forest is done through the provisions of a micro-plan prepared by the community on participatory rural appraisal (PRA) basis with the technical help of the officials of the forest department. Micro-planning should be done in conformity on the overall working plan prescription of the forest division and may be reviewed by working plan wing of the state forest department. Approval of JFM micro-plan from MoEF is not necessary as they are covered by the macro level prescription of working plan of the forest division. Any deviation from the macro level prescription will require prior approval of the Regional Office (MoEF). The latest directives issued by the MoEF/State Government for preparation of Micro-plans should be incorporated in the JFM overlapping working circle. The compartments falling within any JFM may have to be realigned/ subdivided to keep them within the respective JFM/village boundary. Analysis of implementation of JFM programme, grading of JFMC, award winning JFMC, women's participation, etc. should be provided in the working plans. It should be made necessary to assess the dependence of villagers on the forests for their livelihood needs. Field works like Socio-economic survey including NTFP survey, problems of grazing and fire wood needs should be analyzed carefully before making prescription for JFM. The activities related to JFM during the past working plan period along with results and comments over the results should be included in the preliminary working plan report (PWPR) along with supporting data.

1.1.2.8 Community Forest Management: -

Forest community right related to use of community forest resources like minor forest produce, grazing ground, water bodies, recognized under the provisions of the Forest Right Act 2006 or any other State Act/Rule (e.g. Van Panchayats in Uttarakhand), can be exercised within the frame of sustainable management. The term “sustainable use” is given in section 2(n) of the Bio –Diversity Act, 2002. As per section 2(o) of Biodiversity Act, “sustainable use means the use of components of the biological diversity in such a manner and such a rate that does not lead to the long-term decline of the biological diversity thereby maintaining its potential to meet the needs and aspirations of present and future generation”. Details of existing rights are to be

provided so as to assess their sustainability, reasoning for their continuity and enhancement of productivity. Therefore, special efforts in the form of good practice guidance, capacity building, orientation, provision of incentives for the exercise of rights would need to be provided not only for preparation of working plans of such community forests but also for creation of various working circles as per the prevailing conditions of the division to maintain the sustainability of these forests. This will also facilitate Gram Sabha to monitor the working of the committee constituted under clause 4(e) of forest Right Rules 2012, which shall prepare a conservation and management plan for community forest resources in order to sustainably and equitably manage such community forest resources for the benefit of forest dwelling scheduled tribes and other traditional forest dwellers and integrate such conservations and management plan with the micro-plans or management plans of the forests.

1.1.2.9 Fringe forest management: -

In general, the forest fringe area is conspicuously different from the inner forest due to close contact with local communities. Although the dependence of forest fringe villages and their interaction with forest is almost same, but the kind of interaction and its severity may vary from one type of forest fringe to another. The communities living in the forest fringes depend heavily on the forest for the fuel wood and fodder needs. In rural households, fuel wood each use for cooking as well as for heating water in household heating, more so in the hilly regions. The dependence of villagers is heavy because commercial sources of energy are not easily available due to varied reasons. Non- timber forest products (NTFPs), referred to, in the system of national income accounts, as minor forest products are source of livelihood and food security for large number of rural communities living in and around forest. They are important to rural household in terms of their contribution to health, food, energy and other aspects of rural welfare. The importance of management of the fringe forests lies in the fact that a properly managed, it can arrest people's entry into the forest by catering to their need at the fringe only, thereby sparing the forest from the biotic pressure that has the potential to cause irreparable damage to the forest bio-diversity and eco- system services. Forest fringe villages have been a major cause of forest fires due increased dependency of people on forests as stated above, thus causing the forest more vulnerable in terms of fire. Alternatives may be discovered to reduce the dependency of people on forests residing fringe forest.

1.1.2.10 Forest health & diseases.

The pests significant to the Indian forests in the recent past are the Sal borer, leaf gall of Eucalyptus, Shisham mortality, etc. interestingly, these pest phenomena cover both natural forests as well as plantations, Based on generalized symptoms (spots, wilt, etc.) and signs (mushroom like fruiting bodies); nature of pathogen-whether fungi, bacteria, nematode, plant parasite, etc. ; Pathogen survival especially in relation to weeds; photographic documentation of problem and their confirmation through internet sources and expert advice; mapping of disease distribution may be done. Such details are very vital for timely diagnosis and effective management of the problem. Role of silvicultural practices that can reduce the pest problem; knowledge of species phenology to collect healthy seeds from the trees before they fall off on forest floor; scientific felling to reduce the standing tree damage as injury serves as an infection court for many heart rotes, etc., nutrient status of the soil governing the susceptibility/resistance of the host in many cases; identification and selection of superior individuals also as a source for resistance against the disease; identification and evolution of lesser known species (and weeds) of an area for their biochemical profiling including bio-pesticide properties, etc. can be an effective , eco-friendly, economical and easily available for pest/disease management.

As per the Malkangiri Forest Division concerned there is no Forest Disease or Pest has been reported in the recent past. The Forest area of Malkangiri Are Mixed dry Deciduous Forest the epidemic of Forest Disease and Pest are minimum and do not creating any major havoc to the Forest Department.

Thus, any major are not been noticed, but it is necessary to constitute a Divisional level Research Team with Forest Scientist and Field Staff to monitor the epidemic of Pest and Disease and also to take up research on Entomology in Malkangiri.

1.1.2.11 Forest Fire & Protection.

Forest fires are as old as the forests themselves. They sometime pose serious threat to the biodiversity and ecology. Forest fires have environmental impact in terms of tropical biomass burning, which produce large amount of trace gases, aerosol particles, and play a pivotal role in troposphere chemistry and climate aberrations. Thus, there is a need to carry out fire frequency

and burnt area mapping for fire vulnerability on one hand and operational fire monitoring in real time/near real time for effective response on the other. Real time monitoring of forest fires is being carried out by FSI using MODIS sensor fire alerts on-board two of the satellites – Terra and Aqua. The processed signals on forest hot-spots are being transmitted to SFDs on regular basis during fire season. Hence real time monitoring of forest fires is a process now in operation to curtail fire severity and sensitize SFDs at operational level to prevent normal fires in getting converted into wild fires. The online feedbacks on forest fires which are a part of this system could help estimate the actual loss of forest strata as well as the loss caused to top-soil.

A digital mapping of Forest Fire showing the vulnerability of Forest Fire in Malkangiri based on the previous year data should be prepared with help of ORSAC, Bhubaneswar and data from National Remote Sensing Agency, Hyderabad.

1.1.2.12 Tree Outside Forest

Tree Outside Forests (TOF) are located on the lands other than forests, including agricultural lands (e.g. agro-forestry systems, farm forestry, industrial plantations, hedgerows, woodlots), built-up areas such as settlements and infrastructure (e.g. street trees, parks and other urban tree systems) and bare lands (e.g. dunes, both abandoned and accomplished mining sites). They not only contribute nearly one fourth of the total growing stock of the country but also have become major source of wood in India. So there is a need to describe and comprehend the dynamics of trees and shrubs on rural and urban land, and their interaction with forest ecosystem. This will lead to a better understanding of off-forest tree management and towards integrated and sustainable management of forests as natural resources. Based on plot description and enumeration for areas outside forests, assessment will be done with respect to present scenario and their potential for forestry outside forests as part of sustainable land use management at landscape level within the forest division. The focus of forestry outside forest areas is on production forestry, revitalization of rural economy and expanding economic opportunities through innovations. This requires inter-sector synergy and convergence. WPO may therefore prepare a separate strategy as a new chapter, not being part of general prescription of Working Plan to address the concepts and issues related to TOF. Forest certification guide as marketing tool may also be developed for the trees outside forests.

1.2 METHOD OF TREATMENT TO BE ADOPTED.

1.2.1 The prescription of the outgoing plan/ scheme were almost similar to the ones set for the present revision but for various reasons (as cited in Chapter-11), the corresponding prescriptions could hardly be carried out. Thus, the results could not be analyzed. Due to lack of intensive management and sufficient cultural operations, the productivity of forest has also been drastically reduced, as can be inferred from the production of bamboo and NTFP items. Hence, the forests have in general degraded during the outgoing plan/ scheme period. However, at many places, crop condition has shown improvement mostly because of active participation of local people and implementation of NAP and OFSDP (AJY) scheme during the intervening period. All these ground realities have necessitated the need for protection and improvement of forests as the prime methodology of management.

1.2.2 The management practices to be prescribed should also lay special emphasis on the people's participation in the process of regeneration, protection and development vis-à-vis their bonafide requirements of different forest produces since their dependence on forests cannot be completely done away with. Thus, in this changed situation, the treatments prescribed in the revision are commensurate with such requirements as well.

1.2.3 Some Forest blocks in all Ranges have good growth requiring improvement operations to further boost the existing stock by thinning and canopy manipulation. Similarly, many blocks have congested coppice crop requiring thinning operations to create conducive conditions for better and adequate natural regeneration. However, many blocks stand further denuded needing special efforts ranging from complete protection from biotic interference; rehabilitation measures (supplemented by artificial regeneration) to pure plantation. In fact, large chunk of barren areas still need plantation measures besides tending of old existing plantations.

1.2.4 Some of the miscellaneous forests managed under Selection- cum- Improvement Working Circle in the last plan have been devastated by encroachment and reckless hackling. But some large patches are still there which could be managed for producing large sized timber.

1.2.5 The bamboo forests of the Division require regular and systematic silvicultural operations followed by protection from all sorts of biotic interference and annual fire to have sustainable

bamboo production. Further, the degraded bamboo areas need to be restocked through annual plantation in gaps for fulfillment of bamboo requirements both for local needs and paper pulp industry at Jeypore and Rayagada.

1.2.6 After transfer of control of NTFP items from Forest Department to Panchayat bodies, concentrated effort is required to ascertain to potential of the different NTFP items vis-à-vis the value addition for getting additional benefits for the primary collectors out of it. On the other hand, the confidence and co-operation of the local people could be gained by introducing innovative methods of value addition of NTFPs for commercial gain of the individual and the community.

1.2.7 Wildlife of the Division, which is under decline stage, the special attention for its managed effectively and all efforts should be made to get the proposed Wildlife Sanctuary at Balimela.

1.2.8 However, above all, special efforts are required to be undertaken to check the menace of podu that has solely been the major cause of forest degradation in the Division. And to keep the podu cultivators engaged. Since the dependences of the local people on forests cannot be ignored, the forest management practices should be based on people's participation in the process of regeneration, protection, and development of the forests.

1.2.9 The present revision is limited only RFs and PRFs of the Division and included V.F and some area of the last scheme of Bamboo areas which is still as RL and URL. He consolidation work of these blocks to convert them into RFs is be emphasized especially in areas with good forest cover for bringing more areas under management fold.

1.3 CONSTITUTION OF WORKING CIRCLES

1.3.1 GUIDELINES FOR PREPARATION OF REVISED WORKING PLAN:

1.3.1.1 The descriptive part-I of the plan should as usually deal with summaries of the facts on which the proposals are based. In Chapter-I in dealing with the tract geology of the areas should be described with details up-dating the information in consultation with Geological survey of

India. The latest information on soil, climate and human health should be collected and be incorporated. The 2011 census figures for human and cattle population should be incorporated along with latest demographic position. The legal position, rights and concessions of the people should be dealt keeping in view the laws and rules applicable to the area.

1.3.1.2 While describing the composition and the conditions of the crop in Chapter-II, mention should be made of all the Reserved Forests and the Proposed Reserved Forest. Ecological degradations which have been taken place to be mentioned. Changes in crop as observed in some of the Forest Blocks owing to the protection provided by the V.S.S should be taken in to account. In the Forest area the Title granted under FRA both Individual and Community rights and the other forest lands diverted for non-forestry purpose may also benoted in the Working Plan.

1.3.1.3 The Forest types should be described according to revised clarification given by Champion & Seth in revised Survey of forest types in India. While describing the injuries to which the crop is liable, the intensity of fire, grazing and other biotic facts should be examined and described from Socio-economic angle. So for as utilization of forest produce in Chapters-II &III are concerned, advantage should be taken of the information available which the OFDC. Under Chapter-XII of statistics of growth and yield local volumes table should be prepared from the records available with M/s OFDC Ltd. Statistics of the growth volume and yield of important species of timber such as Teak, Sal, Asan, Bija, etccan be adopted from the records of ICFRE- Yield of timber from the representative felling series under Selection Working Circle.

1.3.2 CHAPTERS TO BE DESCRIBED IN PROPOSED WORKING PLAN:

While describing the composition and the conditions of the crop in Chapter-II mention should be made of all the Reserved Forests/ Proposed Reserved Forest and other Forest lands diverted for non-Forestry purpose (including areas diverted for community/ individual claims under FRA, 2006). Ecological degradations which have taken place deserve to be mentioned. Changes in the crop conditions as observed in different Forest Blocks should be taken into account. The Forest types should be described according to revised classification given by Champion and Seth in “revised survey of Forest types in India”. While describing the injuries to which the crop is liable, the intensity of fire, grazing and other biotic factors should be examined

and described from socio-economic angle. So far as utilization of Forest produce in Chapter-III is concerned, advantage should be taken on the information available with the OFDC Ltd. and other Agencies. Under chapter VI for statistics of growth and yield local volume table should be prepared from the records available with M/s OFDC Ltd. and other Agencies. Statistics of the growth volume and yield of important species of timbers such as Teak, Sal, Asan and Haldu can be adopted from the records of ICFRE.

1.3.3 WORKING CIRCLES AND THEIR DISTRIBUTION: In consistence with the provisions of the National Working Plan Code, 2014, the following eight working circles have been constituted as per the approval of the Working Plans' Committee for management of the total working plan area of 218302.1895 hectares.

1. Selection working circle.
2. Rehabilitation working circle.
3. Plantation working circle.
4. Protection working circle.
5. Bamboo overlapping working circle.
6. NTFP Overlapping working circle.
7. Wild life Overlapping working circle.
8. JFM Overlapping working circle.

1.3.3.1 The Selection Working Circle: This Working Circle has formed with an aim to improve the growing stock both in terms of quality and quantity. The forest blocks covered under this working circle are mostly of un-even aged crop, with Sal bearing and miscellaneous forests where there is good growth and mature trees available for harvest. Also there are some other blocks where the mostly young to middle aged crop needs improvement felling only. The total area allotted to this working circle is 48271.8566 ha.

1.3.3.2 The Rehabilitation Working Circle: The Rehabilitation working circle has been constituted taking all the forest blocks with degraded crops but having adequate rootstocks, which can improve the cultural operations supplemented by artificial regenerations. These areas

are mostly adjoining to the human habitations and thus face tremendous biotic pressure all round the year. The total area allotted to this working circle is 139183.5591 hectares.

1.3.3.3 The Plantation Working Circle: The Plantation Working Circle includes all the forest blocks where old Teak and miscellaneous plantations exist. Also, the circle includes all the forest blocks where there are permanent gaps which are in need of intensive artificial regeneration measures without which these areas cannot be restocked through natural regeneration within a reasonable period. The total area allotted to this working circle is 6197.38 hectares inclusive of 5111.76 hectares of existing plantations.

1.3.3.4 The Protection Working Circle: This circle includes all the ecologically fragile areas and those situated in catchments of major rivers including the ones existing in steep precipitous hill slopes (however, it excludes those blocks/ areas which are already dealt under the rehabilitation Working Circle). Thus, the areas under this circle are mostly having steep gradient requiring protection and crop improvement measures without much intervention. These areas are usually having good growth in cooler aspects. However, regular biotic interference has led to decrease in vegetative cover leading to high run-off and frequent flash floods. Thus, some soil and moisture conservation measures are also required. The total area included in this working circle is 24649.3938 hectares.

1.3.3.5 The Bamboo (overlapping) Working Circle: This Working Circle covered all the bamboo bearing blocks with previous bamboo scheme areas irrespective of its gregarious or scattered manner. The bamboo forests of this Division are mostly congested and are maintained poorly due to frequent forest fire, grazing and illicit felling. Sporadic flowering is also noticed in all most all forest blocks of this Division. The total area allotted in this working circle is 110367.5123 hectares.

1.3.3.6 The NTFP (overlapping) Working Circle: This working circle is also an overlapping circle covering the entire plan area other than that prescribed under the protection working circle. The total area under this overlapping working circle works out to be 189045.9106 hectares. The areas under CA and VFs have not been included in this Working Circle.

1.3.3.7 The Wildlife (overlapping) Working Circle:-This Working Circle is an overlapping working circle covering the entire working plan area of the Division that is 218302.1895 hectares. However, the Working Circle focuses on the Forest Blocks of Chitrakonda, Balimela and Mathili Forest Ranges, where there is proposal for constitution of Wildlife Sanctuary and also special management prescriptions are also provided for some forest blocks, where there is adequate concentration of wild life.

1.3.3.8 The J.F.M. (overlapping) Working Circle: This Working Circle is an overlapping working circle is constituted taking all those forest areas which have already been brought under the joint Forest management fold and registered in the Office of the Divisional Forest Officer, Malkangiri/Jeypore irrespective whether Micro plan has been prepared or not. This working circle is also includes Village Forest areas notified under Orissa Village Forest Rule, 1985. Also other /open degraded forest areas where there is possibility of formation of VSS has been included in this overlapping Working Circle. However, the micro-plans of forest blocks under JFM should adhere to the broad framework provided in the prescriptions of this plan. The total area allotted in this working circle is 16623.59 hectares.

1.3.3.9 AREA ALLOTTED TO THE DIFFERENT WORKING CIRCLES:

The outgoing Working Plan covered the Topo depicted area of **89160.53 Ha**. Now in the proposed Working plan the same topo depicted area of 89160.53 Ha has been taken comprising of 71 RFs and 93 PRFs. In addition to this 51 no's VFs , 11 no's coupes of Bamboo working scheme area (4URL), 10RL and 1 UDPF have also been proposed to include in the revised Working plan. Hence, the total Working Plan area covered is 218302.1895 Ha after deducting an area of 4011.31 ha diverted under FCA and FRA.

The following Table is showing the abstract of Range-wise area allotted to the different Working Circles in respect of Malkangiri Division for the proposed working plan 2021-22 to 2030-31.

Table No. 1.1: Range-wise area Allotted to the Different Working Circles. (in ha.)

Range-wise Area Allotted to Different Working Circles in Malkangiri Division in the revised W.Plan in ha							
Working Circle	Malkangiri	Mathili	Balimela	Chitrakonda	Kalimela	Motu	Total
SelctionWC	2492.0000	12146.652	7930.3910	9744.7036	11753.560	4204.5500	48271.8566
Plantation WC	839.8000	724.5800	1714.0000	1684.0000	848.000	387.0000	6197.3800
Rehabilitation WC	17748.2816	16696.8360	3010.0360	64979.5015	25626.6588	11122.2452	139183.5591
Protection WC	5595.5100	1098.5450	2111.3600	5040.2428	4024.5870	6779.1440	24649.3938
Total Working Plan area	26675.5916	30666.613	14765.792	81448.4479	42252.8058	22492.9392	218302.1895
Bamboo OWC	1120.00	3206.00	12310.28	8456.2158	3650.00	400.00	29142.4958
Bamboo Scheme Area	0	0	0	60405.7475	14247.0548	6572.2102	81409.0865
Total Bamboo (O)	1120.00	3206.00	12310.28	68861.9633	17897.0588	6972.2102	110367.5123
JFM (OWC)	7664.00	3328.00	1034.00	470.00	3152.59	975.00	16623.5900
NTFP (OWC)	20771.2890	28523.772	12654.432	73702.4576	37392.4100	16001.5500	189045.9106
WL (OWC)	26675.5916	30666.613	14765.792	81448.4479	42252.8058	22492.9392	218302.1895

Table No. 1.2: Distribution of Working Plan Area to different non overlapping Working Circle.

Sl. No.	Name of the Working Circle	Area allotted (in ha.)	Remarks
1	SelectionW/C	48271.8566	
2	Rehabilitation W/C	139183.5591	
3	Plantation W/C	6197.3800	
4	Protection W.C	24649.3938	
Total		218302.1895	

In order to cover the entire Division and as per the necessity, the NTFP (OWC) comes to **189045.9106 ha.** and Wildlife (O) Working Circle has been constituted with an area of **218302.1895 ha.** for the entire Working Plan area. The details list working circle wise area are given in ***Annexure-I.***

1.4 Period Of Working Plan And Necessity For Intermediate Revision

1.5.1 This Working plan has been prepared for a period of 10 years i.e. from 2021-22 to 2030-31. The prescription may be revised after 5 years and if so required the Regional Chief Conservator of Forests (T), shall submit a proposal with the effect for approval of the competent authority.

CHAPTER 2

SELECTION-CUM- IMPROVEMENT WORKING CIRCLE

Latitude: 18.11661
Longitude: 82.142881



SELECTION WORKING CIRCLE

2

2.1 NAME OF WORKING CIRCLE (CLEARLY MARKED ON GIS BASED MAPS (1:50,000) :

The area of this working circle has been clearly marked on the GIS based map of 1:50,000 which are appended as management map in the plan.

2.1.1 In this Working Circle dense forests of this Division are prescribed for management. The forest Blocks and compartments kept under this working circle are the high forests having 0.4 and more crown density, natural regeneration and also crop of different age class specially matured trees required to be removed for the general hygiene of the forests. However, few forest Blocks though having density more than 0.4 in larger proportion but approaching dense crown density in small proportion are taken under this working circle for sake of proper management in entirety to whole of the forest block. The forest block has been taken as the smallest unit for considering its inclusion in the working circle.

2.2 GENERAL CONSTITUTION OF WORKING CIRCLE

2.2.1 The Reserved Forest and Proposed Reserved Forest was included under this Working Circle of the outgoing plan and in this plan also included R.Fs and P.R.Fs only in this circle. The Forest Blocks and compartment which have high crop density, good stocking, adequate natural regeneration with mature trees and good number of trees in approach class are included in the working circle. Since most of these forest Blocks are located in plain, undulating and some hilly terrain. The Blocks and compartments included in the Selection Working Circle in the previous plan was reviewed with reference to the crop condition, regeneration, and estimation of growing stock received from NRSA, Hyderabad. Excepting Blocks like Ghenaguda PRF, Pujariguda 'A' PRF, Pujariguda 'B' PRF, Mangipalli RF, Pulimetla PRF, Tangorkonda RF, Kattanpalli 'A' RF and Tamanpalli PRF, the other Blocks were retained in Selection working circle. In addition

Chedenga RF (P), Jharapalli RF (P), Pitatung PRF (P) (Comptt. No- 4, 5, 6, 7), Datunguda PRF (P) and Mantriput 'A' PRF (P) which was placed in Rehabilitation Working Circle in the outgoing working plan has now been included in this working circle due to improved crop condition. Further 19 no's RF/PRF (P) and 3 Nos. of RL like Dasmantpur RL, Dharamgarh RL (P), Silakota RL (P) with high crop density brought under the working circle.

2.2.2 The Blocks with congested pole crop have also been included in this circle which require only tending operations including improvement felling.

2.2.3 This Working Circle comprises Southern Tropical Moist Deciduous and Southern Tropical Dry Deciduous Forest which are uneven aged and with good tree growth. This working circle has been constituted with an objective to further improve the growing stock and crop composition. Allotment of forest Blocks to this working circle is based on reconnaissance survey followed by confirmation through sample plot inventory, analysis of growing stock.

2.2.4 In the proposed working plan, about **48271.8566 ha** area has been taken in that Working Circle instead of 41, 064.92 ha in outgoing plan and the detail list of Forest Blocks are enclosed as **Annexure-II**. The special objective of management will be the same as discussed above in the past management of the working plan. While working of the Selection working circle, the marking of Trees should be conservation oriented rather than commercial harvesting with special prescription of removal of only dead dried and fallen trees.

Besides this, prescription may be given for green felling of Mature Trees as per the Stand Table with reference to the available Plantation Journal. It may be included as per field enumeration and by keeping the point that not to create open gap while green felling. A proper sampling and accurate yield calculation shall be made. The focus should be given for improvement of growth of principal and secondary species.

Subsidiary Silvicultural Operation should be done in extensive manner both in worked out and non-worked out areas of the Selection working circle. In the prescription fire protection measures should be prescribed to promote seedlings and wildlings in the Forest Block.

2.3 GENERAL CHARACTER OF VEGETATION

2.3.1 The detailed description of the vegetation in this Division has been given in Chapter-II of Part-I. The forests under this working circle are uneven aged and have good natural regeneration. These forests covers mostly the Miscellaneous Forest of Malkangiri, Kalimela, Chitrakonda, Balimela and Motu Ranges, degraded natural teak forest and Sal forest of Mathili Ranges distributed over plain, undulating and even hilly slopes. The major forest types included in this working circle are 3B (Southern Tropical Moist Deciduous) and 5A (Southern Tropical Dry Deciduous Forest). There are in some portion of the forest Blocks are covering with crop of pole stage and middle age group which needs tending operations and some improvement felling. Salia bamboo is present in number of Blocks allotted to this circle.

2.3.2 The vegetation mainly miscellaneous species consists of Bija, Sissoo, Dhaura, Asan, Kendu, Sidha, Kurum, Kasi, Badhan, Tangini, Mundi, Char, Moi, etc. Bamboo (*Dendracalamus strictus*) is present in pure brakes in small pockets as well as varying densities with other tree species in all Ranges. Daba bamboo is occasionally found in nallah banks.

2.3.3 The biotic pressures like grazing, fires and some illicit felling have adversely affected the natural regeneration of crop. Step will have to be taken during implementation of this plan to ensure that these pressures are minimized in these Blocks. In general, the problem of fire especially during the NTFP collection season is prevalent in the entire area, resulting in changes in soil composition and crop condition.

2.4 FELLING SERIES, CUTTING SECTION, AND JFM AREAS:

2.4.1 In the last plan only the RFs and PRFs Blocks were covered under this circle but now other category of forests like V.F, RL and bamboo scheme area of last scheme (URL), UDPF have also been included. Moreover, number of RF Blocks which were earlier kept outside this circle have also been now included here because of better crop composition. Hence, the felling series have been reconstituted basing on the field requirements.

2.4.2 It has been proposed divide the entire Working Circle into 11 Felling Series i.e 9 Nos. Felling Series namely, Sarangapalli, Sindrimal, Pitatung, Balimela, Taralakota, Sileru

(West), Matumkonda, Kalimela, Motu for RF and PRF area and included 2 Nos. Felling Series of RL area like Dharmagarh and Silakota Felling Series. All the Felling Series will have 10 annual coupes constituted on equiproductive area basis which is based on the enumeration data and estimation of growing stock.

2.5 BLOCKS, COMPARTMENTS AND JFM AREA:

2.5.1 The total area allotted in this Working Circle is 48271.8566 Ha in 47 blocks (Whole/ Part) which includes 16477.2210 Ha in 21 RFs, 21819.6346 Ha in 23 PRFs and 9975.00 ha in 3RLs. The details of blocks and compartments allotted to different felling series are given below in Table No-2.1 and map of the Selection Working Circle is provided in Table No-2.1.

Table No-2.1 Allotment of Blocks and Compartments to different selection-cum Improvement Working Circle

Name of the Range	Sr. No.	Name of the Felling Series	Name of the Forest Block	Legal Selection	Compartment		Total Felling Series Area (Ha)
					No.	Area in Ha.	
Mathili	1	Sarangapalli F.S	Sarangapalli	R.F	No.1	706.78	
			Sarangapalli	R.F	No.2	213.95	
			Sarangapalli	R.F	No.3	572.12	
			Sarangapalli	R.F	No.4	393.97	
			Sarangapalli	R.F	No.5	979.50	
			Sarangapalli	R.F	No.6	814.04	
			Sarangapalli	R.F	No.7	606.84	
			Chedanga	R.F	Part	200.00	
			Malidangar	R.F	Part	100.00	
			Gotiguda	R.F	Part	100.00	
			Dusamantapur Ext.	R.F	Whole	16.492	
			Dusanad	PRF	Whole	57.86	

			Champajharan	PRF	Part	50.00	
		Total				4811.552	4811.552
Malkangiri	2	Sindrimal F.S	Koilipari	PRF	No.1 (Part)	400.00	
			Koilipari	PRF	No.2 (Part)	256.00	
			Jhileruguda	PRF	No.1 (Part)	100.00	
			Jhileruguda	PRF	No.2 (Part)	117.00	
			Jharapalli	R.F	Part	100.00	
			Sindrimal	PRF	No.1 (Part)	275.00	
			Sindrimal	PRF	No.2 (Part)	364.00	
		Total				1612.00	1612.00
Malkangiri	3	Pititung F.S	Pititung	R.F	No.5 (Part)	103.00	
			Pititung	R.F	No.6 (Part)	177.00	
			Pititung	R.F	No.7 (Part)	165.00	
			Pititung	R.F	No.8 (Part)	435.00	
Mathili			Pititung	R.F	No.1	985.39	
			Pititung	R.F	No.2	475.76	
			Pititung	R.F	No.3	510.51	
			Pititung	R.F	No.4	436.94	
		Total				3288.6	3288.60
Balimela	4	Balimela F.S	Chitapari	R.F	No.1 (Part)	780.00	
			Chitapari	R.F	No.2	515.00	

					(Part)		
			Balimela	PRF	No.1 (Part)	310.00	
			Balimela	PRF	No.2 (Part)	780.00	
			Balimela	PRF	No.3 (Part)	450.00	
			Balimela	PRF	No.4 (Part)	1260.00	
		Total				4095	4095.00
Balimela	5	Tarlakota F.S	Tarlakota	R.F	No.1 (Part)	670.00	
			Tarlakota	R.F	No.2 (Part)	550.78	
			Tarlakota	R.F	No.3 (Part)	226.08	
			Tarlakota	R.F	No.4 (Part)	400.51	
			Tarlakota	R.F	No.5 (Part)	370.38	
			Tarlakota	R.F	No.6 (Part)	430.43	
			Tarlakota	R.F	No.7 (Part)	224.09	
		Total				2872.27	2872.27
Chitrakonda	6	Sileru(West) F.S	Sileru West	R.F	No.1 (Part)	580.199	
			Sileru West	R.F	No.2 (Part)	277.00	
			Banguru	R.F	Part	75.00	
			Limalari	R.F	Part	200.00	
			Pabliguda	R.F	Part	91.27	
			Mantriput	PRF	Part	225.57	

			Gouragauri	PRF	Part	44.03	
			Bodokonda	PRF	Part	154.13	
			Bhimaram	PRF	No.1 (Part)	587.15	
			Bhimaram	PRF	No.3 (Part)	400.00	
			Bandhaguda	PRF	Part	385.83	
			Ranguniguda	PRF	Part	624.56	
			Jantri	PRF	No.1 (Part)	856.9	
			Jantri	PRF	No.2 (Part)	500.52	
			Singaram	PRF	No.1 (Part)	500.15	
			Singaram	PRF	No.2 (Part)	400.00	
			Singaram	PRF	No.3 (Part)	268.63	
			Sikpanasa	PRF	No.1 (Part)	881.61	
			Datunguda	PRF	No.1 (Part)	485.00	
			Datunguda	PRF	No.2 (Part)	400.00	
		Total				7937.549	7937.549
Balimela	7	Matumkonda F.S	Matumkonda	PRF	No.1 (Part)	126.83	
			Matumkonda	PRF	No.2 (Part)	415.87	
			Matumkonda	PRF	No.3 (Part)	284.77	
			Matumkonda	PRF	No.4 (Part)	135.65	

Chitrakonda	7	Matumkonda F.S	Matumkonda	PRF	No.1 (Part)	950.77	
			Matumkonda	PRF	No.2 (Part)	29.6046	
			Matumkonda	PRF	No.3 (Part)	250.00	
			Matumkonda	PRF	No.4 (Part)	576.78	
		Total				2770.2746	2770.2746
Kalimela	8	Kalimela F.S	Mandapalli	PRF	No.1 (Part)	600.00	
			Mandapalli	PRF	No.2 (Part)	400.00	
			Yengulkonda	R.F	Part	520.00	
			Venkatpallam	R.F	Part	310.82	
			Gompakonda	R.F	No.2 (Part)	200.00	
			Udayagiri	R.F	No.1 (Part)	950.00	
			Udayagiri	R.F	No.2 (Part)	820.00	
			Udayagiri	R.F	No.3 (Part)	840.00	
			Udayagiri	R.F	No.4 (Part)	1450.00	
			Matumguda	R.F	Whole	114.24	
			Pedawada	PRF	Part	500.00	
		Total				6705.06	6705.06
Motu (MV-79)	9	Motu F.S	Pusugudam	R.F	No.1 (Part)	250.00	
			Pusugudam	R.F	No.2 (Part)	250.00	
			Pusugudam	R.F	No.3	600.00	

Motu (MV-79)	9	Motu F.S			(Part)		
			Pusugudam	R.F	No.4 (Part)	400.00	
			Polur	R.F	Part	300.00	
			Dupenkonda	PRF	Part	200.00	
			Malavaram	R.F	Part	50.00	
			Anantaplli	R.F	Part	500.00	
			Kattaguda	PRF	Part	54.55	
			Tadimella	R.F	No.1 (Part)	200.00	
			Tadimella	R.F	No.2 (Part)	500.00	
			Tadimella	R.F	No.3 (Part)	700.00	
			Tadimella	R.F	No.4 (Part)	200.00	
		Total				4204.55	4204.55
Mathili	10	Dharmagarh FS	Dharmagarh	RL	No.1	1278.25	
			Dharmagarh	RL	No.2	929.50	
			Dharmagarh	RL	No.3	770.25	
			Dasamantpur	RL	No.1	1166.25	
			Dasamantpur	RL	No.2	782.25	
		Total				4926.50	4926.50
Kalimela	11	Silakota FS	Silakota	RL	No.3	1398.00	
			Silakota	RL	No.4	1475.50	
			Silakota	RL	No.5	1334.50	
			Silakota	RL	No.6	840.50	
		Total				5048.50	5048.50
		G.Total				48271.8566	48271.8566

All species have been given equal importance for conservation of biodiversity and development of balanced forest where in natural selection of the species shall be encouraged. Since this working plan has laid emphasis on bio-diversity conservation because of growing concern for loss of the same, the old conventional classification of principal species, secondary species and inferior species has been done away with. Further, the NTFP yielding species including the fruit bearing trees such as Mahula, Mango, Tamarind, Anla, Chara, Bahada, Harida, Bela, Jamun etc. shall not be felled.

2.6 SPECIAL OBJECTIVES OF MANAGEMENT

- To retain, maintain and improve the available growing stock to conserve soil as well as water and to ensure ecological equilibrium and maintain bio-diversity.
- To increase the proportion of valuable species with encouragement of the growth of principal species by adapting suitable silvicultural system and forestry operations.
- To remove dead, dry, hollow, seriously diseased, uprooted and over mature trees without creating permanent gaps in the crown to derive maximum sustained yield.
- To carryout subsidiary silvicultural operations so that conducive situation can be created for better growth of existing crop and natural regeneration.

2.6.1 ANALYSIS OF THE CROP:

2.6.1.1 The entire working circle has been stock mapped basing on Reconnaissance Survey and Satellite Imagery. The stock maps have been attached to the respective compartment history files. The average density of the crop included in this working circle is 0.5 though it varies from 0.3 to above 0.7.

2.6.1.2 The entire forest area of the Division was satisfied on the basis of the forest type layer. The two inputs layers were integrated along with the layer containing in the administrative boundaries and forest block of the Division. Based on the stratified layer, sample points were allotted in compartments and Blocks are carrying out 0.1 ha field inventory. Inventory points were located on the ground by using GPS receivers. At first field work for pre-

inventory sample points were taken up. Based on the results of pre-inventory and reconnaissance survey allotment of Blocks and compartment to the Selection-cum-Improvement was carried out. The 2nd set of sample points were taken in the Blocks allotted to the Selection-cum-Improvement on the basis of the results obtained. During this time an intensive sampling was made in the Selection Blocks. i.e. Balimela, Chitapari, Matumkonda(P), Tarlakata of Balimela Range Matumkonda(P), Mantriput, SileruWest, Banguru, Limalori, Pabliguda, Gourgurei, Bodakonda, Bhimaram, Bandhghuda, Ranginiguda, Jantri, Sinkpanas, Datunguda of Chitrakonda Range, Sindrimal, Jharapalli, Titybiri, Jhileruguda, Pitatung(P) of Malkangiri Range, Sarangapalli, Malidanger, Gotiguda,,Chedenga, Pitatung(P) and Champajharan of Mathili Range, Tadimetla, Pusigudum, Poluru, Anantapalli and Malavaram of Motu Range and Udayagiri, Gompakonda, Mandapalli, and Yungalkonda of Kalimela Range. Sampling intensity varied from 0.25 to 0.4% in the Blocks depending upon the crop composition and density.

2.6.1.3 Stand and stock tables have been computed based on the inventory data giving number of trees in different girth classes varying from 30cm to 180cm and above with 30 cm interval. The principal species in the selection forest are Sal, Asan Dhaura, Bija and Tangini mixed with miscellaneous species. The number of trees available in different girth classes and computation of volumes and growing stock estimated was done as explained in Chapter-8. In the entire Division it is generally observed that the numbers of trees are more in the interior compartments than the compartments adjoining to the villages. That is why in the enumeration, in some compartments number of trees per ha are found to be more than that of other compartments. The average quality of the Sal found in the forests is Quality class III. However, the selection trees are mainly miscellaneous species. The enumeration results also revealed that there is abundance of the species in lower girth class that of higher girth class. The other economic associates' species of Sal like Bija, Kurum and Sissoo are also found deficient in higher girth class. This shows the over exploitation in the past as well as illicit felling in these forest.

2.6.1.4 The Salia bamboo is found throughout the circle. The analysis result shows that there is more representation of mature culms in the clumps due to not removal of bamboo though silvicultural bamboo operation is carried out. However the majority of the clumps is of Quality-III and congested.

2.6.1.5 The regeneration is found to be poor to good. The regeneration of Sal in Mathili Range is found to be satisfactory. The details of the regeneration survey are given in the Chapter-4 of Part-I indicate that there is an inadequacy of established regeneration. The reason behind this poor status is annual forest fire, Sal seed collection by sweeping the forest floor, grazing and trampling by the cattle. The enumeration results reveal that there are fairly good number of trees in the exploitable and above exploitable girth classes.

2.6.2 SILVICULTURAL SYSTEM

2.6.2.1 This working circle will be adopted with emphasis on sustainable production and stability of the eco-system. The crop and soil condition will be improved by selective opening up of the canopy. Moreover this circle needs improvement of stand structure through removal of dead, uprooted, diseased and defective trees. No felling has been prescribed in eroded and steep hill slopes, bank area and along nalla banks. Marking is a very important exercise, requiring judicious application of skill.

2.6.2.2 During management of these forests, care shall also be taken to maintain the balance proportion of stand of all age classes on every unit area. In case of abnormal condition, the felling shall be restricted only to dead, dying, defective and trees of undesirable species.

2.6.2.3 The silvicultural system prescribed in this Working Circle is Selection-cum-improvement system. Only silviculturally available trees in the exploitable girth class shall be removed as would be admissible according to Smithies safe guarding formula.

2.6.3 ROTATION PERIOD

2.6.3.1 As per Letter No-13-FCWP/BH/KOLHAN, Dated 13.01.1997 of the Chief Conservator of Forests (Central), Ministry of Environment & Forest, Govt. of India, Regional Office Bhubaneswar, the silvicultural rotation period of 120 years is fixed for all the species.

2.6.4 HARVESTABLE DIAMETERS

2.6.4.1 The exploitable girth class fixed for various species is based on the silvicultural rotation. The other factors such as site quality, production capacity, growth, yield and market demand etc. The exploitable girth of different species is provided in Table No-2.2.

Table No. 2.2: Exploitable Girth in Breast Height:

SI No	Species	Exploitable girth at breast height
1	Sal, Sissoo, Gamhar,Bija,Kurum, Mundi, Asan, Simili,Kasi, Dhaura, Tangini	150cm and above
2	Bandhan	105cm and above
3	Other Miscellaneous	150cm and above

2.6.5 REDUCING FACTORS AND REDUCED AREAS.

2.6.5.1 In comparison with the outgoing plan to the present plan, the area in this working circle has decreased because some forest Blocks lost their potentiality due to severe biotic interference and repeated fire attacks where involvement of forest people is less, a good number of forest Blocks regained their potentiality with active participation of local people and dedicated forest personnel. The loss and gain in area is given in Table No.2.3.

Table No. 2.3: Increase and decrease in Area in Selection cum Improvement Working Circle in Malkangiri Division.

Name of the Range	Name of the Forest Block	Status of the Block	Comptt.	Area taken in outgoing plan	Area taken in present plan	Area reduced	Area increased	Area newly added
Mathili	Sarangapalli	RF	1to 7	4287.20	4287.20	0	0	0
	Chedanga	R.F		-	200.00	0	0	200.00
	Malidangar	R.F		-	100.00	0	0	100.00
	Gotiguda	R.F		-	100.00	0	0	100.00
	Dusamantapur Ext.	R.F		=	16.492	0	0	16.492
	Dusanad	PRF		57.86	57.86	0	0	
	Champajharan	PRF		-	50.00	0	0	50.00
	Pititung	PRF(P)	1to 4	1971.66	2408.60	0	436.94	
Malkangiri	Koilipari	PRF	1to2	1817.02	656.00	1161.02	0	

	Jhileruguda	PRF	1to2	1129.09	217.00	912.09	0	
	Jharapalli	R.F		-	100.00	0	0	100.00
	Sindrimal	PRF	1to2	2630.51	639.00	1991.51	0	
	Pititung	PRF(P)	8	1150.42	435.00	715.42	0	
	Pititung	PRF(P)	5,6,7	0	445.00		0	445.00
Balimela	Chitapari	RF	1 to 2	2125.69	1295.00	830.69	0	
	Balimela	PRF	1to4	4488.20	2800.00	1688.20	0	
	Taralakota	PRF	1to 7	5197.56	2872.27	2325.29	0	
	Matumkond a	PRF	1(P)to 4(P)	1693.84	963.12	730.72	0	
Chitrakond a	Sileru West	R.F	1 to 2	1573.10	857.199	715.901	0	
	Banguru	R.F	Part	0	75.00	0	0	75
	Limalari	R.F	Part	0	200.00	0	0	200
	Pabliguda	R.F	Part	0	91.27	0	0	91.27
	Mantriput	R.F	Part	0	225.57	0	0	225.57
	Gouragauri	PRF	Part	0	44.03	0	0	44.03
	Bodokonda	PRF	Part	0	154.13	0	0	154.13
	Bhimaram	PRF	No.1&3 (P)	0	987.15	0	0	987.15
	Bandhagud a	PRF	Part	0	385.83	0	0	385.83
	Rangunigu da	PRF	Part	0	624.56	0	0	624.56
	Jantri	PRF	1(P)&2(P)	0	1357.42	0	0	1357.42
	Singaram	PRF	1(P), 2(P)&3(P)	0	1168.78	0	0	1168.78

	Sikpanasa	PRF	1(P)	0	881.61	0	0	881.61
	Datunguda	PRF	1(Part)	0	885.00	0	0	885.00
	Matumkon da	PRF	1(P)to 4(P)	0	1807.1546	0	0	
Kalimela	Mandapalli	PRF	1(P)&2(P)	0	1000.00	0	0	1000.00
	Yengulkon da	R.F	Part	0	520.00	0	0	520.00
	Venkatpall am	R.F	Whole	460.82	310.82	150.00	0	
	Gompakon da	R.F	2(Part)		200.00			200.00
	Udayagiri	R.F	1 to 4	6650.29	4060.00	2590.29	0	
	Matumgud a	R.F	Whole		114.24	0	0	114.24
	Pedawada	PRF	Part		500.00	0	0	500.00
Motu	Pusugudam	R.F	1(P) to 4(P)	250	1500.00	0	0	1500.00
	Poluru	R.F	Part	300	300.00	0	0	300.00
	Dupenkond a	PRF	Part	200	200.00	0	0	200.00
	Malavaram	R.F	Part	50	50.00	0	0	50.00
	Anantaplli	R.F	Part	500	500.00	0	0	500.00
	Kattaguda	PRF	Part	54.55	54.55	0	0	54.55
	Tadimetla	R.F	1(P) to 4(P)	0	1600.00	0	0	1600.00
Mathili	Dharmagar h	RL	No-1	0	1278.25	0	0	1278.25
			No-2	0	929.50	0	0	929.50

			No-3	0	770.25	0	0	770.25
	Dasamanpur	RL	No-1	0	1166.25	0	0	1166.25
			No-2	0	782.25	0	0	782.25
Kalimela	Silakota	RL	No-3	0	1398.00	0	0	1398.00
			No-4	0	1475.50	0	0	1475.50
			No-5	0	1334.50	0	0	1334.50
			No-6	0	840.50	0	0	840.50
	Total			39958.02	48271.8556	13811.131	436.94	24555.62

2.6.6 FELLING CYCLE

2.6.6.1 In the last plan the Felling Cycle was fixed to 10 years which synchronizes with the plan period and this plan has also been fixed at 10 years. In case of a longer Felling Cycle, the crop will remain unattended for over a long period of time. With a shorter Felling Cycle silvicultural operations can be taken up at shorter intervals to maintain the forest in healthy condition. Since the improvement of growing stock is the primary objective of management, it is desirable to have shorter Felling Cycle.

2.6.7 DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS (PB)

2.6.7.1 Not applicable as Shelter wood system is not adopted for this Working Circle.

2.6.8 CALCULATION OF THE YIELD

2.6.8.1 As the prime objective of this circle is to be improving the density and stand structure, there will be very conservative marking and the yield will be regulated by area. Besides this, there will be improvement marking of dead, dying, diseased, and defective trees from annual coupe area. Thus there will be some timber yield from the Selection- cum- Improvement felling.

2.6.8.2 The yield shall be regulated by area with a percentage check on the removal of exploitable trees as per “Smithy’s Safe Guarding Formula” This formula is also known as U.P. Safe guarding formula.

2.6.8.3 According to the “Smithy’s Safe Guarding Formula” the yield available during the felling cycle is regulated by the number of trees in approach Class-II(A) tree (out of which) per hectare that may pass into next girth Class-I (exploitable girth class) during the felling cycle. The increment is expressed by the following formula:

$$X = (F / T) \times (II - Z \% \text{ of II}) \text{ _____ (1)}$$

Where

X = Number of trees in approach class that passes into the exploitable class within period of Felling Cycle.

F = Felling Cycle (10 years)

T = Time period in years that takes approach Class II tree to reach to exploitable Class or Class I.

II = No of trees in approach class

Z = Percentage of Class II trees do not pass into Class I in “T” years due to mortality or removal of thinning.

2.6.8.4 The value of “T” and “Z” is generally referred from linear increment plots laid down along fertility gradients in different parts of the forest for determining these values under different diameter class but no such records have been maintained in this Division. As such the values of “T” and “Z” have been taken as 40 years and 50% respectively on the basis of All India Yield Table. Thus, taking into account of the above values for “T” & “Z” and considering felling cycle of 10 years. The percentage of the trees available for exploitation(Y) is calculated as follows.

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

Where

I: Number of trees already existing in the exploitable girth.

A: Arbitrary value to get the round figure of “Y”

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

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

$$Y = \frac{(F / T) \times (II - Z \% \text{ of } II)}{\quad} \times 100 + A \quad (3)$$

$$\begin{aligned}
& \frac{(I + (F / T) \times (II - Z \% \text{ of } II))}{2} \\
= & \frac{2FII(100-Z)}{200IT + FII(100-Z)} \times 100 + A \\
= & \frac{200II}{16I+II} + A
\end{aligned}$$

Thus the Yield has been calculated on percentage basis using “Smythie’s Safe Guarding Formula” and found as follows.

Table No. 2.4: Yield calculation in Percentage as per Smythie’s Safe Guarding Formula.

Felling Series	Forest Block		Comp No.	Enumeration Data/Hectare				Yield (%)	
				Sal		Non-Sal			
				II	I	II	I	Sal	Non-Sal
Mathili Selection Series with area of 4811.5520 Hectare									
Sarangapalli	Sarangapalli	RF	C-1	2.00	4.00	2.00	6.00	6.06	4.08
	Sarangapalli	RF	C-3	2.00	12.00	4.00	20.00	2.06	2.47
	Sarangapalli	RF	C-4	10.00	20.00	10.00	10.00	6.06	11.76
	Sarangapalli	RF	C-5	2.50	5.00	8.75	10.00	6.06	10.37
	Sarangapalli	RF	C-6	1.67	0.00	16.67	13.33	200.00	14.49
	Sarangapalli	RF	C-7	0.00	0.00	10.00	26.67	0.00	4.58
	Chedenga	RF	Part	0.00	0.00	10.00	13.33	0.00	8.96
	Malidanger	RF	Part	0.00	0.00	30.00	10.00	0.00	31.58
	Gotiguda	RF	Part	0.00	0.00	10.00	0.00	0.00	2.00
Sindrimal Selection Series with area of 1612.0000 Hectare									
Sindrimal	Sindrimal	PRF	C-1(P)	0.00	0.00	10.00	8.00	0.00	14.49
	Sindrimal	PRF	C-2(P)	0.00	0.00	5.00	7.50	0.00	8.00
	Koilipari		C-1(P)	0.00	0.00	20.00	0.00	0.00	2.00
	Koilipari	PRF	C-2(P)	0.00	0.00	17.50	12.50	0.00	16.09
	Jhileruguda	PRF	C-1(P)	0.00	0.00	10.00	10.00	0.00	11.76
	Jhileruguda	PRF	C-2(P)	0.00	0.00	10.00	12.50	0.00	9.52
	Jharapalli	RF	Part	0.00	0.00	0.00	0.00	0.00	0.00

Pitatung Selection Series with area of 3288.6000 Hectare									
Pitatung	Pitatung	PRF	C-1	0.00	0.00	24.29	17.14	0.00	16.27
	Pitatung	PRF	C-2	0.00	0.00	40.00	16.67	0.00	26.09
	Pitatung	PRF	C-3	0.00	0.00	30.00	10.00	0.00	31.58
	Pitatung	PRF	C-4	0.00	0.00	15.00	25.00	0.00	7.23
	Pitatung	PRF	C-6(P)	0.00	0.00	0.00	0.00	0.00	0.00
	Pitatung	PRF	C-7(P)	0.00	0.00	0.00	0.00	0.00	0.00
Balimela Selection Series with area of 4095.0000 Hectare									
Balimela	Chitapari	RF	C-1(P)	0.00	0.00	21.25	35.00	0.00	7.31
	Chitapari	RF	C-2(P)	0.00	0.00	7.50	32.50	0.00	2.84
	Balimela	PRF	C-1(P)	0.00	0.00	13.33	43.33	0.00	3.77
	Balimela	PRF	C-2(P)	0.00	0.00	17.50	91.25	0.00	2.37
	Balimela	PRF	C-3(P)	0.00	0.00	25.00	20.00	0.00	14.49
	Balimela	PRF	C-4(P)	0.00	0.00	9.09	32.73	0.00	12.56
Tarлакota Selection Series with area of 2872.2700 Hectare									
Tarлакota	Tarлакota	PRF	C-1(P)	0.00	0.00	0.00	0.00	0.00	0.00
	Tarлакota	PRF	C-2(P)	0.00	0.00	15.00	40.00	0.00	4.58
	Tarлакota	PRF	C-3(P)	0.00	0.00	0.00	0.00	0.00	0.00
	Tarлакota	PRF	C-4(P)	0.00	0.00	0.00	20.00	0.00	0.00
	Tarлакota	PRF	C-5(P)	0.00	0.00	26.67	23.33	0.00	13.33
	Tarлакota	PRF	C-6(P)	0.00	0.00	12.50	32.50	0.00	4.69
	Tarлакota	PRF	C-7(P)	0.00	0.00	6.67	36.67	0.00	2.25
Sileru(West) Selection Series with area of 7937.5490 Hectare									
Sileru(West)	Sileru(West)	RF	C-1(P)	0.00	0.00	6.67	2.50	0.00	28.57
	Sileru(West)	RF	C-2(P)	0.00	0.00	5.00	2.00	0.00	27.03
	Banaguru	RF	Part	0.00	0.00	0.00	0.00	0.00	0.00
	Datunguda	PRF	C-1(P)	0.00	0.00	5.00	1.67	0.00	31.58
	Datunguda	PRF	C-2(P)	0.00	0.00	0.00	0.00	0.00	0.00
	Mantriput	PRF	Part	0.00	0.00	0.00	0.00	0.00	0.00
	Gouragurei	PRF	Part	0.00	0.00	0.00	10.00	0.00	0.00
	Badakonda	PRF	Part	0.00	0.00	0.00	0.00	0.00	0.00
	Publiguda	PRF	Part	0.00	0.00	20.00	40.00	0.00	6.06
	Bandhaguda	PRF	Part	0.00	0.00	0.00	0.00	0.00	0.00
	Limalori	RF	Part	0.00	0.00	5.00	0.00	0.00	2.00
	Shikpanas	PRF	C-1(P)	0.00	0.00	0.00	0.00	0.00	0.00
	Singaram	PRF	C-3(P)	0.00	0.00	10.00	10.00	0.00	11.76
	Bhimaram	PRF	C-1(P)	0.00	0.00	0.00	0.00	0.00	0.00
	Bhimaram	PRF	C-3(P)	0.00	0.00	0.00	7.50	0.00	0.00
Matumkonda Selection Series with area of 2770.2746 Hectare									
Matumkonda	Matumkonda	PRF	C-1(P)	0.00	0.00	23.13	30.00	0.00	9.19
	Matumkonda	PRF	C-2(P)	0.00	0.00	13.64	21.82	0.00	7.52
	Matumkonda	PRF	C-3(P)	0.00	0.00	9.09	6.36	0.00	16.39
	Matumkonda	PRF	C-4(P)	0.00	0.00	0.00	4.29	0.00	0.00

Kalimela Selection Series with area of 6705.0600 Hectare									
Kalimela	Udayagiri	RF	C-1(P)	0.00	0.00	10.71	12.14	0.00	10.45
	Udayagiri	RF	C-2(P)	0.00	0.00	13.64	19.09	0.00	8.55
	Udayagiri	RF	C-3(P)	0.00	0.00	3.33	26.67	0.00	1.55
	Udayagiri	RF	C-4(P)	0.00	0.00	14.71	11.76	0.00	14.49
	Mandapalli	PRF	C-1(P)	0.00	0.00	18.00	30.00	0.00	7.23
	Mandapalli	PRF	C-2(P)	0.00	0.00	45.00	7.50	0.00	54.55
	Yengulkonda	RF	Part	0.00	0.00	8.00	14.00	0.00	6.90
	Venkatpalam	RF	Part	0.00	0.00	15.00	5.00	0.00	31.58
	Pedawada	PRF	Part	0.00	0.00	15.00	33.33	0.00	5.47
	Gomphakonda	RF	C-2(P)	0.00	0.00	12.00	20.00	0.00	7.23
	Mutumguda	RF	part	0.00	0.00	15.00	30.00	0.00	6.06
Motu Selection Series with area of 4204.5500 Hectare									
Motu	Pusigudam	RF	C-1	0.00	0.00	20.00	8.00	0.00	27.03
	Pusigudam	RF	C-2	0.00	0.00	10.00	0.00	0.00	2.00
	Pusigudam	RF	C-3	0.00	0.00	23.33	3.33	0.00	60.87
	Pusigudam	RF	C-4	0.00	0.00	10.00	20.00	0.00	6.06
	Poluru	RF	Part	0.00	0.00	0.00	0.00	0.00	0.00
	Dupenkunda	PRF	Part	0.00	0.00	23.33	6.67	0.00	35.90
	Malavaram	RF	Part	0.00	0.00	0.00	10.00	0.00	0.00
	Anantapalli	RF	Part	0.00	0.00	32.50	7.50	0.00	42.62
	Tadimetla	RF	C-1	0.00	0.00	10.00	0.00	0.00	2.00
	Tadimetla	RF	C-2	0.00	0.00	0.00	0.00	0.00	0.00
	Tadimetla	RF	C-3	0.00	0.00	3.33	0.00	0.00	2.00
	Tadimetla	RF	C-4	0.00	0.00	0.00	0.00	0.00	0.00

In this Working Circle included 3 Nos. RL like Dharmagarh RL (P), Dasamantpur RL and Silakota RL. It is divided into 2 Nos. Felling Series i.e Darmagarh Felling Series and Silakota Felling Series. Thus the Yield has been calculated on percentage basis using “Smythie’s Safe Guarding Formula” and found as follows.

Table No. 2.5: Yield Calculation in Percentage as per Smythie's Safe Guarding Formula of RL

Felling Series	Forest Block		Comp No.	Enumeration Data/Hectare				Yield (%)	
				Sal		Non-Sal			
				II	I	II	I	Sal	Non-Sal
Dharmagarh Selection Series with area of 4926.50 Hectare									
Dharmagarh	Dharmagarh	RL	1	05	40	10	20	1.5	6.06
	Dharmagarh	RL	2	0	0	10	30	0	4.08
	Dharmagarh	RL	3	05	05	05	20	11.76	3.07
	Dasamantpur	RL	1	05	30	20	05	20.61	40.0
	Dasamantpur	RL	2	15	05	0	05	31.57	0.0
Silakota Selection Series with area of 5048.50 Hectare									
Silakota	Silakota	RL	3	0	0	0	05	0	0
	Silakota	RL	4	0	0	05	10	0	6.06
	Silakota	RL	5	0	0	10	25	0	4.87
	Silakota	RL	6	0	0	15	30	0	6.06

2.6.8.5 While calculating the yield for Selection-cum-Improvement Working Circle, factors like site quality, crop density and biotic interference like illicit felling, grazing etc. are to be taken into consideration. Further, in order to compensate such loss in different forms and time prescription of very conservative marking with further reduction in percentage of removal has been done by 50% in consonance with the paragraph no. 12 of the Guide line for Preparation of Working Plan and Felling Forests reprinted in 1997 by Ministry of Environment & Forests Govt. of India, Eastern Region, Bhubaneswar. Thus the number of trees both for Sal and other species to be removed in percentage is reduced further by 50% in all Blocks coming under Selection-cum-Improvement Working Circle.

Table No. 2.6: Yield Regulation Felling Series wise including limit on per hectare tree removal

Name of the Felling Series	Forest Block		Comp tt. No.	Area of the Felling Series in Hectare	From Smythie's Safe				After Reduction by 50%				Proposed Nos. of trees	
					Guarding Formula				for Biotic factors etc					
					Allowed		Tree limit		Allowed		Tree limit			
					% Removal		per ha		% Removal		per hectare			
					Sal	Non - Sal	Sal	Non-Sal	Sal	Non - Sal	Sal	Non - Sal	Sal	Non -Sal
Sarangapalli	Sarangapalli	RF	C-1	706.78	6.06	4.08	0.12	0.08	3.03	2.04	0.06	0.04	42	28
	Sarangapalli	RF	C-3	572.12	2.06	2.47	0.04	0.09	1.03	1.23	0.02	0.04	11	22
	Sarangapalli	RF	C-4	393.97	6.06	11.76	0.60	1.176	3.03	5.88	0.30	0.58	118	228
	Sarangapalli	RF	C-5	979.5	6.06	10.37	0.15	0.90	3.03	5.18	0.07	0.45	68	440
	Sarangapalli	RF	C-6	814.04	200	14.49	3.34	2.41	100	7.24	1.67	1.20	1359	977
	Sarangapalli	RF	C-7	606.84	0	4.58	0	0.458	0	2.29	0	0.22	0	133
	Chedenga	RF	Part	200	0	8.96	0	0.896	0	4.48	0	0.44	0	88
	Malidanger	RF	Part	100	0	31.58	0	9.47	0	15.79	0	4.73	0	473
	Gotiguda	RF	Part	100	0	2	0	0.2	0	1	0	0.1	0	10
Sindrimal	Sindrimal	PRF	C-1(P)	275	0	14.49	0	1.44	0	7.24	0	0.72	0	198
	Sindrimal	PRF	C-2(P)	364	0	8	0	0.4	0	4	0	0.2	0	72
	Koilipari	PRF	C-1(P)	400	0	2	0	0.4	0	1	0	0.2	0	80

	Koilipari	PRF	C-2(P)	256	0	16.0 9	0	2.81	0	8.04	0	1.40	0	358
	Jhileruguda	PRF	C-1(P)	100	0	11.7 6	0	1.176	0	5.88	0	0.58	0	58
	Jhileruguda	PRF	C-2(P)	117	0	9.52	0	0.95	0	4.76	0	0.47	0	55
	Jharapalli	RF	Part	100	0	0	0	0	0	0	0	0	0	0
Pititung	Pititung	PRF	C-1	985.39	0	16.2 7	0	3.95	0	8.13	0	1.97	0	1941
	Pititung	PRF	C-2	475.76	0	26.0 9	0	10.43	0	13.04	0	5.21	0	2478
	Pititung	PRF	C-3	510.51	0	31.5 8	0	9.47	0	15.79	0	4.73	0	2414
	Pititung	PRF	C-4	436.94	0	7.23	0	1.08	0	3.615	0	0.54	0	0
	Pititung	PRF	C-6(P)	177	0	0	0	0	0	0	0	0	0	0
	Pititung	PRF	C-7(P)	165	0	0	0	0	0	0	0	0	0	0
Balimela	Chitapari	RF	C-1(P)	780	0	7.31	0	1.55	0	3.65	0	0.77	0	600
	Chitapari	RF	C-2(P)	515	0	2.84	0	0.21	0	1.42	0	0.10	0	52
	Balimela	PRF	C-1(P)	310	0	3.77	0	0.50	0	1.88	0	0.25	0	78
	Balimela	PRF	C-2(P)	780	0	2.37	0	0.41	0	1.18	0	0.20	0	156
	Balimela	PRF	C-3(P)	450	0	14.4 9	0	3.62	0	7.24	0	1.81	0	814
	Balimela	PRF	C-4(P)	1260	0	12.5 6	0	1.14	0	6.28	0	0.57	0	718
Tarlakota	Tarlakota	PRF	C-1(P)	670	0	0	0	0	0	0	0	0	0	0
	Tarlakota	PRF	C-2(P)	550.78	0	4.58	0	0.68	0	2.29	0	0.34	0	187

	Tarлакота	PRF	C-3(P)	226.082	0	0	0	0	0	0	0	0	0	0
	Tarлакота	PRF	C-4(P)	400.51	0	0	0	0	0	0	0	0	0	0
	Tarлакота	PRF	C-5(P)	370.38	0	13.3 3	0	3.55	0	6.66	0	1.77	0	655
	Tarлакота	PRF	C-6(P)	430.433	0	4.69	0	0.58	0	2.34	0	0.29	0	125
	Tarлакота	PRF	C-7(P)	224.09	0	2.25	0	0.15	0	1.12	0	0.07	0	16
Sileru(West)	Sileru(West)	RF	C-1(P)	580.199	0	28.5 7	0	1.90	0	14.28	0	0.95	0	551
	Sileru(West)	RF	C-2(P)	277	0	27.0 3	0	1.35	0	13.51	0	0.67	0	185
	Banaguru	RF	Part	75	0	0	0	0	0	0	0	0	0	0
	Datunguda	PRF	C-1(P)	485	0	31.5 8	0	1.57	0	15.79	0	0.78	0	378
	Datunguda	PRF	C-2(P)	400	0	0	0	0	0	0	0	0	0	0
	Mantriput	PRF	Part	225.57	0	0	0	0	0	0	0	0	0	0
	Gouragurei	PRF	Part	44.03	0	0	0	0	0	0	0	0	0	0
	Badakonda	PRF	Part	154.13	0	0	0	0	0	0	0	0	0	0
	Publiguda	PRF	Part	91.27	0	6.06	0	1.21	0	3.03	0	0.60	0	54
	Bandhaguda	PRF	Part	385.83	0	0	0	0	0	0	0	0	0	0
	Limalori	RF	Part	200	0	2	0	0.1	0	1	0	0.05	0	10
	Shikpanas	PRF	C-1(P)	881.61	0	0	0	0	0	0	0	0	0	0
	Singaram	PRF	C-3(P)	268.63	0	11.7 6	0	1.17	0	5.88	0	0.58	0	156
	Bhimaram	PRF	C-1(P)	587.15	0	0	0	0	0	0	0	0	0	0
	Bhimaram	PRF	C-3(P)	400	0	0	0	0	0	0	0	0	0	0
Matumkond	Matumkonda	PRF	C-1	1327.6	0	9.19	0	2.12	0	4.59	0	1.06	0	1407

a	Matumkonda	PRF	C-2	445.4746	0	7.52	0	1.02	0	3.76	0	0.51	0	227
	Matumkonda	PRF	C-3	284.77	0	16.39	0	1.48	0	8.19	0	0.74	0	210
	Matumkonda	PRF	C-4	712.42	0	0	0	0	0	0	0	0	0	0
													0	
Kalimela	Udayagiri	RF	C-1(P)	950	0	10.45	0	0.80	0	5.22	0	0.40	0	380
	Udayagiri	RF	C-2(P)	820	0	8.55	0	1.16	0	4.27	0	0.58	0	475
	Udayagiri	RF	C-3(P)	840	0	1.55	0	0.05	0	0.77	0	0.02	0	168
	Udayagiri	RF	C-4(P)	1450	0	14.49	0	2.13	0	7.24	0	1.06	0	1537
	Mandapalli	PRF	C-1(P)	600	0	7.23	0	1.30	0	3.61	0	0.65	0	390
	Mandapalli	PRF	C-2(P)	400	0	54.55	0	24.54	0	27.27	0	12.27	0	4908
	Yengulkonda	RF	Part	520	0	6.9	0	0.55	0	3.45	0	0.27	0	140
	Venkatpalam	RF	Part	310.82	0	31.58	0	4.73	0	15.79	0	2.36	0	732
	Pedawada	PRF	Part	500	0	5.47	0	0.82	0	2.73	0	0.41	0	205
	Gomphakond a	RF	C-2(P)	200	0	7.23	0	0.86	0	3.61	0	0.43	0	86
	Mutumguda	RF	part	114.24	0	6.06	0	0.90	0	3.03	0	0.45	0	51
Motu	Pusigudam	RF	C-1	250	0	27.03	0	5.40	0	13.51	0	2.70	0	675
	Pusigudam	RF	C-2	250	0	2	0	0.2	0	1	0	0.10	0	25

	Pusigudam	RF	C-3	600	0	60.87	0	14.20	0	30.43	0	7.10	0	4260
	Pusigudam	RF	C-4	400	0	6.06	0	0.60	0	3.03	0	0.30	0	120
	Poluru	RF	Part	300	0	0	0	0	0	0	0	0	0	0
	Dupenkunda	PRF	Part	200	0	35.9	0	8.37	0	17.95	0	4.18	0	836
	Malavaram	RF	Part	50	0	0	0	0	0	0	0	0	0	0
	Anantapalli	RF	Part	500	0	42.62	0	13.85	0	21.31	0	6.92	0	3460
	Tadimetla	RF	C-1	200	0	2	0	0.2	0	1	0	0.1	0	20
	Tadimetla	RF	C-2	500	0	0	0	0	0	0	0	0	0	0
	Tadimetla	RF	C-3	700	0	2	0	0.06	0	1	0	0.03	0	700
	Tadimetla	RF	C-4	200	0	0	0	0	0	0	0	0	0	200

Table No. 2.7: Yield Regulation Felling Series of RL Wise including limit on per hectare tree removal

Dharmagarh	Dharmagarh	RL	C-1	1278.25	1.5	6.06	0.07	0.60	0.75	3.03	0.03	0.30	38	383
	Dharmagarh	RL	C-2	929.5	0	4.08	0	0.40	0	2.04	0	0.20	0	186
	Dharmagarh	RL	C-3	770.25	11.76	3.07	0.58	0.15	5.88	1.53	0.29	0.07	223	54
	Dasamantpur	RL	C-1	1166.25	20.61	40.0	1.03	8.0	10.30	20.0	0.51	4	595	4665
	Dasamantpur	RL	C-2	782.25	31.57	0	4.73	0	15.78	0	2.36	0	1846	0
Silakota	Silakota	RL	C-3	1398	0	0	0	0	0	0	0	0	0	0
	Silakota	RL	C-4	1475.5	0	6.06	0	0.30	0	3.03	0	0.15	0	221
	Silakota	RL	C-5	1334.5	0	4.87	0	0.48	0	2.43	0	0.24	0	320
	Silakota	RL	C-6	840.5	0	6.06	0	0.90	0	3.03	0	0.45	0	378

2.6.8.6 As revealed from the above tabular statement, the average allowed percentage of removal in case of Sal is 1% where as for Non- Sal species is 5% of the total number of trees to be harvested. Thus in the present trend of heavy biotic interference the reduced percentage will certainly help in compensating the day to day illegal removal and in maintaining the environmental and ecological stability. In fact, the yield will be negligible while considering the needs of the local people and industries too.

2.6.9 TABLE OF FELLING

2.6.9.1 The forest area allotted to the Selection-cum-Improvement Working Circle has been distributed into different felling series. While constituting the felling series, care has been taken to restrict the area to about 900 ha for better implementation of the prescriptions, administrative convenience and ensure that the annual coupes are manageable size which could be working during one working season. The annual coupes in each felling series have been demarcated by taking the natural features, compartment boundaries, administrative boundaries of the different ranges and crop condition. Each felling series is divided into 10 annual coupes so that the entire area of the felling series is covered in the plan period. As per the decision of the higher authority the year of felling should start from 2021-22 to 2030-31 instead of starting from 2017-18 to 2026-27. The felling series together with the details of Coupe No's, Forest Blocks, Compartments with area and Year of felling series wise coupe maps (1:50000) have been furnished in Table No-2.6 to 2.14.

Table No.2.8: Annual Coupes under Sarangapalli Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Mathili	Sarangapalli	RF	No-6(P)	318.04	484.532
			Gotiguda	R.F	Part	100.00	
			Dasamantapur Ext.	R.F	Whole	16.492	
			Champajharan	PRF	Part	50.00	
2022-23	II	-do-	Sarangapalli	RF	No-6(B)	496.00	496.00

2023-24	III	-do-	Sarangapalli	RF	No-7(P)	506.84	506.84
2024-25	IV	-do-	Sarangapalli	RF	No-7(B)	100.00	485.00
			Sarangapalli	RF	No-1(P)	385.00	
2025-26	V	-do-	Sarangapalli	RF	No-1(B)	321.78	434.78
			Sarangapalli	RF	No-2(P)	113.00	
2026-27	VI	-do-	Sarangapalli	RF	No-2(P)	100.950	453.07
			Sarangapalli	RF	No-3(P)	352.12	
2027-28	VII	-do-	Sarangapalli	RF	No-3(B)	220.00	513.97
			Sarangapalli	RF	No-4(P)	293.97	
2028-29	VIII	-do-	Sarangapalli	RF	No-4(B)	100.00	511.84
			Sarangapalli	RF	No-5(B)	411.84	
2029-30	IX	-do-	Dusanad	PRF	Whole	57.86	435.75
			Malidanger	RF	Part	100.00	
			Sarangapalli	RF	No-5(P)	277.89	
2030-31	X	-do-	Sarangapalli	RF	No-5(P)	289.770	489.77
			Chedenga	R.F	Part	200.00	
G.Total							4811.552

Table No. 2.9: Annual Coupes under Sindrimal Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Malkangiri	Jhileruguda	PRF	No.2(P)	117.00	217.00
			Jharapalli	PRF	part	100.00	
2022-23	II	-do-	Sindrimal	PRF	No.1(P)	175.00	175.00
2023-24	III	-do-	Sindrimal	PRF	No.1(P)	100.00	164.00
			Sindrimal	PRF	No.2(P)	64.00	
2024-25	IV	-do-	Sindrimal	PRF	No.2(P)	150.00	150.00
2025-26	V	-do-	Sindrimal	PRF	No.2(P)	150.00	150.00
2026-27	VI	-do-	Koilipari	PRF	No.1(P)	200.00	200.00
2076-28	VII	-do-	Koilipari	PRF	No.1(P)	200.00	200.00
2028-29	VIII	-do-	Koilipari	PRF	No.2(P)	156.00	156.00
2029-30	IX	-do-	Koilipari	PRF	No.2(B)	100.00	100.00
2030-31	X	-do-	Jhileruguda	PRF	No.1(P)	100.00	100.00
G.Total							1612.00

Table No. 2.10: Annual Coupes under Pitatung Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Mathili	Pitatung	PRF	No-1(P)	328.00	328.00
2022-23	II	-do-	Pitatung	PRF	No-1(B)	329.00	329.00
2023-24	III	-do-	Pitatung	PRF	No-2(P)	340.76	340.76
2024-25	IV	-do-	Pitatung	PRF	No-2(B)	135.00	335.00
			Pitatung	PRF	No-3(P)	200.00	
2025-26	V	-do-	Pitatung	PRF	No-3(B)	310.51	310.51
2026-27	VI	-do-	Pitatung	PRF	No-4(P)	306.94	306.94
2027-28	VII	Mathili	Pitatung	PRF	No-4(B)	130.00	333.00
		Malkangiri	Pitatung	PRF	No-5(P)	103.00	
			Pitatung	PRF	No-6(P)	100.00	
2028-29	VIII	Malkangiri	Pitatung	PRF	No-6(P)	77.00	342.00
			Pitatung	PRF	No-7(P)	165.00	
			Pitatung	PRF	No-8(P)	100.00	
2029-30	IX	Malkangiri	Pitatung	PRF	No-8(P)	335.00	335.00
2030-31	X	Mathili	Pitatung	PRF	No-1(P)	328.39	328.39
G.Total							3288.60

Table No.2.11: Annual Coupes under Balimela Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Balimela	Balimela	PRF	No.2(P)	380.00	380.00
2022-23	II	-do-	Balimela	PRF	No.2(P)	400.00	400.00
2023-24	III	-do-	Balimela	PRF	No.3(P)	450.00	450.00
2024-25	IV	-do-	Balimela	PRF	No.4(P)	420.00	420.00
2025-26	V	-do-	Balimela	PRF	No.4(P)	420.00	420.00
2026-27	VI	-do-	Balimela	PRF	No.4(P)	420.00	420.00

2027-28	VII	-do-	Chitapari	R.F	No.1(P)	400.00	400.00
2028-29	VIII	-do-	Chitapari	R.F	No.1(P)	380.00	480.00
			Chitapari	R.F	No.2(P)	100.00	
2029-30	IX	-do-	Chitapari	R.F	No.2(P)	415.00	415.00
2030-311	X	Balimela	Balimela	PRF	No-1(P)	310.00	310.00
G.Total							4095.00

Table No. 2.12: Annual Coupes under Tarlakota Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Balimela	Tarlakota	R.F	No.2(P)	290.00	290.00
2022-23	II	-do-	Tarlakota	R.F	No.2(P)	100.00	326.08
			Tarlakota	R.F	No.3(P)	226.08	
2023-24	III	-do-	Tarlakota	R.F	No.4(P)	290.51	290.51
2024-25	IV	-do-	Tarlakota	R.F	No.4(P)	110.00	290.38
			Tarlakota	R.F	No.5(P)	180.38	
2025-26	V	-do-	Tarlakota	R.F	No.5(P)	190.00	300.00
			Tarlakota	R.F	No.6(P)	110.00	
2026-27	VI	-do-	Tarlakota	R.F	No.6(P)	320.43	320.43
2027-28	VII	-do-	Tarlakota	R.F	No.7(P)	224.09	224.09
2028-29	VIII	-do-	Tarlakota	R.F	No.1(P)	270.00	270.00
2029-30	IX	-do-	Tarlakota	R.F	No.1(P)	290.00	290.00
2030-31	X	Balimela	Tarlakota	R.F	No.1(P)	110.00	270.78
			Tarlakota	R.F	No.2(P)	160.78	
G.Total		-					2872.27

Table No. 2.13: Annual Coupes under Sileru-West Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Sileru West	R.F	No.1(P)	197.08	642.48
			Pabliguda	R.F	Part	91.270	
			Limalari	R.F	Part	200.000	
			Bodokonda	PRF	Part	154.13	
2022-23	II	-do-	Sileru West	R.F	No.2(P)	277.000	621.600
			Banguru	R.F	Part	75.000	
			Mantriput	R.F	Part	225.570	
			Gouragauri	PRF	Part	44.030	
2023-24	III	-do-	Jantri	PRF	No.1(P)	156.90	744.05
			Bhimaram	PRF	No.1(P)	587.15	
2024-25	IV	-do-	Bhimaram	PRF	No.3(P)	400.00	785.83
			Bandhaguda	PRF	Part	385.83	
2025-26	V	-do-	Datunguda	PRF	No.1(P)	485.00	685.00
			Datunguda	PRF	No.2(P)	200.00	
2026-27	VI	-do-	Ranguniguda	PRF	Part	624.56	824.56
			Datunguda	PRF	No.2(P)	200.00	
2027-28	VII	-do-	Jantri	PRF	No.1(P)	700.00	906.869
			Sileru West	RF	No-1(P)	206.869	
2028-29	VIII	-do-	Jantri	PRF	No.2(P)	500.52	900.52
			Singaram	PRF	No.2(P)	400.00	
2029-30	IX	-do-	Singaram	PRF	No.1(P)	500.15	900.15
			Sikpanasa	PRF	No.1(P)	400.00	
2030-31	X	-do-	Sikpanasa	PRF	No.1(P)	481.61	926.49
			Sileru West	R.F	No.1(P)	176.25	
			Singaram	PRF	No.3(P)	268.63	
G.Total							7937.549

Table No. 2.14: Annual Coupes under Matumkonda Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Matumkonda	PRF	No.1(P)	290.00	290.00
2022-23	II	-do-	Matumkonda	PRF	No.1(P)	280.00	280.00
2023-24	III	-do-	Matumkonda	PRF	No.1(P)	100.00	256.4346
			Matumkonda	PRF	No.2(P)	29.6046	
		Balimela	Matumkonda	PRF	No.1(P)	126.83	
2024-25	IV	Chitrakonda	Matumkonda	PRF	No.1(P)	250.00	250.00
2025-26		-do-	Matumkonda	PRF	No.4(P)	280.78	280.78
2026-27	VI	-do-	Matumkonda	PRF	No.4(P)	296.00	296.00
2027-28	VII	Balimela	Matumkonda	PRF	No.2(P)	280.87	280.87
2028-29	VIII	-do-	Matumkonda	PRF	No.2(P)	135.00	270.65
2029-30	IX	-do-	Matumkonda	PRF	No.4(P)	135.65	284.77
			Matumkonda	PRF	No.3(P)	284.77	
2030-31	X	Chitrakonda	Matumkonda	PRF	No.1(P)	280.77	280.77
G.Total							2770.2746

Table No. 2.15: Annual Coupes under Kalimela Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Kalimela	Udayagiri	R.F	No.2(P)	400.00	600.00
			Mandapalli	PRF	No.2(P)	200.00	
2022-23	II	-do-	Udayagiri	R.F	No.3(P)	590.00	704.24
			Matumguda	R.F	Whole	114.24	
2023-24	III	-do-	Mandapalli	PRF	No.2(P)	200.00	650.00
			Udayagiri	R.F	No.3(P)	250.00	
			Gompakonda	R.F.	No.2(P)	200.00	

2024-25	IV	-do-	Udayagiri	R.F	No.4(P)	100.00	700.00
			Mandapalli	PRF	No.1(P)	600.00	
2025-26	V	-do-	Udayagiri	R.F	No.4(P)	680.00	680.00
	VI	-do-	Udayagiri	R.F	No.4(P)	670.00	670.00
2026-27	VII	-do-	Yengulkonda	R.F	Part	520.00	670.00
			Pedawada	PRF	Part	150.00	
2028-29	VII	-do-	Pedawada	PRF	Part	350.00	660.82
			Venkatpallam	R.F	Part	310.82	
2029-30	IX	-do-	Udayagiri	R.F	No.1(P)	670.00	670.00
2030-31	X		Udayagiri	R.F	No.2(P)	420.00	700.00
			Udayagiri	R.F	No.1(P)	280.00	
G.Total							6705.06

Table No. 2.16: Annual Coupes under Motu Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Motu	Pusugudam	R.F	No.1(P)	250.00	400.00
			Pusugudam	R.F	No.2(P))	150.00	
2022-23	II	-do-	Pusugudam	R.F	No.2(P)	100.00	400.00
			Pusugudam	R.F	No.3(P)	300.00	
2023-24	III	-do-	Pusugudam	R.F	No.3(P)	300.00	404.55
			Kattaguda	PRF	Part	54.55	
			Malavaram	R.F	Part	50.00	
2024-25	IV	-do-	Pusugudam	R.F	No.4(P)	400.00	400.00
2025-26	V	-do-	Tadimella	R.F	No.1(P)	200.00	400.00
			Tadimella	R.F	No.2(P)	200.00	
2026-27	VI	-do-	Tadimella	R.F	No.2(P)	300.00	400.00
			Tadimella	R.F	No.3(P)	100.00	
2027-28	VII	-do-	Tadimella	R.F	No.3(P)	400.00	400.00

2028-29	VIII	-do-	Tadimella	R.F	No.3(P)	200.00	400.00
			Tadimella	R.F	No.4(P)	200.00	
2029-30	IX	-do-	Poluru	R.F.	(P)	300.00	500.00
			Dupenkonda	PRF	Part	200.00	
2030-31	X	-do-	Anantaplli	R.F	Part	500.00	500.00
G.Total							4204.55

Table No. 2.17: Annual Coupes under Dharmagarh Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compart-ment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Mathili	Dharmagarh	RL	1(P)	426.00	426.00
2022-23	II	-do-	Dharmagarh	RL	1(P)	426.00	426.00
2023-24	III	-do-	Dharmagarh	RL	1(B)	426.25	426.25
2024-25	IV	-do-	Dharmagarh	RL	2(P)	460.00	460.00
2025-26	V	-do-	Dharmagarh	RL	2(B)	469.50	469.50
2026-27	VI	-do-	Dharmagarh	RL	3(P)	500.00	500.00
2076-28	VII	-do-	Dharmagarh	RL	3(P)	270.25	570.25
			Dasamantpur	RL	1(P)	300.00	
2028-29	VIII	-do-	Dasamantpur	RL	1(P)	500.00	500.00
2029-30	IX	-do-	Dasamantpur	RL	1(B)	366.25	566.25
					2(P)	200.00	
2030-31	X	-do-	Dasamantpur	RL	2(B)	582.25	582.25
G.Total					G.Total	4926.50	4926.50

Table No.2.18: Annual Coupes under Silakota Felling Series

Year	Coupe No	Range	Name of Forest Block	Status	Compart -ment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Kalimela	Silakota	RL	3(P)	520.00	520.00
2022-23	II	-do-	Silakota	RL	3(P)	578.00	578.00
2023-24	III	-do- -do-	Silakota	RL	3(B)	300.00	575.00
			Silakota	RL	4(P)	275.00	
2024-25	IV	-do-	Silakota	RL	4(P)	600.50	600.50
2025-26	V	-do-	Silakota	RL	4(B)	600.00	600.00
2026-27	VI	-do-	Silakota	RL	5(P)	500.00	500.00
2076-28	VII		Silakota	RL	5(P)	534.50	534.50
2028-29	VIII	-do-	Silakota	RL	5(B)	300.00	300.00
2029-30	IX	-do-	Silakota	RL	6(P)	440.50	440.50
2030-31	X	-do-	Silakota	RL	6(B)	400.00	400.00
					G.Total	5048.50	5048.50

2.6.9.2 Year wise, felling series wise area break up is furnished in Table No.2.19

Table No. 2.19: Year wise distribution of Area felling Series wise of Selection Working Circle

Sl. No .	Name of the Felling Series	Year wise area in Ha										Total
		2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	
1	Sarangapalli	484.532	496.00	506.84	485.00	434.78	453.07	513.97	511.84	435.75	489.77	4811.5520
2	Sindhimal	217.000	175.00	164.00	150.00	150.00	200.00	200.00	156.00	100.00	100.00	1612.0000
3	Pititung	328.00	329.00	340.76	335.00	310.51	306.94	333.00	342.00	335.00	328.39	3288.6000
4	Balimela	380.00	400.00	450.00	420.00	420.00	420.00	400.00	480.00	415.00	310.00	4095.0000
5	Tarlakota	290.00	326.08	290.51	290.38	300.00	320.43	224.09	270.00	290.00	270.78	2872.2700
6	Sileru-West	642.48	621.60	744.05	785.83	685.00	824.56	906.869	900.52	900.15	926.49	7937.5490
7	Matumkonda	290.00	280.00	256.4346	250.00	280.78	296.00	280.87	270.65	284.77	280.77	2770.2746
8	Kalimela	600.00	704.24	650.00	700.00	680.00	670.00	670.00	660.82	670.00	700.00	6705.0600
9	Motu	400.000	400.00	404.55	400.00	400.00	400.00	400.00	400.00	500.00	500.00	4204.5500
10	Dharmagarh	426.00	426.00	426.25	460.00	469.50	500.00	570.25	500.00	566.25	582.25	4926.50
11	Silakota	520.00	578.00	575.00	600.50	600.00	500.00	534.50	300.00	440.50	400.00	5048.50
	G. Total	4578.012	4735.92	4808.3946	4876.71	4730.57	4891.00	5033.549	4791.83	4937.42	4888.45	48271.8556

2.6.10 METHOD OF EXECUTION OF FELLING

2.6.10.1 Demarcation of Annual Coupes

- i) The annual coupes shall be demarcated in the winter season (October to December) preceding to the year of working.
- ii) If any portion of the coupe line coincides with compartment or sub-compartment line, it need not be laid on the ground. The compartment and sub-compartment line shall be maintained by putting double white paint rings on the trees standing on the boundary at visible distance.
- iii) The rest of the coupe lines shall be laid by clearing 1.5m wide strip along the coupe boundary and putting stone cairns (white painted) at visible distance. Clearance shall be restricted for the purpose of identification and visibility only. No felling of any kind shall be done along the strip. Double coal tar rings shall be given on the trees standing on the strips.
- iv) In case a coupe overlaps two or more compartments each compartment shall be treated as a lot. This will ensure proper maintenance of compartment histories. In all these cases, the lot line should be demarcated with single coal tar ring on the trees standing along the compartment and/or sub-compartment line.
- v) Coupes shall be indicated by single boards at corners or at points of intersection with rod. Inspection paths, boundary lines of reserved forests etc. The signboard should contain the name of the felling series, the number of the coupe, its area, year of working and number of the compartment.
- vi) Annual coupes shall be demarcated by a Forest Officer not below the rank of Forest Ranger and shall be checked by a forest officer not below the rank of Asst. Conservator of Forests before the marking is taken up.

2.6.10.2 Marking Rules

2.6.10.2.1 General Considerations: The following aspects need to be kept in mind while going in for markings in both Selection and Improvement felling series.

- (i) After demarcation of coupes, marking of trees shall be done in accordance with the marking rules prescribed in the following paragraphs. The demarcation and marking should

be entrusted to the officers not below the rank of a Forest Ranger. It shall be checked by a forest officer not below the rank of Assistant Conservator of Forests; even the DFO shall also ensure test check at his level as well (except as provided specifically in the marking rules)

(ii) The Marking Officer shall assess the illicit felling inside the annual coupes prior to marking. The quantum of marking shall be reduced by the extent of trees illicitly felled. Thus the net trees to be marked should be difference between the permissible number of trees due to marking and the number of trees illicitly felled during the period between last felling and the subsequent felling. In case the difference is negative, then no marking shall be done in that coupe.

(iii) All dead, dying seriously diseased, uprooted and fallen trees shall not be marked for felling. A tree whose top one third is already dead shall be treated as a dying tree. However, 2-3 such trees per hectare shall be retained for shelter to the wildlife like owls etc.

(iv) Out of the trees above exploitable girth class available, the trees limit of sal as per availability limited to 1% and non-sal 5% for RF & PRFs in case of RL the trees limit of sal as per availability limited to 3% and non-sal 5% shall be marked for felling. During marking the map shall be consulted for better guidance where marking can be planned.

(v) The trees retained (reserved trees) should be well grown and vigorous. They shall be painted with single white paint ring at breast height and at the base, and shall be serially numbered in each coupe. The list of such trees shall be maintained in the compartment history and coupe register.

(vi) If a tree is forked below the breast height, it shall be taken as two trees; if it is forked above the breast height it shall be taken as one tree.

(vii) All trees to be marked for felling shall be given two blazes of size 15 cm x 15 cm, one at breast height and the other at a place as close to the ground as possible and marked with a making hammer and numbered serially. If a tree is forked below the breast height, it shall be taken as two trees; otherwise, it shall be taken as one tree. The trees may be classified as sound or unsound from external appearance

(viii) Marking shall not be done within 50 meters of roadside and either side of nallah banks. Similarly, marking shall not be done within 50-meter radius of the key habitat of wild animals such as den, salt lick, wallows, game tank and water holes.

- (ix) If a tree is marked for felling, no other tree shall be marked within 15 meter radius of that tree.
- (x) Marking should not be done in areas where the slope of terrain is more than 30° except for dead and uprooted trees.
- (xi) Only those trees shall be marked whose removal will not create a permanent gap in the canopy and will not affect regeneration of the flora.
- (xii) Trees standing on the bank patch having no established regeneration of any species underneath shall not be marked.
- (xiii) Fruit bearing and Oil seed trees such as Mahua, Mango, Tamarind, Amla, Char, Kendu, Harida, Bahada, Bela, Kusum etc shall not be marked for felling.
- (xiv) All climbers shall be cut prior to marking.

2.6.10.3 Improvement Marking:

The improvement marking is mainly intended for improve the crop composition without aiming at on yield. Marking of all dead, diseased and defective trees irrespective of girth class and inclusive of even fallen trees as well. However some dead standing trees shall be retained in the interest of Wild-life purpose.

Marking of unsound or malformed trees irrespective of girth class which are unlikely to survive or which will further deteriorate before the next felling unless they are required for seed or soil cover. Such marking and removal shall be subjected to following additional condition.

1. The marked trees shall form part of congested crop and principle of thinning warrants its removal.
2. There shall be established seedling, sapling of poles to replace the removal.
3. No marking of fruit bearing trees such as Mango, Tamarnd, Mahula, Kendu, Char, Bela, and Kusum etc. shall be done for its removal.
4. The marking of trees shall be always of inferior species interfering of likely to interfere to the established growth of principal species.

2.6.10.4 Thinning: After Selection-cum-Improvement marking, if the crop will be found congested, then the thinning operations shall be carried out in order to afford the better opportunity of growth to the retained principal species. While carrying out thinning operation, the following points are to be kept in mind.

- (i) There should be no mechanical thinning but silvicultural thinning to be carried out in the congested pole crops below 90 cm girth at breast height.
- (ii) The thinning shall be restricted to dominated and suppressed stems.
- (iii) No thinning shall be carried out in open area, which may otherwise resist soil erosion of the site.
- (iv) The thinning of fruit bearing trees such as Char, Kendu, Kusum, Mango, Harida, Bahada, Amla etc. shall not be made in any circumstances.
- (v) Marking shall be done on the lines of “C” grade thinning which is restricted to removal of only ‘dominated’ & ‘suppressed’ stems besides removal of some ‘co-dominant’ stems as well [Dominated stems have height about $3/4^{\text{th}}$ where as Suppressed stems are about half to $5/8^{\text{th}}$ of the height of the predominant stems. The Dominant stems comprise of all trees which form the upper most canopy and are divided into (i) Predominant trees comprising of the tallest trees which determine the general top level of canopy and (ii) Co-dominant trees which are about $5/6^{\text{th}}$ the height of the pre-dominants]
- (vi) Limit on removal of stems vis-à-vis retention per hectare shall be governed by the formula: $D=0.5[(G/10)+1]$, where ‘D’ is the distance between two stems in meters after thinning and ‘G’ is the average girth of stems in cms.
- (vii) As thinning, markings are to be done very sparingly with meticulous reflection of mind and extreme silvicultural restraints; this will need prior approval of DFO.

2.6.10.5 Execution of Marking and Felling

- (i). The marking shall be done by an Officer not below the rank of a Forest Ranger and duly checked by an officer as provided in the Orissa Forest Department Code 1979, and as modified by the Government from time to time.
- (ii). All climbers shall be cut in the annual coupe during marking. The portions of the annual coupe, where felling is prohibited, shall be kept free from climbers to safeguard the timber value of trees.

(iii). The method of disposal of trees marked for felling shall be as per Chapter XIV of the O.F.D. Code 1979, as modified by the Government from time to time.

(iv). Felling and extraction in annual coupes shall be allowed from 1st October to 30th June only. No felling, logging, passing, dragging and extraction shall be allowed between 1st July and 30th September. The competent authority, if so required, shall consider any proposal for extension, only after physical verification of the coupes by the Divisional Forest Officer and his report.

(v). Trees marked for felling shall be lopped before felling to avoid damage to regeneration and standing crops. The trees shall be felled towards upper slope in hilly coupes.

(vi). Works undertaken, number of lots formed if any, passing list and deviation, if any shall be mentioned in the compartment history.

2.6.11 SUBSIDIARY SILVICULTURAL OPERATION:

2.6.11.1 Subsidiary silvicultural operation shall be taken up in the year following the main felling, over the entire coupe area except in much degraded area and steep slopes. The following operations are prescribed.

(i) In order to take up subsidiary Silvicultural operation, annual action plan shall be prepared one year in advance along with treatment plan and treatment map.

(ii) Marked trees left standing by the lessee /OFDC Ltd. shall be felled. Trees damaged during working of the coupe, which do not have any chance of survival, shall also be felled.

(iii) Seriously diseased trees and high stumps shall be cut back.

(iv) Climbers left per chance during marking of the coupes, shall be cut.

(v) Lops and tops, small wood pieces and barks left after main felling shall be removed to avoid fire hazards and harbouring of insect and disease causing organisms.

(vi) Soil and moisture conservation measures, wherever necessary inside the annual coupes, shall be taken up like gully plugging, contour bonding, dry stone packing, check dams vegetative bonds etc.

(vii) Thinning of congested advanced growth if found after main felling shall be carried out in order to favour the promising stem.

(viii) The blank areas created due to encroachment or any other reasons (more than half hectare of any blank patch can be considered as blank area) shall be planted by indigenous species. The standard techniques of plantation and its after care are to be adopted here as well.

2.6.11.2 All the subsidiary silvicultural operations carried out shall also be entered in the respective compartment history files.

2.6.12 REGENERATION

2.6.12.1 Natural regeneration, including rootstock management, is prescribed to be preference over Artificial Regeneration. The areas with promising seedling of seed origin and root stock patches shall be identified and marked on the treatment map. Artificial Regeneration shall be taken only in gap areas (except natural blanks) having inadequate natural regeneration of a minimum of 5 ha area. It shall be ensured that no seedling is planted within 3 meters distance from a established seedling or existing trees. The standing trees have influence zone of spreading shadow and pit should not be dug in the shadow or in the influence zone of the standing trees. Influence zone of various sizes of trees is given in below table.

Table No. 2.20: Influence zone of various sizes of trees

Sl.No.	Girth class (cm)	Influence zone(meter)
1	<30	2
2	30-60	3
3	60-90	4
4	90-120	5
5	>120	6

2.6.13 ASSOCIATED REGULATIONS AND MEASURES

2.6.13.1 Fire Protection: The coupe shall be protected against fire for a period of five years after the main felling. The Orissa Forest (Fire Protection Rules) 1979 shall be strictly followed. The coupe and plantations area should be rigidly protected from fire. Awareness regarding fire hazard and fire safety should be created in the villagers adjacent to the forest area. Appointment of suitable temporary firewatchers from the village adjoining to the forest Blocks should forms a part of the subsidiary operations.

2.6.13.2 Grazing: The coupe shall be closed for grazing for a period of five years including the year of working. Grazing shall be regulated in other area on the basis of rotation. Lopping is strictly prohibited.

2.6.13.3 Soil and Moisture Conservation: After completion of the felling, where required, the soil and moisture conservation measures like gully plugging, stone wall, check dams vegetative bond etc are to be carried out.

2.6.13.4 Rights and Concession: Rights and concessions shall be regulated as per Chapter-I of Part I. Rights and concessions for this Working Circle shall be regulated in accordance with the provisions of the relevant gazette notification of the respective forest Blocks.

2.6.14 CONTROL

2.6.14.1 Compartment history, control forms, and other records shall be maintained for each Selection-cum-Improvement coupe/ compartment and felling series in accordance with the Working Plan Code.

2.6.15 MISCELLANEOUS REGULATIONS

2.6.15.1 Sample Plots: At least one 0.1 ha sample plots inventory enumerated during field work with the help of GPS in each annual coupe shall be maintained and reviewed for future studies this working circle.

2.6.15.2 Treatment for Non-valuable Coupes: As this plan prescription for conservative marking i.e. reduced to 50% of the available trees harvest, there may be possibility very limited number of trees to be left for harvest. As such the working of coupe may not be viable for the agency engaged for the purpose under such situation, if there will be denied by the said agency, the coupe work shall be undertake by the Department.

2.6.16 INTERMEDIATE REVISION

2.6.16.1 Intermediate revision is not anticipated. However, if necessary prescription reviewed after 5 years jointly by the Conservator of Forests (T) and the Conservator of Forests (Working Plan). Any deviation suggested shall be subjected to approval of the Competent Authority.

2.6.17 Economic Analysis

2.6.17.1 The cost norm for implementation of the prescriptions and the total estimated cost of working under this circle has been discussed in Chapter -10.

CHAPTER 3

REHABILITATION WORKING CIRCLE



Latitude: 18.119141
Longitude: 82.276689
Elevation: 471.0 m
Accuracy: 3.8 m
Azimuth: 195° (S)
Pitch: -1.9°
Time: 10-23-2020 12:47
Note: LBCD 1

WORK at bhimaram PRF

Powered by AngleCam

3.1 NAME OF WORKING CIRCLE CLEARLY MARKED ON GIS BASED MAPS (1:50,000):

The area of this working circle has been clearly marked on the GIS based map of 1:50,000 which are appended as management map in the plan.

3.2 GENERAL CONSTITUTION OF THE WORKING CIRCLE

3.2.1 The forest blocks allotted to this Working Circle are those, whose forest crops are various stages of degradation. Degradation of these forests is due to the relentless biotic interference such as illicit felling, repeated fires, grazing, encroachment and other natural calamities. These adverse biotic conditions have led to the top soil being washed away in some blocks resulting in the exposure of rocks. On the other hand, these forest blocks still contain enough biotic potential in terms of sufficient rootstock and natural regeneration.

In the outgoing working plan the total area was 11922.18 Ha. But total forest area allotted to this working circle is **139183.5591 ha** which includes 28 RF (Part/Whole) covering 5689.7990 Ha, 61 PRF Part/Whole) covering 12559.50 Ha, 9 RL (Part/Whole) covering 28861.2436 Ha, 4 URL covering 81225.0165 Ha and 1 UDPF covering 10850.00 Ha have been indentified for management. Attempt is to be made to involve the local villagers in Rehabilitation of these forests by the formation of Vana Samarakshayna Samities (VSS) as per the JFM Resolution of the State Government.

3.2.2. The major forest blocks allotted to this working circle are Mendikuli PRF, Pongam A&B PRF, Pujariguda B PRF, Ghenaguda PRF, Singhguda PRF, Laktiguda PRF, Chimtapalli PRF, Orkel PRF and portion of some of these forest blocks like Udayagiri RF, Balimela PRF, Tarlakata PRF, Datunguda PRF, Pitatung PRF, Jhileruguda PRF, Koilipari PRF, Jharapalli PRF etc. have been allotted to this working circle. The details forest blocks is given in Table No-3.1

3.3 GENERAL CHARATER OF VEGETATION

3.3.1 The areas included in this Working Circle can be improved by proper treatment and silvicultural operations. These forests are mostly open mixed miscellaneous forest in various stages of degradation. The crop density would vary from 0.1 to 0.3 and these forest

blocks are generally found in close proximity to human habitation. Matured trees may be available in a scattered manner in some of the forest blocks interspersed with pole crop and bushy growth. Regeneration study of these blocks reveals that the regeneration of Sal, Kendu, Asan etc. is moderate to good. But the young shoots are affected due to frequent fire during summer season.

3.3.2 The forest blocks of the working circle are spread all over the Ranges. The forests are mainly of the following types.

- (1) 5A/C3-Southern Tropical Dry Deciduous Miscellaneous Forests
- (2) 3B/C2-Southern Tropical Moist Deciduous Forests

3.3.3 Most of the forest blocks included in this Working Circle support 5A/C3-Southern Tropical Dry Deciduous Miscellaneous Forests except few blocks in Balimela and Chitrakonda Ranges which have Orissa Tropical Semi Evergreen Forests and 3B/C2-Southern Tropical Moist Deciduous Forests. The main miscellaneous species present like *Terminalia tomentosa*, *Diospyrus melanoxylon*, *Xylia xylocarpa*, *Lagerstroemia parviflora*, *Anogeiosus latifolia*, *Pterocarpus marsupium*, *Ardina cardifolia* etc. are the dominated species in the forest of Malkangiri, Balimela, Chitrakonda, Kalimela and Motu (MV-79) Ranges where as few Sal forest found in Mathili Range which it gives way to teak forming an Ecotone Zone. Some degraded natural teak forests along with miscellaneous forest are seen in Mathili, Kalimela and Motu Ranges due to change of climate and edaphic factors. Besides this Salia Bamboo is seen all most all blocks of Chitrakonda, Balimela, Kalimela and Malkangiri Ranges.

3.3.4 The areas included in this Working Circle have been distributed over the entire Division. However most of the areas lies in Malkangiri and Chitrakonda Ranges of this Division and subjected to continuous heavy biotic interference. In fact the stems are being removed at every stage like sapling, poles and trees for use as fencing materials, charcoal, fire wood and small timber etc.

3.3.5 The vegetation found in most of the blocks is of all age classes. In open areas, there is invasion of weed growth there by suppressing of natural regeneration. These blocks found in close proximity to human habitation and hence appropriate silvicultural operation

and protection measures to be taken involvement of the forest fringe dwellers through local people / JFM bodies.

3.4 FELLING SERIES, CUTTING SECTION AND JFM AREAS:

3.4.1 The different Rehabilitation Series have been constituted after detail field verification of crop composition to facilitate proper and systematic treatment. This series have been constituted taking into account silvicultural operations to be carried out and the administrative feasibility. Care has been taken to restrict the series as far as possible within the Range jurisdiction to which a particular block belongs. All the 89 (Part/Whole) nos. forest blocks have been divided into 7 (Seven) Rehabilitation Felling Series. Each treatment series divided into 10 coupes to synchronize the plan period of 10 years. These treatment series with annual treatment coupes have been shown in the Management Map.

3.4.2 TREATMENT TYPE

3.4.2.1 This Working Circle consists of forest areas, which are degraded and eroded in varying degrees and needing site specific treatment. All areas may, therefore, not require uniform treatments. The areas included in this Working Circle, may be classified into the following two categories.

3.4.2.2 Category – I includes the areas where the degraded forest has moderate to good regeneration of the major species and good restock are already present. The terrain here is generally plain/ flat/ hilly with gentle to steep slope. These forest areas were subjected to heavy biotic interference, which has led to the degradation of the forest crop. The focus of management is to encourage establishment of regeneration and increase of forest growth so as to result in closure of the canopy. These areas generally require some soil and moisture conservation measures, gap plantation and strict protection against illicit felling and forest fires. Controlled grazing may be allowed in some areas but preference will be for fodder development operations where local people are encouraged to cut/ collect fodder from the assigned areas rather than allowing cattle to directly graze. Climbers interfering with the growth of sound trees, damaged/ decayed stumps shall be dressed with the view to promote accelerated growth. In some areas, singling of coppice shoots may be required to select and prefermost promising ones at the cost of weak shoots/ stems. In other areas, cleaning operation may be necessary to free regeneration from undesired growth.

3.4.2.3 Category- II includes those areas where forest growth exists, but the density of forest crop and regeneration status of many species is poor. The extent of plain/ flat area is less compared to the extent of steep slopes and hilly area. In many places the hilly areas are exposed and the vegetation is present only on the lower contours. These areas often have large gaps without vegetation. Site degradation is more than in Category-I. These areas shall require intensive soil and moisture conservation measures along with some cleaning operations. The soil nutrient status is generally poor in these areas. Artificial regeneration by gap plantation and soil moisture conservation measures is required.

3.5 BLOCKS AND COMPARTMENT

3.5.1 The area allotted to this Working Circle is 139183.5591 ha including RF, PRF, RL, URL and UDPF. The RF and PRF have listed in one table and other RL, URL and UDPF have listed in separate table. The detailed list of Forest Blocks and their corresponding areas included in this Working Circle are given in the following table.

Table No. 3.1: Forest Block (RF/PRF) wise area included in Rehabilitation Working Circle.

Name of the Range	Sl. No.	Name of the Series	Name of the Forest Block	Area category	Legal Status	Compartment		Total Treatment Series Area (Ha.)
						No.	Area in Ha.	
Mathili	1	Mathili Treatment Series	Malidangar		R.F	Part	259.26	
			Gotiguda		R.F	Part	298.61	
			Chaulmendi		R.F	Part	44.6	
			Meca		RF	Part	70.00	
			Mathili		R.F	Part	40.85	
			Chedenga		R.F	Part	100	
			Godiali		PRF	Part	141.99	
			Dhobaguda		PRF	Whole	34.38	
			Doraguda		PRF	Part	24.63	
			Kolab-Teak		PRF	Whole	31.07	
			Pujariguda'A'		PRF	Part	102.81	
			Pujariguda'B'		PRF	Whole	43.46	
			Champaijharan		PRF	Part	51.05	
			Kurumpalli'A'		PRF	Part	11.5	
			Kurumpalli'B'		PRF	Whole	8.53	
			Gangarajguma		PRF	Part	53.99	
			Mendukuli		PRF	Whole	70.02	
			Bariabahal		PRF	Whole	35.87	
			Pangam'A'		PRF	Whole	73.87	

			Pangam'B'		PRF	Whole	11.74	
			Siraguda		PRF	Whole	37.8	
			Challanguda		PRF	Part	102.04	
			Singhaguda		PRF	Whole	21.31	
			Kurmapalli 'C'		PRF	Whole	6.74	
			Kurmapalli 'D'		PRF	Whole	12.56	
			Jagannath		PRF	Whole	22.16	
			Ghenaguda		PRF	Whole	43.2	
		Total					1754.04	1754.04
Malkangiri	2	Jharapalli Treatment Series	Jhileruguda		PRF	No.1(Part)	200.00	
			Jhileruguda		PRF	No.2(Part)	300.00	
			Jharapalli		R.F	Part	198.489	
			Sindrimal		PRF	No.1(Part)	260.00	
			Sindrimal		PRF	No.2(Part)	257.00	
			Girididongar		PRF	Part	280.00	
			Dharamdongar		PRF	Part	80.00	
			Tamasa		PRF	Part	50.00	
			Namkonda		PRF	Part	200.00	
			Titiviry		PRF	Part	20.00	
			Kottamateru		PRF	Part	100.00	
			Allur		PRF	Part	20.00	
			Koilipari		PRF	No.1(Part)	246.35	
			Koilipari		PRF	No.2(Part)	250.00	
			Cheruguda		PRF	Part	50.00	
			Kukudaguda		PRF	Part	100.00	
			Kutiguda		PRF	Part	20.00	
			Tandikonda		PRF	Part	40.00	
			Korukonda		PRF	Part	97.28	
			Baraja		PRF	Part	50.00	
			Guppakonda		PRF	Part	250.00	
			Kumadangar		PRF	Part	200.00	
		Total					3269.119	3269.119
Malkangiri	3	Pititung Treatment Series	Pititung		PRF	No.5(Part)	200.00	
			Pititung		PRF	No.6(Part)	200.00	
			Pititung		PRF	No.7(Part)	200.00	
			Pititung		PRF	No.8(Part)	300.00	
		Total					900.00	900.00
Balimela	4	Balimela Treatment Series	Balimela		PRF	No.1(Part)	77.79	
			Balimela		PRF	No.2(Part)	184.42	
			Balimela		PRF	No.3(Part)	220.00	
			Balimela		PRF	No.4(Part)	220.00	
			Tarlakota		PRF	No.1(Part)	115.00	
			Tarlakota		PRF	No.2(Part)	145.426	

			Tarlakota		PRF	No.3(Part)	65.00	
			Tarlakota		PRF	No.4(Part)	80.00	
			Tarlakota		PRF	No.5(Part)	104.00	
			Tarlakota		PRF	No.6(Part)	140.00	
			Tarlakota		PRF	No.7(Part)	70.00	
			Chitapari		R.F	No.1(Part)	180.69	
			Chitapari		R.F	No.2(Part)	100.00	
			Nuagam		R.F	Part	90.00	
			Orkel		PRF	Whole	64.18	
			Laktiguda		PRF	Whole	113.56	
			Chimtapali		PRF	Whole	12.98	
			Sadasibpur		PRF	Part	212.06	
			Kanangi		PRF	Part	205.06	
			Gopiguda		R.F	Part	226.49	
			Teakguda		R.F	Part	31.03	
			Matumkonda		PRF	No.2(Part)	170.00	
			Matumkonda		PRF	No.3(Part)	130.00	
			Mahadevpur		R.F	Part	52.35	
		Total					3010.036	3010.036
Chitrakonda	5	Chitrakonda Treatment series	Sileru West		R.F	No.1(Part)	181	
			Sileru west		R.F	No.2(Part)	200	
			Gunthawada		R.F	Part	24.08	
			Datunguda		PRF	No.1(Part)	358.964	
			Datunguda		PRF	No.2(Part)	242.41	
			Bhimaram		PRF	No.1(Part)	200	
			Bhimaram		PRF	No.2(Part)	336	
			Bhimaram		PRF	No.3(Part)	355	
			Ranginiguda		PRF	No.1(Part)	214	
			Ranginiguda		PRF	No.2(Part)	285.3	
			Jantri		PRF	No.1(Part)	392	
			Singaram		PRF	No.1(Part)	251	
			Singaram		PRF	No.2(Part)	275	
			Singaram		PRF	No.3(Part)	300	
			Sikpanasa		PRF	No.1(Part)	104	
			Sikpanasa		PRF	No.2(Part)	353	
			Motamkonda		PRF	No.1(Part)	350	
			Motamkonda		PRF	No.3(Part)	152	
		Total					4573.754	4573.754
Kalimela	6	Kalimela Treatment series	Rajulkonda		R.F	Part	142.16	
			Bapanpally		R.F	Part	200.00	
			Yengulkonda		R.F	Part	191.00	
			Venkatpallam		R.F	Part	100.00	
			Gompakonda		R.F	No.1(Part)	90.00	
			Mangipally		R.F	Part	150.00	

			Udayagiri		R.F	No.1(Part)	268.00	
			Udayagiri		R.F	No.2(Part)	290.00	
			Udayagiri		R.F	No.3(Part)	260.00	
			Udayagiri		R.F	No.4(Part)	399.00	
			Udayagiri'B'		R.F	Part	71.00	
			Supal'A'		R.F	Whole	61.19	
			Supal'B'		R.F	Part	30.00	
			Pedawada		PRF	Part	250.00	
			Pulimetala		PRF	Part	250.00	
			Mandapally		PRF	No.1(Part)	150.00	
			Mandapally		PRF	No.2(Part)	150.00	
			Chinapotteru		PRF	Part	150.00	
			Sindhiguda		PRF	Part	50.00	
		Total					3252.35	3252.35
Motu	7	Motu Treatment series	Pusugudam		R.F	No.1(Part)	350.00	
			Pusugudam		R.F	No.2(Part)	140.00	
			Pusugudam		R.F	No.3(Part)	120.00	
			Pusugudam		R.F	No.4(Part)	70.00	
			Pendikonda		R.F	Part	10.00	
			Tamanpalli		PRF	Part	150.00	
			Tadimetla		R.F	No.1(Part)	100.00	
			Tadimetla		R.F	No.2(Part)	200.00	
			Tadimetla		R.F	No.3(Part)	250.00	
			Tadimetla		R.F	No.4(Part)	100.00	
		Total					1490.00	1490.00
		G. Total					18249.2990	18249.2990

Table No. 3.2: Forest Block (R.L./UDPF) wise area included in Rehabilitation Working Circle.

Name of the Range	Sl. N o.	Name of the Series	Name of the Forest Block	Area category	Legal Status	Compartment		Total Treatment Series Area (Ha.)
						No.	Area in Ha.	
Mathili	1	Govindapalli Treatment series	Dharmagarh		RL	4	1018.00	4092.7960
			Dharmagarh		RL	5	1036.00	
			Dharmagarh		RL	6	605.750	
			Dharmagarh		RL	7	632.000	
			Burdiguda		RL	Whole	801.046	
		Total					4092.7960	4092.7960
	2	Tulasi Treatment series	Tulasi		UDPF	1	907.75	10850.00
			Tulasi		UDPF	2	1137.50	
			Tulasi		UDPF	3	1312.50	
			Tulasi		UDPF	4	1350.00	

Mathili	2	Tulasi Treatment series	Tulasi		UDPF	5	1767.25	
			Tulasi		UDPF	6	1650.00	
			Tulasi		UDPF	7	1450.00	
			Tulasi		UDPF	8	1275.00	
		Total					10850.00	10850.00
Malkangiri	3	Goiparbat Treatment series	Goiparbat		RL	1	884.75	
					RL	2	601.75	
					RL	3	789.80	
					RL	4	816.25	
					RL	5	600.00	
					RL	6	834.60	
					RL	7	762.90	
		Total					5290.05	5290.05
	4	Manaskunda Treatment series	Manaskunda		RL	1	1785.50	
			-do-		RL	2	1193.75	
			-do-		RL	3	875.00	
			Siadimal		RL	1	1687.50	
			-do-		RL	2	1750.00	
			Kambada		RL	Whole	635.2336	
			Batupalli		RL	Whole	362.129	
		Total					8289.1126	8289.1126
Kalimela	5	Silakota Treatment series	Silakota		RL	1	1390.00	
			-do-		RL	2	1618.75	
			-do-		RL	7	1023.50	
			-do-		RL	8	1331.25	
			-do-		RL	9	1143.75	
			-do-		RL	10	1620.00	
		Total					8127.2500	8127.2500
	6	Sighnakhunta Treatment series	Bhejangiwad a		URL	5	1877.8080	
			-do-		URL	6	2085.8238	
			-do-		URL	7	1388.1210	
			-do-		URL	8	1570.2360	
		Total					6921.9888	6921.9888
	7	Sudhakhunta Treatment series	Bhejangiwad a		URL	9	1667.3640	
			-do-		URL	10	1537.8600	
			-do-		URL	11	2076.1110	
			-do-		URL	12	2043.7350	
		Total					7325.07	7325.0700
Chitrakonda	8	Janbai	Kondakambe		URL	1	2944.6930	13773.6426

		Treatment series	ru					
					URL	2	3421.7856	
					URL	3	3446.4170	
					URL	7	3960.7470	
		Total					13773.6426	13773.6426
	9	Kondakambe ruTreatment series	Kondakambe ru		URL	4	1835.8300	8194.3900
					URL	5	1967.8850	
					URL	6	2191.6550	
					URL	8	2199.0200	
		Total					8194.3900	8194.3900
	10	Ramaguda Treatment series	Kondakambe ru		URL	9	1414.0790	5578.0290
					URL	10	1359.3800	
					URL	11	1456.9200	
					URL	12	1347.6500	
		Total					5578.0290	5578.0290
	11	Paleru Treatment series	Paleru		URL	1	1275.6144	5329.0896
					URL	2	1372.7424	
					URL	3	1443.9696	
					URL	4	1236.7632	
		Total					5329.0896	5329.0896
	12	Sileru East Treatment Series	Sileru East		URL	5	2460.5760	9453.7920
					URL	6	2201.5680	
					URL	7	2460.5760	
					URL	8	2331.0720	
		Total					9453.7920	9453.7920
	13	Allurukata Treatment Series	Bhejangiwad a		URL	13	1560.2360	5941.3740
			-do-		URL	14	1335.6040	
			-do-		URL	15	1432.7320	
			-do-		URL	16	1612.8020	
		Total					5941.3740	5941.3740
	14	Pancha Treatment Series	Bhejangiwad a		URL	17	1655.5990	6486.7480
					URL	18	1693.9750	
					URL	19	1571.1740	
					URL	20	1566.0000	
		Total					6486.7480	6486.7480
	15	Gonmetpada Treatment Series	Bhejangiwad a		URL	21	2190.5680	5648.6823
					URL	22	1270.5454	
					URL	23	1317.4169	
					URL	24	870.1520	
		Total					5648.6823	5648.6823
Motu	16	Tagarkota Treatment	Bhejangiwad a		URL	1	1748.1862	6572.2102

		Series			URL	2	1667.3640	
					URL	3	1719.9750	
					URL	4	1436.6850	
		Total					6572.2102	6572.2102
	17	Tinrajpalli	Tinrajpalli		RL	1	940.80	
		Treatment				2	1104.5350	
		Series				3	1014.7000	3060.0350
							3060.0350	3060.0350
		G.Total					120934.2601	120934.2601

3.6 SPECIAL OBJECTIVES OF MANAGEMENT

3.6.1.1 The following special objectives of management are set for this Working Circle which is within the ambit of the general objectives of management for this Working Circle.

- (i) To improve the quality of the existing crop by adopting suitable cultural operations through cleaning, climber cutting, singling out the multiple shoots of principal species to obtain quick growth.
- (ii) To remove miscellaneous thorny bushes growth to favour of the growth of principal and secondary species.
- (iii) To take up gap filling plantation with suitable species in contiguous area extending over more than 0.4 ha.
- (iv) To enhance the productivity of soil through proper soil and moisture conservation where there is soil erosion.
- (v) To take up silvicultural thinning wherever required so that villagers (VSS) involved in protection will get some thinning materials as intermediate yield.
- (vi) To improve the economic condition of the local people by creating employment opportunities in the process of management of the Forest.
- (vii) Necessary fire protection measures shall be undertaken during the fire season by engaging fire watchers or providing fire line.

3.6.1 ANALYSIS AND EVALUATION OF CROP

3.6.1.1 In all blocks allotted to this Working Circle, the study on vegetation, crop condition and extent of erosion, gradation has been conducted. Detailed assessment of growing stock, biodiversity and regeneration study was carried out in all these blocks. As already mentioned, there exists variation in the crop condition in the various blocks included in this circle. These blocks require treatment to promote natural regeneration and artificial

regeneration in areas where there are permanent blanks. In some block likes Siraguda, Doraguda and Chedenga of Mathili Range though the regeneration is poor but there are some mature trees present in scattered manner. Simultaneously appropriate treatment will be required to conserve the soil and moisture.

3.6.2 SILVICULTURAL SYSTEM

3.6.2.1 The Forest Blocks included in this Working Circle are of different stages of degradation. The prime objective is to restock these forest blocks and reduce the biotic pressure to which these blocks have become degraded. There will be no exploitation of mature trees except for removal of dead and uprooted trees. No normal silvicultural system is prescribed. However to achieve the major objectives operations like, regeneration cleaning, soil and moisture conservation, gap planting, block planting along with tending will be carried out. In addition steps will have to be taken to protect the area from grazing, theft and fire with the active support of the people (under JFM mode) wherever possible.

3.6.3 ROTATION AND CONVERSION PERIOD

3.6.3.1 As timber production is not a consideration in this working circle, no rotation or no conversion period is prescribed. However as part of the rehabilitation treatment removal of dead, fallen and thinning in very congested pole crop is prescribed as per site specification.

3.6.4 HARVESTABLE DIAMETER

3.6.4.1 As it has been discussed in above Para, no exploitable diameter is required.

3.6.5 REDUCING FACTORS & REDUCING AREAS: Not applicable.

3.6.6 FELLING CYCLE (REHABILITATION CYCLE)

3.6.6.1 For smooth and systematic implementation of the prescription, the entire areas of this Working Circle has been divided into seven Rehabilitation Treatment Series and the Rehabilitation Cycle has been kept at 10 years.

3.6.7. DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS (PB):

Not applicable, as the silvicultural system applied is for rehabilitated, there is no division into period or any periodic block.

3.6.8. CALCULATION OF YIELD

3.6.8.1 As the primary objective of the Working Circle is not timber production, the method of yield regulation is not required. In order to meet local needs removal of dead and fallen trees besides thinning in congested crop is prescribed here.

3.6.9 TABLE OF FELLING

3.6.9.1 In order to execute the Rehabilitation measures systematically, each rehabilitation series has been divided into ten rehabilitation coupes. The annual treatment coupes have been formed in such a manner that continuity of the rehabilitation measures is ensured and areas for treatment have been taken up on watershed basis. Table No-3.2 to 3.8 gives the annual coupe, rehabilitation series wise its number, year of treatment, forest blocks, compartments and area included in the coupe.

Table No. 3.3: Annual Coupes under Mathili Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Mathili	Challanguda	PRF	Part	102.04	154.42
			Singhaguda	PRF	Whole	21.31	
			Kolab-Teak	PRF	Whole	31.07	
2022-23	II		Godiali	PRF	Part	141.99	193.04
			Champaijharan	PRF	Part	51.05	
2023-24	III		Siraguda	PRF	Whole	37.80	197.06
			Malidangar	R.F	Part	159.26	
2024-25	IV		Mathili	R.F	Part	40.85	185.45
			Malidangar	R.F	Part	100.00	
			Chaulmendi	R.F	Part	44.60	
2025-26	V		Gotiguda	R.F	Part	180.61	180.61
2026-27	VI		Gotiguda	R.F	Part	118.00	188.02
			Mendukuli	PRF	Whole	70.02	
2027-28	VII		Gangarajguma	PRF	Part	53.99	168.30
			Kurumpalli'A'	PRF	Part	11.50	
			Pujariguda'A'	PRF	Part	102.81	
2028-29	VIII		Doraguda	PRF	Part	24.63	150.49
			Kurumpalli'B'	PRF	Whole	08.53	
			Pujariguda'B'	PRF	Whole	43.46	

			Pangam'A'	PRF	Whole	73.87	
2029-30	IX		Pangam'B'	PRF	Whole	11.74	160.81
			Ghenaguda	PRF	Whole	43.20	
			Meca	RF	Whole	70.00	
			Bariabahal	PRF	Whole	35.87	
2030-31	X		Kurmapalli 'C'	PRF	Whole	6.74	175.84
			Kurmapalli 'D'	PRF	Whole	12.56	
			Jagannath	PRF	Whole	22.16	
			Chedenga	R.F	Part	100.00	
			Dhobaguda	PRF	Whole	34.38	
G.Total							1754.04

Table No. 3.4: Annual Coupes under Jharapalli Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Comparison No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Malkangiri	Kumadangar	PRF	Part	200.00	300.00
			Kukudaguda	PRF	Part	100.00	
2022-23	II	-do-	Baraja	PRF	Part	50.00	310.00
			Kutiguda	PRF	Part	20.00	
			Jhileruguda	PRF	No.1(P)	200.00	
			Tandikonda	PRF	Part	40.00	
2023-24	III	-do-	Cheruguda	PRF	Part	50.00	330.00
			Namkonda	PRF	Part	100.00	
			Dharamdongar	PRF1	Part	80.00	
			Kottamateru	PRF	Part	100.00	
2024-25	IV	-do-	Titiviry	PRF	Part	20.00	318.489
			Namkonda	PRF	Part	100.00	
			Jharapalli	R.F	Part	198.489	
2025-26	V	-do-	Koilipari	PRF	No.1(P)	246.35	346.35
			Sindrimal	PRF	No.2(P)	100.00	
2026-27	VI	-do-	Koilipari	PRF	No.2(P)	150.00	307.00
			Sindrimal	PRF	No.2(P)	157.00	
2027-28	VII	-do-	Koilipari	PRF	No.2(P)	100.00	370.00
			Allur	PRF	Part	20.00	
			Jhileruguda	PRF	No.2(P)	250.00	
2028-29	VIII	-do-	Jhileruguda	PRF	No.2(P)	50.00	310.00

			Sindrimal	PRF	No.1(P)	260.00	
2029-30	IX	-do-	Girididongar	PRF	Part	280.00	330.00
			Tamasa	PRF	Part	50.00	
2030-31	X	-do-	Guppakonda	PRF	Part	250.00	347.28
			Korukonda	PRF	Part	97.28	
G.Total							3269.119

Table No. 3.5: Annual Coupes under Pitatung Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Malkangiri	Pitatung	PRF	No-6(P)	100.00	100.00
2022-23	II	-do-	Pitatung	PRF	No-6(P)	100.00	100.00
2023-24	III	-do-	Pitatung	PRF	No-7(P)	100.00	100.00
2024-25	IV	-do-	Pitatung	PRF	No-7(P)	100.00	100.00
2025-26	V	-do-	Pitatung	PRF	No-8(P)	75.00	75.00
2026-27	VI	-do-	Pitatung	PRF	No-8(P)	75.00	75.00
2027-28	VII	-do-	Pitatung	PRF	No-8(P)	75.00	75.00
2028-29	VIII	-do-	Pitatung	PRF	No-8(P)	75.00	75.00
2029-30	IX	-do-	Pitatung	PRF	No-5(P)	100.00	100.00
2030-31	X	-do-	Pitatung	PRF	No-5(P)	100.00	100.00
G.Total							900.00

Table No.-3.6: Annual Coupes under Balimela Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Balimela	Chimtapali	PRF	Whole	12.98	289.22
			Sadasibpur	PRF	Part	212.06	
			Orkel	PRF	Whole	64.18	
2022-23	II	-do-	Kanangi	PRF	Part	205.06	326.09

			Teakguda	R.F	Part	31.03	
			Nuagam	R.F	Part	90.00	
2023-24	III	-do-	Gopiguda	R.F	Part	226.49	326.49
			Chitapari	R.F	No.2(Part)	100.00	
2024-25	IV	-do-	Chitapari	R.F	No.1(Part)	180.69	294.25
			Laktiguda	PRF	Whole	113.56	
2025-26	V	-do-	Tarлакота	PRF	No.1(Part)	115.00	322.79
			Balimela	PRF	No.1(Part)	77.79	
			Matumkonda	PRF	No.3(Part)	130.00	
2026-27	VI	-do-	Balimela	PRF	No.2(Part)	184.42	329.846
			Tarлакота	PRF	No.2(Part)	145.426	
2027-28	VII	-do-	Tarлакота	PRF	No.3(Part)	65.00	285.00
			Balimela	PRF	No.3(Part)	220.00	
2028-29	VIII	-do-	Balimela	PRF	No.4(Part)	220.00	300.00
			Tarлакота	PRF	No.4(Part)	80.00	
2029-30	IX	-do-	Tarлакота	PRF	No.5(Part)	104.00	274.00
			Matumkonda	PRF	No.2(Part)	170.00	
2030-31	X	-do-	Tarлакота	PRF	No.6(Part)	140.00	262.35
			Tarлакота	PRF	No.7(Part)	70.00	
			Mahadevpur	R.F	Part	52.35	
G.Total							3010.036

Table No. 3.7: Annual Coupes under Chitrakonda Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Datunguda	PRF	No.1(Part)	358.964	462.964
			Sikpanasa	PRF	No.1(Part)	104.00	
2022-23	II	-do-	Datunguda	PRF	No.2(Part)	242.41	595.41
			Sikpanasa	PRF	No.2(Part)	353.00	
2023-24	III	-do-	Sileru West	R.F	No.1(Part)	181.00	531.00
			Motamkond a	PRF	No.1(Part)	350.00	
2024-25	IV	-do-	Sileru west	R.F	No.2(Part)	200.00	376.08
			Motamkond a	PRF	No.3(Part)	152.00	
			Gunthawada	R.F	Part	24.08	
2025-26	V	-do-	Bhimaram	PRF	No.1(Part)	200.00	414.00
			Ranginiguda	PRF	No.1(Part)	214.00	
2026-27	VI	-do-	Bhimaram	PRF	No.2(Part)	336.00	436.00
			Ranginiguda	PRF	No.2(Part)	100.00	
2027-28	VII		Bhimaram	PRF	No.3(Part)	255.00	440.30

		-do-	Ranginiguda	PRF	No.2(Part)	185.30	
2028-29	VIII	-do-	Bhimaram	PRF	No.3(Part)	100.00	400.00
			Singaram	PRF	No.3(Part)	300.00	
2029-30	IX	-do-	Singaram	PRF	No.2(Part)	275.00	467.00
			Jantri	PRF	No.1(Part)	192.00	
2030-31	X	-do-	Jantri	PRF	No.1(Part)	200.00	451.00
			Singaram	PRF	No.1(Part)	251.00	
G.Total							4573.754

Table No. 3.8: Annual Coupes under Kalimela Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Kalimela	Sindhiguda	PRF	Part	50.00	300.00
			Chinapotteru	PRF	Part	150.00	
			Venkatpallam	R.F	Part	100.00	
2022-23	II	-do-	Rajulkonda	R.F	Part	142.16	342.16
			Bapanpally	R.F	Part	200.00	
2023-24	III	-do-	Yengulkonda	R.F	Part	191.00	282.19
			Supal'A'	R.F	Whole	61.19	
			Supal'B'	R.F	Part	30.00	
2024-25	IV	-do-	Gompakonda	R.F	No.1(Part)	90.00	340.00
			Pedawada	PRF	Part	250.00	
2025-26	V	-do-	Mangipally	R.F	Part	150.00	300.00
			Mandapally	PRF	No.1(Part)	150.00	
2026-27	VI	-do-	Mandapally	PRF	No.2(Part)	150.00	400.00
			Pulimetala	PRF	Part	250.00	
2027-28	VII	-do-	Udayagiri	R.F	No.1(Part)	268.00	268.00
2028-29	VIII	-do-	Udayagiri	R.F	No.2(Part)	290.00	290.00
2029-30	IX	-do-	Udayagiri	R.F	No.3(Part)	260.00	360.00
			Udayagiri	R.F	No.4(Part)	100.00	
2030-31	X	-do-	Udayagiri	R.F	No.4(Part)	299.00	370.00
			Udayagiri'B'	R.F	Part	71.00	
G.Total							3252.350

Table No.-3.9: Annual Coupes under Motu Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Motu	Pusugudam	R.F	No.1(Part)	175.00	175.00
2022-23	II	-do-	Pusugudam	R.F	No.1(Part)	175.00	175.00
2023-24	III	-do-	Pusugudam	R.F	No.2(Part)	140.00	140.00
2024-25	IV	-do-	Pusugudam	R.F	No.3(Part)	120.00	120.00
2025-26	V	-do-	Pusugudam	R.F	No.4(Part)	70.00	110.00
			Pendikonda	R.F	Part	10.00	
			Tamanpalli	PRF	Part	30.00	
2026-27	VI	-do-	Tamanpalli	PRF	Part	120.00	120.00
2027-28	VII	-do-	Tadimetla	R.F	No.1(Part)	100.00	150.00
			Tadimetla	R.F	No.3(Part)	50.00	
2028-29	VIII	-do-	Tadimetla	R.F	No.3(Part)	200.00	200.00
2029-30	IX	-do-	Tadimetla	R.F	No.2(Part)	200.00	200.00
2030-31	X	-do-	Tadimetla	R.F	No.4(Part)	100.00	100.00
G.Total						1490.00	1490.00

17 Nos. Treatment series of RL, URL, UDPF are given below.

Table No. 3.10: Annual Coupes under Govindapalli Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Mathili	Dharmagarh	RL	4(P)	500.00	500.00
2022-23	II	Mathili	Dharmagarh	RL	4(B)	518.00	518.00
2023-24	III	Mathili	Dharmagarh	RL	5(P)	518.00	518.00
2024-25	IV	Mathili	Dharmagarh	RL	5(B)	518.00	518.00
2025-26	V	Mathili	Dharmagarh	RL	6(P)	305.75	305.75
2026-27	VI	Mathili	Dharmagarh	RL	6(B)	300.00	300.00

2027-28	VII	Mathili	Dharmagarh	RL	7(P)	316.00	316.00
2028-29	VIII	Mathili	Dharmagarh	RL	7(B)	316.00	316.00
2029-30	IX	Mathili	Burdiguda	RL	(Part)	400.00	400.00
2030-31	X	Mathili	Burdiguda	RL	(Part)	401.046	401.046
G.Total						4092.7960	4092.7960

Table No.3.11: Annual Coupes under Tulasi Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Mathili	Tulasi	UDPF	1	907.75	907.75
2022-23	II	-do-	Tulasi	UDPF	2	1137.50	1137.50
2023-24	III	-do-	Tulasi	UDPF	3	1312.50	1312.50
2024-25	IV	-do-	Tulasi	UDPF	4	1350.00	1350.00
2025-26	V	-do-	Tulasi	UDPF	5(P)	850.00	850.00
2026-27	VI	-do-	Tulasi	UDPF	5(B)	917.25	917.25
2027-28	VII	-do-	Tulasi	UDPF	6(P)	850.00	850.00
2028-29	VIII	-do-	Tulasi	UDPF	6(B)	800.00	800.00
2029-30	IX	-do-	Tulasi	UDPF	7	1450.00	1450.00
2030-31	X	-do-	Tulasi	UDPF	8	1275.00	1275.00
G.Total						10850.00	10850.00

Table No. 3.12: Annual Coupes under Goiparbat Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Malkangiri	Goiparbat	RL	1(P)	450.00	450.00
2022-23	II	-do-	Goiparbat	RL	1(B)	434.75	434.75
2023-24	III	-do-	Goiparbat	RL	2	601.75	601.75
2024-25	IV	-do-	Goiparbat	RL	3	789.80	789.80

2025-26	V	-do-	Goiparbat	RL	4(P)	400.00	400.00
2026-27	VI	-do-	Goiparbat	RL	4(B)	416.25	416.25
2027-28	VII	-do-	Goiparbat	RL	5	600.00	600.00
2028-29	VIII	-do-	Goiparbat	RL	6(P)	420.00	420.00
2029-30	IX	-do-	Goiparbat	RL	6(B)	414.60	414.60
2030-31	X	-do-	Goiparbat	RL	7	762.90	762.90
G.Total						5290.05	5290.05

Table No. 3.13: Annual Coupes under Manaskonda Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Malkangiri	Manaskonda	RL	1(P)	890.00	890.00
2022-23	II	-do-	Manaskonda	RL	1(B)	895.50	895.50
2023-24	III	-do-	Manaskonda	RL	2(P)	600.00	600.00
2024-25	IV	-do-	Manaskonda	RL	2(B)	593.75	593.75
2025-26	V	-do-	Manaskonda	RL	3	875.00	875.00
2026-27	VI	-do-	Kambada	RL	Whole	635.2336	997.3626
			Batupalli	RL	Whole	362.1290	
2027-28	VII	-do-	Siadimal	RL	1(P)	850.00	850.00
2028-29	VIII	-do-	Siadimal	RL	1(B)	837.50	837.50
2029-30	IX	-do-	Siadimal	RL	1(P)	875.00	875.00
2030-31	X	-do-	Siadimal	RL	1(B)	875.00	875.00
G.Total						8289.1126	8289.1126

Table No. 3.14: Annual Coupes under Silakota Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Kalimela	Silakota	RL	1(P)	700.00	700.00
2022-23	II	-do-	Silakota	RL	1(B)	690.00	690.00
2023-24	III	-do-	Silakota	RL	2(P)	800.00	800.00
2024-25	IV	-do-	Silakota	RL	2(B)	818.75	818.75
2025-26	V	-do-	Silakota	RL	7(P)	823.50	823.50
2026-27	VI	-do-	Silakota	RL	7(B)	200.00	831.25
				RL	8(P)	631.25	
2027-28	VII	-do-	Silakota	RL	8(B)	700.00	943.75
				RL	9(P)	243.75	
2028-29	VIII	-do-	Silakota	RL	9(B)	900.00	900.00
2029-30	IX	-do-	Silakota	RL	10(P)	810.00	810.00
2030-31	X	-do-	Silakota	RL	10(B)	810.00	810.00
G.Total						8127.25	8127.25

Table No. 3.15: Annual Coupes under Sighnakhunta Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Kalimela	Bhejangi wada	URL	5(P)	625.00	625.00
2022-23	II	-do-	Bhejangi wada	URL	5(P)	625.00	625.00
2023-24	III	-do-	Bhejangi wada	URL	5(B)	627.8080	627.8080
2024-25	IV	-do-	Bhejangi wada	URL	6(P)	700.00	700.00
2025-26	V	-do-	Bhejangi wada	URL	6(P)	700.00	700.00
2026-27	VI	-do-	Bhejangi wada	URL	6(B)	685.8238	685.8238
2027-28	VII	-do-	Bhejangi wada	URL	7(P)	700.00	700.00
2028-29	VIII	-do-	Bhejangi wada	URL	7(B)	688.1210	688.1210

2029-30	IX	-do-	Bhejangiwada	URL	8(P)	800.00	800.00
2030-31	X	-do-	Bhejangiwada	URL	8(B)	770.2360	770.2360
G.Total						6921.9888	6921.9888

Table No. 3.16: Annual Coupes under Sudhakhunta Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Kalimela	Bhejangiwada	URL	9(P)	800.00	800.00
2022-23	II	-do-	Bhejangiwada	URL	9(B)	867.3640	867.3640
2023-24	III	-do-	Bhejangiwada	URL	10(P)	750.00	750.00
2024-25	IV	-do-	Bhejangiwada	URL	10(B)	787.8600	787.8600
2025-26	V	-do-	Bhejangiwada	URL	11(P)	690.00	690.00
2026-27	VI	-do-	Bhejangiwada	URL	11(P)	694.00	694.00
2027-28	VII	-do-	Bhejangiwada	URL	11(B)	692.1110	692.1110
2028-29	VIII	-do-	Bhejangiwada	URL	12(P)	680.00	680.00
2029-30	IX	-do-	Bhejangiwada	URL	12(P)	680.00	680.00
2030-31	X	-do-	Bhejangiwada	URL	12(B)	683.7350	683.7350
G.Total						7325.07	7325.07

Table No. 3.17: Annual Coupes under Tagarkota Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Motu	Bhejangiwada	URL	1(P)	580.0000	580.0000
2022-23	II	-do-	Bhejangiwada	URL	1(P)	580.0000	580.0000
2023-24	III	-do-	Bhejangiwada	URL	1(B)	588.1862	588.1862
2024-25	IV	-do-	Bhejangiwada	URL	2(P)	800.0000	800.0000
2025-26	V	-do-	Bhejangiwada	URL	2(B)	867.3640	867.3640

2026-27	VI	-do-	Bhejangiwada	URL	3(P)	570.0000	570.0000
2027-28	VII	-do-	Bhejangiwada	URL	3(P)	570.0000	570.0000
2028-29	VIII	-do-	Bhejangiwada	URL	3(B)	579.9750	579.9750
2029-30	IX	-do-	Bhejangiwada	URL	4(P)	700.0000	700.0000
2030-31	X	-do-	Bhejangiwada	URL	4(B)	736.6850	736.6850
G.Total						6572.2102	6572.2102

Table No. 3.18: Annual Coupes under Tinrajpalli Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Motu	Tinrajpalli	RL	1(P)	310.00	310.00
2022-23	II	-do-	Tinrajpalli	RL	1(P)	310.00	310.00
2023-24	III	-do-	Tinrajpalli	RL	1(B)	320.80	320.80
2024-25	IV	-do-	Tinrajpalli	RL	2(P)	300.00	300.00
2025-26	V	-do-	Tinrajpalli	RL	2(P)	300.00	300.00
2026-27	VI	-do-	Tinrajpalli	RL	2(P)	300.00	300.00
2027-28	VII	-do-	Tinrajpalli	RL	2(B)	204.535	319.235
					3(P)	114.700	
2028-29	VIII	-do-	Tinrajpalli	RL	3(P)	300.00	300.00
2029-30	IX	-do-	Tinrajpalli	RL	3(P)	300.00	300.00
2030-31	X	-do-	Tinrajpalli	RL	3(B)	300.00	300.00
G.Total						3060.0350	3060.0350

Table No. 3.19: Annual Coupes under Allurkota Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Bhejangiwada	URL	13(P)	520.0000	520.0000
2022-23	II	-do-	Bhejangiwada	URL	13(P)	520.0000	520.0000

2023-24	III	-do-	Bhejangiwada	URL	13(B)	520.236	520.236
2024-25	IV	-do-	Bhejangiwada	URL	14(P)	650.0000	650.0000
2025-26	V	-do-	Bhejangiwada	URL	14(B)	685.6040	685.6040
2026-27	VI	-do-	Bhejangiwada	URL	15(P)	700.0000	700.0000
2027-28	VII	-do-	Bhejangiwada	URL	15(B)	732.7320	732.7320
2028-29	VIII	-do-	Bhejangiwada	URL	16(P)	530.0000	530.0000
2029-30	IX	-do-	Bhejangiwada	URL	16(P)	530.0000	530.0000
2030-31	X	-do-	Bhejangiwada	URL	16(B)	552.8020	552.8020
G.Total						5941.3740	5941.3740

Table No. 3.20: Annual Coupes under Pancha Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Bhejangiwada	URL	17(P)	550.00	550.00
2022-23	II	-do-	Bhejangiwada	URL	17(P)	550.00	550.00
2023-24	III	-do-	Bhejangiwada	URL	17(B)	555.5990	555.5990
2024-25	IV	-do-	Bhejangiwada	URL	18(P)	570.00	570.00
2025-26	V	-do-	Bhejangiwada	URL	18(P)	560.00	560.00
2026-27	VI	-do-	Bhejangiwada	URL	18(B)	563.9750	563.9750
2027-28	VII	-do-	Bhejangiwada	URL	19(P)	750.00	750.00
2028-29	VIII	-do-	Bhejangiwada	URL	19(B)	821.1740	821.1740
2029-30	IX	-do-	Bhejangiwada	URL	20(P)	780.00	780.00
2030-31	X	-do-	Bhejangiwada	URL	20(B)	786.00	786.00
G.Total						6486.7480	6486.7480

Table No. 3.21: Annual Coupes under Gonmetpada Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Bhejangiwada	URL	21(P)	550.00	550.00
2022-23	II	-do-	Bhejangiwada	URL	21(P)	550.00	550.00
2023-24	III	-do-	Bhejangiwada	URL	21(P)	550.00	550.00
2024-25	IV	-do-	Bhejangiwada	URL	21(P)	540.5680	540.5680
2025-26	V	-do-	Bhejangiwada	URL	22(P)	650.00	650.00
2026-27	VI	-do-	Bhejangiwada	URL	22(B)	620.5454	620.5454
2027-28	VII	-do-	Bhejangiwada	URL	23(P)	550.00	550.00
2028-29	VIII	-do-	Bhejangiwada	URL	23(P)	550.00	550.00
2029-30	IX	-do-	Bhejangiwada	URL	23(B)	217.4169	517.4169
					24(P)	300.00	
2030-31	X	-do-	Bhejangiwada	URL	24(B)	570.1520	570.1520
G.Total						5648.6823	5648.6823

Table No. 3.22: Annual Coupes under Paleru Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Paleru	URL	1(P)	650.00	650.00
2022-23	II	-do-	Paleru	URL	1(B)	625.6144	625.6144
2023-24	III	-do-	Paleru	URL	2(P)	550.00	550.00
2024-25	IV	-do-	Paleru	URL	2(P)	550.00	550.00
2025-26	V	-do-	Paleru	URL	2(B)	272.7424	572.7424
					3(P)	300.00	
2026-27	VI	-do-	Paleru	URL	3(P)	570.00	570.00
2027-28	VII	-do-	Paleru	URL	3(B)	573.9696	573.9696
2028-29	VIII	-do-	Paleru	URL	4(P)	400.00	400.00

2029-30	IX	-do-	Paleru	URL	4(P)	400.00	400.00
2030-31	X	-do-	Paleru	URL	4(B)	436.7632	436.7632
G.Total						5329.0896	5329.0896

Table No. 3.23: Annual Coupes under Sileru East Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Sileru- East	URL	5(P)	820.00	820.00
2022-23	II	-do-	Sileru- East	URL	5(P)	820.00	820.00
2023-24	III	-do-	Sileru- East	URL	5(B)	820.5760	820.5760
2024-25	IV	-do-	Sileru- East	URL	6(P)	1100.00	1100.00
2025-26	V	-do-	Sileru- East	URL	6(B)	1101.5680	1101.5680
2026-27	VI	-do-	Sileru- East	URL	7(P)	820.00	820.00
2027-28	VII	-do-	Sileru- East	URL	7(P)	820.00	820.00
2028-29	VIII	-do-	Sileru- East	URL	7(B)	820.5760	820.5760
2029-30	IX	-do-	Sileru- East	URL	8(P)	1200.00	1200.00
2030-31	X	-do-	Sileru- East	URL	8(B)	1131.0720	1131.0720
G.Total						9453.7920	9453.7920

Table No. 3.24: Annual Coupes under Janbai Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Kondakamberu	URL	1(P)	1500.00	1500.00
2022-23	II	-do-	Kondakamberu	URL	1(B)	1444.6930	1444.6930
2023-24	III	-do-	Kondakamberu	URL	2(P)	1140.00	1140.00
2024-25	IV	-do-	Kondakamberu	URL	2(P)	1140.00	1140.00

2025-26	V	-do-	Kondakamberu	URL	2(B)	1141.7856	1141.7856
2026-27	VI	-do-	Kondakamberu	URL	3(P)	1723.00	1723.00
2027-28	VII	-do-	Kondakamberu	URL	3(B)	1723.4170	1723.4170
2028-29	VIII	-do-	Kondakamberu	URL	7(P)	1320.00	1320.00
2029-30	IX	-do-	Kondakamberu	URL	7(P)	1320.00	1320.00
2030-31	X	-do-	Kondakamberu	URL	7(B)	1320.7470	1320.7470
G.Total						13773.6426	13773.6426

Table No. 3.25: Annual Coupes under Kondakamberu Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Kondakamberu	URL	4(P)	920.00	920.00
2022-23	II	-do-	Kondakamberu	URL	4(B)	915.8300	915.8300
2023-24	III	-do-	Kondakamberu	URL	5(P)	980.00	980.00
2024-25	IV	-do-	Kondakamberu	URL	5(B)	987.8850	987.8850
2025-26	V	-do-	Kondakamberu	URL	6(P)	730.0000	730.0000
2026-27	VI	-do-	Kondakamberu	URL	6(P)	730.0000	730.0000
2027-28	VII	-do-	Kondakamberu	URL	6(B)	731.6550	731.6550
2028-29	VIII	-do-	Kondakamberu	URL	8(P)	730.0000	730.0000
2029-30	IX	-do-	Kondakamberu	URL	8(P)	730.0000	730.0000
2030-31	X	-do-	Kondakamberu	URL	8(B)	739.0200	739.0200
G.Total						8194.3900	8194.3900

Table No. 3.26: Annual Coupes under Ramaguda Treatment Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Kondakamberu	URL	9(P)	500.00	500.00
2022-23	II	-do-	Kondakamberu	URL	9(P)	500.00	500.00
2023-24	III	-do-	Kondakamberu	URL	9(B)	414.0790	414.0790
2024-25	IV	-do-	Kondakamberu	URL	10(P)	680.00	680.00
2025-26	V	-do-	Kondakamberu	URL	10(B)	679.3800	679.3800
2026-27	VI	-do-	Kondakamberu	URL	11(P)	500.00	500.00
2027-28	VII	-do-	Kondakamberu	URL	11(P)	500.00	500.00
2028-29	VIII	-do-	Kondakamberu	URL	11(B)	456.92	456.92
2029-30	IX	-do-	Kondakamberu	URL	12(P)	670.00	670.00
2030-31	X	-do-	Kondakamberu	URL	13(B)	677.6500	677.6500
G.Total						5578.0290	5578.0290

3.6.10 METHOD OF EXECUTION OF OPERATIONS

3.6.10.1 As restoration of forest cover and improvement on the composition of the vegetations the main objectives of the circle, site- specific treatment plan on watershed based eco-system approach is required with the active participation of the local people. The following steps shall be taken for treatment under this working circle.

3.6.10.2 Demarcation of Annual Rehabilitation Coupe Areas

(i) Annual coupes shall be demarcated in the preceding season of treatment on the ground with small stone cairns of the 2' height erected at visible distances on its periphery and preferably at the corners or by the painting Coal tar rings on the trees at breast height standing on the coupe line so as to facilitate easy identification of the coupes. However, care should to be taken to ensure that such cairns are not confused with forest block boundary pillars.

(ii) In case the line pass through the dense vegetation, the ground flora of uneconomic species and branches of the trees at a width of 2 meters may also be trimmed for easy

identification of the coupes. If any portion of the coupe line coincides with compartment line, the said compartment line shall be maintained by putting double white paint rings on the trees standing on the said line at visible distance and/ or clearance of the line over a width of 1 (one) meter, during such clearance, no established seedlings shall be felled nor damaged.

(iii) The rehabilitation coupe shall be indicated by sign boards at corners of the points of intersection with roads, inspection paths and boundary line of the Reserved Forest and Proposed Reserved Forest. The sign boards should contain the name of the treatment series, coupes number, its area, year of working and compartment number.

3.6.10.3: Treatment plan: A site-specific treatment plan has to be developed before any treatment is taken up. Micro plan for VSS allotted areas should be consulted in case the VSS allotted areas form part of the rehabilitation treatment area. These site specific treatment plans will be made in order as to achieve the major objectives of management of this Working Circle. The concerned Range Officer shall prepare an annual Treatment plan in the 0th year but will cover the treatment to be taken up at the site in the next 3-4 years. The plan shall include all vital information like,

- a) Site identification i.e. Forest Block/ Compartment No.
- b) Area and Treatment Map.
- c) Site Category (i.e. Category I, II)
- d) Site Characteristics (terrain, slope, drainage, soil type and depth)
- e) Vegetation and extent of regeneration.
- f) Extent of degradation of site / vegetation
- g) Year of operations (including maintenance, if any)
- h) Major operations to be undertaken.
- i) Cost norms and calendar of operations.

The Treatment Plan shall also include provisions for monitoring of the execution of operations, e.g. operations actually performed, cost incurred, time schedule followed and the overall results of operations. The ACF shall check the annual action plan and it will be approved by the Divisional Forest Officer. Range wise abstract of treatment plans will be sent to the Conservator of Forests for information.

3.6.11 SUBSIDIARY SILVICULTURAL OPERATION (REHABILITATION OPERATION)

- (i) Once the treatment plan has been prepared and approved, the work shall be carried out as per the requirement without any major deviation. As far as possible, operations will be carried out in the JFM and through the VSS.
- (ii) Silvicultural operations shall be carried out in the year of creation and preferably before the onset of monsoon. The cultural operations like singling out of the coppice shoots, retaining the most promising ones, rectification of the high stumps to encourage coppice shoots and climber cutting. Clearing out of invasive weeds and in congestion area light thinning of C- Grade may also be carried out subject to the rectifications prescribed vide paragraph no.3.6.11.1.2
- (iii) All the dead, dry and fallen trees shall be removed from the annual coupes area if such trees are not required for wild life purposes.
- (iv) Artificial regeneration in the form of gap and block plantation shall be carried out after meticulous planning. Quality seedling shall be raised followed by other operations in accordance with the prescription of the Orissa Plantation Manual and additional stipulations in described at paragraph no 3.4.2.
- (v) Appropriate soil and moisture conservation measures shall be undertaken in the 0th year.

3.6.11.1 Silvicultural Treatments

3.6.11.1.1 The following silvicultural operation will be carried out in the areas as per requirements at the site.

- ❖ High stump will be cut flush to the ground to encourage coppice shoots.
- ❖ Singling out of multiple coppice shoots to retain the most promising ones.
- ❖ Removal of invasive weeds
- ❖ Removal of congestion by cleaning operations aimed at encouraging the growth of locally desirable species.
- ❖ Adoption of few seedlings per ha of locally important and desirable species from the available natural regeneration by giving these species preferentially treatment.

3.6.11.1.2 In congested crop area where the regeneration is fully established, thinning operation shall be undertaken in the interest of further growth. These operations will provide more growing space to the retained crop. The thinning in general shall include the following conditional operations:

- i) No thinning shall be carried out in open areas.
- ii) It should be restricted to the congested pole crop only and limited to the species with girth at breast height less than equal to 75cm.
- iii) Fruit bearing species like Mahua, Mango, Tamarind, Anla, Chara, Harida, Bahada, Kusuma, Bela etc. shall not be thinned out whatever are the circumstances.
- iv) Marking shall be done on the lines of “C” grade thinning which restricted to removal of “dominated” and” suppressed “trees only.
- v) The removal of stems vis-à-vis retention per hectare shall be governed by the formula $D = 0.5 (G/10) \div 2$ where D is the distance between two stems in meters after thinning, Where as G is the average girth of stems in cms.

3.6.12 REGENERATION

3.6.12.1 Choice of species: The choice of species for retention in order of importance will be Sal, Bija, Sahaja, Sissoo, Kurum, Bahada, Harida, Anla, Dhaura, Sidha, Arjuna etc.

3.6.12.2 Natural Regeneration: Natural Regeneration shall be given preference over the plantation. The existing natural regeneration and restocked shall be tended. The gap plantation shall be taken as a supplementary activity to natural regeneration in the under stocked areas.

3.6.12.3 Singling of Coppice Shoots: One healthy and promising coppice shoot will be retained on the stumps and rest to be removed. However, coppice shoots should be cut flush to the ground so that it would be able to develop the root system.

3.6.12.4 Artificial Regeneration: Depending open the local factors, particular soil condition, the species to be artificially raised shall be carefully selected for gap plantation and block plantation. Since the primary objective is to restock these areas and to improve the existing forest growth. Preference should be given to local indigenous species that have the best potential to adopt the sites. At the same time due consideration shall be given to raising of bamboo, NTFP species including fruit bearing and medicinal plant species.

Generally species like Asan, Arjuna, Mahula, Bamboo, Teak, Anla etc. are suitable for different areas proposed in this Working Circle. Some indigenous species which have faster rate of growth which may be considered are *Cedrela toona*, *Ailanthus excelsa*, *Gmelina arborea*, *Trewia nudiflora*, *Albizia lebbek*, *Pterocarpus marsupium*. In areas close to the villages Ficus species and fruit bearing species like Mango, Jack fruit, Tamarind, Karanja, Neem, Kusuma and other shall be tried. On much eroded and degraded sites species like *Acacia leucopholia*, *Zizyphus*, *Aegle marmelos*, Babul and Agave shall be tried along bunds and gullies. A list of species that can be grown for treatment of different sites in this working circle is presented in **Table No.3.27**.

Table No. 3.27: Species Suitable for Problematic Sites

Site	Measure To Be Taken	Species To Be Planted
Ravine	1.Soil and water conservation measures	<i>Dalbergia sissoo</i> , <i>Albizia lebbek</i> , <i>Azadirachta indica</i> , <i>Agave sisalana</i> , <i>Prosopis juliflora</i> , <i>Acacia nilotica</i>
	2.Full protection from grazing and fire	
	3.Safe disposal of run off	
	4.Grass land development	
	5.Afforestation	
Laterite soil	1.Soil and water conservation measures	<i>Dendrocalamus strictus</i> , <i>Madhuca indica</i> , <i>Acacia auriculiformis</i> , <i>Bombax ceiba</i> , <i>Cleistanthus collinus</i> , <i>Albizia lebbek</i> , <i>Cassia siamea</i> , <i>Tamarindus indica</i> , <i>Dalbergia sissoo</i> , <i>Soyimida febrifuga</i> , <i>Ailanthus excelsa</i> , <i>Acacia catechu</i>
	2.Full protection from grazing and fire	
	3.Afforestation	
Skeletal soil	1.Contour bunding, trenching	<i>Anthocephalus kadamba</i> , <i>Syzygium cumini</i> , <i>Terminalia arjuna</i> , <i>Bombax ceiba</i> , <i>Lagerstromia speciosa</i> , <i>Dalbergia sissoo</i> , <i>Acacia nilotica</i>
	2.Afforestation	
	3.Soil and water conservation measures	
	4.Full protection from grazing and fire	
	5.Showing grasses	
	6.Seed dibbling / Afforestation	
Water logging areas	1.Preparation of mounds	<i>Anthocephalus kadamba</i> , <i>Syzygium cumini</i> , <i>Terminalia arjuna</i> , <i>Bombax ceiba</i> , <i>Lagerstromia speciosa</i> , <i>Dalbergia sissoo</i> , <i>Acacia nilotica</i>
	2.Planting of tall plant	
	3.Application of anti Termite chemicals	
	4.Early planting	
	5.Drainage	

3.6.13 ASSOCIATED REGULATION AND MEASURES

3.6.13.1 Soil and Moisture Conservation Measures

3.6.13.1.1 Soil and Moisture Conservation measures should form the main component of rehabilitation operations in Category II areas since most of these areas have steep slopes and affected by soil erosion. Appropriate soil and water conservation measures shall be taken up to reduce the velocity of the water flow and to retain the top soil. Measures like

gully plugging check dams, contour bonds, nallah bonding, and vegetative bunds are prescribed.

(a) Gully plugging: 1) Check dams are required to be erected across gullies. Loose boulder check dams are medium sized mechanical structures provided in the middle reaches of the gullies having a width of 1.0 to 3.0 mt. Rough stones of size of 0.15 to 0.3 cum are required for the construction of these structures. Earthen bunds should be provided in both sides of the structure. Height of the check dam should be regulated $\frac{1}{3}^{\text{rd}}$ to $\frac{1}{2}$ of the gully depth. These check dams should be constructed at regular intervals depending on the gradient, steeper the slope, more check dams are required. More number of check dams are required in category II areas since slopes are steep and the velocity of runoff is high.

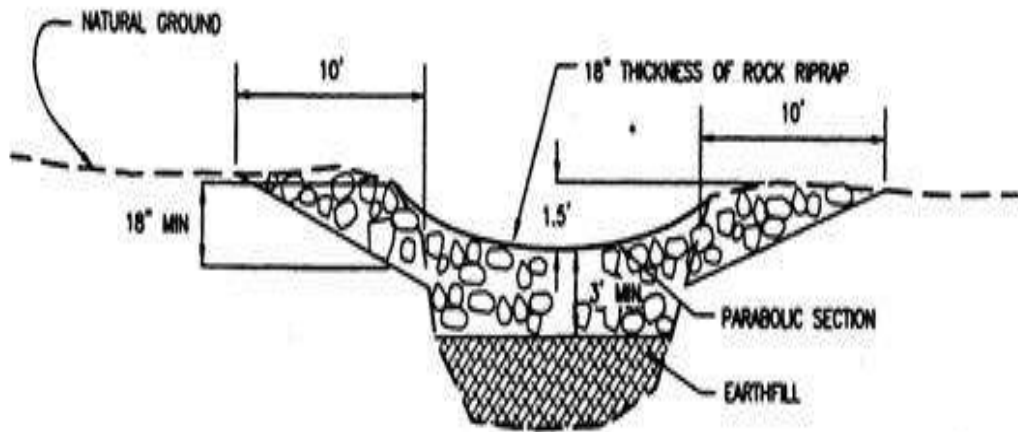


Fig. 3.1: Diagram for Gully plugging.

2) Gully plugging can also be done with brushwood depending on the availability of materials, requirement of sites and cost norms. The gully beds should be planted with soil binder like Sabai grass, vetiver grass and Agave. Generally for brushwood check dams, the height of the fall taken into consideration is 1mt, the maximum width of the gully is 3 mt and depth is 0.6 mt.

(b) Contour (Staggered) Trenches: These trenches would be constructed along the contours in ordered to arrest the speed of the runoff and harvest water. The trench should be of correct size (2.0mt x 0.5 mt. x 0.5mt) and soil dug from the trenches should be kept at least one foot away from the trench in an inverted trapezium manner. This soil should be compacted and dribbled with the seeds. These trenches should not be resorted to when the slope more than 30%. In these areas the trenches half the original size can be taken up

along the contour line. Generally the distance between the two trenches can be 3.0 mt along the contour and 3mtr along the slope.

(c) Contour bonding: Contour bunds are constructed along the contour to arrest the water velocity of water flow during the rainy season. Contour bonding shall be taken up in steep slopes like dry stone bonding or vegetative bonding. Grass turfing is given on the side slope and top of the bund. The soil binding species like Vetiver grass are to be planted on the upper slope of the bund with spacing of 2.3 mt.

(d) Percolation Tanks: These tanks are to be constructed for percolation of water into the soil on flat areas at the height points. Generally large sized tanks are to be dug out with dimensions of about 5 mt. x 5 mt. x 0.5 mt. The width and the depth can vary depending on the availability of the flat surface. The earth dug out from the tanks should be placed in an inverted trapezium and soil should be compacted. No inlet and outlet to be provided from the percolation tank. The bunds should be treated with seeds Dhanicha, Sun Hemp or even Horse gram.

(e) Vegetative Fencing: Vegetative is the cheapest and most useful one. Sisal shall be planted in four rows in staggered manner at spacing of 1 mt. x 1 mt. along the annual coupe boundary line. Palm seeds, (khejuri), Bamboo seeds may also be sown on the inner side in one or two rows

(f) Stone Fencing: In rocky patches where boulder is locally available stone wall fencing shall be adopted.

(g) Trench Fencing: Trench fencing is costly and requires periodic repairs. If the additional objective is to even create labour intensive works and funds are not a constraint, this protection measure shall be undertaken. However, no trenching shall be done across the contours i.e. it shall be invariably along the contours only in order to prevent subsequent erosion. Moreover, the dugout soil shall be kept on uphill side only and stabilized with vegetative means.

The main activity to be taken up in Rehabilitation WC area is the Soil and Moisture Conservation works (SMC works). During implementation RDF and ANR works in this area a special care may given in choosing the method of SMC works.

Mechanical method/ Engineering measures/Structural measures may be broadly classified as below.

1. Erosion control measures

- i. Bonding
 - a. Contour bonding
 - b. Graded bonding
- ii. Bench terracing
 - a. Level terrace
 - b. Inward sloping terrace
 - c. Out ward slopping terrace
- iii. Trenching
 - a. Contour trenching
 - b. Graded trenching

2. Drainage Line treatment measures

3. Water harvesting measures

While selecting the method of SMC works the following point may be kept in mind;

GENERAL AREAS

- i. Protective afforestation
- ii. Gully control works
- iii. Protection of Riverine land (Stream bank Erosion Control)
- iv. Land Development (Contour bunding, bunding, excess water disposal by gravity channel, water harvesting and distribution etc.)

HILL AREAS

- i. Protective afforestation
- ii. Gully control works
- iii. Protection of Riverine land (Stream bank Erosion Control)
- iv. Land Development (Contour bunding, excess water disposal by gravity channel, water harvesting structure)
- v. Land reclamation
- vi. Terracing

3.6.13.1.2 Grass and Fodder: Grass planting is the preferred treatment for exposed soils in eroded areas, Local and indigenous grasses should be preferred. A list of grasses suitable for control soil erosion is presented in **Table No.3.28**

Table No. 3.28: List of grasses suitable for control soil erosion.

Species	Type	Habit Factor
<i>Arundinella nepalensis</i>	Fodder	Slopes having good drainage and permeability, Sandyloam, PH 6.5
<i>Arundinella bengalensis</i>	Fodder	Yellowish brown soil, Sandy loam pH 6.2

<i>Chrysopogon fulvas</i>	Fodder	Hilly gravel soil, Black cotton soil, Red soil and low level of moisture
<i>Chrysopogon gryllus</i>	Fodder	Strong acidic soil on high hills, pH 4.2
<i>Cymbopogon jwarancusa</i>	Non-Fodder	Prefer level to hilly topography, sandy and rocky soil pH 6.5 to 7.5
<i>Cymbopogon dactylon</i>	Fodder	All types of soil on level land, prefers moist and stands moderate grazing and trampling
<i>Dichanthium annulatum</i>	Fodder	A species level land prefers sandy loam to loamy soil moist areas
<i>Dichanthium caricum</i>	Fodder	A species level land prefers sandy loam to loamy soil moist areas
<i>Eragrostis arctata</i>	Fodder	A xerophytic grass
<i>Eulaliopsis binata</i>	Non-Fodder	Can grow in slopes up to 50%, hot dry localities withstand forest area
<i>Heteropogon contortus</i>	Non-Fodder	Shallow eroded, black or red soil, pH 6.8 to 7.0
<i>Ischaemum indicum</i>	Fodder	Prefer most swampy areas pH 4.0 to 7.5
<i>Iseilema spp.</i>	Fodder	Low lying wet area heavy black soil pH 7 to 8.5
<i>Themeda triandra</i>	Fodder	Gravelly soil on hills, pH acidic to neutral, Rainfall 1000 mm and above

3.6.13.1.3 If the Rehabilitation works could not be taken up due to any reason in one year, then the pending area will be taken up in the subsequent years in addition to that year's area. If more funds are available then the area due for working in future could not be taken up in early years.

3.6.14 CONTROL (RECORD KEEPING)

3.6.14.1 The Plantation Journal and other records will be maintained for each coupe in accordance with the "Orissa Forest Manual 1977". Annual Rehabilitation Journal may be maintained at the Division level to keep track of the rehabilitation work taken up in the division. Necessary entries must be made in the Compartment Histories file about all the works undertaken like cleaning, thinning, soil conservation measure, plantation etc. in the coupe as well as in the treatment series as per Management Plan Procedure, 1990.

3.6.15 MISCELLANEOUS REGULATIONS

3.6.15.1 Protection Measures: In order to check degradation of rehabilitation areas due to biotic interference, it is highly necessary to protect the area effectively from fire, grazing and illicit felling. The annual treatment areas shall be rigidly protected and closed to grazing up to 5 years. They shall also be protected from fires. The provisions of Rule 283 of the Orissa Forest Department Code and the Orissa Forest Fire (Protection) Rules will be implemented. The following further measures are suggested.

3.6.15.2 Joint Forest Management: JFM is an accepted way to involve people in protection and regeneration of forests. Constitution of Forest Development Agency (FDA) in the Division is a great leap in this direction. Hence, each annual rehabilitation coupe shall have registered JFM committee (VSS) for the purpose of implementation of the treatment plan. However, if necessary from protection point of view, more than one such annual coupe may be assigned to an individual VSS. However, while constituting such committees, the Govt. guidelines shall also be kept in mind.

3.6.15.3 The Divisional Forest Officer shall make efforts to secure funding from all possible sources (e.g. Non-Plan Sector, State and Central Plan Sector, Districts Plan Schemes) to ensure that sufficient funds to implement prescription of this Working Circle are available. He shall also include requirement of funds for this purpose in his annual budget and estimates.

3.6.16 RIGHT AND CONCESSION

3.6.16.1 Right and Concession in this Working Circle shall be regulated in accordance with the provisions of the relevant gazette notifications of the Forest Blocks as RFs and PRFs. Further, on bringing the management under JFM fold the privileges shall be regulated as per Chapter-I and JFM Policy of the Government in consultation with general Working Plan prescriptions.

3.6.17 COST NORM

3.6.17.1 The cost norm for implementation of prescriptions under this circle and total estimated cost has been discussed under Chapter-II (Financial Forecast and Plan of Operation).

3.6.18 INTERMEDIATE REVISION

3.6.18.1 In general, no major changes in the prescription of this Working Circle are anticipated. However; it may be reviewed if necessary, after five years jointly by the Regional Chief Conservator of Forests, Koraput Circle, Koraput and Conservator of Forest Working Plan. Any deviations suggested shall be subjected to the approve of competent authority.



4.1 NAME OF WORKING CIRCLE CLEARLY MARKED ON GIS BASED MAPS (1:50,000):

The area of this working circle has been clearly marked on the GIS based map of 1:50,000 which are appended as management map in the plan.

4.2 GENERAL CONSTITUTION OF WORKING CIRCLE

4.2.1 This Working Circle includes all those blocks that have old existing plantations raised during as well as prior to the outgoing plan period. The other areas included in this working circle, which Forest Blocks are completely open/ barren land within the management area and which are devoid of rootstock and natural regeneration is not available.

4.2.2 In the outgoing working plan a total of 2976.94 Ha was kept under this working circle of different plantation series. But during the passage of time as per prescription of the existing working plan total of 840 Ha only has been covered under AR block plantation in different schemes.

So, in the proposed Working Plan, it is proposed for about **6197.38 Ha**, which includes **2801.76 Ha** of old Plantation raised during 2007-08 to 2015-16 and 51 nos. of Village Forests of area 268.20 Ha and old Teak plantations raised during 1959-60 to 1991-92 which comes 2041.80 Ha. The list of Plantation showing sitewise and schemewise is enclosed in **Annexure-VIII**. The objectives and treatment of this working plan shall remain as in the existing working plan.

4.2.3 In Chitrakonda, Balimela, Motu, Malkangiri, Kalimela and Mathili Range of Malkangiri Division, where the Afforestation Wing of the Department have raised 1044.4 ha of Teak Plantation during the year 1959-60 to 1991-92 in RF, PRF area as well as outside WP area. They are all attained the age of 28 to 60 years. Now those plantations are under severe threat for illegal felling. Though the Department is taking strict protection, it needs special scheme for tending operation or felling it may be included in the Selection Working Circle for Management Purpose.

4.2.4 These block plantations of pure teak which was raised in this Division under non JFM mode of Afforestation wing, which was merged with Territorial in due course of Time since 1959-60 to 1991-92, needs tending operation such as Thinning, Pruning, singling out, Branch cutting and climber cutting in every seven year as per the silviculture of Teak. This tending operation will enhance the growth of clear bole as a result commercial value of teak trees will increase.

4.2.5 Accordingly an area of **2041.80 Ha** of Old Teak Plantation Area is kept under this Working Circle. The detail list of Old Teak plantation raised during the above period is furnished in **Annexure- IX**.

4.3 GENERAL OBSERVATION AND VEGETATION

4.3.1 The areas included in this working circle have existing plantations raised during the period of previous plans. Most of the areas fall under (i) Southern Tropical Dry Deciduous Forest (ii) Southern Tropical Moist Deciduous Forest and to some extent Orissa Tropical Semi evergreen Forests. Artificial regeneration through plantations is comparatively expensive and is resorted to improve the forest/tree cover, extend the resource base and to meet the requirements of the people and forest-based industries. Considerable environmental benefits like protection of topsoil and conservation of moisture, recycling of nutrients etc. also accrue due to these plantations. With the introduction of fast-growing species including genetically improvement planting stock, improved nursery and planting techniques, management of plantations has become increasing more intensive.

4.3.2 All the old plantations existing in the RF/ PRF/ VFs etc. are also included here. However, in most of such plantations, proper record of either the year in which these were created and whether operations like thinning etc. have been carried out has not been maintained. In absence of any such records, it was not possible to identify the exact year of their formation in the field or exact extent of many such existing plantations. Many of the Teak plantations have been illicitly felled repeatedly and as a result only coppice regrowths are existing at places badly suppressed by natural other species. In the blocks the plantation have been raised twice/ thrice in same sites due to repeated failure in the past as well as illegal hackling and removal by local people for various uses. However, existing plantation are reflected in Compartment History files of the concerned blocks.

4.3.3 The prescription of the Plantation Working Circle of the outgoing plan, a number of plantations have been raised in RL and URL (outside the RFs and PRFs) by Forest Department and other agencies like Horticulture, Soil Conservation Department etc. In fact, most of the plantations of Eucalyptus and other quick growing species raised outside the RFs and PRFs have been subjected to heavy illicit felling and removal.

4.4 PLANTATION SERIES, CUTTING SECTION AND JFM AREAS

4.4.1 In order to have site specific plan and to deal with various requirements of Teak and miscellaneous plantations, separate series are required to be constituted. Also, for plantation of short rotations and commercial plantations, there is need of formation of separate felling series.

4.4.2 While constituting different planting series, care has been taken to restrict the area in one Range. This will not only help in proper implementation of the prescriptions but also administrative convenience.

4.4.3 The total area of this Working Circle has been divided into 2 (Two) plantation series, 1 (One) Miscellaneous Tending operations, 1 (One) Teak Tending operations and 1 (One) V.F Tending operations.

4.5 BLOCKS, COMPARTMENTS AND JFM AREA (MARKED ON GIS BASED MAP)

4.5.1. The area allotted to this Working Circle is 6197.38 ha. It comprises of both the plantable areas as well as existing plantation. The detailed list of Forest Blocks and their corresponding areas included in this Working Circle are given in the following table.

Table No. 4.1: Abstract of Area Statement of plantation working circle

Type of area and plantation	Area in ha	Remarks
Plant able area	1085.62	Blank and Barren areas
Miscellaneous plantation	2801.76	Miscellaneous species like Sissoo, Chakunda, Badachakunda, Acacia, Karanja, Siris, Simaruba etc.
Teak plantation	2041.80	Mainly teak including its old teak plantation
Plantation in VF areas by Social Forestry	268.20	Mainly Eucalyptus, Acacia, San Chakunda species

4.5.2 Allotment of Blocks and Compartments into Planting Series: The plantable area of 1085.62 ha under this Working Circle has been divided into 2 (Two) Planting Series due to not available of barren area and other existing miscellaneous tending series area of 2801.76, Teak Tending Series area of 2041.80 ha and VF Tending Series area of 268.20 ha. However, a statement of allocation of blocks and compartments into different planting series together with area is given below.

Table No. 4.2: Allotment of Blocks and Compartments into planting series:

Name of the Range	Sl. No.	Name of the Planting series	Name of the Forest Block	Legal Status	Compartment		Total Treatment Series Area (Ha.)
					No.	Area in Ha.	
Mathili	1	Malkangiri	Challanguda	PRF	(Part)	30.00	290.00
	2		Pujariguda	PRF(Part)	(Part)	30.00	
				Total	-	60.00	
Malkangiri	1		Jhileruguda	PRF	(Part)	30.00	
	2		Tandikonda	PRF	(Part)	30.00	
	3		Baraja	PRF	(Part)	10.00	
				Total	-	70.00	
Balimela	1		Tarlakota	PRF	No-1(Part)	20.00	
				PRF	No-6(Part)	60.00	
				Total	-	80.00	
Kalimela	1		Yengulkonda	RF	(Part)	30.00	
	2		Venkatpalam	RF	(Part)	50.00	
				Total		80.00	
Chitrakonda	1	Chitrakonda	Ranginiguda	PRF	No-1(Part)	125.00	795.62
				PRF	No-2(Part)	60.00	
	2		Jantri	PRF	No-1(Part)	100.62	
				PRF	No-2(Part)	80.00	
	3		Singaram	PRF	No-2(Part)	170.00	
	4		Sikhapanas	PRF	No-2(Part)	120.00	
	5		Bhimaram	PRF	No-	100.00	

					1(Part)		
	6		Bodakonda	PRF	-	40.00	
				Total		795.62	795.62
				G.Total		1085.62	1085.62

Table No. 4.3: Miscellaneous plantation Tending series

Year	Range	Forest Block	Status	Extent	Area in Ha
2007-08	Malkangiri	Sindrimal	PRF	Part	20.00
	Balimela	Nuagam	RF	Part	10.00
	Kalimela	Pulimetla	PRF	Part	20.00
		Pedawada	PRF	Part	10.00
	Chitrakonda	Mutumkonda	PRF	Part	20.00
		Jantri	PRF	Part	10.00
	Motu	Mallavaram	RF	Part	25.00
			Total		115.00
2008-09	Malkangiri	Titibiri	PRF	Part	25.00
		Sindrimal	PRF	Part	50.00
	Mathili	Dalpatiguda B	PRF	Part	20.00
		Mendikuli	PRF	Part	25.00
	Balimela	Nuagam	RF	Part	30.00
	Kalimela	Pulimetla	PRF	Part	40.00
		Pedawada	PRF	Part	10.00
	Chitrakonda	Jantri	PRF	Part	25.00
		Banaguru	RF	Part	25.00
		Banaguru RF	RF	Part	10.00
		Goudagurei	PRF	Part	25.00
		Datunguda	PRF	Part	50.00
	Motu	Pendikonda	RF	Part	15.00
		Pusuguda	RF	Part	20.00
		Potakhal	PRF	Part	20.00
			Total		390.00
2009-10	Malkangiri	Jharapalli	RF	Part	50.00
	Mathili	Saradaput	RF	Part	100.00

	Balimela	Tarлакota	PRF	Part	130.00
	Kalimela	Pulimetla	PRF	Part	15.00
	Chitrakonda	Dantunguda	PRF	Part	10.00
	Motu	Tadimetla	RF	Part	15.00
			Total		320.00
2010-11	Malkangiri	Jharapalli	RF	Part	20.00
		Sindrimal	PRF	Part	100.00
		Jharapalli	RF	Part	50.00
	Mathili	G.R.gumma	PRF	Part	50.00
		Gotiguda	RF	Part	30.00
		Malidanger	RF	Part	30.00
	Balimela	Teakguda	RF	Part	30.00
	Kalimela	Pedawada	PRF	Part	30.00
	Chitrakonda	Sileru West	RF	Part	25.00
	Motu	Pendikonda	RF	Part	11.76
			Total		376.76
2011-12	Malkangiri	Korukonda	PRF	Part	20.00
	Chitrakonda	Banaguru	RF	Part	30.00
			Total		50.00
2012-13	Malkangiri	Pititung	PRF	Part	20.00
	Kalimela	Pedawada	PRF	Part	20.00
	Chitrakonda	Sileru West	RF	Part	25.00
			Total		65.00
2013-14	Malkangiri	Gharsaldangar	PRF	Part	40.00
		Dugali		Part	20.00
		Gharsaldangar	PRF	Part	15.00
		Cheruguda	PRF	Part	15.00
		Tumsapally	PRF	Part	15.00
	Mathili	Singguda	PRF	Part	20.00
		Putparbat	RF	Part	20.00
		Gangrajgumma	PRF	Part	30.00
		Chalanguda	PRF	Part	20.00

		Dalapatiguda	PRF	Part	20.00
		Chaulamendi	RF	Part	20.00
		Tandiki	RF	Part	10.00
	Balimela	Laktiguda	PRF	Part	30.00
		Orkel	PRF	Part	15.00
		Balimela	PRF	Part	20.00
		Kanangi	PRF	Part	40.00
		Gopiguda	RF	Part	30.00
		Mundiguda	PRF	Part	30.00
		Tarлакота	PRF	Part	20.00
	Kalimela	Chitrangpalli	PRF	Part	20.00
		Materu	PRF	Part	20.00
	Chitrakonda	Banaguru	RF	Part	40.00
	Motu	Pusuguda	RF	Part	20.00
		Kotaguda	RF	Part	10.00
		Kalapalli	RF	Part	15.00
		Motu	RF	Part	15.00
			Total		570.00
2014-15	Malkangiri	Kotameta	PRF	Part	30.00
		Pitatung	PRF	Part	20.00
		Dharmadangar	PRF	Part	10.00
	Mathili	Putparbat	RF	Part	30.00
		Mathili	RF	Part	20.00
		Mekka	RF	Part	25.00
	Balimela	Mahadevpur	RF	Part	30.00
		Tarлакотта PRF	PRF	Part	20.00
	Kalimela	Koimetla	RF	Part	25.00
		Similibancha	RF	Part	20.00
		Pedawada	PRF	Part	25.00
		Pedawada	PRF	Part	10.00
		Pedawada	PRF	Part	5.00
		Venkatapalam	RF	Part	10.00

	Chitrakonda	Banaguru	RF	Part	45.00
		Goudagurei PRF	PRF	Part	20.00
		Datunguda	PRF	Part	25.00
		Matumkonda	PRF	Part	20.00
		Bandhaguda	PRF	Part	20.00
	Motu	Manyamkonda	PRF	Part	20.00
			Total		430.00
2015-16	Malkangiri	Siadimal	PRF	Part	25.00
		Tumsapalli	PRF	Part	30.00
		Pitatung	PRF	Part	30.00
		Tumusapalli	PRF	Part	25.00
	Mathili	Mendukulli	PRF	Part	25.00
		Kolab Teak	PRF	Part	25.00
		Gunenguda	PRF	Part	25.00
	Balimela	Balimela	PRF	Part	25.00
		Teakguda	RF	Part	10.00
	Kalimela	Pedawada	PRF	Part	10.00
	Chitrakonda	Bandhaguda	PRF	Part	40.00
		Dantunguda	PRF	Part	30.00
		Dantunguda	PRF	Part	20.00
		Publiguda	RF	Part	25.00
		Sileru West	RF	Part	20.00
		Sileru West	RF	Part	25.00
		Banaguru	RF	Part	30.00
	Motu	Malavaram	RF	Part	20.00
		Pendikonda	RF	Part	25.00
		Malavaram	RF	Part	20.00
			Total		485.00
			G.Total		2801.76

Table No. 4.4: Teak Plantation Tending Series**Malkangiri Range**

Year	Range	Block	Status	Extent	Area in Ha
1966-67	Malkangiri	Guppakonda	PRF	Part	44.00
1968-69	Malkangiri	Guppakonda	PRF	Part	28.00
1970-71	Malkangiri	Guppakonda	PRF	Part	10.80
1971-72	Malkangiri	Guppakonda	PRF	Part	18.00
1979-80	Malkangiri	Korkonda	PRF	Part	30.00
1982-83	Malkangiri	Potrel Teak	RF	Part	30.00
1984-85	Malkangiri	Sindirimal	PRF	Part	05.00
2002-03	Malkangiri	Sindrimal	PRF	Part	50.00
2004-05	Malkangiri	Sindhriml	PRF	Part	15.00
2004-05	Malkangiri	Sindhimal	PRF	Part	10.00
1987-88	Malkangiri	Girdidanger PRF	PRF	Part	20.00
1989-90	Malkangiri	Jharapalli	RF	Part	25.00
2004-05	Malkangiri	Jharapalli	RF	Part	15.00
2002-03	Malkangiri	Akuru	RF	Part	45.00
2002-03	Malkangiri	Pititung	PRF	Part	25.00
2002-03	Malkangiri	Pititung	PRF	Part	55.00
2003-04	Malkangiri	Pititung	PRF	Part	25.00
2003-04	Malkangiri	Pititung	PRF	Part	25.00
2004-05	Malkangiri	Pititung	PRF	Part	10.00
2006-07	Malkangiri	Pititung	PRF	Part	25.00
			Total		510.8

Mathili Range

1988-89	Mathili	Godiali	PRF	Part	20.00
1993-94	Mathili	Mathili	RF	Part	10.00
2003-04	Mathili	Gangarajgumma	RF	Part	25.00
1996-97	Mathili	Putparbat	RF	Part	20.00
			Total		75.00

Balimela Range

1962-63	Balimela	Tarлакota	PRF	Part	80.00
1963-64	Balimela	Tarлакota	PRF	Part	20.00
1972-73	Balimela	Tarлакotta	PRF	Part	20.00
1966-67	Balimela	Balimela	PRF	Part	28.00
1967-68	Balimela	Chitapari	RF	Part	20.00
1969-70	Balimela	Chitapari	RF	Part	16.00
1973-74	Balimela	Chitapari	RF	Part	24.00

1982-83	Balimela	Chitapari	RF	Part	24.00
2004-05	Balimela	Chitapari	RF	Part	25.00
2006-07	Balimela	Chitapari	PRF	Part	30.00
1982-83	Balimela	Nuagaon	RF	Part	06.00
1989-90	Balimela	Teakguda	RF	Part	20.00
1991-92	Balimela	Teakguda	RF	Part	30.00
2005-06	Balimela	Balimela P	PRF	Part	25.00
			Total		368.00

Kalimela Range

1963-64	Kalimela	Pedawada	PRF	Part	20.00
1963-64	Kalimela	Udayagiri	RF	Part	20.00
1964-65	Kalimela	Udayagiri	RF	Part	20.00
1965-66	Kalimela	Udayagiri	RF	Part	20.00
1966-67	Kalimela	Udayagiri	RF	Part	40.00
1978-79	Kalimela	Udayagiri	RF	Part	20.00
1979-80	Kalimela	Udayagiri	RF	Part	20.00
1979-81	Kalimela	Similipancha	RF	Part	30.00
1972-73	Kalimela	Gompakonda	RF	Part	06.00
1972-73	Kalimela	Gompakonda	RF	Part	05.00
1973-74	Kalimela	Gomphakonda	RF	Part	20.00
2006-07	Kalimela	Silakota	PRF	Part	02.00
1981-82	Kalimela	Pedawada	PRF	Part	30.00
1982-83	Kalimela	Kalimela	RF	Part	20.00
1989-90	Kalimela	Kangurukonda	PRF	Part	20.00
1990-91	Kalimela	Mandapalli	RF	Part	20.00
2003-04	Kalimela	Mangipalli	RF	Part	30.00
2005-06	Kalimela	Bapanpalli	RF	Part	25.00
			Total		368.00

Chitrakonda Range

1968-69	Chitrakonda	Sileru west	RF	Part	06.00
1969-70	Chitrakonda	Sileru West	RF	Part	16.00
1988-89	Chitrakonda	Silleru west	RF	Part	20.00
1988-90	Chitrakonda	Hilpahad	RF	Part	30.00
1989-90	Chitrakonda	Silleru west	RF	Part	20.00
1991-92	Chitrakonda	Datunguda	PRF	Part	40.00
1992-93	Chitrakonda	Silleru west	RF	Part	15.00
1995-96	Chitrakonda	Silleru west	RF	Part	05.00
1979-80	Chitrakonda	Sileru west	RF	Part	10.00
1979-80	Chitrakonda	Mantriput	PRF	Part	64.00

1986-87	Chitrakonda	Banguru	RF	Part	48.00
1987-88	Chitrakonda	Banguru	RF	Part	10.00
1987-88	Chitrakonda	Banaguru	RF	Part	25.00
2004-05	Chitrakonda	Gunthawada	RF	Part	10.00
2005-06	Chitrakonda	Matumkonda	PRF	Part	25.00
			Total		344.00

Motu Range

1959-60	Motu	Motu	RF	Part	10.00
1961-62	Motu	Motu	RF	Part	24.00
1964-65	Motu	Motu	RF	Part	40.00
1965-66	Motu	Motu	RF	Part	40.00
1966-67	Motu	Motu	RF	Part	40.00
1967-68	Motu	Motu	RF	Part	30.00
1968-69	Motu	Motu	RF	Part	16.00
2005-06	Motu	Motu	RF	Part	10.00
1964-65	Motu	Tadimetla	RF	Part	40.00
1965-66	Motu	Tadimetla	RF	Part	48.00
1967-68	Motu	Tadimetla	RF	Part	20.00
1968-69	Motu	Tadimetla	RF	Part	18.00
2004-05	Motu	Tadimetla	RF	Part	25.00
2005-06	Motu	Muraliguda Teak	RF	Part	15.00
			Total		376.00
			G.Total		2041.80

Table No. 4.5: Village Forest Tending Series

Name of the Range	Sl. No.	Name of the Forest Block	Legal Status	Compartment		Total Treatment Series Area (Ha.)
				No.	Area in Ha.	
Mathili	1	Chaulmendi	VF	Whole	5.00	
	2	Katapaliguda	VF	Whole	5.00	
	3	Markapalli,	VF	Whole	5.00	

		Colony				
	4	Markapalli	VF	Whole	5.00	
	5	Buduguda	VF		5.00	
	6	Sargiguda	VF	Whole	6.00	
	7	Madkamiguda	VF		8.00	
	8	Markapali	VF	Whole	5.00	
	9	Pangam	VF	Whole	10.00	
	10	Govindpalli	VF	Whole	5.00	
	11	Pujariguda	VF	Whole	3.50	
	12	Khemaguda (Angriguda)	VF	Whole	8.00	
	13	Khemaguda (Tentuliguda)	VF	Whole	8.00	
	14	Machhaguda	VF	Whole	10.00	
	15	Pakhanaguda (Baliguda)	VF	Whole	5.00	
	16	Kadalguda (Muduliguda)	VF	Whole	10.00	
	17	Thapaguda	VF	Whole	2.00	
	18	Madkamiguda	VF	Whole	3.00	
	19	Baliguda	VF	Whole	3.00	
	20	Challanguda	VF	Whole	6.00	
	21	Similibanchha,	VF	Whole	5.00	
	22	Similibanchha,	VF	Whole	5.00	
	23	Madkamiguda	VF	Whole	7.10	
	24	Madkamiguda	VF	Whole	0.50	
	25	Madkamiguda	VF	Whole	3.10	
	26	Khadimati	VF	Whole	5.00	

	27	Madkamiguda	VF	Whole	5.00	
	28	Kamalapadar	VF	Whole	5.00	
				Total	153.20	
Malkangiri	1	Korukonda	VF	Whole	5.00	
	2	Koilipari	VF	Whole	5.00	
	3	Korukonda (Nuaguda)	VF	Whole	5.00	
	4	Korukonda (MV-31)	VF	Whole	5.00	
	5	Saradaguda	VF	Whole	3.20	
	6	Korukonda	VF	Whole	10.00	
	7	Saradaguda	VF	Whole	1.80	
	8	MPV- Daniguda	VF	Whole	5.00	
	9	Sikhpalli	VF	Whole	5.00	
	10	Orkelguda	VF	Whole	5.00	
	11	Tirlaguda	VF	Whole	5.00	
	12	Tandapali	VF	Whole	3.00	
	13	Gorakhunta	VF	Whole	5.00	
	14	Nilamari	VF	Whole	3.00	
	15	Bhaluguda (Mundapariguda)	VF	Whole	3.00	
	16	Sargiguda (Sydimal)	VF	Whole	5.00	
	17	Sydimal	VF	Whole	10.00	
	18	Thapaguda (Markapalli)	VF	Whole	5.00	
	19	Bhaluguda	VF	Whole	5.00	

	20	Buduguda (Uperguda)	VF	Whole	5.00	
				Total	99.00	
Balimela	1	Nilapari	VF	Whole	5.0	
				Total	5.00	
Motu	1	Lugal	VF	Whole	6.00	
	2	Maharajpalli	VF	Whole	5.00	
				Total	11.00	
				G. Total	268.20	

4.6 SPECIAL OBJECTIVES OF MANAGEMENT

The special objectives of Management under this working circle are listed below;

- To restock the barren and permanent blanks besides encroached areas by raising plantations of suitable species through artificial regenerations.
- To nurse the existing plantations by appropriate tending operations.
- To harvest mature plantations to meet the requirement of both the industry and the local people followed with necessary replanting as per the silvicultural requirements.
- To augment fodder, fuel wood and small timber requirement of the local people
- To concrete more on such species of the plantations which have proved successful

4.6.1 ANALYSIS OF THE CROP:

4.6.1.1 As stated above, the areas included in this Working Circle are mostly blank patches and devoid of any vegetation cover. The detail analysis and valuation has not been made. The existing miscellaneous plantations raised in RFs and PRFs are mostly in degraded condition due to lack of proper protection mechanism. However, now days after launching of RLTA, CAMPA all the activities are with precondition of JFM mode and are well protected by the villagers. During field verification it has been noticed that most of the old plantations are in the 5 to 30 years old age group. The species planted are Gambhar, Sissoo, Chakunda, Acacia, Mahaneem, Karanja, Bamboo, Eucalyptus, Tamarind, Amla, Arjun, Simul, Simaruba, Jafra etc. The miscellaneous plantations are generally thinly

populated due to continuous biotic interference and lack of cultural operations. In failure areas, some natural growths, weeds etc. have also come up. Hence, all the plantations raised in RFs and PRFs of the Division need complete protection and tending operations to boost their growth.

4.6.1.2 Teak plantations raised in earlier part of the expired plan have attained the average girth class of 90 to 120 cm and have been subjected to select illicit felling, leaving about 30 to 40 % intact in the field. However, the age group of plantations varies from 30 to 40 years. Due to lack of proper and regular tending/ thinning operations, the size of trees in these plantations are not commensurate with that of age. In valley and plains, where there is good soil and well protected by village mass, the trees have attained sizable growth. Also, the quality class of these plantations varies from class III to IV.

4.6.1.3 The plantations raised in Village Forests under Social Forestry Projects and constituted as Village Forest under provision of Orissa Village Forest Rules, 1985. The species like Acacia, Eucalyptus and Sanchakunda were planted. Most of the plantation areas handed over to concerned VSS and encroached by the local people. Due to lack of proper and regular tending/ thinning operations, the size of the trees not up to the mark. Hence, all the plantations raised of the Division need complete protection and tending operations to boost their growth.

4.6.1.4 The entire Working Circle has been stock mapped on 1:50 000 scale topo sheet and maps have been attached in the respective Compartment History files.

4.6.2 SILVICULTURAL SYSTEM

4.6.2.1 Areas included in this working circle are required to be restocked through artificial regeneration with fresh plantations in barren and degraded areas. Existing plantations are required to be appropriately tended with view to encourage growth and to enhance site productivity. Therefore, no formal silvicultural system is prescribed for this Working. Under artificial regeneration, the barren/blank areas shall be restocked with suitable species of choice. Post planting operations as per Orissa Plantation Manual' 1977 shall be followed. Besides, for existing plantations, tending operations shall be taken up as required as well thinning operations coupled with strict protection from biotic interference under JFM mode. Soil and moisture conservation measures will also be undertaken up.

4.6.3 ROTATION AND CONVERSION PERIOD

4.6.3.1 The rotation for all the species of the Division has been fixed at 120 years where as the exploitable girth has been fixed at 150 cm and above. The growth of Teak in various plantations varies due to different site conditions, tending operations carried out and biotic interference of the locality. From the enumeration data obtained during field verification, neither Teak plantation nor existing miscellaneous plantations have attained to exploitable girth class except 20 Ha of teak and 80 Ha of miscellaneous plantations raised in Balimela Range during 1967-98 and 1962-63 respectively. Hence, final harvest followed with replanting is to be taken up in these two plantations whereas in rest of the plantations, only tending operations are required.

4.6.4 HARVESTING DIAMETERS (EXPLOITABLE DIAMETER)

4.6.4.1 In the last plan, the exploitable girth fixed for Teak and other species in Selection-cum-Improvement Working Circle was 150 cm. However, during the field visit and other reference like growth statistics, it has been concluded that the trees after 150 cm. girth show very negligible increment and starts developing deformations. In this situation, the exploitable girth of Teak and other species has been fixed to 150 cm.

4.6.5 REDUCING FACTORS AND REDUCING AREAS: Not applicable

4.6.6 FELLING CYCLE/PLANTING CYCLE

4.6.6.1 As the area allotted to this Working Circle shall be treated within the plan period, the planting cycle fixed for this circle is 10 years coinciding with the plan period.

4.6.6.2 Keeping the special objectives of management in view, indigenous species shall be given priority in all the planting series because they are better adapted to local environment. Economically important species including Teak, Gamhar, Sissoo, Dhaura, Sahaja, Bandhan and Asan may be planted, as far as possible in areas away from villages and other human habitants. However, in areas close to habitations, fuel wood and fruit bearing species such as Siris, Bamboo, Semal, Mango, tamarind, Jackfruit, Mahul, Aml, Kusuma, Harida, Bahad and Neem etc. shall be planted.

4.6.6.3 In case of tending series, the gap shall be planted with only those species which are already thriving well. However, in case of Teak tending series, Teak shall preferably be planted.

4.6.7 DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS

(PB): Not applicable

4.6.8 CALCULATION OF YIELD AND ITS REGULATION

4.6.8.1 Since the special object of management is to restock the barren and blank patches of the forest areas with artificial regeneration within the plan period and to tend the existing plantations, yield is not expected from these plantations. However, this can be possible only in commercial plantations of Eucalyptus and Acacia raised in the outgoing plan period. But in Malkangiri Forest Division no such commercial plantations have been raised.

4.6.9 TABLE OF FELLING/PLANTING

4.6.9.1 This Working Circle divided into 2 (Two) planting series. Each planting series has been divided into 10 (Ten) annual coupes. If the plantation operations could not be taken up in a particular year due to lack of funds, staff or other factors, those Forest Blocks will be taken for plantation in subsequent years in addition to current years. The details of annual coupes are given below.

Table No. 4.6: Annual Coupes under Malkangiri Plantation Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt Area	Coupe area
2021-22	I	Kalimela	Yengulkonda	RF	Part	30.00	30.00
2022-23	II	Balimela	Tarлакota	PRF	No-1(Part)	20.00	20.00
2023-24	III	Kalimela	Venkatpalam	RF	Part	25.00	25.00
2024-25	IV	Mathili	Pujariguda A	PRF	Part	30.00	30.00
2025-26	V	Balimela	Tarлакota	PRF	No-6(Part)	30.00	30.00
2026-27	VI	Kalimela	Venkatpalam	RF	Part	25.00	25.00
2027-28	VII	Malkangiri	Tandikonda	PRF	Part	30.00	30.00
2028-29	VIII	Mathili	Challanguda	PRF	Part	30.00	30.00
2029-30	IX	Balimela	Tarлакota	PRF	No-6(Part)	30.00	30.00
2030-31	X	Malkangiri	Jhileruguda	PRF	Part	30.00	40.00
			Baraja	PRF	Part	10.00	
				G.Total		290.00	290.00

Table No. 4.7: Annual Coupes under Chitrakonda Plantation Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area/	Coupe area
2021-22	I	Chitrakonda	Ranginiguda	PRF	No-1(P)	30.00	80.00
			Jantri	PRF	No-1(P)	30.00	
			Singaram	PRF	No-2(P)	20.00	
2022-23	II	-do-	Jantri	PRF	No-1(P)	15.00	85.00
			Sikpanas	PRF	No-2(P)	40.00	
			Bhimaram	PRF	No-1(P)	30.00	
2023-24	III	-do-	Badakonda	PRF	-	40.00	80.00
			Ranginiguda	PRF	No-2(P)	40.00	
2024-25	IV	-do-	Jantri	PRF	No-2(P)	30.00	75.00
			Singaram	PRF	No-2(P)	45.00	
2025-26	V	-do-	Sikpanas	PRF	No-2(P)	40.00	80.00
			Bhimaram	PRF	No-1(P)	40.00	
2026-27	VI	-do-	Ranginiguda	PRF	No-1(P)	40.00	75.62
			Jantri	PRF	No-1(P)	35.62	
2027-28	VII	-do-	Singaram	PRF	No-2(P)	45.00	75.00
			Bhimaram	PRF	No-1(P)	30.00	
2028-29	VIII	-do-	Ranginiguda	PRF	No-2(P)	20.00	80.00
			Jantri	PRF	No-2(P)	30.00	
			Singaram	PRF	No-2(P)	30.00	
2029-30	IX	-do-	Ranginiguda	PRF	No-1(P)	25.00	85.00
			Jantri	PRF	No-1(P)	20.00	
			Sikpanas	PRF	No-2(P)	40.00	
2030-31	X	-do-	Ranginiguda	PRF	No-1(P)	30.00	80.00
			Jantri	PRF	No-2(P)	20.00	
			Singaram	PRF	No-2(P)	30.00	
				G. Total		795.62	795.62

Table No.4.8 : Annual Coupes of Teak Plantation Tending Series

Year	Coupe No	Year of planted	Range	Name of Forest Block	Status	Extent	Area in Ha	Coupe Area
2021-22	I	1966-67	Malkangiri	Guppakonda	PRF	Part	44.00	208.00
		1968-69	Malkangiri	Guppakonda	PRF	Part	28.00	
		1962-63	Balimela	Tarlakota	PRF	Part	80.00	
		1963-64	Balimela	Tarlakota	PRF	Part	20.00	

		1963-64	Kalimela	Pedawada	PRF	Part	20.00	
		1968-69	Chitrakond a	Sileru west	RF	Part	06.00	
		1959-60	Motu	Motu	RF	Part	10.00	
2022-23	II	1963-64	Kalimela	Udayagiri	RF	Part	20.00	204.00
		1964-65	Kalimela	Udayagiri	RF	Part	20.00	
		1965-66	Kalimela	Udayagiri	RF	Part	20.00	
		1961-62	Motu	Motu	RF	Part	24.00	
		1964-65	Motu	Motu	RF	Part	40.00	
		1965-66	Motu	Motu	RF	Part	40.00	
		1966-67	Motu	Motu	RF	Part	40.00	
		1966-67	Motu	Motu	RF	Part	40.00	
2023-24	III	1967-68	Motu	Motu	RF	Part	30.00	324.00
		1968-69	Motu	Motu	RF	Part	16.00	
		1964-65	Motu	Tadimetla	RF	Part	40.00	
		1965-66	Motu	Tadimetla	RF	Part	48.00	
		1969-70	Chitrakond a	Sileru West	RF	Part	16.00	
		1966-67	Balimela	Balimela	PRF	Part	28.00	
		1967-68	Balimela	Chitapari	RF	Part	20.00	
		1969-70	Balimela	Chitapari	RF	Part	16.00	
		1966-67	Kalimela	Udayagiri	RF	Part	40.00	
		1978-79	Kalimela	Udayagiri	RF	Part	20.00	
		1979-80	Kalimela	Udayagiri	RF	Part	20.00	
		1979-80	Kalimela	Similibancha	RF	Part	30.00	
2024-25	IV	1967-68	Motu	Tadimetla	RF	Part	20.00	235.80
		1968-69	Motu	Tadimetla	RF	Part	18.00	
		1970-71	Malkangiri	Guppakonda	PRF	Part	10.80	

		1971-72	Malkangiri	Guppakonda	PRF	Part	18.00	
		1979-80	Malkangiri	Korkonda	PRF	Part	30.00	
		1972-73	Kalimela	Gompakonda	RF	Part	05.00	
		1972-73	Kalimela	Gompakonda	RF	Part	06.00	
		1973-74	Kalimela	Gomphakond a	RF	Part	20.00	
		1972-73	Balimela	Tarlakotta	PRF	Part	20.00	
		1973-74	Balimela	Chitapari	RF	Part	24.00	
		1979-80	Chitrakond a	Mantriput	PRF	Part	64.00	
2025-26	V	1979-80	Chitrakond a	Sileru west	RF	Part	10.00	208.00
		1986-87	Chitrakond a	Banguru	RF	Part	48.00	
		1987-88	Chitrakond a	Banguru	RF	Part	10.00	
		1987-88	Chitrakond a	Banaguru	RF	Part	25.00	
		1981-82	Kalimela	Pedawada	PRF	Part	30.00	
		1982-83	Kalimela	Kalimela	RF	Part	20.00	
		1982-83	Balimela	Chitapari	RF	Part	24.00	
		1982-83	Balimela	Nuagaon	RF	Part	06.00	
		1982-83	Malkangiri	Potrel Teak	RF	Part	30.00	
		1984-85	Malkangiri	Sindirimal	PRF	Part	05.00	
2026-27	VI	1987-88	Malkangiri	Girdidanger PRF	PRF	Part	20.00	215.00
		1989-90	Malkangiri	Jharapalli	RF	Part	25.00	
		1988-89	Mathili	Godiali	PRF	Part	20.00	
		1989-90	Balimela	Teakguda	RF	Part	20.00	
		1989-90	Kalimela	Kangurukond a	PRF	Part	20.00	
		1988-89	Chitrakond a	Silleru west	RF	Part	20.00	
		1988-90	Chitrakond a	Hilpahad	RF	Part	30.00	

		1989-90	Chitrakond a	Silleru west	RF	Part	20.00	
		1991-92	Chitrakond a	Datunguda	PRF	Part	40.00	
2027-28	VII	1992-93	Chitrakond a	Silleru west	RF	Part	15.00	180.00
		1995-96	Chitrakond a	Silleru west	RF	Part	05.00	
		1990-91	Kalimela	Mandapalli	PRF	Part	20.00	
		2003-04	Kalimela	Mangipalli	RF	Part	30.00	
		1991-92	Balimela	Teakguda	RF	Part	30.00	
		1993-94	Mathili	Mathili	RF	Part	10.00	
		2003-04	Mathili	Gangarajgum ma	RF	Part	25.00	
		1996-97	Mathili	Putparbat	RF	Part	20.00	
		2003-04	Malkangiri	Pititung	PRF	Part	25.00	
2028-29	VIII	2002-03	Malkangiri	Sindrimal	PRF	Part	50.00	200.00
		2002-03	Malkangiri	Akuru	RF	Part	45.00	
		2002-03	Malkangiri	Pititung	PRF	Part	25.00	
		2002-03	Malkangiri	Pititung	PRF	Part	55.00	
		2003-04	Malkangiri	Pititung	PRF	Part	25.00	
2029-30	IX	2004-05	Malkangiri	Sindhriml	PRF	Part	15.00	110.00
		2004-05	Malkangiri	Sindhrimal	PRF	Part	10.00	
		2004-05	Malkangiri	Jharapalli	RF	Part	15.00	
		2004-05	Malkangiri	Pititung	PRF	Part	10.00	
		2004-05	Balimela	Chitapari	RF	Part	25.00	
		2004-05	Chitrakond a	Gunthawada	RF	Part	10.00	
		2004-05	Motu	Tadimetla	RF	Part	25.00	
2030-31	X	2006-07	Malkangiri	Pititung	PRF	Part	25.00	157.00
		2005-06	Balimela	Balimela	PRF	Part	25.00	

		2006-07	Balimela	Chitapari	RF	Part	30.00	
		2006-07	Kalimela	Silakota	PRF	Part	02.00	
		2005-06	Kalimela	Bapanpalli	RF	Part	25.00	
		2005-06	Chitrakonda	Matumkonda	PRF	Part	25.00	
		2005-06	Motu	Muraliguda Teak	RF	Part	15.00	
		2005-06	Motu	Motu	RF	Part	10.00	
Total							2041.80	2041.80

Table No. 4.9: Annual Coupes of Misc. Plantation Tending Series

Year	Coupe No	Year of planted	Range	Name of Forest Block	Status	Extent	Area in Ha	Coupe Area in Ha
2021-22	I	2007-08	Malkangiri	Sindrimal	PRF	Part	20.00	305
			Balimela	Nuagam	RF	Part	10.00	
			Kalimela	Pulimetla	PRF	Part	20.00	
				Pedawada	PRF	Part	10.00	
			Chitrakonda	Mutumkonda	PRF	Part	20.00	
				Jantri	PRF	Part	10.00	
			Motu	Mallavaram	RF	Part	25.00	
		2008-09	Malkangiri	Titibiri	PRF	Part	25.00	
				Sindrimal	PRF	Part	50.00	
			Mathili	Dalpatiguda B	PRF	Part	20.00	
				Mendikuli	PRF	Part	25.00	
			Balimela	Nuagam	RF	Part	30.00	
			Kalimela	Pulimetla	PRF	Part	40.00	
2022-23	II	2008-09	Kalimela	Pedawada	PRF	Part	10.00	250
			Chitrakonda	Jantri	PRF	Part	25.00	
				Banaguru	RF	Part	25.00	
				Banaguru RF	RF	Part	10.00	
				Goudagurei	PRF	Part	25.00	

				Datunguda	PRF	Part	50.00	
			Motu	Pendikonda	RF	Part	15.00	
				Pusuguda	RF	Part	20.00	
				Potakhal	PRF	Part	20.00	
		2009-10	Malkangiri	Jharapalli	RF	Part	50.00	
2023-24	III	2009-10	Mathili	Saradaput	RF	Part	100.00	270.00
			Balimela	Tarlakota	PRF	Part	130.00	
			Kalimela	Pulimetla	PRF	Part	15.00	
			Chitrakonda	Dantunguda	PRF	Part	10.00	
			Motu	Tadimetla	RF	Part	15.00	
2024-25	IV	2010-11	Malkangiri	Jharapalli	RF	Part	20.00	280.00
				Sindrimal	PRF	Part	100.00	
				Jharapalli	RF	Part	50.00	
			Mathili	G.R.gumma	PRF	Part	50.00	
				Gotiguda	RF	Part	30.00	
				Malidanger	RF	Part	30.00	
2025-26	V	2010-11	Balimela	Teakguda	RF	Part	30.00	271.76
			Kalimela	Pedawada	PRF	Part	30.00	
			Chitrakonda	Sileru West	RF	Part	25.00	
			Motu	Pendikonda	RF	Part	11.76	
		2011-12	Malkangiri	Korukonda	PRF	Part	20.00	
			Chitrakonda	Banaguru	RF	Part	30.00	
		2012-13	Malkangiri	Pititung	PRF	Part	20.00	
			Kalimela	Pedawada	PRF	Part	20.00	
			Chitrakonda	Sileru West	RF	Part	25.00	
		2013-14	Malkangiri	Gharsaldangar	PRF	Part	40.00	
				Dugali		Part	20.00	
2026-27	VI	2013-14	Malkangiri	Gharsaldangar	PRF	Part	15.00	290.00
				Cheruguda	PRF	Part	15.00	
				Tumsapally	PRF	Part	15.00	
			Mathili	Singguda	PRF	Part	20.00	

				Putparbat	RF	Part	20.00	
				Gangrajgumma	PRF	Part	30.00	
				Chalanguda	PRF	Part	20.00	
				Dalapatiguda	PRF	Part	20.00	
				Chaulamendi	RF	Part	20.00	
				Tandiki	RF	Part	10.00	
			Balimela	Laktiguda	PRF	Part	30.00	
				Orkel	PRF	Part	15.00	
				Balimela	PRF	Part	20.00	
				Kanangi	PRF	Part	40.00	
2027-28	VII	2013-14	Balimela	Gopiguda	RF	Part	30.00	280.00
				Mundiguda	PRF	Part	30.00	
				Tarlakota	PRF	Part	20.00	
			Kalimela	Chitrangpalli	PRF	Part	20.00	
				Materu	PRF	Part	20.00	
			Chitrakonda	Banaguru	RF	Part	40.00	
			Motu	Pusuguda	RF	Part	20.00	
				Kotaguda	PRF	Part	10.00	
				Kalapalli	RF	Part	15.00	
				Motu	RF	Part	15.00	
		2014-15	Malkangiri	Kotameta	PRF	Part	30.00	
				Pititung	PRF	Part	20.00	
				Dharmadangar	PRF	Part	10.00	
2028-29	VIII		Mathili	Putparbat	RF	Part	30.00	
				Mathili	RF	Part	20.00	285.00

				Mekka	RF	Part	25.00	
			Balimela	Mahadevpur	RF	Part	30.00	
				Tarлакotta PRF	PRF	Part	20.00	
			Kalimela	Koimetla	RF	Part	25.00	
				Similibancha	PRF	Part	20.00	
				Pedawada	PRF	Part	25.00	
				Pedawada	PRF	Part	10.00	
				Pedawada	PRF	Part	5.00	
				Venkatapalam	RF	Part	10.00	
			Chitrakonda	Banaguru	RF	Part	45.00	
				Goudagurei PRF	PRF	Part	20.00	
2029-30	IX	2014-15	Chitrakonda	Datunguda	PRF	Part	25.00	295.00
				Matumkonda	PRF	Part	20.00	
				Bandhaguda	PRF	Part	20.00	
			Motu	Manyamkonda	PRF	Part	20.00	
		2015-16	Malkangiri	Siadimal	PRF	Part	25.00	
				Tumsapalli	PRF	Part	30.00	
				Pitatung	PRF	Part	30.00	
				Tumusapalli	PRF	Part	25.00	
			Mathili	Mendukulli	PRF	Part	25.00	
				Kolab Teak	PRF	Part	25.00	
				Gunenguda	PRF	Part	25.00	
			Balimela	Balimela	PRF	Part	25.00	
2030-31	X		Balimela	Teakguda	RF	Part	10.00	275.00
			Kalimela	Pedawada	PRF	Part	10.00	

			Chitrakonda	Bandhaguda	PRF	Part	40.00	
				Dantunguda	PRF	Part	30.00	
				Dantunguda	PRF	Part	20.00	
				Publiguda	RF	Part	25.00	
				Sileru West	RF	Part	20.00	
				Sileru West	RF	Part	25.00	
				Banaguru	RF	Part	30.00	
			Motu	Malavaram	RF	Part	20.00	
				Pendikonda	RF	Part	25.00	
				Malavaram	RF	Part	20.00	
G. Total								2801.76

Table No.4.10 : Annual Coupes of Village Forest Plantation Tending Series

Year	Coupe No	Range	Forest Block	Legal status	Area in ha	Coupe area
2021-22	I	Mathili	Chaulmendi	VF	5.00	58.20
			Katapaliguda	VF	5.00	
			Markapalli, Colony	VF	5.00	
			Markapalli	VF	5.00	
			Buduguda	VF	5.00	
		Malkangiri	Korukonda	VF	5.00	
			Koilipari	VF	5.00	
			Korukonda (Nuaguda)	VF	5.00	
			Korukonda (MV-31)	VF	5.00	
			Saradaguda	VF	3.20	
			Korukonda	VF	10.00	
2022-23	II	Mathili	Sargiguda	VF	6.00	45.80
			Madkamiguda	VF	8.00	
			Markapalli	VF	5.00	
			Pangam	VF	10.00	
		Malkangiri	Saradaguda	VF	1.80	
			MPV-Daniguda	VF	5.00	
			Sikhpalli	VF	5.00	

			Orkelguda	VF	5.00	
2023-24	III	Mathili	Govindpalli	VF	5.00	58.50
			Pujariguda	VF	3.50	
			Khemaguda (Angriguda)	VF	8.00	
			Khemaguda (Tentuliguda)	VF	8.00	
			Machhaguda	VF	10.00	
		Malkangiri	Tirlaguda	VF	5.00	
			Tandapali	VF	3.00	
			Gorakhunta	VF	5.00	
			Nilamari	VF	3.00	
			Bhaluguda (Mundapariguda)	VF	3.00	
			Sargiguda (Sydimal)	VF	5.00	
2024-25	IV	Mathili	Pakhanaguda (Baliguda)	VF	5.00	59.00
			Kadalguda (Muduliguda)	VF	10.00	
			Thapaguda	VF	2.00	
			Madkamiguda	VF	3.00	
			Baliguda	VF	3.00	
			Challanguda	VF	6.00	
			Similibanchha,	VF	5.00	
			Sydimal	VF	10.00	
		Malkangiri	Thapaguda (Markapalli)	VF	5.00	
			Bhaluguda	VF	5.00	
			Buduguda (Uperguda)	VF	5.00	
2025-26	V	Mathili	Similibanchha,	VF	5.00	46.70
			Madkamiguda	VF	7.10	
			Madkamiguda	VF	0.50	
			Madkamiguda	VF	3.10	
			Khadimati	VF	5.00	
			Madkamiguda	VF	5.00	
			Kamalapadar	VF	5.00	
		Balimela	Nilapari	VF	5.0	
		Motu	Lugal	VF	6.00	
			Maharajpalli	VF	5.00	
G.Total						268.20

4.6.10 METHODS OF EXECUTION IN PLANTING SERIES

4.6.10.1 Each planting series has been divided into 10 annual planning coupes. The sequence of planting in each planting series has been shown in **Table No.4.6 & Table**

No.4.7 While taking up plantation, guidelines provided in the Orissa Plantation Manual and other executive instructions issued from time-to-time shall be given due weight age. If the plantation could not be taken up in a particular year due to lack of funds or any other reasons, in subsequent year those plantation blocks in addition to current year coupe shall be taken up for consideration. If more funds are available, the Divisional Forest Officer can also consider the coupe due for planting in subsequent year. Any deviation in the work shall be subjected to formal approval of the competent authority and shall be recorded in the Compartment History.

4.6.10.2 Demarcation of Annual Planting Coupes: The areas are prescribed for plantations are shown in the management maps of scale 1:50,000. The annual plantation coupe shall be demarcated well in advance in the 0th Year i.e. October to December in the year proceeding to the year of plantation. Except where the annual planting coupe coincides with the compartment line/ entire block, the strip to a width of at least 3 meters shall be cleared along the survey line and stone cairns erected at every station at visible distance. In case, any of the survey points coincide with the boundary pillars of the forest block, such pillar shall be maintained as per the requirement. The plantation area shall also be indicated by putting permanent sign board at conspicuous place points indicating details like name of the site, status of land, compartment area, year of plantation, species planted etc.

4.6.10.3 Preparation of Treatment Plan and Map: The Range Officer shall prepare a treatment plan indicating details like name of the site,, area in hectare, soil type, slope, nature of erosion, biotic interference if any, indigenous species and peoples aspiration etc. He shall also prepare the calendar of operations and cost estimates following the approval cost norm for different schemes. Further, the Range Officer shall also prepare a site-specific treatment map on 1:50,000 scale topo sheets. The concerned Assistant Conservator of Forests shall check the maps as well as the plan. This exercise shall be completed by end of December and got approval by Divisional Forest Officer.

4.6.10.4 Method of Raising Plantation: Prescriptions given in the Orissa Plantation Manual and other executive instructions, in force, shall be given due consideration. It is needless to emphasize that success of the plantation depends largely on good planting stock and timely planting operations in the field. However, a tentative work schedule with different operations is indicated below.

4.6.10.5 Raising Nursery: Considering the locality factors, the people's aspiration and the set for the working circle, the nursery work for the selective species shall be started in the 0th year and good quality seedlings at least 6 months to 1 year old are to be planted. With the onset of Hi-tech Nursery/ Mega Nursery in the Division, quality seedlings should be ensured for establishment of successful plantations.

4.6.10.6 Site Preparation: Site preparation shall begin in the 0th year. After completion of the demarcation of the plantation site, it shall be cleared by cutting and removing undesired weeds, thorns etc. The debris shall also be removed to safe distance for avoiding fire hazard. These operations shall be completed by December of the preceding year. Area shall be closed for grazing at least up to next five years. Appropriate soil and moisture conservation measures shall also begin in the 0th year like creation of check dams. Species suitable for the site shall be identified in accordance with the objectives of management, gully plugging, contour bonding and other shall be taken up as per treatment plan during plan the intervening period from April to May.

Every possible effort shall be made to ensure successful establishment of plantations. Clone propagation may also be attempted, at least on experiment basis, in some plantations.

4.6.10.7 Stacking, Pitting & Planting: After completion of the site preparation by December, the alignment, stacking and pitting should be taken up at a spacing of 2.5 m × 2.5 m for economic species and 2 m × 2 m for other miscellaneous species. The standard size of pit 30cm × 30cm × 30 cm shall be dug in the entire area. Stacking and pitting shall be completed by March-April. However, in case of stump planting, crow bar holes shall be done just at the time of planting itself. The site preparation including pitting should be over by April so as to provide intervening time for weathering of the opened up soil. However, planting shall be commenced immediately on the onset of monsoon and not later than 1st week of July. At the time of planting, insecticide and fertilizer shall be applied as a basal doze depending on the requirement. Planting will be done departmentally and plantation journal shall be maintained as per the Orissa Plantation Manual.

4.6.10.8 Post Planting Operations: Post Planting Operations shall include casualty replacement; weeding, soil working and other operations to be carried out as per calendar of operations. The planting and post-planting operations shall be carried out as per the norm approved by the Govt. from time to time and in accordance with the prescriptions given in

the Orissa Plantation Manual. The plantations shall be fully protected from all of biotic interferences. Further, the tending operations in these plantations shall be carried out. An indicative schedule of various planting operations is shown in Table 4 for guidance of the field staff.

Table No-4.11: Tentative Schedule of Planting Operations:

Operations	Tentative time of execution
0th Year Operations	
Raising of Nursery	September- October
Advance preparation of site	October- December
Alignment & Stacking	February
Soil & Moisture Conservation (Mechanical Part)	February-March
Digging of pits (Part Major Work)	February-March
Planting and Post Planting Operations in 1st year	
Digging of pits (Balance left over)	April
Soil & Moisture Conservation (Balance)	April-May
Scooping of Pits already Dug	May-June
Poly pot Planting	June Last to 1 st Week of July
Casualty replacement	July last to August
1 st Soil Working, Weeding, Manuring	August-September
2 nd Soil Working and weeding	December
Mulching	January- February
Fire tracing	February -March
Post Planting Operations in 2nd Year	
Casualty replacement	Within July
One Weeding, Soil working & manuring	August-September
Fire Tracing	February -March
Post Planting Operations in 3rd Year	
Soil working and casualty replacement	July-August
Pruning and other cleaning operations as required	May-June or November
Fire Tracing etc.	

4.6.10.9 Protection: The plantations so raised shall be protected from all sorts of biotic interference. Here, the local villagers should be involved in the protection of the plantation by forming VSS as per J.F.M. resolution 2011 and amended. Further, tending operations shall be carried out as per the prescriptions gives under tending series.

4.6.10.10 Commercial Plantation: As one of the thrusts of forest management is restoration of degraded forests and environment with improvement of income level of

villagers living in the forests fringe areas, the Divisional Forest Officer, shall try take up some commercial plantations in J.F.M. areas. While considering the sites for commercial plantations he should take the advantage of irrigations facilities available in the Division.

4.6.11 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING:

4.6.11.1 TREATMENT OF EXISTING PLANTATIONS

4.6.11.2 The existing plantations have been taken to constitute the tending series. Three such series have been made, i.e. exclusively for miscellaneous plantation, teak plantation and another for the Village Forest Plantations as per **Table No.4.3 Table No. 4.4 and Table No. 4.5** respectively. However, growth of these plantations is not uniform. In some cases, plantations have been adversely affected by biotic interference where as in a few cases the plantations are protected by the VSS members. Moreover, the exact age of these plantations is also not made available nor any authenticated records to this effect are provided. Further, these plantations have been not reached the harvesting stage. Hence uniform treatment for all the plantations is not possible.

4.6.11.3 No systematic survey of these plantations is warranted. For these reasons, none of these constituted tending series have even been divided into annual areas of treatment. The Divisional Forest Officer shall be at liberty to demarcate annual coupes in a given tending series according to administrative convenience and requirements of the plantations. However, on an average, about 280 hectares in Miscellaneous tending series, 200 hectares in teak tending series and 26 hectares in Village forest area tending series shall be taken up annually for the treatments so as to cover the entire area of tending series within a plan period. The annual area of treatment shall be demarcated as is prescribed above in the planting series and concerned Range Officer shall submit the annual plan and estimate for it through Assist Conservator of Forests of the Division for necessary approval by the Divisional Forest Officer. This work shall be completed in the year proceeding to the tending operations.

4.6.11.4 OPERATIONS IN TENDING SERIES

4.6.11.4.1 Teak Series: -The Teak plantations of the Division vary with different age group and as such need appropriate silvicultural operations for boosting the growth of these plantations. The operation like cleaning, thinning and climber cutting are the main

requirements of the plantation. However, the following tending operations are to be carried out in the annual coupe wise. The tending operation of annual is given in **Table No-4.8.**

- i) All the trees reaching exploitable dia/girth shall be harvested.
- ii) In bushy and branch plantations, the pruning of the branches to be carried
- iii) All climbers are to be cut back.
- iv) All dead, diseased, uprooted trees are to be removed departmentally.
- v) Gap plantation shall be taken in the blank/open areas having more than half hectare in a patch
- vi) Thinning shall be done in congested crop area.

4.6.11.4.2 Many of the Teak plantations in Balimela, Chitrakonda, Motu and Salimi area of the Division having illegally cut/cleared by the local people, the plantation are in patchy form. According to requirement to carry out the following thinning operation may be taken up,

- i. The first thinning shall be of Mechanical thinning on the 8th year of the formation and it includes removal of alternate rows/plants.
- ii. During the operation all the climbers and other growth interfering with the growth of the Teak plants shall be removed.
- iii. The second and subsequent thinning shall be of Silvicultural thinning and it should be restricted to congested area only. These thinning shall be carried out on 16th, 25th, 41th and 65th year.
- iv. The Teak felling from Plantation may be regulated by 'Teak Management Scheme prepared by the Divisional Forest Officer and approved by the competent authority.

4.6.11.4.3 The silvicultural thinning that to be executed shall be of 'C' Grade thinning, while removing through such thinning, only dominated and suppressed trees shall be considered for such removals maintaining distance of growing space after thinning to be determined by the Formula $R = 0.75 (D+R)$ where 'R' is the radius of growing space in feet whereas 'D' is the average diameter in inches.

- i) All the species coming within this circle of growing space shall be removed in addition to the trees interfering with the crown of the pre-dominant and co-dominant trees.
- ii) While carrying out thinning operations, care shall be taken not to create any permanent gaps in the canopy.

- iii) Wherever permanent gaps of more than half hectare are there, those are shall be filled up with gap plantations of Teak and other economic species like Gambhar, Sissoo, and Bija. While taking up such plantations care shall also be taken not to have scattered patches as this will not only create problem in existing the different operations but also in supervision of the works.

4.6.11.5 MISCELLANEOUS TENDING SERIES

4.6.11.5.1 In miscellaneous plantations, due to want of post plantings maintenance like pruning and thinning, the trees has become bushy and branchy. Therefore, tending operations in early stage of formations are beneficial to these plantations. Tending operations, which shall be carried out in the miscellaneous tending series in annual coupe wise .The year wise tending operation of miscellaneous is given in **Table No-4.9**.

- i) Weeding and pruning shall be done regularly till the 8th year of plantation.
- ii) All the dead, diseased and uprooted trees shall be removed departmentally.
- iii) All the climbers including Loranthus attacked branches to be cutback.
- iv) In congested area, thinning shall be done on the lines of A and B grade.
- v) Gap plantations shall be carried out wherever necessary.

4.6.11.6 VILLAGE FOREST TENDING SERIES

4.6.11.6.1 The existing social forestry plantations included species mainly Eucalyptus, Acacia and Sanchakunda. These plantations are found thinly populated due to continued biotic interference and illicit felling. Since these plantations have already the exploitable stage, these are required to be harvested as per rule. Once the productivity of these plantations is gone, such area shall be replanted. The year wise tending operation or harvest of V.F. is given in **Table No-4.10**.

4.6.12 REGENERATION

4.6.12.1 Choice of Species: Order of priority among desirable species for retention is prescribed as; Bija, Kuruma, Mundi, Sissoo, Khaira, Dhaura, Sidha, Asan, Moi, Semal etc.

Valuable local species suitable for the site and favored by the local village communities and JFMs will be preferred in plantation, Sissoo, Khaira, Siris, Karanja, Anla,

Bija, Dhaura, Neem, Gamhar, Bamboo etc should be considered among the recommended species. In poorly drainage area, Arjuna, Babul, Jamun shall be preferred. Seedlings of edible fruit yielding forest species may constitute up to 20 percent and seedlings of medicinal plants up to 5 percent each.

Area of high slope should not be planted. In area of gentle slope, nalla banks planting may be restored to. Tending of natural regenerations and existing rootstock in prescribed to be given preference over plantations. In view of the poor regeneration status across the Division, areas with promising natural regeneration may not be available but wherever exist the prescriptions is that natural regenerations should be supported with Aided Natural Regeneration.

4.6.13 ASSOCIATED REGULATION AND MEASURES

4.6.13.1 Soil Moisture Conservation Measures:

- i) Check dams are required to be erected across gullies. The run-off in the gully shall be obstructed by making bond with dry rubble or stones depending on availability of materials and cost norm.
- ii) For drainage line treatment along the stream, a series of check dams are required at intervals to be decided by the gradient factor.
- iii) Staggered trenches shall be prepared as per gradient, in order to arrest the water speed.

4.6.14. MISCELLANEOUS REGULATIONS:

4.6.14.1 Control and Maintenance of Records: As per Orissa Plantation Manual 1977, the plantation journal and other records may be maintained for each plantation separately. The Compartment History and Control Forms shall be maintained for each coupe/compartment in accordance with the management plan procedure 1990.

4.6.14.2 Protection: The annual coupe/treatment area shall be strictly protected from biotic interference such as forest fire, grazing, illicit felling, encroachment etc.

4.6.14.3 JFM: The people living in and around the plantation shall be associated with the work right from the decision making to enjoyment of usufructs as per the Orissa JFM Resolution-2011. PRA exercise shall be undertaken before executing the activities

under the planting series to assess felt-needs of people and their willingness vis-à-vis choice of species so as to ensure their continued support in the entire process of regeneration

4.6.11.4 Grazing: In order to reduce the grazing pressure on this land activities like fodder cultivation in adjoining area and stall feeding to be encouraged.

4.6.14.5 Rights and Concessions: Only such right and concessions shall be admitted as have been described in Chapter I of Part-I. Further additional usufructuary right shall be allowed with regard to JFM and provision under the Government policy prevailing from time to time. No other rights and concessions shall be allowed in this Working Circle

4.6.15 INTERMEDIATE REVISION

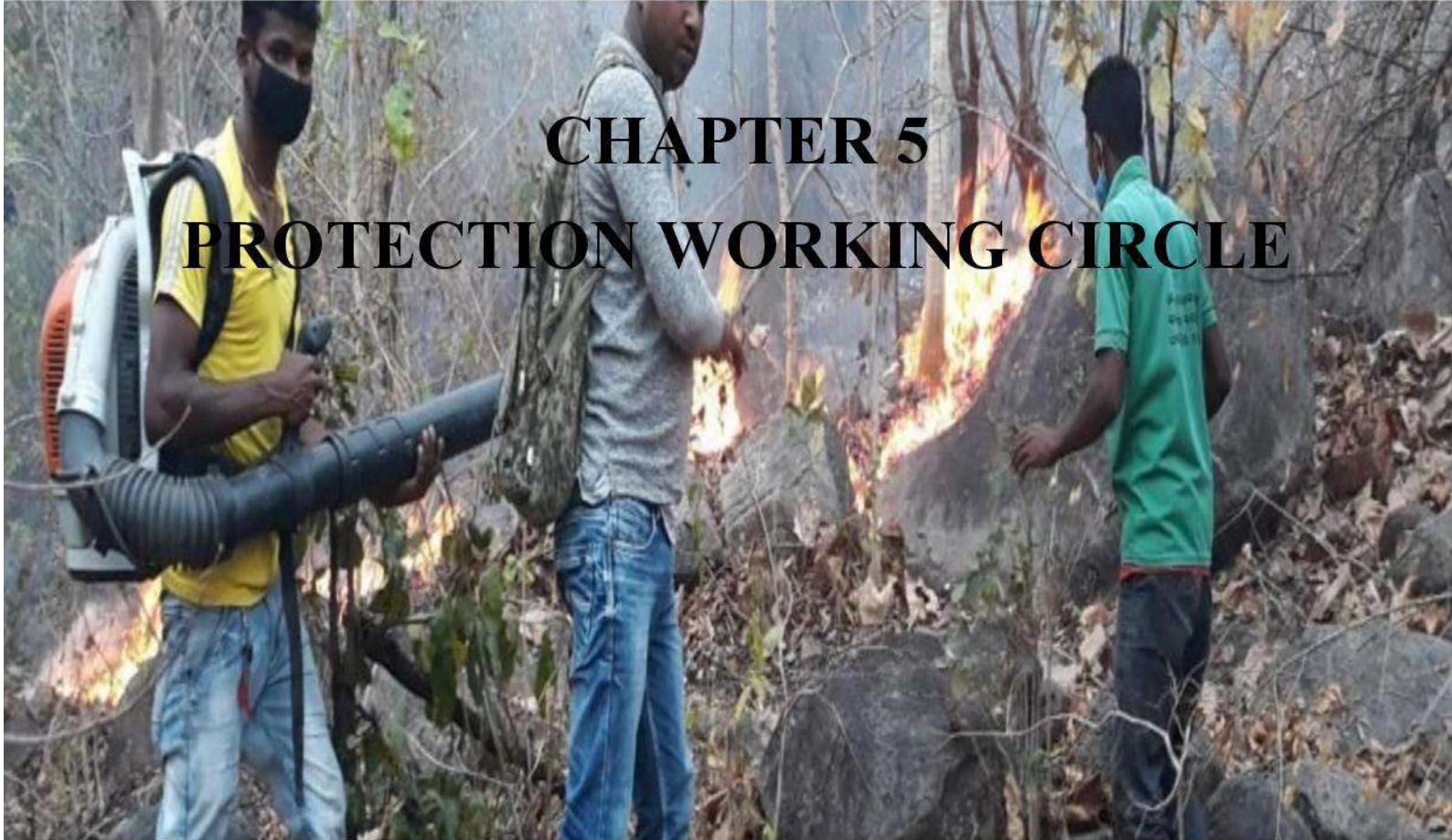
4.6.15.1 No major changes in prescriptions made under the circle are anticipated. However, if required so within the plan period, there may be joint review by Regional Chief Conservator of Forest, Koraput and Conservator of Forest Working plan and any deviation suggested shall be subject to approval by the competent authority.

4.6.16 ANNUAL COST AND WORKING NORM

4.6.16.1 The cost norm for implementation of prescription under this circle and total estimated cost has been discussed in Chapter-10 of Part-II.

CHAPTER 5

PROTECTION WORKING CIRCLE



Latitude: 18.583218
Longitude: 82.337592
Elevation: 543.59m
Accuracy: 3.8m

5.1 NAME OF WORKING CIRCLE CLEARLY MARKED ON GIS BASED MAPS (1:50,000):

The area of this working circle has been clearly marked on the GIS based map of 1:50,000 which are appended as management map in the plan.

5.2 GENERAL CONSTITUTION OF WORKING CIRCLE

5.2.1 Forest protection is the prerequisite for any meaningful management of forests. The National Working Plan Code has emphasized this and has suggested a mandatory working circle for protection. Accordingly, utmost care has been taken to allocate those forest blocks which need special protection measures into this overlapping working circle. This overlapping working circle covers all those blocks which need special protection measures from biotic interferences.

5.2.2 In fact, this circle includes all the ecologically fragile areas i.e. the area having 30% or more slopes and susceptible to environment degradation and those situated in catchments of Major Rivers. Due to regular biotic interference, it has led to decrease in vegetative cover leading to high run off and frequent flash floods.

5.2.3 Despite the area included in this working circle in the existing working plan it is proposed to include the area which are highly affected or fragile and the area under Podu cultivation which is very meager. Therefore, instead of keeping entire Plan area as like in the Previous Plan, only selected and highly fragile area are proposed in this Plan. Thus **24649.3938 Ha** of forest areas which are ecologically more fragile and need treatment shall be kept under this Working Circle in this working plan.

5.3. GENERAL OBSERVATION AND VEGETATION

5.3.1 This Protection working circle comprises all those blocks which need special protection measures from biotic interferences, besides the blocks and compartments existing in ecologically fragile areas and those which form part of major rivers. Due to intense biotic pressure from human i.e. regular removal of biomass, encroachment, removal of boulders and cattle, large number of forest blocks of the division is under various stages

of degradation. Steps are to be taken to prevent fires, illicit felling, and encroachment, poaching or podu cultivation so that the process of degradation can be reversed. Further, there is a need to see that forest on steep slopes and ecologically fragile areas are not disturbed and are completely protected. The areas under this circle are mostly having steep gradient requiring protection and crop improvement measures without much intervention. Most of the forest blocks with density less than 0.4 and 0.5 have been included under this working circle.

5.2.2 The type and classification of forests included in this circle has already been dealt in detail under Chapter-2 and 3. However, the major forest areas of this circle are coming under 5-A Southern Tropical Dry Deciduous Forests and few patches also comes under Tropical Moist Deciduous Forests.

5.4 FELLING SERIES, CUTTING SECTIONS AND JFM AREAS (PROTECTION SERIES)

5.4.1 The principal aim of this Working Circle is protection against the biotic interference, constitution of protection series is not only desirable but also other works like soil and moisture conservation along with boundary maintenance are prescribed. The blocks allotted to these circles have been divided into 6 Nos. of Protection Series. However, the protection series further divided into 10 Annual Protection Coupes and each coupe shall be maintained once in plan period.

5.5 BLOCKS, COMPARTMENTS AND JFM AREAS (MARKED ON GIS BASED MAPS)

5.5.1 The area allotted to this Working Circle is 24649.3938 ha. There are whole/ part of 52 nos RF and 66 nos PRF included in this Working Circle. The detailed list of Forest Blocks and their corresponding areas included in this Working Circle are given in the following table.

Table No-5.1: Forest Blocks and their corresponding areas included in this Working Circle

Name of the Range	Sl. No.	Name of the Series	Name of the Forest Block	Legal Status	Compartment		Total Treatment Series Area (Ha.)
					No.	Area in Ha.	
Mathili	1	Mathili Protection Series	Siroli	R.F	Part	51.62	
			Dangarkholi	R.F	Part	73.92	
			Tandiki	R.F	Part	116.50	
			Putparbat	RF	Part	268.7750	
			Chedenga	R.F	Part	496.65	

			Sindhbeda 'A'	RF	Part	12.94	
			Sindhbeda 'B'	RF	Whole	12.85	
			Dalapatiguda	PRF	Part	34.43	
			Dhobaguda	PRF	Whole	18.44	
			Kenkar	PRF		12.42	
			Total			1098.5450	1098.5450
Malkangiri	2	Malkangiri Protection Series	Jhileruguda	PRF	No.1 (Part)	278.758	
			Jhileruguda	PRF	No.2 (Part)	100.15	
			Jharapalli	R.F	Part	200.00	
			Sindrimal	PRF	No.1 (Part)	388.39	
			Sindrimal	PRF	No.2 (Part)	669.9040	
			Girididongar	PRF	Part	37.43	
			Dharamdongar	PRF	Part	25.72	
			Akur	RF	Part	83.86	
			Tamasa	PRF	Part	22.63	
			Namkonda	PRF	Part	157.25	
			Titiviry	PRF	Part	4.02	
			Kottamateru	PRF	Part	86.22	
			Allur	PRF	Part	12.19	
			Koilipari	PRF	No.1 (Part)	330.9020	
			Koilipari	PRF	No.2 (Part)	300.12	
			Cheruguda	PRF	Part	111.62	
			Tumusapalli	PRF	Part	115.76	
			Kukudaguda	PRF	Part	328.19	
			Kutiguda	PRF	Part	13.00	
			Suliapadar	PRF	Part	64.14	
			Mariwada 'B'	PRF	Part	22.04	
			Tandikonda	PRF	Part	8.20	
			Bailapari-Tumusapalli Teak	PRF	Part	47.25	
			Korukonda	PRF	Part	332.91	
			Baraja	PRF	Part	14.22	
			Katameta	PRF	Part	71.65	
			Potrel	PRF	Part	3.006	
			Guppakonda	PRF	Part	64.57	
			Kumadangar	PRF	Part	399.64	
			Pititung	PRF	No.5 (Part)	200.51	
			Pititung	PRF	No.6 (Part)	300.71	
			Pititung	PRF	No.7 (Part)	400.13	

			Pitattung	PRF	No.8 (Part)	400.42	
		Total				5595.51	5595.51
Balimela	3	Balimela Protection Series	Balimela	PRF	No.1 (Part)	100.00	
			Balimela	PRF	No.2 (Part)	125.00	
			Balimela	PRF	No.3 (Part)	203.40	
			Balimela	PRF	No.4 (Part)	117.32	
			Tarlakota	PRF	No.1 (Part)	123.14	
			Tarlakota	PRF	No.2 (Part)	100.00	
			Tarlakota	PRF	No.3 (Part)	65.00	
			Tarlakota	PRF	No.4 (Part)	115.00	
			Tarlakota	PRF	No.5 (Part)	194.59	
			Tarlakota	PRF	No.6 (Part)	173.47	
			Tarlakota	PRF	No.7 (Part)	60.0	
			Chitapari	R.F	No.1 (Part)	157.00	
			Chitapari	R.F	No.2 (Part)	109.6650	
			Nuagaon	R.F	Part	82.78	
			Kanangi	PRF	Part	115.00	
			Matumkonda	PRF	No.2 (Part)	140.00	
			Matumkonda	PRF	No.3 (Part)	130.00	
		Total				2111.3650	2111.3650
Chitrakonda	4	Chitrakon da Protection series	Sileru West R.F	R.F	No-2	220.7640	
			Banguru R.F	R.F	Part	37.1758	
			Limalori R.F	R.F	Whole	102.9300	
			Datunguda	PRF	No-2	260.00	
			Bhimaram	PRF	No.1 (Part)	1041.3600	
			Bhimaram	PRF	No.2 (Part)	137.1600	
			Bhimaram	PRF	No.3 (Part)	532.0000	
			Ranginiguda	PRF	No.2 (Part)	300.00	

			Jantri	PRF	No.2 (Part)	305.00	
			Hillpahad P.R.F	PRF	(Part)	18.54	
			Singaram P.R.F	PRF	No.2 (Part)	320.6930	
			Singaram P.R.F	PRF	No.3 (Part)	200.0000	
			Sikpanasa P.R.F	PRF	N04 (Part)	234.0000	
			Sikpanasa	PRF	No.2 (Part)	480.3100	
			Matumkonda	PRF	No.1 (Part)	385.0000	
			Matumkonda	PRF	No.3 (Part)	100.3100	
			Motamkonda	PRF	No-4 (Part)	365.0000	
		Total				5040.2428	5040.2428
Kalimela	5	Kalimela Protection series	Rajulkonda	R.F	Part	298.55	
			Bapanpally	R.F	Part	198.31	
			Yengulkonda	R.F	Part	195.51	
			Gumuka Teak' B'	R.F	Whole	2.41	
			Gumuka Teak' C'	R.F	Whole	16.68	
			Kalimela	R.F.	Part	34.61	
			Gompakonda	R.F	No.1 (Part)	159.24	
			Gompakonda	R.F	No.2 (Part)	250.6070	
			Mangipally	R.F	Part	51.89	
			Udayagiri	R.F	No.1 (Pat)	45.64	
			Udayagiri	R.F	No.2 (Part)	347.57	
			Udayagiri	R.F	No.3 (Part)	100.14	
			Udayagiri	R.F	No.4 (Part)	105.77	
			Kawasiguda	R.F	Part	14.10	
			Koimetla	RF	Part	42.11	
			Teakguda Teak-II	RF	Whole	2.75	
			Kaldapally	RF	Whole	25.64	
			Pegedapally	RF	Whole	130.28	
			Tangarkonda	RF	Whole	67.5200	
			Kurty Teak	RF	Whole	15.2500	
			Nadiwada Teak	RF	Whole	3.0700	
			Podia Teak (A)	RF	Whole	4.7500	

	Kaldapally Teak	RF	Whole	47.5200	
	Nandiwada Teak – II	RF	Whole	14.7600	
	Kamarguda Teak	RF	Whole	7.5000	
	Udayagiri (B)	RF	Whole	60.7000	
	Podia Teak (B)	RF	Whole	3.9800	
	Eralgundi	RF	Whole	11.3800	
	Tanginiguda	RF	Whole	29.0300	
	Supal (B)	RF	Part	38.8700	
	Similibanchha	PRF	Whole	63.1600	
	Matteru	PRF	Whole	9.0200	
	Chitrangipally	PRF	Whole	23.6400	
	Marimetla	PRF	Whole	22.0400	
	Singanguda	PRF	Whole	11.5200	
	Marigata	PRF	Whole	12.2700	
	Pedawada	PRF	Whole	289.2700	
	Pulimetla	PRF	Whole	228.0600	
	Teakguda Teak	PRF	Whole	15.7800	
	Mandapally, PRF	PRF	C-1	148.7200	
	Mandapally	PRF	C-2	170.0000	
	Pitakonda	PRF	Whole	164.3800	
	ChinaPotteru	PRF	Whole	55.7900	
	Patakhal	PRF	Whole	77.8800	
	Kangurukonda	PRF	Whole	88.6700	
	Tegadapally	PRF	Whole	5.1000	
	Bodigatta (B)	PRF	Whole	10.6100	
	Sindhiguda	PRF	Whole	82.3000	
	Battanwada' B'	PRF	Whole	97.2200	

			Battanwada 'C'	PRF	Whole	13.0800	
			Sillakata, 'B'	PRF	Whole	87.7400	
			Telamiguda	PRF	Whole	22.2000	
		Total				4024.5870	4024.5870
Motu	6	Motu Protection series	Pusugudam	R.F	No.1 (Part)	423.6100	
			Pusugudam	R.F	No.2 (Part)	506.7100	
			Pusugudam	R.F	No.3 (Part)	347.8840	
			Pusugudam	R.F	No.4 (Part)	221.3200	
			Poluru	R.F	Whole	107.4900	
			Dupenkonda	PRF	Whole	405.1000	
			Mallavaram	R.F	Whole	119.1100	
			Anantapalli	R.F	Whole	318.4800	
			Sirikonda RF	R.F	Whole	347.8300	
			Katanpalli -A	R.F	Whole	27.0800	
			Katanpalli -B	R.F	Whole	1014.6300	
			Pendikonda	R.F	Whole	77.7100	
			Manyamkonda	PRF	Whole	731.5700	
			Tamanpalli	PRF	Whole	236.7800	
			Kottaguda - B	PRF	Whole	20.0000	
			Motu Teak	RF	Whole	38.3100	
			Motu RF	R.F	Whole	516.2700	
			Tadimetla	R.F	No-1 (Part)	100.6800	
			Tadimetla	R.F	No-2 (Part)	389.1400	
			Tadimetla	R.F	No-3 (Part)	484.9000	
			Tadimetla	R.F	No-4 (Part)	326.7500	
			Muruliguda Teak-A	R.F	Whole	3.7500	
			Muruliguda Teak-B	R.F	Whole	1.2500	
			Peta Teak-A	R.F	Whole	12.7900	
		Total				6779.1440	6779.1440
		G. Total				24649.3938	24649.3938

5.6. SPECIAL OBJECTIVES OF MANAGEMENT

The special objectives of management of this working circle are to protect the area completely which will lead to improvement of vegetative cover. The objectives are as follows:

- i) To prevent further degradation of eco-fragile areas by maintaining adequate vegetative cover and ecologically stabilize the area.
- ii) To enhance the natural regeneration adopting strong protection measures to minimize biotic interference and to arrest further degradation.
- iii) To physically protect these forests from fire, grazing, and also provide strict vigil against illicit felling, encroachment and poaching.
- iv) To protect area from quarrying, removal of boulders, morums, rocks and soil.
- v) Soil and Moisture Conservation shall be taken up where ever required.
- vi) To increase physical infrastructure in the remote areas to provide shelter to the forest protection staff.
- vii) To prevent further encroachment of the forest land by regularly maintaining the boundary line and boundary pillars.
- viii) To improve forest protection by developing road network, improving VHF coverage and constituting special protection units.

5.6.1 ANALYSIS AND VALUATION OF CROP:

5.6.1.1 The degraded forest or high forests which need intensive protection measures are included in this working circle. It is expected that with proper protection and stoppage of illegal removal of biomass from the degraded blocks, these blocks will quickly regain its original state. Protection of the High forest blocks will ensure that these blocks do not get degraded. Protection from grazing and fire will ensure that the regeneration status in the forests of this circle will be restored substantially. Though crop composition in some of the forests is good, the establishment of natural regeneration is very poor. Hence, all these protective measures will ensure that these forests will not further degrade.

5.6.2 SILVICULTURAL SYSTEM

5.6.2.1 As the forests included in this working circle are to be mainly protected without any other consideration, no silvicultural system has been prescribed. However, for achieving the special objectives of this circle, the following operations are prescribed:

- i. The areas shall be rigidly protected from illegal biomass removal so as to keep it under nature's own care and nursing.
- ii. Areas of forest blocks on steep precipitous slopes and eco-fragile areas would be specially protected to ensure there is no loss of vegetation or soil cover.
- iii. Steps will be taken to prevent fires and grazing in the forests.
- iv. Boundary of compartments and blocks will be maintained.
- v. Forest road network will be maintained.
- vi. Communication network – VHF and HF sets will be used effectively
- vii. Special anti-smuggling squads and firefighting squads will be created for each Protection Unit.

5.6.3 ROTATION AND CONVERSION PERIOD

5.6.3.1 Since no yield is expected from these areas, rotation period is not desirable.

5.6.4 HARVESTING DIAMETER: Not applicable

5.6.5 REDUCING FACTORS AND REDUCED AREA: Not applicable

5.6.6 FELLING CYCLE (PROTECTION UNIT AND CYCLE)

5.6.6.1 Different Protection unit has been created for the purpose of special protection, which will be extended over the entire Working Circle area. These units will assist in taking up protection of the vulnerable forest by increased vigil and patrolling, taking up operation like maintenance of boundary to prevent encroachments, road repairs to ensure regular patrolling, and anti- smuggling squad's operations to check all activities in a planned and systematic manner. Accordingly, after detailed field verification, the working circle area

has been divided into 6 protection units as per the block and area wise details furnished in Table No-5.1.

5.6.6.2 A protection cycle of 10 years is prescribed so that these vulnerable areas will be treated once during the plan period of ten years. Treatment will be mainly in terms of road and boundary maintenance.

5.6.7 DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS (PB): Not applicable

5.6.8 CALCULATION OF YIELD

5.6.8.1 As it has already been discussed, the principal aim of this working circle is to protect the area from all sorts of biotic interferences and no yield is expected.

5.6.9 TABLE OF FELLING (TABLE OF TREATMENT)

5.6.9.1 The annual coupes of different Protection Series are furnished with its number, year of treatment, name of the forest blocks, compartment and area in Table No-5.2 to 5.7

Table No. 5.2: Annual Coupes under Mathili Protection Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Mathili	Siroli	R.F	Part	51.62	125.54
			Dangarkholi	R.F	Part	73.92	
2022-23	II	-do-	Tandiki	R.F	Part	116.50	116.50
2023-24	III	-do-	Putparbat	RF	Part	90.00	102.94
			Sindhbeda 'A'	RF	Part	12.94	
2024-25	IV	-do-	Putparbat	RF	Part	90.00	102.85
			Sindhbeda 'B'	RF	Whole	12.85	
2025-26	V	-do-	Putparbat	RF	Part	88.775	107.215
			Atalguda	PRF	Whole	18.44	
2026-27	VI	-do-	Chedenga	R.F	Part	96.65	131.08
			Dalapatiguda	PRF	Part	34.43	
2027-28	VII	-do-	Chedenga	R.F	Part	100.00	112.42
			Kenkar	PRF		12.42	
2028-29	VIII		Chedenga	R.F	Part	100.00	100.00
2029-30	IX	-do-	Chedenga	R.F	Part	100.00	100.00
2030-31	X		Chedenga	R.F.	Part	100.00	100.00
					Total	1098.545	1098.545

Table No. 5.3: Annual Coupes under Malkangiri Protection Series

Year	Coupe No.	Range	Name of Forest Block	Status	Comparison No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Malkangiri	Jhileruguda	PRF	No.1(P)	278.758	522.778
			Tamasa	PRF	Part	22.63	
			Namkonda	PRF	Part	157.25	
			Suliapadar	PRF	Part	64.14	
2022-23	II	-do-	Jhileruguda	PRF	No.2(P)	100.15	555.61
			Pitatung	PRF	No.5(P)	200.51	
			Cheruguda	PRF	Part	111.62	
			Girididongar	PRF	Part	37.43	
			Mariwada 'B'	PRF	Part	22.04	
			Akur	RF	Part	83.86	
2023-24	III	-do-	Jharapalli	R.F	Part	200.00	565.28
			Pitatung	PRF	No.6(P)	300.71	
			Guppakonda	PRF	Part	64.57	
2024-25	IV	-do-	Sindrimal	PRF	No.1(P)	388.39	567.61
			Allur	PRF	Part	12.19	
			Tumusapalli	PRF	Part	115.76	
			Bailapari-Tumusapalli				
			Teak	PRF	Part	47.25	
			Titiviry	PRF	Part	4.02	
2025-26	V	-do-	Sindrimal	PRF	No.2(P)	200.00	600.13
			Pitatung	PRF	No.7(P)	400.13	
2026-27	VI	-do-	Pitatung	PRF	No.8(P)	100.42	570.324
			Sindrimal	PRF	No.2(P)	469.9040	
2027-28	VII	-do-	Pitatung	PRF	No.8(P)	300.00	600.12
			Koilipari	PRF	No.2(P)	300.12	
2028-29	VIII	-do-	Koilipari	PRF	No.1(P)	330.9020	588.7720
			Korukonda	PRF	Part	100.00	
			Kottamateru	PRF	Part	86.22	
			Katameta	PRF	Part	71.65	
2029-30	IX	-do-	Kumadangar	PRF	Part	299.64	532.55
			Korukonda	PRF	Part	232.91	
2030-31	X	-do-	Kumadangar	PRF	Part	100.00	492.336
			Dharamdongar	PRF	Part	25.72	
			Potrel	PRF	Part	3.006	
			Kutiguda	PRF	Part	13.00	

			Tandikonda	PRF	Part	8.20	
			Baraja	PRF	Part	14.22	
			Kukudaguda	PRF	Part	328.19	
				Total		5595.51	5595.51

Table No. 5.4: Annual Coupes under Balimela Protection Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Balimela	Balimela	PRF	No.1(P)	100.00	225.00
			Balimela	PRF	No.2(P)	125.00	
2022-23	II	-do-	Tarlakota	PRF	No.2(P)	100.00	215.00
			Kanangi	PRF	Part	115.00	
2023-24	III	-do-	Balimela	PRF	No.3(P)	203.40	203.40
2024-25	IV	-do-	Balimela	PRF	No.4(P)	117.32	182.32
			Tarlakota	PRF	No.3(P)	65.00	
2025-26	V	-do-	Tarlakota	PRF	No.1(P)	123.14	232.805
			Chitapari	R.F	No.2(P)	109.665	
2026-27	VI	-do-	Tarlakota	PRF	No.4(P)	115.00	245.00
			Matumkonda	PRF	No.3(P)	130.00	
2027-28	VII	-do-	Tarlakota	PRF	No.5(P)	194.59	194.59
2028-29	VIII	-do-	Tarlakota	PRF	No.6(P)	173.47	173.47
2029-30	IX	-do-	Tarlakota	PRF	No.7(P)	60.00	217.00
			Chitapari	R.F	No.1(P)	157.00	
2030-31	X	-do-	Nuagaon	R.F	Part	82.78	222.78
			Matumkonda	PRF	No.2(P)	140.00	
				Total		2111.3650	2111.3650

Table No. 5.5: Annual Coupes under Chitrakonda Protection Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Chitrakonda	Sileru West	R.F	No-2(P)	220.7640	520.764
			Ranginiguda	PRF	No.2(P)	300.00	
2022-23	II	-do-	Datunguda	PRF	No-2(P)	260.00	494.00

			Sikpanasa	PRF	No-1(P)	234.0000	
2023-24	III	-do-	Sikpanasa	PRF	No.2(P)	480.3100	480.3100
2024-25	IV	-do-	Banguru	R.F	Part	37.1758	476.7188
			Singaram P	PRF	No.2(P)	320.6930	
			Matumkonda	PRF	No.3(P)	100.3100	
			Hillpahad	PRF	(Part)	18.54	
2025-26	V	-do-	Bhimaram	PRF	No.3(P)	137.1600	522.16
			Matumkonda	PRF	No.1(P)	385.0000	
2026-27	VI	-do-	Motamkonda	PRF	No-4(P)	365.0000	565.00
			Singaram	PRF	No.3(P)	200.0000	
2027-28	VII	-do-	Bandhaguda	PRF	(Part)	532.0000	532.000
2028-29	VIII	-do-	Jantri	PRF	No.2(P)	305.00	407.93
		-do-	Limalori R.F	R.F	Whole	102.9300	
2029-30	IX		Bhimaram	PRF	No.2(P)	541.36	541.36
2030-31	X	-do-	Bhimaram	PRF	No.2(P)	500.00	500.00
				Total		5040.2428	5040.2428

Table No. 5.6: Annual Coupes under Kalimela Protection Series

Year	Coupe No	Range	Name of Forest Block	Status	Compart -ment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Kalimela	Udayagiri	R.F	No.2(P)	347.57	410.73
			Similibanchha	PRF	Whole	63.1600	
2022-23	II	-do-	Udayagiri	R.F	No.1(P)	45.64	421.76
			Matteru	PRF	Whole	9.0200	
			Pedawada	PRF	Whole	289.2700	
			ChinaPotteru	PRF	Whole	55.7900	
			Marimetla	PRF	Whole	22.0400	
2023-24	III	-do-	Mandapally,	PRF	No-1	148.7200	376.78
			Pulimetla	PRF	Whole	228.0600	
2024-25	IV	-do-	Kangurukonda	PRF	Whole	88.6700	393.98
			Singanguda	PRF	Whole	11.5200	
			Pitakonda	PRF	Whole	164.3800	
			Chitrangipally	PRF	Whole	23.6400	
			Udayagiri	R.F	No.4(P)	105.77	
2025-26	V	-do-	Mandapally	PRF	No-2	170.0000	362.99
			Patakhall	PRF	Whole	77.8800	
			Telamiguda	PRF	Whole	22.2000	
			Bodigatta (B)	PRF	Whole	10.6100	
			Sindhiguda	PRF	Whole	82.3000	
2026-27	VI	-do-	Battanwada' B'	PRF	Whole	97.2200	415.53
			Eralgundi	RF	Whole	11.3800	
			Sillakata, 'B'	PRF	Whole	87.7400	

			Tegadapally	PRF	Whole	5.1000	
			Bapanpally	R.F	Part	198.31	
			Teakguda Teak	PRF	Whole	15.7800	
2027-28	VII	-do-	Koimetla	RF	Part	42.11	394.36
			Gumuka Teak' B'	R.F	Whole	2.41	
			Gumuka Teak' C'	R.F	Whole	16.68	
			Rajulkonda	R.F	Part	298.55	
			Kalimela	R.F.	Part	34.61	
2028-29	VIII	-do-	Kaldapally	RF	Whole	25.64	407.95
			Pegedapally	RF	Whole	130.28	
			Udayagiri	R.F	No.3(P)	100.14	
			Kawasiguda	R.F	Part	14.10	
			Podia Teak (A)	RF	Whole	4.7500	
			Tangarkonda	RF	Whole	67.5200	
			Kurty Teak	RF	Whole	15.2500	
			Kaldapally Teak	RF	Whole	47.5200	
			Teakguda Teak-II	RF	Whole	2.75	
2029-30	IX	-do-	Gompakonda	R.F	No.1(P)	159.24	418.91
			Marigata	PRF	Whole	12.2700	
			Mangipally	R.F	Part	51.89	
2030-31	X	-do-	Yengulkonda	R.F	Part	195.51	421.597
			Gompakonda	R.F	No.2(P)	250.6070	
			Udayagiri (B)	RF	Whole	60.7000	
			Battanwada' C'	PRF	Whole	13.0800	
			Supal (B)	RF	Part	38.8700	
			Podia Teak (B)	RF	Whole	3.9800	
			Nadiwada Teak	RF	Whole	3.0700	
			Nandiwada Teak -II	RF	Whole	14.7600	
			Kamarguda Teak	RF	Whole	7.5000	
			Tanginiguda	RF	Whole	29.0300	
				Total		4024.587	4024.587

Table No. 5.7: Annual Coupes under Motu Protection Series

Year	Coupe No	Range	Name of Forest Block	Status	Compartment No.	Area in Ha	
						Comptt. Area	Coupe area
2021-22	I	Motu	Pusugudam	R.F	No.1(P)	423.6100	643.40
			Tandimetla	R.F	C-1	100.6800	
			Mallavaram	R.F	Whole	119.1100	
2022-23	II	-do-	Pusugudam	R.F	No.2(P)	506.7100	743.49
			Tamanpalli	PRF	Whole	236.7800	
2023-24	III	-do-	Pusugudam	R.F	No.3(P)	347.8840	737.024
			Tandimetla	R.F	C-2	389.1400	
2024-25	IV	-do-	Pusugudam	R.F	No.4(P)	221.3200	706.22
			Tandimetla	R.F	C-3	484.9000	
2025-26	V	-do-	Tandimetla	R.F	C-4	326.7500	674.58
			Sirikonda RF	R.F	Whole	347.8300	
2026-27	VI	-do-	Dupenkonda	PRF	Whole	405.1000	723.58
			Anantapalli	R.F	Whole	318.4800	
2027-28	VII	-do-	Manyamkonda	PRF	Whole	731.5700	731.57
2028-29	VIII	-do-	Kottaguda - B	PRF	Whole	20.0000	652.29
			Motu Teak	RF	Whole	38.3100	
			Motu RF	R.F	Whole	516.2700	
			Pendikonda	R.F	Whole	77.7100	
2029-30	IX	-do-	Katanpalli -A	R.F	Whole	27.0800	652.36
			Katanpalli -B	R.F	Whole	500.00	
			Peta Teak-A	R.F	Whole	12.7900	
			Muruliguda Teak-A	R.F	Whole	3.7500	
			Muruliguda Teak-B	R.F	Whole	1.2500	
			Poluru	R.F	Part	107.49	
2030-31	X	-do-	Katanpalli -B	R.F	Whole	514.63	514.63
G.Total						6779.144	6779.144

5.6.10 METHOD OF EXECUTION OF TREATMENT

5.6.10.1 Division into Annual Protection Areas

- i. In order to execute the protection measures, each protection units have been divided into 10 (ten) annual coupes to facilitate systematic operations. The annual coupe shall be attended to as per the sequence prescribed in the plan. One Protection Unit in each Range has been formed like, Mathili, Malkangiri, Balimela, Chitrakonda, Kalimela and Motu Protection Series. The annual coupes (protection unit wise) with its number and the year of treatment along with the name of the forest block, its compartment number and area included in the coupe.
- ii. The annual coupes of all the units have also been depicted in the Management Map.

5.6.10.2 Demarcation of Annual Coupes and preparation of Annual Plan of Action

- i. Annual coupes shall be demarcated in the preceding season of treatment by clearing 3 mt. widths for clear visibility. In case a coupe overlaps two or more compartments, each compartment shall be treated as a separate treatment area; this will even ensure proper maintenance of compartment histories. Boundary maintenance, pillar posting, Signboards, showing the name of the forest block, Working Circle, Compartment no., area and year shall be displayed on prominent and easily identifiable trees.
- ii. The DFO shall ensure preparation of an annual action plan with a calendar of operations before execution of works. The guiding factors for incorporation of different components shall be as per the activities stipulated above in paragraph.
- iii. Two lines of agave may be planted along vulnerable block boundary at least over a length 500Mtrs every year in each protection unit with priority to blocks, vulnerable to encroachment.
- iv. Each protection unit will have the concerned Section Foresters and Beat Guards and they will be provided with additional protection staff in the form of anti- smuggling squads, fire watchers etc. Vehicle and VHF equipment as per requirement will be provided to each unit.

5.6.11 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING

5.6.11.1 i) Harvesting of standing trees (dead or alive) is strictly prohibited. Dressing of high stumps, singling out of coppice shoots, cleaning and climber cutting shall be undertaken in annual protection series.

ii) While executing singling out operations, the more promising shoots shall be retained. Cleaning and climber cutting operations shall be undertaken on these sites where regeneration is suppressed.

iii) Light thinning shall be undertaken to remove congestion and to promote growth in forest stands, such thinning shall be on the lines of either 'A' grade or with maximum intensity of 'B' grade thinning.

5.6.12 REGENERATION: Not applicable

5.6.13 ASSOCIATED REGULATIONS AND MEASURES

5.6.13.1 Forest Protection Measures:

- ❖ Neither collection of NTFPs nor any removal of forest produce shall be allowed from the annual protection coupes except for dead and fallen trees.
- ❖ All the forests of this Working Circle shall be strictly protected against illicit felling, forest fires and all other sorts of biotic interference. Though protection of forests is the prime duty of the field forest staff, these duties/ functions are generally sub-optimally discharged. Anti-smuggling squads at vulnerable points shall be created by deployment of manpower from other less important areas besides engagement of protection watchers.
- ❖ The performance of each Beat of Forest Guard and Section Forester shall be periodically monitored by the concerned Range Officer/ DFO.
- ❖ The field staff shall also take steps to control encroachments in the forests and to contain shifting cultivation. The success of protection efforts shall not only be judged with regards to the number and nature of forest offence cases booked but also the effectiveness with which such offence cases are investigated and contested in the appropriate courts of law.
- ❖ The forest cases detected shall not as a matter of routine be compounded. Proper investigation shall be done to convert the UD cases to PR cases so that the accused are brought to the books. Further PR cases shall be

submitted in time duly following the procedure stipulated in the Orissa Forest Offence (Detection, Enquiry and Disposal) Rule, 1980. The PR cases filed in the court shall be regularly pursued through the Public Prosecutor/ Assistant Public Prosecutors.

- ❖ Provision should be there to give away attractive rewards and incentive to the staffs as well as to the villages for their outstanding performance in forest protection.

5.6.13.2 Forest Road Network

- ❖ The existing forest road network in Malkangiri Division is not properly maintained due to paucity of funds. These forest roads are critical for communications, for transportation of forest produce, for supervision of forestry operations and to check smuggling, illicit felling and poaching. Forest fringe dwellers also use these forests roads. Therefore, these require to be properly maintained.
- ❖ These forest roads tracks should be maintained by providing drains on either side of road. The side drains should be periodically cleared to allow smooth flow of surface runoff. Cross-drains across the roads should be provided in hill slopes. Existing causeway, culvert and temporary bridge should be improved. Light morrum topping of road should be done periodically so as to prevent soil erosion because of surface runoff and constant use. Roads should be repaired generally during November and December.
- ❖ Attempt should be made to black top/ make all weather roads connecting vulnerable forest blocks so that the intensity of patrolling can be maintained during the rainy season.
- ❖ The concerned Range Officer shall prepare a plan and estimate for annual repair/ special repair after physical verification of forest roads and obtained the approval of the competent authority prior to execution of the work. In case of new constructions, details investigation shall be undertaken before execution of any such projects.

5.6.13.3 Forest Fire Protection

- ❖ In Part-I, analysis of extent, causes of forest fire and damage done to forest has been explained. Forest blocks vulnerable to fire based on satellite

imageries have been identified. Protection against fire requires concerted effort of the field staff and the forest fringe dwellers during the period February to 15th June.

- ❖ Fire continues to be the major threat to forest regeneration and establishment. Fire watcher system need to be strengthened in the identified vulnerable areas. Depending upon requirement and availability of funds fire watchers will be provided to every protection unit.
- ❖ The VSS should be involved in containing forest fires. Incidence of annual fire should be entered in the compartment history. Fire prone areas should be identified and precautionary measures taken in time. Every year fire maps need to be prepared block wise. Fire protection incentive schemes for VSS/ community may be developed.
- ❖ Annual fire line clearance of 1 chain width in fire sensitive areas, coupled with controlled burning shall be done under the personal supervision of the Forester/ Range Officer. Moreover, old fire lines, forest road boundary lines, village ring shall be kept clean by taking up control burning in 1 chain strip on both side of it.
- ❖ Modern firefighting methods should be adopted i.e. use of fire blower.
- ❖ Awareness on the damage caused by fire to be created amongst the people.
- ❖ One firefighting squad should be created during the fire season for each protection units consisting of two to three department staff along with two to three regular laborers' stationed at the vital point of the unit with vehicle and firefighting equipment in order to take immediate steps against fire.

5.6.13.4 Soil and Moisture Conservation:

5.6.13.4.1 On appropriate sites, soil and moisture conservation measures shall be under taken to improve the productivity of the area. These measures shall include gully control measures either by construction of check dam, dry rubble stone masonry according to availability of fund, materials and requirement of sites. The run-off in the gully shall be obstructed and diverted. The gully beds should be planted with soil binding species like Vetiver grass, Sabai grass, Agave, Dodonea etc.

5.6.13.4.2 The numbers of check dams require to be constructed depends up on the gradient factors of the stream. Steeper the slopes, more the check dams required and these should be started form the top to the bottom of the stream.

5.6.14 MISCELLANEOUS REGULATION

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

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

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

5.6.14.4 CONTROL:

All the entries regarding further encroachments, encroachment evictions, consolidation, illicit felling, poaching etc. need to be entered in the compartment histories. All the works undertaken must be entered in the compartment histories. The checking of compartment histories should form a part of the office inspections by the Regional Chief Conservator of Forest and the DFO to impart brief training to the staff for operation of VHF and firefighting equipment.

5.6.15 COST NORM

The cost norm for implementation of the prescriptions and the total estimated cost work under this circle is discussed in Chapter-10 (Financial Forecast & Plan of Operation)

5.6.16 INTERMEDIATE REVISION

The revision of the prescription of this Working Circle is anticipated. Since the collection of NTFP items in Protection series is prohibited, the prescriptions as well as implementation there on shall be reviewed after 5 years and if results are found satisfactory, the collection of NTFP may be permitted after approval of the competent authorities.

CHAPTER 6

BAMBOO (OVERLAPPING) WORKING CICLE



6.1 NAME OF WORKING CIRCLE CLEARLY MARKED ON GIS BASED MAPS (1:50,000):

The area of this working circle has been clearly marked on the GIS based map of 1:50,000 which are appended as management map in the plan.

6.2 GENERAL CONSTITUTION OF WORKING CIRCLE

6.2.1 This Working Circle is an overlapping Working Circle comprising the selected Forest Blocks, which have good concentration of bamboo crop. In the outgoing working plan 10 Nos. of Felling Series were covering 18 Forest Blocks with an area of 39446.77 Ha of Forest land under Bamboo overlapping working circle and it is seen that there are some Forest Blocks which are devoid of Bamboo growth and also are unproductive. Hence one Forest Block is omitted and deducted some areas from the unproductive forest blocks. Further, 11 Nos. of Forest Blocks are included in these Working plans which are containing productive area. Sometime the working agency i.e. M/s OFDC Ltd reported that some of the Bamboo Coupes are economically not-viable. There is problem of LWE existence in the District which also hinders the working of bamboo coupes.

6.2.2 A large tract of Bamboo areas in Malkangiri Division are lying in Revenue lands, Protected Forests and URLs which have not been included in the Working Plan. A bamboo scheme was prepared for the year 2004-05 to 2007-08 and extended up to 2010-11. The Working permission of Malkangiri Plan prepared for the year 2007-08. It was felt necessary to prepare a Scheme to harvest bamboo areas not covered under present Working Plan to enhance the production of bamboo and for scientific management of bamboo areas as well as to meet the raw material requirement of local industries and also to provide additional livelihood to the people living in and around these areas for inclusion in proper management plan later. The bamboo scheme prepared for 2011-12 to 2016-17 over an area of 81,639.9749 ha. The same Scheme has been submitted to Govt. of India, Ministry of Environment & Forest, Eastern Regional Officer, Chandrasekharpur, Bhubaneswar vide letter No. 16541 dt.08.11.2011 of the Principal Chief Conservator of Forests, Odisha. The Regional Office, MoEF accorded approval of the Scheme for one year i.e. 2011-12

with certain stipulations to be complied by the State Forest Department for consideration of the Scheme for the coming years vide letter No.8(31)-12/2007-FCE, dt.08.12.2011. On compliance to the stipulations by the State Forest Department, the yearly approval is being given from 2012-13 to 2014-15 latest by Letter No.8 (31)-12/2007-FCE, dt.24.9.2014.

6.2.3 During the Approval of bamboo scheme of the Malkangiri Forest Division for the balance period from 2015-16 to 2016-17 was discussed at length. The Additional Principal Chief Conservator of Forests (C) agreed to accord approval of the Scheme. It was apprised by the Divisional Forest Officer that area in question lies outside Working Plan area and therefore the scheme has been prepared. He further informed that a lot of revenue areas and reserved lands have very good Bamboo vegetation and have not been included in the Working Plan. The Addl. Principal Chief Conservator of Forests (Central) suggested that such area which supports forest growth i.e. Bamboo forest may be included in the fold of new Working Plan as it satisfies the dictionary meaning of forest.

6.2.4 As per the above discussion and communicated vide Letter No- 16030/11F, dt.22.09.2015 by the Addl. Chief Conservator of Forest, O/o the PCCF, Odisha the revenue areas and reserved lands which are good in Bamboo vegetation are now included in the Bamboo Working Circle of this Working plan.

6.2.5 Thus this unproductive/ non-economical Bamboo Forest Blocks excluded from the existing Bamboo overlapping working circle. The actual productive Bamboo growth available in those Forest Blocks is included in this working plan. The detail list of Forest Block of unproductive Bamboo is furnished in Annexure-VII. The earlier estimation needs to be verified by the WPO during field exercise. The areas may be treated with intensive SSO work apart from higher protection and extensive SMC works. Thus, total area suggested under this current Working Plan is 110367.5123 ha in this working circle including with Bamboo Scheme area. However, some blocks like Kondakamberu, Paleru, Sileru East and Bhejengiwada Forest Blocks covering an area 81,225.0165 ha after deduction an area 414.9584 ha under FRA, which were earlier parts of the bamboo scheme.

6.2.6 The bamboo forests closed to habitations have been highly degraded due to severe biotic interference and are in need of strong protection measures. The bamboo forests of this Division are found in all six Ranges.

6.3 GENERAL CHARACTER AND VEGETATION

6.3.1 The bamboos like Salia (*Dendrocalamus strictus*), Topi Bans (*Cephalostachyam purgacille*) and Pani Bans (*Oxytenanthera mnostigma*) were the main species recorded in the past but at present *Dendrocalamus strictus* (Salia or Dongor) is the most common species found in the Division. However, very limited number of clumps of pani bans is also found along the perennial nallas and streams. Though bamboo forests exist as overlapping forest with miscellaneous tree species, the occurrence of more bamboo is found in Chitrakonda Range, Kalimela Range and Balimela Range. Bamboo is associated with Sal Forest in Mathili Range and with miscellaneous species like Bija, Sissoo, Asan, Dhaura, Kurum, Kasi, Kangada etc in other Ranges.

6.3.2 The bamboo clumps of different felling series of the last plan close to habitations have been heavily degraded because of un-systematic removal of bamboo culms by the local inhabitants and improper application of prescribed cutting rules. This is degraded due to the excessive removal of bamboo culms not only by the local inhabitant but also in the process of working out such forests by the Forest Corporation.

6.3.3 Availability of Bamboo in different forest types are detailed below;

- (I) Southern Indian tropical dry mixed deciduous Type SAC3 contain mainly Dangar Baunsa (*Dendrocalamus Strictus*) growing both in hills and plains.
- (II) Southern tropical dry deciding forest dry bamboo breaks Forest type SAE4 in mainly hilly area.
- (III) Sothern Indian tropical moist deciding forest dry bamboo brakes: Forest type: 3B2s mainly in belts along with nallah banks.

6.4 FELLING SERIES, CUTTING SERIES AND JFM AREAS.

6.4.1 In the outgoing plan, the Bamboo areas of this Division were treated under 10 (Ten) Felling Series. But as the forest block Manoskonda, Goiparbat, Kondakamberu, Paleru, Sileru East, Bhejangi wada and Tulsi fall outside the plan area, from the above blocks Kondakamberu, Paleru, Sileru East, Bhejangi wada were included separate bamboo scheme and working was going on like this in the Division. Now theses blocks Kondakamberu, Paleru, Sileru East, and Bhejangi wada of the bamboo scheme are included in this Bamboo Overlapping Working Circle. Motu Felling Series is omitted from this working Circle due to absence of bamboo but part of Comptt. No-2 & 3 of Motu Felling Series areas are included in

Kalimela Felling Series. Further, another Felling Series i.e. Datunguda of Chitrakonda Range is included in this plan as per available of bamboo potentiality. Accordingly, as per detail field verification of bamboo areas, 21 Felling Series has been constituted and taken the less ha of some Compartments area in this plan. However, for better supervisions and implementations of the prescription, attempt has been made to keep the areas of the Felling Series within Range jurisdiction only.

6.5 BLOCKS, COMPARTMENTS AND JFM AREAS (MARKED ON GIS BASED MAPS)

6.5.1 In the outgoing plan there were 10 nos. feeling series in Bamboo Working Circle and separate 11 nos. Felling Series in the scheme and unproductive areas are excluded in this plan to be treated under this Working Circle. The Range and Felling Series wise Blocks are given below.

Table No. 6.1: Range and felling Series wise Blocks

Sl. No.	Felling Series/ Cutting series	Range	Name of the Forest Block	Legal status	Comptt. No.	Area in Ha	Annual Coupes
1	Sarangapalli	Mathili	Sarangapalli	RF	No-1	506.00	A
					No-2	200.00	
					No-3	400.00	B
					No-4	300.00	
					No-5	750.00	C
					No-6	550.00	D
					No-7	500.00	
			Total			3206.00	
2	Malkangiri	Malkangiri	Jhileruguda	PRF	No-2	400.00	A
			Guppakonda	PRF	-	70.00	B
			Jharapalli	RF	-	250.00	
			Sindrimal	PRF	No-2	100.00	C
					No-1	100.00	
			Koilipari	PRF	No-1	100.00	D
					No-2	100.00	
			Total			1120.00	
3	Gomphakonda	Kalimela	Mandapalli	PRF	No-1	750.00	A
			Gamphakonda	RF	No-1	200.00	B
			Yenugulkonda	RF	Part	500.00	
			Yenugulkonda	RF	(B)	600.00	C
			Mandapalli	RF	No-2	550.00	D
			Total			2600.00	
4	Kalimela	Kalimela	Rajulkonda	RF	-	200.00	A
			Pedawada	PRF	Part	450.00	B
		Motu	Pusuguda	RF	No-2	200.00	
		Kalimela	Pedawada	PRF	Part(Bal)	400.00	C
		Motu	Pusuguda	RF	No-3	100.00	D

			Polloru	RF	(P)	100.00	
			Total			1450.00	
5	Taralakota (North)	Balimela	Taralakota	RF	No-4	645.51	A
					No-1	800.00	B
					No-2	300.00	C
					No-3	426.00	D
			Total			2171.51	
6	Taralakota (South)	Balimela	Taralakota	RF	No-6(P)	523.00	A
					No-6(B)	300.00	B
					No-7	394.00	C
					No-5	728.00	D
			Total			1945.00	
7	Chitapari	Balimela	Chitapari	RF	No-1(P)	600.00	A
					No-1(B)	600.00	B
					No-2(P)	600.00	C
					No-2(B)	253.00	D
			Gopiguda	PRF	-	266.49	
			Mahadevpur	PRF		68.35	
			Total			2387.84	
8	Balimela	Balimela	Balimela	PRF	No-1	595.79	A
					No-2	1189.42	B
					No-3	978.40	C
					No-4	1697.32	D
			Total			4460.93	
9	Datunguda	Chitrakonda	Datunguda	PRF	No-1	900.00	A
			Ranginiguda	PRF	No2	630.00	
			Bandhaguda	PRF	-	715.00	B
			Bhimaram	PRF	No-2	850.00	
			Singaram	PRF	No-2	772.90	C
					No-3	200.00	
			Sikpanas	PRF	No-1	416.90	D
					No-2	300.00	
			Total			4784.80	
10	Chitrakonda	Chitrakonda	Sileru(West)	RF	No-1	746.8225	A
			Limalori	RF	-	300.2833	
			Jantri	PRF	No-1	502.3100	B
					No-2	622.0000	
			Matumkonda	PRF	No-1to 4(B)	1500.0000	C
		Balimela	Matumkonda	PRF	No-1to 4(B)	1345.0000	D
			Total			5016.4158	
11	Janbai	Chitrakonda	Kondakamberu		1	2944.6930	C
					2	3421.7856	A
					3	3446.4170	D
					7	3960.7470	B
			Total			13773.6426	
12	Kondakamb eru	Balimela	Kondakamberu		4	1835.8300	A
					5	1967.8850	B

				6	2191.6550	C
				8	2199.0200	D
			Total		8194.3900	
13	Ramaguda	Chitrakonda	Kondakamberu	9	1414.0790	D
				10	1359.3800	C
				11	1456.9200	B
				12	1347.6500	A
			Total		5578.0290	
14	Paleru	Chitrakonda	Paleru	1	1275.6144	A
				2	1372.7424	B
				3	1443.9696	C
				4	1236.7632	D
			Total		5329.0896	
15	Sileru East	Chitrakonda	Sileru East	5	2460.5760	A
				6	2201.5680	B
				7	2460.5760	C
				8	2331.072	D
			Total		9453.7920	
16	Allurukota	Chitrakonda	Bhejangi wada	13	1560.2360	A
				14	1335.6040	B
				15	1432.7320	C
				16	1612.8020	D
			Total		5941.3740	
17	Pancha	Chitrakonda	Bhejangi wada	17	1655.5990	A
				18	1693.9750	B
				19	1571.1740	C
				20	1566.0000	D
			Total		6486.7480	
18	Gonmetpada	Chitrakonda	Bhejangi wada	21	2190.5680	A
				22	1270.5454	B
				23	1317.4169	C
				24	870.1520	D
			Total		5648.6823	
19	Tagarkota	Kalimela	Bhejangi wada	1	1748.1862	A
				2	1667.3640	B
				3	1719.9750	C
				4	1436.6850	D
			Total		6572.2102	
20	Sighnakhunta	Kalimela	Bhejangi wada	5	1877.8080	A
				6	2085.8238	D
				7	1388.1210	C
		Chitrakonda		8	1570.2360	B
			Total		6921.9888	
21	Sudhakhunta	Kalimela	Bhejangi wada	9	1667.3640	A
		Chitrakonda		10	1537.8600	B
		Chitrakonda		11	2076.1110	C
		Kalimela		12	2043.7350	D
			Total		7325.0700	
			G.Total		110367.5123	

6.6 SPECIAL OBJECTIVES OF MANAGEMENT

The Special Objects of Management in respect of this Working Circle are within the scope of general objectives of management.

- 1) To ensure silvicultural operation to prevent deterioration of the growing stock.
- 2) To ensure scientific exploitation to maximum yield to satisfy growing demand for public and industries.
- 3) To rehabilitate exhausted/degraded forest through appropriate measures like tending, soil working and plantations.
- 4) To generate employment to local people.
- 5) To meet the requirement of raw material to local industry.

6.6.1 ANALYSIS AND VALUATION OF CROP

6.6.1.1 The bamboo forests of the Division mainly comprise of *Dendrocalamus strictus* and Daba Bamboo on nalla banks and perennial streams. The unsystematic and indiscriminate felling, unregulated removal by the local tenants coupled with annual fire, grazing and want of sufficient and timely silvicultural operations has led to degradation of the crop. Further, the bamboo bearing areas of the Division are also shrinking due to destruction of the forests.

The enumeration of bamboo has been taken up during the silvicultural operations. Basing on the said data, the number of clumps per hectare and average number per clumps have been determined. Most of the bamboo clumps are of quality II and III. The abstract of analyzed data is given below.

Table No. 6.2: Enumeration Data of Bamboo Clumps.

Name of the Range	No. of sample Points.	Area in Ha	No. of Clumps	No. of Culm	No. of Clumps per Ha	No of Culms per Ha	Avg. No of Culms per Clump
Balimela	15	1.5	62	2260	41	1505	38
Chitrakonda	26	2.6	156	6393	60	2458	41
Kalimela	12	1.2	53	2054	44	1712	39
Malkangiri	6	0.6	28	874	46	1456	31
Mathili	10	1.0	35	1040	35	1040	30
Motu	15	1.5	63	2250	42	1500	35
Total	84	8.4	397	14871	268	9671	36

6.6.2 SILVICULTURAL SYSTEM

6.6.2.1 The economically and silviculturally important species found in Malkangiri Forest Division is *Dendrocalamus strictus*, the Salia Bamboo. The silvicultural system prescribed is “Culm Selection-cum-Clump Improvement”. A clump is taken as a unit for working. Only permissible number of old culms shall be removed. The young culms shall be left untouched and evenly spaced by removing short stunted or congested stumps to achieve optimum future production. All new culms of two years shall be retained in the clump. During cutting of bamboo, cleaning and cultural operations shall be carried out simultaneously in each clump.

6.6.3 ROTATION PERIOD: 4 YEARS

6.6.4 HARVESTING DIAMETER: NOT APPLICABLE

6.6.5 REDUCING FACTOR AND REDUCING AREAS:

6.6.5.1 In comparison with the outgoing plan to the present plan, the area in this working circle has decreased because some forest blocks lost their potentiality due to severe biotic interference and repeated fire attacks where involvement of forest people is less, a good number of forest blocks regained their potentiality with active participation of local people and dedicated forest personnel. The loss and gain in area is given in Table No. 6.3.

Table No. 6.3: Increase and decrease in Area in Selection-cum-Improvement Working Circle in Malkangiri Division.

Name of the Range	Name of the Forest Block	Status of the Block	Compt t.	Area taken in outgoing plan	Area taken in present plan	Area reduced	Area increased	Area newly added
Mathili	Sarangapalli	RF	No-1	706.78	506.00	200.78	0	0
			No-2	213.95	200.00	13.95	0	0
			No-3	572.12	400.00	172.12	0	0
			No-4	393.97	300.00	93.97	0	0
			No-5	979.50	750.00	229.50	0	0
			No-6	814.04	550.00	264.04	0	0
			No-7	606.84	500.00	106.84	0	0
Malkangiri	Jhileruguda	PRF	No-1	582.04	0	582.04	0	0
			No-2	547.15	400.00	147.15	0	0

	Guppakonda	PRF		415.37	70.00	345.37	0	0
	Jharapalli	RF		554.48	250.00	304.48	0	0
	Sindrimal	PRF	No-1	1140.82	100.00	1040.82	0	0
			No-2	1489.69	100.00	1389.69	0	0
	Koilipari	PRF	No-1	0	100.00	0	0	100.00
			No-2	0	100.00	0	0	100.00
Kalimela	Mandapalli	PRF	No-1	918.72	750.00	168.72	0	0
			No-2	799.05	550.00	249.05	0	0
	Gomphakonda	RF	No-1	279.24	200.00	79.24	0	0
			No-2	497.25	0	497.25	0	0
	Yenugulkonda	RF	-	1110.01	1100.00	10.01	0	0
Kalimela	Rajulkonda	RF		475.11	200.00	275.11	0	0
	Pedawada	PRF		1190.03	850.00	340.03	0	0
	Bapanpally	PRF		523.31	0	523.31	0	0
Balimela	Tarлакota	PRF	No-1	1095.66	800.00	295.66	0	0
			No-2	934.78	300.00	634.78	0	0
			No-3	462.46	426.00	36.46	0	0
			No-4	668.51	645.51	23.00	0	0
Balimela	Tarлакota	PRF	No-5	734.38	728.00	6.38	0	0
			No-6	869.43	823.00	46.43	0	0
			No-7	432.34	394.00	38.34	0	0
							0	0
Balimela	Chitapari	RF	No-1	1267.69	1200.00	67.69	0	0
			No-2	858.00	853.00	5.0	0	0
	Gopiguda	PRF	-	0	266.49	0	0	266.49
	Mahadevpur	PRF		0	68.35	0	0	68.35
Balimela	Balimela	PRF	No-1	600.16	595.79	4.37	0	0
			No-2	1189.42	1189.42	0	0	0
			No-3	983.30	978.40	4.90	0	0

			No-4	1715.32	1697.32	18.00	0	0
Motu	Pusigudum	RF	No-1	1073.61	0.00	1073.61	0	0
			No-2	956.71	200.00	756.71	0	0
			No-3	1147.23	100.00	1047.23	0	0
			No-4	721.32	0.00	721.32	0	0
	Polloru	RF	(P)		100.00		0	100.00
Chitrakonda	Sileru(West)	RF	No-1	792.12	746.8225	45.2975	0	0
			No-2	780.98	0	780.98	0	0
	Jantri	PRF	No-1	1404.31	502.3100	902.00	0	0
			No-2	885.52	622.0000	263.52	0	0
	Matumkonda	PRF	No-1(1) to 4(P)	3370.21	1500.0000	1870.21	0	0
	Limalori	RF	-	0	300.2833	0	0	300.2833
Balimela	Matumkonda	PRF	No-1(1) to 4(P)	1693.84	1345.0000	348.84	0	0
Chitrakonda	Datunguda	PRF	No-1	0	900.00	0	0	900.00
	Ranginiguda	PRF	No2	0	630.00	0	0	630.00
	Bandhaguda	PRF	-	0	715.00	0	0	715.00
	Bhimaram	PRF	No-2	0	850.00	0	0	850.00
	Singaram	PRF	No-2	0	772.90	0	0	772.90
			No-3	0	200.00	0	0	200.00
	Sikpanas	PRF	No-1	0	416.90	0	0	416.90
			No-2	0	300.00	0	0	300.00
Chitrakonda	Kondakamberu	URL	No-1 to 12	0	27546.0616	0	0	27546.0616
Chitrakonda	Paleru	URL	No-1 to 4	0	5329.0896	0	0	5329.0896
Chitrakonda	Sileru East	URL	No-5 to 6	0	9453.7920	0	0	9453.7920
Chitrakonda	Bhejingiwada	RL	13to24	0	18076.8043	0	0	18076.8043
Kalimela an	Bhejingiwada	RL	5to 12	0	14247.0588	0	0	14247.0588
Motu	Bhejingiwada	RL	1 to 4	0	6572.2102	0	0	6572.2102
Total				39446.77	110367.5123	16024.1975	0	86944.9398

6.6.5.1 Due to unproductively/non-economic crop, one Bamboo Forest Blocks is excluded from the outgoing working plan of Bamboo overlapping working circle. The actual productive Bamboo growth available in those Forest Blocks is included in the working plan.

6.6.6 FELLING CYCLE:

6.6.6.1 A felling cycle of 4 years has been adopted for both Salia Bamboo and Daba bamboo. Each felling series has been divided into four annual coupes i.e. A, B, C and D as shown in Table No-6.1.

6.6.7 DIVISION INTO PERIOD AND ALLOTTED TO PERIODIC BLOCK: Not Applicable

6.6.8 CALCULATION OF YIELD AND ITS REGULATION

6.6.8.1 The bamboo felling shall be guided by the bamboo cutting rules communicated by the Govt. of India, Ministry of Environment & Forests vide Letter No.13/FCWP/05 Gen dated 24th December, 1990. As per the said rule, culms up to 2nd year age will not be cut under any circumstances. Further, the culms more than one year of age and the culms which are older than 2 years but less than 3 years age shall be retained in the clump and their numbers shall not be less than number of karadies. In addition, the minimum number of culms to be retained per clump after cutting shall not be less than 15 in number in clump quality II and 10 for clump in quality III.

6.6.8.2 Keeping in view the aforementioned condition, the yield estimation has been done for such Felling Series. Here, the bamboo enumeration date has been taken into account for clumps and Culm analysis to arrive at the number of culms per clump available for harvest. As already discussed, the average quality of bamboo of this Division is quality II & III, the average height of culms is taken as 7.5 & 3.0 meters for quality class II & III respectively for yield estimation. Since one Sale unit (SU) is equal to 2400 RMT or one MT.

Thus Yield of Felling Series (Y) = $\frac{(A \times N \times n \times h)}{2400}$

Where, A = Area of Felling Series
 N = No. of clumps/ ha
 n = No. of harvestable culms/clump
 h = Average culms height

Since, the estimation of yield as shown in Table No. 6.4 are based on the sample result carried out of Industrial bamboo and Commercial bamboo during the year 2018-19 and 2019-20, this estimation is likely to change due to various reasons like quantity of illegal removal, silvicultural inputs to be given etc. Also, as it is short rotation crop and felling cycle is of just 4 years, this estimation will act as guiding factor only for preparation of different treatment plan to the bamboo forests of the Division.

Table No- 6.4 Sample Result sum of Industrial Bamboo and Commercial Bamboo.

Felling Series	'A' Coupe		'B' Coupe		'C' Coupe		'D' Coupe		Total	
	Area in Ha	Yield in SU	Area in Ha	Yield in SU	Area in Ha	Yield in SU	Area in Ha	Yield in SU	Area in Ha	Yield in SU
Sarangapalli	706.00	0	700.00	0	750.00	0	1050.00	0	3206.00	0
Malkangiri	400.00	0	320.00	0	200.00	0	200.00	10.97	1120.00	10.97
Gomphakonda	750.00	0	700.00	490.72	600.00	490.72	550.00	129.97	2600.00	1111.41
Kalimela	200.00	0	650.00	264.64	400.00	201.61	200.00	0	1450.00	466.25
Taralakota (N)	645.51	0	800.00	323.33	300.00	313.23	426.00	363.75	2171.51	1000.31
Taralakota (S)	523.00	0	300.00	303.13	394.00	282.92	728.00	262.71	1945.00	848.76
Chitapari	600.00	0	600.00	262.71	600.00	282.92	587.84	242.50	2387.84	788.13
Balimela	595.79	0	1189.42	343.54	978.40	363.75	1697.32	383.96	4460.93	1091.25
Datunguda	1530.00	310.00	1565.00	421.25	972.90	342.65	716.90	364.71	4784.80	1438.61
Chitrakonda	1047.1058	431.08	1124.31	437.50	1500.0	375.25	1345.0	404.17	5016.4158	1648.00
Janbai	3421.7856	315.87	3960.747	396.13	2944.693	551.87	3446.417	370.7	13773.6426	1634.57
Kondakamberu	1835.83	431.25	1967.885	365.17	2191.655	624.17	2199.02	460.25	8194.3900	1880.84
Ramaguda	1347.65	405.42	1456.92	399.87	1359.38	362.87	1414.079	345.04	5578.0290	1513.20
Paleru	1275.6144	275.62	1372.7424	310.50	1443.9696	399.87	1236.7632	217.29	5329.0896	1203.28
Sileru East	2460.576	295.75	2201.568	295.75	2460.576	304.79	2331.072	295.75	9453.7920	1192.04
Allurkota	1560.236	399.87	1335.604	295.75	1432.732	405.42	1612.802	522.08	5941.374	1623.12
Pancha	1655.599	350.58	1693.975	290.37	1571.1740	403.12	1566.000	474.83	6486.7480	1518.90
Gonmetpada	2190.568	275.62	1270.5454	255.5	1317.4169	310.33	870.152	127.75	5648.6823	969.2
Tagorkota	1748.1862	725.33	1667.364	595.36	1719.975	55.42	1436.685	551.62	6572.2102	1927.73
Sighnakhunta	1877.808	405.77	1570.236	434.94	1388.121	80.50	2085.8238	405.78	6921.9888	1326.99
Sudhakhunta	1667.364	188.30	1537.86	318.28	2076.111	100.94	2043.735	188.30	7325.0700	795.82

6.6.9 TABLE OF BAMBOO FELLING

6.6.9.1 The bamboo coupes shall be opened for working from 1st October to 31st June. If any coupe remains un-worked for any particular reason, then the arrear coupes shall be worked along with the coupes due for working in that year. Further, during felling of bamboo in a coupe a definite sequence of felling is required. The coupes shall be divided into 4 cutting sections running along the contours. The section from the uphill side shall be worked first and then to down hillside one after another. The care shall be taken to complete the work in all respect before proceeding to 2nd Section and so on.

Table No. 6.5 Year wise sequence of felling of Bamboo Coupes

Cutting Series	Year of Cutting									
	2021-22		2022-23		2023-24		2024-25		2025-26	
		Area	Coupe No	Area	Coupe No	Area	Coupe No	Area	Coupe No	Area
Sarangapalli	C	750.00	D	1050.00	A	706.00	B	700.00	C	750.00
Malkangiri	C	200.00	D	200.00	A	400.00	B	320.00	C	200.00
Gomphakonda	C	600.00	D	550.00	A	750.00	B	700.00	C	600.00
Kalimela	C	400.00	D	200.00	A	200.00	B	650.00	C	400.00
Taralakota (N)	C	300.00	D	426.00	A	645.51	B	800.00	C	300.00
Taralakota (S)	C	394.00	D	728.00	A	523.00	B	300.00	C	394.00
Chitapari	C	600.00	D	587.84	A	600.00	B	600.00	C	600.00
Balimela	C	978.40	D	1697.32	A	595.79	B	1189.42	C	978.40
Datunguda	C	972.90	D	716.90	A	1530.00	B	1565.00	C	972.90
Chitrakonda	C	1500.0	D	1345.0	A	1047.1058	B	1124.31	C	1500.0
Janbai	D	3446.417	A	3421.7856	B	3960.747	C	2944.693	D	3446.417
Kondakamberu	D	2199.02	A	1835.83	B	1967.885	C	2191.655	D	2199.02
Ramaguda	D	1414.079	A	1347.65	B	1456.92	C	1359.38	D	1414.079
Paleru	A	1275.6144	B	1372.7424	C	1443.9696	D	1236.7632	A	1275.6144
Sileru East	A	2460.576	B	2201.568	C	2460.576	D	2331.072	A	2460.576
Allurkota	A	1560.236	B	1335.604	C	1432.732	D	1612.8020	A	1560.236
Pancha	A	1655.599	B	1693.975	C	1571.1740	D	1566.0000	A	1655.599
Gonmetpada	A	2190.568	B	1270.5454	C	1317.4169	D	870.152	A	2190.568

Tagorkota	A	1748.1862	B	1667.364	C	1719.975	D	1436.685	A	1748.1862
Sighnakhunta	A	1877.808	B	1570.236	C	1388.121	D	2085.8238	A	1877.808
Sudhakhunta	A	1667.364	B	1537.86	C	2076.111	D	2043.735	A	1667.364
G. Total		28190.7676		26756.2204		27793.0333		27627.4910		28190.7676

Cutting series	Year of Cutting									
	2026-27		2027-28		2028-29		2029-30		2030-31	
	Coupe No	Area	Coupe No	Area	Coupe No	Area	Coupe No	Area	Coupe No	Area
Sarangapalli	D	1050.00	A	706.00	B	700.00	C	750.00	D	1050.00
Malkangiri	D	200.00	A	400.00	B	320.00	C	200.00	D	200.00
Gomphakonda	D	550.00	A	750.00	B	700.00	C	600.00	D	550.00
Kalimela	D	200.00	A	200.00	B	650.00	C	400.00	D	200.00
Taralakota (N)	D	426.00	A	645.51	B	800.00	C	300.00	D	426.00
Taralakota (S)	D	728.00	A	523.00	B	300.00	C	394.00	D	728.00
Chitapari	D	587.84	A	600.00	B	600.00	C	600.00	D	587.84
Balimela	D	1697.32	A	595.79	B	1189.42	C	978.40	D	1697.32
Datunguda	D	716.90	A	1530.00	B	1565.00	C	972.90	D	716.90
Chitrakonda	D	1345.0	A	1047.1058	B	1124.31	C	1500.0	D	1345.0
Janbai	A	3421.7856	B	3960.747	C	2944.693	D	3446.417	A	3421.7856
Kondakamberu	A	1835.83	B	1967.885	C	2191.655	D	2199.02	A	1835.83
Ramaguda	A	1347.65	B	1456.92	C	1359.38	D	1414.079	A	1347.65
Paleru	B	1372.7424	C	1443.9696	D	1236.7632	A	1275.6144	B	1372.7424
Sileru East	B	2201.568	C	2460.576	D	2331.072	A	2460.576	B	2201.568
Allurkota	B	1335.604	C	1432.732	D	1612.8020	A	1560.236	B	1335.604
Pancha	B	1693.975	C	1571.1740	D	1566.0000	A	1655.599	B	1693.975
Gonmetpada	B	1270.5454	C	1317.4169	D	870.152	A	2190.568	B	1270.5454
Tagorkota	B	1667.364	C	1719.975	D	1436.685	A	1748.1862	B	1667.364
Sighnakhunta	B	1570.236	C	1388.121	D	2085.8238	A	1877.808	B	1570.236
Sudhakhunta	B	1537.86	C	2076.111	D	2043.735	A	1667.364	B	1537.86
		26756.2204		27793.0333		27627.4910		28190.7676		26756.2204

6.6.10 METHODS OF EXECUTION OF FELLING

6.6.10.1 As bamboo is a nationalized forest produce, the State Government decides the agency for working of bamboo coupes of the State. However, at present Orissa Forest Development Corporation Ltd. is the sole agent nominated by the State Government to work bamboo through raw material procurer (RMP) in the Division.

6.6.10.2 Demarcation of annual Coupes: Bamboo coupes shall be demarcated by giving double coal-tar rings at the breast height of all the trees standing on the coupe lines, which are distinctly visible from each other. Similarly, Section line should also be shown by putting single coal tar ring at breast height of boundary tree. The demarcation shall be completed well before the working season i.e. October. Sign-board shall be displayed on compartment lines, road, near nallah and other strategic points mentioning the details like Cutting series, Name of coupe, Area, Year of working, and Compartment number. Bamboo coupes have been shown on 1:25,000 topo-sheets. The coupe boundaries are kept coterminus with compartment line so that demarcation of coupe is not difficult.

6.6.10.3 Execution of Operation: The State Government decides the agency for working of bamboo. The Orissa Forest Development Corporation (Ltd) is the agency nominated by the Govt. to work out the coupes through a Raw Material Procurer. However, the State Government, Forests, Fisheries & A.H. Department vide its Notification No-6F-10/88.21693/FFAH, dated Bhubaneswar the 21st September, 1988 have appointed the Orissa Forest Development Corporation Ltd. (OFDC Ltd.) as the agent for execution of and trade in bamboo of all species on its behalf w.e.f. the 1st day of October, 1988.

6.6.10.4 Estimation of Yield and Fixation of Target

The production of bamboo from a coupe varies with the change in climatic condition, past working, illicit felling of culms and removal of Karadi by local people, fire incidence, flowering of bamboo clumps and other factors. There is a need for annual estimation of Bamboo before fixing any target for the area. The estimation of the yield shall be completed by August of every year for the coupe due for working keeping in view of the clump quality, treatment type and the sample enumeration result.

6.6.10.5 Working of Bamboo

The working of Bamboo in JFM area shall be guided by JFM resolution that shall be in force and operational guidelines issued by the government from time to time.

Bamboo forests of the Division shall be worked as per the guideline issued by the C.C.F(Central) Eastern Regional Office, Ministry of Environment & Forests, Govt.of India, Bhubaneswar vide office Memo No-13F/FCWP/OS-GEN-Dt. 24.12.1990. It envisages preparation of treatment maps and felling rules for different treatment type.

6.6.10.6 Treatment maps

- i. After completion of demarcation of bamboo coupes, a Treatment map shall be prepared by the lessees on a copy of the available Management Map in 1:50,000 scale.
- ii. The Treatment map shall show specific indication towards Salia Bamboo and other Bamboo area.
- iii. The treatment types shall be based on the assessment of standard clumps condition and quality classes of culms in a clump.
- iv. The bamboo area less than 4 Ha. in extent shall not be separated out as distinct treatment types.

6.6.10.7 Treatment types of Salia Bamboo

The Salia Bamboo forests have been classified into following three treatment types.

Treatment Type ‘A’- Areas with healthy and well stocked bamboo clumps.

Treatment Type ‘B’- Areas with well stocked but degraded, damaged congested and fire burnt bamboo clumps.

Treatment Type ‘C’-Areas where bamboo clumps are sparse and scattered.

According to quality of bamboo clumps it has also been categorized into three quality classes.

Quality-I - Culms height in a clump 9 meters and above.

Quality-II - Culms height in a clump 6 to 9 meters.

Quality-III - Culms height in a clump less than 6 meters

6.6.10.8 Cutting Rules:

Salia Bamboo of the Division shall be worked as per the following prescription.

6.6.10.8.1 Rules which are uniformly applicable to all treatment types:

- i) Karadi, the culms up to one year age and the culms over one year but under two year of age shall not be cut at any circumstances. Also, more than one year old culms and the culms which are older than 2 (two) years but less than 3 years of age shall be retained in the clump and their number should not be less than the number of Karadis.
- ii) The minimum number of culms to be retained in clumps has been fixed on the basis of quality of the clumps as follows.

a)	Clumps quality I	20 nos.
b)	Clumps quality II	15 nos.
c)	Clumps quality III	10 nos.
- iii) The clumps having the minimum or less than the minimum prescribed number shall not be worked commercially only the top broken, dead, dry and malformed bamboo shall be removed.
- iv) A clump shall be distinguished as an independent clump where its periphery is easily distinguished from others. Where such discernible is not possible, two clumps within one-meter distance shall be regarded as one.
- v) While retaining culms against felling in a clump, they should remain well spreader and preferable at periphery and in the order of preference as follows:
 - Karadi Bamboo.
 - Kasi Bamboo (older than one year but less than 2 years)
 - Pakala bamboo (Young green bamboo)
 - Older live bamboo.
 - Others as may be available.
 - The rhizomes shall not be dry and separated out.

- The culms height shall not be less than 15 cm or more than 45 cm from the ground level and in no case below the first prominent node from the ground.
- The cut shall be made with a sharp instrument to ensure that the stump remains intact without splitting.
- Lops and tops of bamboos shall be simultaneously cleared to avoid fire hazard. The hazardous materials shall be kept to a minimum distance of one meter away from the periphery of the worked clumps.
- While working, all the climbers shall be cut from the bamboo clumps.
- The bamboo strips shall not be used as tying materials while bundling the bamboo.
- Bamboo felling shall not be taken up from 1st July to 30th September.
- In case of sporadic flowering once the seeds fall the flowered clumps shall be clear felled.
- In case of gregarious flowering, once the shedding of ripen seed complete, the clumps shall be clear felled and extracted early for avoiding further dry and deterioration and become prone to fire damage. Steps shall also be taken for expeditor's disposal of such bamboo to prevent deterioration in quality.
- There shall not be any lopping of bamboos either for feeding to livestock or otherwise.
- As far as possible, Bamboo cutting shall be completed by the end of May.
- The bamboo forests shall be strictly protected from fire especially during the year of working and the year following it.
- No grazing shall be permitted during the rainy season in bamboo forests, which shall have been worked in the previous year.

6.6.10.8.2 Rules Applicable to different Treatment Types

A. Treatment Type 'A'

- a) The commercial felling of bamboo shall be carried out in those clumps where there will be minimum number of culms as prescribed above.

- b) The cultural operations shall be carried out in clumps having less than the minimum numbers of culms in each clump. Also, in such clumps there shall be no commercial felling.

B. Treatment Type ‘B’

There shall be no commercial felling in any clumps. Only cultural operations/ decongestion shall be carried out which includes.

- i) Felling of all dead, dried, burnt, broken and over matured bamboos.
- ii) Broken or high stumps in green condition having height of 2.5 mts. Or more shall be retained if necessary, to maintain the size of the clumps.
- iii) The minimum number of culms per clump to be retained as prescribed in the forgoing Paras for various quality classes may be strictly followed if necessity so arises.
- iv) The congested bamboo clumps shall be clear felled by forming segments. The maximum number of segment s under which a congested clump shall be worked should be there and at each working not more than one segment shall be cut. The middle segment shall be of a triangle shape having apex touching the periphery. Only this middle segment shall be felled at the first working. In subsequent cycles side segments shall be worked.

C. Treatment Type ‘C’

- i) Only cultural operation/decongestion shall be carried out in the existing bamboo clumps.
- ii) The bamboo potentiality of such forests shall be augmented by raising bamboo plantation. The minimum area to be planted annually shall be 1200 ha area under this type.
- iii) Tending and cultural operations shall be carried out per standard practices in bamboo plantation area.

6.6.10.9 Cutting rules for Daba Bamboo:

- i) All the culms in a clump having more than 3 years of age shall be harvested on culms selection basis provided that the number of culms left uniformly distributed in a clump and shall not be less than 10 in numbers.
- ii) In case of congested clumps where culms selection is not possible, the culms shall be felled carefully by forming segments depending upon the interlacing of bamboos, which will otherwise provide support to the remaining segments against wind damage.
- iii) The maximum number of segments under which a congested clump shall be worked will be three and at each working, there shall not be more than one segment to be worked. Stumps higher than 50 cm. or more than two internodes shall not be left.
- iv) Where the segments are formed the middle segment shall be of triangle shape and felled at the 1st working. The rest of the segments shall be worked one after another in subsequent years.

6.6.11 SILVICULTURAL OPERATION:

- i) The productivity of the bamboo forests depends upon the inputs given to the clumps.
 - i. Silvicultural operations shall be carried out either during/ or immediately after the year of actual harvest. Also, established natural regeneration shall be taken care of at the time of silvicultural operation so as to add to the future crop of the bamboos forests. The operations shall preferably be comprised of the follows.
 - ii. All the lops and tops including debris shall be removed to a distance of at least 1 mt. away from the clumps and it shall be kept clean.
 - iii. In case of clumps left un-cleaned at the time of felling, such clumps shall be attended to through removal of high stumps, pruning and climber cutting.
 - iv. The exposed rhizomes shall be covered with soil duly scrapped from half-moon trench on the up hillside of a hilly or undulating terrain. Wherever necessary, stonewall or brush wood wall shall be erected on the downhill

side to support the soil till its stabilizing. However, care shall be taken, as a soil conservation measure half-moon trenches shall also be dug in upper hill side of the clump.

- v. Besides pulverization, soil working around the clumps shall be done to improve the overall quality and productivity of the bamboo forests.

6.6.12 TREATMENT OF GREGARIOUSLY FLOWERED AREAS

- i. The bamboo seedling shall be thinned out leaving the promising one at spacing of 4mt. x 4mt.
- ii. Cleaning, soil working and weeding shall be carried out around the left out/adopted bamboo seedlings at a radius of 50cm.
- iii. In gaps planting of Rhizomes shall be carried out.
- iv. All the flowered clumps shall be felled and removed following the prescriptions.
- v. The area shall be closed for grazing.
- vi. Elaborate fire protection measures shall be taken up.

6.6.13 FLOWERING IN BAMBOO

6.6.13.1 In selection forests due to variation in age of the clumps, there occurs variation in intensity of flowering. The delay in flowering in poor sites is due to poor growth and storage of starch, sugar and other substances in the clumps which help in flowering. In well-stocked forests, the intensity of flowering is less in comparison to un-worked forests containing congested clumps. Similarly, intensity of flowering is more in areas having more biotic interference in the form of grazing and fire in comparison to protected areas. It is important to identify the character of flowering in Salia Bamboo to decide appropriate management techniques. A comparative statement showing distinction between two types of flowering is given below Table No- 6.6.

Table No. 6.6: A comparative statements showing distinction between two types of flowering

Sporadic flowering	Gregarious flowering
1. Only few clumps are involved with flowering and in scattered manner.	1. Flowering occurs in almost all the areas
2. Only few culms flowering in a clump.	2. Almost all the culms in a clump and all or some portions of a place flowering take place.
3. The culms may or may not die after flowering.	3. All the culms of a clump die after flowering.
4. The clump does not die.	4. Flowering is followed by death of the clumps.
5. It takes place usually irregularly and almost every alternate year.	5. It follows a cycle of a long interval of 20 to 65 years.
	6. It progresses in definite direction like an epidemic form.
	7. It takes 2 to 4 years to complete flowering in the area.

6.6.14 MAIN THREATS TO BAMBOO FORESTS

6.6.14.1 Some of the main threats on bamboo forests of the Division are as follows:

6.6.14.2 Indiscriminate felling: The bamboo forests of this Division are facing problem of indiscriminate cutting of bamboo for domestic uses like house construction, basket and mat making by artisans etc. Also, first year karadies are removed for its delicious nature of food among the tribal.

6.6.14.3 Fire: Though activities in respect of protection to the forests against forest fire have increased, almost all the bamboo- bearing areas are suffering from annual fire.

6.6.14.4 Excessive grazing: There are prescriptions of control of grazing in the coupe during working and the year following for maintaining natural regeneration, in absence of proper awareness among public and dearth of sufficient staff, it is quite difficult to implement the prescription.

6.6.14.5 Over felling/ Improper working: Due to various reasons like accessibility and growing demand for both bonafide need of locals as well as industries has prompted for over felling as well as hacking of clumps in the past resulting degradation in both quality and productivity of the bamboo forests of the Division. Almost all the coupes are now in unproductive stage and need of special efforts for its revival.

6.6.14.6 Insufficient silvicultural operations: Due to insufficient and irregular flow of funds, systematic and complete silvicultural operations could not be carried out in coupe area. Further, requirement of gap planting could not be made as a result the bamboo forests are getting deteriorate day by day.

6.6.15 MORPHOLOGICAL CHARACTERS OF CULMS OF DIFFERENT AGE

Distinguishing Morphological Characters of the culms of different ages are given in Table No-6.7

Table No. 6.7: Morphological Characters of the culms of different ages

Culm Age	Morphological Characters
Karadi (First Year culm)	Culm sheath present on lower half of culm. The branches present throughout the length of culm. Culm green uniformly, bloom is abundantly present and comes off easily on finger. A fresh cut just under the node shows the same fresh coloration even after one or two minutes.
Kasi (Second year culm)	Culm sheath mostly absent except for some part. Culm dark in colour, branches presents practically at all nodes. Bloom is patchy, greyish-white in colour and comes off less easily on finger. A fresh cut just under the node shows the same fresh coloration even after one or two minutes.
Pakala (3 rd & 4 th Year culm)	Culm sheath absent. White bloom absent. Blackish grey or dark blotches appear which come off on finger slightly, on rubbing. A fresh cut just under the node shows reddish brown coloration after one or two minutes.

6.6.16 MISCELLANEOUS REGULATION

6.6.16.1 Grazing: Grazing will be regulated in this working circle in accordance with the Orissa Forest (Grazing of Cattle) Rule 1980 and carrying capacity of the forests. Regeneration in bamboo coupes shall be strictly protected from grazing.

6.6.16.2 Fire Protection: Fire lines on the boundaries of each coupe shall be cleared 5 meters width to prevent spread of fire. The Orissa Forest Protection Rules, 1979 and Provisions of Chapter-XVII of Orissa Forest Department Code shall be strictly implemented.

6.6.16.3 Demand of Artisans: The bamboo requirement by the Artisans shall be fulfilled from the protected forests as per the supply of Bamboos to Artisans and Co-operative Societies (Orissa) Rule 1980. Besides that to meet the growing demand of Green Bamboo by the Artisans, the DFO shall prepare a locality wise list of artisans and annual quantum of requirement. Accordingly, he should plan for raising community/ beneficiary-oriented bamboo plantations by obtaining the required funds from local bodies like DRDA, ITDA etc.

6.6.16.4 Rights and Concession: It shall be regulated as per the provision of notifications and prevailing Govt. policy.

6.6.16.5 Bamboo Plantation: Bamboo Plantation may be taken up in deficient areas. The technique of raising bamboo plantation prescribed in the Forest Plantation Manual 1977 shall be adopted

6.6.16.6 Maintenance of Records: Control forms and Compartment History Files besides other records shall be maintained for each coupe/ compartment as per Management plan Procedure, 1991.

6.6.17 COST NORM:

The cost norm for implementation of these prescriptions and total estimated cost for working under this Working Circle has been discussed at Chapter-10 of Part-II (Financial Forecast & Plan of Operation).

6.6.18 INTERMEDIATE REVISION:

No intermediate revision is anticipated. However, result of prescription may be reviewed after 5 years and if found necessary, The Regional Chief Conservator of Forests, Koraput Circle in consultations with the Conservator of Forests (Working Plan) Odisha Bhubaneswar may recommend for an intermediate revision of the same to the competent authority whose decision shall be final.

CHAPTER 7

WILDLIFE (OVERLAPPING) WORKING CIRCLE

Latitude: 18.475009
Longitude: 81.891976
Elevation: 259.47m
Accuracy: 4.3m
Azimuth: 238° (SW)
Pitch: -7.3° (-0.7°)
Time: 14-09-2020 12:40

Powered by An



7.1 NAME OF WORKING CIRCLE CLEARLY MARKED ON GIS BASED MAPS (1:50,000):

This Working Circle covers whole Division area and is therefore not specifically worked on GIS based map.

7.2 GENERAL CONSTITUTION WORKING CIRCLE

7.2.1 Wild life is an integral part of the forests and plays a major role in the forest ecosystem. Though, there is overwhelming support given to the conservation of bio-diversity and wildlife, there has been decline in the forest cover and wild life habitat due to biotic interference and other reasons. The National Forest policy, 1988 envisages the need of conservation of wildlife and their habitat. Therefore, to provide protection to existing wild life, to improve their habitat and to conserve bio-diversity, this working circle has been formed.

7.2.2 The present working plan covers all the Forest Blocks under wild life overlapping working circle. The objective shall remain same as prescribed in the past management of working plan. This is very much essential to give special attention while prescribing for management of wild life in the Division focusing particularly on the wild life movement and habitat in the different Forest Blocks.

7.2.3 The Major Carnivore available in this Division is Wild Sloth Bear and Leopard. This Division frequently faces the problem of Wild Bear depredation throughout the Division. There are herbivores which also play vital role in the ecological balance of the Division.

Therefore in order to manage this wildlife scientifically and to tackle the issue of wild animal depredation, the entire Working Plan i.e. **218302.1895** Ha is kept under this Working Circle, so as to provide specific emphasis for habitat development, food availability for the wild animals.

7.3 GENERAL CHARACTER OF VEGETATION

7.3.1 The bio-diversity of flora and fauna has been adversely affected due to considerable degradation of forest. No systematic bio-diversity survey has been made in past. The details description of the composition and diversity of the forests have been discussed in Chapter No.3 of part-1. However, the major Forest types noticed in these forest are:

- (i) Southern Moist Mixed Deciduous Forests (3B/C2)
- (ii) Southern Tropical Semi Ever Green Forests(2B)
- (iii) Southern Tropical Dry Deciduous Forests (5A), Type: Dry teak bearing forests (5A/C1), Southern dry mixed deciduous Forests (5A/C3), Dry bamboo brakes (5B/E9).

The forests of this Division have faced immense biotic pressure, particularly human being and domestic cattle over the years. The density of the forests varies from 0.2 to 0.5 i.e. open to moderately dense forests. Salia Bamboo occurs in the drier parts of the slopes and higher elevation where as Panibans (*Oxytenanthera monostiguma*) are found damp ground along the nallah.

The biodiversity surveys have been conducted by the Division during 2006 first time. Again, the biodiversity surveys have been made during 2019 of this plan by the Forest and Ecology Division NRSA, Hyderabad which has been reported in Chapter of part-1. This will act as bench mark survey in study of each biodiversity in future. The study shows that the Division has rich biodiversity in flora and fauna.

7.4 FELLING SERIES, CUTTING SECTIONS AND JFM AREAS

Not applicable in this Working Circle.

7.5 BLOCKS AND COMPARTMENTS AND JFM AREAS

All the forest blocks included in the plan have been allotted to this overlapping working circle. Moreover; this circle covers the entire geographical area of the Division as far as protection of the wildlife concerned. As this working circle overlaps the entire plan area, the forest blocks which need special emphasis on wildlife management are furnished below at Table No. 7.1. In these blocks systematic plan for management of wildlife is to be ensured.

Table No.7.1: List of Forest Blocks needs Special Emphasis.

Sl. No	Range	Forest Blocks	Status	Area in Ha.
1	Mathili	Sarangapalli	RF	4287.20
2		Pititung	PRF(P)	2408.60
3		Chedenga	RF	796.65
4		Malidanger	RF	399.26
5		Gotiguda	RF	439.81
6	Malkangiri	Sindrimal	PRF	2630.51
7		Jhileruguda	PRF	1129.19
8		Jharapalli	RF	554.48
9		Kumadanger	PRF	599.64
10		Koilipari	PRF	1816.21
11		Pititung	PRF(P)	3296.77
12	Kalimela	Udayagiri	RF	6650.29
13		Gomphakonda	RF	776.49
14		Mandapalli	PRF	1717.77
15		Venkatpalam	RF	460.82
16		Yengulkonda	RF	1110.01
17		Pedawada	PRF	1089.27
18	Balimela	Balimela	PRF	4488.20
19		Chitapari	RF	2126.69
20		Kanangi	RF	455.06
21		Matumkonda	PRF(P)	1663.12
22		Nuagaon	RF	198.78
23		Taralakota	PRF	5197.56
24	Chitrakonda	Sileru West	RF	1573.09
25		Singaram	PRF	2728.68
26		Bhimaram	PRF	29586.67
27		Jantri	PRF	2289.83
28		Ranginiguda	PRF	1608.86
29		Publiguda	RF	91.27
30		Matumkonda	PRF(P)	3339.4646
31	Motu	Motu	RF	716.27
32		Pusigudam	RF	3908.87
32		Tadimetla	RF	3702.47
33		Poluru	RF	407.49
34		Anantapalli	RF	818.48

7.6 SPECIAL OBJECTIVES OF MANAGEMENT

The special objects of management set for this working circle are within the ambit of general objectives of management. These include:

- (i) To conserve, protect and improve wildlife habitat with special emphasis.

- (ii) To ensure scientific management of wildlife in the managed forests by undertaking measures like habitat management, waterhole development and monitoring population of the wild animals.
- (iii) To create awareness amongst the local people regarding the need to conserve and protect wildlife and their habitat.
- (iv) To promote and encourage ecotourism without disturbing and damaging wildlife.
- (v) To check wild life trade and smuggling.
- (vi) To protect wildlife in general and endangered species in particular.

7.6.1 ANALYSIS OF THE CROP/ WILDLIFE

7.6.1.1 The general condition and density of the wildlife in the Division is poor. As per wild life census report of the year's 2006, 2010, 2014, 2018 show that there has been reduction in the number of wild animals in these forests. The formal analysis and valuation of the data has not been carried out at the Division level except for statistical purpose. Besides, the previous proposed Kondakamberu and Balimela Wildlife Sanctuaries are also yet to be notified though proposal to this effect has been pending before inception of this Division.

7.6.1.2 The wild life habitat of the Division continues to get degraded as a result wild animals are seen coming out the forests for food and shelter leading to man-animal conflicts. Though wild elephant are not found in the Division, cattle lifting, injury by wild bear, snake bite etc. are reported regularly.

7.6.1.3 The main reasons for continued degradation of wildlife habitat in the Division are:

- i) Increasing incident of encroachment and shifting cultivation which leads to habitat destruction and fragmentation.
- ii) Increasing demand for firewood, timber, fodder and other NTFPs from the forest.
- iii) Frequent forest fire and lack of effort for habitat improvement and awareness amongst the local people.
- iv) Inadequacy of the forest staff to combat poaching of mass hunting associated with local festivals and rituals "Chaitra-Benta-Paraba".

- v) No appreciable concentrated work of improvement of wildlife habitat.

However, the Division still has variety of wild animals which is need of proper management practice.

7.6.1.4 Main Habitat System and Its Composition

7.6.1.4.1 The basic requirement of all animals is food, water and cover (shelter). The different species generally adapt to a particular arrangement of these basic requisites in order to meet its biological needs of food and reproduction. The special arrangement of amount of food, water and cover in respect of species is called its habitat niche. The plants are the primary producer of food for all living beings. Herbivorous animals are the primary consumers where as the carnivorous and the insectivorous animals are the secondary consumers. In fact, while wildlife is supported by forests (proving food, shelter and instinctive needs) wild animals including microbes is necessary for forests in assisting as nutrients and above all disposal of seeds. Also well being of forests soils depends largely on microbial activity and the activity of burrows. Wildlife especially rodents are important in preventing run-off, soil erosion and flooding.

7.6.1.4.2 The bulk of the wildlife habitat of the Division is terrestrial. However, the Balimela Dam and river Satiguda reservoir near Malkangiri provide congenital habitat for aquatic wildlife. Besides the above dam, river Sileru, Saberi, Potteru, Saptadhara, Kolab and other criss-cross nallas of the Division also ideal habitat of the aquatic wildlife including the transitory home for the migratory birds. The sub terrestrial habitat consists of burrows and natural crevices interspersed extensively all over the forests of the Division. Sometimes the local people in the process of hunting and removal of roots and tubers dig these burrows. Similarly the crack developed on the rocks on the steep slopes and accumulated rocks at the foot hills act as shelter to reptiles, lizards, snakes, and other microorganisms. The vast stretch of forest cover of the Division provides most ideal habitat of variety of rich avifauna.

7.6.1.4.3 The formation types in the terrestrial habitat are mostly covered with dense woodlands of miscellaneous species in Chitrakonda, Balimela Ranges. The Ranges Mathili, Malkangiri, Kalimela, Motu and part of Balimela supports both open forests of dry mixed deciduous species.

7.6.1.4.4 The 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 plan to maintain these special habitats especially during the course of silvicultural operations in the forests.

7.6.1.5 SPECIES STRUCTURE: The common wildlife is found in the Division as below (detailed list is given in the list of fauna under Introduction).

- A. Carnivores:** (i) Leopard (ii) Hyena (iii) Jackal (iv) Indianfox (v) Jungle cat (vi) CommonMongoose (vii) Wild dog
- B. Omnivore:** (i) Wild Bear
- C. Herbivores:** (i) Barking deer (ii) Wild boar (iii) Common langurs (iv) Rhesus Macaque.
- D. Rodents:** (i) Three stripped palm squirrel (ii) Jungle stripped squirrel (iii) Porcupine (iv) Hare (v) Jungle Rats and Moles.
- E. Snakes :** (i) Dhamana or Common rat snake (ii) Indian Cobra (iii) Krait (iv) Russels viper (v) Python
- F. Birds :** (i) Red Jungle fowl (ii) Peafowl (iii) Pigeon (iv) Doves (v) Hill Myna (vi) Wood Peckers (vii) Koels (Viii) Common quail (ix) Crow (x) Pheasants (xi) Indian Parakeet (xii) Common King fisher (xiii) Common Horn bill (xiv) Little Grebe (xv) Cormorant (xvi) Grey Heron (xvii) Large Egret (xviii) Black ibis (xix) Cattle Egret (xix) Pond Heron (xx) Great Horned owl.

7.6.2 SILVICULTURAL SYSTEM: Not applicable.

7.6.3 ROTATION PERIOD: Not applicable.

7.6.4 HARVESTABLE DIAMETER: Not applicable.

7.6.5 REDUCING FACTORS AND REDUCING AREAS: Not applicable.

7.6.6 FELLING CYCLE: Not applicable.

7.6.7 DIVISION INTO PERIODS AND ALLOTMENT TO PERIOD BLOCK:
Not applicable.

7.6.8 CALCULATION OF THE YIELD: Not applicable.

7.6.9 TABLE OF FELLING: Not applicable.

7.6.10 METHOD OF EXECUTION THE FELLING: Not applicable.

7.6.11 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not applicable.

7.6.12 REGENERATION: Not applicable.

7.6.13 ASSOCIATED REGULATIONS AND MEASURES

7.6.13.1 History of Wildlife Management in General

From time immemorial the wild animals have occupied a place of pride the folklore of Indian culture. They were respected and protected by the tribal's who never used to kill the animals for fun or pleasure. However, hunting became an important pastime for "Raja and Maharaja" who used to hunt and kill the animals for meat as well as for preparing trophies.

However, after the enactment of the Wildlife Protection Act, 1972, the hunting and trading of wild animals and its trophies were strictly mentioned and subsequent amendments in this Act in 1991 and 2002, hunting of any animals included in the Schedules of Wildlife (Protection) Act, 1972 (other than Vermin), as game or sport has been completely banned. Hunting of Wild animals however can be allowed in special purposes but only in exceptional circumstances. The maintenance of biological diversity as the new mandate of National Forest Policy, 1988, restriction of degraded habitats outside the protected areas is one of the strategies for action listed in National Wildlife Action Plan (2002-2016).

The Wildlife, which used to flourish in the forests of the Division is threatened due to various factors like population explosion, encroachments, over grazing, regular forest fires , improvement network of roads and availability of sophisticated weapons Due to increase in demand for wildlife products all over the world, poaching problems have increased. Hence, the special efforts are required to be made by the Division to protect the wildlife in the region.

There are many endangered insects and plants included in the schedule of Wildlife Protection Act, 1972. They silently play a very important role in the ecology but information about such species is scanty. Hence, division should make efforts to build database on such species by instituting special studies involving research organization.

7.6.13.2 Existence of Wildlife in Forest: Existence of particular wildlife animals in particular forests can be identified from the following observations.

1. **By Actual Sighting:** In the early morning or evening near water holes, grazing sites or on the roads we can see the wild animals.
2. **Pug Marks:** By keen observation of these pug/hoof marks we can identify the category of wild animals, their sex and age.
3. **By Excreta:** By examination of excreta we can know the category of wildlife, their numbers, way of walking and quantity of food etc.
4. **Antlers Marks (on the stem of tree):** Before falling of antlers, spotted deer and Sambar rub their antler.
5. **By Smell (Odour):** Many animals have the smell glands. In Hyena these glands are found in his Anus and in case of black buck they are found below their eyes.
6. **By Salt Licking Places:** In forest some soil contains more percentage of salt and minerals and wild animals use to lick this soil to get the necessary amount of salt.
7. **By Sound:** In forest we can hear different kind of sounds of wild animals. Some wild animals give signal of danger to other animals with the help of different sounds.
8. **Nail Marks:** Tiger and Bear with the help of their claws/ Nails scratch the bark of some tree.

7.6.13.3 Injuries to Wild Animals:

7.6.13.3.1 Poaching: In spite of stringent provisions in the wildlife and forest laws, poaching for skin, bones, pets and flesh, continues to be the most important reason for destruction of Wildlife in the Division. Poachers use various methods to kill wild animals. Vulnerability to poaching increases during summer (pinch period) when number of water holes reduce drastically and also water in a water hole reduce to minimum.

7.6.13.3.2 It has been noticed that poisoning of drinking water by mixing urea in large concentration can kill wild animals instantaneously. When an animal drink such water, it dies within hours due to intense gas formation in stomach and chocking of breathing organs. The poachers then remove the skin or bones of the dead animal for trafficking.

Setting of nets, snares and traps for catching birds, hares and sometimes small animals like barking deer, Wild Boar etc. The poachers also use by lying live electric wire in the forest for killing of wild animals.

7.6.13.4 Degradation of Habitat: Due to various human activities, the habitat of various wild animals is degrading very fast and is manifested in the form of reduced population of many animals and birds species. The main factor adversely affecting wild animals' habitat are;

- * Heavy biotic pressure, like over grazing, encroachments on forest lands, large scale human and cattle movement in the forest area, forest fire etc. are responsible for the general degradation of these habitats.
- * Large scale diversion of Forest Land for project like Hydro Electric Project, Irrigation, construction of roads are also adversely affecting the wildlife habitat by fragmenting the forest areas.

7.6.13.5 Diseases: The livestock from the villages in the forests regularly frequent the forest and share the water holes used by wild animals. Therefore various diseases common in domestic cattle, and which spread through contact and water borne (contagious diseases) are passed from livestock to wild animals.

7.6.14 RECOMMENDATION FOR FUTURE MANAGEMENT

7.6.14.1 Methods of Treatment

7.6.14.1.1 Maintaining Special 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 Plan to maintain these special habitats especially in the areas coming under the Selection Working Circle.

7.6.14.1.2 Snags: As a rule of thumb, at least the 5 tallest and largest diameter snags per hectare should be maintained in a well distributed design in all silvicultural treatments. Also retained snags need to appear in Compartment History. These are vital for a variety of primary hole-nesting like Woodpeckers and Barbets which are colonized by secondary hole-nesters like Hill Myna, Rollers and Owlets etc during subsequent years.

7.6.14.1.3 Snag Recruits: Likewise maintain 5 snag recruits per hectare. They are dying trees, mostly affected by heart root fungus but not quite dead. They can be recognized by their external symptoms. All such trees, which are being retained, need to reflect in the compartment histories. These along with snags provide a very good substrate for epiphytic orchids, especially of genus *Dendrobium*.

7.6.14.1.4 Large Old trees: In low density open areas large very old trees occur in few numbers. The *Ficus* species should not be counted among these since *Ficus* is not felled even otherwise. Large old trees of different species as mango, as and when encountered shall be reserved in any felling/ tending operation. The retained trees (2 to 4 per ha) shall be entered in the Compartment Histories. They serve as daytime roosts/ nesting sites for large owls of *Bubo* sps found in the Division.

7.6.14.1.5 Trees with fluting boles and buttresses and holes at the base: These occur in very low densities forest represented by a small number of species. They provide significant micro-habitat 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 marking list.

7.6.14.1.6 Lianas and Tangled climbers: Climber cutting operation is a standard practice and prescription for the same is there 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 at least two old spaced apart climbers per hectare shall be retained, and recorded in Compartment Histories. *Bauhinia vahlii* is very heavy in Lasserri extn.

7.6.14.1.7 Fruit bearing trees and shrubs: All Working Plans now reserve all fruit bearing tree species in felling/tending operations that are known to provide fruits to local

human inhabitants and wildlife. The information on human use is well known but the importances to wildlife still require literature survey, expert consultations and personal observations. Such significant trees shall be retained. Marking rules shall be specific on this.

7.6.14.1.8 Roosting/ Nesting trees: All trees which are known to support nesting colonies of birds or roosting congregations of raptors/ other birds shall be retained. This is crucial especially with reference to vultures and kochila khai which are critically endangered and have become very rare.

7.6.14.2 Development of Habitat: Habitat shall be developed with the cooperation of local people using silvicultural techniques. The aim should be to provide more food, water and shelter to the wild life so as to reduce the man-animal conflict.

7.6.14.2.1 Improving the Cover: Providing adequate forest cover to different wild animals within their habitat is necessary for shelter and protection of wild animals from weather, predators and enemies. Keeping in view this aspect, it has been prescribed in Selection Working Circle shall not fell those mature trees, which create a lasting gap in the canopy. It is also prescribed not to fell trees near water holes, wallows and saltlicks to maintain cover. In case of Rehabilitation working circle it has been prescribed to go for mixed plantations instead of pure plantations to create ground flora and middle storey to provide cover for different types of wild animals. Tree cover around the stream, water holes and salt licks shall also be maintained and improved.

7.6.14.2.2 Improving Availability of Food: The adequacy of food in a particular wild life habitat depends upon the quality and quantity of food produced and the animal population living therein. Keeping in view this aspect of wild life management, the exploitable diameter of various species has been kept on higher side and the percentage of removal of exploitable size trees have been properly regulated and safe guarded. Similarly, under various subsidiary silvicultural operations like opening of canopy, thinning of congested patches, improving the general availability of food shall always be taken into consideration. For these reasons and also for their utility as NTFPs, the fruit bearing trees like amla, mango, kendu, jamun, mahua char shall be prohibited from felling under the respective working circles. Further, the species of any plantation/retention operation taken in forest areas shall be as follows.

- i. Food availability in a habitat changes with the season. Herbivores depend on plant materials like leaves, barks, twigs, flowers, fruits and seeds of species like *Mallotus philippinensis*, *Dendrocalamus strictus*, *Adina cordifolia*, *Albizzia lebbek*, *Aegle marmelos*, *Cassia fistula*, *Ficus bengalensis*, *Ougeinia ougenensis*, *Shorea robusta*, *Syzygium cumini*, *Terminalia alata*, *Terminalia belerica*, *Zizyphus mauritiana*, *Bombax ceiba* etc.
- ii. Deer, Monkey, Langur, Rats and Hare feed on wild fruits of plants like *Ficus* species, *Terminalia belerica*, *Buchanania lanzan*, *Aegle marmelos*, *Syzygium cumini*, *Embllica officinalis*, *Zizyphus spp*, *Diospyros melanoxylon*, *Grewia hirsute* etc. These animals help in dispersal of fruits and seeds in the forests.
- iii. Among the plant materials, grasses constitute major portion of the herbivores' food. Grasses, which are highly preferred and consumed by herbivores, are *Dicanthium spp*, *Eragrostis pilosa*, *Saccharum bengalensis* etc. These grasses should be raised in the wildlife concentrated areas to meet the food requirement of herbivores. Natural meadow shall be enriched, and new small patches should be created and maintained near water holes and saltlicks in Jharapalli, Balimela, Matumkonda, Sarangapalli etc. Forest Blocks.

7.6.14.2.3 Water availability: Generally, there is no dearth of water from July to December. However, scarcity is felt from January to June, when most of the seasonal nallahs and streams dry up. Hence, it is necessary to create waterholes and check dams on the higher slopes across nallahs to improve water availability during summer. Available waterholes should be well protected from poaching during the summers as animals frequently move to areas where water is available. Check-dams have been created in all Ranges of the Division in the form of Water body. But further creation water body/ check dam can be done in Chitrakonda, Mathili and Balimela area.

Besides this, the check dams shall be constructed along the small streams, nallas at suitable sites. The Divisional Forest Officer shall study the field reality in due course and submit annual action plan for approval of competent authority.

7.6.14.2.4 Distribution of Natural salt licks: There are good numbers of natural salt licks scattered being mostly on sides of nallas and in foothills. There shall be maintained and improved upon. New salt licks to be created in areas like near anti-smuggling/ poaching

camps, beat houses, rest houses, etc. where more protection can be provided to the wildlife. The probable sites where artificial salt licks can be started are

Sarangapalli RF	-	2 Nos
Pitatung PRF	-	2 Nos
Chitapari RF	-	2 Nos
Balimela PRF	-	2 Nos
Matumkonda PRF	-	2 Nos

7.6.14.2.5 Corridor Development:

Due to decreasing prey base in the area and loss of connectivity and fragmentation of the habitat there is increase in man- animal conflicts. Along with strengthening of protection measures for wildlife, corridor development shall be given priority. With concentrated efforts for protection and improvement of forest cover in blocks like Kondakamberu, Balimela, Chitrapari, Matumkonda, Bhenangiwarda, Dasmantpur RL, Dharmagad RL, Tulsi RL, Sarangapalli RF etc. steps should be taken through Afforestation and JFM activities to provide tree cover in potential corridors.

7.6.14.3 Maintaining Unique Habitats:

7.6.14.3.1 Unique habitats provide special functions not provided by succession stages and special habitats. They are geomorphic in origin. These include the following habitats.

7.6.14.3.2. Caves: They are use by a variety of animals. Large mammals like the tiger, leopard, bear and hyena use caves as shelter and for rearing cubs. Apart from this, in limestone formation caves may have stalactites and stalagmites, some of which can be of significant visitor value. Caves can have in them springs and small streams. They can thus be important for amphibians, reptiles, fishes and species of birds like the Edible, Nest Swift lets, and several species of bats live in colonies inside caves. Caves need complete protection, even while being a worked area. Sri S.R. Choudhury in one of his writings on Similipal mentions that Tigress uses a cave regularly even while the coupe was being worked hardly a kilometer away. Hence, it is crucial that any live cave/ den be given stringent protection. Inventory of available caves in various forest blocks and mention of them in compartment histories should be taken up during this plan period.

However, Artificial Caves/ Dens have been constructed at Godiali PRF and Mendikuli PRF of Mathili Range, Publiguda VF and Bhejingiwada URL of Chitrakonda Range, Sindrimal PRF of Malkangiri Range and Balimela PRF of Balimela Range for shelter of wildlife.

7.6.14.3.3. Overhangs: When soft rock underlying hard rock weathers away, an arch is formed which serves as a shelter, as a substrate for bee hives (pollinators), nesting colonies for swallows etc. Such sites need to be protected. Survey of available overhangs in various forest blocks and entering them in compartment histories should be taken up during this plan period.

7.6.14.3.4. Dens: These are much smaller and distinct from caves usually dug in soft rock or earth cuttings by animals such as wild dogs, hyena, wolves, foxes, porcupines etc. for the purpose of shelter and breeding. When not occupied they can be used by a variety of taxa such as small mammals and reptiles. Porcupines and pythons are known to share the same underground chambers. Dens are subjected to human disturbance. Local inhabitants are known to smoke out porcupines for pot, smoke out and kill wolf cubs or otherwise look for animals in dens. Dens need to be protected. Inventory of available dens in various forest blocks and mentioning them in compartment histories should be taken up during this plan period.

7.6.14.3.5. Cliffs, talus and Ledges: Sheer cliffs often have crevices and ledges, some in shade, some exposed to the sun thus providing a variety of microclimate. Ledges located high up serve as nesting platform for eagles (endangered) and vulture colonies (now critically endangered). Cliff tops are equally important for this purpose. Crevices are colonized by several species of bats. Beehives hang along overhangs. Several cliff dwelling birds like swallows, martins establish their nesting colonies along cliff faces. Plants specific to rocky substrates grow along cliffs. The base may provide caves. Talus is an aggregate of loose rocks dislodged from time to time from cliff faces. They secrete space in between which provides thermally secure microhabitats to several species of small mammals and reptiles. The threats to cliff-based microhabitats may come from honey collectors, from activities such as rock climbing. Talus often may be used as source for stone, road metal etc. These features need to be strongly protected. The availability of such unique habitats should be inventoried and mention of them in compartment histories should be taken up during this plan period.

7.6.14.3.6 Large Boulders Aggregates: These are normally found in drainages, especially in section in proximity of headwaters. These are excellent habitat elements for bears, honey badger and some species of reptiles. On rocky banks wild bananas grow which is an important food item for the bear besides species value. These are areas where disturbance needs to be completely controlled.

7.6.14.3.7 Sheet Rocks: These often have cervices, which provide shelter to several species of small vertebrates. Lithophytic plants peculiar to rocky substrates grow along sheet rocks. This habitat is vulnerable to road construction, development of hiking trails, and tourism infrastructure as a source of stone etc. and therefore needs protection.

7.6.14.3.8 Earth Cuttings: These are important for species which dig dens. Near streams, kingfishers bore burrows into the banks for nesting. Significant banks/ earth – cuttings need to be protected from activities such as road alignment etc.

7.6.14.3.9 Sandy Banks and Sand Spits: Depending on the character and extent these are important as nesting sites for crocodilians, fresh water turtles, activities of otters etc. sand mining therefore needs to be strongly controlled, especially along the critical stretches where a survey has offered proof of such wildlife use. Dredging changes stream dynamics and may promote accelerated erosion. Likewise uncontrolled boulder collection from boulders riverbeds can have similar consequences. Such activity therefore needs to be regulated appropriately. IF collection of boulders has been an important activity, then this needs to be allowed from the central portion of the bed with undisturbed stretches e.g. 50 m length alternating with collection sites. Such prescriptions need to be made.

7.6.14.3.10 Saltlicks: Natural saltlicks are important for all herbivores and such sites need to be protected from disturbance such as road alignment, soil conservation or any other engineering work, setting up labour camps or cattle camps in their vicinity etc.

7.6.14.3.11 In summary, the unique habitats are vulnerable for a variety of reasons. Depending on the existing and anticipated situation, the DFO needs to prescribe appropriate protection/ regulatory strategies. Some of the prescriptions are likely to be generic, while some need to be site specific with reference to critical sites that come into notice during the survey conducted.

7.6.14.4. Maintaining Critical Micro Habitants:

Two kinds of critical macro habitats are the riparian zones and gorges.

7.6.14.4.1. Riparian Zones: They are among the most diverse, ecologically productive and dynamic systems. Being dendrites in pattern they connect all kinds of habitats along and across the altitudinal range and act as wildlife corridors. They are used disproportionately more in relation to their availability by wild animals since all animals need to come to water. Herbivores feed on a diversity of vegetation that is associated with this zone. The riparian forests provide thermal cover in winter and summer, which is important for all wild animals. The lofty trees and unbroken canopy is of great significance to arboreal mammals and reptiles. The tall trees provide nesting cover to raptors. These systems are equally attractive to domestic cattle. Often scenic values are associated with riparian zones and hence they are attractive to people. Riparian stretches offer the cheapest road alignment opportunities to locate extraction roads and paths since minimum amount of cutting and filling is required. Riparian zones are linear and hence most vulnerable to change due to the great pressures they attract. The DFO should ensure that,

- i. As far as practicable extraction path alignment needs to be avoided along the riparian forests.
- ii. Roads already existing but not in particular use need to be closed for traffic.
- iii. There should be no plantation activity in riparian forests.
- iv. Rule of the thumb is that on either side of the stream, an area of a width equal to thrice the average top height of trees in riparian forest should be prescribed as a no felling and no activity zone to filter out effects of an edge in the interior of riparian forests and to maintain their ecological processes and functions.
- v. Labour camps likewise should be located outside such zones.
- vi. New road alignment should be located outside the no felling zone.
- vii. No borrow pits should be located within the riparian zone.
- viii. When there is natural tree fall from the bank into the streambed, in water or not, then at least four such trees per running kilometer as far as possible, equally spaced need to be retained.
- ix. Recreation sites within the riparian zones should be minimum in number and strictly controlled. They should not be located on sites that are ecologically of critical value.
- x. There should be no quarrying within the riparian zones.
- xi. Neither cattle camps nor any infrastructure development shall be allowed.

- xii. Specific strategies should be prescribed by the DFO relevant to the issues. If fishing is a concession granted to forest dwellers, it should be regulated by conventional methods.
- xiii. If nets are allowed, the minimum mesh size will be prescribed.
- xiv. If there are crocodiles and turtles in the water, suggestions from a qualified herpetologist should be solicited as relevant to fishing and other activities.
- xv. Use of poison (natural or synthetic) or explosives must be strictly prohibited.
- xvi. No non-native fish will be introduced in isolated pools, reservoirs or running streams.
- xvii. If pisciculture is to be developed, it will be outside the natural streams.

7.6.14.4.2 Gorges: These may not be a common feature. Gorges may occur in hilly areas. They have steep sides and usually evergreen vegetation along the bottom. These are sites where primitive plants may be found. They also provide crucial microhabitat for helpto fauna. Gorges need to be protected.

7.6.14.5 Maintenance of Water Sources and Wetlands:

7.6.14.5.1 Water sources, perennial and seasonal, artificial or natural need to be protected and maintained. The main water sources/ wet land of the Division are Balimela reservoir at Chitrakonda, Upper Sileru Dam at Chitrakonda, Satiguda medium Irrigation Project at Malkangiri, Siv Sagar at Mathili and Potteru Irrigation Project at Gomphakonda are subjected to silting, poisoning, being drained off, subject to other pollutants. Some are shared between cattle, people and wildlife and some are monopolized by cattle or people. Site-specific strategies for their protection and maintenance need to be prescribed by the DFO. Artificial sources may be created if required. The ecological principles for the purpose are to be followed.

7.6.14.6 Maintaining the Cultural Landscape:

7.6.14.6.1 Sites of Pilgrimage: Deities of tribal's are often locked in ancient/ old growth stands or groves and there are specific periods of pilgrimage. People follow several forest routes to get to the holy site. DFO needs to have full information on the average number of people, activities on the pilgrimage site and off site, travel routes, needs of pilgrims etc. from the time pilgrims enter the forest area to the time they exit, their movements and activities need to be regulated and extra protection efforts need to be

invested. On the en-route, they would need fuel wood, camping sites and they may place any other demands on resources. Rubbish dumping, illegal cutting, opportunistic poaching could be serious. Once issues are firmed up, specific strategies for protection and resource regulation should be prescribed by the DFO. A major concern is for the old growth/ groves from the presence of a large number of people.

7.6.14.7 Other Prescriptions.

7.6.14.7.1 The distribution of wildlife in different forest blocks shall be studied and their occurrence in different habitats in different seasons shall be estimated. Census of wild animals shall be done every alternate year in consultation with the Chief Wildlife Warden to assess the prey-predator base. This will help in future improving the management prescriptions.

7.6.14.7.2 Wildlife habitats of endangered species shall be identified and mapped. Presence of natural waterhole, saltlicks and natural meadows shall be estimated and their adequacy shall be assessed with reference to their population estimates. Watch towers shall be constructed near crucial waterholes and saltlicks to not only facilitate estimation of occurrence of wildlife but also to discourage hunting.

7.6.14.7.3 Migration routes for wild animals shall be identified and preventive measures taken to protect and improve those corridors. The areas vulnerable to poaching shall be protected from all sorts of biotic interference.

7.6.14.7.4 The fire lines should be cleared and material removed should be dumped in such a way that it facilitates rodents, insects, jungle fowl and other birds to build their nests for safe breeding.

7.6.14.7.5 Cattle population in different areas shall be estimated and the carrying capacity of the forests and fodder enhancement measures shall be taken up keeping the requirements of cattle and wildlife in view.

7.6.14.7.6 The place wild life concentrate including scenic beauty can be developed as Ecotourism center. The details of such place with possible activities have been dealt under ecotourism.

7.6.15 WILDLIFE PROTECTION MEASURES

7.6.15.1 The immediate need is to collect and tabulate all available spatial-temporal information about incidence of wildlife crime including identity and modus operandi of the criminals. The second step is to analyze the information and prepare a strategy and action plan while third step is to carry out the appropriate action plan with posted the Anti-Poaching check gates in proper place of Forest roads/ Forest ways.

7.6.15.2 The Division is running short of staff both at Forester and Forest Guard levels. Even the post of Range Officer enforcement is lying vacant. In the above situation, there is need of forming of Divisional anti smuggling/ poaching unit by recruiting contractual staffs preferably of retired Military, Forest or Police personals. The unit should consist of one Range Officer, two Foresters and Forest Guard. The staff deployed for Anti-Poaching operations shall be extremely alert, in good health with high motivation. They should be trained in handling of arms and ammunition and in proper identification of wildlife species and parts. They should be properly armed and provides with VHF sets for communication. Satisfactory maintenance of the fixed and mobile VHF sets should be fixed at vulnerable points besides supply of walki talkies to all Forest Guards and Foresters for effective implementation of the prescription. The places where additional VHF sets required are as under:

Table No. 7.2: Place where VHF Sets can be set up:

Sl. No.	Name of the Range	Place where additional VHF sets to be setup
1	Chitrakonda	Orapadar, Janbai, Jantri, Tunel camp
2	Balimela	Bandhamamudi
3	Malkangiri	Tandiki, Korukonda, M.V-17
4	Kalimela	Podia
5	Mathili	Pongam, Salimi
6	Motu	Motu. MV-88

For movement inside the Balimela reservoir, one Motor Boat has been provided to Chitrakonda Range but it is not sufficient, there should be one motor launch under the custody of Chitrakonda Range Officer. This will not only help in movement of field staffs inside the reservoir but also help in conduction census for Crocodile.

7.6.15.3 Further, the patrolling party/ anti-poaching squad must be well acquainted with the entire terrain. Patrolling paths should be planned out in advance and such paths should not always follow the beaten tracks but should be varied on random choice or based on specific information. Proper dialogue with the local villagers during a patrol is important to gain vital information and also to gain their trust. The patrol party must always try obtaining information that can be used to prevent further poaching in the area.

7.6.15.4 As information collection is vital for prevention and/ or detection of wildlife crime, both covert and overt information shall be gathered. For this, there is need of deployment of watchers/ informers in each beat, who will otherwise help in gathering information and advancing evidences in the court of law. The officer who is handling the full time informers and information inflow should ensure proper follow up of the said information. Decoy and undercover operations may also be adopted to arrest the offenders and seize the wildlife products being traded.

7.6.15.5 An aspect of concern is the lack of proper prosecution leading to very low conviction rate in wildlife cases. The success of protection efforts can not only be judged with regard to the number and nature of wildlife offence cases booked but also the effectiveness with which such offence cases are investigated and contested in the appropriate court of law. The staff involve in the entire operation shall also be conversant with the court procedure with regard to wildlife crime. In most cases the offenders booked in wildlife offence go out on bail and/ or acquitted to commit the crime again. Very often, the accused escapes due to technical flaws or perfunctory prosecuting report or shoddy investigation. Hence, appropriate training in wildlife crime investigation methods and techniques shall be imparted to adequate number of staff. It is vital that proper evidence is recorded at every stage of investigation and case records are meticulously built/ maintained on daily basis. Moreover, the prosecution report shall be thoroughly scrutinized by the ACF/ DFO before being filed in the court. Even the cases shall be persuaded regularly in the court. So as to ensure greater rate of conviction, these measures will have long lasting effect even on the overall forest and wildlife protection in the entire Division as well.

7.6.15.6 For better protection anti-poaching camp should be set up in vulnerable pockets where there is greater concentration of wildlife. During the fire season these forest blocks should be given priority in protection from fire. The patrolling staffs after day's work need some rest inside the forests where there is no beat house or other infrastructure.

Therefore, it is necessary to build some watchers shed/anti-poaching camp in such localities. In Chitrakonda Range the forest blocks like Janbai, Jantri, and Singaram which forms the part of proposed Kondakamberu wildlife Sanctuary need the construction of sheds at Orapodar and Janbai. For better visibility and information collection the construction of watch tower at Nilapari, Balimela, and Tunnel camp of Balimela Range, Anjuriaguda of Chitrakonda, Rajulkonda of Kalimela, Satiguda, Doraguda and Kusumput of Malkangiri is required.

7.6.15.7 There shall be inventory prepared of all the gun licenses within 10 kms radius of books rich in wildlife. This will help in better control over the poaching activities otherwise also. This inventory should be regularly posted up to date.

7.6.16 PROMOTION OF ECO-TOURISM

7.6.16.1 The Indian tradition has always taught that, humankind is a part of nature and one should look upon all creations with the eyes of love and respect. It is tragic that in the last few decades, the mad quest for material and economical progress in India and abroad has become identical with the exploitation of nature. Today, most of the underground and above the ground resources are being exploited at rates not witnessed in the past, resulting in abrupt climate changes, increased natural disaster and more. One of the ways to get a balance is Eco-tourism. It is an attempt to bring to the local people money for maintaining natural resources like forests, wildlife in its pristine form by promoting high value low impact tourism. It is one way to maximize the environmental and social benefit of tourism, not forgetting the economic developments.

7.6.16.2 Eco-tourism is derived from two words – ‘Ecosystem’ & ‘Tourism’. Ecosystem is the system in which we live-the system which include the earth, the water, the sky and of course of living and the non-living objects in all these systems. It is a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. And, tourism means ‘the practice of traveling for pleasure’. Thus, any tourism that contains a visit to an Ecosystem is known as Eco-tourism. Basically Eco-tourism means tourism involving travel to areas of natural or ecological interest, typically under the guidance of a naturalist for the purpose of observing wildlife and learning about the environment and at the same time focus on wildlife and promotion of understanding and conservation of the environment. This is a conscientious form of tourism of tourism development, which encourages going back to natural products

in every aspect of life and helps preserve nature. It is also the key to sustainable ecological development.

7.6.16.3 In short, eco-tourism can be categorized as a tourism programme that is “Nature based, ecologically sustainable, where education and interpretation as a major constituent and where local people are benefited”. All this together can be called eco-tourism. If a travel does not satisfy any one of these constituents, then it is not called a real eco-tourism venture.

7.6.16.4 A common eco-tourism goal is the generation of economic benefits whether there may be profits for companies, jobs for communities or revenues for parks. Eco-tourism plays a particularly important role because it can create jobs in remote regions that historically have benefited less from economic development programs than have more populous areas. Even a small number of jobs may be significant in communities where populations are low and alternatives are few.

7.6.16.5 Eco-tourism can fundamentally change the economic dynamics of business because it recognizes the ecological and cultural costs of doing business as well as championing local economy. Through eco-tourism the community has the potential to become strong and cohesive through developing and managing their resources and visitors to those resources. Eco-tourism should in all cases, aim to achieve sustainable development.

7.6.16.6 Eco-tourism is based on principles, guidelines and standards and as a growing industries needs to have a regulatory system of certification. The basic elements of eco-tourism most include:

- Ensures prior informed participation of all stakeholders in meaningful decision making.
- Ensure equal, effective and active participation of all stakeholders.
- Contributes to conservation of biodiversity.
- Provides direct financial benefits for conservation.
- Sustains the well-being of local people by providing financial benefits and empowerment.
- Involves responsible action by tourist operators and tourists themselves.
- Provides to small groups of tourists.
- Provides a positive experience for tourists and local people.

- Involves the least possible consumption of non-renewable resources.
- Supports international human rights and labour agreements and raises awareness and understanding of environmental, political, social and cultural contextual realities.

7.6.16.7 The Eco-tourism developmental process itself should meet the following principles:

1. It should involve the local community and lead to the overall economic development of the area.
2. It should find out the likely conflict between resource use for tourism and the livelihood of local inhabitants and attempt to minimize such conflicts.
3. The type and scale of tourism development should be compatible with the environment and social cultural characteristics of the local community.
4. It should be plan as a part of the overall area development strategy guided by an integrated land use plan and associated with commensurate expansion of public services.

7.6.16.8 Eco-tourism destination in the Division should be carefully planned and developed. Eco-tourism is the fastest growing sector in tourism and its greatest value is the impetus it gives to conservation and the money it provides to people in remote hard to reach localities who have for generations preserved nature.

7.6.16.9 Eco-Tourism Resource of the Division

7.6.16.9.1 Balimela Dam Site: The Balimela Power Project forms the second stage of development of Machhkund–Sileru River, the first stage being the Machhkund Project. The water released from Machhkund Power House and the inflow from intermediate catchment between Machkund-Balimela Dam is impounded by an Earth-cum-Rock fill at Chitrakonda known as Balimela Dam. Balimela Dam is a joint project of Orissa and Andhra Pradesh Governments and the inflow into Balimela Reservoir is shared between the two States on 50:50 bases.

7.6.16.9.2 Bonda Hills: Bonda Hill comes under the Khairput Block of Malkangiri District; this is the living place of Bondas, the primitive tribal community in Malkangiri District. It is surrounded in all sides by dense hilly forest. The Bondas of the place even now remain scantily clad and it is believed that they were cursed by Goddess Sita as they

laughed at her while she was bathing in a kunda which is named as “Sita Kunda” at Bonda Hills. There is one specific festival called “Patkhanda Yatra” at Mudulipada which is celebrated by the Bondas in the month of January in which they worship a sword. They believe that this sword belongs to Pandavas. Apart from these things many more area to be seen on the Bonda Hills, which is locally know as Bonda Ghati.

7.6.16.9.3 Ammakunda: Ammakunda is one of the tourist places in Malkangiri District. It is situated at Khairput Block near about 70 Kms. from the district headquarter Malkangiri. This cool place embraces a natural waterfall and subsequent flow of water forming a narrow gorge. The fishes found in that gorge are quite friendly to the human being and are believed to the form of Lord Vishnu in “Matsya Avatar”. Fishing in that place is not practiced according to the belief of the local people of Malkangiri as well as the visitors. Visitors can enjoy their stay at this place by deeding the fishes. This area is surrounded by dense forest and small hillocks.

7.6.16.9.4 Motu: Motu is the southernmost point of the Malkangiri District situated at 150 feet from the sea level at the confluence of the rivers Saberi and Sileru. Timbers and bamboos were transported in large quantity from this place down the Sabari and Godavari to Rajahmundry through river transport. This Tahasil Headquarter attracts the tourists for its beautiful “Jagannath Temple“ and “Moogi Point “ – the extreme south point on the bank of the confluence of the river Saberi and Sileru. Difference in colour of the water of these two rivers can be marked even after confluence. The statues of “Utkal Gourav Madhu Sudhan Das” and “Saheed Laxman Nayak’ are built inside the park near the confluence. The DFO may take necessary step to build a watchtower at a suitable spot near the Moogi Point which will help the visitors from Odisha, Andhra and Chattishgarh States to enjoy the Sangam of the two rivers (cultures) at one point.

7.6.16.9.5 Satiguda Dam: Satiguda Dam is situated at a distance of 8 Kms. from Malkangiri Town. The reservoir provides irrigation facility to the nearby cultivable land throughout the year. The natural beauty of the dam can be enjoyed in the early morning and evening hours. Boating facility is also available inside the reservoir, which attracts visitors as well as the local people. Lord Shiva is being worshiped inside a cave near the Dam. Being surrounded by a large number of small hills this place is considered to be the most favorite picnic spot of the people. A guesthouse of Irrigation Department of Government of Orissa provides accommodation to the official VIPs.

7.6.16.9.6 Manyamkonda: Manyamkonda is one of the GPs of Kalimela Block and it is situated at about a distance of 90 Kms. from the District Headquarter. This is an important religious place in Malkangiri District as the famous God of the Malkangiri District (Lord Mahaprabhu) is being worshiped at this place. Every year during the month of February/ March a festival is being celebrated here. Every alternate year the famous festival known as “Bada Yatra” of Malkangiri starts from this place to Malkangiri “Mauli Maa Temple”. Three Gods namely “Kanam Raju” relates to Lord Krishna, “Pota Raju” relates to Vima and “Bal Raju” relates to Arjun are being worshiped in this festival. This place is surrounded by number of small hills. The scenic beauty of this place and the temple of the Lord Mahaprabhu attract a large number of religious visitors of this place.

7.6.16.9.7 Jaduguda: Jaduguda is one village of Padmagiri GramaPanchayat and it is situated about at distance of 25 Kms from the District Headquater near to the Chhatisgarh State boarder. This is an important religious place in Malkangiri District as the famous God of the Malkangiri District (Lord Shiva) is being worshiped inside a cave. Every year the “Shiva Ratri” and “Kartika Purnima” is being celebrated here. Being surrounded by a large number of small hills which attracts visitors, the scenic beauty of this place and the temple of the Lord Shiva attract a large number of religious visitors with Chhattisgarh States visitors of this place.

7.6.16.9.8 Sulia Pahada: Sulia Pahada is situated near the Korkunda village under Korkunda GP near about 15 Kms. from the district headquarters Malkangiri. This is an important religious place in Korkunda G.P. as the famous God of the Lord Shiva is being worshiped at this place. Every year during the month of February/ March a festival is being celebrated here “Shiva Ratri” and “Kartika Purnima” is being celebrated during November. Being a large hill Sulia Pahaada which attracts visitors. The scenic beauty of this place and the temple of the Lord Shiva attract a large number of religious visitors of this place.

7.6.16.10 The above scenic spots can be developed as eco-tourism centers by the Forest Department individually or with the collaboration of other Govt. Departments/ Non Government Agencies. This will not only help in building public awareness about forest, medicinal plants and wildlife but also play a major role in preserving the nature’s treasure. Trekking points/ routes should be identified and designated. These centers should be developed with the active support of the local community who should be able to earn some

livelihood through the influx of visitors. Visitors' amenities and recreational facilities should be developed by submitting specific projects for the same.

7.6.16.10.1 As per the above scenic sports the Forest Department Malkangiri Division has already been developed three Eco-Tourism sites with the help of concerned VSS as follows.

1. Satiguda Eco-Tourism near Satiguda Dam
2. Chitrakonda Eco-Tourism near Balimela Reservoir at Chitrakonda
3. Jaduguda Eco-Tourism at Jaduguda of Padmagiri Grama Panchayat.

Further, the Forest Department Malkangiri Division is taking up development work of 2 nos. of new Eco- Tourism sites i.e one is at Ammakunda of Khairput Block and other is Suliapadar at Korkunda for social benefit of tourism and economic developments of the VSS.

7.6.17 MISCELLANEOUS REGULATIONS

7.6.17.1 Awareness: The Wild animals are part of ecosystem and for maintaining ecological balance conservation of these wild animals is important. But wild life depredation such as loss of human life, loss of property i.e. i) loss of food crops ii) loss of cash crop by trampling and otherwise and iii) damage to house and other properties compels the people living on the forest fringe villages to kill the animals as a means of retaliation strike and sometimes for quick monetary gains by selling the animals and its part. This has an adverse impact on the population of these heavenly creatures. Therefore, there is need of creation of awareness for conservation of such beautiful creature among the political as well as local people. The politicians sitting in legislative Assembly/ Parliament are responsible for framing different pro conservation Acts and rules, where as the local people take contrary steps in preventing enforcement of Act and Rules and in combating activities of wild life depredation. The awareness for wildlife preservation may be created through celebration of wildlife week, competitions and debate among the school/ college students. Even publicity material shall be distributed and the benefits of wildlife conservation explained through electronic media. The legal provisions under the Wildlife (Protection) Act- 1972 shall also be brought to the notice of all including the scope and extent of the compassionate amount for wildlife depredation.

7.6.17.2 Immunization Programme: As most of the mouth and hoof diseases spread through the domesticated animals to wildlife populations, steps should be taken for immunization of cattle population of the forest fringe villages in consultation with veterinary department every year.

7.6.17.3 Strengthening of VSS: The VSS formed in all the peripheral villages shall be strengthened by proper motivation and co-operation of local villagers. Steps also be taken to form new VSS in villages where no such institutions exist. Thus, the services of all the VSS as well as wildlife lovers should be utilized fully in the management of wildlife.

7.6.17.4 Infrastructure and Training: To ensure better protection and to enhance their effectiveness, the field staff shall be provided with modern equipments including proper arms and wildlife, divisional headquarters, all the range headquarter, section headquarter, sensitive beats and check gates should be provided with VHF sets. More and more field staff shall be trained in wildlife management and in detection and investigation of wildlife crimes.

7.6.17.5 Information Network and Records Keeping: A regular data base should be maintained at Divisional level comprising of details like:

- ❖ Schedule species found in the area.
- ❖ Pictorial directory of all identified poachers to be prepared and circulated in the locality.
- ❖ List of traders in cattle and goatskins as well as tanneries.
- ❖ List of eating houses alleged to be serving bird/deer meat and.
- ❖ Timely and proper documentation of all the incidences of man-animal conflicts including poaching.

Further, the DFO shall also submit half-yearly report to the authorities concerned with regard to steps taken by him to protect wildlife and improved their habitat. He shall also report constraints faced by him in implementing the prescriptions of this Working Circle.

7.6.17.6 Wildlife Depredation: Depredation by wild animals is gradually increasing and the main reason for this conflict in the shrinkage of their habitat and shortage of food. Animal depredation is a problem in this division. There are several reports of killings and injury of the human being, damage to the corps in the Division. The details of depredation by different animals are discussed in the Chapter-3 of Part-I. Human killings, injury and

crop damage are on an increasing trend as detailed in Chapter-3 of Part-1. The DFO should develop short term and long-term measures to combat this problem. To mitigate miseries of people due to wild animals, the compassionate amount for crop damage, house damage, injuries and death, should be disbursed as quickly as possible. Delay makes people loss faith in the forest department and they tend to take revengeful self-protection measures even by resorting to killing/poisoning of animals.

7.6.17.7 Control of Grazing: The wildlife rich areas shall be closed for grazing; however, grazing may be controlled elsewhere as per the provisions of the Orissa Forest (Grazing of Cattle) Rules, 1980. The local people and the VSS may even be motivated to immunize their cattle, which graze inside the forests.

7.6.17.8 Fire Protection Measures: Fire lines should be cleared and maintained regularly. As most of the forest fires are man-made, it can be prevented to a large extent by motivating and educating the local people. Adequate field staff should be stationed with necessary infrastructure in fire prone areas to control and suppress the fire menace during the summer season.

7.6.17.9 Incentives and Rewards: There shall be provision for rewards and incentives to the staff and public including the informers whose efforts lead to detection of wildlife crime and arrest of the offenders. Moreover, their deeds shall also be given media publicity in the locality as well as recognition on the occasions like wildlife week and World Forestry Day.

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

7.6.18 INTERMEDIATE REVISION AND WORKING COST

7.6.18.1 No intermediate revision is anticipated. However, if so required, the Regional Chief Conservator of Forests (Territorial) in consultation with the Conservator of Forests (Working Plans) will send a proposal for amendment of prescriptions to the competent authority for necessary approval.

7.6.18.2 The estimated cost for implementation of various prescriptions of this Working circle is given in Chapter II (Financial Forecast and Cost of the Plan).

CHAPTER 8

JOINT FOREST MANAGEMENT(OVERLAPPING) WORKING CIRCLE

Latitude: 18.188071
Longitude: 82.228997
Elevation: 491.34 m
Accuracy: 9.6 m
Azimuth: 73° (E)
Pitch: -9.6° (-3.8°)
Time: 12-18-2020 11:49

Note:
AJY PRA activity at Tontapali vss, Chitrakonda range

Powered by AngleCam



Latitude: 18.018958
Longitude: 81.565966
Elevation: 96.09 m
Accuracy: 9.9 m
Time: 11-12-2020 17:04

Note: Seasonal Calendar work at Ginipalli

Powered by NoteCam

JOINT FOREST MANAGEMENT (OVERLAPPING) WORKING CIRCLE

8

8.1 NAME OF WORKING CIRCLE CLEARLY MARKED ON GIS BASED MAPS

(1:50,000): The area of this Working Circle is covered some portion of the Working plan area which are marked on GIS based maps.

8.2 GENERAL CONSTITUTION OF WORKING CIRCLE

8.2.1 Forests are one of the complex eco-systems. The role of forest in conservation of environment and economic prosperity of mankind is well established. Economic growth and environment protection are inextricably linked. For surviving on the earth we ought to live in harmony with Nature. Conservation of environment and protection of forest and wildlife have already been enshrined in our Constitution. The National Forest Policy, 1988 envisages co-operation of the people in conservation and development of the forests. The Government of Orissa has adopted the policy of Joint Forest Management and has sought for community participation in the protection, regeneration and management of the forest wealth.

8.2.2 The State of Orissa has been a pioneer in involving the forest fringe dwellers in the protection and management of the Forests. Orissa brought out the Orissa Village Forest Rules in 1985 and first step for involving the people in forest protection was through Govt. Resolution No. 10F (Pron.)-47/88/17240/FFAH dt. 1.8.1988. In this Resolution, the villagers were assigned a specific role in the protection of Reserve Forests adjoining their villages and were in return granted, under section-24 of the Orissa Forest Act, 1972, certain concessions in the matter of meeting their bonafide requirement of firewood and small timber. This Resolution was amended vide Resolution No-10F (Pron.)-47/88/23638/FFAH dt. 13.10.1988 which prescribed that the village level Forest protection Committee (FPC) should be constituted in consultation with the local villagers and that meeting of the concerned villagers. This Resolution was superseded subsequently by Resolution No-10F (Pron.)-4/90/29825/FFAH dt. 11.12.1990, in which Protected Forests were also included for assignment to adjoining villages. To make the involvement of villagers more effective, the Govt. of Orissa issued Resolution No. 10F (Pron.)-20/93-16700/F & E dt. 3.7.1993 which

dealt in exhaustive manner with the involvement of the local communities in protection of adjoining forests, formations of Vana Samrakshayna Samities (VSS) and their Executive Committees, duties and responsibilities of the VSS and Provision of MOU.

In the previous Working plan 19,717.67 Ha of Forest Area have been allotted to the VSSs of all the Ranges covering both Plan and Outside Plan area. There were 202 Nos. of VSSs formed in the Division by assigning 11,648.56 Ha.

8.2.3 While implementing the previous working plan, as per the prescription, there are 279 Nos. of VSS are listed in this Division including 77 Nos. of new VSSs created under JFM Resolution 2008 & 2011, which are formed adjoining to different Forest Blocks of this Division to protect Plantation and other Degraded area and conserve the Forest and to uplift the economic status of local people in order to reduce anthropological pressure on Forest.

8.2.4 As per the **National Working Plan Code -2014**, a meeting on consultation with Local Stakeholders i.e. VSSs, JFM Committee Members, Gram Panchayat Representative on the expectations of people dependent on forests and to accommodate the same in the Working Plan to the extent that they are compatible with the technical feasibility of sustainable management of forests, was convened by the Regional Chief Conservator of Forests, Koraput Circle.

8.2.5 Considering the above, it is proposed to form a JFM overlapping working circle in the proposed working plan of this Division with **279 Nos. of VSSs** covering **16,623.59 Ha**, to protect the Forest with involvement of JFM communities (VSS) in a sustainable way. The list of VSSs of this is annexed in **Appendix -XI**.

8.2.6 There were 279 Nos. VSSs constituted at the time of approved PWPR and covering area 16,623.59 ha but now total 515 Nos. VSSs are formed with covering an area 27895.00 ha remaining 236 Nos. of VSSs may be incorporated in the next Working plan.

8.3 GENRAL CHARACTER OF VEGETATION

8.3.1 The composition and diversity of the forests allotted to this Working Circle have already been discussed in Chapter-2 & 3 of Part-I of this plan. However, the major forest types found are:

- i) Orissa Tropical Semi-Evergreen Forests 2B/C3
- ii) Southern Tropical Moist Deciduous Forests 3B/C2
- iii) Southern Tropical Dry Deciduous Forests 5A/C1

8.3.2 The forest area included in this working circle are spread over the entire Division and subjected to severe/ continuous biotic interference. AS per the JFM Resolution, 1993 revised during 1996, the forest areas were allotted in this working circle is degraded forests and in need protection, tending operations as well as enrichments through gap plantation. Then decided as per Resolution 2008 and 2011, the Villages that are adjoining to the forest areas, the focal areas practicing JFM. The JFM has become almost synonymous with forest and natural resource management these days. Any approach or strategy for the protection, conservation and development of forest resources and forest ecosystem involves in participation of local people in the entire management process.

8.3.3 The vegetation of these areas is mostly open and regeneration is poor to deficient. The species found are Sal with its associates in Mathili Range where as miscellaneous species like Piasal, Sossoo, Asan, Arjuna, Dhaura, Kurum, Kasi, Tangini, Char etc. in Malkangiri, Balimela, Kalimela, Chitrakonda and Motu (MV-79) Ranges. Salia Bamboo also occurs in some forest blocks of the Division. The density of the crop varies from 0.1 to 0.3. Moreover, in the planted area under CAMPA, FDA, AJY Schemes the condition is good due to better involvement of local people in regeneration and protection of the forests.

8.4 FELLING SERIES, CUTTING SECTIONS AND JFM AREAS: Not applicable.

8.5 BLOCKS, COMPARTMENTS AND JFM AREA (MARKED ON GIS BASED MAPS)

The Range wise abstract of Forest Blocks allotted to this working circle have been furnished at Table No. 8.1 whereas details is furnished at Appendix No-XI.

Table No. 8.1: Range wise Abstract of VSS & V.F Area under Malkangiri Forest Division

Sl. No	Name of the Range	Nos. of VSS Range wise	Category wise VSS Area In Ha				Total VSS area in ha
			RF	PRF	VF	Others	
1	Mathili	62	1048	220	100	1960	3328
2	Malkangiri	134	347	1367		5950	7664
3	Balimela	22	284	345	115	290	1034
4	Kalimela	36	2282.59	870	0	0	3152.59
5	Chitrakonda	12	225	120		125	470
6	Motu	13	850	0	0	125	975
	Total	279	5036.59	2922.00	215.00	8450.00	16623.59

8.6 SPECIAL OBJECTIVES OF MANAGEMENT

8.6.1 The special objectives of management in respect of this Working Circle are within the scope of general objectives of management as follows.

- i) To develop the degraded forest resources by promising natural and artificial regeneration and protection of the forests and wild life by formation of VSS in each village adjoining to the Reserved and Protected Reserved.
- ii) To improve the crop condition of these areas, this will in turn fulfill the demands of the local people in terms of small timber, fire wood, NTFPs etc.
- iii) To explore and evolve strategies to generate sustainable employment to local people for financially sound in future maintenance management of the assigned forest areas.

8.6.1 ANALYSIS AND VALUATION OF THE CROP

8.6.1.1 The area included in this working circle are mostly degraded and subjected to various degrees of degradation. The main reasons for degradation is illicit felling, fire, grazing and others factor. The average density of this area is about 0.25. Some VSS are also not active in Malkangiri Division. However, due to people's participation in regeneration and protection, forests of some blocks have possibility changed the crop condition and structure. Though regeneration of main species is generally poor, few patches of coppice growth along with scattered mature trees are also seen in Akur RF, Mathili RF, Pongam A PRF, Kalimela RF and many other blocks. Since, the area of this Working Circle has already been dealt in main Working Circle repetition is not desirable.

8.6.2 SILVICULTURAL SYSTEM

8.6.2.1 This Working Circle is an overlapping circle and therefore, the silvicultural system to be followed depends on the prescriptions outlined for the main Working Circle to which the block is primarily allotted. Moreover, the system of working in these particular areas shall be guided by the micro-plans prepared in conformity with the prescriptions of the main Working Circle, jointly by the DFO/ VSS for the individual VSS. The intermediate and final felling to be proposed in the micro-plans should be clearly mentioned in the micro-plans and the yield needs to be fixed by taking into account all the safeguards for sustainable management of the products.

8.6.3 ROTATION & CONVERSION PERIOD

8.6.3.1 Since this an overlapping Working Circle and the area are distributed over the entire Division, the rotation period shall be followed to the rotation fixed in the principal working circle. Moreover, in case of plantations of short rotation/ commercial crop like Eucalyptus, Acacia, Chakunda, Bamboo etc. in Village Forests and outside forests of the RFs and PRFs. The rotation period shall be clearly mentioned in the site specific micro-plan prepared/ to be prepared.

8.6.4 HARVESTING DIAMETER: Not applicable.

8.6.5 REDUCING FACTORS AND REDUCING AREAS: Not applicable.

8.6.6 FELLING CYCLE:

8.6.6.1 Since this is an overlapping working circle, there is no need to deal with it separately.

8.6.7 DIVISION INTO PERIODS AND ALLOTMENT TO PERIODIC BLOCKS (PB): Not applicable

8.6.8 CALCULATION OF YIELD

8.6.8.1 As mentioned above, the area allotted in this working circle are mostly degraded and bushy forest, there is no requirement of calculation of the yield. Moreover, intermediate yield through cleaning, pruning and thinning at the time of different silvicultural operation shall be distributed among the villagers free of cost (as per JFM guide line).

8.6.9 TABLE OF FELLING

8.6.9.1 As this is an overlapping working circle, there is no need to deal with it separately.

8.6.10 METHOD OF EXECUTION

8.6.10.1 Formation of V.S.S.

- a) As this working circle deals with the existing JFM area including area to be brought under JFM in future, care shall be taken to follow the JFM guide line-2015 and subsequent resolutions to come in the state while selecting the areas for regeneration and protection by the communities.
- b) Only such forest area shall be brought under the Joint Forest Management (JFM) where villagers of the adjacent villages or cluster of villages are willing and/ or can be motivated to offer active cooperation, in management, protection and regeneration of the forests. There should be agreement and recognition of the assigned forest area to a particular village for protection and management by delineating all the other villages in the vicinity or this may create conflicts later.
- c) After getting suggestions from DFO or Range Officer, the Gramapanchayat shall convey a General Body Meeting of all adults wherein DFO/ACF/FR will explain about the scheme of the JFM.
- d) Joint Forest Management. If there is positive response, the Gram Panchayat may recommended for constitution of the VSS taking group of hamlets or village located adjacent to the forest to be regenerated.
- e) All adults of the village will be the members of the VSS/EDC. They may pay an enrolment fee determined by the General Body (GB) of VSS/EDC where as the Forester or Forest Guard of locality will be the Ex-officio Secretary of the Samiti.
- f) The Palli Sabha shall send its Resolution to the Range Officer concerned regarding constitution of VSS / EDC for his record and communication to the DFO concerned for registration at the Division level

8.6.10.2 Constitution of the Executive Committee (EC):

The Palli Sabha shall elect the Chairperson, the Vice-Chairperson, the Secretary and the Treasurer and a minimum of other 11 (eleven) members to constitute the Executive

Committee. At least 50% of the members of the EC shall be women. The number of SC & ST members in the Executive Body shall be in proportion to their membership in VSS. There should also be representation from the group of community, who do not have any livelihood support other than depending on the forests.

(i) Either the Chairperson or Vice-Chairperson shall be a woman.

a. The composition of the EC shall be as follows:

1. Chairperson	1 Elected Member
2. Vice-Chairperson	1 Elected Member
3. Secretary	1 Elected Member
4. Treasurer	1 Elected Member
5. Ward Member (s) concerned	Ex officio Member (s)
6. Members	11 Elected Members
7. Local Forest Guard	1 Ex officio Member

(ii) The Range Officer concerned will act as the Returning Officer for conducting the election of the EC. It shall be the responsibility of the Returning Officer to ensure that the representation in the EC is in accordance with reservation specified in Para-i above.

(iii) The EC will have tenure of 3 years at a time.

8.6.10.3 Meeting:

8.6.10.3.1 (i) General Body (GB)

- (a) The GB meeting of the VSS shall be held at least once in every six months. It can also be called as and when required.
- (b) The Secretary with the approval of the Chairperson will convene the meeting of the GB. Ordinarily a 15 days notice would be necessary for convening the meeting. A copy of the notice will be sent to the Gram Panchayat.
- (c) The Chairperson and in his absence the Vice-Chairperson shall preside over the meetings.
- (d) 50% of the members of the VSS will constitute the quorum for the GB. At least one third of the members present should be women.

- (e) Under special circumstances, a special meeting of the VSS can be convened provided at least one third of the members agree to convene such a meeting and make such a request to the Chairperson in writing. Where the Chairperson does not convene the meeting, the Secretary shall convene the GB meeting with the approval of the Vice-Chairperson. In all such cases, a 3 days notice would be necessary indicating the purpose of the said meeting. The decision in such meeting shall be taken by a minimum of 2/3rd members of VSS.
- (f) The Secretary shall record the proceedings and get them approved by Chairperson. A copy of the proceedings would be either pasted in a register or preserved in a guard file. A copy of the Resolution will be forwarded to the Forest Range Office and the Gram Panchayat under the signature of the Secretary.
- (g) The Executive Committee shall be elected by GB at least one month before expiry of its tenure.

8.6.10.3.2 (ii) Executive Committee (EC)

- (a) EC would meet as often as possible and necessary, but not less than once in two months.
- (b) The meeting will be presided over by the Chairperson and in his absence by the Vice-Chairperson.
- (c) The quorum for any meeting of the EC shall be 50% of its membership, out of which at least one-third shall be women.

8.6.10.4 Duties and responsibilities of VSS

- (i) The members of the VSS individually and collectively shall be responsible for protection of the forest, against illicit felling, grazing, fire, encroachment, wildlife and biodiversity.
- (ii) The VSS shall put in necessary efforts so that adjoining catchments area, water resources and other ecologically sensitive areas are protected.
- (iii) The VSS shall place adequate emphasis on plantation of indigenous medicinal and NTFP species in the forests as well as outside the forest area adjoining the village.

- (iv) The VSS shall ensure that the decisions taken in the Palli Sabha to regulate access to community forest resources and stop any activity which adversely affects the wildlife, forests and the biodiversity, are complied with.
- (v) The General Body of the VSS shall have the powers to remove and/or substitute any elected member of the EC by a two third majority of the members if the concerned member does not discharge his/her duties satisfactorily.

8.6.10.5 Duties and responsibilities of the Executive Committee (EC):

- (i) The EC shall carry out the day-to-day business of the VSS as per provisions of the Resolution. The EC shall prepare the Micro Plan and Annual Work Plan for the assigned forest area and integrate other developmental activities outside the forest area associated with the forest based livelihood system and get it approved by the VSS after technical scrutiny by the Forest Range Officer concerned. The EC shall be responsible for managing and implementing the Micro Plan and Annual Plan and other decisions of the General Body of VSS.
- (ii) The EC shall be responsible for protection of the forests assigned to the VSS and extend their assistance to the Forest Department for apprehending the offenders who commit forest offences. If the members of the VSS play a significant role in detection of forest offence and seizure of the forest produce within their village limits, they will be entitled for a fixed percentage of the value of the forest produce (except in case of WL Trophies) so seized as per procedure laid down in Para-11(iii).
- (iii) The EC in consultation with the GB shall evolve methodology on all issues relating to membership, conflict resolution and prevention of encroachment, exercise of customary rights and use of the permissible forest resources such as NTFP including Bamboo.
- (iv) The EC shall be responsible to account for and manage the funds and other resources received from the Government, other agencies and funds internally generated, if any. For this purpose a joint account called VSS account shall be opened in any commercial, rural or Co-operative Bank recognized by the RBI or in any post office, which shall be operated, jointly by the Secretary and the Treasurer of the VSS. Utilization Certificate relating to the expenditure incurred shall be

jointly signed by the Chairperson and the Secretary and submitted to the authorities concerned.

- (vi) The EC shall be responsible for managing funds received by VSS by maintaining and operating VSS account as per the procedure detailed in Annexure A.
- (vii) The EC shall try to establish marketing linkage for various NTFP items and other micro-enterprise products for securing better returns for the members. The Forest Department will provide necessary support in this regard.
- (viii) Annual account of VSS shall be placed before the GB for its approval

8.6.10.6 Role of the Forest Department:

- (i) To register the VSS and maintain close liaison with them.
- (ii) To support the VSS in identifying and apprehending the forest offender(s).
- (iii) To take action as per law in cases where VSS members have handed over the offender(s) and forest produce involved in the offence.
- (iv) To assist in capacity building of VSS 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.
- (v) To provide technical help to the VSS in preparation and implementation of the Micro plan/ annual work programme.
- (vi) To invite suggestion from the VSS while preparing the Working Plan / Management Plan of the concerned Forest Area / Protected Area.
- (vii) To sign Memorandum of Understanding with the VSS and ensure sharing of benefit as per norms in vogue.
- (viii) To establish co-ordination with other departments/agencies for successful implementation of the micro plans and related area development programmes.
- (ix) To facilitate the process of discharging the duties and resolving the conflicts by the ECs.

8.6.10.7 Dissolution, reconstitution and supersession of JFMC

- i. Based on the report of the Range Officer or otherwise the DFO may dissolve, reconstitute or supersede any JFMC within his jurisdiction if in his opinion the activity of the VSS is detrimental to forest protection and management. He may then order for restoration of management of the assigned forest with the forest department. The appeal against such order shall lie with the Conservator of forests whose decision shall be final.
- ii. If the work of the EC of any VSS is found to be against the principles of regeneration and proper management of forest, the DFO may dissolve and reconstitute the EC after due enquiry and recording his finding to this effect. The appeal against such order shall lie with the Conservator of forests whose decision shall be final.
- iii. On receipt of a report from the concerned Range Officer regarding irregularities by any member(s) of the EC or member (s) of the subcommittee appointed by the EC, the DFO may divest the said member (s) of their powers temporarily pending finalization of enquiry to this effect.

8.6.10.8 Micro Plan:

- (i) After constitution of the EC, as soon as possible, a Micro Plan shall be prepared by the members of the Committee through a participatory process involving VSS Members and with the technical input provided by the field officers of the Forest Department.
- (ii) The Micro Plan shall be prepared for conservation and sustainable management of the assigned forests while integrating other developmental activities outside the forest area associated with the forest based livelihood system, with participation and involvement of line departments, wherever necessary.
- (iii) The Micro Plan will primarily prescribe afforestation with priority for plantation of indigenous medicinal and NTFP species, soil and moisture conservation measures and activities to be undertaken for livelihood support of the forest dependent communities. It may also incorporate formation of SHGs and micro-enterprises that could be undertaken based on locally available resources and may include activities such as:– eco-tourism, farm forestry, Agro forestry, Silvi-pasture development, promotion of fuel-efficient devices,

animal husbandry, pisciculture, bee keeping, mushroom cultivation, tassar/lac cultivation etc.

- (iv) The Micro Plan shall indicate the choice of species in different plantation schemes and models. It shall contain a detailed silvicultural operations plan, which shall be consistent with the prescriptions of the overall working plan covering the area or the Wildlife Management Plan of the Protected Area.
- (v) The Micro Plan so prepared shall be in consonance with the existing laws of the land.
- (vi) The Micro Plan shall also detail out the various NTFP items that can be collected. This shall be done with due regard to the carrying capacity, productivity and biodiversity of the local eco-system.
- (vii) The draft Micro Plan prepared by the EC, will be scrutinized by the Forest Range Officer from the technical, financial and legal point of view. After that the same shall be placed before the GB for deliberation and approval.

8.6.10.9 Usufruct sharing:

(i) The VSS 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 may be obtained as a result of silvicultural operations and bamboo harvested in VSS assigned area shall be made available to the VSS 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 for salvaging and harvesting work. Valuation of the produce so obtained shall be done and information shared with the VSS and the produce will be sold / disposed of by the forest department or by agents of the forest department. The VSS 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 bonafide 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 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 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" after disposal of the seized produce following due procedure of law. 12. Transit of harvested forest product: All forest produce requiring permits for transit as per provisions of Orissa Timber and Other Produce Transit Rules, 1980 shall be removed from the assigned forest

area in accordance with a permit to be issued jointly by the President and the Secretary in the prescribed format (Form-4). The permit shall be valid only within the limits of the area to which the VSS members belong. A record will be maintained to this effect by the VSS and the Secretary will keep the local Forest Range Officer informed of the same on a quarterly basis. In case of transportation outside the above limit, the permit will be issued by the competent forest officer on receipt of application from VSS/ EDC.

8.6.10.11 Conflict Resolution:

- (i) In case of intra village conflict in matters of implementation of Joint Forest Management, the Executive Committee of the VSS shall Endeavour to amicably resolve the conflict. If it fails to resolve the conflict, it shall bring the same to the notice of the Palli Sabha and try to sort out the issue. If the conflict still remains, the same would be referred to the Sub-Divisional Level Steering Committee formed in the line of the SDLC under FRA, 2006 and their decisions would be final.
- (ii) In case of inter village conflict; the same would be referred to the Sub-Divisional Level Steering Committee and their decisions would be final.

8.6.10.12 Memorandum of Understanding (MoU):

To ensure smooth working relationship between the Forest Department and the VSS and also to bring in a sense of ownership, empowerment and accountability a MoU shall be signed between the FD and VSS delineating the duties and responsibilities of the parties concerned.

- (i) The Chairperson of the VSS will sign the MoU on behalf of the VSS while the Range Officer concerned will sign the same on behalf of Forest Department. Other members at the EC will also be signatory to the MoU as witness while the concerned local forest officials such as the Forester and Forest Guard will sign the MoU as witness.
- (ii) The MoU shall be in the prescribed form (Form-5).

8.6.10.13 Steering Committee:

- (i) There shall be Steering Committees at the Sub Division Level, District Level and at the State Level.

(ii) Sub Division Level Steering Committee (SDLC): This committee shall comprise of the following members:

(a) Sub-Collector	:	Chairperson
(b) Assistant Conservator of Forests	:	Member Convener
(c) An Officer of the Tribal Welfare Department in-charge of the Sub-Division	:	Member
(d) Sub Divisional Police Officer (SDPO)	:	Member
(e) Forest Ranger concerned	:	Member
(f) Tahashildar concerned	:	Member
(g) Chairperson of the Panchayat Samiti	:	Member Concerned
(h) Zilla Parishad member	:	Member
(i) Two Chairpersons/Vice-Chairpersons of (to be nominated by the DFO)	:	Member VSS/ EDC

(iii) The SDLC will be responsible to resolve all cases of intra village and inter village conflicts as referred to them in regards to smooth functioning of VSS.

(iv) The SDLC will meet at least once in every quarter and shall facilitate functioning of the VSS and provide necessary support and guidance to them.

v) The SDLC will facilitate the VSS for protection and sustainable management of forests, forest based livelihood and holistic development of the villages.

vi) The SDLC may invite the representatives of the committees concerned and other such peoples' representatives, reputed persons / organizations working in the field of forest management to their meetings as per requirement.

(vii) District Level Steering Committee (DLSC): This committee shall comprise of the following members:

(a) District Collector	:	Chairperson
(b) Divisional Forest Officers	:	Member (Territorial and Wildlife)
(c) ADM dealing with land matters	:	Member

(d) Deputy Director (Agriculture)	:	Member
(e) Chief District Veterinary Officer	:	Member
(f) PD, DRDA	:	Member
(g) PA, ITDA	:	Member
(h) District Welfare Officer	:	Member
(i) Deputy Director Horticulture	:	Member
(j) Soil Conservation Officer	:	Member
(k) 5 VSS (Chairperson/ Vice-Chairperson:	Member	(at least 2 women) (to be nominated by the DFO)

(viii) The DFO concerned having the jurisdiction over the district headquarters will be the Member Convener of the meetings of DLSC.

(ix) The tenure of the non-official members will be three years.

(x) The DLSC may co-opt NGOs or other experts as members with credibility and experience of working on forest related issues.

(xi) The DLSC will meet at least once in six months and shall facilitate functioning of the VSS / EDC and provide necessary support and guidance to them.

(xii) The DLSC will oversee protection and sustainable management of forests, forest based livelihood and holistic development of the villages.

(xiii) State Level Steering Committee (SLSC): The constitution of the State Level Steering Committee shall be as under:—

1. Minister (Forest)	:	Chairperson
2. Chief Secretary	:	Vice-Chairperson
3. Principal Secretary, F & E Department	:	Member
4. Principal CCF (O)	:	Member
5. PCCF (WL)	:	Member
6. 2 D.F.Os./One RCCF from field to be	:	Member nominated by PCCF (O) on rotation basis
7. Secretary, Revenue Department	:	Member
8. Secretary, Rural Development Department:		Member

- 9 . Secretary, Home Department : Member
10. Secretary, PR Department : Member
- 11 . Secretary, SC & ST Department : Member
12. Chief Conservator of Forests (Central) : Member
13. Director, Orissa Watershed : Member Development Mission
14. Two representatives of : Member Civil Society Organisations/
Experts to be nominated by F&E
Department
15. Special Secretary, F& E Department : Member
16. Chairpersons of two VSS to be nominated by the PCCF (O) : Member
17. CCF (Plan, Programme & Afforestation), Office of PCCF, Odisha: Member-Convener

(xiv) The non-official members of the State Level Steering Committee will have tenure of three years.

(xv) The Committee shall meet at least once in a year to guide the process of participatory forest management.

(xvi) Changes in the Resolution, if any shall be placed before the SLSC for approval

8.6.11 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not applicable

8.6.12 REGENERATION: Not applicable

8.6.13 ASSOCIATES REGULATION AND MEASURES

8.6.13.1 The important role of the Forest Department is to play is the proper motivation of the people for active cooperation in the regeneration, protection and management of the assigned forest area. As the gestation period for the forest to provide return is quite long, the field staffs fail to continue the good will to Department from the stakeholders. In difficult period, help s from the NGOs or local eminent persons shall be taken into confidence for resolving different issues.

8.6.13.2 Reward and Incentives: The active and best VSS should be identified and rewarded. Incentive to outstanding performance and contribution towards awareness

creation, excellence in protection, management should be rewarded. Success stories should be given wide publicity and the other VSS members, potential VSS villages should be taken to these successful VSS villages to get inspiration and ideas.

8.6.13.3 Income Generation: In each village, efforts should be made to create sustainable income generating activities which may be forest product based. Income generating activities (IGA) like Sericulture, Pisciculture, Vermiculture, Lac, and Honey collection could be encouraged through the VSS.

Many NTFP items are also collected from the forests and efforts should be made to explore processing, value addition and finding good markets for these forest based products. The entry point activities done in different programmes should aim at sustainable income generation to the villages. NGOs specializing in IGA and SHG and marketing should be entrusted with promotion of livelihood amongst the members of the VSS

8.6.13.4 Capacity Building: The capacity of frontline staff in the Forest Department should be improved as well as the VSS members more updated, activities like training and exposure visits shall be carried out frequently. During training and workshops, special emphasis shall be given on philosophies and need of participatory forest management. NGOs and Forest Department could impart vocational training on sustainable livelihood and value addition for different NTFP items and sustainable livelihood to both staff as well as VSS members.

8.6.14 MISCELLANEOUS REGULATION

8.6.14.1 Maintenance of Records: All works executed in the VSS area shall be entered in the Compartment History. Also, the assigned area shall be clearly marked on the fields as well as Topo Sheets of 1:50,000 scale.

8.6.14.2 Right and Concession: The right and concession in this working circle shall be regulated in accordance with provisions made in the concerned notifications of RF and PRF blocks and JFM policy of the State Government framed from time to time.

8.6.15 FINANCIAL ARRANGEMENTS

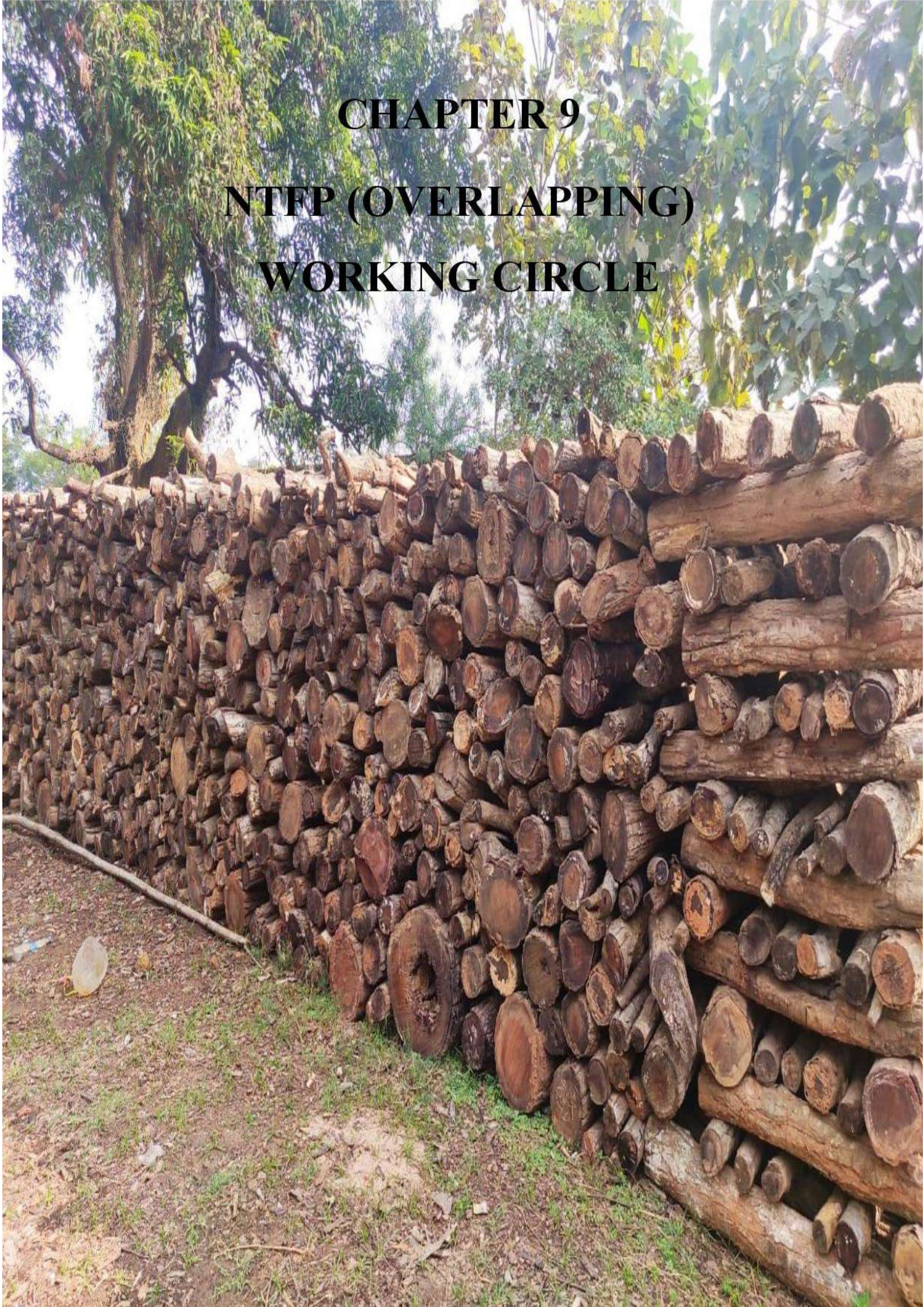
8.6.15.1 The Micro plans should be prepared for each VSS irrespective of whether funds for implementation are available or not. While preparing the Microplans, tools like GIS could also be used for better planning. For this, the help of ORSAC and NGOs can also

be taken. The DFO shall make every attempt to obtain funds from different sources like State Budget, DRDA, ITDA, MPLAD and MLALAD funds etc. for implementation of the management plan.

8.6.16 INTERMEDIATE REVISION

8.6.16.1 No major changes in the prescription of this Working Circle are anticipated. However, if required, the Regional Chief Conservator of Forests, Koraput Circle may review the situation after five years. Any change suggested shall be subjected to the approval by the competent authority.

CHAPTER 9
NTEP (OVERLAPPING)
WORKING CIRCLE



9.1 NAME OF WORKING CIRCLE CLEARLY MARKED ON GIS BASED MAPS (1:50,000): The area of this working circle has been clearly marked on the GIS based map of 1:50,000 which are appended as management map in the plan.

9.2 GENERAL CONSTITUTION OF WORKING CIRCLE

9.2.1 The Non-Timber Forest Produce (NTFP) plays a key role in the life and economy of communities living in and around forest. NTFPs are mostly collected by economically backward people living in and around the forests. The tribal people have been conserving plant and crop genetic resources as well as the knowledge on their utility. The forests of the Division are rich in a wide variety of NTFP items like fruits, seeds, gums, barks, leaves, flowers etc. The medicinal plants play a key role in the health support system in remote village. The people living in and around the forests collect these forest products for their own consumption as well as sale to add to their incomes. Thus, NTFPs play major role in sustenance of the tribal life living in the forest fringe villages.

9.2.2 The irregular and over exploitation of these NTFPs by the villagers has led to endangered less to the resource itself. Further, regular fire incident, illicit felling of trees and grazing etc. are the cause of such loss of regeneration of different species. Now, the increased demand of various NTFPs as raw materials for some industries like cosmetic industry, dyes, drugs etc. has acted as a catalyst to this gradation. The dominance of market of certain NTFPs is over riding the concept of ecological sustainability leading to unsustainable & destructive exploitation of these resources abetted by traders and middlemen.

9.2.3 All these issues have resulted in the increasing interest in NTFPs among the Conservationists, Development Workers, Foresters and indigenous people's groups. This has promoted numerous initiatives aimed at promoting NTFPs use and commercialization as a means of improving the wellbeing of rural populations and at the same time, conserving the existing forests. The interests on NTFPs have increased and Government has taken right steps in the direction by issuing the NTFP Resolution in March, 2000 and Gram Panchayat (Minor Forest Produce) Rule, 2002.

9.2.4 In order to protect the interest of the primary collectors vis-à-vis conservation of the natural resources of the forests, the NTFP (Overlapping) Working Circle has been constituted. This circle includes all the forest area except Protection Working Circle of the plan area.

9.3 GENERAL CHARACTER OF VEGETATION

9.3.1 The composition and diversity of the forests allotted to this Working Circle has already been described in Chapter-3 of Part-I of this plan. Further, vegetation of all the forest blocks allotted to this Working Circle have been vividly described in the respective working circles as well. Therefore, repetition is not required.

9.3.2 The Range wise details of the major NTFP items available in the Division are already mentioned in Chapter-7 of Part-1 including details of medicinal plants. Similarly, the annual yield and royalty realized has also been furnished in the same chapter.

9.4 FELLING SERIES, CUTTING SECTIONS AND JFM AREAS:

Not applicable

9.5 BLOCKS, COMPARTMENTS AND JFM AREA MARKED ON GIS BASED MAPS)

9.5.1 All the forest area except Protection Working Circle has been allotted to this Working Circle. Thus, total area of this Working Circle is 189045.9106 ha.

9.6 SPECIAL OBJECTIVES OF MANAGEMENT

As per the National Forest Policy, 1988 and “**The Schedule Tribe and Other Traditional Forest Dwellers (Recognition of Forest Right Act, 2006)**” the development of Non- Timber Forest Produce (NTFP) has been one of the most important objectives in forest management. Therefore, consistent with the policy and law, the special object of management enunciated as below.

- i) To ensure sustainable production and utilization of the NTFPs consistent with the National Forest Policy, 1988 and other State Government Policies.
- ii) To protect NTFP tress and promote their regeneration.
- iii) To generate employment and improve the economy of the local people and thereby improving their socio- economic condition.
- iv) To ensure people participation in all activities of NTFPs to achieve the larger goal of the forest regeneration and production.

9.6.1 ANALYSIS AND VALUATION OF CROP

9.6.1.1 The Forest Resource Division, Cuttack has stated the job of survey of NTFPs in different Forest Divisions for ascertaining the availability and potentiality of some NTFPs. This will only provide idea about availability of different items but not the sustainable extraction. The assessment by the FRS Division was carried out with regards to tannin materials like Dhaura leaves, Myrobolans, barks of Sunari and Karada. The yield of tannin materials is 12 kgs from Dhaura leaves per tree, 30 kgs of fruits per tree from Amla 66 kgs of fruits per tree from both Harida and Bahada, 8 kgs and 16 kgs of bark per tree from Sunari and Karadatrees (Ref:-Repot dt.4.3.1966 of the Forest Utilization Division for Forest Resource Survey of Kalahandi and Bolangir Division. Accordingly, the tanning materials assessed in the Malkangiri Forest Division is furnished in Table No- 9.1.

Table No. 9.1: Range wise Estimation of Tannin Materials i.e Leaves, Fruits, Barks etc. in Quintals.

Name of the Range	Dhaura leaves	Amla Fruits	Harida Fruits	Bahada Fruits	Sunari Bark	Karada Bark
Mathili	17975.79	9140.23	7540.69	2513.56	507.79	34123.54
Malkangiri	26155.11	23299.09	3306.59	13227.87	3407.17	53312.34
Balimela	24576.60	13074.92	22450.59	17305.66	2069.31	3747.43
Chitrakonda	60730.79	47445.93	20876.21	33401.93	4048.71	30871.48
Kalimela	17140.90	20687.29	6501.72	9752.58	3940.43	66987.43
Motu	25516.53	19934.79	5847.53	32161.46	1417.58	19137.39
Total	172095.72	133582.25	66523.70	108363.06	15390.99	208179.61

9.6.1.2 In the previous Working Plan no systematic and substantial work has been carried out in the past plan due to want of fund and un-availability of skilled person to assess the potentiality *vis-a-vis* availability of various NTFP items and to ascertain impact of collection etc. of such NTFPs on sustainability of Forest. However, during the year 2011-12 in Mathili Rang, 2012-13 in Malkangiri and Motu Range and 2013-14 in Chitrakonda, Balimela and Kalimela that the detail NTFP study was conducted under 13th FC scheme in this Division by taking 100 sample plots method in each Range.

9.6.1.3 It is proposed to continue this working circle in the Forest Block having NTFP items as per the Inventorisation carried out during the year 2011-12 to 2013-14.

Since this NTFP inventorisation has been done for whole of the Forest area of the Division except protection area. However, some yielding plants, parts that are used for different purposes are furnished in Tables below.

Table No.9.2: Important Fiber Yielding Species

Local Name	Scientific Name	Useful Parts	Purpose of using
Siali	<i>Bauhinia vahlii</i>	Fibre	Binding of kendu leaves&making of rope
Palasa	<i>Butea monosperma</i>	Root	Rope making
Bara	<i>Ficus bengalensis</i>	Tree	Rope making
Aswastha	<i>Ficus religiosa</i>	Tree	Rope making
Jai Sanda	<i>Litsea glutinosa</i>	Fiber	Medicinal value

Table No. 9.3: Important Oil Yielding Species

Local Name	Scientific Name	Useful Parts	Purpose of using
Karanja	<i>Pongamia pinnata</i>	Seed	Medicines and oil
Kusuma	<i>Schleichera oleosa</i>	Seed	Soap making and Cooking
Kochila	<i>Strychnos vomica</i>	Seed	Medicines
Mahula	<i>Madhuca indica</i>	Flower&Seed	Edible and oil
Neem	<i>Azadirachta indica</i>	Seed	Medicines
Sal	<i>Shorea robusta</i>	Seed	Edible oil and Food
Champa	<i>Michelia champaca</i>	Flower	Perfume
Eucalyptus	<i>Euclyptus hybrid/globulus</i>	Leaf	Medicine
Polanga	<i>Calophyllum inophyllum</i>	Seed	Soap making

Table No. 9.4: Important Gum and Resin Yielding Species

Local Name	Scientific Name	Useful Parts	Purpose of using
Babul	<i>Acacia nilotica</i>	Gum	Calico printing dying and sizing materials for silk& cotton
Dhaura	<i>Anogeissus latifolia</i>	Gum	Paper sizing and Printing
Genduli	<i>Sterculia urens</i>	Gum	Gum is edible and use for preparation of confectionary items
Khaira	<i>Acacia catechu</i>	Khaira	Pan chewing
Salai	<i>Boswellia serrata</i>	Gum	Perfume
Sal	<i>Shorea robusta</i>	Resin	Manufacture of varnish & paint

Table No. 9.5: Important Fruit bearing Species of the Division

Local Name	Scientific Name	Uses
Amba	<i>Mangifera indica</i>	Edible
Amla	<i>Emblica officinalis</i>	Medicinal value
Aswastha	<i>Ficus religiosa</i>	Fruit edible
Bahada	<i>Terminalia belerica</i>	Medicinal value
Bara	<i>Ficus bengalensis</i>	Fruits eaten by Birds and Animals
Baula	<i>Mimusopselangi</i>	Fruit edible
Barkoli	<i>Zyzyphusmauritiana</i>	Fruit isedible
Bela	<i>Aegle marmelos</i>	Edible Fruit
Bhalia	<i>Semicarpus anacardium</i>	Medicinal use
Chara	<i>Buchnanialanzan</i>	Edible Fruit
Dimiri	<i>Ficus glomerata</i>	Edible Fruit
Gamhar	<i>Gmelina arborea</i>	Fruits eaten by animals
Harida	<i>Terminalia chebula</i>	Fruits for medicine
Jamun	<i>Sygygiumcumini</i>	Edible Fruit
Kendu	<i>Diospyros melanoxyton</i>	Edible Fruit
Karanja	<i>Pongamia pinnata</i>	Oil and Medicine
Kusuma	<i>Schleicheraoleosa</i>	Edible oils and fruits
Kochila	<i>Strychnosnuxvomica</i>	Fruits for medicine and edible by birds
Mahula	<i>Madhuca indica</i>	Edible oils and flower
Neem	<i>Azadirachta indica</i>	Medicine and oil
Panas	<i>Artocarpus heterophyllus</i>	Edible Fruit
Sal	<i>Shorearobusta</i>	Edible Oil
Semul	<i>Bombax ceiba</i>	Yield Cotton
Tentuli	<i>Tamarindus indica</i>	Edible Fruit

Table No. 9.6: Important Tannin Yielding Species

Local Name	Scientific Name	Useful Parts	Purpose of using
Amla	<i>Emblica officinalis</i>	Fruits	Medicinal value
Arjuna	<i>Terminalia arjuna</i>	Barks& Fruits	Leather

Babul	<i>Acacia nilotica</i>	Barks& Fruits	Leather
Bahada	<i>Terminalia belerica</i>	Fruits	Medicine & Leather
Harida	<i>Terminalia chebula</i>	Fruits	Medicine & Leather
Dhaura	<i>Anogeissus latifolia</i>	leaves	Leather
Sunari	<i>Cassia fistula</i>	Barks & Fruits	Medicine
Sal	<i>Shorearobusta</i>	Barks & Fruits	Leather

9.6.1.4 It is generally believed that collection of NTFP because little or no harmful effect on the forests, but this not always true. The method of collection of some NTFPs often adversely affects the sustainability of the forests. This is evident in many Sal forests of Mathili Range of this Division where seed has not been collected very intensively. There is no regeneration in forests blocks like Mathili, Kotameta, Chalmendi. Of course collection of seeds is not the only cause of such situation but grazing incidence, annual fire etc. also play a major role for unsuccessful regeneration of the species. Similarly, in forests and other area, due to complete collection of Mahua flowers and seeds, no/ very little young regenerations of trees are observed.

9.6.1.5 Besides, forest floors are often brunt before collection of some seeds i.e. Sal seeds. This practice is very harmful to the forests which otherwise burns the regeneration of valuable species, grass, fauna and other micro-organisms over the top layers of the soil. It also leads to compact formation of the soil. It further gets aggravated when the seeds are collected by sweeping the forest floors.

9.6.1.6 The leaves, which play an important role in photosynthesis as well as transpiration process, are often collected unscientifically and recklessly. The excess collection of Sal and Siali leaves for leaf plates may harm the proper growth of the trees/ plant. Similarly, over exploitation of some medicinal plants either for roots, shoots or leaves have now brought many species under threat. Now the time has come to motivate the VSS members and general people of the locality on the negative aspects of over collection and exploitation. Also, staffs as well as VSS members shall be made aware through meetings, workshops and other means on the proper way of collection, processing and value addition of major NTFP items of the Division.

9.6.2 SILVICULTURAL SYSTEM: Not applicable

9.6.3 ROTATION PERIOD: Not applicable

9.6.4 HARVESTABLE DIAMETERS: Not applicable

9.6.5 REDUCING FACTOR AND REDUCING AREAS: Not applicable

9.6.6 FELLING CYCLE: Not applicable

9.6.7 DIVISION INTO PERIODS AND ALLOTTED TO PERIODIC BLOCK:

Not applicable

9.6.8 CALCULATION OF THE YIELD

The collection figures during the years 2012-13 & 2013-14 of various NTFP items have been furnished at Table No.7.11 to 7.16 of Chapter-7 of Part-I. The figures do not indicate the actual potential of the NTFP items as in most of the cases only surplus quantities after local consumption are sold in the market. Further the production of different NTFP items depends upon the crop year of different species which vary quite drastically due to weather effects of the locality and also prevailing market price etc. If there is attractive price, good quantities of NTFPs would be brought to the market. In view of these factors it is not possible to prescribe any regulation of yield. However, it has been general observation that many NTFPs have been on decline due to over exploitation and degradation of the forests.

9.6.9 TABLE OF FELLING: Not applicable.

9.6.10 METHOD OF EXECUTION, THE FELLING/ CUTTING:

9.6.10.1 The forest fringe villages which are traditionally involved with collection of above items shall be identified and enlisted. The primary collectors shall be properly guided and trained in collection of different NTFP items. They should also be provided with latest techniques of collection, drying and storage. Further, training on value addition of collected NTFPs and marketing facilities will definitely help in increase their earnings.

The felling/ cutting is not required.

9.6.11 SUBSIDIARY SILVICULTURAL OPERATIONS CLEANING AND THINNING: Not applicable

9.6.12 REGENERATION: Not applicable

9.6.13 ASSOCIATED REGULATION AND MEASURES

9.6.13.1 METHODS OF TREATMENT OF SOME MAJORNTFPs

Methods of treatment for Major NTFPS of Malkangiri Forest Division and Suggestions for their improvement

1. Amla

Botanical Name : *Emblica officinalis*

Family : Euphorbiaceae

Trade Name : Amla

Local Name : Anla

Parts Used: Root, Bark, Stem bark, Leaves, Seeds, **Fruits**

Harvesting: For sustainable harvesting, 20% of fruits are left on the trees for regeneration. In case it is not possible, 10% of trees are left for natural regeneration. Fruits are also collected by locally designed plucking equipment with long bamboos/ poles with a hook and a cotton bag tied at one end. Trees or branches should not be cut to harvest Anla fruits. Bamboo baskets or plastic crates with newspaper lining are used for carrying fresh Anla from collection site in order to prevent bruises. Harvested fresh Anla fruits are first sun dried on a commented floor/ mat/ cloth for 2 days to make them soft after which the fruit rind is removed manually with the help of knife, cut into pieces and sun dried for 5-6 days till they develop reddish tint colour. At times the fruits are steam boiled for 5-10 minutes to make the pericarp soft. But boiling destroys nutritive value of fruits. Therefore, steam boiling is preferable. In this case the fruits are steam boiled for 3-6 minutes in a perforated bamboo basket put on an earthen pot with water which is boiled. The steam boiled fruits are decupled and fruit rind cut into pieces and dried. The dried fruit rind is further powdered with the pulverize to obtain higher price and stored in High Density Polyethylene (HDPE) container.

1. **Processing of Dried Amla.**

1. Drain washed fruits in a stainless-steel sieve.
2. Cut fruits into thick slices.
3. Layer fruit slices with salt to draw moisture lout of the fruits and to speed up the drying process.
4. Cover and keep in salt for 3-4 hours.

5. Drain in a stainless steel sieve for 1 hour until all liquid has drained out.
6. Place fruit slices in a single layer on the mesh dryer trays, puts them close together but not touching.
7. Dry fruits :
 - (a) Under bright sun for 6-8 days.
 - (b) In solar dried for 4-5 days.
 - (c) In cabinet drier at 60° - 65° C for 10-35 hours.
8. Pick dried fruits in moisture proof containers, e.g. 400 gauge poly ethylene or polypropylene pouches and heat-seal them.
9. Label.

2. **Processing of Amla powder.**

1. Drain washed fruits in a stainless steel sieve.
2. Cut fruits into thick slices.
3. Layer fruit slices with salt to draw moisture lout of the fruits and to speed up the drying process.
4. Cover and keep in salt for 3-4 hours.
5. Drain in a stainless steel sieve for 1 hour until all liquid has drained out.
6. Place fruit slices in a single layer on the mesh dryer trays, puts them close together but not touching.
7. Dry fruits :
 - (d) Under bright sun for 6-8 days.
 - (e) In solar dried for 4-5 days.
 - (f) In cabinet drier at 60° - 65° C for 10-35 hours. To a final moisture content of 5%.
8. Grind fruits into a powder using pestle and mortar or a grinder.
9. Sieve powder to remove lumps and unground material.
10. Pack powder in moisture – proof containers e.g 400 gauge polythene of polypropylene pouches and heat – seal them.
11. Label.

Packing: Packing the dried fruits with seeds, without seeds in 1 kg capacity polythene bag 25 kg gunny bag. Pack the pickles, powder and jams and squash in different size plastic container with your trade label.

2. BAHADA

Botanical name	:	<i>Terminalia bellerica</i>
Family	:	Combretaceae
Trade Name	:	Balliric myrobalans
Local Name	:	Bahada
Parts Used	:	Fruits, seeds, bark

Harvesting Method: Fruits of Belliric myrobalan ripen during December-January ericarp becomes silky or ashy colour. Month of January is the best time for collection of fruits for optimum tannin contents after or before which inferior quality tannin is obtained. Fruits are collected by shaking the trees and picking up from the ground or as soon as they have naturally fallen or plucked by use of a long bamboo with a hook tied at one end. Fruits bored or damaged by insects should not be collected.

Post Harvesting and Processing Method:

After collection, fruits are dried in the sun on a commented floor or a mat for about 8-10 days. It should not be directly dried on the ground. As most of the pharmaceutical industries/ exporters need fruit rind for direct use, the fruits should be decupled manually by trashing with a wooden thrasher or stone after drying them for 5 days. The broken fruit rind so obtained is again dried for 3 to 4 days. In such a case seed kernel is also sold in the market. It is used for production of oil which is used in soap industry as it gives better foaming and detergency. The oil is also used as hair oil for grayness of hair.

Packing and Storage:

Belliric myrobalan fruits/ fruit rind are packaged in jute bags with polyethylene liner or woven sacks. But broken fruit rind for export is packaged in fiber board drums. The powder of fruit rind after value addition is packaged in air tight HDPE containers. The packaged product is stored in dry place. About 170-423 seeds weigh one kg. The seeds can be stored for one year but viability decrease appreciably.

3. HARIDA

Botanical name	:	<i>Terminalia chebula</i>
Family	:	Combretaceae
Trade Name	:	Myrobalan or Chebolic Myrobalan
Local Name	:	Harida
Parts Used	:	Fruits

Harvesting: The fruits are collected during January to March. They are also collected by shaking the trees and picking up from ground but plucking with the help of a bamboo tied with a hook at one end is good. Bal Harida or Kala Harad or Chhoti Harad which is primarily used for manufacturing Ayurvedic medicines is collected during August before development of stones in the fruits. It also fetches about 4 to 5 times higher price than mature fruits. Harvested fruits are dried in the sun for about two weeks on a platform. The dried fruit fruits are graded according to their solidness, colour. Inferior fruits constitute second grade. The fruits are also crushed by decorticator or trashing manually and stone removed. The crushed fruit rind known as “Kacheria” is also further dried for 3-4 days before packaging. Crushed chebulic myrobalan is preferred by the pharmaceutical industries and exporters. About 160 Kg. of fruits yield about 100 Kg. of broken fruit rind. The dried crushed chebulic myrobalan is further graded as per market requirement especially for export. The fruit rind is also further powdered and stored in HDPE containers usually with prior market linkage. Harida fruit is also value added for its juice when it is green and pieces of fruit rind are fried in Cow ghee and packaged for use cough. Generally two good years are followed by one or two poor ones; fruits are collected when they turn yellow. The seeds can be collected as soon as they fall on the ground and are dried under shade. The seeds can be stored in gunny bags for one year germinates quicker.

4. MAHUA FLOWER

Botanical Name : *Madhuca indica*

Family : Sapotaceae

Trade Name : Mahua flower

Local Name : Mahula

Parts Used : - Flower

Distribution: It occurs throughout the Division, a constituent species of South and Northern Tropical Moist Deciduous Forests, South and Northern Tropical Dry Deciduous Forests in various forest types, popular among tribal community and can survive up to more than 200 years of age.

Habitat: It is a medium size to large deciduous tree, with a short bole, attaining a height of 12-18 mtrs and a girth up to 2.4 mtrs. It is a strong light-demander, drought and frost hardy. It is deep rooted but can adopt to shallow soil, coppice fairly well when small and felled in

dry season, is liable to browsing damage when young, wood is heavy, refectionary, difficult to saw.

Harvesting: The Mahua flower consist of mostly corolla and rocium of butter tree without calyx, it is fleecy, reddish brown 0.5 to 2 cm long, sweet taste. Collection of Mahua flower is done during the month of March to April. The ground under the tree is made clean to facilitate easy collection. The showering of flowers takes place usually between 4 a.m. to 7 a.m. and continues for about 3-4 weeks. Flowers collected after 7 a.m. contains comparatively less quantity of sugars. Therefore, collection is completed before 7 a.m. Harvested flowers are first dried for 3-4 days under sun on earthen floor which is plastered with cow dung solution and thereafter on cement floor or floor made with slate stone or mat for 6-7 days. Turning is done 2 to 3 times daily during course of drying to ensure uniform drying. The weight is reduced by about 70 percent after drying. Many of the primary collectors keep the flowers collected during first 4 days and last 4 days separately for their own consumption. These are locally called Bharari Mahul. Kanua flowers are believed to possess comparatively less moisture content. Dried mahua flowers are also graded as 'Pod-Sukha' and 'Chalu'. Well dried flowers with reddish brown colour are graded as 'Pod-Sukha' which fetches comparatively higher price and rest as 'Chalu' grade.

Packing: Dried flowers are packaged in gunny bags and stored on a layer of leaves of *Vitex negundo* (Nirgundi) spread on a bamboo mat. They are also stored preferably in Olia or Pura made with Khajur (*Phoenix acualis*) leaves. As per existing Excise Act in force, no one can keep more than 2 quintal of mahua flowers. Mahua flowers can also be packaged in corrugated box with polypropylene woven sacks.

Uses: It is rich with sugars and vitamins chiefly used in preparation of liquor, vinegar and syrup. It is cooling, tonic, demulcent, laxative, stimulant, anthelmintic and useful in coughs colds and bronchitis.

5. MAHUA SEED

Botanical Name	: <i>Madhuca indica</i>
Family	: Sapotaceae
Trade Name	: Mahua seed kernels
Common Name	: Tol manji
Parts Used	: Seed

Harvesting: Mahua flowers whitish, appear late February to April, having a peculiar smell, fruits ripen June-July and fall soon after. An average tree is estimated to yield about a quintal of flowers. Seeds are separated from the fruits by processing and then dried, being only, lose viability quickly with storage. Good seed years do not occur every year, on an average, in alternate years. Season for seed collection is short much of the seed crop is lost in rains. Seed weight for various sources varies 423-670/kg. and germinative capacity 13 to 57%. The seeds are the dried seed kernels of mature berries (fruits), more or less flattened on one or two sides, pale-brown in colour. Mature and ripe fruits locally known as ‘Tol’ are collected during June-July. Fruiting of trees commences at about 20-25 years of age and continues up to a very long age of more than 200 years. The outer part of the fruit is edible and is eaten as curry. The Fatty oil content is comparatively less in immature fruits. Therefore, they are not collected except for preparing curry. The harvested fruits are heaped in one place for 2-3 days and seeds removed by hand and thereafter seed kernels are separated from fresh seeds by thrashing them with a stone and dried under sun for 7-8 days. Due care is taken to protect the seed kernels from damage due to rains during course of drying. Mahua butter is extracted from seed kernels at the oil extraction unit.

Packaging: Seed kernels are packed in woven sacks with LD liner and Mahua oil in airtight HDPE containers or glass bottles and kept in cool and dry place.

Uses : The seed kernels contain 45%-51% of fatty oil which is known as Mahua butter, the oil is edible, used in skin diseases, rheumatism, headache, intestinal worms, piles, illumination, industrial uses domestic consumption etc. Mahua cake is used as manure and pesticide in farming. Cake is also used as hair wash along with ‘Shikakai’.

6.TAMARIND

Botanical Name	: <i>Tamarindus indica</i>
Family	: Leguminosae
Trade Name	: Imli
Local Name	: Kaiyan
Parts Used	: Fruit

Distribution: It is naturalized in Moist Deciduous and Tropical Forest and also available in Dry Deciduous and thorn forest available outside the forest area also throughout the Division.

Habitat: It is a large handsome ever green tree attaining a height up to 30 mtr and girth up to 5 mtr with a large spreading crown. It is a light-demander, very sensitive to frost, drought-resistant deep-rooted and wind firm, slow-growing, coppices fairly well, produces root suckers freely. It thrives well in warm climate and can withstand drought.

Harvesting : Flower in April to June, September to October, its fruit is a long pod with 6-10 seeds, appear during winter and ripen in spring February to April, collected during March-April by shaking the branches, start fruiting after 10-15 years and continue for a very long period. A healthy full grown tree may produce about 200 kg of fruit every year, which may yield about 80 kg seed. Seeds weigh 1450-2000 kg, average 1800/kg. Fruits are dried in the sun, the outer shell is removed by hand or by beating with a mallet, the seed is separated from the pulp by hand kneading and washing in water. Washed seeds are dried in shade and stored in gunny bags in a dry cool place; it retains viability for about 6 months.

Value-addition:

- ❖ The outer cover of the tamarind is removed and then it is sold directly in the market or dried to enhance its shelf life before placing it in the market.
- ❖ By using simple tools like pins and knife the tamarind is deseeded at household level and subsequently sent to the market. The process substantially increases the shelf life of the product and its utility is enhanced by removing the seeds that are of less use to the customer. However these seeds can also fetch a good price if crushed/ powdered and sold to the starch and cattle feed industries.
- ❖ Dried tamarind fruits are cleaned and after soaking them in water, they are boiled in steam jacketed kettle for about 40-45 minutes. Then pulp is extracted in pulper and dried in drum type drier and on cooling, the final product is packed.
- ❖ Cleaned and dried tamarind fruits are soaked in water and then they are heated in an SS jacketed kettle for about an hour. Then pulp is extracted in pulper and concentrate is packed after filtration. Similar process is repeated twice for residue. Recovery or yield is 60 percent by weight

- ❖ Due to its self-life and taste, it is used extensively at household level in the form of pickle and many small private players have launched small toffees of tamarind in the market.
- ❖ The tamarind kernel powder is made from the tamarind seed; starch is extracted and is mostly used in the textiles and card board industries.
- ❖ A gum is prepared from ground tamarind seeds and is spread on the cloth to prepare a base for making traditional folk paintings.

Uses : Tamarind is used as preservative, pickles, juices, tamarind concentrates, as a food by tribal's, kernel powder in textile/ paper industry, cattle & poultry feed, in dysentery, the heart wood for wheel parts, rice pounders, sugar-crushers and oil presses etc. paints and varnishes, used to make dyes, glue, polish carvings and buildings.

7. SAL SEED AND LEAVES

Botanical Name	: <i>Shorea robusta</i>
Family	: Dipterocarpaceae
Trade Name	: Red Balua
Local Name	: Sargi (Sal)
Parts Used	: Fruit

Distribution: Sal is not the major species of the Division and its multiple uses justifies its description as an NTFP source. It is a large tree and can grow up to height of 20 to 30 meters depending upon the site condition. Mainly it's found in Mathili Range in flat and undulating ground as in Sarangapalli, Mathili, Dasamantapur Extension RF etc. and some part of Malkangiri Range in Pitatung and Kottameta Forest Blocks. In hilly area it has stunted growth i.e. 15 to 20 meters height. It shed leaves in late winter and foliage gets renewed by March when it flowers. The fruit matures by May/June. Sal trees are light demander and it coppices well up to moderate size. It is highly susceptible to drought but is most fire-resistant species.

Sal Seed: The extraction of oil from Sal seeds for domestic consumption has been in practice since last long. Now it has found many alternatives uses such as soap making, manufacture of vanaspati and many more are including cattle feeding. The most important thing is that the poor tribal's living in and around the forests consume the seeds while in distress.

Harvesting: The Sal seeds generally picked up from the forest floor. Sometimes, the villagers use to sweep the forest floor for easy collection. Since the seeds have a very short viability collection of seed may be permitted up to 15th June before the arrival of monsoon.

Value addition: The poor people living in and around the forests collect the seeds and de-seed them before taking it to the market. The moisture content in the seeds has great impact on the quality of the seeds. The excess moisture in the seeds invites fungal attack and there are chances of decrease in its value. Hence, store the seeds after proper drying and to dispose of the deseeded seed as early as possible for getting better price.

Sal Leaves: The better quality of fresh Sal leaves appear after defoliation during the month of March as the Sal tree is good coppice. The Sal leaves collection shall be allowed from branches only and not from the leading shoots. The exploitation shall not be allowed from the degraded forest area as well as beyond silviculturally permissible limits. Moreover, the collection of Sal leaves shall be governed by the Government of Orissa, Forest & Environment Department Resolution No. F-C-74/99-16744/F&E, Dated Bhubaneswar 27th September, 2002.

Harvesting: The ideal period of collection of Sal leaves is 1st October to 31st December and 1st April to 30th June. As the collection of Sal leaves is regular practice of the rural people of the Division for their own use as well as sale.

Uses: Sal leaves are generally used for making cup and plates in tribal areas. After introduction of molding machines, it has become a commercial activity. The other uses of these leaves are pika (Bidi like country cigarette) making food wrapper and betel wrapper.

8. KENDU LEAF:

Botanical Name	: <i>Diospyros melanoxylon</i>
Family	: Ebenaceae
Trade Name	: Ebony
Local Name	: Kendu
Parts Used	: Fruit

Distribution: Kendu leaf is one of the major NTFPs in Malkangiri Division. It is obtained from Kendu bushes (*Diospyros melanoxylon*). Similarly when it grows into tree it yields timber known as “Coromandelica ebony”. It is generally found in open and high lands of the Division. The Kendu tree can grow up to 25 meters height in suitable condition.

Harvesting: In order to get good quality leaves annual bush cutting in command areas are taken up in month of February/ March. The leave collection/ plucking starts from April/ May after 40 to 45 days of bush cutting. The maturity of leaves depends upon the weather condition. In hot and dry weather, it takes more than in humidity area. However, if the bushes get any shower of rain, it matures early.

Processing: The KL production in the Division is in the form of “Phal” bags i.e. unprocessed leaves are produced and are disposed of as such.

Value addition: The cost of production of “Phal” leaves is obviously less than the processed one. The leaves are valued for their use as wrapper for tobacco. Further, value addition of by the primary collectors can be done by bidi making and increase their earning.

Uses: Fruit is edible and widely used as food during peak summer by the tribals. ‘Bidi’ also making from Kendu leaves which is used by some people as drug.

9. CHAR SEED

Botanical Name : *Buchanania lanzan*

Family : Anacardiaceae

Trade Name : Chironji

Local Name : Charkoli

Parts Used : Nut, Seed

Distribution: This is a seed called Chiranjee–dana or Char-dana obtained from the fruit of tree *Buchanania lanzan*. The tree is medium sized, found in almost all areas of the Division and is deciduous in nature.

Harvesting: The tree flowers during January and fruits ripen during April/ May. The primary collectors often collect the fruits by plucking the mature fruits. Sometimes due to competition, they also collect green fruits, which do not give good return. The kernel obtained from de-coated fruits with proper drying fetches high price. But moisture in the

kernel attracts insect attack. Therefore, proper drying in the sun in addition to proper storage and bagging adds to the value of the product. The primary collectors should be made aware of the collection, drying de-coating method through training and should also be assisted in marketing the collection, so as to facilitate better remuneration for their labour.

Uses: Theripe fruits with delicious endocarp are often regarded as poor man's grapes. However, char seeds/ kernels have variety of uses. It is eaten directly by the rural poor. It is also use in flavouring sweet meat, confectionary, betel nut power etc.

10. GUMS (GENDULI)

Botanical Name : *Sterculia urens*

Family : Malvaceae

Trade Name : Karaya Gum

Local Name : Kateera Gum

Distribution: The Genduli is one of the most important gums available in the Division. It is extracted from the tree *Sterculia urens* that is found all over the Division. The past record of collection of Gum shows that the total collection of gum is going down and down. During the years 1993-94, 1994-95, 1995-96 there was collection of 153.00, 71.00 and 87.13 quintals respectively, whereas for the year 1980-81, 1981-82 and 1982-83 the collection figures were 784.36, 1233.48 and 540.00 Qtls respectively. As there are sufficient trees, care should be taken for adapting the latest techniques of gum tapping so that there will be maximum production and minimum injury to the trees. Also effective check on the movement of the materials is required.

Harvesting Method: For optimum production of the gum, tapping shall be done on trees of 0.9 mt. girths and above, similarly, two blazes shall be made on the trees up to 1.35 mt. girth. The initial blaze of size should be 16 cm × 7.5 cm and this needs to be made at the breast height using sharp instrument. This blaze shall be increased gradually to 45 cm and 25 cm respectively, at a stretch; there shall not be more than 3.0 cm × 1.5 cm extension to the bark. Further, any hammering to the bark may lead to closing of the pores and prevent the exudation of gums.

Harvesting: The best period of exudation of gum is April to June and gum obtained during rainy season is poor in quality. For better and sustainable production, a cycle of 4 to 5 years shall be adopted.

Uses: Genduli gum used as a thickener in medications, cosmetics and denture adhesives and as a binder and stabilizer in foods and beverages

11. HILL BROOMS:

Botanical Name : *Thysanolaena maxima (Thysanolaena latifolia)*

Family : **Poaceae**

Trade Name : **Hill broom**

Local Name : **Phooljhadu**

Distribution: Hill brooms are prepared out of grass i.e “*Thysanolaena maxima*” and otherwise known as Tiger grass. Normally found on forest slopes particularly near nallahs.

The grasses grow up to a height of 4 to 5 and attain long inflorescence up to 45 cms. which forms the major part of the broom.

Harvesting: The collection time of this grass is before its full maturity during March to June. Due to unsystematic collection procedure, the species has faced the problem of further propagation. Here care should be taken to retain some mature stalks for ensuring natural regeneration.

Processing and value addition: The simple processing and value addition of hill broom adds great market value. After cutting the stalks are dried for two to three days and separated into equal length. Then by using rope, it is tied properly at the lower end of the stalk to make the broom. These operations are done manually. Steps shall be taken to involve the local VSS and SHG groups for adding to their earning and betterment of the forests. Small village level enterprises could be started to make brooms.

Uses: Local tribes use broom sticks as well as building materials. It is also used as sweeping the home by the people. Broom sticks also used as raw material in paper industry.

12. SIALI LEAVES AND FIBRE

Botanical Name : *Bauhinia vahlii*

Family : Fabaceae

Trade Name : Kanchan

Local Name : Siali

Distribution: Siali leaf is an important NTFP of central and southern Odisha. Large leaves of Siali are shaped like Camel foot and appear as twins. After the NTFP policy of March 2000, its management has been transferred to Grama Panchayata. The importance of the leaf in the socio-economic life of poor tribal.

Harvesting: Leaves are better available between October to February, both in terms of quality and quantity. This is a peak period of collection.

Processing and value addition: The simple processing is dry the collected leaves in sun for about three to four days and then stitch five to six leaves into a plate with the help of bamboo splits and then sell in bundles. There is a scope to raise the remuneration of the primary collectors if they could be organised into cooperatives including SHG and provided with processing machines to get the benefit of value addition.

Uses: Sialileaves are largely used in making disposable plates, Donas and food wrapper.

Fibre: - (i) The fibres obtained from the climbers are used for making ropes for domestic purposes. However, major use is by the Kendu Leaf organisation for the purpose of binding.

(ii) For extraction of the fibre, the climber shall have at least two feet girth. This is girth when the climber moves towards its maturity and requires to be cut for silvicultural need. Even the quality of leaves also great reduced.

(iii) The climber has to be cut flush to the ground and carefully pulled out from the host plant. Usually, it takes four to five years for the climber to attain the exploitation size. Hence cutting cycle of five years may be adopted to work out this climber.

(iii) The processes of separating the fibre from the wood plant issue are technically known as “Retting”. This process consists of submitting the stem to the action of

water and allowing fermentation in take place resulting in removal of gummy material by water and subsequent beating and scrapping of the softened tissue to get the fibre.

9.6.13.2 Medicinal Plants and Their Prescriptions

9.6.13.2.1 As described in Chapter 7 of part I, the distributing patterns and habitat of medicinal plants are varied and diverse. Through there is practically no specific study on the medicinal plant resources and their potential, the use in the traditional system of medicine continues to be in vogue in the Division and the large populating still depends upon these resources for their medical needs. However, gradually, popularization of medicinal plant species and their derivatives is regaining its lost ground/ value in the state and is being encouraged by the State Medicinal Plant Board. Still, a lot of work is required to be done to preserve this resource for posterity.

9.6.13.2.2 Since there is hardly any authenticated information and documentation of these species, the immediate steps required to be taken should be rigid protection measures. Inventorization and characterization of all known medicinal plant species with the help of the local knowledge of the people and vaidiyas. This unique, traditional, local knowledge existing within the community of an area should be documented. The knowledge is normally stored in the memories of the traditional healers and users of the medicinal plant resources. In case, some other methodologies for collection, extraction of plant products adopted by the locals are found to be injurious to the plant, then steps shall be taken to modify such practices.

9.6.13.2.3 The Bio-Diversity Act, 2002 and the corresponding Rules, 2004 have already come into force. These provisions duly take care of all the issues relater even to the medicinal plants, their derivatives, uses and harvesting techniques, Hence the people's Biodiversity Register shall be made on priority and updated regularly. It is a participatory documentation, inventorization and characterization of known biological resources of the area. It is intended to even identify and protect local's rights over the intellectual property and natural resources.

9.6.13.2.4 The strategy should be not only to maintain the existing medicinal plan resources at sustainable level but also to increase the productivity through improved methodologies. The augmentation of raw material resource shall be done by

domestication of wild plants having medicinal value and their large-scale cultivation. The cultivation of Amla, Black Pepper and Safed Musli etc. has already been taken up for meeting the requirements of the local people in the Division.

9.6.13.2.5 Efforts shall be made for development of 'Identification Keys' for diverse medicinal plant resources. It will not only improve in the management skills but will also check the illegal removal of non-medicinal plants and their parts out of ignorance. It will further help in regulation of trade and realization of right price by the primary collectors. Moreover, herbal gardens shall be developed for propagation and awareness of the medicinal resources of the area.

9.6.13.2.6 The best option will be to form the Bio-Diversity Management Committees at the local level under the provisions of the Bio-Diversity Act-Rules and prepare Bio-Diversity Conservation Action Plan for promoting, conservation and sustainable use of the biodiversity in general and medicinal plants in particular. The conservation measures should be both 'In-situ' & 'Ex-situ' as has been started in the Division and the traditional healers/ users of these resources shall be an intrinsic part of any such effort for long term gains both for the forest and all stake holders.

9.6.14 Development of Special NTFPs

9.6.14.1 Apart from the NTFPS naturally available in the Division, the need for development of certain special items should also be considered on priority. As there is growing demand of raw material for bio-diesel projects, plantation of *Jatropha* both on the boundary line of forest blocks as well as on community land as block plantation should be carried out. Similarly, *Agave sisalana* plantations can be taken up both on forest boundary and on degraded community lands. This will help in mitigating the requirement of maintenance of boundary line of the forests and also the fibre requirement of the local area. This will also help in soil conservation and improve the economic condition of the people. These species being non-brows able, their protection from browsing is not at problem.

9.6.14.2 The Divisional Forest Officer shall prepare an annual action plan to develop these new NTFPs viz. *Jatropha* and *Agave* with a view to enhance the supply of the concerned raw material. This plan shall be approved by the Regional Chief Conservator of

Forests, Koraput Circle or any other specified authority for execution by the Divisional Forest Officer.

9.6.14.3 The Orissa Plantation Manual 1977 shall be followed while carrying out this plantation including the calendar of operations. However, some specific points relevant to the species are spelt out in the following paragraphs.

9.6.14.4 *Agave sisalana*:

9.6.14.4.1 Sisal is a xerophytic plant and thus has a greater ability to withstand drought under most adverse conditions and is adaptable to wide ranging soils. The fiber extracted from its leaves is used for rope making and is in great demand. The plant acts as a good soil binder and helps preventing erosion of the top soil. The agave plantation shall be taken up along the block boundaries particularly the boundaries adjoining village habitations where the forest blocks are more susceptible to encroachment. The plantation should be done in staggered pattern in two to three rows as spacing of 1 × 1 meter over 400 RKM.

9.6.14.4.2 Planting technique: Sisal seedlings weighing about a Kg and having stout and well developed bole are the ideal planting material. The nursery raised with ground sucker is better than be one done with bulbils. Seedlings of 9 months to 1 year old should be planted. Sisal being a surface feeder because of fibrous roots does not required very deep pits for planting. The normal size of 1 cm³ pit is sufficient which shall be disinfected with BHC/ Aldrine to prevent white ant attack to the root system. The ideal time for planting is just before onset of monsoon. The seedlings should not be planted deeper than the bole, otherwise soil will get into leaf axils above the bole damaging the terminal leaf meristem and resulting in subsequent death of the whole plant. Mulching done to the plant helps in checking weed growth. Fertilization adds to the growth. However, use of insecticides is required only in the event of an epidemic borer attack.

9.6.14.4.3 *Harvesting*: It flowers during January to March. However the Sisal leaves become ready for harvesting by 4th year. In the 1st year of harvest, only sound leaves should be cut leaving a minimum of 15-16 leaves per plant. If excessive cutting is done, the plant may not survive. The best and safest rule is to only cut those leaves which are positioned on the perimeter of the bowl. The out turn per RKM is about 1 (One) quintals of fibre (Two rows staggered pattern of plantation with 1×1 meter spacing). The extraction of fibre starts from November and continues up to May. The extracted fibre shall be cleaned by washing,

dried, brushed and bundled. Quick disposal is desirable as long storage affects the colour and hence the price.

9.6.14.5 *Jatropha curcas*:

9.6.14.5.1 *Jatropha curcas* belongs to the family ‘Euphorbiaceae’ and it thus closely related to some other important cultivated plants like Rubber plant and Castor. It is a small evergreen, nearly glabrous tree or soft wooded shrub 3 to 4 meter high. It flowers between September to December. The fruits mature within two to four months after flower turns yellow. It is easily propagated by seed or cutting and grows rapidly. A hot and humid climate helps in the early germination of seeds.

9.6.14.5.2 This plant has a production life of nearly 40 to 50 years without necessitating replanting or tending unlike other such crops. It is indigenous to America but now grows in semi wild condition in the vicinity of the villages, in almost all the states. It can grow successfully on all kinds of barren and unproductive waste lands. It is more popular as a live fence for protection of agricultural fields from the attack by livestock as it is unpalatable to cattle and goats. Other uses include *Jatropha* oil as bio diesel, soap making, medicinal value etc. However, the main use anticipated in the near future is its use for bio diesel production as already mentioned in Chapter-3 of Part- I. The total area to be taken up is about 300 Hectare.

9.6.14.5.3 Planting technique: The plantation along block boundary in two rows at 1m × 1m spacing shall be done in the staggered manner. Since large scale plantation of *Jatropha* has been recommended by the Planning Commission, even the block plantation @500 plants per ha may also be considered in community waste land as well private land. The seedlings should be raised in poly bags of half kg capacity filled with a mixture of soil and organic manure in the ratio of 4:1. Two seeds be sown in each poly bag at a depth of 6 cm and watered regularly. When the seedlings are about 4 weeks old, the weaker of two seedlings be removed and used for gap fillings. The seeds or cuttings can also be directly planted in the field on the onset of monsoon. For planting 1 ha area, around 5 to 6 kg of seeds is enough if the spacing is 2mt × 2mt. is adopted. However, in rain fed wastelands high- density plantation at 2mt × 1mt or 1.5mt × 1.5mt shall be considered. Two main techniques followed for this plantation are described below.

9.6.14.5.4 Direct planting: The land shall be ploughed once or twice depending upon the nature of soil. In case of heavy soils, deep ploughing is done whereas in light soils, shallow ploughing is enough. The seed/ cuttings are planted in the field on the onset of monsoon. Two seeds shall be dibbled at each pit at a spacing indicated above. When the seedlings are 4 weeks old, weaker seedlings should be removed to retain healthy one per pit. The seeds with overnight pre-soaking treatment shall be used for direct dibbling. In plantation with cuttings, the planting materials should be 45 to 100 cm long with thickness of 3 to 4 cm and obtained as far as possible from base of the stem.

9.6.14.5.5 Transplanting: The planting site is prepared by digging small pits of 30×30×30 cm³ at spacing indicated above. Pits are filled up with excavated soil and 400g compost/ organic manure per pit. Basal dose of fertilizers may be applied @ 20g urea + 120g single super phosphate whereas Muriate of Potash 16gm mixed with soil at the time of filling pits. The poly pot seedlings shall be planted on the onset of monsoon.

9.6.14.5.6 Fertilizer application: Apart from organic manure fertilizers containing N, P, and K @ 46:48:24 per hectare should be applied. For direct planting 20g urea + 12g single super phosphate and 16g Muriate of Potash should be applied around the plant and the fertilizer should be applied at the time of transplanting or immediately after the plants establish in the pits. The remaining dose of urea should be applied in two splits @ 10g per plant. The first split should be applied one month after basal dose and second split after two months of basal dose. Jatropha oil cake can also be used for recycling of nutrients to maintain the productivity of the soil.

9.6.14.5.7 Yield: The fruits of Jatropha are ripened in between December to April and can be easily plucked from the bushes providing casual employment to rural people. The planted crop starts seedling from the 2nd year itself if raised with cuttings whereas transplanted/ seed origin gives production from 3rd year onwards. The properly maintained plantation gives more production in irrigated crop than rain fed. The out turn is shown in Table No. 9.7.

Table No. 9.7: Expected Yield of Jatropha Seeds per Ha. With 2500 Plants:

Year after planting	Expected Yield/Ha Rain fed Crop(in Kg)	Expected yield/ha in irrigated Crop(In Kg)
1 st	-	250
2 nd	250	1000
3 rd	1000	2500
4 th	2000	5000
5 th	3000	8000
6 th onwards	4000	12000

9.6.15 CALENDAR OF OPERATIONS OF MAJOR NTFPS

9.6.15.1 The collection period for different NTFP items will be from 1st October to 30th September of following year. The general period of collection of some of the important NTFP items are described in Table 7.9. There may be local variations in period of ripening due to terrain, aspect and weather conditions.

Table No. 9.8: Calendar for Collection of Major NTFPs:

NTFP	Collection Time	NTFP	Collection Time	NTFP	Collection Time
Amla(Anla)	Jan-April	Gum	Sept-June	Khair	Oct-May
Arrow root	Dec- jan	Harida	March-April	Khajuri leaves	Oct-May
Bahada	Jan-April	Honey	January	Kurei fruit	Dec-Feb
Bel	May-June	Honey wax	January	Kamlagundi	Feb-March
Broom grass	Oct-May	Jatropha seed	Dec-April	Lemon grass	Mar-April
Char seed	April-May	Kendu leaf	Mar-June	Lodha bark	Oct-May
Cashew nut	April-May	Kendu fruits	April-May	Mahua flower	April-May
Dhatiki flower	Jan- April	Kusum seed	May-June	Mahua seed	June-July
Dantari bark	Nov- March	Karanja seed	Dec-Jan	Marking nut	Dec-March
Genduli gum	Oct-May	Kochila seed	Dec-Jan		

9.6.16 MISCELLANEOUS REGULATIONS

9.6.16.1 Choice of Species: During the course of artificial regeneration through block/ gap plantation, preference should be given to the species which yield NTFPs or medicines. Similarly, in the Rehabilitation Working Circle areas, care should be taken to retain the miscellaneous species, which yield important NTFPs.

9.6.16.2 Marketing: Marketing of NTFP items has been found to be the biggest problem of the primary collectors. Wherever, such channels exist, they are too long so that the primary collectors get a pittance for the valuable product. Most of the times, the middleman exploits the illiterate NTFP gatherers in the name of inferior quality. Hence, all these marketing aspects of various NTFPs need to be attended to on priority basis.

The VSS and Gram Panchayats should be given information about the marketing prospects of Non-Timber Forest Products consist of goods of biological origin other than wood, derived from forests, other wooded land and plants outside forests. Collection of NTFP forms an integral part of the economy and important source of livelihood for large sections of poor forest dwellers.

Presently there is no organized market access in NTFP sector in Orissa. The primary collectors/farmers are being exploited by the traders. Most of the Ayurvedic pharmacies of the state have also been procuring their raw materials from outside the State. There is need of interface between these manufacturers that with the primary gatherers/ SHGs/ farmers. Formation of Primary Co-Operative and Apex Co-Operatives at the linkage and to build sustainable business plan. The rich experience of maintaining NTFP mandies by Uttaranchal Forest Development Corporation and marketing policy of Girijan Co-operative Corporation (GCC) of Andhra Pradesh & Gujarat Forest Development Corporation can be shared to develop marketing strategy in the State with greater success.

9.6.16.3: Training and Awareness: The DFO shall organize regular trainings on collection, exploitation and utilization of NTFP items in accordance with the relevant Government policies in force from time to time. The main objectives of such trainings should be to ensure regulations of collection, exploitation and utilization of desired NTFPs in such a manner that composition, regeneration and sustenance of forests shall not be affected adversely. Simultaneously, the DFO and his staff must work in tandem with local

people so that most of the benefit from NTFPs even through simple value addition where ever possible/ desirable passes to them.

9.6.16.4 Protection Measures: The divisional staff must possess a clear perception of threats from faulty/ injurious local practices during collection of NTFPs that adversely affect the sustenance of forests. Keeping in view the perceived threats to forests. For example, vulnerable forests may be temporarily closed for NTFP collection for specified period so that regeneration of desired species is not adversely affected. Similarly, collection period may be reduced in some cases (e.g. seeds) to ensure that sufficient seeds are left on forest floor to induce regeneration. The divisional staff may work in close co-operation with local people who may be motivated not to collect entire seeds from forest floors and to allow some seeds to remain on ground for regeneration purposes. Similarly, local people may also be encouraged to adopt more forest friendly techniques while collecting barks, branches, leaves and roots so that forests are not affected adversely. They may also be encouraged not to resort to forest fires. The collection of leaves, barks from standing trees and collection of roots must be scrupulously supervised so as to cause minimum damage to the trees. All forests shall be strictly protected against forest fires, un-authorized grazing and illicit-felling. Effective measures should also be taken to contain shifting cultivation and other encroachments in forests.

9.6.16.5 Regulation of Purchase Price: The Divisional staffs should prevent the purchase of the NTFPs at lower price by middlemen and ensure the collection/ disposal in accordance with the Rules-2002 in Chapter 8 of Part- and price of NTFP/ MFP fixed by the Panchayat Samiti of Malkangiri District (**Annexure-XI**). The minimum procurement prices should be given wide publicity through VSS and other media. Audio and video methods should also be utilized to create awareness among the public. More emphasis should be given on the medicinal plants, their derivatives and uses.

9.6.16.6 Documentation: The Divisional Forest Officer shall maintain proper record of different NTFP items mentioning the quantity of collection, area/ forest from which collected and the period of their collection. An annual assessment of potential on availability of various NTFP items shall also be made in the beginning of each calendar year. Steps taken in accordance with the above regulation to ensure sustainable management of forests and fair deal to local people shall also be recorded and reviewed periodically by the Divisional Forest Officer and higher authorities. Even, the impact of

transfer of NTFPs items to the Gram Panchayats on the forests as well as the primary collectors shall also be studied and annual reports should be submitted suggesting any modification if required.

9.6.16.7 Maintenance of Records: Besides other records, Compartment History Files and Control Forms should be maintained in accordance with the Management Plan Procedure, 1991 and other instructions in vogue.

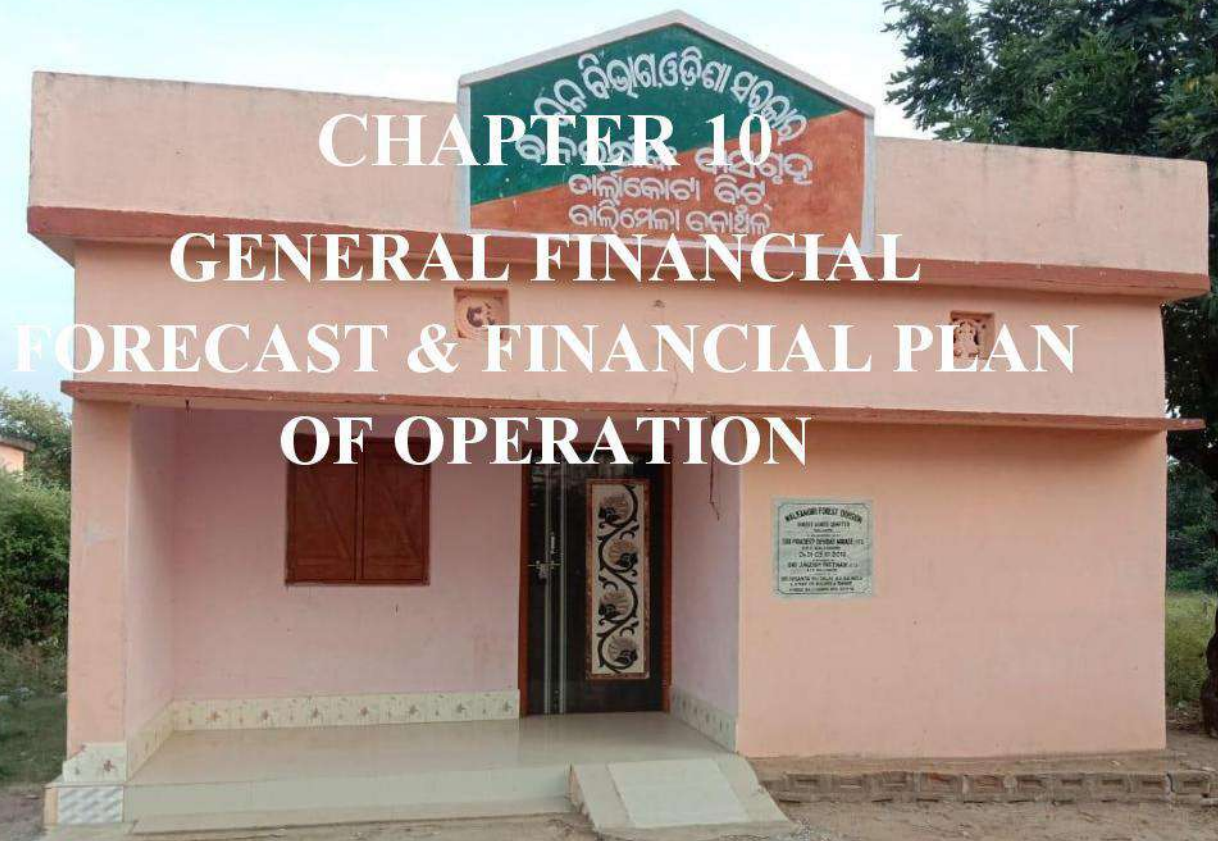
9.6.16.8 Rights and Concessions: Rights and concessions of local people shall be regulated in accordance with the Orissa Forest Act, 1972 and relevant Rules in force besides the Government Policy communicated from time to time.

9.6.17 COST NORM

9.6.17.1 The cost norm for implementation of prescription and the total estimated cost of working under this Working Circle is discussed in Chapter 10 of Part-II (Financial Forecast and Plan of Operation).

9.6.18 INTERMEDIATE REVISION

9.18.1 The current policy in NTFP items has been internalized in this Plan. However, some Gray areas still exist in working of the NTFPs by the Gram Panchayats. This may require an interim revision of the prescriptions of this Working Circle. Further, interim revision is anticipated an account of improvement of forest vegetation under Protection Working Circle, The Regional Chief Conservator of Forests, Koraput Circle in consultation with the Conservator of Forests, Working Plans may review the situation in the light of impact of the NTFP Policy and may suggest for interim revision of this Working Circle.



CHAPTER 10

GENERAL FINANCIAL FORECAST & FINANCIAL PLAN OF OPERATION

Latitude: 18.267328
Longitude: 82.073175
Elevation: 253.93m
Accuracy: 10m
Time: 22/11/2020 16:38

CONST. OF FOREST GUARD QUARTER AT M.V.-37 UNDER SCHEME CAMPA

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CONST. OF REST SHED AT AMAKUNDA

Time: 22-02-2020 13:32

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10.1 GENERAL CONSTITUTION

10.1.1 As discussed in forgoing chapters, the forests of the Division have suffered from gradual degradation due to increasing biotic pressure and very little silvicultural inputs. This has posed serious threat to the existing eco-system. Late receipt of Outgoing Working plan and some timber coupes were not worked due to a smaller number of exploitable girths, as a result essential silvicultural operation to maintain the forest could not take up during the plan period.

10.1.2 The prescription of this plan has aimed at improving the forests, its productivity and biodiversity and overall making sustainable use of the forests and maintaining forests for prosperity. Further, this plan has prescribed marking of trees on a conservative manner in the Selection-cum-Improvement Working Circle, so certain revenues will be available from the forests of this Division from both timber and non-timber produce. Resources for the implementation of improvement works to be taken up should be made available to the DFO so that the implementation of the plan can be taken up to achieve the set of stated objectives.

10.2 PAST REVENUE AND EXPENDITURE

10.2.1 The past revenue and expenditure in detail has been furnished in Chapter-11 of Part-I. However, budget subhead wise revenue and expenditure statement of 2007-08 to 2019-20 is furnished at Table No.11.1 to 11.5 respectively. The revenue is also expected from Selection-cum- Improvement coupes, salvage operations of wind fallen, uprooted, dry & diseased trees, tending & thinning operations though it is sub-ordinate to forest conservation. Further, growth of Bamboo forests and their outturns is expected to improve with the implementation of prescribed intensive bamboo silvicultural operations. The prices of timber will continue to move upwards due to progressive depletion of forests on one side and increasing demand for timber on the other side.

10.2.1.1 Revenue:

Table No. 10.1: Budget Sub-Head wise Revenue of 2007-08 to 2020-21

Budget Sub-Head	Revenue Actually Collected in Lakhs												2019	2020
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018		
0406-F & WL (Forest Revenue)														
0168-R-Timber and Other Forest Produce removed from Forest by Government Agency (B)	22.34005	0	0	0	0	0	0	0	0	0	0	0		
i)02154- Royalty of Timber		20.30706		32.03292	13.71629	93.87672	11.56269	24.03292	33.00889	9.48542	13.07769	48.20542	24.20498	14.51302
ii)02060-Grass & Fodder grass	0	0.084110	0.05530	0.05875	0.04169	0.00861	0.02268	0.00600	0.00	0.00	0.00	0.00	0.00	
0168-R-Timber and Other Forest Produce removed from Forest by Consumer & Purchaser (A)														
i)0033-R-Drift & Waif wood confiscated	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
ii)02078- Misc. Sale of Forest Produce	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
Total	22.34005	20.39117	0.05530	32.09167	13.75798	93.88533	11.58537	24.03892	33.00889	9.48542	13.07769	48.20542	24.20498	14.51302
800- Other Receipts														
i) 02024- Fines & Forfeiture	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
ii) Rent on Buildings (Try)	0.0058	0	0	0	0	0.76945	0.96550	1.52774	1.85270	1.93410	1.91252	1.77566	2.21200	2.33372
iii) 02082- Other Misc														
a) Compounding fees	4.04030	3.42715	2.52165	2.82725	4.36675	4.92195	6.43915	8.30695	9.80111	7.86575	8.34630	6.91690	6.07600	6.61650

b) Registration fees	0.00010	0.00100	0.00200	0.00200	0.00070	0							0.00050	0.00040
c) Rent on FRH	0.01788	0.01960	0	0.01526	0.00450	0	0	0	0	0	0	0	0.00	
d)11001-(-)Refund of Revenue	0	0	0	0	0	0	0	0	0	0	0	0	0.00	
e)Regnl fees	0	0	0	0		0.00010	0.00020	0.00110	0.00030	0.00100	0.00170	0.00020	0.00	
f)Renewal Fees	0	0	0	0		0.00370	0.00100	0.00200	0.00140	0.00270	0.00	0.00110	0.00170	0.00340
g)Sale of Coupe permit	0	0	0	0		0.00004	0	0	0	0	0	0.00010	0.00	
h)Misc.Receipt	0	0	0	0	0	0	0	0	0.16134	4.07180	0.82211	0.98765	0.69476	7.66306
Total	4.06408	3.44775	2.52365	2.84451	4.37195	5.69524	7.40585	9.83779	11.81685	13.87535	11.08263	9.68161	8.98496	16.61708
G.Total	26.40413	23.83892	2.57895	34.93618	18.12993	99.58057	18.99122	33.87671	44.82574	23.36077	24.16032	57.88703	33.18994	31.13010

10.2.1.2 Expenditure:

Table No. 10.2: Budget Sub-Head wise Non-Plan Expenditure of 2007-08 to 2020-21 (in lakh).

Budget Sub Head	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Non Plan Expenditure														
a)2059-Non Plan														
22-2059-Public works-Non-Plan (Repair & Maint of Non Residential buildings)	27.20000	36.30750	9.60000	12.60000	11.60000	7.60000	9.00000	9.00000	10.00000	13.00000	10.81000	5.00000	8.00000	9.00000
b)2406-Non Plan 01-Forestry														
78180- GPS/01-003-1478	0	1.34750	1.50000	0.80000	0.80	1.00000	2.00000	0.04000	0.00	1.00000	0.00	0.00		0
22-2406-070-Communication of Buildings	11.00000	11.00000	10.50000	38.50000	27.50000	0	0	0	0	0	0			
I) Minor work	0	0	0	0	0	0	1.00000	5.10000	0.00	0.00	0.00	0.00		

i)21033- Maintenance work	0	0	0	0	0	1.00000	3.00000	1.20000	2.00000	1.00000	1.65000	0.00		
ii)21064-Repair of Building	0	0	0	0	0	8.50000	12.00000	10.00000	6.50000	10.00000	7.00000	4.20000	6.00000	5.52000
iii)21094-Repair of Forest Road	0	0	0	0	0	18.00000	10.00000	10.00000	10.67000	15.00000	10.00000	15.00000	10.00000	5.00000
101-FCD & Regeneration	2.50000	3.40000	3.40000	4.38000	4.48000	0.00	0.00	0.00	0.00	0.00	0.00			
I) 21019-Boundary Maintenance	0	0	0	0	0	0.80000	1.60000	0.80000	1.00000	2.00000	0.00	2.80000	1.00000	0.50000
ii)78124-Working Plan	0	0	0	0	0	0.80000	0.80000	0.60000	0.00	1.00000	0.00	0.00		
iii)22026-Forest Consolidation	0	0	0	0	0	0.31000	0.31000	0.27000	0.00		0.00	0.00		
iv)22036-Regeneration	0	0	0	0	0	0.17000	0.17000	0.21000	0.00	0.30000	0.00	0.00		
V)22035-Protection from fire	0	0	0	0	0	0.30000	0.30000	0.31000	0.25000	0.25000	0.00	0.00		
22041-Sowing & Planting	0	0	0	0	0	0.60270	0.21000	0.20000	0.25000	0.00	0.00	1.81000		
37109-Other work	0	0	0	0	0	100000	5.00000	4.50000	2.50000	1.50000	2.87300		0.30000	0.30000
101-FCD & Regeneration (PIANTATION)														0.75150
2556-13th FCA														
i) AR (WP) 2013-14/2014-15	0	0	0	0	0	0	45.90000	37.90800	0	0	0	0		
ii)AR (OWP) 2013-14/2014-15	0	0	0	0	0	0	6.12000	14.49000	0	0	0	0		
iii)TOF 2013-14/2014-15	0	0	0	0	0	0	33.67989	27.58280	0	0	0	0		
iv) AR WP 2012-13/2013-14(2nd Yr Maint)	0	0	0	0	0	0	3.54000	26.55000	0	0	0	0		
v)) AR OWP 2013-14 (2nd Yr Maint)	0	0	0	0	0	0	0.00	3.54000	0	0	0	0		
v) AR 2011-12/2012-13 (OWP) 3rd Yr Maintenance	0	0	0	0	0	0	2.64000	2.64000	0	0	0	0		
vi)AR 2014-15/2015-16 WP (PO)	0	0	0	0	0	0	53.46000	53.46000	0	0	0	0		
vii)AR 2014-15/2015-16 OWP (PO)	0	0	0	0	0	0	19.80000	14.85000	0	0	0	0		
viii) TOF 2014-15 /2015-16(PO)	0	0	0	0	0	0	31.50920	30.74100	0	0	0	0		

IX) Cadre of Community Youth	0	0	0	0	0	0	6.75675	6.85000	0	0	0	0		
x) Stall Feeding & Cattle grazing	0	0	0	0	0	0	3.75000	2.50000	0	0	0	0		
xi) NTFP Survey	0	0	0	0	0	0	8.76000	0.00	0	0	0	0		
xii) SSO Timber	0	0	0	0	0	0	29.19000	0.00	0	0	0	0		
xiii) Incentive based fire Protection	0	0	0	0	0	0	12.60000	0.35000	0	0	0	0		
ix) Fire Protection Squad	0	0	0	0	0	0		7.20000	0	0	0	0		
x) Hiring Vehicle	0	0	0	0	0	0		4.80000	0	0	0	0		
105- Forest Produce	0.40000	0.40000	0.40000	0.23000	0.23000	0.23000	0.50000	1.75000	0.15400	0.30000	0.00	0.00		
111-D.W.Timber	6.50000	1.00000	1.70000	1.30000	1.30000	1.30000	0.30000	1.11000	0.25000	0.50000	0.00	0.00		
111-D.W.Bamboo		5.10000	5.10000	1.10000	1.10000	1.10000	1.10000	1.36000	0.42000	1.26000	0.00	0.00		
2406- 02 Forestry- Wildlife Preservation- Other charges/Compensation of WL Victims		0.06000	0.33330	0	0.00	0.00	0/3.30000	0.00	0.50000	1.10000	0.00	1.00000		
800-Other Expenditure/Incentive to VSS	0	0	0	0	0.00	0.39000	0.63100	0.55050	0.40100	0.20050	0.79150	0.65050	0.70050	6.05000
TOTAL 01-Forestry= 2406 Non-Plan	20.40000	22.30750	22.93330	46.31000	35.41000	35.50270	299.92684	271.4623	24.44500	34.41050	22.31450	25.46050		0
22-4406-Non Plan (Compensatory Afforestation)	0	0	0.28300	0	0	0	0	0	0					18.12150
G. Total Non-Plan	47.60000	58.61500	23.21630	58.91000	47.01000	43.10270	308.92684	280.46230	34.44500	48.41050	33.12450	30.46050	26.00050	27.12150

10.2.1.3 Expenditure:

Table No. 10.3: Budget Sub-Head wise State Plan Expenditure of 2007-08 to 2020-21 (in lakh)

Budget Sub Head	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
State Plan Expenditure														
D.No.22-2401- State Plan-SS-01- Fry101-FCD &Regn.- Strengthening & Maint of Forests under 12th FC Grant -78090- Silv Reserch-SSO Bamboo in overlapping WC	0.00	4.98000	0	0	0	0	0	0	0	0	0	0	0	
D.No.22-2401- State Plan-SS-01- Fry-796-TASP- 08001-Office Expenses WFP														
662- Handling Charges	0.92319	0.00	0	0	0	0	0	0	0	0	0	0	0	
Constn. of WFP Storage Godown	1.90000	0.00	0	0	0	0	0	0	0	0	0	0	0	
Total WFP Office Expenses	2.82310	0.00	0	0	0	0	0	0	0	0	0	0	0	
D.No.22-2401- State Plan-DS-01- Fry-OBBDP			3.50000	2.35000	3.03620	0	0	0	0	0	0	0	0	

D.No.22-2401- State Plan-SS-01- Fry-IPCEA	0	0	3.78000	3.80000	3.78000	0	0	0	0	0	0	0	0	
D.No. 22-2406- COL on F&WL- 01-796-TASP- 2151-OBDP	0	0	0	0	0	2.67900	0	0	0	0	0	0	0	
D.No. 22-2406- COL on F&WL- 01--2118-IPCEA	0	0	0	0	0	3.78375	0	0	0	0	0	0	0	
D.No. 22-2406- COL on F&WL- 01--2556-13th FC IWP	0	0	0	0	0	171.32032	0	0	0	0	0	0	0	
D.No. 22-2406- COL on F&WL- 01--2556-13th FC PWC	0	0	0	0	0	20.21675	0	0	0	0	0	0	0	
22-2406-01-SP- DS-2063- Urban Pltn	0	0	0	0	0	46.54011	0	0	0	0	0	0	0	
22-2406-01-SP- DS-2399-IFM	0	0	0	0	0	0.67656	0	0	0	0	0	0	0	
22-2406-02-SP-SS- 1571-WL Conv & Protection	0	0	0	0	0	10.18660	0	0	0	0	0	0	0	
TOTAL 2406- STATE PLAN	0	0	0	0	0	255.40309	0	0	0	0	0	0	0	
D.No 22-2406- F&WL-State Plan-SS-01-Fry- 101-FCD & Reg- Strengthening & Maint of Forests under 12th FC Grant 78141- Protection Working Circle														

1.Antismuggling Squad	1.63000	1.89000	2.31000	0	0	0	0	0	0	0	0	0	0	
2.Incentive & Reward	0.46000	0.11200	0.20000	0	0	0	0	0	0	0	0	0	0	
3.Boundary Maintenance	0.87000	0.00	0.00	0	0	0	0	0	0	0	0	0	0	
4.POL-Mobility	0.00	0.37000	0.37000	0	0	0	0	0	0	0	0	0	0	
5.Arms & Ammunitions		0.50000	0.50000	0	0	0	0	0	0	0	0	0	0	
6.Road Maintenance	0.00	0.20000	0.20000	0	0	0	0	0	0	0	0	0	0	
7.Repair of VHF Sets	0.00	0.13500	0.00	0.00		0	0	0	0	0	0	0	0	
TOTAL PWC	2.96000	3.20700	3.58000	0		0	0	0	0	0	0	0	0	
d.No.22-2406- State Plan-796- TASP-1782 DCN- 20002 -OC													0	
1.1782- Decentralized Nursery	1.25000	0.75000	0	0	0	0	0	0	0	0	0	0	0	
2.Strengthening of VSS	0.00	5.00000	0	0	0	0	0	0	0	0	0	0	0	
Total	1.25000	5.75000	0	0	0	0	0	0	0	0	0	0	0	
D.No 22-2406- F&WL-State Plan-DS-01-Fry- 789-SCP forScheduled Caste-2151-OB 1.Inf. Dev of Nursery & Preplanting	0.00	1.44000	0	0	0									
D.No 22-4406- COL on F&WL-State Plan-DS-01-Fry-	0.00	2.50000	5.50000	0	0	0	0	0	0	0	0	0	0	

796-TASP- 1. 0182-Constn of Building														
D.No.22-2401- State Plan-SS-01- 101-FCD&R- Strengthening & Maint of Forests- 12th FCA													0	
1.Silvicultural Research (SSO Bamboo) 8611 Ha	0	0	18.25000	0	0	0	0	0	0	0	0	0	0	
D.No.22-2401- State Plan-SS-01- 101-FCD&R- PWC- 2556-13th FCA	0	0	0	0	0	0	0	0	0	0	0		0	
1.AR 40 Ha PO 2011-12(PO)OWP	0	0	0	4.75000	0.00	0	0	0	0	0	0	0	0	
2.TOF				12.68000	0.00	0	0	0	0	0	0	0	0	
3.POL- Building Cadre of Community Youth	0	0	0	5.13000	5.13000	0	0	0	0	0	0	0	0	
4.Stall Feeding and Cattle Grazing	0	0	0	1.40000	1.40000	0	0	0	0	0	0		0	
TOTAL PWC				23.96000	6.53000									
D.No.22-2401- State Plan-SS-01- 101-FCD&R- IWP-13th FCA														
1.AR 2011-12 Creation 2011-12	0	0	0	0	3.95000	0	0	0	0	0	0	0	0	
2.Raising of sappling for distribution 2011- 12	0	0	0	0	10.97000	0	0	0	0	0	0	0	0	
1.AR (PO 12-13)	0	0	0	0	1.92000	0	0	0	0	0	0	0	0	
2.Raising of	0	0	0	0	17.59750	0	0	0	0	0	0	0	0	

sappling for distribution (PO 12-13)														
3.NTFP Survey	0	0	0	0	2.17250	0	0	0	0	0	0	0	0	
TOTAL IWP	0	0	0	0	36.61000	0	0	0	0	0	0	0		
D.No.22-2401- State Plan-DS-01- Fry-/2117 -LOC														
i)Strengthening of VSSs 12 Nos+(12Nos)	0	0	5.99620	5.00000	5.00000	0	0	0	0	0	0	0		
ii)Strengthening of DCN	0	0	0.30000	3.00000	3.00000	0	0	0	0	0	0	0	0	
TOTAL			6.29620	8.00000	8.00000	0	0	0	0	0	0	0	0	
D.No.22-2406- State Plan-SS-02- Fry-110-WL- 1571-WL Protection													0	
Compensation to WL Victims	0	0	0.06000	2.00000	2.33330	0	0	0	0	0	0	0	0	
D.No 22-4406- COL on F&WL-State Plan-DS-01-Fry- 1. 2327-Constn of Building	0	0		3.50000	0	0	0	0	0	0	0	0	0	
D.No.22-2406- State Plan-SS-01- 2063 Urban Pltn 12-13 PO													0	
Tall Sappling Plantation Urban Area (PO)	0	0	0	0	5.55600	0	0	0	0	0	0	0	0	
D.No.22-2406- State Plan-SS-01- 0345 -Economic													0	

Plantation/ RDF (SMC)														
1) Silvicultural Operation (ANR)	0	0	0	0	5.01440	0	0	0	0	0	0	0	0	
ii) Soil & Moisture Conservation	0	0	0	0	4.58560	0	0	0	0	0	0	0	0	
TOTAL Economic/RDF					9.60000	0	0	0	0	0	0	0	0	
D.No.22-4406-State Plan-COL-01-Fry-DS-796 TASP					3.75000	0	0	0	0	0	0	0	0	
D.No.22-2406-01-Fry-2399-IFM-Camp Equipment					0.03125	0	0	0	0	0	0	0	0	
D.No.22-4406-COL on F&WL-DS-2327 -Constn Bldng	0	0	0	0	0	15.00000	0	0	0	0	0	0	0	
D.No.22-4406-COL on F&WL-DS-0793-KBK Dist Pltn	0	0	0	0	0	4.39024	0	0	0	0	0	0	0	
D.No.22-4406-COL on F&WL-DS-0345-Economic Pltn	0	0	0	0	0	8.28000	0	0	0	0	0	0	0	
D.No.22-4406-COL on F&WL-DS-2744-Avenue Pltn	0	0	0	0	0	4.87800	0	0	0	0	0	0	0	
D.No.22-4406-COL on F&WL-DS-2745-Maint. P.Nursery	0	0	0	0	0	7.56000	0	0	0	0	0	0	0	
TOTAL 4406-STATE PLAN	0	0	0	0	0	40.10824	0	0	0	0	0	0	0	

2406-State Plan (District Sector)													0	
22-2406-COL on F&WL-SP-DS- 2829 -IGC-Maint P.Nry/PN	0	0	0	0	0	0	24.23980				0	0	8.22096	8.86400
								21.86478	21.47000	11.88000.				
Celebration of Van Mahotsav													0.50000	1.00000
IPCEA Squad													8.88889	9.96283
-do- Urban Plantation	0	0	0	0	0	0	45.87700		125.02750			32.12564	31.70645	17.71628
								71.71750		159.16360	43.29007			
-do- Urban Plantation 2 nd year	0	0	0	0	0	0	0		0			0	0	11.43672
								0		0	0			
Maint. Of surplus seedlings IGC	0	0	0	0	0	0	0		0			0	0	13.82831
								0		0	0			
-do- O.B.D.P	0	0	0	0	0	0	3.36713	5.09363		2.80050		1.33500	0	0
								7.26760						
-do- Economic Plantation	0	0	0	0	0	0	18.26750	17.94490	31.91250	15.59510	0	6.77831	0	0
-do- Avenue Plantation/Ave Maint.	0	0	0	0	0	0	20.62670	23.61680	49.09675	3.20000	0	16.05419	0	0
-do- Conservation of Sacred Groove	0	0	0	0	0	0	0.15850	3.22300	9.87870		0	0	0	0
										0.0				
-do- Fuel efficient Chullah	0	0	0	0	0	0	0.12000	0.12000	0.15000	0.13960	0	0	0	0
-do- Agro Forestry	0	0	0	0	0	0	16.60000	48.90000	81.50000	22.42500	0	0	0	0
ANR /RDF	0	0	0	0	0	0		20.00000	0.00		0	0	3.23200	38.96775
IFM-Camp Equipment	0	0	0	0	0	0	0	9.14706	0	0	0	0	0	0
02- Fry (Observ of WL week & Comp. Payment	0	0	0	0	0	0	0	3.95000	11.95000	6.30000	0	0	0	0
Management of Plantation													0	
AR (WP) 2016-17 Creation	0	0	0	0	0	0	0	0	0	54.06400	0	0	0	15.19260

AR (WP) 2 nd year 2019-20	0	0	0	0	0	0	0	0	0	0	0	0	0	14.22900
Bald hill plantation	0	0	0	0	0	0	0	0	0	0	0	0	0	6.36420
S.S.O.Timber	0	0	0	0	0	0	0	0	0	79.32000	86.21130	105.72800	0	0
S.S.O.Bamboo	0	0	0	0	0	0	0	0	0	47.92100	0	0	0	0
TOF 2015-16	0	0	0	0	0	0	0		28.24460		0	0	0	0
Root Trainer	0	0	0	0	0	0	0	0	0	0	0	1.00000	0	0
IFM-Fire Protection measure	0	0	0	0	0	0	0	0	15.86000	23.83000	0	0	0	0
TOTAL							129.25663	225.57767	382.35765	426.6388	129.50137	163.02114	52.54830	137.29169
105-Drift & Waif wood (0334+0513)	0	0	0	0	0	0	0				2.75000	0.71800	0.20000	0.20000
Survey & Investigation (005+796)	0	0	0	0	0	0	0	0	0	0	0.05000	0.03500	0.03425	0
Working Plan	0	0	0	0	0	0	0	0	0	0	2.62499	19.98699	8.80000	0.68200 12.41800
D.W.Bamboo	0	0	0	0	0	0	0	0	0	0	0.65000	1.79483	5.66426	1.86191
D.W.Timber	0	0	0	0	0	0	0	0	0	0	1.00000	2.47893	3.43858	3.80826 3.75995
AR (IWP)	0	0	0	0	0	0	0	0	0	0	0.00	39.48000	58.38300	0
Distribution of seedlings 2019-20 PO	0	0	0	0	0	0	0	0	0	0	0.00	8.89429	4.81600	0
BHP 2019-20 PO	0	0	0	0	0	0	0	0	0	0	0.00	1.97400	29.29605	0
Protection from Fire	0	0	0	0	0	0	0	0	0	0	0.37000	0.00	40.97606	24.75381
Regeneration	0	0	0	0	0	0	0	0	0	0	0.43584	0.38800	0.33846	0.21500 0.28500
TOP UP MGNREGS	0	0	0	0	0	0	0	0	0	0	0	0	15.83320	0
Consolidation	0	0	0	0	0	0	0	0	0	0	0.28461	0.44000	0.40856	0.65100 0.34900
Training on HRD													1.18000	0
Forest produce sold to purchaser and consumer	0	0	0	0	0	0	0	0	0	0	0	0	0	0.87000
02-Fenv Fry-110- WL	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0	4.20000

Observation of WL Week	0	0	0	0	0	0	0	0	0	0	0.10000	0.00	0.05000	0
Compassionate Payment to WL victims	0	0	0	0	0	0	0	0	0	0	4.25000	0.00	2.35000	0.10000
Development of Eco-Tourism (Chitrakonda Eco-Park/Satiguda)	0	0	0	0	0	0	0	0	0	0	57.00000	0.00	0.80000	5.76000
02-Fry-110 WL (Tiger Estimation etc	0	0	0	0	0	0	0	0	0	0	0.00	24.21600	0	0
4406-State Plan-01 Forestry	0	0	0	0	0	0	0	0	0	0	6.25000		0	0
2406-State Plan (State Sector)														
22-2406-COL on F&WL-SP-SS-2118- IPCEA	0	0	0	0	0	0	6.08000	6.25000	7.50500	8.00000	8.27055	8.88889	0	0
22-2406-02- Env Fry-110-WL conservation etc	0	0	0	0	0	0	0.05000	0	0	0			0	0
TOTAL	0	0	0	0	0	0	6.13000	6.25000	7.50500	8.00000	84.03599	109.29493	172.56842	59.91393
4406-State Plan (District Sector)														
D.No. 22-4406-COL on F&WL-SP-DS-01 Fry	0	0	0	0	0	0	0	0	0	0	0	0	0	0
i) Constructon of Building/FRH G.Pally	0	0	0	0	0	0	4.73333	13.32000	6.07000	6.25000	0	0	8.00000	0
ii) 070-Commn of Building		0	0	0	0	0	6.62667	0.00	0.00	0.00	0	0	0	6.00000
TOTAL 4406-STATE PLAN		0	0	0	0	0	11.36000	13.32000	6.07000	6.25000	0	0	8.00000	6.00000
OEMF		0	0	0	0	0					17.02350	6.71150	6.71150	36.00000
G.Total	7.03310	0	0	43.61000	79.22675	295.51133	146.74663	245.14767	395.93265	440.8888	230.56086	279.02757	239.82822	
State CAMPA APO: 2020-21	0	0	0	0	0	0	0	0	0	0	0	0	0	1157.82461
AJY	0	0	0	0	0	0	0	0	0	0	0	0	0	398.18000
Grand total	7.03310	0	0	43.61000	79.22675	295.51133	146.74663	245.14767	395.93265	440.8888	230.56086	279.02757	239.82822	1795.21023

10.2.1.4 Expenditure

Table No.10.4: Budget Sub-Head wise Central Sponsored Plan of 2007-08 to 2018-19 (in Lakh)

Budget Sub-Head	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Central Sponsored Plan												
Demand No. 22-2406-F&WL-State Plan-SS-01												
Forestry-796-TASP-0736-IFPS-78097-State Share2002-Other Charges-Central Share in CSP												
1.Water Storage	1.50000	0	0	0	0	0	0	0	0	0	0	0
2.Boundary Maintenance	1.00000	0	0	0	0	0	0	0	0	0	0	0
3.Equipment (GIS/TV)	0.50000	0	0	0	0	0	0	0	0	0	0	0
4.Road Repair	1.00000	0	0	0	0	0	0	0	0	0	0	0
5. Publicity/JFMC	0.20000	0	0	0	0	0	0	0	0	0	0	0
6.Fire line creation (7 Mtr wide)@ 2500	2.20000	0	0	0	0	0	0	0	0	0	0	0
7.Fire Line Maintenance - 6Mtr Wide@ 1500	0.80000	0	0	0	0	0	0	0	0	0	0	0
8.Fire Watcher (30 days)	0.12500	0	0	0	0	0	0	0	0	0	0	0
9.Setting up FF Cell	0.10000	0	0	0	0	0	0	0	0	0	0	0
10.F.F.F.Equipment	0.25000	0	0	0	0	0	0	0	0	0	0	0
11.Fire Mapping/Fire Management Plan	0.20000	0	0	0	0	0	0	0	0	0	0	0
Total C.S.P.	7.87500	0	0	0	0	0	0	0	0	0	0	0
Demand No. 22-2406-F&WL-State Plan-SS-01												

Forestry-101-FCD&Regeneration												
1.Field Survey & Boundary Demarcation	0	0.50000	0.50000	0	0	0	0	0	0	0	0	0
2 Camp Equipment	0	1.00000	1.00000	0	0	0	0	0	0	0	0	0
3.Fire Line Maintenance - 6Mtr Wide@ 1500	0	0.30000	0.30000	0	0	0	0	0	0	0	0	0
4.Fire Watcher	0	1.26000	1.26000	0	0	0	0	0	0	0	0	0
5.Asst. to JFMC	0	1.00000	1.00000	0	0	0	0	0	0	0	0	0
6.Purchase of Mobile Phones	0	0.30000	0.30000	0	0	0	0	0	0	0	0	0
7.Monitoring, Incentive & Fire Map	0	0.20000	0.20000	0	0	0	0	0	0	0	0	0
Total C.S.P.	0	4.56000	4.56000	0	0	0	0	0	0	0	0	0
22-2406-F&WL-CSP-02-Env Fry-SP-SS-796-TASP-1283 STR												
i) Tiger Census				1.26500			1.30200	0	0	0	0	
ii)Fire Protection							8.97000	0	0	0	0	
22-2406-F&WL-CSP-02-Env Fry-SP-SS-101-FCD&R2399-IFMS 2009-10 & 2010-11												
i)Fire Protection (2009-10)	0	0	0	4.64000	0	0	0	0	0	0	0	0
ii) Fire Protection (2010-11)	0	0	0	0.45000	0	0	0	0	0	0	0	0

iii)Conservation of Sacred grooves	0	0	0	0.25000	0	0	0	0	0	0	0	0
iv) Camp Equipments	0	0	0		9375.00	0	0	0	0	0	0	0
2406-01-Fry- FPM (CSP) 2018-19								0	0	0	0	0
1.Creation/Maintenance of Fire line 410 Rkm	0	0	0	0	0	0	0	0	0	0	0	8.20833
Communication- Procurement of Mobiles- 7 Nos	0	0	0	0	0	0	0	0	0	0	0	0.74200
Procurement of FF Equipment	0	0	0	0	0	0	0	0	0	0	0	2.56200
Awareness Campaigning (6 Sub Units)	0	0	0	0	0	0	0	0	0	0	0	0.56800
Pre-Fire season Workshop- 1 No	0	0	0	0	0	0	0	0	0	0	0	0.02200
Training & Capacity Building -1No Divn.	0	0	0	0	0	0	0	0	0	0	0	0.63000
Incentive to Village/Community @ 5000/- 16 Nos	0	0	0	0	0	0	0	0	0	0	0	0.80000
F.F.Squad- 6 Units	0	0	0	0	0	0	0	0	0	0	0	11.88000
Hired Vehicle	0	0	0	0	0	0	0	0	0	0	0	4.70250
Grand Total C.S.P	7.8750	4.56000	4.56000	6.60500	9375.00	0	10.27200	0	0	0	0	30.11483

10.2.1.5 Expenditure

Table No.10.5: Budget Sub-Head wise of ELTAP plantation 2007-08 to 2019-20(in Lakh)

Budget Sub-Head	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ELTAP												
1.Economic Plantation 07-08 Creation	26.25000	0	0	0	0	0	0	0	0	0	0	0
2.ANR 07-08 Creation (JFM Mode)	9.57330	2.49000	0	0	0	0	0	0	0	0	0	0
3.Biodisel (Karanja)07-08 Creation	13.38000	15.76434	0	0	0	0	0	0	0	0	0	0
4.AR 2007-08 (JFM Mode3)Creation	12.13869	5.50000	0	0	0	0	0	0	0	0	0	0
5.Ex-Situ Creation	6.06739	2.75000	0	0	0	0	0	0	0	0	0	0
TOTAL PLANTATION CREATION	67.40938	26.50434	0	0	0	0	0	0	0	0	0	0
1.Economic Plantation (PO 2008-9) and Creation	1.30000	2.20525	0.84445	0	0	0	0	0	0	0	0	0
2.ANR (JFM Mode) (PO 2008-9)) and Creation	4.63864	4.03231	4.41324	0	0	0	0	0	0	0	0	0
3.Biodisel/Karanj (PO 2008-09)) and Creation	3.80000	13.27017	11.63878	0	0	0	0	0	0	0	0	0
4.Ex-Situ (PO 2008-09)) and Creation	1.96261	3.30000	3.26567	0	0	0	0	0	0	0	0	0
5. AR (Po 2008-09)) and Creation	3.31937	5.62721	6.00288	0	0	0	0	0	0	0	0	0
TOTAL PLANTATION (PO 2008-09) AND CREATION.	15.02062	28.43494	26.16502	0	0	0	0	0	0	0	0	0

(Maintenance)												
Economic PO 2009-10	0	8.09500	0	0	0	0	0	0	0	0	0	0
Biodisel/Karanj PO 2009-10	0	3.03600	0	0	0	0	0	0	0	0	0	0
Ex-Situ PO 2009-10	0	1.82160	0	0	0	0	0	0	0	0	0	0
AR (JFM Mode) PO 2009-10	0	1.51800	0	0	0	0	0	0	0	0	0	0
ANR (JFM Mode) PO 2009-10	0	0.75819	0	0	0	0	0	0	0	0	0	0
Micro Watershed Plantation PO 2009-10	0	15.90091	0	0	0	0	0	0	0	0	0	0
Seedlings for distribution PO 2009-10	0	0.84880	0	0	0	0	0	0	0	0	0	0
TOTAL PO 2009-10	0	31.97850	0	0	0	0	0	0	0	0	0	0
Economic 2007-08 (2nd Yr Maintenance) and 3rd Year	0	6.10722	4.99449	0	0	0	0	0	0	0	0	0
TOTAL	82.43000	93.02500	31.15951			0	0	0	0	0	0	0
AR(Micro Watershed) 2009-10 350 Ha/2010-11 Creation, 2 nd yr. Maint.	0	0	35.22511	21.32700	7.89000	0	0	0	0	0	0	0
Seedlings for distribution- 180000 Nos	0	0	3.00538	3.94300	0	0	0	0	0	0	0	0
Total Creation MWS	0	0	38.23049	25.27000	7.89000	0	0	0	0	0	0	0
AR(Micro Watershed) 2010-11 PO=150 Ha (PO)/11-12 PO-150ha	0	0	11.31300	10.84350	0	0	0	0	0	0	0	0
Seedlings for distribution (PO)	0	0	3.55700	0	0	0	0	0	0	0	0	0
Total PO 2010-11 MWS	0	0	14.87000	10.84350	0	0	0	0	0	0	0	0
Others	0	0			0	0	0	0	0	0	0	0

ANR(Silvicultural Measure) MWS-300 Ha	0	0	12.00000	4.05000	0	0	0	0	0	0	0	0
Soil Moisture Conservation Measure-1500 Ha	0	0	17.25000	28.95000	0	0	0	0	0	0	0	0
Well directive initiatives (Digging up Pond)- 3 units	0	0	6.00000	3.00000	0	0	0	0	0	0	0	0
NTFP based Livelihood- 3 Units	0	0	6.00000	3.00000	0	0	0	0	0	0	0	0
Selection of Watersheds- 3 Units	0	0	1.50000	0.50000	0	0	0	0	0	0	0	0
Total Others MWS	0	0	42.75000	39.50000	0	0	0	0	0	0	0	0
TOTAL MICRO WATERSHEDS	0	0	95.85049	75.61350	7.89000	0	0	0	0	0	0	0
Economic of 2009-10 Plantation-350 Ha-2nd Yr Main/3 rd yr maint.	0	0	0	0	13.23000	0	0	0	0	0	0	0
3rd Yr Maint of 2008-09 Plantation-3rd Yr (Economic)	0	0	0	0	0	0	0	0	0	0	0	0
3rd Yr Maint of 2008-09 Plantation-3rd Yr (Biodisel)	0	0	0	0	0	0	0	0	0	0	0	0
3rd Yr Maint of 2008-09 Plantation-3rd Yr (Block)	0	0	0	0	0	0	0	0	0	0	0	0
3rd Yr Maint of 2008-09 Plantation-3rd Yr (ANR)	0	0	0	0	0	0	0	0	0	0	0	0
3rd Yr Maint of 2008-09 Plantation-3rd Yr Ex- Situ	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL 3rdYear Maint 2008-09 Pltn	0	0	0	0	13.23000	0	0	0	0	0	0	0
ELTAP- INCOME GENERATING	0	0	0	0	0	0	0	0	0	0	0	0

ACTIVITIES (IGA)												
1.Hill Broom Cultivation	0	0	0	0	0	0	0	0	0	0	0	0
2.Apiary	0	0	0	0	0	0	0	0	0	0	0	0
3.Cashew Plantation	1.42600		0	0	0	0	0	0	0	0	0	0
4.Banana Cultivation	1.86000	2.00000	0	0	0	0	0	0	0	0	0	0
5.Poultry	0.68400		0	0	0	0	0	0	0	0	0	0
6.Pisci Culture	0.48000	5.00000	0	0	0	0	0	0	0	0	0	0
TOTAL I.G.A.	10.00000	7.00000	0	0	0	0	0	0	0	0	0	0
Impvt.Permanent Nursery-Raising of Planting Stock	1.10000	0.42000	0	0	0	0	0	0	0	0	0	0
GRAND TOTAL ELTAP	93.53000	100.44500	127.01	75.61350	21.12	0	0	0	0	0	0	0

10.3 COST OF PREPARING PLAN

11.0.1 The preparation of the plan started during the year 2015 and continued up to 2019-20. The total cost of the plan is 2969.38252 Lakhs and year wise break up of expenditure is furnished at Table No.10.6. This expenditure is for working plan exercise of this Forest Division. The total forest area covered under this working plan is 169476.1989 Ha. Thus, the cost of the preparation of revised working plan comes to Rs.1752.09 per ha including Establishment and without establishment it is comes to Rs.109.25 per Ha.

Table No. 10.6: Expenditure in Preparation of the Working Plan of Malkangiri Division in lakhs.

Budget Head	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Establishment-Salary, T.E, Clothing and other Exp	447.02969	511.46356	624.47191	598.32809	602.47814	2783.77139
Working Plan	0	1.00	2.62489	19.98699	8.80000	32.41188
Communication and Building	19.17	26.0	18.65	19.20	16.00	99.02
Boundary maintenance	1.00	2.00	0	2.80	1.00	6.80
Survey & Investigation	0	0	0.05	0.035	0.03425	0.11925
Building repairing	10.00	13.00	10.81	5.00	8.00	46.81
13 th F.C Grant						
Total	477.19969	553.46356	656.6068	645.35008	636.31239	2969.38252

10.4 FINANCIAL IMPLICATION FOR IMPLEMENTATION OF THE PLAN

10.4.1 The Revised Working Plan of Malkangiri Forest Division has been prepared for a period of ten years i.e. 2021-22 to 2030-31. Actually, the previous plan was prepared from 2006-07 to 2016-17 and next plan to start from 2017-18. But due to shortage of staff this plan could not be prepared from 2017-18. Hence Annual Working Schemes have been prepared from 2017-18 to 2020-21. The Financial implication for implementation of this working plan has been calculated based on cost norm prevalent now. This can be modified as per requirements of this plan as well as ground realities. Thus, these norms are subject to change as per changed field condition and instruction from the higher authorities. However, the entire calculation has been made assuming annual rise of 5% for all components of works/ items.

10.4.1.1 Establishment: The total cost of the Field Estt. during 2019-20 as per Table No. 11.7 was about Rs.602.48 Lakhs. The projected cost of establishment will be as follows on assuming five percent rise over the previous year.

Table No. 10.7: Cost of the Field Estt. in Lakhs.

Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Total
Rs.	664.23	697.44	732.31	768.92	807.36	847.72	890.10	934.60	981.33	1030.39	8354.4

10.4.1.2 Roads, Building and wells:

(i) **Roads:** The total length of the Roads in the Division is 113.536 Kms. for which annual maintenance of cost has been taken as Rs.50000 per Km. Besides for better and improved connectivity, additional amount of Rs. 5.00 Lakhs to be kept for construction of new roads annually. Thus, the annual requirement of funds for repair and maintenance including new conservation comes to Rs. 764.06 Lakhs.

Table No. 10.8: Cost of Maintenance of Roads in Lakhs

Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Total
New	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	50.0
Mant.	56.77	59.61	62.59	65.72	69.00	72.46	76.08	79.88	83.88	88.07	714.06
Total	61.77	64.61	67.59	70.72	74.00	77.46	81.08	84.88	88.88	93.07	764.06

(ii) **Buildings:** Malkangiri Forest Division has 248 numbers of buildings including all quarters, FRH, WFP, NTFPGo down etc. The average annual cost of maintenance of these buildings calculated for last five years comes to Rs.4000/- which is not sufficient. The minimum and required for repair and maintenance per building is Rs. 8000/-. With this average annual maintenance cost, the requirement of funds works out to be 19.84 or 20.0 Lakhs. Besides, it is necessary to go for construction of new 2 nos. ACF Quarter and 40 Nos. Forest Guard quarters i.e. every year need four to five quarters. Thus, the total requirement of funds comes to Rs. 700.01 Lakhs. The details of annual requirement of funds have been furnished in Table No. 10.9.

Table No. 10.9: Cost of Construction of Buildings and its Maintenance in Lakhs.

Year		2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Total
New	ACF	20.00	20.00	0	0	0	0	0	0	0	0	40.00
	FG	32.48	34.10	35.80	37.60	39.48	41.45	43.52	45.70	47.98	50.38	408.49
Mant.		20.0	21.0	22.05	23.15	24.31	25.52	26.80	28.14	29.55	31.00	251.52
Total		72.48	75.10	57.85	60.75	63.79	66.97	70.32	73.84	77.53	81.38	700.01

(iii) **Wells / Tube Wells:** There are 29 tube wells in this Division. Out of which 20 nos tube well maintainable and another 20 tube wells are required for catering the water requirements of the Division. Thus with Rs 1,00,000/- per new tube well. Further, annual maintenance of Rs 5000/- is required per tube well. Thus, total requirement of funds works out to be Rs 38.50 Lakhs. The construction of tube well should be taken up with in 4 to 5 years.

Table No. 10.10: Cost of Digging Tube Wells and its Maintenance (in Lakhs)

Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Total
New	6.0	6.0	6.0	2.0	0	0	0	0	0	0	20.00
Mant.	1.0	1.15	1.32	1.52	1.75	1.93	2.12	2.33	2.56	2.82	18.50
Total	7.0	7.15	7.32	3.52	1.75	1.93	2.12	2.33	2.56	2.82	38.50

10.4.1.3 Working Plan Prescriptions:

(i) **Selection-cum-Improvement Working Circle:** The Gross area of the circle comes to 48271.8566 Ha. Thus, the prescription under Selection-cum-Improvement Working Circle needs Rs. 1292.01 Lakhs annually as per detail given below in Table No. 10.11.

Table No. 10.11: Projected Expenditure on Selection-cum-Improvement Working Circle: 1 MD=Rs.308/-

No.	Items of Work	Rate	Area in Ha	Amount in Lakhs
1	Demarcation of annual coupes	@1MD/Ha	48271.8566	148.67
2	Exploitation Marking	@1.5MD/Ha	48271.8566	176.93
3	Improvement Marking	@0.5MD/Ha	48271.8566	74.33
4	Thinning& its operation etc.	@2.5MD/Ha	48271.8566	371.69
5	Subsidiary Silvicultural Works	@3.0MD/Ha	48271.8566	446.06
6	Misc. regulation	@0.5MD/Ha-	48271.8566	74.33
	Total			1292.01

(ii) **Rehabilitation Working Circle:** The gross area of the working circle is 139183.5591 Ha. The annually requirement for execution of different works comes to be Rs. 5085.349 Lakhs. The amount required for execution of works is as under:

- a) Execution of works/treatment @ Rs. 36,383/- per Ha. = 50639.15
- b) Misc. regulation on L.S. @ 0.5 Mandays per Ha. = 214.34
- Total = 50853.49**

Cost Norm for individual works under this Working Circle are:

Table No. 10.12: Cost Norm for individual works under this Working Circle are:

Items of Works	M/Ds	Amount	Materials	Total in Rs.
	0 th Year	in Rs.	in Rs.	
Survey and Demarcation Pillar Posting	2	616.00	15.00	631.00
Preparation of treatment plan	3	924.00	55.00	979.00
Soil and Moisture conservation (part) LS	10	3080.00	90.00	3170.00
Alignment and stacking and pitting (P)	9	2772.00	45.00	2817.00
Nursery part				1050.00
Entry point activities (LS)				1430.00
Overhead (LS)				530.00
Total				10607.00
1st year Operation				
Nursery Balance (LS)				750.00
Soil and Moisture Conservation Balance	10	3080.00	90.00	3170.00
Carriage of seedling and planting	5	1540		1540.00
Weeding (1 st & 2 nd)	4	1232.00		1232.00
Soil Working	2	616.00		616.00
Manuring and cost of manure	1	308.00	900.00	1208.00
Fire line pre and inspection path	2	616.00		616.00
Silvicultural Operations	15	4620.00	180.00	4800.00
Entry Point Activities (LS)				1200.00
Overhead (LS)				960.00
Total				16092.00
2nd Year Operation				
Casualty replacement	2	616.00		616.00
Weeding	2	616.00		616.00
Soil Working & Manuring	2	616.00		616.00
Cost of Manure				450.00
Soil Moisture Conservation	5	1540.00	90.00	1630.00
Fire line tracing and Inspection path	2	616.00		616.00
Entry Point Activities (LS)				900.00
Overhead (LS)				530.00
Total				5974.00
3rd Year Operation				
Weeding and Pruning	2	616.00		616.00
Soil Working	2	616.00		616.00
Soil Moisture Conservation	4	1232.00	90.00	1322.00
Fire line tracing and Inspection path	2	616.00		616.00
Entry Point Activities (LS)				360.00
Overhead (LS)				180.00
Total				3710.00
Grand Total:				36383.00

(iii) **Plantation Working Circle:** The gross area of the plantation-working circle is 6197.38 Ha. Here, blank and open area readily available for plantation is about 18%. The prescription under plantation Working Circle is in need of Rs. 1719.01911 Lakhs annually as per the details furnished in Table No.10.13.

Table No. 10.13 Projected Expenditure on Plantation Working Circle:

Items of Works with Cost Norm	Amount in Lakh Rs.
Planting series 1085.62 Ha. @ Rs. 146503/ ha	1590.46586
Tending series 2041.80 Ha @ Rs 20 MD/ha	123.89642
Misc. regulations 2801.76 Ha @ 0.5 MD/ha	4.25027
V.F. area 268.20 Ha @ 0.5 MD/ha	0.40656
Total Requirement	1719.01911

The breakup of cost norm per ha for treatment under this working circle is furnished at Table No. 10.14.

Table No. 10.14: Cost Norm per Hectare under Plantation Working Circle (Plantation):

Item of Work	MDs	Amount in Rs.	Material in Rs.	Total in Rs.
0th Year				
Survey and Demarcation	2	616.00	75.00	691.00
Site Preparation	12	3696.00		3696.00
Alignment and Stacking	2	616.00		616.00
Digging of pits	40	12320.00		12320.00
Nursery Cost	44	13552.00	3104.00	16656.00
Overhead (LS)				300.00
Total				34279.00
1st Year				
Nursery (Bal)	21.5	6622.00	893.00	7515.00
Fencing	38	11704.00	8990.00	20694.00
Carriage and Planting	21	6468.00		6468.00
Insecticide & Fertilizer			4842.00	4842.00
1 st Weeding	7	2156.00		2156.00
Manuring	5	1540.00		1540.00
2 nd Weeding	5	1540.00		1540.00
Soil Working& Manuring	7	2156.00		2156.00
Fire tracing	3	924.00		924.00
Soil Moisture Conservation	10	3080.00		3080.00
Watch & Ward	7	2156.00		2156.00
Entry point Activities (LS)				1500.00
Overhead (LS)				530.00
Total				55101.00
2nd Year				

Soil Moisture Conservation	7	2156.00		2156.00
Casualty Replacement	4	1232.00	2978.00	4210.00
Weeding	6	1848.00		1848.00
Repair & Maintenance of Bamboo Fencing	20	6160.00	7620.00	13780
Application of fertilizer	4	1232.00		1232.00
Cost of fertilizer			4122.00	4122.00
Soil Working	7	2156.00		2156.00
Fire tracing	3	924.00		924.00
Entry Point Activity (LS)				300.00
Overhead (LS)				300.00
Total				31028.00
3rd Year				
Weeding and fertilizer application	7	2156.00		2156.00
Cost of fertilizer			2880.00	2880.00
Soil Working	7	2156.00		2156.00
Repair & Maintenance of Bamboo Fencing	20	6160.00	1500.00	7660.00
Fire line tracing, pruning etc.	3	924.00		924.00
Watch & Ward	15	4620.00		4620.00
Entry Point Activity (LS)				115.00
Overhead (LS)				40.00
Total				20551.00
4th Year				
Fire line Tracing	3	924.00		924.00
Watch & Ward	15	4620.00		4620.00
Total				5544.00
Grand Total				146503.00

- (iv) **Protection (Overlapping) Working Circle:** The gross area of this working circle is 24649.3938 Ha. The prescriptions under protection Working Circle are in need of Rs.11309.14 Lakhs annually as per the details furnished in Table No. 10.15.

Table No. 10.15: Requirement of funds under Protection Working Circle

Items of Works with Cost Norm	Amount in Lakh Rs.
Execution of operation @45264.00 per Ha	11157.30
Miscellaneous regulation @2.0MD per Ha.	151.84
Total requirement of funds	11309.14

The breakup of cost norm per hectare for treatment under this working circle is furnished at Table No. 10.16

Table No. 10.16: Cost Norm Per Ha under Protection Working Circle (in Rs):

Item of Work	MDs	Amount	Material	Total in Rs.
0th Year				
Survey, Demarcation and Pillar Posting	2	616.00	45.00	661.00
Preparation of Annual Action Plan	1	616.00	45.00	661.00
Watch & Ward (Anti-Smuggling Squad/ Fire Protection squad)	7	2156.00	75.00	2231.00
Communication & Mobility			45.00	45.00
Incentives to VSS	0.5	154.00		154.00
Overhead (LS)				75.00
Total				10137.00
1st Year				
Silvicultural operation	15	4620.00	0.0	4620.00
Soil and Moisture Conservation	20	6160.00	150.00	6310.00
Fireline tracing and Inspection path	5	1540.00		1540.00
Watch & Ward (Anti-Smuggling Squad/ Fire Protection squad)	15	4620.00		4620.00
Communication & Mobility			50.00	50.00
Incentives to VSS	0.5	154.00		154.00
Overhead (LS)				75.00
Total				17369.00
2nd Year				
Silvicultural operation	10	3080.00	0.0	3080.00
Soil and Moisture Conservation	10	3080.00	100.00	3180.00
Fireline tracing and Inspection path	5	1540.00		1540.00
Watch & Ward (Anti-Smuggling Squad/ Fire Protection squad)	15	4620.00		4620.00
Communication & Mobility			50.00	50.00
Incentives to VSS	0.5	154.00		154.00
Overhead (LS)				75.00
Total				12699.00
3rd Year				
Soil and Moisture Conservation	8	2464.00	100.00	2564.00
Watch & Ward (Anti-Smuggling Squad/ Fire Protection squad)	7	2156.00	75.00	2231.00
Communication & Mobility			50.00	50.00
Incentives to VSS	0.5	154.00		154.00
Overhead (LS)				60.00
Total				5059.00
				45264.00

(v) **Bamboo (Overlapping) Working Circle:** Preparation under Bamboo (Overlapping) Working Circle is in need of Rs. 13075.09 Lakhs annually as per the details furnished in Table No. 10.17. (Gross Area = 110367.5123 Ha and Annual Area = 11036.75123 Ha.) 1MD= Rs. 308/-

Table No. 10.17: Requirement of Funds under Bamboo (Overlapping) Working Circle (Plan & Scheme Area)

Items of Works with Cost Norm	Amount in Lakh Rs.
Demarcation of coupe @ 0.5 M.D per Ha.	169.96
Silvicultural Operations @ 8 M.D per Ha	2719.45
Misc. regulations @ 0.5 MD per Ha	169.96
Bamboo planting @ Rs. 91052/ Ha for 11000 Ha. (i.e. 10% of the total area)	10015.72
Total Requirement	13075.09

Table No.10.18: Cost Norm per Ha Bamboo Plantation under Bamboo (O) Working Circle:

Items of Work	MDs	Amount	Material	Amount in Rs.
0th Year				
Survey and Demarcation	2	616.00		616.00
Site Preparation	2	616.00		616.00
Alignment and Stacking	2	616.00		616.00
Digging of pits	25	7700.00		7700.00
Nursery Cost (i.e. cost of seedlings)	11.5	3542.00	895.00	4437.00
Total				13985.00
1st Year				
Nursery Cost (Balance)	4	1232.00	804.00	2036.00
Carriage & Planting	5	1540.00		1540.00
Cost of Fencing	38	11704.00	12840.00	24544.00
Cost of Fertilizer			1617.00	1617.00
1 st Weeding	2	616.00		616.00
Soil Working & Manuring	2	616.00	360.00	976.00
2 nd Weeding	2	616.00		616.00
Soil Conservation Measures	13	4004.00		4004.00
Fire Tracing	3	924.00		924.00
Overhead Charges (LS)				574.00
Entry Point Activity (LS)				1440.00
Total				38887.00
2nd Year				
Casualty Replacement	1	308.00	748.00	1056.00
Weeding	2	616.00		616.00
Repair & Maintenance of Bamboo	20	6160.00	7620.00	13780.00

Fencing				
Application of fertilizer	1	308.00		308.00
Cost of fertilizer			657.00	657.00
Soil Working	2	616.00		616.00
Fire tracing	3	924.00		924.00
Watch & Ward	15	4620.00		4620.00
Overhead (LS)				100.00
Entry Point Activities (LS)				235.00
Total				22912.00
3rd Year				
Weeding & Application of Fertilizer	2	616.00		616.00
Cost of Fertilizer			657.00	657.00
Repair & Maintenance of Bamboo Fencing	20	6160.00	1500.00	7660.00
Soil Working	2	616.00		616.00
Fire Tracing	3	924.00		924.00
Watch & Ward	15	4620.00		4620.00
Overhead Charges (LS)				55.00
Entry Point Activity (LS)				120.00
Total				15268.00
G.Total				91052.00

(vi) **Non-Timber Forest Produce (Overlapping) Working Circle:** Prescriptions under Non Timber Forest Produce (Overlapping) Working Circle are in need of Rs. 699.34 Lakhs annually as per the details furnished in Table No.10.19.

Total No. 10.19: Requirement of Funds under NTFP (Overlapping) Working Circle

(Gross Area = 189045.9106 Ha. and Annual Area = 18904.59106 Ha.) 1MD= Rs. 308/-

Items of Works with Cost Norm	Amount in Lakh Rs.
General Prescription (Rs. 80/-per Ha)	151.23
Agave Plantation 420 RKM @ Rs. 50472/-per RKM	211.98
Jatropha Plantation 300 Ha @ Rs 15000/- per Ha	45.00
Miscellaneous Regulations 144777.7461 Ha @ 0.5 MD per Ha	291.13
Total Requirement	699.34

The Cost Norm per Hectare for treatment under this working circle is furnished at Table No. 10.20.

Table No.10.20: Cost Norm per RKM of Agave Plantation under NTFP (O) Working Circle

Items of Work	MDs	Amount in Rs.	Material in Rs.	Total in Rs.
Site Preparation	3	924.00		924.00
Alignment and stacking	2	616.00		616.00
Pitting	50	15400.00		15400.00
Nursery Cost (Plant population=2000)	60	18480.00	1050.00	19530.00
Carriage and planting	25	7700.00		7700.00
Insecticide and fertilizer cost			1280.00	1280.00
Manuring	6	1848.00		1848.00
Weeding/ Soil Working/ Mulching	8	2464.00		2464.00
Overhead (LS)				180.00
Entry Point Activity (LS)				530.00
Total Requirement				50472.00
Total Rs 50472/- per RKM for Agave plantation				
NB: (i) Planting in two rows in staggered pattern with spacing of 1m X 1m				
(ii) The live fence to be maintained only in the year of formation with subsequent maintenance through VSSs.				

Cost Norm per RKM of Jatropha Plantation under NTFP (O) Working Circle:

The cost norm is Rs. 15000/- per RKM with same pattern and numbers of seedlings. The cost reduction is because of saving on nursery, pitting and carriage, as jatropha cuttings shall be planted.

(vii) Wild Life (Overlapping) Working Circle: Prescription under Wild life (Overlapping) Working Circle is in need of Rs. 2357.50 Lakhs annually as per the details furnished in Table No 10.21.

Table No. 10.21: Wildlife Cost Norm: Malkangiri Forest Division:

Sl No	Particulars	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Total
1	Survey Demarcation and Geo reference Mapping											
	a) Survey of Kondakamberu and Balimela Wildlife Sanctuaries	5.00	15.00									20.00
	b) Posting of pillars with GPS reading	30.00	20.00									50.00
	c) Preparation of Maps/ Atlas	2.00										2.00
	d) Maintenance of Boundary Pillars	4.00	4.4	4.84	5.32	5.84	6.44	7.08	7.80	8.58	9.44	63.74
2	Protection Measures Forests and Wildlife											
	a) Development of Protection Squads using Contractual Staffs (1 RO, 2 FRs, 4 FGs)	5.00	5.20	5.77	6.35	6.98	7.68	8.44	9.29	10.22	11.24	76.17
	b) Purchase and Maintenance of modern arms and ammunitions (Revolvers, Flases, Light Pistol, Search Light etc)	Maintenance	0.30	0.33	0.36	0.40	0.44	0.48	0.53	0.58	0.64	4.76
		Purchase	4.00	4.40	4.84	5.32	5.85	6.44	7.08	7.79	8.58	63.74
	c) Strengthening of Intelligence Network with provision of secret funds for informers		2.00	2.20	2.42	2.66	2.92	3.22	3.54	3.90	4.29	31.87
3	Institutional Strengthening and Capacity Building, Infrastructure and Communication Development											
	a) Boats (Steel body) for Patrolling including POL and wages of temporary Drivers for Balimela Reservoir	Purchase	22.00									22.00
		Wage	0.60	0.66	0.72	0.80	0.88	0.96	1.06	1.16	1.28	9.53
	b) Anti-Poaching camp 6 nos @ Rs. 1000000/- each		10.00	10.00	10.00	10.00	10.00					60.00
	c) Seized produced yard at Motu, Balimela, Kalimela @ Rs. 1000000/- each		30.00									30.00
	d) Xerox Machine, Computer, Mobile Phones etc.	Purchase	4.00	4.00	4.00							12.00
		Maintenance	0.20	0.22	0.24	0.26	0.28					1.20
4	Prevention and Control of Forest Fire											
	a) Creation and Maintenance of internal/external fire lines with fire Observation Tower	Fire line	5.00	5.20	5.77	6.35	6.98	7.68	8.44	9.29	10.22	76.17

		Tower	10.00	11.00	12.10								33.10
	b) Development of fire fighting squads with all provisions such as vehicles, engagement of watchers from February to May and incentives to VSS/ Villagers for prevention of forest fire		6.00	6.60	7.26	7.98	8.78	9.66	10.63	11.69	12.86	14.15	95.61
	c) Purchase and maintenance of modern fire fighting vehicles with POL, equipments etc.	P Purchase/Hiring	15.00	15.00									30.0
		Maintenance	0.60	0.66	0.72	0.80	0.88	0.96	1.06	1.16	1.28	1.41	9.53
5	Habitat Improvement and Management												
	a) Habitat corridor linkage by improving vegetation cover by augmentation of natural forest through assisted natural regeneration, weed, eradication in proposed Sanctuaries		2.00	2.20	2.42	2.66	2.92	3.22	3.54	3.90	4.29	4.72	31.87
	b) Plantation of fruit bearing trees, fodder species, pasture development including nurseries over 600 Ha	Plantation	377.49	130.31	86.31	23.28							617.39
		Pasture Devp.		161.78	55.85	36.99	9.98						264.60
	c) Maintenance of special habitat, unique and micro habitat		2.50	2.75	3.00	3.33	3.66	4.02	4.43	4.87	5.36	5.89	39.81
	d) Creation and Maintenance of new water bodies/ game tanks, check dams etc for augmentation of water availability – 20 Nos. 40mX3mX30m size		13.10	14.41	15.85	17.44	19.18	21.10	23.20	25.53	28.08	30.89	208.78

6	Soil and Moisture Coservation												
	i) Soil and moisture conservation on water shed basis in different small/ medium nallah/ streams small 300 Nos. @ Rs 6000 each = Rs 18,00,000/- Medium 100 Nos @ Rs 25000 each = Rs 2500000/-	Cosntruction	1800	25.00									43.00
		Maintenance	0	1.00	1.10	1.21	1.33	1.46	1.61	1.77	1.95	2.14	13.57
7	Eco- tourism Activities Development Site												
	i) Creation of infrastructure at Saptadhara, Motu, Amakund, Salimi and other sites its maintenance etc. Mandap, Shed, Drinking Water point @ Rs 2000000 each site	20.00	20.00	20.00	20.00								80.00
	ii) Establishment and maintenance of interpretation centre, display of sign boards, way site exhibits, natural trail, development of medicinal garden, boating facility for children etc.	5.00	5.00	5.00	5.00								20.00
8	Eco Development Programme												
	i) Supply of biogas, fuel efficient chullah, solar light etc.	6.50	7.15	7.86	8.65	9.52	10.47	11.52	12.67	13.93	15.33	103.6	
	ii) Encouraging stall feeding livelihoods such as high yielding milch cow, sericulture, apiculture, piggery, aquaculture etc. through SHG/VSS	3.00	3.30	3.63	3.99	4.39	4.83	5.31	5.87	6.43	7.07	47.82	
	iii) Organizing Health Camps	0.60	0.66	0.72	0.80	0.88	0.96	1.06	1.16	1.28	1.41	9.53	
9	Wildlife Depredation												
	Driving out of animals from crop fields, human habitations and others for reducing man – animal conflicts	5.00	5.25	5.77	6.35	6.98	7.68	8.44	9.29	10.22	11.24	76.22	
10	Training and Capacity Building												
	i) Training to field staffs and VSS members on anti depredation activities.	0.50	0.55	0.60	0.67	0.73	0.80	0.88	0.97	1.07	1.18	7.95	

	ii) Purchase of metrological observatories, GIS equipments, computers, printers, scanners with other accessories, GPS and soft wears etc.	1.00	1.10	1.21	1.33	1.46	1.61	1.77	1.95	2.14	2.35	15.92
11	Awareness Programme											
	i) Organization of meeting, Workshop Nature camps, trekking, purchase of books, magazines, toposheets etc., including LCD, Slide projector and audio visual system.	2.00	2.20	2.42	2.66	2.92	3.22	3.54	3.90	4.29	4.72	31.87
	ii) Posters, Signboards, Signage	1.00	1.10	1.21	1.33	1.46	1.61	1.77	1.95	2.14	2.35	15.92
12	Research and Monitoring											
	i) Census of Tiger and other animals and Establishment of research cell	2.40	2.64	2.90	3.19	3.51	3.86	4.25	4.68	5.14	5.66	38.23
	Total	615.79	491.27	274.89	185.12	118.75	118.36	119.18	131.17	144.27	158.70	2357.50

(viii). Miscellaneous Regulations: Prescriptions under Chapter on Miscellaneous Regulations (other than those already dealt above) are in need of Rs. **48.45** Lakhs annually as per the details furnished in Table No. 10.22.

Table No 10.22: Requirement of Funds under Chapter on Miscellaneous Regulations

Items of Works with Cost Norm	Amount in Lakhs
Forest Consolidation (LS)	5.00
Area Discrepancy Reconciliation (LS)	3.00
Salvage Operations (LS)	5.00
Boundary maintenance @Rs 2000 per Km for 1576.48 km	30.95
Compensatory Afforestation/ Consolidation (LS)	1.00
Maintenance of Records (LS)	1.50
Human Resource Development (LS)	2.00
Total Requirement	48.45

10.4.1.4 Basing on the above analysis, the component wise projected requirement of funds for implementation of the prescriptions is summarized in Table No 10.23 for the entire plan period, which works out to be Rs. 1121.2145 Corers.

Table No 10.23: Estimated Projected Cost of Implementation of the plan (In Rs Lakhs)

Head	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Total
Estt	664.23	697.44	732.31	768.92	807.36	847.72	890.10	934.60	981.33	1030.39	8354.40
Build	(20+52.48)= 72.48	(20+55.10)= 75.10	57.85	60.75	63.79	66.97	70.32	73.84	77.53	81.38	700.01
Road	61.77	64.61	67.59	70.72	74.00	77.46	81.08	84.88	88.88	93.07	764.06
Well	7.0	7.15	7.32	3.52	1.75	1.93	2.12	2.33	2.56	2.82	38.50
Sel-c- Imp.	129.02	135.47	142.24	149.35	156.82	164.66	172.89	181.54	190.62	200.15	1622.76
Rehb	5085.34	5339.61	5606.59	5886.92	6181.26	6490.32	6814.84	7155.58	7513.36	7889.03	63962.85
Pln	171.90	180.50	189.52	199.00	208.95	219.39	230.36	241.88	253.97	266.67	2162.14
Protn	1130.94	1187.48	1246.86	1309.20	1374.66	1443.39	1515.56	1591.34	1670.91	1754.45	14224.79
Bmbo	1307.50	1372.87	1441.51	1513.59	1589.27	1668.73	1752.17	1839.78	1931.77	2028.36	16445.55
NTFP	69.93	73.42	77.09	80.95	85.00	89.25	93.71	98.39	103.31	108.48	879.53
WL	615.79	491.27	274.89	185.12	118.75	118.36	119.18	131.17	144.27	158.70	2357.50
Misc.	48.45	50.87	53.41	56.08	58.89	61.83	64.92	68.17	71.58	75.16	609.36
Total	9364.35	9675.79	9897.18	10284.12	10720.50	11250.01	11807.25	12403.50	13030.09	13688.66	112121.45

Estt=Establishment, Build=Building, Road=Road, Well= Wells & Tube Wells, Pln= Plantation WC, Sel-c-Imp= Selection cum Improvement WC, Prtn= Protection, Bmbo= Bamboo (Overlapping) WC, NTFP= Non Timber Forest Produce (Overlapping) WC, WL= Wildlife (Overlapping) WC, Misc= Miscellaneous Regulations.

10.5 TANGIBLE BENEFITS

10.5.1 The Forest provides both tangible and intangible services to the mankind. The tangible benefits constitute the very insignificant fraction of the total benefits. Some of tangible benefits from forests can be estimated by valuation of growing stock in terms of timber, firewood, bamboo and NTFPs obtained from it.

10.5.2 The number of trees available for felling in Selection felling series is limited to 1 number of trees per Ha. Thus, the total timber to be obtained from selection cum improvement Working Circle coupe annually is calculated as follows:

Total number of trees available for felling	=	1 tree per Ha
Therefore, number of units per Ha.	=	2.0 units
Total area of the selection felling series	=	48271.8566 Ha
Therefore, annual Selection area available	=	4827 Ha
Total Units available per year	=	9654 units
Estimated Cost of One unit for 2020-21	=	Rs. 2006.00
Therefore, value of timber available annually	=	Rs. 19365924.00 or 193.5924 lakhs

10.5.3 The average production of bamboo in the Division is estimated (fixed) to be Sale 200 Units for the year 2019-20 to 2022-23 vide Memo No.10661 dt.30.05.2020 of Principal Chief Conservator of Forest, Odisha, Bhubaneswar. But the average production of bamboo in the Division is fixed to be sale 1000 units (Total yield estimation on four-year rotation is 4000 sale units). The selling price of one sale unit of bamboo is Rs 4100 .00 for the year 2018-19. Thus, the value of bamboo to be harvested annually will be Rs.16400000.00.

10.5.4 The average production of Kenduleaf in the Division is 49,900 quintals. The average sale price obtain during last two years is Rs 6670/- Thus the total value of Kenduleaf to be obtained annually is Rs 33, 28, 33, 000.00 or 3328.33 lakhs.

10.5.5 The average annual revenue anticipated from NTFP, thinning and removal of dead, diseased and fallen trees in different working circles, house rent, drift and waif wood and other miscellaneous heads like grazing fees, fine and forfeiture etc. is taken as Rs 36,00,000.00 assuming as per revenue collected from 2007-08 to 2019-20.

Table No 10.24: Estimated Revenue during the plan period (In Lakhs)

Head	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	Total
Timber	193.59	203.26	213.42	224.09	235.29	247.05	259.40	272.37	285.99	300.29	2434.75
Bamboo	164.00	172.20	180.81	189.85	199.34	209.31	219.77	230.76	242.30	254.41	2062.75
Kendu-leaf	3328.33	3494.75	3669.48	3852.96	4045.61	4247.89	4460.28	4683.29	4917.46	5163.33	41863.38
Misc.	48.45	50.87	53.41	56.08	58.89	61.83	64.92	68.17	71.58	75.16	609.36
Total	3734.37	3921.08	4117.12	4322.98	4539.13	4766.08	5004.37	5254.59	5517.33	5793.19	46970.24

10.5.6 Thus the total anticipated annually works out to be Rs 3734.37 Lakhs for the year 2021-22. However, the total revenue generation year wise is given in Table No. 10.24 and the revenue during the entire plan period is estimated to be to the tune of Rs. 46970.24 Lakhs assuming 5% annual rise in the entire period.

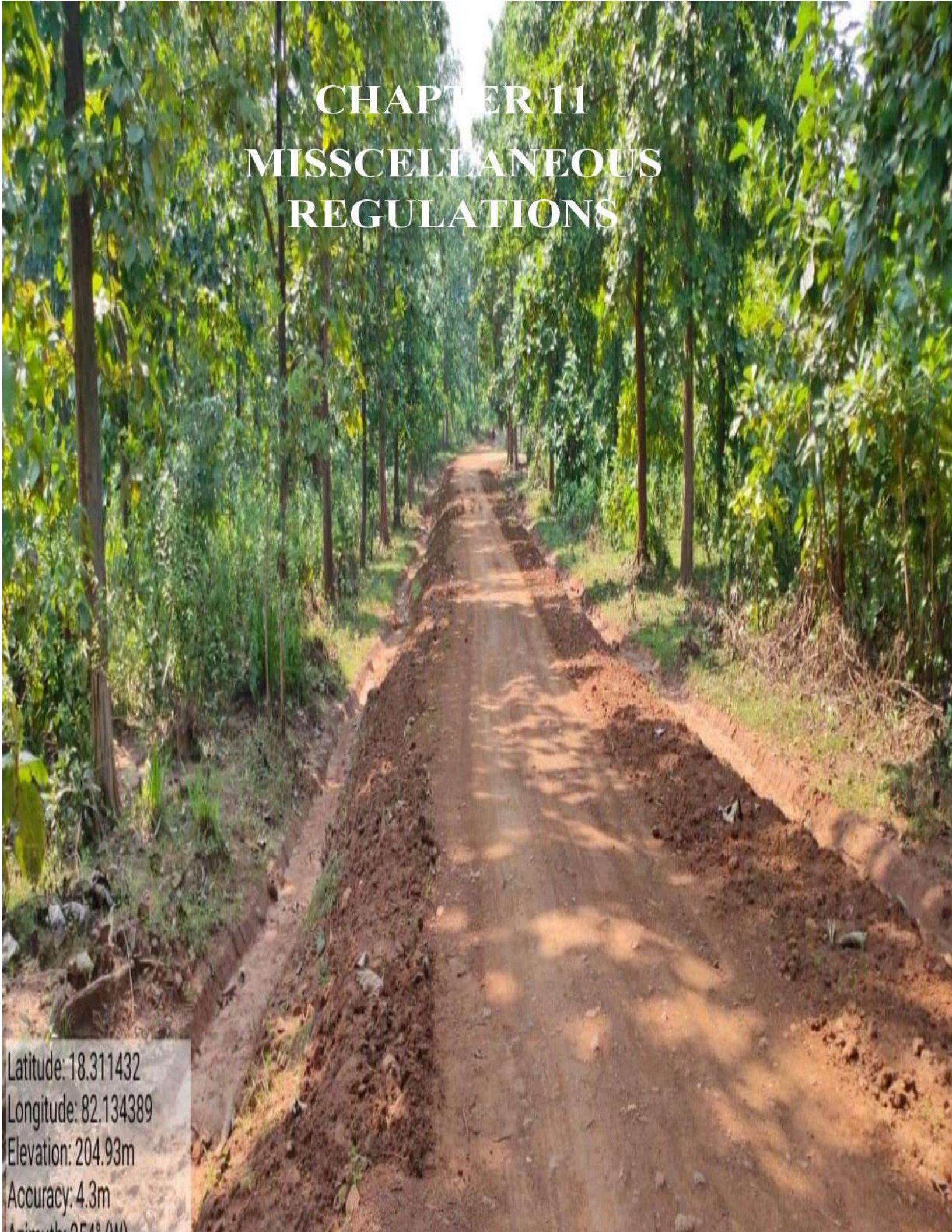
10.6 COST- BENEFIT ANALYSIS

10.6.1 The cost benefit notwithstanding the environmental services and other intangible benefits derived from the forests is furnished below.

Projected total costs of this plan	=	Rs. 112121.45 Lakhs
Projected total direct Revenues	=	Rs. 46970.24 Lakhs
Cost-Benefit Ratio	=	1:0.42

10.6.2 The forests of this Division are in a much degraded condition and unless and until there will be regular investment as prescribed in the plan; they are not in position to yield revenue more than projected cost of this plan. However, the major contribution to the revenue comes from Kenduleaf Trade. Obviously, these forests are treasure of immense value and need to be protected and natured at any cost.

10.6.3 Investments in the forestry sector have long gestation period. The investment made during this plan period (2021-22 to 2022-23) will yield results after 30-40 years. Though, long gestation period is an immediate hindrance for any such large investments in these forests, but it is not only justified but also essential in order to build capital assets for future generations and prosperity besides food security of the tribal and rural poor. If the prescriptions of this plan are effectively implemented, these forests are expected to show improved cost benefit ratio in the next revision of the plan. Moreover, the financial returns are not the main objective of this plan. This plan also visualizes others benefits to society and hence, the prescriptions shall be implemented in true spirit.

A photograph of a dirt road lined with trees, used as a background for the chapter title. The road is unpaved and stretches into the distance, flanked by lush green trees and foliage. The title is centered at the top in a large, white, serif font.

CHAPTER 11

MISSCELLANEOUS REGULATIONS

Latitude: 18.311432
Longitude: 82.134389
Elevation: 204.93m
Accuracy: 4.3m
Azimuth: 251° (W)

11.1 GENERAL CONSIDERATIONS

11.1.1 Miscellaneous prescriptions, spelt out in this Chapter, fall in two categories. First, this Chapter includes prescriptions with regard to those important activities that have not been discussed before (e.g. roads, buildings, and boundaries of forest blocks). Second, this Chapter also re-iterates some regulations, already prescribed in the Main Working Circles, for the sake of emphasis.

11.2 DIVISION BOUNDARY

11.2.1 The divisional boundary of Jeypore and Malkangiri Recognized Forest Division is not clear, though the forest block Sarangapalli RF is situated under the jurisdiction of both of the division. There is no mention of any area of Sarangapalli RF under Jeypore Division. As per previous working plan both the divisions tried to settle the discrepancy but failed. Hence, this discrepancy should settle immediately for smooth management of the Division. The inter-divisional boundary should be maintained as required in the Orissa Forest Department Code.

11.3 FOREST CONSOLIDATION

11.3.1 Consolidation of forest blocks shall be given due attention on priority basis. A phased programme is required to be drawn and resolutely pursued by the DFO (T), for constitution of existing Proposed Reserved Forests, identified UDPFs and other forest lands into Reserved Forests under the Orissa Forest Act, 1972. The DFO (T) shall take steps to finalize the present proposals of PRF and DPFs. New forest blocks, having good forest crop, shall be demarcated and proposed for reservation. New forest blocks need to be surveyed, demarcated and mapped.

11.3.2 In many cases of PRFs, the Forest Settlement Officer has raised minor objections like boundary clearance certificate and reference of the corresponding village sheets/ topo sheets. And mere compliance of these types of objections will facilitate further consolidation proceeding. Hence, the DFO shall take special drive to submit compliance of the objections raised by the FSO.

11.3.4 As stated in Part-I the consolidation of forest blocks has been completely neglected in the Division. In fact, no forest blocks have been notified in RFs or PRFs during the past plan period and intervening period though there are 73 Nos. of DPFs and 93 Nos. of PRFs in the Division. Further there are good chunk of forest area in the name of RL, PL and URL, subsequently known as protected forest, lying un-surveyed/ un-amended in 2001. The Divisional Forest Officer shall have to make persistent effort with Collector and Forest Settlement Officer for notification of all such Forest Blocks as Reserve Forests for better and intensive management of the area.

11.3.5 Many DFF, PRF and RF Blocks of the Division have been demarcated long back and in due course there has been a lot of encroachment in the field. In fact due to encroachment and dismantling of boundary pillars, the Forest Block like Challanguda PRF, Siraguda PRF, Ghenaguda PRF, Kurumpalli A, B, C and D PRF and Sindhabeda A & B RF, Kottanpalli RF etc. are not even traceable and require complete re-demarcation in the field. From the field verification it is evident that most of the boundary pillars are missing of all forest blocks due to encroachment and issue of title under Forest Right Act. Further, minor objection like demarcation and clearance of boundary line, reference of village sheets/ topo sheets etc raised by Forest Settlement Officer are there, which can be easily complied to. The Divisional Forest Officer shall make special efforts for compliance of such objections and pursue vigorously for completion of the proceedings in a fixed time frame. Further, the Divisional Forest Officer should also make phase programme for attending to all the pending PRF Blocks within the plan period.

11.4 AREA RECONCILIATION

11.4.1 In the outgoing plan described during scrutiny of the area of the various blocks, it was noticed that the notification area does not tally with that of topo depicted area. Many of the forest blocks were also not found depicted on the topo sheet. However, the field verification with respect to block map vis-à-vis notification reveals that topo depicted is prima facie correct and discrepancies are within 10%. Therefore the topo depicted and digitized area has been taken in the outgoing plan till detailed resurvey of these blocks and reconciliation of the discrepancies there on shall be carried out during the implementation of this plan.

11.4.2 According to the outgoing plan filed survey has been done to sort out the discrepancies of some forest blocks but failed due to encroachment, dismantling the boundary

pillars, settlement of the villages in the forest blocks and issues the Title of Right under Forest Right Act. Hence topo depicted area of outgoing plan has been taken in this Working Plan. Some forest blocks of notified area and topo depicted area are given in **Annexure-II**.

11.5 SYSTEMS OF SALE/DISPOSAL OF FOREST PRODUCE

11.5.1 All the timber coupes shall be worked by the Orissa Forest Development Corporation Ltd. in the Division. However, all silvicultural operations like thinning cleaning, pruning must be done departmentally. Similarly, timber and firewood from wind fallen trees, and materials of illicitly felled trees, shall be salvaged departmentally. However, the Range Officer concerned shall submit proposal in details to this effect of indicating locations, stump wise expected timber and firewood quantity available etc. duly checked by ACF/ DFO for approval by the RCCF. Salvaged materials shall be handed over to M/S OFDC Ltd. for sale to the local people. Similarly, confiscated and Undetected Case (UD Case) timbers shall be disposed of through M/S OFDC Ltd. or through local auctions, as the circumstances may dictate. Saleable thinning materials may, therefore, be disposed of through local auctions or in accordance with the Government policy of JFM depending upon the local circumstances. As regards NTFP, efforts shall be made to encourage local level in accordance with the Government policies on NTFP in currency. The DFO shall also take steps to encourage the local people for value addition in NTFP particularly with women Self Help Groups.

11.6 IRREGULAR EXPLOITATION

11.6.1 Removal of dead, fallen fire wood and trees uprooted by wind or storm from all part of the forest, except the coupes due for working, will be done in following manner. Every year in the month of October each Beat Guard will report the availability of dead fallen firewood and trees uprooted by wind or storm to the concerned Range Officer. The Range Officer will estimate availability for such materials in each Compartment and ACF /DFO concerned will verify the same for approval by the Regional Chief Conservator of Forests. The salvaged materials shall be handed over to OFDC Ltd. for disposal of the produce as per the Govt. instructions in vogue. Besides, the thinning and cleaning materials shall be disposed off through local auctions or in accordance with the Govt. policy. In JFM areas the intermediate yield shall be distributed among the members of the VSS as per JFM policy in vogue.

11.6.2 In normal course, irregular felling of trees will not be permitted. However, in emergencies like departmental requirement, religious functions and different developmental projects irregular removal of trees shall be allowed subject to prior verification of the actual requirement by local Range Officer and other Higher Authorities and with approval of the Regional Chief Conservator of Forests/Principal Chief Conservator of Forest. In case of car festival, it shall be supplied on receipt of requisition from the concerned temple authority and subject to prior verification of the actual requirement by the local Range officer and PWD authority as detailed in Govt. Circular No-6FB) 19/97-14043 and 15.07.1998. The trees which are silviculturally available for removal and whose removal shall not create any permanent gap in canopy shall be marked for felling. Such marking shall be carried out by the Range Officer concerned and checked by the ACF of the Division. The felling shall be undertaken departmentally and timber shall be disposed off in the manner prescribed for the purpose.

11.7 COMPENSATORY AFFORESTATION AREA & THEIR CONSOLIDATION

11.7.1 The Compensatory Afforestation has already been discussed in Para No-2.4.4.7 of Part-I. Besides, large scale pre-80 diversification 53.651 Ha of forest land has been diverted (as per Forest Conservation Act, 1980) for non-forestry purpose against which Compensatory Afforestation have been raised over 15.612 ha AR 2.664 Ha ANR and 32.0 Ha CATP in Malkangiri Forest Division. In most of the cases, only advance possession and mutation process is over. However, till date none of the patches have been notified as Protected Forest/ Reserved Forests. As the Compensatory Afforestation lands are in lieu of forest lands diverted for non-forest purpose, such land shall be brought under legal frame work of PF/ RF immediately. This will not only help in enhancement of protection measure but will also help in conviction of the offenders.

11.8 DEVELOPMENT OF FOREST ROADS

11.8.1 The existing forest roads (i.e., 113.536 K.Ms.) are damaged due to poor maintenance for a variety of reasons including paucity of funds. These roads are major communication net-works for transportation of forest produce, to effective supervision and to check smuggling, illicit felling and poaching. Local people also use these roads for transportation. Therefore, these are important social capital assets and required to be properly maintained. Therefore, all forest roads

should be provided with good drains (at least of size 30 cm wide and 45 cm deep) on either side. The side drains should be periodically cleared to allow surface runoff smoothly. Cross-drains should be provided before onset of monsoon especially in high slopes. Existing causeways and temporary bridges should be improved. Light murom turfing of road should be done periodically so as to prevent soil loss and erosion because of surface runoff and constant use. Roads should be repaired generally during November and December.

11.9 IMPROVEMENT OF BUILDINGS/WELLS

11.9.1 After reorganization of Malkangiri Forest Division in October, 2003 the position with regard to buildings has improved. But still the situation needs to improve further. There is shortage of accommodation for all kind of staff. The residential quarters for the DFO, and ACF requires to be renovated on priority basis. Quarters are also in short supply for ACF and subordinate field staff (e.g. Foresters, Forest Guards and Ministerial Staff). The staff quarters are in inhabitable condition due to poor maintenance. Construction of quarters shall be taken up in a sustained manner. The existing old buildings and wells are also required to be repaired/renovated in a sustained and equitable manner. Though current allocation of funds for maintenance of buildings is inadequate, rest house at Balimela already damaged by naxal (Maoist) in the year, 2009 which needs immediate construction of new rest house and others rest houses Mathili, Kalimela and Malkangiri were renovated which also needs repairing.

11.9.2 The water supply in the field is very poor. The wells and tube in the Division are not sufficient. The DFO should take steps to sink tube well in each campus/ residential quarters of the forest Rangers/ Foresters/ Forest Guards in the field. Also, annual maintenance of the same is a must.

11.9.3 Electrification of all the buildings in remote Beats and Sections, where such facilities are available, should be taken up. The residential buildings for the DFO and Asst. Conservator of Forests should be renovated during the 2nd and 3rd year of the Plan period. A phased programme shall be drawn up by the DFO, for construction of residential and office buildings for the newly created Ranges during the Plan period.

11.10 MAINTENANCE OF BOUNDARY

11.10.1 The boundaries of various forest blocks are in poor shape due to a variety of reasons including paucity of funds. A field staff is often not aware of correct boundary of forest blocks under his jurisdiction. Boundary lines are also required to be cleared and properly maintained. A five year cycle of maintenance of boundaries and boundary pillars is prescribed. Details of block boundaries, e.g. length of forest boundary, number of pillars, pillar to pillar bearings and distances and a record of maintenance of boundaries are meticulously maintained in the Divisional Office. Efforts shall be made to determine the geo-reference of boundary pillars in respect of all Forest Blocks, so that it will be easier to locate the missing pillars. Some of the new masonry pillars are constructed near the original pillar, this need to be rectified by the DFO (T) as in the long run it bound the affect the records.

11.10.2 Specification of Boundary Pillars

According to the Memo No. 15931 dt.03.08.2007 of the Principal Chief Conservator of Forests. Odisha Bhubaneswar, the construction of Boundary pillars of RF and PRF are given below.

i) **Masonry Pillars of RF:**

Masonry pillars may also be constructed on the RF boundary line where adequate curing is possible. The foundation of the pillar shall be 60cm × 60cm × 60cm. The size of the pillar above foundation (ground) shall be 60cm × 60cm × 90cm on back side and 60cm × 60cm (height) on front side with face slanting outside. The pillar should be plastered and duly numbered with name of RF written on the slanting position. This will be volume of 18 cft.

ii) **Masonry Pillars of PRF/ DPF:**

Masonry pillars may also be constructed on the PRF/ DPF boundary at places where adequate curing is possible. The foundation of the pillar shall be 60cm × 60cm × 60cm. The size of the pillar above foundation (ground) shall be 60cm × 60cm × 60cm on back side and 60cm × 30cm (height) on front side with face slanting outside. The pillar should be plastered and duly numbered with name of PRF/ DPF written on the slanting position. This will be volume of 14cft.

iii) Stone Pillars of RF:

- a) Ground shall be levelled before construction of the pillar.
- b) The diameter of the base of the pillar shall be kept 120 cm and that at the top 80 cm so that the diameter of the centre will be 100 cm. Height of the pillar shall be 130 cm. locally available stones and boulder shall be fixed using mud mortar.
- c) The pole of 160 cm length (duly painted with coal tar) to be fixed in the centre shall be 130 cm inside pillar and 30 cm above pillar i.e. one end of pole shall be embedded in ground.
- d) The visible portion of pole shall be flattened with face towards outside and pillar number written on it. The pillar number shall also be written at the base of the pillar.
- e) The voids on the outer surface of the pillar should be invariably being cemented.

(iv) Stone Pillars of PRF and DPF:

- a) Ground shall be levelled before construction of the pillar.
- b) The diameter of the base of the pillar shall be kept 90 cm and that at the top 60 cm so that the diameter of the centre will be 75 cm. Height of the pillar shall be 100 cm. locally available stones and boulder shall be used and made stable before filling of voids with mud mortar.
- c) The pole of 130 cm length (duly painted with coaltar) to be fixed in the centre shall be 100 cm inside pillar and 30 cm above pillar i.e. one end of pole shall be embedded in ground.
- d) The visible portion of pole shall be flattened with face towards outside and pillar number written on it. The pillar number shall also be written at the base of the pillar.
- e) The voids on the outer surface of the pillar should be invariably be cemented.

11.10.3 Clearance for the Boundary Line

11.10.3.1 Boundary line is to be cleared of all the growth and debris at the rate of 25 labourers per km and the stone-cairns are to be repaired at the rate of 5 labourers per cairn. In case of missing pillars the same shall be replaced with stone cairns at the rate of 5 labourers per cairn. The wooden post at the center of the pillar is to be charred at the base and painted with coal-tar and numbered with white paint. Sign boards indicating the name of the Forest Block and Compartment No. shall be displayed at prominent places.

11.10.3.2 The Inter-divisional boundary shall be cleared to a width of 12 mt, external and common block boundaries to 6mt and enclosed village ring lines to 3m. Compartment lines where they do not follow natural features like nallah, road, bridges etc. shall be cut to width of 3m. Tree should not be felled for the boundary line, but shrubby undergrowth should be cleared.

11.10.3.3 Encroachment, if any, shall be evicted as per law. The affected area shall be demarcated and pillars posting done to avoid further encroachment. Re- survey, demarcation and construction of permanent boundary pillars are absolutely necessary to check this growing problem. GPS instrument should be used in course of field survey. There are encroachments due to shifting cultivation which is continuing since long in the Division. Effective measures shall have to be taken to control shifting cultivation.

11.11 MAINTENANCE OF RECORDS

11.11.1 Control Forms shall be filled up and properly maintained by the DFO as per National Working Plan Code 2014. Compartment histories must be updated from time to time. A separate binding Control book shall be maintained by the DFO to reflect records of those important activities of all working Circles e.g. Activities like VSS/ JFM, micro-planning, RDF work, Felling, crop condition, regeneration status and other deviations/ shortfall of prescribed details should also be entered regularly. Maps and other records including a register of reserved forests and other legally constituted forests shall also be maintained and kept in safe custody.

11.11.2 Compartment Histories: The Compartment Histories update have been neglected and in all cases in spite of clear instruction in Rule 132 of OFD Code and Code of Working plan procedure. Much effort have gone in collection of reliable data for drafting Compartment Histories files of all forest blocks which was extremely time taking. This is the revised Working Plan therefore Compartment History files for all the compartments of Forest Blocks have been prepared de-novo in three sets, so that one set could be kept in the Division Office and other given to the Range Officer concerned for maintenance, in accordance with the standard instructions contained in the O.F.D. Code. A map on 1: 25,000 scales showing growing stock of the compartment has been attached to each file. Entries in the Compartment Histories should be completed by Range Officer before 30th of June every year and send to the Divisional Forest Officer for onward transmission to then Conservator of Forests, for perusal within 31st July.

During office inspection maintenance of compartment histories shall be checked. Divisional Forest Officer must check the Compartment History file during field inspection.

11.11.3 Control Forms: Standard control forms will be used and maintained as per Rule, 132 of the O.F.D. Code and Code of Working Plan and direction from higher authorities. In this Division maintenance of control forms has been highly unsatisfactory in the past.

11.11.4 Plantation Journal: Journals will be maintained for the plantations raised in a Range level, showing details of operations and their cost, in the forms prescribed in Orissa Forest Plantation Manual 1977 and a copy of which is at Division level.

11.11.5 Plantation Register: A plantation register shall be maintained at the divisional level giving details of every plantation carried out in the Division like year of plantation, location, area, species planted and agency which planted. Entries should be made in this register at the end of every year. A unique index number will be assigned to individual plantation, and a separate serial shall be adopted for each Block and some pages will be assigned to it in the register to have room for later entries. This register should not show any detail of operations, which will be shown in the plantation journals. The plantation register should be maintained as prescribed under Plantation manual 1977. Maps of the plantations with all details will also be kept in the plantation register.

11.11.6 Register of Forest Blocks: Maintenance of this register needs much care and immediate attention. It should preferably contain the original notification (or an attested copy thereof) declaring the blocks and reserved forests. Accurate maps of the block delineating the boundaries and showing the position of the boundary pillars as they exist on the ground and other details like boundary lengths, number of pillars, their coordinates etc. should also be kept as part of this register. The DFO shall keep on trying to obtain copies of reservation notifications and original maps etc.

11.11.7 Building Register: The Building Register is the vital document for buildings created in the Division. The information like land status, plot area, plinth area, amount spent and year of construction etc. are the main contents of the register. Further, a map/ plan is to be affixed. As these are the part of un-classed forests, proper maintenance of record is highly essential.

11.11.8 Divisional Journal: This should be maintained as per Rule 134 of the Orissa Forest Department Code, 1979, by the Divisional Forest Officer. Other publications on special projects and activities of FDA, AJY, World Food programs, wild life conservation women participation in JFM in the Division and livelihood based approach, success stories of all schemes should also be documented annually or half yearly.

11.11.9 Boundary Repair Register: The Divisional Forest Officer, Malkangiri Division shall maintain a permanent register allotting 2 to 3 pages to each block and details of all repairs carried out each year should be entered in the register. It helps to know the exact updated position of boundaries and the repairs carried out to them. Also this should have GPS co-ordinates for reference.

11.12. SURVEY AND MAINTENANCE OF MAPS:

The following maps have been prepared during the Working Plan field exercise and compilation of the Plan.

11.12.1 Stock Maps: Three sets of stock maps have been prepared with GIS technology in 1:25,000 scale giving details of crop composition for both RFs and PRFs of the Division. Stock map for each compartment have been pasted in the compartment history file. One set will be retained in the office of the Working Plans Officer and the remaining sets will be kept in DFOs office.

11.12.2 Index Map: Digitized Administrative layer has been prepared on 1:50,000 scale with GIS technology. The map depicts the important towns, roads, forest blocks, river system, range headquarters, beat headquarters, section headquarters, important villages etc. of the Division includes all administrative jurisdictions i.e. Division, Range, Section, Beat boundaries in the layer.

11.12.3 Management Maps: Three sets of management maps have been prepared on 1:50,000 scale topo sheets. Annual coupes with coupe number in each Working Circle have been shown. One set of management maps will be retained in the Working Plans Division Office and two sets will be supplied to the Divisional Forest Officer, Malkangiri.

11.12.4 Working Plan Maps: Five copies of the digitized Working Plan map or management have been prepared on 1:50,000 scale in consultation with the NRSA and ORSAC Bhubaneswar. The map shows different Working Circles, felling series, Rehabilitation series etc.

It also shows the permanent features, territorial boundaries, name of the block, number of compartments etc. Three sets will be supplied to Divisional Forest Officer, Malkangiri for use in Division Office and Range office. One set will be retained in the office of Working Plans Officer and one set will be given to the Conservator of Forests.

11.12.5 Fire Maps: They shall be maintained as per Rule 283 (22) of the Orissa Forest Department Code. The records should be submitted annually in code Form No.39, along with fire map (on a trace copy of Working Plan map scale 1:50,000), to the Conservator of Forests. Burnt area shall be shown on a trace copy of compartment map and details shall be given in respective compartment history form.

11.13 FUELWOOD MANAGEMENT.

11.13.1 The detail estimation and analysis of firewood requirement in the Division has already been described in Chapter No-7 of Part-1. The fire wood is legally supplied by the OFDC Ltd only. This supply is very limited and delivered by the Forest Department for sale through OFDC Ltd retail Sale Depots. Instead of firewood the other sources like LPG, Agriculture Waste and Kerosene and Cow dung are also available and used as a cooking of fuel. But firewood continuous to be the major cooking fuel putting tremendous pressure on the Forest of the Division.

To reduce the heavy pressure on the existing forests, following measures may be adopted.

- ❖ Extensive plantations of short rotation fuel wood species should be raised on community& other barren lands.
- ❖ Encouragement of Agro Forestry and Farm Forestry in large scale.
- ❖ Motivation of people through formation of VSS to regenerate degraded patches of forests to meet their fuel-wood requirement, instead of depending on existing forests.
- ❖ Distribution of fuel-efficient smokeless chullahs, LPG to all the villagers at concessional rates to reduce the consumption of fuel.
- ❖ Use of firewood in commercial establishment like hotels, restaurants; Bricks kiln etc shall be strictly prohibited.

11.14 MONITORING OF OLD PLANTATIONS

11.14.1 Old plantations shall be monitored from time to time with regard to survival percentage, growth characteristics, injuries to the crop and other indicators. Observation of monitoring and inspection shall be reported in the journals.

11.15 MANAGEMENT OF VILLAGE FORESTS

11.15.1 There are 51 numbers of Village Forests in the Division with an area of 268.20 ha. These Village Forests are those plantation raised under Social Forestry Project and constituted as Village Forest under the provision of the Orissa Village Forest Rules, 1985. Now all the Village Forests are handed over to concerned VSS and most of the area not indentified due to encroachment. All 51 Nos. Village Forests are included in the Plantation Working Circle in this Plan. The detail list of Village Forests has been appended to this plan as Annexue VIII. The Plantations/ Village Forests so constituted shall be managed in accordance with the Management plan prepared under the provisions of the Rule, 1985.

11.16 INCREASING AND EFFECTIVE INVOLVEMENT OF LOCAL PEOPLE IN FOREST MANAGEMENT:

11.16.1 Local people shall be increasingly involved in protection and management of these forests in accordance with the current policy of the Govt. of Orissa on Joint Forest Management (JFM). EDC shall also be formed in the periphery of the Sanctuary. Effective co-operation of people shall be enlisted in controlling illicit felling of trees and poaching of wild animals.

11.16.2 The National Forest Policy of 1988 envisages people's involvement in the development and protection of forest and asks for creating a massive people's movement with the involvement of women, so that the forest communities could identify themselves with the development and protection of forests from which they derive benefits. Moreover, the rights and concessions from forests should primarily be for the bona fide use of the communities living in and around forest areas, specially the tribes. The policy further prescribes that enjoyment of rights and concessions should be subject to carrying capacities of forests and availability of adequate quantities of relevant forest products without jeopardizing regeneration of forests.

11.16.3 The Govt. of Orissa have resolved vide their Resolution No.17240/FFAH dt.01.08.1988, for the formation of Forest Protection Committees (FPCs), for the protection of Reserved Forest areas by local communities. These committees are entitled to collect dry/ wind fallen, small timber and firewood for their bona-fide requirement. This circular is appended to this Plan. This Notification has been further amended/replaced by subsequent Notifications No.10F (Pron) 4190/29825/FFAHH, Bhubaneswar dt.11.12.90; No 16700-10-F(Prong)-20/93-

F&E dated 3rd July 1993 and No.122180/F &E, dt.30.9.1996. To implement provisions regarding Joint Forest Management (JFM) contained in the relevant notifications in force for protection and regeneration of degraded Forest areas and to meet the local demands of firewood, small timber and other bona fide requirements during the Plan period.

11.16.4 Successful J.F.M. solves the problems of fuel, fodder and small timber requirements to a great extent and also helps in soil and moisture conservation. It increases the income of local people through increased collection of NTFPs, JFM activities also increase forest cover, change the micro climate and increase the water table to a large extent.

11.16.5 In Malkangiri Forest Division degraded and podu affected areas generally having few root stock, which can be regenerated by protecting it from grazing, illicit felling and fire, without any huge investment. Here formation of new V.S.S. and activating the existing VSS can bring about major transformation. Joint efforts by the lower field staff like beat Forest Guards, Section Foresters, NGOs voluntary organizations along with regular meeting and monitoring by DFO and ACFs are highly essential for creating the right atmosphere for this purpose. In these areas, VSS should be strengthened through the FDAs and AJY funding.

11.16.6 Successes of J.F.M also help in checking further encroachments on the fringes of the forest areas and in the eviction of encroachers. These areas can also be afforested without much litigation with the help of respective Samities. Satellite imageries should be procured for forest cover and fire management to know the indicator of intervention.

11.16.7 For every VSS one Micro Plan will be prepared basing on the Participatory Rural Appraisal technique (PRA). Before the preparation of Micro-Plan, the forest assigned to the VSS shall be surveyed and demarcated. Pillars should be posted to avoid any future area-dispute among different Samities. A map to the scale will be prepared by the field staff and enclosed with the micro plan. Different activities like plantation, soil conservation measures, silvicultural operations like tending and cultural operations, disposal of the cleaned materials, water harvesting structures, pastures etc shall be discussed in detail along with financial outlay in the micro plan.

11.16.8 Silvicultural system under JFM should be evolved and prescribed as per local conditions, existing physical and biological resources and requirement of the community within the broad guidelines provided by Working Plan. Podu cultivation should be discouraged at any cost.

11.17 FOREST FIRE MANAGEMENT

11.17.1 Forest blocks vulnerable to fire based on satellite imageries have been identified in Chapter-4 of Part I. Special plans to prevent fires in these blocks have to be prepared and implemented. The community around these blocks has to be made aware and with their assistance the occurrence of fire in these blocks is to be reduced. In these villages, the village level committees or VSS need to be formed and each committee is to be given incentive for three months (March, April and May) for preventing the incidence of fire and they should be motivated to protect the forests from fire. The following fire protection measures are suggested:

- i. All Range Officers shall maintain annual fire maps on 1:25,000 scales of their respective ranges showing incidence of fire, in order to enable them to take advance fire protection measures in fire prone areas.
- ii. Annual fire line clearance of 1 to 2 chain width in fire sensitive areas, coupled with controlled burning shall be done under the personal supervision of forester. Moreover, old fire lines, forest roads, boundary lines, village ring shall be kept clean by taking up control burning in 1chain strip on both sides of it.
- iii. The Orissa Forest (Fire Protection) Rules, 1979 and the fire protection measures provided in the O.F.D. Code shall be followed in these forests. The forest fringe village where there is high fire vulnerability is to be identified. In these villages, the village level committees/ VSS need to be formed and each committee is to be given incentive for three months (March, April and May) for preventing incidents of fire and motivate them to protect the forests from fire.
- iv. Public awareness campaign should be organized in winters ahead of dry season to educate people especially in the fire prone areas not to resort to burning of ground flora to collect NTFP including kendu-leaf. Besides, VSS shall be actively involved in fire protection including extinguishing of fire in their allotted area. Incentives should be

announced to both public (including VSS) and staff to protect the forests from fire. Funds for this purpose should be provided in budget.

- v. Fire fighting teams consisting of Section Forester, beat guard and fire watchers should be formed in areas vulnerable to fire. Incidence of annual fire should be entered in the compartment history.
- vi. Imparting training to forest staff, VSS members and workers on modern forest fire management. Better communication facilities like wireless sets, vehicles etc. will be of great help to combat the menace.
- vii. Measures for protection against fire have not been satisfactory in the Division. Adequate funds should be made available to the DFO for this purpose. Fire protection has to be attended as top priority in the Division. The fire incidences should be also monitored by the DFO through internet facility and plan accordingly.

11.17.2 Fire records: Fire records shall be submitted annually to the Regional Chief Conservator of Forest and should be updated in the GIS database.

11.18 GRAZING

11.18.1 Estimation and analysis of grazing problem has been discussed in Chapter 2A of Part – I. Due to heavy cattle population pressure in the Division, adequate regeneration is affected in the forest areas. For better fodder availability following measures may be adopted.

- (i) People may be motivated with the help of veterinary department, to minimize the number of unproductive cattle. They should rather go for better quality cattle and stall-feeding
- (ii) Plantations of fast growing fodder species and development of silvipasture plots in the selected high-density cattle areas be taken up

11.18.2 To control the damage caused by indiscriminate grazing of forests, the Government has framed the Orissa Forest (Grazing Cattle) Rules 1980. To minimize damage caused by indiscriminate grazing and browsing, following measures shall be adopted.

- (i) Grazing will be allowed strictly basing on the carrying capacity of the area e.g. Lopping of trees for fodder is to be discouraged.
- (ii) Grazing should not be allowed in over-grazed areas, regenerating areas and where cleaning have been carried out.
- (iii) All plantations shall remain closed for grazing for a period of 5 years including the year of planting. No grazing should be allowed in areas where bamboos are raised under plantations.
- (iv) Coupe areas should be closed for grazing for at least 8 years, i.e. three years prior to felling and five years following the year of working. In areas where there is no regeneration, it should be totally closed to grazing.
- (v) The grazing year shall be from 1st July to following 30th June. All grazing permits shall expire on 30th June.

11.19 CAPACITY BUILDING OF FORESTRY PERSONNEL

11.19.1 The skill and the information requirements of the staff at the beat, section and range level has undergone a lot of change in the last two decades. The interaction of this level of staff with the public, people's representative, NGOs and officials of other department has increased manifold. The following proposal may be considered by the DFO for improving the efficiency and performance of the field staff;

- i. Proper training and regular refresher courses for the field executives.
- ii. Good communication skill training to the FG/ Fr /FR level
- iii. Regular in-house discussion to update knowledge of the field staff. Important relevant rulings of different Courts should be discussed & changes brought about in Forest Act and Rules in recent years should be brought to their notice. New techniques of plantation, nursery raising etc be demonstrated to the field staff.
- iv. Monthly meeting at the Range level should give opportunity to Foresters and Forest Guard to express views and opinion on various current issues. Successful tackling of situations should be discussed and analyzed.

- v. Important circulars and changes in methods/ technology/approach should be discussed at length by the DFO during monthly meeting of Range Officers.
- vi. Supply of firearms to all Range Officers, Section Foresters and Guards and impart arms training to them.
- vii. Frequent raids and surprise checks should be conducted in the smuggling prone areas and check gates.
- viii. Awards/ Incentives should be given to the field staff for exemplary work in the protection and development activities.
- ix. Malkhanas to keep seized produce should be available in all smuggling prone areas.
- x. Personal entitlements of field staff especially those posted in remote areas should be disbursed at the earliest.

11.19.2 Some of the administrative changes as stipulated below may also be considered by the authorities concerned

- i. Promotional opportunity to the field staff should be increased. At present most of the FGs/ Foresters who are at the cutting edge of the territorial administration are disgruntled as they are retiring without any promotion. Minimum of one promotion should be assured.
- ii. Power of Executive Magistrate be given to the ACFs and DFOs for eviction operations and forest raids/ search.
- iii. Secret Service Funds should be provided to the DFO to collect intelligence about timber smuggling, poaching etc.
- iv. Attractive compensatory/ rehabilitation package be given to the families of field staffs laying their life or getting badly injured on forest protection duty.

11.20 FOREST CONSERVATION ACT AND ITS IMPLEMENTATION

11.20.1 Under the forest conservation Act, 43 (ha) of forest land has been diverted for different Minor and Major irrigation Project and transmission line in the Division. In lieu of

diverted forest land non forest land no compensatory land has been handed over to the Forest Department by the Revenue Deptt. to take up Compensatory afforestation. These non-forest lands are to be declared as Protected Forests to give legal protection under the Orissa Forest Act, 1972. An area of 201.274 ha has to be afforested within the Revised Plan period. However, the DFO may also take up Compensatory afforestation as per stipulation of the Govt. of India against projects which are in the pipe line if cleared within the Plan period.

11.21 ECO-TOURISM

11.21.1 The tribals in Malkangiri are original inhabitants and it is found that a number of tribes who are cradle of tribal culture offer a harmonious blend of tribal diversity. The fascinating life style of Bondas, Koyas, Duruas and Sauras who have their own culture, customs, traditions, practices and life style have become the another major source to develop Eco-Tourism in the District which give rise to form Eco-tourism in the District. At present there are three Nos. of Eco-Tourism created in this Division namely,

1. Eco-Tourism, Satiguda in Talaguda VSS of Malkangiri Range,
2. Eco-Tourism, Jaduguda in Jaduguda VSS of Malkangiri Range and
3. Eco-Tourism, Chitrakonda in Maa Bhandaragharani VSS of Chitrakonda Range.

Eco-tourism should be encouraged in all potential areas in order to create awareness and increase revenue. The DFO shall select Eco-scouts from local people to guide the tourist. Buildings for accommodation/ lodges may be constructed at Malkangiri Range and Chitrakonda Range. The VSS and EDC should be encouraged to provide decent catering services to visitors. The Range Officer will give training in consultation with the Tourism Department. Nature trail, interpretation centers, hiking, picnicking, trekking shall be organized and monitored in each Range. This activity should be a livelihood base program for rural people.

11.22 RIGHT AND CONCESSION

11.22.1 The right and concession existing under different provisions have been discussed in Chapter-2 of Part-I and also individual Working Circle. However, these rights, concessions and privileges are subject to the condition of the forests being good if such resources are exhausted or damaged, all such rights, concessions or privileges shall cease to exist.

11.23 COST NORM:

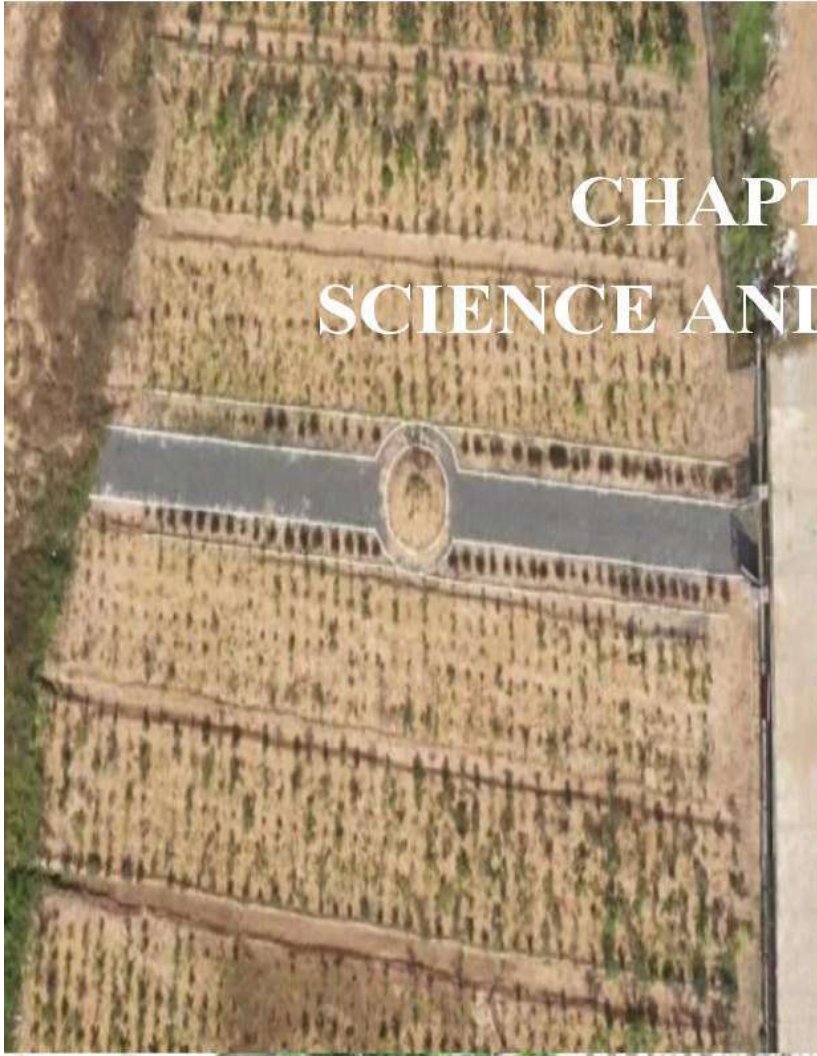
11.23.1 The cost norm for implementation of the prescription and the total estimated cost of working under chapter is discussed in Chapter No-10 of Part-II (Financial Forecast and Cos of the Plan)

11.24 INTERMEDIATE REVISION:

11.24.1 Since there is scope of change in legal classification of some blocks of forest, there may be possibility of intermediate revision during the currency of the plan. Hence, if required the Regional Chief Conservator of Forests, Koraput Circle in consultation with the Conservator of Forests, Working Plan will send the necessary proposals for approval of competent authority.

CHAPTER 12

SCIENCE AND RESEARCH



12.1 REPORT AND DOCUMENTS

During the process of writing of this plan, the following reports and documents were referred and used.

1. Status of the Forest Report (SFR) 2015, 2016, 2017 published by Forest Survey of India (FSI, Dehradun) to know the condition of the forest and forest cover over the last few years during implementation of the plan based on FSI satellite data.
2. Carbon statistic of India: to know the methodology for the assessment of forest carbon, counting of forest carbon stock.
3. Central Ground Water Board (CGWB) water level data with the long term trend of ground water recharge, ground water development.
4. iucnredlist.org for IUCN status of animals.
5. National Bureau of Soil Survey and Land Use Planning (NBSS): To know the soil erosion caused and expected, soil loss, Soil erosion, soil texture map.
6. Geological Survey of India (GSI) report on rough formation in Malkangiri District.
7. Hon'ble Supreme Court orders in different cases regarding forests.

12.2 RESEARCH GAPS:

Because of the lack of any research works / paper related to the division and the undivided Koraput District, many chapters that involve specific information on the forest division of Malkangiri could not be written with accurate data. The research gap is in almost every aspect of the working plan as our writing of the plan in early years has not looked into the new aspects that the need of our present times required, like Biodiversity and all its components, climate change and carbon sequestration, NTFP research, Indigenous Traditional Knowledge (ITK), Trees Outside Forests, social and cultural aspects of forests, Ecosystem services etc. There is a need for research to be done all documentation of all the species that are being used by people, ecosystem provided by the forests, carbon sequestration and Biodiversity assessment.

12.3 PRESERVATION PLOTS

In Malkangiri Forest Division, 6 Nos. of preservation plots were established. The details of preservation plots given in the table below:

Table No. 12.1: Preservation Plot in Malkangiri Forest Division.

Sl. No.	Range	Name of Regeneration plot	Year	Area	Remarks
1	Motu	Kattanpalli RF	2013-14	4.0 ha.	
2	Malkangiri	Goiparbat RL	2014-15	2.0 ha.	
3	Mathili	Dharamgarh RL	2014-15	1.05 ha.	
4	Balimela	Balimela PRF	2014-15	4.0 ha.	
5	Malkangiri	Siadimal RL	2016-17	30.0 ha.	
6	Balimela	Balimela PRF	2019-20	5.0 ha.	

12.4 SAMPLE PLOTS

For the preparation of this working plan, a total of 457 nos. Sample plots were laid & the relevant information was recorded. The GIS&IT cell of Forest and Environment Department, Odisha provided the sample points and information was captured by using GPS PDA devices with the Odisha Forestry App. The data collected thorough GPS PDA device was synchronized and sent directly to the server of GIS & IT cell. The data collected was then sent for analysis to NRSC, Hyderabad.

12.5 REGENERATION PLOTS

The sample plots have been surveyed as per the new Working Plan Code, 2014 and have in them the four nos. of 3×3 mtrs sub-plots recorded for the regeneration too. These plots will also be the plots where regeneration will be studied. This will make the monitoring and data collection easier.

Table No. 12.2 Plots recorded for regeneration:

Sl. No.	Range	Name of Preservation plot	UID No.	Year	Area	Remarks
1	Motu	Manyamkonda PRF	450	2019-20	0.1 ha.	
2	Motu	Tamanpalli PRF	440	2019-20	0.1 ha.	
3	Motu	Kattanpally-B RF	449	2019-20	0.1 ha.	
4	Motu	Pendikonda RF	448	2019-20	0.1 ha.	
5	Balimela	Balimela PRF	159	2019-20	0.1 ha.	
6	Balimela	Balimela PRF	163	2019-20	0.1 ha.	
7	Balimela	Chitapari PRF	183	2019-20	0.1 ha.	
8	Balimela	Chitapari PRF	184	2019-20	0.1 ha.	
9	Balimela	Kanangi RF	158	2019-20	0.1 ha.	
10	Balimela	Balimela PRF	160	2019-20	0.1 ha.	
11	Balimela	Balimela PRF	161	2019-20	0.1 ha.	
12	Balimela	Tarlakota PRF	111	2019-20	0.1 ha.	
13	Balimela	Balimela PRF	101	2019-20	0.1 ha.	
14	Balimela	Balimela PRF	112	2019-20	0.1 ha.	
15	Balimela	BalimelaPrF	114	2019-20	0.1 ha.	
16	Balimela	Tarlakota PRF	115	2019-20	0.1 ha.	
17	Chitrakonda	Sileru West RF	350	2019-20	0.1 ha.	
18	Chitrakonda	Sileru West RF	354	2019-20	0.1 ha.	
19	Chitrakonda	Banaguru RF	425	2019-20	0.1 ha.	
20	Chitrakonda	Datunguda PRF	413	2019-20	0.1 ha.	
21	Chitrakonda	Mantriput PRF	309	2019-20	0.1 ha.	
22	Chitrakonda	Mantriput PRF	310	2019-20	0.1 ha.	
23	Chitrakonda	Mantriput PRF	312	2019-20	0.1 ha.	
24	Chitrakonda	Saigaram PRF	195	2019-20	0.1 ha.	
25	Chitrakonda	Saigaram PRF	196	2019-20	0.1 ha.	
26	Chitrakonda	Saigaram PRF	197	2019-20	0.1 ha.	
27	Malkangiri	Namkonda PRF	169	2019-20	0.1 ha.	
28	Malkangiri	Kumadongar PRF	78	2019-20	0.1 ha.	
29	Malkangiri	Pitatung PRF	60	2019-20	0.1 ha.	
30	Malkangiri	Jhileruguda PRF	67	2019-20	0.1 ha.	
31	Malkangiri	Kotukonda PRF	156	2019-20	0.1 ha.	
32	Kalimela	Gompakonda RF	415	2019-20	0.1 ha.	
33	Kalimela	Yengulkonda RF	443	2019-20	0.1 ha.	
34	Kalimela	Yengulkonda RF	444	2019-20	0.1 ha.	
35	Kalimela	Udayagiri RF	424	2019-20	0.1 ha.	
36	Kalimela	Udayagiri RF	330	2019-20	0.1 ha.	
37	Kalimela	Udayagiri RF	332	2019-20	0.1 ha.	
39	Kalimela	Udayagiri RF	246	2019-20	0.1 ha.	
40	Kalimela	Batenwada RF	172	2019-20	0.1 ha.	

41	Kalimela	Bapanpalli RF	384	2019-20	0.1 ha.	
42	Kalimela	Pulimetla PRF	226	2019-20	0.1 ha.	
43	Mathili	Sarangpalli RF	6	2019-20	0.1 ha.	
44	Mathili	Saramgpalli RF	7	2019-20	0.1 ha.	
45	Mathili	Malidangar RF	52	2019-20	0.1 ha.	
46	Mathili	Malidangar RF	53	2019-20	0.1 ha.	
47	Mathili	Pititung PRF	33	2019-20	0.1 ha.	

12.5.1 Data needs to be collected

Regeneration plots are established to study the regeneration status of important species.

1. Data should be collected on population dynamics of seedling, saplings and young trees.
2. Each seedling and saplings should be marked individually.
3. The mark seedling should be measured and monitored periodically.
4. The status of growth, their health and conditions should be measured in detailed.
5. The condition of soil, present of litter, the canopy opening level should be recorded properly.
6. The incidences of pest should be recorded.
7. Any threat or outside interference like fire, grazing should be removed.
8. The monitoring periodically, the period of which should be decided in consulting with the GIS and IT cell.

The aim of monitoring of the regeneration is also to find out under what condition the regeneration of particular species comes offbest and under what conditions they grow best. In knowing this, the next step would be to create those conditions that are most suitable for regeneration plots.

12.6 OTHER RESEARCH AND EXPERIMENTAL PLOTS

12.6.1 Sal Regeneration plot (Sal RDF).

Malkangiri Forest Division is rich in natural flora and fauna. The low level Malkangiri plain varies from 300 to 600 mtrs from the sea level. The forest of this area, due to low rainfall and high temperature, supports mostly dry deciduous mainly miscellaneous species. The forests are also more or less covered with dry bamboo breaks and few **isolated patches of Northern Sal**

Forests. Due to varying altitudinal, edaphic and climatic changes, there is the limiting zone of northern peninsular Sal forest in the State, towards north of this land, there is pure Sal or miscellaneous with Sal, whereas towards South the natural Teak is found. **The Eco-tone line** passes roughly about 70 kms from Jeypore and 30 kms from Malkangiri covering the Forest Blocks Sindhrimal, Monuskonda, Pitatung etc. The Sal forest is mainly in Dharmagarh RL, Dasmantpur RL, Sarangpalli RF, Pitatung PRF etc. of Mathili Range and limited to Akur RF, Jharapalli PRF of Malkangiri Range of Malkangiri Division.

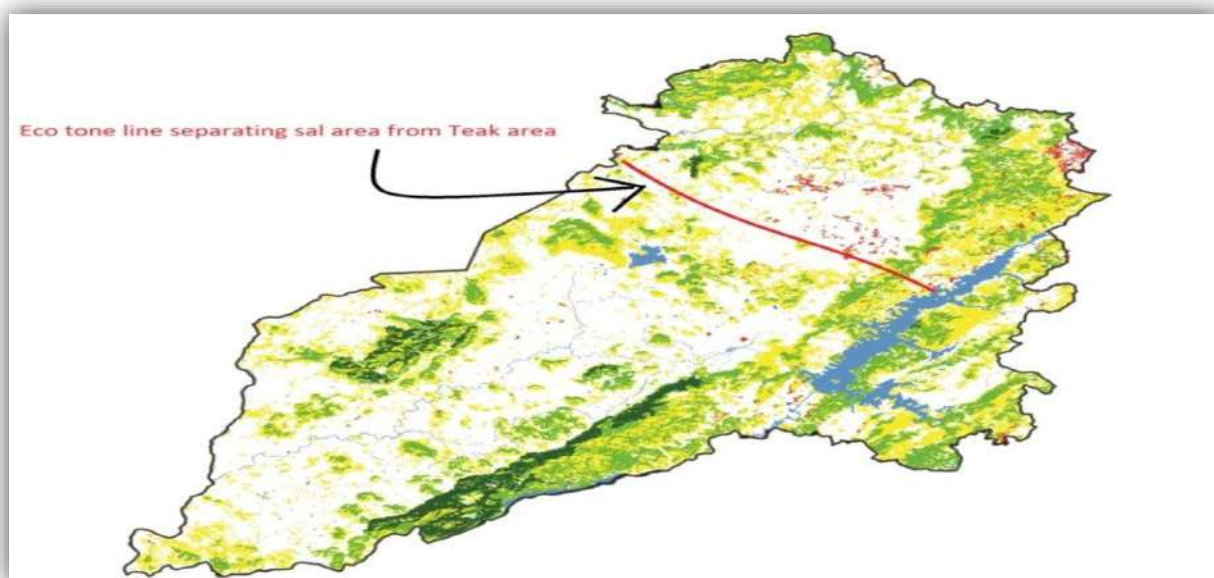


Fig. 12.1 Map showing Approx Ecotone Line separating Sal area from Teak area in Malkangiri Forest Division

Known for its medicinal value and cultural importance, **Sal** (*Shorea robusta*) assumes immense importance in this tribal heartland. What makes Sal the most priced species is its capability to restore the natural biodiversity of a place. This means, unlike teak, sal doesn't deter the growth of other species, but compliments their development. *Shorea robusta* can also be an income booster for indigenous tribes here. Its leaves are generally in demand for making platters, bowls and small baskets. Most importantly, it is a great source of fertilizer and the wood makes for good furniture. Hence, its plantation or regeneration through artificial/ assisted way is very important to preserve and compliment the biodiversity of the region.

12.6.1.1 Natural Regeneration of Sal:

The natural regeneration of Sal is very inadequate. Due to heavy biotic interference and common forest fire, the new recruits though adequate, hardly get an opportunity to establish themselves. The heavy illicit felling and grazing, particularly cattle, repeated hacking of sal shoots for tooth brush, charcoal making and fencing materials have led to further degradation of forests. Moreover, the regeneration of sal on the higher slopes on the hills is deficient or absent. After felling of grown up trees, there will be no successor to take their place. Tending and other cultural operation have remained neglected. Only in some RFs and PRFs under Selection-cum-Improvement and Rehabilitation Working Circle, cultural operations and gap planting have been attempted.

Hence, a tried and tested technique of Sal Rejuvenation from Kurseong Forest Division of West Bengal can be tried here at Malkangiri.

12.6.1.2 Concept:

The Kurseong Division- NB Sal RDF model, which was implemented by Shri Sheik Farid, IFS, DFO, Kurseong Forest Division, West Bengal Forest Department; has got good results just in 2 years.

There are vast stretches of degraded Sal Forests in the north part of Bengal, wherein normal plantation becomes very difficult due to frequent damages by Elephants. In this exercise, a Sal dominant area was identified and demarcated. Cleaning was done and the Sal crops were cut flush to the ground to induce coppicing. The area is then protected and left for regeneration with intermittent weeding, soil mulching, application of fertilizers, etc. As per these field trials/ experiments in the last 2 years in Lalfa block in Bagdogra Range, Kurseong Forest Division, the growth of regenerated Sal shoots was found to be more than 10 fts. This NB Sal RDF model suits the best to revive the forests and tolerate the damage by wildlife in Kurseong Division.

Experiment:

Taking help from this model and based on the site conditions and requirement in Malkangiri Forest Division, a proposal has been made for Assisted Regeneration (Regeneration of Degraded Forest) of Sal Forest. An **experimental patch of 5 Ha in Pangam PRF** was taken.

This patch was having Sal growth but in degraded condition. Preparatory work was carried out as explained in the flow chart. The Sal crops were cut flush to the ground to induce coppicing which was observed during rainy season. As the area was small, in order to prevent any biotic interference, fencing was done. The material which was obtained after the cleaning of the area was used for brushwood fencing. Controlled burning of all plant wastes/ weeds in field was done to kill soil germs, insects, weed seeds and to add nutrients to soil. Creation of fire line and inspection paths was also done. Then after the emergence of Sal shoots in rainy season, randomly 100 shoots were numbered and marked with GPS reading to observe the increase in height, under the ideal undisturbed condition in the plot.



Fig. 12.2 : Numbering of 100 regenerated Sal shoots for height measurement inside 5 Ha experimental area

Similarly, Plantation of 100 Sal seedlings raised in Central Nursery was done to compare artificial plantation with Assisted Natural Regeneration. Now, after the coppicing of shoots as well as Plantation of seedlings, recording of increase in height and survival in both the sets of experimental plots is being done monthly.



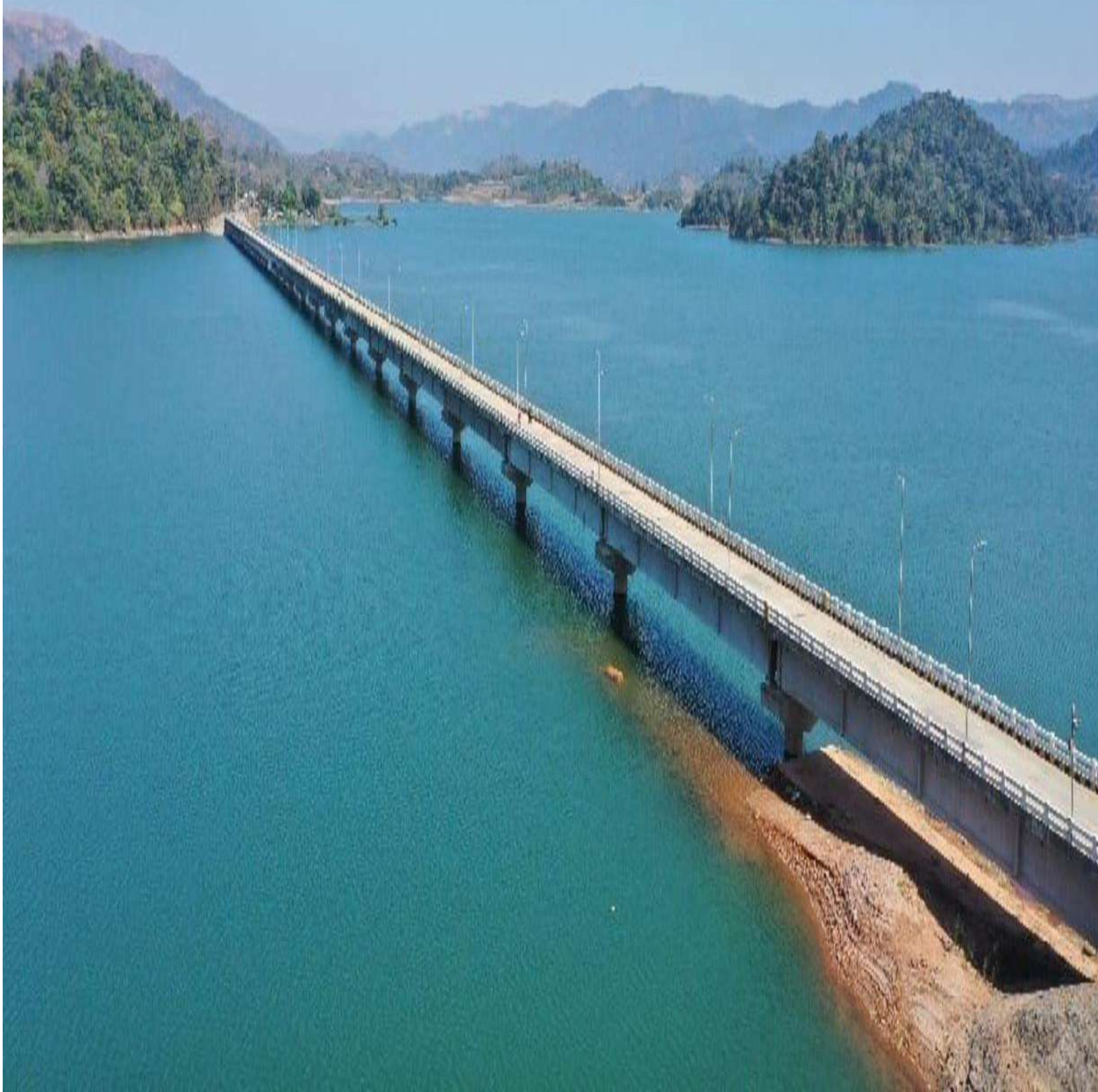
Fig.12.3 Plantation of 100 Sal seedlings and monthly measurement of height

Based on monthly data, growth of the regenerated Sal Shoots with the planted seedlings can be compared, which can be used to see the effectiveness of Assisted Regeneration of Sal. The data is being monthly collected and observations based on the data analysis will be shared soon. Cost norm preparation based on the actual process followed and expenditure incurred will be prepared soon.

Based on the success of this method in different divisions of North Bengal and limited observations from sample plot at Malkangiri Division, it is proposed that in order to rejuvenate the degraded Sal Forests in Malkangiri and other parts of Odisha, this method can be tried on pilot basis in 50 Ha/ 100 Ha area.

CHAPTER 13

SUMMARY OF PRESCRIPTION



SUMMARY OF PRESCRIPTIONS

13

13.1 INTRODUCTION:

Malkangiri Forest Division extend from longitude E 81° 23'16" to E 82° 24'18" and latitude N 17° 49'38" to N 18° 44'15". The administrative jurisdiction of the Division was a part of Jeypore Sub-Division of Koraput District and whole of Malkangiri Sub-Division of Malkangiri District. The forest area of Malkangiri Division occurs in compact block and some scattered patches. The forest belongs to the Tropical Dry Deciduous Forest and Tropical Moist Deciduous Forest. The boundaries of the tract dealt with are as shown below.

Table No. 13.1: Boundaries of the tract dealt with

Sl. No	Direction	Name of Forest Division/District/State
1	North	Jeypore Division
2	South	Andhra Pradesh/ Chattisgarh
3	East	Koraput Division/ Andhra Pradesh
4	West	Chattisgarh

Malkangiri Forest Division was created on 01.10.2003 vide Govt. of Odisha, Forest & Environment Department Notification **No.1F (A) 100/2003/13228/F&E dt.08.08.2003**. During the re-organization of Forest Department, the Malkangiri Forest Division was under the administrative control of the then Jeypore Forest Division and systematic/ scientific management practices were being followed.

The entire Division has been divided into 6 Ranges, 23 Sections, and 116 Beats.

13.2 DISTRIBUTION OF THE FOREST AREA FOR PROPOSED WORKING PLAN:-

Table No. 13.2: Distrinution of the Forest area for proposed Working Plan.

Sl No	Ranges	RF	PRF	V.F	RL	URL	UDPF	Total Area (in ha)
1	Malkangiri	700.355	12297.074	99.00	13579.1626	0	0	26675.5916
2	Mathili	6861.647	3782.470	153.20	9019.296	0	10850.0	30666.6130
3	Kalimela	10449.547	4380.4500	0	13175.75	14247.0588	0	42252.8058
4	Balimela	2736.005	12024.787	5.0	0	0	0	14765.7920
5	Chitrakonda	2264.4188	18778.2816	0	0	60405.7475	0	81448.4479
6	Motu	11051.694	1798.00	11.00	3060.035	6572.2102	0	22492.9392
Total		34063.6668	53061.0626	268.20	38834.2436	81225.0165	10850.00	218302.1895

13.3 DISTRIBUTION OF AREA TO VARIOUS WORKING CIRCLES:

The allocation of forest areas under various working circles of the proposed working plan is as under.

Table No. 13.3: Area allocation to different Working Circles

Sl No	Name of the Working Circle	Area allotted (in Ha)
1	Selection Working Circle	48271.8566
2	Rehabilitation Working Circle	139183.5591
3	Plantation Working Circle	6197.3800
4	Protection Working Circle	24649.3938
	Total	218302.1895
6	Bamboo over lapping Working Circle	110367.5123
7	Joint Forest Management (OWC)	16623.59
8	Non-Timber Forest Produce (OWC)	189045.9106
9	Wild Life (OWC)	218302.1895

13.4 BASIS OF PROPOSAL: The Summary of the Chapter “Basis of Proposal” is furnished in **Table No. 13.4**

Table No.13.4: Summary of the Chapter “Basis of Proposal”

Summary of “Basis of Proposal”			
Chapter	Heading	Prescription	Para
Basis of proposal	1. General Considerations.	National Forest Policy 1988 and ground realities.	1.1
	2. General Objectives of Management.	1. To maintain the ecological balance to order to get favorable environment for survival of the living organisms.	1.1.1
		2. To maintain hydrological cycle and to check soil erosion by increasing green coverage on the hill slopes.	
		3. To improve the condition composition and productivity of the Forests by appropriate scientific management.	

		4. To increase the green coverage on the barren and degraded Forest land by appropriate silvicultural prescription.	
		5. To create employment opportunities for rural people by proper mechanism of collection, value addition and marketing of NTFP	
		6. To involve the local people for protection and conservation of Forest based natural resources by formulating JFM communities.	
		7. To protect and conserve the wild life resources by way of scientific management and new technology.	
	3. Methods of treatment.	Different method vis-à-vis their justification are described in detail under this paragraph.	1.2
	4. Constitution of Working Circle.	1. Selection working circle.	1.3
		2. Rehabilitation working circle.	
		3. Plantation working circle.	
		4. Protection working circle	
		5. Bamboo overlapping working circle.	
		6. NTFP Overlapping working circle.	
		7. Wild life Overlapping working circle.	
		8. JFM Overlapping working circle.	
	5. Rangewise allotted to different Working Circle	Allocation of areas as to different Working Circle is 218302.1895 ha.	1.3.4
	6. Period of plan	2021-22 to 2030-31	1.4.1

13.5 SELECTION WORKING CIRCLE

The Summary of prescriptions under “Selection-cum-Improvement” Working Circle is furnished in Table No-13.5

Table No. 13.5: The Summary of prescriptions under “Selection-cum-Working Circle”

Chapter	Heading	Prescription	Para
Selection-Working Circle	1. General Constitution	R.Fs. and PRFs where is good vegetation have been included in this Working Circle.	2.2
	2. General Character of vegetation	Major portion of this Working Circle under 2 Forest types, namely a) South Tropical Moist Deciduous Forests-3B b) South Tropical Dry Deciduous Forests-5A	2.3
	3. Felling Series and Cutting Series.	Entire area has been divided into 9 Felling Series with 10 Annual Coupes in each.	2.4
	4. Blocks and Compartments.	There are whole/ Part of 21 Nos. RFs, 23 Nos. PRFs and 3 RLs allotted to this Working Circle an area 48271.8566 ha.	2.5
	5. Special objectives of Management.	1. To retain, maintain and improve the available growing stock to conserve soil as well as water and to ensure ecological equilibrium and maintain bio-diversity.	2.6
		2. To increase the proportion of valuable species with encouragement of the growth of principal species by adapting suitable silvicultural system and forestry operations.	
		3. To remove dead, dry, hollow, seriously diseased, uprooted and over mature trees without creating	

		permanent gaps in the crown to derive maximum sustained yield. .	
		4. To carryout subsidiary silvicultural operations so that conducive situation can be created for better growth of existing crop and natural regeneration.	
	6. Analysis and valuation of crop	The entire working circle has been stock Mapped basing on Reconnaissance Survey and Satellite Imagery. The stock maps have been attached to the respective Compartment history files. The average density of the crop included in this working circle is 0.5 though it varies from 0.3 to above 0.7.	2.6.1
	7. Silvicultural System	Selection –cum –Improvement system.	2.6.2
	8. Rotation period	Rotation period of 120 years is fixed for all the species.	2.6.3
	9. Harvestable diameter.	150 cm. and above.	2.6.4
	10. Reducing factor and reduced areas.	The loss and gain of area of Forest Blocks.	2.6.5
	11. Felling cycle	10 years.	2.6.6
	12. Calculation of yield.	Smithies Safe-guarding formula.	2.6.8
	13. Table of felling.	Annual Coupes under different Felling Series is details furnished.	2.6.9
	14. Method of execution of	1. Demarcation of Annual coupes.	2.6.10
		2. Marking Rules.	

	felling	3. Execution of Marking and felling.	
	15. Subsidiary	1. Post felling operations.	2.6.11
	Silvicultural	2. Soil and Moisture Conservation measures.	
	Operations	3. Gap Plantations.	
	16. Regeneration	Artificial Regeneration shall be taken only in gap areas (except natural blanks) having inadequate natural regeneration of a minimum of 5 ha area.	2.6.12
	17. Associated	1. Fire protection.	2.6.13
	Regulations and	2. Grazing.	
	Measures.	3. Soil and Moisture Conservation measures.	
		4. Rights and Concessions.	
	18. Control	Maintenance of records (Control Forms & Compartment of Histories).	2.6.14
	19. Miscellaneous	1. Sample plots	
	regulation.	2. Treatment for Non-valuable Coupes	2.6.15
	20. Economic	Cost norm for implementation of prescription and	2.6.17
	analysis.	total estimated cost discussed in Chapter-10 of Part-II	

13.6 REHABILITATION WORKING CIRCLE

The Summary of prescriptions under Rehabilitation Working Circle is furnished in Table No-13.6

Table No. 13.6: The Summary of prescriptions under Rehabilitation Working Circle

Chapter	Heading	Prescription	Para
Rehabilitati on Working Circle	1. General Constitution.	Forest blocks with abundant root and in various stages of degradation	3.2
	2. General Character of Vegetation.	i. The forest blocks of the working circle are spread all over the ranges. The forests are mainly of the following types. (1) 5A/C3-Southern Tropical Dry Deciduous Miscellaneous Forests.	3.3

		(2) 3B/C2-Southern Tropical Moist Deciduous Forests. ii. The forest areas are evenly distributed in the division and subjected to heavy biotic interference.	
	3. Felling Series/ Cutting Series.	Entire area has been divided into 7nos. Rehabilitation Felling Series with 10Annual Coupes in each.	3.4
	4. Block and Compartments.	There is whole/Part of 28 nos. RFs, 61 nos. PRFs, 9 Nos. RL, 4 Nos. URL, 1UDPF allotted to this Working Circle an area 139183.5591 ha.	3.5
	5. Special objectives of Management.	1. To improve the quality of the existing crop by adopting suitable cultural operations through cleaning, climber cutting, singling out the multiple shoots of principal species to obtain quick growth. 2. To remove miscellaneous thorny bushes growth to favour of the growth of principal and secondary species.	3.6
		3. To take up gap filling plantation with suitable species in contiguous area extending over more than 0.4 ha.	
		4. To carryout subsidiary silvicultural operations so that conducive situation can be created for better growth of existing crop and natural regeneration.	
		4. To enhance the productivity of soil through proper soil and moisture conservation where there is soil erosion.	
		5. To take up silvicultural thinning wherever required so that villagers (VSS) involved in	

		protection will get some thinning materials as intermediate yield.	
		6. To improve the economic condition of the local people by creating employment opportunities in the process of management of the Forest.	
		7. Necessary fire protection measures shall be undertaken during the fire season by engaging fire watchers or providing fire line.	
	6. Analysis and valuation of Crop.	Most of the areas are under different stages of degradation due to encroachment, illicit felling, grazing, annual fire etc. Regeneration, Bio-diversity survey and Study of vegetation.	3.6.1
	7. Silvicultural System.	Regeneration cleaning, soil and moisture conservation, gap planting, block planting along with tending.	3.6.2
	8. Rotation and Conversion period).	As timber production is not the objective of this Working Circle no rotation and conversion period has been prescribed.	3.6.3
	9. Harvesting diameter.	No exploitable diameter is required.	3.6.4
	10. Rehabilitation Cycle	7 (seven rehabilitation series with 10 year rehabilitation cycle has been formed.	3.6.6
	11. Calculation of yield.	No rotation has been fixed. However, to meet the local needs dead and fallen trees along with silvicultural thinning of congested crops to be followed.	3.6.8
	12. Table of treatment series.	This working circle is divided in to Seven treatment series and each treatment series is divided into ten annual coupes for systematic working.	3.6.9
	13. Method of	Demarcation of Annual Rehabilitation Coupes.	3.6.10

	execution		
	14.Preparation of Treatment Map	Category wise treatment prescription	3.6.10.3
	15. Subsidiary Silvicultural Operations.	i. Silvicultural operations shall be carried out in the year of creation and preferably before the onset of monsoon. ii. The cultural operations like singling out of the coppice shoots, retaining the most promising ones, rectification of the high stumps to encourage coppice shoots and climber cutting. iii. Clearing out of invasive weeds and in congestion area light thinning of C- Grade may also be carried out. iv. All dead, dry and uprooted trees shall be removed. v. Gap plantation shall be done by indigenous species.	3.6.11
	16. Regeneration	i. Choice of species. ii. Natural regenerations. iii. Singling of coppice shoots. iv. Artificial regenerations.	3.6.12
	17. Associated regulation and measures (Rehabilitation operations).	1. Soil and Moisture Conservation Measures. 2. Gully plugging. 3. Contour Trenches and Contour bonding. 4. Vegetative fencing. 5. Stone fencing.	3.6.13
	18. Control.	Maintenance of records.	3.6.14
	19. Micellaneous	1. Protection measures.	

	regulation	2. Joint Forest Management.	3.6.15
	20. Right and Concession.	Right and Concession in this Working Circle shall be regulated in accordance with the provisions of the relevant gazette notifications of the Forest Blocks as RFs and PRFs.	3.6.16
	21. Cost Norms.	The cost norm for implementation of prescriptions under this circle and total estimated cost has been discussed under Chapter-10 of Part-II (Financial Forecast and Plan of Operation).	3.6.17
	21. Intermediate revision.	Not anticipated.	3.6.18

13.7 PLANTATION WORKING CIRCLE

The Summary of prescriptions under plantation Working Circle is furnished in Table No-13.7

Table No. 13.7: The Summary of prescriptions under Plantation Working Circle

Chapter	Heading	Prescription	Para
Plantation Working Circle	1. General Constitution.	Blank patches and existing plantation	4.2
	2. General Observation and Vegetation.	(i) Southern Tropical Dry Deciduous Forest (ii) Southern Tropical Moist Deciduous Forest (iii) Orissa Tropical Semi evergreen Forests.	4.3
	3. Plantation Series.	The total area of this Working Circle has been divided into 2 (Two) plantation series, 1 (One) Miscellaneous Tending operations, 1 (One) Teak Tending operations and 1(one) V.F Tending	4.4

		operations.	
	4. Block and Compartments.	There are whole/ Part 2 nos. RF and 12 nos. PRF blocks allotted to this working circle for planting with existing plantation an area of 6197.38 ha	4.5
	5. Special objectives of Management.	1. To restock the barren and permanent blanks besides encroached areas by raising plantations of suitable species through artificial regenerations.	4.6
		2. To nurse the existing plantations by appropriate tending operations.	
		3. To harvest mature plantations to meet the requirement of both the industry and the local people followed with necessary replanting as per the silvicultural requirements.	
		4. To augment fodder, fuel wood and small timber requirement of the local people.	
		5. To concrete more on such species of the plantations which have proved successful.	
	6. Analysis and valuation of Crop.	i) Most of the old plantations are of 5 to 30 years old age group. The species Planted are Teak, Gamhar, Sissoo, Chakunda, Acacia, Simaruba etc.	4.6.1
		ii) Teak plantation raised in earlier part of the expired plan have been attended to the average girth of 90cm to 120 cm and subjected to selective illicit felling, leaving about 30% to 40% intact in the field.	
	7. Silvicultural System.	Artificial regeneration including tending operations.	4.6.2

	8. Rotation and Conversion period.	Rotation period is not fixed but for old plantation, the rotation for all the species of the Division has been fixed at 120 years where as the exploitable girth has been fixed at 150 cm.	4.6.3
	9. Harvesting diameter.	Exploitable girth of Teak and other species has been fixed to 150 cm.	4.6.4
	10. Planting Cycle.	The planting cycle fixed for this circle is 10 years coinciding with the plan period.	4.6.6
	11. Calculation of yield.	Since the special object of management is to restock the barren and blank patches of the forest areas with artificial regeneration within the plan period and to tend the existing plantations, yield is not expected from these plantations	4.6.8
	12. Table of felling.	This Working Circle divided into 2 (Two) planting series. Each planting series has been divided into 10 (Ten) annual coupes. Existing teak plantation, Misc. Plantation and VF area plantations have also divided into 10 (ten) annual coupes each.	4.6.9
	13. Method of execution.	1. Demarcation of annual plantation coupes 2. Preparation of treatment plan and map 3. Method of raising plantation 4. Raising of Nursery 5. Site preparation 6. Stacking, pitting and planting 7. Post planting operations 8. Protection 9. Commercial plantation	4.6.10
	14. Subsidiary Silvicultural Operations.	Treatments of existing plantations have been taken to constitute the tending series. i. Operations of Teak Tending series.	4.6.11

		ii. Miscellaneous Tending Series. iii. VF Tending series.	
	15. Regenerations	Tending of natural regenerations and existing rootstock in prescribed to be given preference over plantations.	4.6.12
	16. Associated regulation and measures.	Soil Moisture Conservation Measures	4.6.13
	17. Miscellaneous regulation.	1.Control and maintenance of records	3.6.15
		2.Protection	
		3.JFM	
		4.Grazing	
		5.Right and Concession	
	18.Intermediate Revision	Not expected	3.6.16
	19.Cost Norms	This cost norm is provided in Chapter-10 of Part-II.	3.6.17

13.8 PROTECTION WORKING CIRCLE

The Summary of prescriptions under Protection Working Circle is furnished in Table No-13.8.

Table No. 13.8: The Summary of prescriptions under Protection Working Circle

Chapter	Heading	Prescription	Para
Protection Working Circle.	1. General Constitution.	This overlapping working circle covers all those blocks which need special protection measures from biotic interferences.	5.2
	2. General observation and vegetation.	This Protection working circle comprises all those blocks which need special protection measures from biotic interferences, besides the blocks and compartments existing in ecologically fragile areas and those which form part of major rivers. Due to	5.3

		intense biotic pressure from human i.e. regular removal of biomass, encroachment, removal of boulders and cattle, large number of Forest Blocks of the division is under various stages of degradation.	
	3. Protection Series.	The blocks allotted to these circle have been divided into 6 Nos. Protection Series and further divided into 10 annual coupes.	5.4
	4. Block and Compartments.	There is whole/part of 52 nos. RF and 66 nos. PRF included in this Working Circle and area allotted to this Working Circle is 24649.3938 ha.	5.5
	5. Special objectives of Management.	1. To prevent further degradation of eco-fragile areas by maintaining adequate vegetative cover and ecologically stabilize the area. 2. To enhance the natural regeneration adopting strong protection measures to minimize biotic interference and to arrest further degradation. 3. To physically protect these forests from fire, grazing, and also provide strict vigil against illicit felling, encroachment and poaching.	5.6
		4. To protect area from quarrying, removal of boulders, morums, rocks and soil. 5. Soil and Moisture Conservation shall be taken up where ever required. 6. To increase physical infrastructure in the remote areas to provide shelter to the forest protection staff. 7. To prevent further encroachment of the forest land by regularly maintaining the boundary line	

		and boundary pillars.	
		8. To improve forest protection by developing road network, improving VHF coverage and constituting special protection units.	
	6. Analysis and valuation of Crop.	The degraded forest or high forests which need intensive protection measures are included in this Working Circle.	5.6.1
	7. Silvicultural System.	1. The Forest Blocks are to be mainly protected without any other consideration; no silvicultural system has been prescribed.	5.6.2
		2. Strict protection of this area from biotic interference including restriction on collection of MFPs.	
		3.Areas of forest blocks on steep precipitous slopes and eco-fragile areas would be specially protected to ensure there is no loss of vegetation or soil cover	
	8. Rotation and Conversion period.	Since no yield is expected, no rotation is prescribed.	5.6.3
	9.Harvesting diameter	Not applicable	5.6.4
	10.Protection Cycle	The protection cycle of 10 years is prescribed so that these vulnerable areas will be treated once during the plan period of ten years	5.6.6
	11.Calculation of yield	As it is irrelevant, no yield has been calculated.	5.6.8
	12. Table of felling	The area has been divided in to 6 treatment series with 10 annual treatment coupes.	5.6.9
	13. Method of execution.	1. Division into Annual Protection series. 2. Demarcation of Annual Coupes & preparation of annual plan of action.	5.6.10

	14. Subsidiary Silvicultural Operations.	1. Harvesting of standing trees (dead or alive) is strictly prohibited.	5.6.11
		2. Cleaning and climber cutting operations shall be undertaken on these sites where regeneration is suppressed.	
		3. Light thinning shall be undertaken to remove congestion and to promote growth in forest stands	
	15. Regenerations	Not applicable.	5.6.12
	16. Associated regulation and measures.	1. Forest Protection measures.	5.6.13
		2. Forest Road Net work.	
		3. Forest Fire Protection.	
		4. Soil and Moisture Conservation.	
	17. Miscellaneous regulation.	1. Grazing control.	5.6.14
		2. People's participation.	
		3. Right and Concessions.	
		4. Control.	
	18. Cost Norms.	This cost norm is provided in Chapter-10 of Part-II.	5.6.15
	19. Intermediate Revision.	The revision of the prescription of this Working Circle is anticipated. Since the collection of NTFP items in Protection series is prohibited, the prescriptions as well as implementation there on shall be reviewed after 5 years and if results are found satisfactory, the collection of NTFP may be permitted after approval of the competent authorities	5.6.16

13.9 BAMBOO OVERLAPPING WORKING CIRCLE

The Summary of prescriptions under Bamboo Overlapping Working Circle is furnished in Table No-13.9.

Table No. 13.9: The Summary of prescriptions under Bamboo Overlapping Working Circle

Chapter	Heading	Prescription	Para
Bamboo Overlapping Working Circle	1. General Constitution.	28 Forest Blocks (Whole/ Part) with included previous scheme 4 Forest blocks area i.e total area suggested under this current Working Plan is 110367.5123 Ha.	6.2
	2. General Character and vegetation.	<i>Dendrocalamus strictus</i> (Salia or Dongor) is the most common species found in the Division. The bamboo clumps of different felling series of the last plan close to habitations have been heavily degraded because of un-systematic removal of bamboo culms by the local inhabitants and improper application of prescribed cutting rules.	6.3
	3. Felling Series.	21 Felling series with 4 years cutting cycle has been prescribed.	6.4
	4. Blocks & Compartments.	There is Whole/ Part of 32 nos. Forest Blocks with 88 Nos. of compartments have been allotted in this Working Circle.	6.5
	5. Special objectives of Management.	1. To ensure systematic and scientific exploitation of the bamboo forests.	6.6
		2. Improving of the bamboo crops through regular silvicultural operations.	
		3. Meeting the demands of the local people and bamboo artisans.	
		4. To provide employment opportunities to the local people	
		5. To rehabilitate the exhausted the bamboo bearing areas through appropriate measures.	
	6. Analysis and valuation of crops.	Most of the blocks comprise <i>Dendrocalamus strictus</i> (Salia bamboo) of quality – II & III with scattered distribution of Pani bamboo	6.6.1

		along nallah banks.	
7. Silvicultural System.		The silvicultural system to be followed Culm Selection.	6.6.2
8. Rotation period.		4 Years.	6.6.3
9. Harvestable diameter.		Not applicable.	6.6.4
10. Reducing factor and reduced areas.		In comparison with the outgoing plan to the present plan, the area in this working circle has decreased because some forest blocks lost their potentiality due to severe biotic interference and repeated fire	6.6.5
11. Felling cycle.		Four year felling cycle both for Salia Bamboo and Daba Bamboo has been prescribed.	6.6.6
12. Calculation of Yield.		1. The bamboo felling shall be guided by the bamboo cutting rules communicated by the Govt. of India, Ministry of Environment & Forests vide Letter No.13/FCWP/05 Gen dated 24 th December, 1990.	6.6.8
		2. The yield calculation has been made in Chapter No-6 of Part-1	
13. Table of felling.		Bamboo felling series has been divided in to four annual coupes. The table has been furnished year wise sequence of different coupes.	6.6.9
14. Method of Execution of felling.		1. Demarcation of Annual Coupes.	6.6.10
		2. Execution of operation.	
		3. Estimation of Yield and fixation of target.	
		4. Working of bamboo.	
		5. Treatment map.	
		6. Treatment types of Salia bamboo.	
		7. Cutting rules of Salia bamboo.	
		8. Rules applicable to different types.	

		9. Cutting rules of Daba Bamboo.	
	15. Silvicultural Operation.	1. Removal of debris.	6.6.11
		2. Removal of dead & high stumps, pruning and climber cutting etc.	
		3. Treatment of exposed rhizomes by covering soil on it.	
		4. Half moon trenches on uphill sides of the clump.	
		5. Soil working.	
	16. Treatment of Gregariously flowered areas.	1. The bamboo seedling shall be thinned out leaving the promising one at an escapement of 4mt. x 4mt.	6.6.12
		2. Cleaning, soil working and weeding shall be carried out around the left out/adopted bamboo seedlings at a radius of 50cm.	
		3. In gaps planting of Rhizomes shall be planted.	
		4. All the flowered clumps shall be cut back.	
		5. The area shall be closed for grazing.	
		6. Intensive fire protection measures shall be taken up.	
	17. Flowering of Bamboo.	Comparative statement on two types of flowering i.e. sporadic and gregarious flowering of bamboo has been provided.	6.6.13
	18. Main threats to Bamboo Forests.	1. Indiscriminate felling.	6.6.14
		2. Fire.	
		3. Grazing.	
		4. Fire Protection.	
		5. Insufficient silvicultural operation.	
	19. Morphological characters of culms	Distinguishing Morphological Characters of the culms of different ages.	6.6.15

	of different age.		
	20. Miscellaneous Regulation.	1. Grazing.	6.6.16
		2. Fire protection.	
		3. Demand of artisans.	
		4. Right and concessions.	
		5. Bamboo plantation.	
		6. Maintenance of records.	
	21 .Cost Norms.	This cost norm is provided in Chapter-10 of Part-II.	6.6.17
	22. Intermediate Revision.	Not anticipated.	6.6.18

13.10 WILDLIFE OVERLAPPING WORKING CIRCLE

The Summary of prescriptions under Wildlife Overlapping Working Circle is furnished in Table No-13.10.

Table No. 13.10: The Summary of Prescriptions under Wildlife Overlapping Working Circle

Chapter	Heading	Prescription	
Wildlife Overlapping Working Circle	1. General Constitution.	Wild life an integral part of forest eco-system. Therefore to protect and improve the natural habitat of existing wild life the entire forest area has been taken into consideration giving due importance to few forest blocks which are reached in wildlife population.	7.2
	2. General Character and Vegetation.	1. Southern Moist Mixed Deciduous Forests (3B/C2).	7.3
		2. Southern Tropical Semi Ever Green Forests (2B).	
		3. Southern Tropical Dry Deciduous Forests (5A).	

	3. Felling Series.	Not applicable in this Working Circle	7.4
	4. Blocks & Compartments.	This Working Circle covers the entire plan area i.e. 73 RF, 93 PRF, 10RL, 1UDPF including Bamboo Scheme areas (4URL) and VF areas covering an area of 218302.1895 Ha. However, emphasis has been given to forest blocks covering 95063.8246 ha where the concentration of wild life is felt.	7.5
	5. Special objectives of Management.	1. To conserve, protect and improve the wildlife habitat.	7.6
		2. To create awareness among the local people.	
		3. To promote Eco-tourism.	
		4. To protect wild life in general and endangered species.	
		5. Increase biodiversity and wildlife population.	
	6. Analysis and valuation of crops.	Wildlife habitat continues to be degraded but still is rich in variety of wild life.	7.6.1
	7. Main habitat system and its composition.	1. The basic requirement of all animals is food, water and cover (shelter). The different species generally adapt to a particular arrangement of these basic requisites in order to meet its biological needs of food and reproduction	7.6.1.4
		2. Terrestrial & aquatic wild life habitat.	
		3. Biological origin of habitat.	
		4. Unique wild life habitat.	
	8. Species structure.	The common heterotrophs found in the Division are Leopard, Barking deer, Sloth bear, Wild boar, Jackel etc.	7.6.1.5
	9. Silvicultural System.	Not applicable.	7.6.2
	10. Rotation	Not applicable.	7.6.3

	period		
	11. Harvestable diameter.	Not applicable	7.6.4
	12. Reducing factor and reduced areas.	Not applicable	7.6.5
	13. Felling cycle.	Not applicable	7.6.6
	14. Calculation of yield.	Not applicable	7.6.8
	15. Table of felling.	Not applicable	7.6.9
	16. Method of Execution.	Not applicable	7.6.10
	17. Subsidiary Silvicultural operation.	Not applicable	7.6.11
	18. Regeneration	Not applicable	7.6.12
	19. Associated regulations and measures.	1. History of wildlife management in general. 2. Existence of Wildlife in Forest. 3. Injuries to wild animals.	7.6.13
	20. Recommendation for future management.	METHODS OF TREATMENT	7.6.14
		1. Maintaining Special Habitats.	
		2. Development of Habitat.	
		3. Maintaining Unique Habitats	
		4. Maintaining Critical Micro Habitants	
		5. Maintenance of Water Sources and Wetlands	
		6. Maintaining the Cultural Landscape	
		7. Other Prescriptions	
	21. Wildlife	1. Collection and tabulation of all available	7.6.15

	protection measures.	spatiotemporal information about wildlife crime	
		2. Deployment of antipoaching staff.	
		3. Installation of VHF and other communications infrastructures.	
		4. Collection of information on wildlife crime	
		5. Proper investigation and regular monitoring of wildlife offence cases.	
		6. Antipoaching camps.	
	22. Promotion of Eco-tourism.	1. Introduction and definition of Eco-tourism.	7.6.16
		2. Economic impact.	
		3. Policy and planning.	
		Eco-tourism resources of the Division i. Balimela Dam site, (ii) Bonda Hills, (iii) Amakund, (iv) Motu, (v) Satiguda Dam (vi) Manyamkonda (vii) Jaduguda (viii) SuliaPahada	
	23. Miscellaneous Regulation.	1. Awareness.	7.6.17
		2. Immunization programme.	
		3. Strengthening to VSS.	
		4. Infrastructure and training.	
		5. Information net work and record keeping.	
		6. Wildlife Depredation.	
		7. Control of Grazing.	
		8. Fire protection measures.	
		9. Incentive and rewards.	
		10. Right and Concession.	
	24. Intermediate Revision and Working Cost.	Not anticipated and Estimated cost has been provided in Chapter No-10 of part-II	

13.11: JFM OVERLAPPING WORKING CIRCLE

The Summary of prescriptions under JFM Overlapping Working Circle is furnished in Table No-13.11.

Table No. 13.11: The Summary of prescriptions under JFM Overlapping Working Circle

Chapter	Heading	Prescription	Para
JFM Overlapping Working Circle	1. General Constitution.	1. Need for conservation of Eco-system.	8.2
		2. National Forest Policy vis-à-vis people's participation in forest protection, village forest Rule, 1985.	
		3. VSSs created under JFM Resolution 2008 & 2011.	
	2. General Character & Vegetation.	i) Orissa Tropical Semi-Evergreen Forests 2B/C3 ii) Southern Tropical Moist Deciduous Forests 3B/C2. iii) Southern Tropical Dry Deciduous Forests 5A/C The forest area included in this working circle are spread over the entire Division and subjected to severe/continuous biotic interference.	8.3
	3. Felling Series.	Not applicable	8.4
	4. Blocks & Compartments.	The Range wise abstract of blocks allotted to this working circle have been furnished. The total area of the working circle is 16623.59 Ha.	8.5
	5. Special objectives of Management.	1. To involve local VSS members in Rehabilitation works. 2. To improve the crop condition of these areas, this will in turn fulfill the demands of the local people in terms of small timber, fire wood, NTFPs etc. 3. To explore and evolve strategies to generate sustainable employment to local people for financially sound in future maintenance management of the assigned forest areas.	8.6

	6. Analysis and valuation of crops.	1. The average density is about 0.25.	8.6.1
		2. The crop degradation is mainly due to illicit felling, fire, grazing and podu cultivation.	
	7. Silvicultural System.	To involve local people in forest management to achieve them self sufficient in respect of forest produce and self employment by preparing micro plans for individual VSS. The prescription of each forest blocks will be guided by the prescription under the individual working circle.	8.6.2
	8. Rotation and Conversion period.	Rotation period shall be followed according to the main Working Circle. Plantation in VSS and outside forest areas will be guided by individual micro plans.	8.6.3
	9. Harvestable diameter.	Not applicable.	8.6.4
	10. Reducing factor and reduced areas.	Not applicable.	8.6.5
	11. Felling cycle.	No separate felling cycle.	8.6.6
	12. Calculation of yield.	No yield is calculated but the intermediate yield shall be enjoyed by the VSS members as usufructory benefits on free of cost. The final harvest shall be distributed as per guide line.	8.6.8
	13. Table of felling.	Not required.	8.6.9
	14. Method of Execution.	1. The existing VSS shall be encouraged in forest protection and where ever there is no VSS action shall be taken to form new VSS.	8.6.10
		2. Constitution of the Executive Committee.	
		3. Meeting.	

		4. Duties and responsibilities of VSS.	
		5. Duties and responsibilities of Executive Committee.	
		6. Role of Forest Department.	
	15. Subsidiary Silvicultural operation.	Not applicable.	8.6.11
	14. Regeneration	Not applicable.	8.6.12
	15. Associated regulations and measures.	1. Reward & Incentives.	8.6.13
		2. Income Generation.	
		3. Capacity building.	
	16. Miscellaneous regulation	1. Maintenance of Records.	8.6.14
		2. Right and Concession.	
	17. Financial arrangements.	The DFO shall make arrangement to obtain funds from different sources like State Budget, DRDA, ITDA, MPLAD and MLALAD funds etc. for implementation of the management plan.	8.6.15
	18. Intermediate Revision.	Not anticipated	8.6.16

13.12: NTFP OVERLAPPING WORKING CIRCLE

The Summary of prescriptions under NTFP Overlapping Working Circle is furnished in Table No. 13.12.

Table No. 13.12: The Summary of prescriptions under NTFP Overlapping Working Circle

Chapter	Heading	Prescription	Para
Non-Timber Forest Produce Working Circle	1. General Constitution.	This Working Circle overlaps entire working plan area except protection Working Circle.	9.2
	2. General Character of Vegetation.	Detail description has been dealt in Chapter-9	9.3
	3. Felling Series	Not applicable	9.4
	4. Blocks and Compartments.	All forest blocks except under protection working circle with an area of 189045.9106 Ha has been allotted in this Working Circle.	9.5
	5. Special Objectives of management.	1. To ensure sustainable production and utilization of the NTFPs consistent with the National Forest Policy, 1988 and other State Government Policies.	9.6
		2. To protect NTFP tress and promote their regeneration.	
		3. To generate employment and improve the economy of the local people and thereby improving their socio- economic condition.	
		4. To ensure people participation in all activities of NTFPs to achieve the larger goal of the forest regeneration and production.	

	6. Analysis and Valuation of the crop.	1. No systematic and substantial work has been carried out in the past plan due to want of fund and un availability of skilled person to assess the potentiality <i>vis-a-vis</i> availability of various NTFP items and to ascertain impact of collection etc of such NTFPs on sustainability of Forest.	9.6.1
		2. A benchmark flora diversity survey undertaken during the year 2011-12 to 2013-14 ,that the detail NTFP study was conducted under 13 th FC scheme in this Division by taking 100 sample plots method in each Range.	
		3. Method of collection discussed.	
	7. Silvicultural System.	Not applicable.	9.6.2
	8. Rotation and Conversion period.	Not applicable.	9.6.3
	9. Harvestable diameter.	Not applicable.	9.6.4
	10. Reducing factor and reduced areas.	Not applicable.	9.6.5
	11.Felling cycle	Not applicable.	9.6.6
	12.Calculation of yield	Discussed in Chapter-9.	9.6.8
	13. Table of	Not applicable.	9.6.9

	felling.		
	14. Method of Execution.	The primary collectors of different NTFP item shall be properly guided and trained on latest technique of collection, drying and storage. Also training on value addition and marketing to be ensured.	9.6.10
	15. Subsidiary Silvicultural operation.	Not applicable	9.6.11
	16. Regeneration	Not applicable	9.6.12
	17. Associated regulations and measures.	i) Method of treatment of some major NTFPs	9.6.13
		1. Amla	
		2. Bahada	
		3. Harida	
		4. Mahua flower	
		5. Mahua seed	
		6. Tamarind	
		7. Sal seed and leaves	
		8. Kenduleaf	
		9. Char seed	
		10. Gums	
		11. Hill brooms	
		12. Siali leaves and fibre	
		ii) Medicinal plants and their prescription	
		1. Distribution pattern has been described in Chapter-9.	
		2. Inventorization and characterization of all known medicinal plant species with the help of the local knowledge of the people and vaidiyas.	
		3. Bio-diversity Register to be maintained.	

		4. Cultivation of medicinal plants both Ex-situ and In-situ.	
		5. Formation of biodiversity management committees of local people.	
	18. Development of Special NTFPs.	The species like Agave sisalana, Jatropha curcas to be encouraged.	9.6.14
	19. Calendar of operations of major NTFPs.	The collection period for different NTFP items will be from 1 st October to 30 th September of following year.	9.6.15
	20. Miscellaneous regulation.	1. Choice of species for artificial regeneration in blocks and gap plantation.	9.6.16
		2. Marketing aspects of various NTFPs to be studied and taken care off.	
		3. Training and awareness for collection, exploitation and utilization of NTFPs.	
		4. Protection measures.	
		5. Regulation of purchase of price.	
		6. Documentation.	
		7. Maintenance of records.	
		8. Right and Concessions.	
	21. Cost Norm.	Cost has been provided in Chapter No-10 of Part-II	9.6.17
	22. Intermediate Revision.	Anticipated as Government Policy.	9.6.18

13.13 GENERAL FINANCIAL FORECAST & FINANCIAL PLAN OF OPERATION

Table No. 13.13: Summary of “Financial Forecast and Financial plan of operation”

Chapter	Heading	Prescription	Para
General Financial Forecast & Financial Plan Operation	1. General Constitution.	The plan has been prepared aiming at perpetual sustainability besides some revenue from Selection felling series, plantation (Coppice), Salvage operations, Bamboo and collection NTFPs.	10.1
	2. Past Revenue & Expenditure.	The Revenue and expenditure Head wise details furnished from 2007-08 to 2019-20.	10.2
	3. Cost of preparing the plan.	Excluding salary Rs.1752.09 per ha have been spent at Division level for preparing the plan	10.3
	4. Financial implications for implementation of plan.	The financial implications for implementation of the prescriptions made under this plan have been estimated to Rs 112121.45 lakhs.	10.4
	4. Tangible Benefit.	The total tangible benefit comes 46970.24 lakhs including 3734.37 lakhs in the first year 2021-22.	10.5
	5. Cost benefits analysis.	The cost benefit analysis has been worked out to be 1:0.82. As the plan aims at other benefits from these forests the prescriptions should be implemented on true spirit.	10.6

13.14 MISCELLANEOUS REGULATION

Table No. 13.14: Summary of “Miscellaneous Regulation”

Chapter	Heading	Prescription	Para
Miscellaneous regulation	1. General Constitution.	The prescription of the chapter is applicable to all the forest blocks (unless and otherwise specified) included in the plan.	11.1
	2. Division Boundary.	Discrepancy in common boundary of Jeypore and Malkangiri Division	11.2
	3. Forest Consolidation.	Consolidation work needs sincere efforts to notify the 73 Nos. DPFs and 93 Nos. of PRF into RF subjected to area available.	11.3
	4. Area Reconciliation.	Detail discussed has been made in Chapter-11 of Part-II.	11.4
	5. System of Sale/ Disposal of Forest produces.	The annual coupes are to be worked out by OFDC Ltd. and subsidiary silvicultural operation to be under taken departmentally.	11.5
	6. Irregular exploitation.	Exploitation of dead, dry, wind fallen trees and left over materials of illicitly felled trees to be done with due approval of the higher authorities. In normal courses no irregular exploitation shall be permitted.	11.6
	7. Compensatory afforestation area and their Consolidation.	The Compensatory Afforestation has already been discussed in Para No-2.4.4.7 of Part-I. Besides, large scale pre-80 diversification 53.651 Ha of forest land has been diverted (as per Forest Conservation Act, 1980) for non-forestry purpose against which Compensatory Afforestation have been raised over 15.612 ha AR, 2.664 ha ANR and 32.0 ha CATP in Malkangiri Forest Division.	11.7
	8. Development of	The existing forest roads (i.e., 113.536 K.Ms.) are	11.8

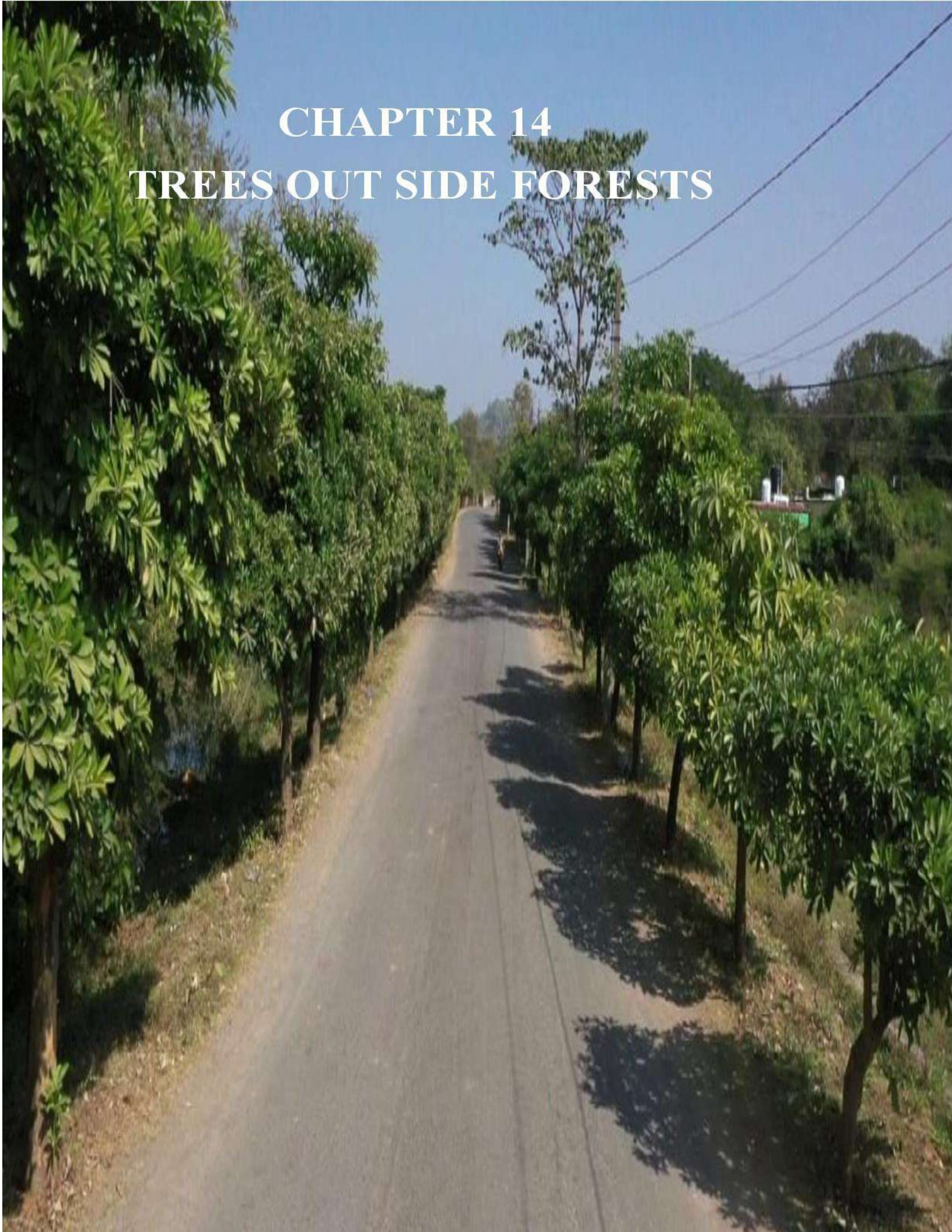
	Forest road	damaged due to poor maintenance for a variety of reasons including paucity of funds. Therefore, these are important social capital assets and required to be properly maintained.	
	9. Improvement of Buildings and Wells.	The Division is running short of quarter for ACFs and Forest Guards. There is need of construction of new quarters. Further the existing buildings need repairs and electrifications	11.9
	10. Maintenance of Boundary.	1. During field verification, most of the boundary pillars were found missing. Nor could numbers of boundary pillars be ascertained in many other cases. Hence, boundary pillars are required to be periodically repaired and numbered. 2. Specification of boundary pillars. 3. Clearance for the boundary line.	11.10
	11. Maintenance of records.	1. Compartment History. 2. Control forms 3. Plantation Journal 4. Plantation Register. 5. Registers of Forest Blocks. 6. Building Register as per OFD Code. 7. Divisional Register. 8. Boundary repair Register.	11.11
	12. Survey and maintenance of maps.	1. Stocks map 2. Index map. 3. Management map. 4. Working plan map. 5. Fire map.	11.12

	13. Fuel wood management.	1. The fire wood is legally supplied by the OFDC Ltd only. This supply is very limited and delivered by the Forest Department for sale through OFDC Ltd retail Sale Depots.	11.13
		2. To reduce the heavy pressure on the existing forests different measures may be adopted.	
	14. Monitoring of old plantations.	Old plantations shall be monitored from time to time with regard to survival percentage, growth characteristics, injuries to the crop and other indicators. Observation of monitoring and inspection shall be reported in the journals.	11.14
	15. Management of Village Forests.	This is to be done as per Orissa Village Forest Rules, 1985. There are 51 nos. village forest with an area of 268.20 ha.	11.15
	16. Increase and Effective involvement of local people in Forest management.	Local people shall be increasingly involved in protection and management of these forests in accordance with the current policy of the Govt. of Orissa on Joint Forest Management (JFM).	11.16
	17. Forest Fire management.	Special plans to prevent fires in these blocks have to be prepared and implemented.	11.17
	18. Grazing.	Due to heavy cattle population pressure in the Division, adequate regeneration is affected in the forest areas. For better fodder availability some measures may be adopted.	11.18
	19. Capacity building of	1. Proper training and regular refresher courses for the field executives.	11.19

	Forestry personnel	2. Good communication skill training to the FG/ Fr/ FR level.	
		3. Interaction of this level of staff with the public, people's representative, NGOs and officials of other department has increased manifold.	
	20. Forest Conversion Act and Implementation.	Under the forest conservation Act, 43 (ha) of forest land has been diverted for different Minor and Major irrigation Project and transmission line in the Division and an area of 201.274 ha has to be afforested	11.20
	21. Eco-Tourism	Eco- tourism should be encouraged in all potential areas in order to create awareness and increase revenue.	11.21
	22. Right and Concession.	The rights, concessions and privileges as discussed in Chapter- I of Part- I and also individual Working Circle subject to the condition of the forests being good if such resources are exhausted or damaged, all such rights, concessions or privileges shall cease to exist.	11.22
	23. Cost Norm	Cost has been provided in Chapter No-10 of Part-II	11.23
	24. Intermediate Revision	Since there is scope of change in legal classification of some blocks of forest, there may be possibility of intermediate revision during the currency of the plan	11.24

CHAPTER 14

TREES OUT SIDE FORESTS



14.1 INTRODUCTION:

14.1.1 This Chapter deals with the important aspects of tree presence and its contribution to the tree cover of the District and Forest Division of Malkangiri.

Trees outside the forest are defined by default, as all trees excluded from the definition of forest and other wooded lands. Trees outside the forest are located on “other lands” mostly on farmlands and built-up areas, both in rural and urban areas. A large number of TOF consist of planted or domesticated trees. TOF includes trees in agro forestry systems, orchards and small woodlots. They may grow in meadows, pastoral areas and on farms or along rivers, canals and roadsides, or in towns, gardens and parks. Some of the land use systems include alley cropping and shifting cultivation, permanent tree cover crops (e.g. coffee, cocoa), windbreaks, hedgerows, home gardens and fruit-tree plantations (FAQ).

14.2 TREE OUTSIDE FOREST:

14.2.1 The tree outside Forests (TOF)/ Plantation for state of Odisha, according to the assessment of 2019, tree resources found outside the forest as defined in the Government records FSI, map forest cover using Satellite data and assesses tree cover outside forests using sampling based method. Forest cover outside the recorded forests area is derived using boundaries of RFA of Green Wash. Extent of TOF therefore may be estimated as the sum of extent of forest cover outside the Recorded Forest Areas (RFA) and tree cover as given below.

Table No. 14.1: Extent of TOF in Odisha

Forest Cover outside of RFA/GW	Tree cover	Extent of TOF
18810 Sq.Km	4648 Sq. Km	23458 Sq.Km

14.2.2 There is no specific figure for the Malkangiri District is available. However, this Division has taken massive steps to increase green cover in terms increasing Tree Outside Forest by

distribution of seedlings among the people, Educational Institutions, NGOs, Govt. institutions etc. The details of year wise/ Scheme wise No. of seedlings distributed during the out-going Plan period is given below:

Table No. 14.2: Year wise/ Scheme wise No. of seedlings distributed during the out-going Plan period.

Sl. No.	Year	Scheme	Component	Target (in Nos.)	Achievement (in Nos.)	Remarks
1	2009-10	RLTAP	Distribution of seedlings	180000	180000	
2	2010-11	RLTAP	Distribution of seedlings	500000	500000	
3	2012-13	13 th FC Grant	T.O.F.	500000	500000	
4	2013-14	13 th FC Grant	T.O.F.	740000	740000	
5	2014-15	State Plan	Agro Forestry	500000	500000	
		13 th FC Grant	T.O.F.	740000	740000	
6	2015-16	State Plan	Agro Forestry	850000	850000	
		13 th FC Grant	T.O.F.	740000	740000	
7	2016-17	State plan	Agro Forestry	650000	650000	
		13 th FC Grant	T.O.F.	300000	300000	
8	2017-18	State plan	Agro Forestry	750000	Nil	
		13 th FC Grant	T.O.F.	650000	Nil	
9	2018-19	MGNREGS	T.O.F.	60000	60000	
10	2019-20	MGNREGS-	-	-	-	
		State plan	IGC	110800	110800	
11	2020-21	State Plan	O.E.M.F	400000	400000	
		MGNREGS	Agro Forestry	600000	600000	
			T.O.F.	250000	250000	
	TOTAL		Distribution of seedlings		680000	7120800
			Agro- Forestry		2600000	
			T.O.F.		3330000	
			OEMF		400000	
			IGC		110800	

14.3 GEOGRAPHICAL AREA:

14.3.1 The total geographical area of the Malkangiri District is 5791.00 sq. km. of which 3353.83 sq. km. is forest after reorganization district of Odisha as per Notification on 1st October, 1992. The total forest cover works out to be just about 40.34% of the total geographical area as per assessment, 2019.

14.4 SOCIAL FORESTRY PLANTATION:

14.4.1 The Social Forestry Project (SFP) of the State has the mandate for the forestry outside forest area. The Social Forestry in Odisha during Phase-I (1983-84 to 1987-88) had covered nine District out of thirteen districts excluded undivided District of Phulbani, Kalahandi, Koraput and Sundargarh and during Phase-II (1988-89 to 1992-93) was covered the entire state of Odisha. It has not only conducted such plantations but has backed-up with good awareness and extension efforts which have borne fruits in many ways. The Social Forestry Project Division, Koraput has been carried out plantations in the private areas since 1989-90 in the District Malkangiri which include Village Wood Lot, Forest Farming for Rural Poor, Farm Forestry, Institutional Plantation and road-side plantations which form a substantial quantity and forest cover in the areas outside forest. The details of year wise/ Scheme wise No. of seedlings distributed and planted during the Social Forestry Project period is given below:

Table No. 14.3: Year wise/ Scheme wise No. of seedlings distributed & planted during the Social Forestry project period.

Sl. No	Year	Component	Physical achievement in Ha/Nos	Financial achievement in Rs
1	1989-90	Nursery of plantation	-	471845
		Village Wood Lot(VWL)	210.3 ha	572104
		Reforestation	60.0ha	157718
		Barren Hill Plantation	0	0
		FFRP	10.0 ha	55940
		Farm Forestry	189253 Nos	76434
		RDF	40.0 ha	20380
		Others	Training & Publicity etc	537437
	Total			1891858
2	1990-91	Nursery of plantation	-	322737

		Village Wood Lot(VWL)	238.0 ha	1137754
		Reforestation	60.0	243719
		Barren Hill Plantation	15.0	85045
		FFRP	26.0	194050
		Farm Forestry	178000	166005
		RDF	75.0	69533
		Inst.Plantation(IP)	0.5	2145
		Others	Training &Publicity etc	357590
	Total			2578588
3.	1991-92	Nursery of plantation	-	574340
		Village Wood Lot(VWL)	123.0	1254477
		Reforestation	25.0	235093
		Barren Hill Plantation	8.0	125790
		FFRP	7.0	447125
		Farm Forestry	639359	513282
		RDF	245.0	363286
		Inst.Plantation(IP)	1.0	8110
		Strip Plantation	1.5	4575
		Others	Training & Publicity etc	196500
	Total			3722578
4.	1992-93	Nursery of plantation	-	973739
		Village Wood Lot(VWL)	260.0	2382252
		Reforestation	55.0	516580
		Barren Hill Plantation	25.0	521450
		FFRP	20.0	389550
		Farm Forestry	651800	630675
		RDF	140.0	256810
		Inst.Plantation(IP)	2.0	10224
		Strip Plantation	1.0	8000
		Building		1240000
		Others	Training & Publicity etc	499900
	Total			7429180
5	1993-94	Nursery of plantation	-	862192
		Village Wood Lot(VWL)	265.00	1910120
		Reforestation	40.0	304000
		Barren Hill Plantation	25.0	198205
		FFRP	30.0	339465
		Farm Forestry	675000	637235
		RDF	160.0	385750
		Inst.Plantation(IP)	3.0	12275
		Strip Plantation	1.0	4290
		Building	-	-

		Others	Training & Publicity etc	995000
	Total			5648532
6	1994-95	Nursery of plantation	-	130398
		Village Wood Lot(VWL)	80.0	738800
		Reforestation	50.0	354585
		Barren Hill Plantation	Maint.	27000
		FFRP	30.0	346800
		Farm Forestry	685000	413750
		RDF	240.0	290500
		Inst.Plantation(IP)	Maint.	4500
		Strip Plantation	Maint.	1500
		Building	-	-
		Others	Training & Publicity etc	406680
	Total			2714513
7.	1995-96	Nursery for CR		102630
		Village Wood Lot(VWL)	Maint.	192000
		Reforestation	Maint.	197505
		Barren Hill Plantation	Maint.	15000
		FFRP	Maint.	94305
		Farm Forestry	950000	793800
		RDF	Maint.	23260
		Inst.Plantation(IP)	Maint.	1650
		Strip Plantation	Maint.	600
		Eco-Restoration(Block & RDF)	194.0	320225
		Others	Training & Publicity etc	282652
				2023627
8.	1996-97	Nursery for CR		-
		Village Wood Lot(VWL)	Maint.	8000
		Reforestation	Maint.	95500
		FFRP	Maint.	24000
		Farm Forestry	665000	303240
		Inst.Plantation(IP)		153200
		Others	Permanent Nursery maint.	25000
	Total			608940
9.	1997-98	Farm Forestry	400000(PO)	12059
	Total			12059

As per its assessment of the above period from 1989-90 to 1997-98, the Social Forestry Koraput Division carried out Plantations for Malkangiri District i.e. Village Wood Lot (VWL) 1176.3 ha, Reforestation 290 ha, Barren Hill Plantation 73 ha, FFRP 123 Ha, RDF 900 ha, Farm Forestry 5033412 Nos. seedlings, Institutional plantation 6.5 ha, Strip plantation 3.5 ha.

14.5 REALISING THE DREAM OF 33% FOREST/ TREE COVER:

14.5.1 In tune with the objectives of our national forest policy 1988 we have to achieve a national target of bringing 33% of landmass of our country under forest and tree cover for ensuring ecological security and environmental balance. However forest cover and tree cover in India has over the year stabilized at around 23% of geographical area and as for Malkangiri Division about 40.34% of the total geographical area under forest cover. The area under forest and forest land is difficult to increase, in fact, lot of diversion of forest land take place and provided title of under FRA, 2006 from year to year. As such there is hardly any scope to increase the recorded forest area in Malkangiri or in the country in general.

The only way left for the increase of forest cover and tree cover has to be through afforestation activities in non-forest areas. The areas outside forests comprises mainly of private farm forestry, canal bank areas, Road side strips, Urban areas and degraded land, wasteland etc. A part from increasing the tree cover, extension of forestry in non forest areas especially as agro-forestry and farm forestry has tremendous potential to increase production of timber and other wood products and reduce the pressure on natural forests. We are going to explore the following means of bringing more Trees Outside Forest.

14.6 INCREASING GREEN COVER (IGC) PLANTATION:-

14.6.1 The scheme was introduced in 2013-14 by subsuming 11 continuing plan Scheme. The components implemented under this scheme for the year-2017-18 for under taking different activities are Urban Plantation, Medicinal plantation, Economic plantation, Odisha Bamboo Development programme, Bald Hill plantation, Avenue plantation, Agro forestry, Permanent Nursery. The plantation programme taken up within Working Plan area as well as outside forest areas.

14.6.1.1 AGRO FORESTRY:

14.6.1.2 Agro Forestry is a collective name for land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used on the same land-management units as agricultural crops and/ or animals, in some form of spatial arrangement or temporal sequence. In agro forestry systems there are both ecological and economical interactions between the different components. Agroforestry can also be defined as a dynamic, ecologically based, natural resource management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels. In particular, agroforestry is crucial to smallholder farmers and other rural people because it can enhance their food supply, income and health. Agroforestry systems are multifunctional systems that can provide a wide range of economic, socio-cultural, and environmental benefits.

There are three main types of agroforestry systems:

- (i) **Agricultural** systems are a combination of crops and trees, such as alley cropping or home gardens.
- (ii) **Silvopastoral** systems combine forestry is grazing of domesticated animals on pastures, rangelands or on-farm.

The three elements, namely trees, animals and crops, can be integrated in what are called **agrosilvopastoral** systems and are illustrated by home gardens involving animals as well as scattered trees on croplands used for grazing after harvests. (Extract from <http://www.fao.org/forestry/agroforestry/80338/en/>)

Agroforestry is a low-input system which combines trees with crops in various combinations or sequences. Agroforestry combines agriculture and forestry technologies to create more integrated, diverse, productive, profitable, healthy and sustainable land-use systems.

14.6.1.3 In Odisha the scheme was introduced in 2013-14 with an aim to increase tree cover outside forests, i.e in agricultural land of the people. Saplings are supplied to the people as per their requirements levying Rs.1/- per seedling for planting. From the Year 2014-15 onwards 350000 nos. seedlings have been already distributed to the beneficiaries at a cost of Rs.1/- per

seedlings in this Malkangiri Division. However, the seedlings have been distributed to Government Schools/ Educational Institutions and other public organization with free of cost.

14.6.2 AVENUE/ROADSIDE/CANAL-SIDE PLANTATIONS:

14.6.2.1 This is an important component of the work of Forest Department during the last Eight years the Malkangiri Division has taken up Avenue (Roadside) Plantation. The scheme is being implemented in the state to create a green belt along both sides of the State's National High Ways, State High Ways, District and Panchayat Roads and Urban roads for providing environmental services, shelters during summer and rains, reducing vehicular pollution etc. The Avenue plantations have been carried out in different schemes outside the Forest area i.e. State plan, CAMPA, MGNREGS in this Division. From the year 2012 to onwards this Malkangiri Division has been planted 99250 Nos. seedlings over 397 RKM.

Table No.14.4: Avenue Plantation taken up from 2012-13 to 2020-21.

Sl No	Year	Name of Scheme	Component	Area in RKM	Nos. of seedlings planted
1	2	3	4	5	6
1	2012-13	IGC	Avenue	15	3750
2	2013-14	IGC	Avenue	20	5000
		MGNREGS	Avenue	70	17500
3	2014-15	IGC	Avenue	20	5000
4	2015-16	IGC	Avenue	40	10000
		MGNREGS	Avenue	45	11250
5	2016-17	MGNREGS	Avenue	25	6250
6	2017-18	MGNREGS	Avenue	22	5500
7	2018-19	MGNREGS	Avenue	25	6250
8	2019-20	MGNREGS	Avenue	25	6250
9	2020-21	MGNREGS	Avenue	90	22500
Total				397	99250

14.6.3 URBAN PLANTATION:-

14.6.3.1 This scheme was introduced during the year 2007-08 with an aim to create green pool in crowded urban areas. Initially the tall saplings plantation was taken up in and around Bhubaneswar city areas through OFDC ltd, City Forest Division and Chandaka Wildlife

Division. From the Year 2012-13 onwards this Malkangiri Division has been planted 1,12,250 Nos. seedlings up to 2020-21. The details of Urban plantation year wise is given below.

Table No-14.5: Urban Plantation taken up from 2012-13 to 2020-21.

Sl No	Year	Name of Range	Name of Scheme	Nos. of seedlings planted	
1	2012-13	Malkangiri	Urban	20000	
2	2013-14	Malkangiri	-do-	10000	
3	2014-15	Malkangiri	-do-	15000	
4	2015-16	Malkangiri	-do-	15000	
		Balimela	-do-	10000	
5	2016-17	Malkangiri	-do-	15000	
		Balimela	-do-	14000	
6	2017-18	Malkangiri	-do-	1800	
		Balimela	-do-	3850	
7	2018-19	-	-	-	
8	2019-20	Malkangiri	Urban	5600	
9	2020-21	Malkangiri	-do-	3000	
	Total			112250	

14.7 PLANTATION FORESTRY SPECIES IN PRIVATE LAND:

14.7.1 During the year 2018-19 to 2020-21 an area over 135 ha of plantations have been taken up 216000 Nos. under MGNREGS.

Table No.14.6: Plantation taken up in Private land in Malkangiri Forest Division.

Sl No	Year	Name of Scheme	Area in Ha	Nos. of seedlings planted
1	2017-18	MGNREGS	75	120000
2	2020-21	-do-	60	96000
	Total		135	216000

14.8 RESTRUCTURED NATIONAL BAMBOO MISSION (NBM):

14.8.1 As amendment was made recently in the Indian Forest Act of 1927 to remove bamboo from the category of trees. With this minor modification, bamboo grown on agricultural land will not require a transit permit (TP) for felling and transportation from the forest department. However, bamboo grown up in forest would continue to require a transit permit. According the amendment we encourage the famers to cultivate the bamboo in hopes to increase their income and green cover the outside the forest area. An area 56 ha has been planted 22400 Nos. bamboo seedlings under NBM in private land during the year 2020-21.

Table No.14.7: Bamboo Plantation taken up in Farmer's Land during 2020-21 under NBM.

Sl No	Year	Name of Scheme	Area in Ha	Nos. of seedlings planted
1	2021	NBM	56	22400

14.9: SUGGESTIVE STEPS FOR THE INCREASE OF AREA FORESTRY:

- (a) Identifications of the fallow lands, culturable and unculturable wastelands, Range wise in agricultural land which is available for taking up afforestation should be done at the District level.

The area under community land should be given priority for plantations.

- (b) Drawing up appropriate time specific action plan is essential, which will require the involvement of the Horticulture and the Agriculture Department along with the Forest Department.
- (c) Farmers must be encouraged and motivated by way providing them technical assistance and cooperation by forest department for taking up planting trees.
- (d) Land laws, if any, should be so modified wherever necessary so as to facilitate and motivate individuals and institutions to undertake tree farming and grow fodder plants, grasses and legumes on their own land.

- (e) Wherever possible, the degraded land should be made available for this purpose either on lease or on the basis of a tree-patta scheme. Steps necessary to encourage them to do so must be taken. Appropriate regulations governing the felling of trees on private holding should be appropriately relaxed.
- (f) High quality stock including clonal planting stock supported with improved silvicultural management practices can usher in a second green revolution in India this time in respect of tree crops for timber and fuel-wood/ fodder production. This critical requirement of genetically improved high quality planting stock should not be neglected, which will impact productivity and quality improvements.
- (g) Peoples support in forest conservation is to be recognized by the state forest department. Appropriate extension programmes are to be undertaken to motivate and make them conscious of the value of trees, wildlife and nature in general. This can be achieved through the involvement of educational institutions, Krishi Vigyan Kendras, Mass Media, Audio-Visual aids and the extension machinery. Trainers Training Centres to learn agri-silvicultural and silvicultural techniques to ensure optimum use of their land and water resources.
- (h) The wood based industries have important role to play in development of agroforestry. They should consider making appropriate arrangements with farmers and play a facilitative role in arranging quality planting material and enter into buy back arrangements.
- (i) Preferred Tree and bamboo species under agro forestry by farmers and not naturally available in neighbouring forests may be exempted from the transit permit and felling regulations.
- (j) The possibility of a Public-Private Partnership in regenerating the cultivable wasteland and barren uncultivable wastelands of about 10 sq. kms should be explored. This can also be explored for raising the improved planting material for supply to the farmers.