SITE SPECIFIC
WILDLIFE MANAGEMENT PLAN
FOR
M/s Lal Trades & Agencies (P) Ltd., MAYURBHANJ, ODISHA

In compliance to the letter No. – J-11015/39/2018-IA.II(M), by the Impact assessment Division of Ministry of Environment, Forest & Climate Change, Government of India , under the Standard TOR for Mining Project stated in the condition No. – 19 dated – 20.07.2018

Submitted by

M/s Lal Trades & Agencies Pvt. Ltd.
Badampahar Mining Project,
Rairanpur, Mayurbhanj
Odisha - 757043

For Lal Trades & Agencies (P) Ltd
Authorised Signatory

Divisional Forest officer
- Cum -
Wildlife Warden
Rairangpur Division

CONTENTS

Sl No.	Chapter	Title
F	**ANNEXURE-VI**	Letter No. 3010/IND-I-CON-2234 dt. 18.02.2016 from State Pollution Control Board depicting the consent order for Badampahar Iron Ore Mines of M/s Lal Trades & Agencies Pvt. Ltd.
G	**ANNEXURE-VII**	NBWL Clearance and payment to Tiger Conservation Foundation vide Letter No. – 1520/3F-219/2017 dt. 03.04.2017 from the Office of the DFO, Rairangur Forest Division
H	**ANNEXURE-VIII**	Wild Animal Depredation data of the Badampahar Forest Range from the O/o of Range Officer, Badampahar
I	**ANNEXURE- IX**	List of Other Non-working Mining and other projects in the Project Area and in the Project Impact Area of the Badampahar Iron Ore Mines
J	**ANNEXURE-X**	Detailes of Plantation and greening activities from 2000-2017 M/s Lal Trades & Agencies in and the around the Mining Lease area.
K	**ANNEXURE-XI**	Cattle Population of Mayurbhanj District
L	**ANNEXURE-B-I**	Plantation Cost Norm per Hectare for planting of trees near the Nalas and Swampy areas
L	**ANNEXURE-B-II**	The cost estimates for PROVISION OF Elephant tracker
M		**Disclosure of the Consultant**

LIST OF TABLES

EXECUTIVE SUMMARY

In 2016-17, India's iron ore production level was above 212.64 million tonnes that is output increased by 1.63% and in terms of global iron ore output was 9.13 percent. . As per statistics reports, from the iron ore distribution zones almost the entire production of iron ore (96%) accumulated from Orissa, Karnataka, Chhattisgarh, Goa and Jharkhand and the remaining (4%) production was reported from Andhra Pradesh, Madhya Pradesh, Maharashtra and Rajasthan.

Badampahar Iron Ore deposit was first reported by Mr. P.N. Bose in 1904 and the mining lease over an area of 1063.61 hectares was obtained on 04.08.1919 by ex-lessee M/s TISCO Ltd. Dispatch of the Ore to the works at Jamshedpur was started in the 1926 till March 1960. After 50 years of extensive working, ex-lessee surrendered the lease to the State Govt. and the same lease was granted on 12.09.1969 vide Memo No. 5943(2) MG Bhubaneswar executed on 27.05.1970 for thirty (30) years in favour of S. Lal, the same lease was transferred to the present lessee, M/s Lal Trades and Agencies (P) Ltd. vide transfer Order No. IIII (C) M. 34/71-8106MG dated 31.08.1971 and executed on 09.06.1973. After 10 years of working, the present Lessee surrendered a part of the no ore bearing over 619.670 hectares on 02.061983 and the same area was accepted by the Govt. In erstwhile Mining and Geology department vide their Letter No. 4341 dated 06.04.1985.

The present lessee started its mining operation over 129.61 ha surrendering 934 ha (619.67 ha + 314.33 ha).

The applied RML area consists of –

a.	Broken up forest land prior to 25.10.1980 For mining and allied purposes	-	117. 84 Ha.
b.	Area required for Office lying within the Non-Forest land	-	0.78 Ha.
c.	Area of Safety Zone (Virgin Forest Land)	-	10.99 Ha
	Total	-	129.61 Ha.

The state govt. has extended the validity period of Mining lease over the same area under section 8A MMDR Act,1957 as amended by the MMDR Amendment Act,2015 till 26.5.2020 (i.e 50 years from 27.5.1970) vide letter no. 5615/SM Bhubaneswar dated 5.7.2016.

The Lessee M/s Lal Trades & Agencies Pvt. Ltd had already obtained environmental Clearance on 9th April 2010 for produce 7, 20,000 TPA of Iron Ore from the Mines. Now,

cutoff grade is considered as 45% Fe, where as in the year 2009-10 cut of grade was 58% Fe. Looking on the marketing demand of low grade iron ore (+45% Fe to -58% Fe), Lessee again intents to enhance his production to 1.5 MTPA.

M/s Lal Trders & Agencies Pvt. Ltd. has applied for obtaining Environmental Clearance in accordance with the provisions of the EIA Notification, 2006 for the Enhancement of Iron Ore from the Badampahar Iron Ore Mines located in Villages of Dhagurimuta, Dhudhijhar and Badampahar RF, of Kusumi Tehsil of Mayurbhanj district of Odisha from 0.72 Million TPA to 1.5 Million TPA.

In cognizance the letter No. – J-11015/39/2018-IA.II(M),dated 27th july 2018 by the Impact assessment Division of Ministry of Environment, Forest & Climate Change, Government of India , under the Standard TOR condition No. 19 for Mining Project stated that

"A detailed Biological Study of the Study Area [Core Zone and Buffer Zone (10 Kms Radius of the periphery of the mine lease)] shall be carried out".....In case of any scheduled – I fauna found in study area, the necessary plan along with budgetary provisions for their conservation should be prepared. …"

Prior to this Conservation Plan M/s Lal Trades & Agencies Pvt. Ltd has prepared a Site specific Wildlife Management plan in accordance to the Govt of India stipulations vide letter F.No. 8-11/2004, FC dated 30th August 2004. This habitat Improvement & Wildlife Conservation plan in consultation with the PCCF (WL) & The Chief Wildlife Warden of Orissa has been duly approved by the O/o of the above mentioned. The Budgetary allocation for the same has been approved to Rs. 68.40 Lakhs.

As this project is near about 100 years old most of the local villages are directly & indirectly related to this for their lively hood. The total cost of the project is about Rs. 254 Crores and 6000 people will be benefitted by this project and it will generate 92,000 Man days per year.

Badampahar Iron Ore Mine falls in the Survey of India toposheet No: 73-J/4 (New SOI Sheet No. F45I4). It is bounded by Latitude: 22^0 03' 52.87" to 22^0 05' 9.53" N Longitude: 86^0 06' 33.81" to 86^0 08' 24.81" E. The area is located in the Village- Dangurimuta, Dudhijharan and Badampahar RF, Thana – Badampahar, in the district of Mayurbhanj of Odisha State.

There are no perennial nala in the lease area. The seasonal water ways like gullies, streamlets and nalas drain the surface run-off water during rainy season. Also there are no Human

settlement in the lease area. The National Highway 6 from Jashipur towards Kolkata via Bisoi comes under the project impact area. Movement along Badampahar – Karida and Badampahar – Dhoba Dhobani corridors takes place by the elephants of Jharkhand. These elephant move to Badampahar RF during crop season and stay up to harvesting season i.e. month of December every year and some times beyond and cause crop damage on their movement path in Rairangpur Division.

Elephants from Karida RF of Jharkhand migrate to Badampahar RF through Tunguru RF and cross NH-6 at Khajurikata and then move to Mahubhandar RF, Bidubhandar RF & Similipal RF of Simlipal wildlife sanctuary.

So, the Project Impact area of Badampahar Iron Ore Mines seldom sees man-animal conflict whereas the Mitigative Wildlife amangement plan of NH -6 has accomodated conservation and mitigation strategies for Mega Wildlife Protection around its zone of influence

Other than the NH-6, a major road connects the Town of Jashipur to Rairanrpur. This passes through the Zone of Influence of the Badampahar Iron Ore Mines.

The Broad Gauge Railway Line of Soth Eastern Railways connecting Badampahar to Tatanagar city falls under the 10 Kms radius of the Mining Lease of Badamahar Iron Ore Mines.

The common species of Flora resent in the Project Area and Project Impact area comprise of Goira, Bel, Kolasiris, Limba, Sialipatra, Kendu, Rai, Karada, Sidha & Sal etc. The forest type present is 3C/C2e (ii) Tropical Moist Deciduous Forest and 5B/1C Northern Tropical Dry Deciduous Forests.

The common Species of Wildlife found in the Project Area and Project Impact Area the mammals are Elephant, Indian hare, Five Striped Palm Squirrel, Hyaena, Common Langur etc. The Reptiles in and around are Chandra boda, Ajagara/Rock Python, Indian Rock Lizard etc. The Avian species in the surrounding being Small Blue Kingfisher, House Crow, Indian Roller, Indian Cuckoo etc along with the amphibian species of Burrowing frog, Brahmuni benga etc.

The area does not form part of any National Park or Sanctuary but it is at a distance of 6.10 Km from the Boundary of the Similipal Tiger Reserve (STR) and it falls in the buffer zone of the Mayurbhanj Elephant Reserve. With regards to this NBWL Clearance has been obtained and a payment of 100 lakhs towards Tiger Conservation Foundation has been done.

The climate in the area is generally cold in winter between November & February and hot is summer between March and June. The monsoon sets in late June and continues up to the end of August. Temperature shows the variation of 9 degree C to 44 degree C.

The Wildlife both in Project area and the Project Impact Area are likely to be affected due to Mining activities and ancillary activities of transportation and carrying of minerals and ore in the mining zone. Though there doesn't seem to be any significant effect on forest cover and habitat for wildlife, but the effects of noise, air, sound pollution along with lightening and other anthropogenic pressures cannot be pretermitted.

Movement along Badampahar – Karida and Badampahar – Dhoba Dhobani corridors takes place by the elephants of Jharkhand. These elephant move to Badampahar RF during crop season and stay up to harvesting season i.e. month of December every year and sometimes beyond and cause crop damage on their movement path in Rairangpur Division.
The Project Impact area of Badampahar Iron Ore Mines rarely sees man-animal conflict, though important measures are suggested to mitigate the threat to wildlife particularly to the elehants in the Buffer zones.

INTERVENTIONS IN THE PROJECT AREA

1. M/s Lal Trades and Agencies Ltd. has proposed to supply of Ultra sonic sound elephant repellent with high frequency including over the plan period
2. A provision of establishing Bulk messaging System for immediate message spreading from field to all grass-root level forest Officials, ROs, ACFs & D.F.O., Rairangpur has been made for fast communication
3. Provision of Solar Street Lighting System in 5 strategic Villages such as Dudhijharan, Dhangrimuta, Kasiabeda, Kantasola, Chakidi.
4. Provision of Long Range Rechargeable Flash Light torches 200 nos to be supplied to the strategic villagers/VSS members/elephants trackers to wade away elephants.
5. Provision of Bee-Boxes alongside the Tatanagar-Badampahad Broadgauge of S.E.Railway line through the V.S.S members/Villagers of strategic villages 5 nos such, Baghdega, Bhandhan, Chhanua, Budadar & Rahihigoda to wade away elephants and side by side generating some secondary income to the villagers.
6. Supply of One SUV for speedy movement protection and anti-depredation activities to the D.F.O., Rairangpur
7. Provision to Purchase and supply of Android based Mobile handsets for quick message transmitting and immediate communication.

8. Provision of one Kirloskar soundless Gen set of 20 KW for the monitoring and evaluation cell of Rairangpur Division Office to enable constant power supply
9. Provision of POL for the anti-depredation speed moving vehicle on lumpsum on demand from DFO, Rairangpur Forest Division

INTERVENTIONS INSIDE THE PROJECT IMPACT AREA

1. In order to have sufficient food and fodder for the wild Elephants it is proposed to have planting of fodder and fruit bearing species *like Banyan (Ficus Benghalensis), Bamboo (Dendro calamusstrictus), Elephant apple (Dillenia indica), Mango (Mangifera indica), Kaitha (Lemonia acidissia), Kumbhi (Careya arborea), Wild Banana (Musa velutina),* etc. in Badampahad RF.
2. According to the field study 5 Nos of Sub Surface has been proposed according the civil estimates and cost norms of the State Government.
3. A provision for 2 Kms of Graded Earthen Bunds is provided for preservation of Soil from erosion in the total stretch.
4. Engagement of Elephant Trackers - To keep a track of elephant movement and to have speedy action on Elephant depredation activities it is proposed to engage 1 Nos. of elephant Tracker Squad over a period of 10 years.
5. Fencing of Unguarded open wells to prevent elephants and their cubs being trapped has been planned in 10 Nos. of strategic locations in and around the project and project impact area.
6. It is proposed to purchase required nos. of fire blowers as, a modern instrument in extinguishing forest fire and laying out fire lines inside forests in addition to conventional firefighting tools.
7. Awareness campaign : The first step could be to sensitize the local community particularly, the young ones in all the villages and hamlets located in Zone of Influence about the need for preservation of wild life and its habitat. It is proposed to have such awareness campaign in the peripheral villages within the Project and Project Impact area in 5 Villages per annum over the period of 10 years.
8. To make the general public aware of the presence of Wildlife it is proposed to put up Hoardings and Signboards on the internal road within the Impact Zone where wildlife and specially elephant movements are there.
9. A monitoring cell is proposed to be created at the Division Headquarters under the supervision of Head quarter Assistant Conservator of forests working in the Division.

The Plan has been prepared for a period of 10 years. Interim revision may be done evaluating the result of the presumptuous. The Project proponent undertakes to prepare subsequent plans in continuation to this plan.

M/s Lal Trades and Agencies Ltd. Will carry out works proposed in this plan with respect to the project area under the supervision of DFO, Rairangpur Forest Division, who will execute different interventions in the project impact area under the supervision of monitoring of The Regional Chief Conservator of Forests, Baripada.

The Total cost of the Plan including 20% extra for escalation of wage rate and material costs is Rs**. 91.16 Lakhs** out of which M/s Lal Trades and Agencies Ltd. Will spend **Rs. 33.77 Lakhs** for different interventions in the project area and the balance amount of **Rs. 57.40 Lakhs** will be kept aside for DFO, Rairangpur Forest Division for execution of Different interventions in the Project Impact Area.

In addition to the above, M/s Lal Trades and Agencies is executing various safeguard measures as prescribed under Mining Plan, Environment Management Plan and submitting compliance to various authorities ***(Annexure – 1 – Details of compliances are attached)***

For Lal Trades & Agencies (P) Ltd
Authorised Signatory

Divisional Forest officer
- Cum -
Wildlife Warden
Rairangpur Division

robusta (Sal) seeds, honey, wax, resins, tassar, *Terminalia chebula* seeds (myrabolans), *Buchanania lanzan* kernels (Char), hill brooms, *Curcuma longa (*Haldi), *Terminalia chebula* seeds (Harra), *Terminalia bellerica* seeds (Baheda), *Maranta arundinacea* (Arrow root), *Madhuca indica* flowers (Mahua), *Schleichera oleosa* (Kusum seeds), Lac, *Bauhinia vahlii* (Siali) fibres, *Shorea robusta* (Sal) leaves, *Tamarindus indica* (Tamarind) and other ivory products. The seeds, fibres, roots, etc, are collected and exported for processing. Villagers are mostly involved in collection of NTFPs like *Emblica officinalis* fruits (Aonla), *Shorea robusta* leaves (Sal), firewood, *Eulaliopsis binnata* grass (Sabai), labour and pot making. They are also involved in rope making from E. binnata grass. The santhals have rainfed agricultural land in which they cultivate paddy and are involved with sal leaf collection for making plates for household use.

Unsustainable harvesting of NTFPs from the forest is noticed. The people in the village are involved in collection of Buchanania lanzan kernels (Char), Emblica officinalis fruits (Aonla), Madhuca indica seeds and flowers (Mahua), Shorea robusta (Sal) leaf plate making for households consumption and Eulaliopsis binnata (Sabai) grass rope making. During harvesting time the villagers go to different parts of Odisha for labour work. Buchanania lanzan fruits are collected and the outer pulp is removed and then sold to the middlemen at Rs. 80/ kg.

In few villages the economy is mostly agrarian. Paddy is their primary crop. The residents of both the villages are also involved into traditional agroforestry. The main crops grown are Oryza sativa (Paddy), Zea mays (Maize), Helianthus annus (Sunflower). Bisoi is the main market place for selling of various NTFPs. The middlemen from various places come to transport their produce to different places.

1.15 Fauna of study area

From the earlier discussions on land-use and floral resources in the area, it is observed that there is no dense forestland within the lease area. The field study could record only the presence of common birds and few mammals as listed below.

Method like Signs, Spotlight counts, Direct Observations and Interaction with villagers are used to record the animals, birds, reptiles and amphibians. On the basis of the field surveys and interaction with local people, accounts of major vertebrate faunal resources were identified in the core (inside ML area) and buffer zones (with in 10 km. radius of study area) of study area. The schedule is represented as per 'Wildlife Protection Act, 1972'.

Core Area: A total of 40 faunal species were recorded from core area include 2 mammals, 25 birds, 4 reptiles, 4 amphibians and 5 insects. The detail list of fauna of core area is at

Buffer Area: In total 87 faunal species were recorded from the buffer area belong to 11 mammals, 53 birds, 11 reptiles, 6 amphibians and 6 insects. The detail list of fauna of buffer area is at

Status of Fauna under the Indian Wildlife (Protection) Act, 1972

The fauna listed consist of mostly common type's species whereas few animals come under various schedules of The Indian Wildlife (Protection) Act, 1972 [WPA, 1972]. They are as follows:

Buffer Area: The fauna listed consist of mostly common types. The status of fauna under various schedules of The Indian Wildlife (Protection) Act, 1972 [WPA, 1972] are presented. Among 87 species recorded in buffer area, 1 species under mammals *Elephas maximus indicus* (Elephant) and 1 species under reptile *Python molurus molurus* (Ajagar) are under Schedule-I. Similarly 9 species among mammals are under Schedule- II of WPA, 1972. All remaining species are under Schedule-IV.

Location of National Parks, Sanctuary, Biosphere Reserve, wild life routes in project area are attached in Annexure Maps.

There is Boundary of Similipal Tiger Reserve (National Park) situated 6.10 Km radius of the lease area of Badampahar Iron ore Mines. Mayurbhanj, and presence of Mayurbhanj Elephant Reserve.

The present study also evaluated the migratory route of wildlife through primary (direct field observations) and secondary information (local peoples and forest department officials).

The study revealed that there are two elephant corridors of Badampahar Karida East corridor and Badampahr Dhobadhobin corridor are present.

Endangered and Endemic Species of Flora and Fauna - No endangered or endemic flora/fauna were encountered during the present study in and around of Badampahar Iron ore Mines.

Information on breeding and hibernating sites in core and buffer zone - No breeding or hibernating site of any wildlife found in the core area found. Some migratory aquatic birds come to Khadkhai dam during winter season as their feeding ground but there is no nests are recorded in the study area.

Table 12: Fauna were recorded in Core and Buffer Zone of Project Study site

Sl. No.	Scientific Name	Common Name	Status	Core	Buffer
Mammals					
1.	*Elephas maximus indicus*	Elephant	Sch I	-	+
2.	*Lepus nigricollis*	Indian hare	Sch. IV	-	+
3.	*Funambulus pennanti*	Five Striped Palm Squirrel	Sch.IV	+	+
4.	*Rattus rattus*	House Rat	Sch.V	+	+
5.	*Vulpes bengalensis*	Indian Fox	Sch.II	-	+
6.	*Presbytis entellus*	Common Langur	Sch.II	-	+
7.	*Sus scrofa*	Wild Pig	Sch.III	-	+
8.	*Hyaena hyaena*	Hyaena	Sch.III	-	+
9.	*Pteropus giganteus*	Indian fly fox	Sch.V	-	+
10.	*Hystrix indica indica*	Jhinka	Sch.IV	-	+
11.	*Herpestes edwardsi*	Neula	Sch.IV	-	+
Reptiles					
1.	*Vipera russelli*	Chandra boda	Sch.II	-	+
2.	*Python molurus molurus*	Ajagara/Rock Python	Sch I	-	+
3.	*Ptyas mucosa*	Dhaman	Sch.II	-	+
4.	*Bungarus caeruleus*	Common Indian Krait	Sch.II	-	+
5.	*Naja naja*	Indian cobra	Sch.II	-	+
6.	*Chamaeleo zeylanicus*	Pohela endua	Sch II	-	+
7.	*Mabuya carinata carinata*	Champainoli	Sch IV	+	+
8.	*Eublepharis species*	Endua (rock geko, fattailed geeko)	Sch II	+	+
9.	* *Hemidactylus flaviviridis*	*House lizard	Sch II	+	+
10.	*Psammophilus blanfordanus*	Indian Rock Lizard	Sch IV	+	+
11.	*Calotes versicolor*	Common Garden Lizard	-	-	-
Amphibians					
1.	*Tomopterna rolandae*	Burrowing frog	Common	+	+
2.	*Philautus similipalensis*	Similipal buda benga	Common	-	+

3.	*Bufo viridis*	Common toad	Common	-	+
4.	*Polypedates maculates*	Tree frog	Common	+	+
5.	*Euphlyctis cyanophlyctis*	Pani benga	Common	+	+
6.	*Hoplobatrachus crassus*	Brahmuni benga	Common	+	+
Butterflies					
1.	*Tirumala limniacae*	Blue tiger	Common	+	+
2.	*Danaus chrysippus*	Plain Tiger	Common	+	+
3.	*Ixias Marianne*	White –orange Tip	Common	+	+
4.	*Papilio polytes*	Common mormon	Common	+	+
5.	*Precis orithya*	Blue Pancy	Common	-	+
6.	*Precis hierta*	Yellow Pansy	Common	+	+

Avian Fauna

Sl. No.	Scientific Name	Common Name	Schedule, WPA (1972)	Core	Buffer
1.	*Acridotheres tristis*	Common Myna	Sch IV	+	+
2.	*Alcedo atthis*	Small Blue Kingfisher	Sch IV	-	+
3.	*Ardeola grayii*	Pond Heron	Sch IV	-	+
4.	*Coracias benghalensis*	Indian Roller	Sch IV	+	+
5.	*Corvus splendens*	House Crow	Sch IV	+	+
6.	*Dicrurus adsimilis*	Black Drongo	Sch IV	+	+
7.	*Merops orientalis*	Green bee eater	Sch IV	+	+
8.	*Nectarinia asiofica*	Purple Sunbird	Sch IV	+	+
9.	*Passer domesticus*	House Sparrow	Sch IV	+	+
10.	*Phalacrocorax niger*	Little Cormorant	Sch IV	-	+
11.	*Pycnonotus cafer*	Red Vented Bulbul	Sch IV	+	+
12.	*Streptopelia decaocto*	Ring Dove	Sch IV	-	+
13.	*Merops philippinus*	Bee eater blue tailed	Sch IV	+	+
14.	*Merops orientalis*	Bee eater small green	Sch IV	-	+
15.	*Dicrurus paradiseus*	Rocket tailed drongo)	Sch IV	-	+

16.	*Pycnonotus cafer*	Red vented Bulbul	Sch IV	+	+
17.	*Milvus migrans*	Chilla (Indian kite)	Sch IV	-	+
18.	*Chloropsis cochinchinensis*	Chloropsis	Sch IV	+	+
19.	*Chloropsis aurifrons*	Chloropsis (green bulbul)	Sch IV	+	-
20.	*Phalacrocorax niger*	Cormorant little/panikua	Sch IV	-	+
21.	*Corvus macrorhynchos*	House Crow (Kua)	Sch IV	-	+
22.	*Cuculus varius*	Koili	Sch IV	-	+
23.	*Cuculus micropterus*	Indian Cuckoo	Sch IV	-	+
24.	*Anhinga rufa maelanogaster*	Darter/snake bird	Sch IV	+	-
25.	*Comumba livia*	Blue rock pigeon	Sch IV	-	-
26.	*Streptopelia chinensis*	Dove spotted	Sch IV	-	+
27.	*Egretta garzetta garzetta*	Little egret	Sch IV	+	+
28.	*Bubulcus ibis coromandus*	Cattle egret (baga)	Sch IV	-	+
29.	*Oriolus xanthornus*	Haladi basanta	Sch IV	-	+
30.	*Crocopus phoenicopterus*	Harada chadhei	Sch IV	+	+
31.	*Nycticorax nycticorax*	Neight heron	Sch IV	-	+
32.	*Ardeola grayii grayii*	Pond heron / kantiyabaga	Sch IV	-	+
33.	*Coracias benghalensis*	Indian roller	Sch IV	-	+
34.	*Perdicula asiatica*	Jungle bush quail (teetri)	Sch IV	-	+
35.	*Gallus sonneratii*	Grey jungle fowl	Sch IV	-	+
36.	*Gallus gallus*	Red jungle fowl	Sch IV	-	+
37.	*Dicrurus macrocercus*	Kajalpati	Sch IV	+	+
38.	*Corvus splendens*	Kau (pati)	Sch IV	+	+
39.	*Corvus macrorhynchos*	Kua (damara), Jungle crow	Sch IV	+	+
40.	*Centropus sinensis*	Kumbhatua, Crow pheasant	Sch IV	+	+
41.	*Turdoides striatus*	Kundachadei, Jungle Babbler	Sch IV	+	+
42.	*Lonchura malacca*	Munias (black headed)	Sch IV	-	+
43.	*Acridotheres tristis*	Myna	Sch IV	+	+
44.	*Caprimulgus asiaticus*	Nightjar	Sch IV	+	+

45.	*Tyto alba stertens*	Owl (Indian barn owl)	Sch IV	-	+
46.	*Bubo nepalensis*	Owl (forest eagle)	Sch IV	-	+
47.	*Psittacula krameri*	Parakeet roseringed (sua)	Sch IV	-	+
48.	*Psittacula eupatria*	Sua (Indian large parakeet)	Sch IV	+	+
49.	*Picus canus*	Wood pecker	Sch IV	-	+
50.	*Saxicoloides fulicata*	Indian robin	Sch IV	-	+
51.	*Actitis hypoleucos*	Common Sandpiper	Sch IV	-	+
52.	*Egretta garzetta*	Little Egret	Sch IV	+	+
53.	*Phalacrocorax fuscicollis*	Indian cormorant	Sch IV	+	+

Aquatic diversity

The study area has three aquatic bodies like one large Khadkhai dam, Kukudajharan Nala and Jalpa nadi. Besides these many small and large ponds were found in the buffer of the study area in which the aquatic diversity is rich. Nine species of aquatic plant including submerge, emergent, Free floating and grasses species were recorded during biodiversity assessment in aquatic environment. The aquatic vegetation of study area was described below in Table 17. Twenty one species of fish were also recorded in aquatic Environment which is described in Table.The aquatic diversity were described below:

Aquatic Vegetation in project study area –

Sl. No.	**Scientific Name**	**Local name**	**Family**
1.	*Alternanthera philoxeroides*	**-**	Amarenthaceae
2.	*Bacopa monnieri*	Brahmi	Brahmi Plantaginaceae
3.	*Cyperus rotundus*	Nutgrass,	Cyperaceae
4.	*Ceratophyllum demersum*	Water head, pond weed	Ceratophyllales
5.	*Chenopodium album*	Bathua	Amaranthaceae
6.	*Enhydra fluctuans*	Hidmicha	Asteraceae
7.	*Hydrilla verticillata*	Hydrilla	Hydrocharitales
8.	*Nymphaea alba*	White water lily	Nymphaeales
9.	*Vallisneria spiralis*	Tape grass	Hydrocharitaceae

Aquatic Fauna in the project area-

Table 13. - Fish diversity recorded in study area

Sl. No.	Common	Scientific Name	Status in
1.	Catla	*Catla catla*	LC
2.	Rohu	*Labeo rohita*	LC
3.	Mrikali	*Cirrhinus mrigala*	LC
4.	Bata	*Labeo bata*	LC
5.	Puti	*Puntius ticto*	LC
6.	Magur	*Clarias b atrachus*	LC
7.	Singhi	*Heteropheustis fossilis*	NA
8.	Sol	*Ophiocephalus str iatus*	LC
9.	Lata	*Ophiocephalus punctatus*	NA
10.	Fali	*Notopterus*	LC
11.	Mahurali	*Amblypharyngodon mola*	LC
12.	Dandikiri	*Rasbora daniconius*	LC
13.	Karandi	*Punctitus conchonius*	LC
14.	Mentua	*Garra mullya*	LC
15.	Kantia	*Hemibagrus menoda*	LC
16.	Tudi	*Macrognathus aculeatus*	LC
17.	Chandakudi	*Chanda nama*	LC
18.	Gadisha	*Channa punctata*	LC
19.	Chingudi	Prawn sps.	LC
20.	Pita Kerandi	Puntius conchonius	LC
21.	Baunsapatri	Salmophasia bacaila	LC

LC= Least Concern, NA= Not Assessed

The authenticated wild life map showing location of Similipal wildlife sanctuary, Similipal national parks and two elephant corridors in the buffer area of Badampahar Iron Ore Mines. Thus, the status of forest cover, floral diversity, distribution and abundance of fodder species, availability of shed, water and ecological parameters were considered to finally arrive at a reasonable assessment of the status of the floral and faunal resources of the region.

Table 14: List of algae in the study area

Sl.No.	Algae in study area
1.	*Phormidium holenii*
2.	*Phormidium rubriterricola*
3.	*Stigonema turfaceum*
4.	*Scytonema mirabile*

Table 15: List of wild edible mushroom in the study area:

Sl. No.	Local name	Species name
1	Kuta Chatu	*Volvariella* sp.
2	Gachha bedha	*Russula cyanoxantha*
3	Mati tara	*Astraeus hygrometricus*
4	Mati tara	*Geastrum* sp.
5	Parabana, Ada chatu	*Termitomyces reticulates*
6	-	*Russala* sp.
7	Kukuda	*Russula emetic*

5.	*Scytonema pseudopunctatum*
6.	*Tolypothrix byssoidea*
7.	*Fischerella muscicola*
8.	*Desmococcus olivaceus*

8	Pitha	*actarius* sp.
9	Bali chatu	*Volvariella glandiformis*
10	Anthua	*Lycoperdon* sp.
11	Anthua	*Lycoperdon* sp.
12	Jatia rutka	*Lycoperdon* sp.
13	Desi rutka	*Tuber* sp.
14	Pija chatu	*Russula* sp.

Table 16: Aquatic flora of study area:

Sl. No.	Emergent	Floating	Submerged
1	*Typha angustata*	*Eichhornia crassipes*	*Hydrilla verticillata*
2	*Polygonum glabrum*	*Lemna polyrhiza*	*Vallisneria spirallis*
3	*Paspalum distichum*	*Nymphaea stellata*	*Potamogeton pectinatus*
4	*Eclipta prostrata*	*N. nauchali*	*P. crispus*
5	*Scirpus maritimus*	*Nelumbo nucifera*	*P. perfoliatus*
6	*Ipomea carnea*	*Jussiaea repens*	*Myriophyllum spicatum*
7	*Phragmites karka*	*Ipomea aquatica*	*Zanichellia palustris*
8	*Polygonum glabrum*	*Azolla pinnata*	*Ceratophyllum demersum*

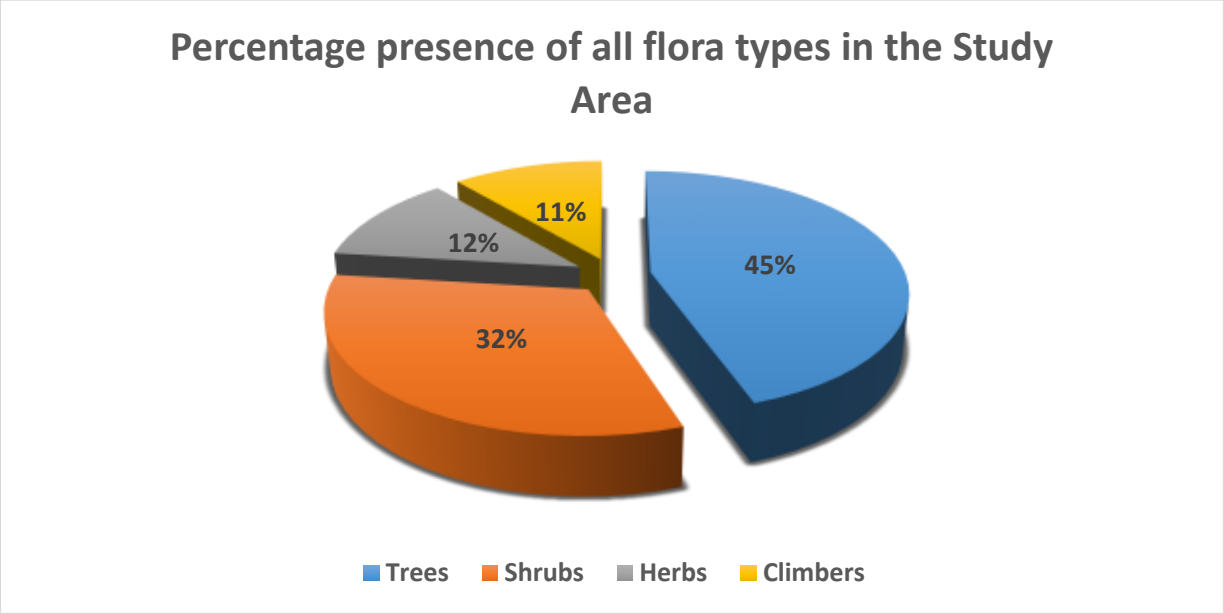
Odonates in study area:

Sl. No.	***Family***	***Species***
1	*Libellulidae*	*Bradinopyga geminate (Ramber)*
2		*Branchythemis sp*
3		*Potamarcha obscura (Rambur, 1842)*
4		*Potamarcha congener (Rambur)*
5		*Pantala flavescens (Fabricius, 1798)*
6		*Trithemis festiva (Schneider1936)*

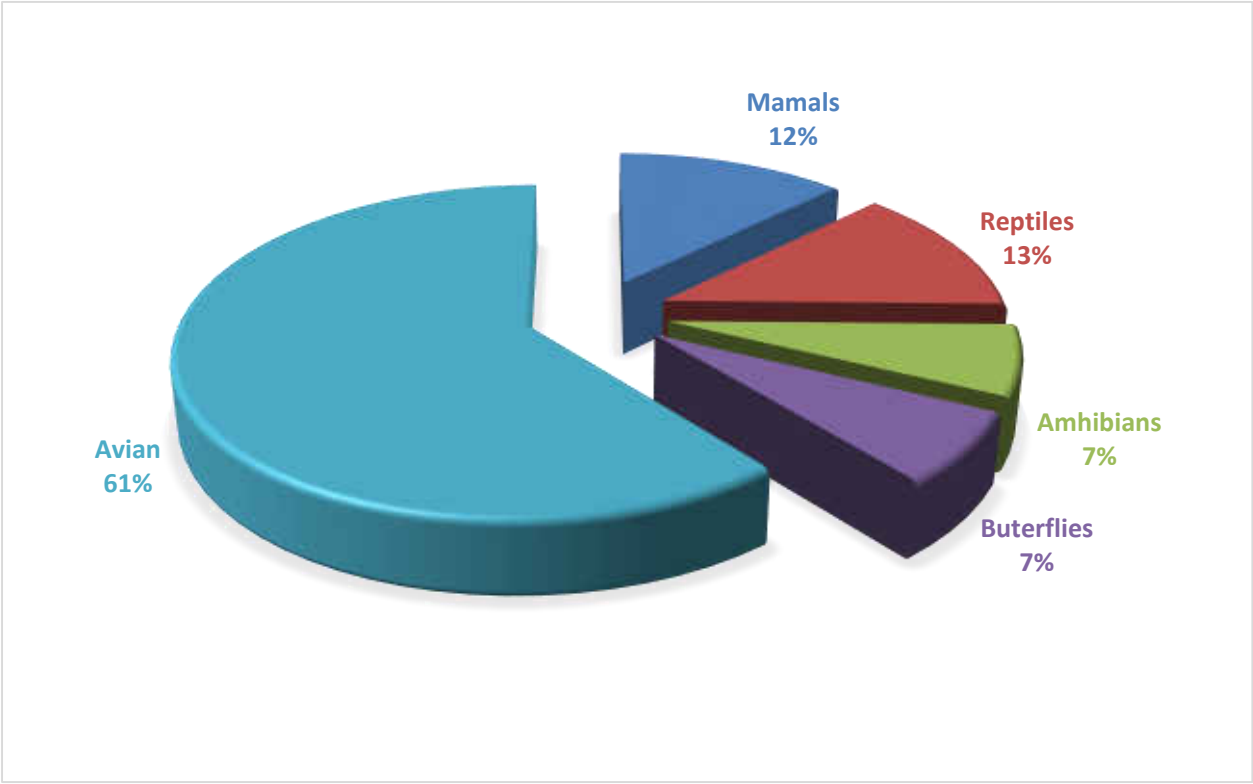
7	*Coenagrionidae*	*Aciagrion hisopo hisopa*
8		*Ceriagrion olivaceum Laidlaw*
9		*Cercion malayanum Selys*
10		*Cercion calamorum dyeri Fraser*
11		*Onychargia atrocyana Selys*
12	*Lestidae*	*Lestis nodalis Selys*
13		*Lestes viridulus Ramber*
14	*Protoneuridae*	*Disparoneura sp*
15	*Aeshnidae*	*Anax imperator Leach*
16	*Calopterygidae*	*Neurobasis chinensis chinensis (Linnaeus)*

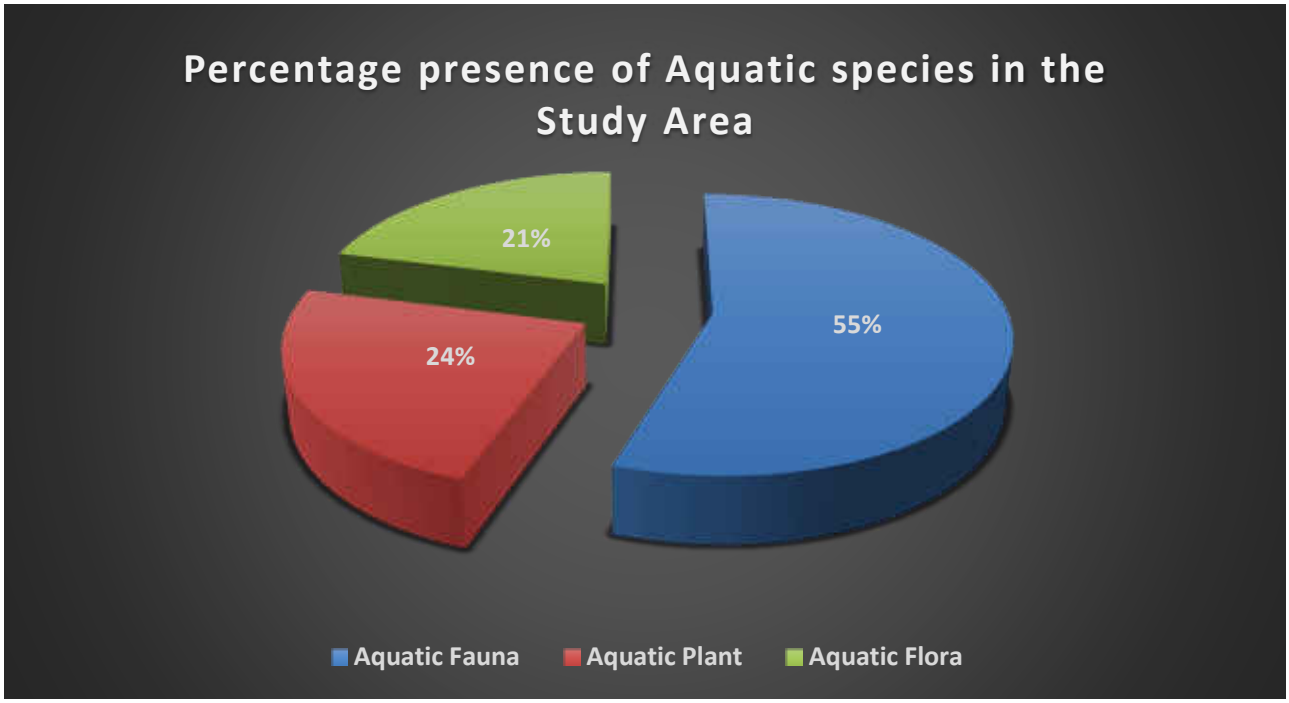
Soil fauna includes Microfauna, Mesofauna and Macrofauna as Collembola (Springtails), Lumbricina (earthworms), nematodes, Isoptera (termites), Acari (mites), Enchytraeid worms, small Diplopoda (millipedes), and many small larval and adult insects, Macrofauna: Isopoda (woodlice), larger Diplopoda, earthworms, Isoptera (termites), Coleoptera (beetles),Diptera (flies), ants, and molluscs.

Distribution and Spread of Different Flora & Fauna in the Study Area (Core Zone and Buffer Zone)



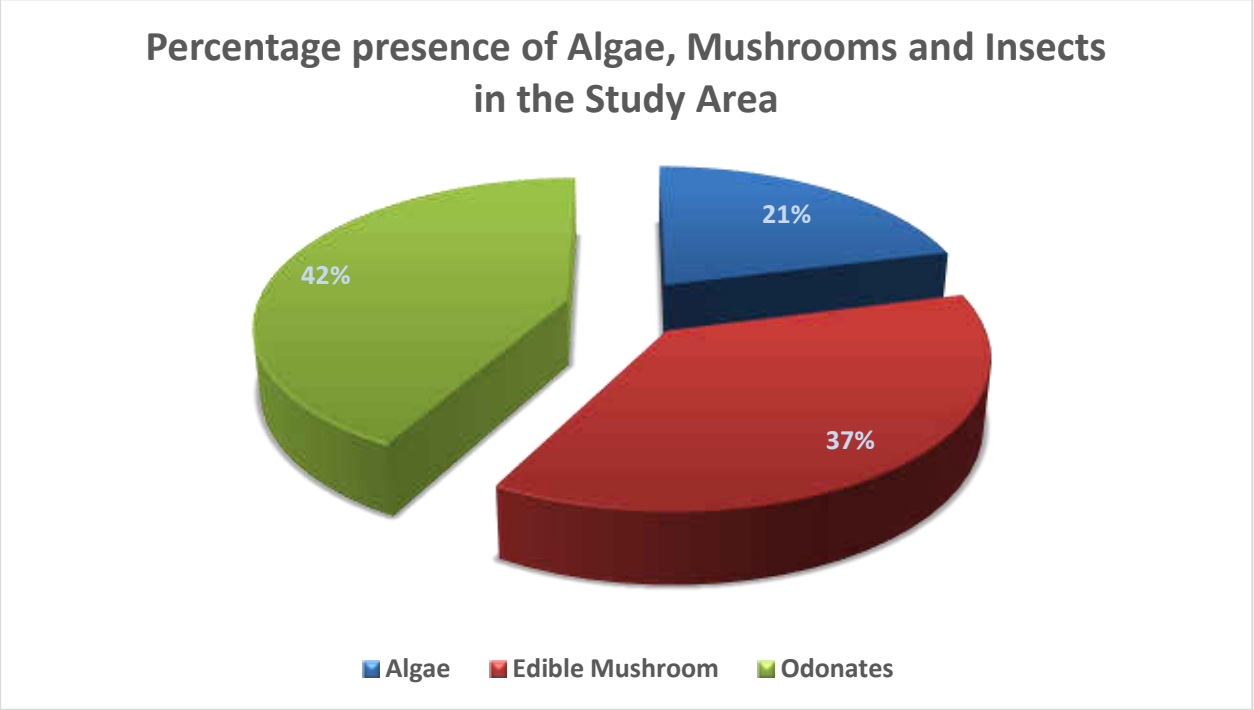
Percentage presence of all Fauna types in the Study Area





For Lal Trades & Agencies (P) Ltd
Authorised Signatory

Divisional Forest officer
- Cum -
Wildlife Warden
Rairangpur Division



1.16 Movement of Mega Wildlife in the impact area

Although 48 nos of elephant population according to last census are recorded in Mayurbhanj District, few migrate to this area from Jharkhand area. They do migrate to the peripheral villages during harvesting seasons causing man elephant conflict. However, as reported, at times they migrate to Badampahar RF in Rairangpur Division and return back

Moreover, 2 identified elephant corridors - **Badampahad Dhobadhobani, Badampahad Karida** find place in the project impact zone. Elephants from Dalama Wildlife Sanctuary of Jharkhand through the 1st corridors migrate to Odisha during harvesting season and cause depredation mostly in Rairangpur & Karanjia Division.

Movement of Elephant in Rairangpur Forest Division:

Badamapahar RF with favourable habitat condition hosts about 7 to 10 elephants throughout the year. At many times they stay themselves in Tunguru RF area.

It is reported that Similipal elephants never cross the NH-6 – present in the impact area of the Badampahar Iron Ore Mines and move in fringe areas only. The Similipal elephants coming out of Tiger reserve move in the fringe area and cause crop damage in few villages of Talabandha section of Bisoi Range.

Movement along Badampahar – Karida and Badampahar – Dhoba Dhobani corridors takes

place by the elephants of Jharkhand. These elephant move to Badampahar RF during crop season and stay up to harvesting season i.e. month of December every year and sometimes beyond and cause crop damage on their movement path in Rairangpur Division.

These elephants also move partly to Tuguru RF under Rairangpur section through Bijatola and then go back to Jharkhand. Elephants from Karida RF of Jharkhand migrate to Badampahar RF through Tunguru RF and cross NH-6 at Khajurikata and then move to Mahubhandar RF, Bidubhandar RF & Similipal RF of Similipal wildlife sanctuary. This corridor connect Badampahar RF and Karida RF maintaining continuity between Similipal National Park and Mosabani Range of Dhalbhum forest Division of Jharkhand. Elephants from Similipal, through Badampahar Forest, Dhasra Forest, Teltangia village forest, Dhenkla National Park, Tungra RF and Sarali RF do enter in to Karida East RF near Satbakra (Jharkhand).

Elephant Census Report in Mayurbhanj district

Sl. No.	Name of Divisions	May-1979	May-1999	May-2002	May-2007	Apr-2010	June-2012	May-2015
1	Baripada	0	0	0	48	48	52	68
2	Karanjia	0	28	44	40	32	23	56
3	Rairangpur	0	0	0	48	48	47	48
4	STR	670	496	412	298	331	334	337

WILD ANIMAL DEPREDATION OF BADAMPAHAR RANGE *(Annexure 8)*

Human Death

Sl.No.	Year	Name of Victims	Place of Occurrence	GPS Co-Ordinates	Amount Paid in Rs.
1	**2015-16**	**NIL**	**NIL**	**NIL**	**-**
2	2016-17	Sri Gereya Naik	Bhagabandi (Kargi Sahi)	N-22^0 06' 59.2" E-86^0 10' 13.0"	3,00,000/-
3	2016-17	Sri Sunyabasi Giri	Ukam village (Giri sahi) inside Paddy field adjacent to village Nullah	N-22^0 09' 29.0" E-86^0 12' 05.0"	3,00,000/-
4	2017-18	Sri Baga Guiya	Near Tangru Sahi Village	N-22^0 03' 20.5" E-86^0 00' 51.7"	1,00,000/-

Elephant Death – NIL

Human Injury

Sl.No.	Year	Name of Victims	Place of Occurrence	GPS Co-Ordinates	Amount Paid in Rs.
1	2015-16	Sri Khela Murmu	Near Suklabandha, Tentuli sahi of Badamchaunradihi village	N-22^0 05' 12.9" E-86^0 09' 00.5"	5,000/-

2	2016-17	NIL	NIL	NIL	-
3	2017-18	Sri Kate Pingua	Sarjamgoda	N-22^0 03' 15.0" E-86^0 04' 32.6"	5,000/-
4	2017-18	Sri Chare Pingua	Sarjamgoda	N-22^0 03' 15.0" E-86^0 04' 32.6"	5,000/-

House Damage

Sl.No.	Year	Nos. of House Damage	Place of Occurrence	Amount Paid in Rs.
1	2015-16	NIL	NIL	-
2	2016-17	NIL	NIL	-
3	2017-18	04 Nos.	Ukam-01 No. Kantasola-03 Nos.	Ukam – 01 No. = 2,000/-

Crop Damage

Sl. No.	Year	Nos. of Victims	Amount Paid in Rs.
1	2015-16	178 Nos.	5,07,000/-
2	2016-17	206 Nos.	9,34,206/-
3	2017-18	134 Nos.	2,19,130/-

1.17 Survey of Working Plan Prescription

The Working Plan has been prepared in the year 1996 by Sri A.O.F.BAKLA and is in force for 20 years from the year 1996- 97 to 2015-16. This plan holds good for the forest division of Rairangpur.

The forests of this division area are of mixed Sal forest. As per the classification of Champion and Seth the forest type is 3C/C-2e-Moist peninsular low level sal forest.

Working Plan for Selection Working Circle

General Constitution and Character of Vegetation

This working circle a portion of Badampahar block. This working circle is proposed in order to provide a favourable silviculture treatment to Sal forest and to increase the proportion of sal in crop composition along with other miscellaneous species.

The result of enumeration indicates that the prescription of the Working circle have not been followed during the implementation of previous plan. As a consequence percentage of Sal *(Shorea robusta)* has reduced considerably and percentage of Sal and other species for felling has also seen decreased. Though ban on felling had been imposed during the operation of previous plan but other subsidiary silvicultural operations have not been carried out in order to improve the vegetation of the forest blocks and compartments.

Special Objectives of Management

- To increase the proportion of sal and other valuable species. The existing Sal crop should be conserved and maintained in the interest of soil, water and environment.
- Consistent with environmental protection and ecological balance, action will be taken for production of big sized timber in order to cater the requirement of the people.
- To improve the density, condition and composition of forest cover with due emphasis on soil and water conservation.
- Tending of growing stock to obtain maximum possible increment, consistent with protection of environment and artificial regeneration techniques are to be adopted wherever necessary for the purpose.
- Ban on felling of trees should be imposed in order to give rest to Sal crop. If required exploitation of silviculturally available exploitable sized trees on sustained yield basis will be taken up.
- To re-stock and to regenerate the all blank patches and existing regeneration respectively by planting two years old Sal seedlings raised in polythene bags.
- To improve the ecological conditions and to improve the sanitation condition of the forest by removing dead, dry and uprooted trees.
- To improve the stocking of low density forest by planting species of fuel, fodder and timber.
- To protect the hill slopes from erosion and to regulate the local water system by conserving and improving the forest standard,
- To protect the sal forest from fire, illicit felling, lopping and uncontrolled grazing.

Choice of Species:

a) Principal Species – Sal, Piasal, Kasi, Dhaura, Sisoo, Gambhar and Champa

b) Useful species – Fruit bearing and M.F.P. yielding species, Bankhira, Panjan, Nageswar, Koim, Asan, Jamun, Tun, Sidha and softwood like Simul, Salai, Kadamba, Rimuli, Bhurkund, Panigambhari and Mango.

The rest species will be treated as inferior species.

Working Plan for Rehabilitation Working Circle

General Constitution

The working circle includes all the compartments and forest blocks of Coppice and Rehabilitation working circle of previous working plan. These blocks and compartments are degraded and reduced to scrub type. The crop included here cannot be worked for commercial exploitation of timber under any al system. The future management practice aims at these rooted waste forests, scrub forests to rehabilitate by integrated rehabilitation technique. So also these forests need protection and intensive nursing in order to regenerate and to revive their productivity during this working plan period. The areas included in this working circle consist of areas having plain, valley and hilly terrain. It includes the degraded mining areas in forest,

which are situated on steep slopes rugged erodable and unstable hill slopes. Disturbance to soil, Geology and vegetation by the way of mining and quarrying on the hilly terrain without giving proper attention to regenerate the area and refilling the gaps created at the time of mining. Such mining activities have degraded the eco-system by polluting air, water and soil.

Special Objects of Management

- To achieve best growth by tending of existing growth.
- To provide effective protection measures against all biotic interferences, repeated fire and illicit removal of commercially important species as well as grasses.
- To re-stock the barren and blank patches by planting indigenous and fast growing and quick maturing exotic species.
- To provide adequate rehabilitation measure in order to protect hill slopes to improve soil and moisture content.
- To reclaim the abandoned mines and stone quarrying sites.
- To conserve and improve the forest cover site quality in the interest of soil erosion conservation by adopting biological and mechanical measures thereby achieve environmental soundness, social acceptable and optimal total productions.

Choice of species

Sal and other species are important and every effort shall be made to revive all the species. For silvicultural tending, principal species will be preferred over useful species but no permanent gap shall be created. Sal, Sisoo, Gambhar, Teak, Asan, Siris, Dhaw, Koim, Piasal, Kasi, Kusum, Mahul, all edible fruit bearing and M.F.P. yielding species shall be treated as principal species. The rest shall be treated as useful species.

The different categories of degradation and its treatment plan included in this working circle are furnished below:

Category	Site specification	Area orientation approach
Category - I	Area previously worked Under copprice sysem and having good copprice regeneration of sal and misc. species.	Singling out of shoots and Climbers cutting, removal Of high stumps and other tending operations.
Category – II	Sal rooted waste	Tending operations

Category – III	Definite gap area eroded and plain area devoid of forest growth.	To be restocked with suitable species through planting activities.
Category	**Site specification**	**Area orientation approach**
Category – IV	Hill slopes with scanty forest growth and mines spoils.	Soil and water conservation under watershed management And reforestation measures.
Category - V	Old plantation areas under rehabilitation scheme.	Tending and raising of plantation in gaps.

Special Objectives

To bring blank area in forest wastelands under vegetative cover and to increase the quality and productivity of forest, waste lands by enrichment plantation and finally to protest and maintain the bio-diversity of the adjoining eco-system, as emphasized in revised National Forest Policy, 1988.

Treatment of Category

Pre-planting, planting and post-planting operations as detailed in forest plantation manual 1977 shall be followed. The spacing of firewood, timber, bamboos, non-timber forest produce and fruit bearing trees will be adopted as per the bio-diversity planting design, in the category - I area. The Sabai cultivation shall be adopted in selected areas, Teak, Eucalyptus hybrid and Acacia auriculiformis shall be planted in category - II area. In category - II areas species of non-timber forest produce and fruits shall also be planted.

Selection of Species for Afforestation

- The species to be planted shall be decided keeping the following points in view
- Monoculture shall be avoided in favour of mixed plantation by designing a suitable proportion.
- The species coming up naturally in the site selected, are the best suitable species for the site.
- Before selection of species for plantation and defining their composition per hectare, a careful consideration has to be given to various aspects of eco-system management. The emphasis on the fact that plantation should not be in any way alter, disturb or change the existing composition of forest block but protect, maintain and restore the biodiversity of the area along with other objectives of plantation. Due consideration shall also be given to the productivity, non-timber forest produce, fruit bearing species and wild life utility aspects of plantation. The

effects should be such to keep the species and their composition more or less same as they exist in the forest block and forest type. Each plantation should have about **2% species having fruit and 12% non-wood forest produce yielding species**. Teak, *Shorea robusta* and species of general utility will be 50% and 36% respectively.

- Selection of species should also be according to demand of the rural poor, their occupation and livelihood.
- Sabai and other grasses can be sown between the plantation rows.

The special objectives of Management

- Conservation, preservation and protection of the Wildlife habitat and biodiversity.
- Socio-econimic developments of local community are addressed upon
- Adequate protection of water holes and creation of check dams
- Natural salt licks identified.
- Enrichment planting of favourable species for wildlife & planting of grasses.
- Strict protection against fire, grazing illicit felling & poaching.
- Maximum importance on improvement of floral composition and density.
- Soil & water conservation measures taken up.
- Involvement of Wildlife Protection committee stressed.
- Implementation of Tourism and Publicity
- Scientific study wildlife census.

1.18 Observations from the Detailed Biological Study and Objectives of the Wildlife conservation Plan

Flora & Fauna, embraces all living organisms and their genetic diversity, a vast and complex array of ecosystems and habitats, as well as the processes that underpin and result from this diversity, such as photosynthesis, nutrient cycling or pollination. Different species – plant, animal, fungal and microbial – interact with each other in a variety of ecological processes to form ecosystems. These processes are in turn the result of the interactions between species and with their physical and chemical environments.

Biodiversity sustains human livelihoods and life itself. The interdependence between people and the flora and fauna is most apparent for some indigenous peoples. At a macro-level, the balancing of atmospheric gases through photosynthesis and carbon sequestration is reliant on biodiversity, while an estimated 40 per cent of the global economy is based on biological products and processes. The biological environment (Flora & Fauna) of the area is also the basis of innumerable environmental services that keep us and the natural environment alive –

from the provision of clean water and watershed services to the recycling of nutrients and pollination.

Thus detailed biological study done has created an in depth understanding of the Flora & Fauna & the habitat of the life forms present in and around the particular area, thereby necessitating a need to prevent, protect and conserve the ecology and biodiversity of the surroundings.

The main objective of the study was to assess biological resources and ascertain probable impacts of the mining activities on the structure & composition of floral and faunal diversity in and around the study area (10 km radius) of the proposed project.

The primary objectives of the study of biological environment are:

- To assess the vegetation types and phytosociology of the Badampahar Iron Ore Mines Core zone (Mining lease area) and the buffer zone (10km radius of the periphery area of the mining lease).
- To find out any endemic, endangered and RET species of study area.
- To identify wildlife habitat of the area and record the Schedule of fauna present (If any) and evaluate impact of the proposed project on wildlife & their natural habitats.

Mining has the potential to affect biological environment throughout the life cycle of a project, both directly and indirectly. Direct or primary impacts from mining can result from any activity that involves land clearance (such as access road construction, exploration drilling, and overburden stripping or tailings impoundment construction) or direct discharges to water bodies (riverine tailings disposal, for instance, or tailings impoundment releases) or the air (such as dusts or smelter emissions).

The potential for significant impacts is greater when mining occurs in remote, environmentally or socially sensitive areas like Badampahar RF etc.

Due to the continuing demand for minerals, the depletion of resources in readily accessible areas and changing technologies and economics in the mining sector, mining is increasingly being proposed in remote and biodiversity-rich ecosystems that were previously unexplored and undeveloped for minerals. Despite the significant potential for negative impacts on the Flora & Fauna and their habitat from mining operations, there is a great deal that we do to minimize or prevent such impacts in areas identified as being appropriate for mining.

Engaging the community and other stakeholders with an objective of developing trust, respect and partnership, aimed at keeping the community informed of a mining company's operations,

is essential to the success of a sustainable project. It should be recognized that stakeholders may have possibly different interests in, perspectives on and priorities for surrounding Flora and Fauna & their Habitat and its management. For which it is now necessary to prepare this **Site Specific conservation plan for the Badamapahar Iron Ore Mining Project in Mayurbhanj District.**

When developing mitigation measures or biodiversity conservation initiatives, attention will be given to respecting cultures, customs and values; to recognizing and engaging local communities as stakeholders; to participating in the social, economic and institutional development of community's along with the priority of conserving the rich and Diverse Flora & Fauna and their Habitat in the area.

1.19 Indicative plan showing location of other projects:

Other Projects - There are no other mining/industrial projects functioning within the impact area of the Badampahar Iron Ore Mines of Lal Trades and Agencies Pvt. Ltd. The list of mining projects which are non-working are attached as ***(Annexure 9)***

1.20 List of experts involved in the study and the Methodology adopted.

The Team

Shri Gadadhar Mohapatra, IFS (Retd.) Shri S.N. Nayak OFS (Retd.) Shri S.M. Singh, OFS (Retd.) Shri R.C. Parida (ACF Retd.), Shri Partik Mahapatra, M.Tech Biotechnology conducted the study, accompanied by local forest staff including the forest rangers Rairangpur Divisions and Lal Trades and Agencies Pvt. Ltd. Officers. Discussion was also held among these Officers and other stake holders, NGO etc. regarding the project implementation and impact on socio economic structure and mitigative measures to be taken to counter act the impact of project implementation.

Methodology adopted and sampling procedure

The team visited the project area and project impact area on several dates between 11.08.2018 to 20.10. 2018 with other resource personnel such as Mr. Hardaman Singh (Sociologist), Dr. M.R. Lenka (Retd. Reader in Zoology).

A detailed biological study was conducted by Dr. Srustidhar Rout, Dr. Sandeep Panda and other experts from North Orissa University, Baripada along with our team members.

The biological study has encompassed several aspects of present flora and fauna with proper findings and scientific field study. The facts and finding were compared with those recorded in the working plan and conclusion was drawn about the flora and fauna.

perennial Tentua Nadi which constituents the regional drainage system. The confluence point of these seasonal nallahs and Tentua Nadi exists at a distance of 6.5 km from the M.L area.

Impact on Climate

The region undergo three climatic cycles throughout the year. The climate in the area is generally cold in winter between November & February and hot is summer between March and June. The monsoon sets in late June and continues up to September.

Temperature shows the variation between 9^0 C to 44^0 C. Average annual rainfalls in 1250 mm. The south-west monsoon remains from mid-June to mid-September and the area receives more than 80% of the annual rainfall during this period. Relative humidity varies from 10% to 96 %. Predominant wind direction is South- West. Area remains calm for nearly 50% of the year.

Impact on Temperature

Due to change of topography of the project area and subsequently clearance of existing vegetation may result in to minor temperature variation at local level only. However proposed green belt development will moderate the local temperature due to mining and its allied activities.

Impact on Rainfall

During the operation of mine due to proposed enhancement of production, rainfall will not be affected. There will not be any adverse impact on the rainfall pattern in that area.

Impact on Wind Speed

Wind speed depends on the existence of elevation. The area is hilly area. As there will become changes in topography of the area, there may be minor variation at local level.

2.3 Impact on air quality

Impact on air quality due to proposed enhancement of production depends upon the magnitude of extraction of iron ore, transportation and handling of minerals. The intensity of operation is directly related to the rate of production. It is proposed to deploy higher capacity of hydraulic shovel with higher capacity of dumpers.

The opencast mining operation will generate Particulate Matter ($PM_{10,}$ $PM_{2.5}$) Impact on air quality is assessed based on the following

- Due to proposed mining operation & allied activities
- Due to screening and crushing

Table 17 – Air Pollution Impacts

Activities	Impact
Air Pollution	• Drilling • Blasting • Excavation • Ore/OB loading, transportation & unloading • Movement of heavy earth moving machinery • Wind erosion of exposed mine surface, ore stack & OB dumps

Table 18 - Impacts Due To Mining Operations

Activities	Impact
Mining Operation	The opencast mining operation will generate high levels of particulate matter and SO2, NOX, CO due to blasting, and fuel consumption. Potential sources of dust emission are loading/unloading operation iron ore handing at crusher and fugitive emissions from blasting and transportation.
Drilling	When the blast holes are drilled, the cuttings from the holes are flushed out of the holes by passing the compressed air through drill roads and these cuttings are allowed to fall outside by means of blowers. Drilling will be done by wagon drill.
Blasting	Blast hole will be drilled by wagon drill. Power gel explosive of 83 mm dia cartridge will be loaded in to wagon drill holes .Milli second delay detonators will be used. Air pollutants generated during blasting will be in the form of chemical gases and particulate matter.
Transportation of Ore	Blasted material will be transported out of the excavated area by 20 Tons capacity dumpers. Low grade fines being sent to the lessee's beneficiation.
Crushing& Screening Plant	200 TPH crusher, 100 TPH fixed screen, 300 TPH mobile screens, 40 TPH rock breaker exist in the lease are. Particulate Matter will be main sources of air pollution in crushing. Water is used to spray at different transfer points. In screening plant ore will be processed to get two types product Lump Ore & fine Ore. Due to water mixed spraying no generation of dust is envisaged.

Ore Loading	Ore after crushing & screening is sent to stockyard. Lumps and fine ores are stacked separately. Water sprinkling arrangements have been provided so that there will not be any pollution.

Table 19- Impact onland environment

Activities	Impact
Land Environment	The major associated impacts are soil erosion, loss of top soil, change in topography, disposal of wastes. No adverse impact is anticipated in buffer zoe on land use due to proposed mining and its allied activities. There will be only four quarries at the end of mines. During course of mining Narvane, Peak-A and Q-4, Peak-B, Q-3 ostek, Garida and Bapet quarries will be merged in to one quarry similarly Champajharana A &B will be merged into one quarry. Damoda quarry will be developed separately. Plantation on the backfilled area will be carried out.

Impacts due to disposal of overburden-mining operations

The stripping ratio (ore to waste ratio) of the mine is 1:0.408. The sub grade iron ore is either blended with high grade ore or stacked. Thus no reject from iron ore has been considered from this deposit except for the topsoil / overburden.

The topsoil does not exist, hence no top soil management envisaged.

Presently, 6 dumps exist in the lease area. The dumps are protected by providing garland drains, settling ponds and check dams with chain link mesh, there by erosion is avoided.

Table 20 - Impacts on soil

Activities	Impact
Soil	The environmental impact mining activities on top soil departments on the nature of activities, extent of area disturbed and associated aspects of environmental concern. The dust generated during blasting operation loading & unloading , vehicular movement normally constitute heavier particles .that will readily settle on very small areas .This will have no adverse impact on the surrounding areas . Soil erosion may also be accelerated on areas where the over burden will be dumped. There is neither toxic effluent nor solid waste from the mine; quality of soil is not expected. There is no generation of top soil during the scheme period as the target area is devoid any top soil. Thus marginal impact on soil quality is envisaged. The impact of leach atewater from over burden on surface and is not envisaged.

Table 21- Impact on noise environment

Activities	Impact
Noise Environment	• Due to Drilling • Due to Blasting • Due to Excavation & Transportation • Due to Crushing, Screening & Loading Plant • Dispersion from Mine

Table 22 - Impact on ground vibration

Activities	Impact
Ground Vibration	Ground vibrations are not likely to affect the structures in the vicinity of lease area. The core zone has only infrastructure which is away from the mine. These structures will not be affected by ground vibration as they are away from the mine. There is no village or settlement within 7 to 8 km from the periphery of mine area damage due to ground vibration is not expected. Vibration Abatement The blasting operations use deep hole drilling and blasting using delay detonators which are bound to reduce the ground vibrations. Further, the ground vibrations are controlled by using modern shock tubes with delay non-electric (nonel) detonators. The following mitigation measures are followed and will be continued for the proposed expansion also:

Table 23 - Impact on water environment

Activities	Impact
Water Environment	The working mine will encounter the water mainly due to rainfall. As mining activities are carried out in hilly topography the rain water flow will be directed by natural slope of the area and will not cause any inundation of the mining area. The natural topography will facility a proper drainage system in the mine .Proper arrangements are to be provided .So that water finally flows out to natural drain . There will be not be any impact on the ground water resources as there is no ground water tapping for mining &

	its allied activities .The waste water generation in mining process is not envisaged Impact on Water Resources Due to Mining Operations Surface Water Resources Ground Water Resources

Table 24 - Impact on solid waste

Activities	Impact
Solid Waste	Solid Waste which will be generated should be dumped properly with proper drainage facilities otherwise water will be polluted due to siltation & drainage facilities will be affected. Impacts due to disposal of Overburden–Mining Operations Impact on Soil due to Generation of Solid Waste Impacts of Leachate – Overburden Dumps

Table 25 - Impact on occupational health

Activities	Impact
Occupational Health	Different activities associated in mining affects health .The following impacts occur in occupational Health **Drilling**- Exposed to high noise level and dusty environment. Impact on hearing and respiratory **Blasting** – Struck by fly rock, dust environment high noise level, excessive vibration. Impact on physical injury dust related disease (Respiratory). Hearing impairment **Loading** – Stock by rolling big boulder. Impact on equipment damage physical injury **Storage of Lubricants & Chemicals** : Leak & spills ,Impact on fire/explosion
Public Health Implication	Various respirable diseases are cause of concern for public health & settling mining areas due to intensity of dust. Also there is impact due to blasting, noise & vibration

Table 26 - Impacts on biological environment

Activities	Impact
Biological Environment	The total lease area is 129.610 ha. including 10.99 ha. of safety zone. Out of total land 117.84 ha is broken forest land and 0.78 is non forest land **Impact on Flora:** In the existing and proposed mining operations, NOx emissions are mainly due to burning of diesel in mining vehicles. However, the low concentrations

	of NOx due to operation of the proposed mining operations will have insignificant impact on ambient air quality and NOx concentration will remain within the NAAQ standards. Therefore, the impact of these emissions on the surrounding agro-ecosystem is not envisaged. Extensive plantation comprising of pollutant resistant trees is being carried out surrounding the mine site, which will serve not only as pollution sink but also as a noise barrier. It is expected that with the adoption of these mitigatory measures, the impact due to operation of the will be minimal on the terrestrial ecosystem. **Impact on Fauna:** The adverse impacts on fauna would be mainly due to: • Human activity; • Noise; • Land degradation; and • Deforestation. The impact on the fauna of the buffer zone due to the mining activity will be marginal. The fauna is less in occurrence in the study area. Even so, by restricting mining at any time to small areas, impact on fauna will be kept to the minimum. Moreover, progressive plantation with over a period of time will create conditions favourable for fauna.

2.4 Study Techniques adopted and observation of the Experts

The terrestrial and aquatic ecosystems of core and buffer areas were surveyed separately by walking criss crossly. All the species encountered were identified and recorded. Identification of plants was done using different books on flora. Haines, HH, *The Botany of Bihar and Orissa,* Vol I-IV, Government of Bihar & Orissa, 1921-24, Saxena HO & Brahmam M, *The Flora of Orissa.* Vol I-IV, (Regional Research Laboratory, Bhubaneswar), 1994-96. And the dept. of Willdife and Biodiversity Conservation, North Orissa University, Baripada.

Besides this, the medicinal values of plants have been ascertained in consultation of plants with Ambasta (1986), Chopra *et al* (1956, 1968), Jain (1956), Kirtikar and Basu (1935), While the general medicinal uses are screened through the literature, the local vaidyas and tribal values are enumerated by asking the local people.

Phytosociology

In order to assess the baseline status of the flora of the core and the buffer zones, a detailed survey of flora and fauna of the Mine lease area (MLA) and its environs extending up to a radius of 10 km was carried out by the expert team of the University during September, 2018. Phyto sociological study was carried out following Random Quadrate Sampling method.

In order to accommodate maximum representation of different types of plant species, sample plots were laid in selected places in different parts of mining area that contain natural vegetation. Quadrats of 20 m X 20 m (400 squre meters) size were randomly laid to study tree

species. Within these sample plots, sub-plots of 5 m x 5 m were laid down randomly for studying the shrub layer and regeneration of tree species. For information on ground layer including herbaceous species, quadrats of 1 m x 1 m size were laid down randomly.

Quantitative analysis: The primary data recorded by laying quadrats were utilized to derive density, frequency and abundance following standard phyto-sociological methods of Misra (1968). Important Value Index for trees only was estimated following the formula developed by Cottam and Curtis (1956) taking into consideration of relative frequency, relative density and Relative Dominance.

Species diversity indices like Shannon-Wiener Index (H') and Simpson's Index (D) were calculated as per Magurran (1988). Formulae used for various calculations are as given below:

Formulae used for various calculations are:

$$\text{Density (D)} = \frac{\text{Total number of individuals of a species}}{\text{Total number of quadrats studied}} \times 100$$

$$\text{Frequency (F)} = \frac{\text{Number of quadrats of occurrence}}{\text{Total number of quadrats studied.}} \times 100$$

$$\text{Relative Density (RD)} = \frac{\text{Number of individuals of a species}}{\text{Total number of individuals of all species}} \times 100$$

$$\text{Relative Frequency (RF)} = \frac{\text{Number of occurrence of a species}}{\text{Total number of occurrence of all species}} \times 100$$

Species diversity indices like Shannon-Wiener Index (H) and Simpson Index (CD) were calculated as per Magurran (1988) using following formulae:-

Shannon-Wiener Index (H') = $-\sum pi \ ln \ pi$

Simpson index (Cd) = $\sum pi^2$

Where, pi is the proportion of individuals of the ith species; $pi = Ni / N$

Ni is the number of individuals in the i^{th} species and N is the total number of individuals of all species in the stand.

Faunal Diversity

The available fauna in the core and buffer area was enlisted through faunal multi species inventory following line transect method. Literature search (Research article from various journals, publication of Zoological Survey of India, Forest Working Plans and publication of other line departments) on occurrence, distribution and faunal composition was done. Further

the survey was made in confirming availability of potential endemic and or endangered fauna, if reported, and the likely impact due to proposed project.

The information regarding the presence of wild animals was collected from the surrounding areas from various stake holders such as available records (Wildlife offence cases, animals depredation report, sanction orders of compassionate grants etc.) discussion with Forest Department staff and the villagers within the impact zone has been relied upon. Besides availability of animal signs was also taken into consideration. The wildlife habitat has also been studied and analyzed for possible presence of the animals. The Working Plan has also been referred, to collect important information regarding wildlife.

The information was collected to deduce the presence of important wild animals species present in the area, particularly the scheduled animals in the category of Mammals, Birds, Reptiles, amphibians and insects and thereafter the final list has been prepared.

Study and observation:

1. **Experts visited** :

   Shri Gadadhara Mahapatra, IFS (Retd.), Shri Surendra Nath Nayak, OFS (I) (Retd.), Sri K.D. Patel, OFS I (Retd.) Sri Sudhansu Mohan Singh, OFS(I) (Retd.), & Shri Rabi Chandra Parida, ACF (Retd.), Shri Pratik Mahapatra, M.Tech Biotechnology comprised the team, along with the staff of Forest Deptt who visited the Project area as well as impact area.

2.5 Area(s) visited

For the present biological study of Badampahar iron ore mines, Twelve (12) transects for vegetation cover and three (03) transects for fauna study were studied in each site to evaluate the vegetation composition and wildlife status.

The common and dominant species was recorded in the data sheet in order to prepare the inventory for wildlife fauna and flora. The longitude and latitude were recorded from the study site to know the accurate location provided in the table below:

Table 28: Latitude & Longitude for quadrate study

Sl. No.	Latitude & Longitude for quadrate study							
			LATITUDE			LONGITUDE		
	Name of the Site	Elevation	Degree	Minute	Second	Degree	Minute	Second
1	Near Lease area	707	22	04	21.99	86	07	20.14
2	Near Badamahar	423	22	05	07.79	86	07	33.74
3	Dudhijharan	380	22	05	29.77	86	08	01.97

4	Badam Chaunradihi	390	22	05	47.34	86	08	46.48
5	Ashoki	503	22	03	27.15	86	07	30.47
6	Baliaban	442	22	03	13.6	86	05	57.00
7	Ashokihill	384	22	04	11.24	86	06	13.43
8	Tirilidihi	324	22	03	28.24	86	04	11.95
9	Suleipat (Karida)	403	22	06	26.2	86	11	21.7
10	Near Jagannathpur	380	22	07	39.9	86	12	53.5
11	Purunapani	411	22	07	17.59	86	11	06.73
12	Purunapani	410	22	07	29.20	86	11	24.87

Table 29: Latitude & Longitude for transect study

Sl. No.	Name of site	Latitude	Longitude	Land use type
1.	Lease area	22° 04’10.4"N	86°07'21.1"E	Roadside Badampahar RF
2.	Badampahar RF	22° 06’56.7"N	86°12'3.5"E	Buffer Zone
3.	Kasiabeda	22° 03’34.3"N	86°05'45"E	Buffer Zone in Badampahar RF

2.6 Records referred to

- The combined working Plan of Baripada, Rairangpur and Karajia Division from 1995-1996 to 2015-16 by the **Sri A.O.F BAKLA**
- Tiger conservation plan of Similpal Tiger Reserve (2013-14 to 2022-23) by Sri. Anup Nayak.
- “The Deer and Tiger” a study of Wildlife in India by Mr. George B. Schaller.
- The Book of Indian Animals by Mr. S.H. Prater, B.N.H.S
- Indian Birds by Dr. Salim Ali.
- Reptiles of India by J.C. Daniel.
- Flora of Orissa by Saxena & Brahman.

- National Wildlife Action Plan, Govt. of India.
- Wildlife (Protection) Act 1972, amended upto 2006.
- Wildlife wealth of Odisha.
- District Gazetter of Mayurbhanj.
- Orissa, India. Journal Economic and Taxonomic Botany 32(suppl.)
- Basu R. and Mukherjee P. K. 1996. Food Plants of the tribes Pararias of Purulia, West Bengal. Adv. Plant Science 9(2).
- Anonymous 2001. Medicinal plants in Folklores of Orissa and Bihar. C.C.R.U.M., New Delhi.
- Rout, S.D., S.K. Panda, N. Mishra and T. Panda. 2010. Role of tribals in collection of commercial Non- Timber Forest Products in Mayurbhanj District, Orissa. Journal of Studies Tribes and Tribals, ISSN: No.0972-639X

Justification in extrapolation - The information collected from various sources was compiled and the conclusion arrived at. As the recorded information such as man-animal conflict data is based on actual happenings, this was given more importance.

4.2 OTHER INTERVENTIONS

4.2.1 SUPPLY OF ULTRA SONIC SOUND HIGH FREQUENCY ELEPHANT REPELLER:

To wade-away the wild elephants from village area to their habitat forest areas it is proposed to supply 4 units of high frequency ultra-sonic sound elephant repellents to the D.F.O., Rairangpur Division @ Rs. 40,000 each frequency including cost of maintenance Rs. 4,000/- over the plan period, a total cost of Rs. 1.84 lakhs.

4.2.2. ESTABLISHMENT OF BULK MESSING SYSTEM

Whenever the pachyderms come out of their habitat to raid crops etc. into the village area, the first-hand information was given by the villagers to the forest personnel and the said information reaches the forest personnel at a later stage. Hence it is proposed to establish one unit & Bulk Messaging System with the D.F.O., Rairanpur with a capacity of about 1.0lakh messages per month so that the villagers/VSS members/Elephants trackers or any other grass root level forest personnel can pass on the message of location of elephant immediately to all forest personnel including Forest Guards, Foresters, Range Officers, ACFs, D.F.Os, Villagers, VSS Members, Sarpanch, Ward members etc. As a result of which immediate anti-depredation activities can be initiated to handle the situation as early as possible to avoid loss of human life and property. The system is to be established at a total cost of Rs. 2.20 lakhs including the cost of maintenance of Rs. 2000 per year over the entire plan period of 10 years.

4.2.3. PROVISION OF SOLAR STREET LIGHT SYSTEM

The wild elephants avoid lighting systems and to keep away from entering the village area by the elephants, it is proposed to provide 10 nos of Solar Street Light System in 5 strategic villages namely Dudhijharan, Dhangrimuta, Kasiabeda, Kantasola, Tamradih @ 2 nos per each village totalling to 10 nos with maintenance cost of Rs. 5,000 per year (One each at both entrances of the village limits) at a total cost of Rs. 2.50 lakhs (@ Rs. 25,000 each).

4.2.4. PROVISION OF LONG RANGE RECHARGEABLE TORCH LIGHT

As an essential anti-depredation equipment, it is proposed to provide 200 nos of Long Range Rechargeable Flash light torches to be supplied to the villagers/VSS member/ Elephant tracker/ Grass root level forest personnel to be

used during anti-depredation activities @ Rs. 1,000 each. And accordingly a total cost of Rs. 2.0 lakhs is provisioned for the purpose.

4.2.5. **PROVISION OF BEE-BOXES**

It is proposed to set up 20 nos of Bee Boxes alongside the Tatanagar, Badampahar Broad-Gauge Railway line of S.E. Railway as a measure to avoid the pachyderms crossing the railwayline. This will be managed and operated through VSS Members/ Villagers of 5 nos of villages namely Baghdega, Bhandhan, Chhanua & Jhuriguda (Tamradih) alongside the said railway line. The villagers will have also a subsidiary income for them. Each village to have 4 such boxes totalling to 20 nos of boxes. The cost structure is Rs. 3,000 per each box and the total cost for 20 nos of boxes is Rs. 0.60 lakh.

4.2.6. **PROVISION OF SUV FOUR WHEELER VEHICLE FOR ENHANCEMENT OF MOBILITY FOR ANTI-DEPREDATION ACTIVITIES**

In order to have a speedy movement of the striking force to attend to call in time for animal depredation events, Kill/injury etc a speedy moving vehicle is proposed at cost of Rs. 13.00 lakhs along with salary of Driver which will be supplied by the Project proponent to the D.F.O., Rairangpur Forest Division.

4.2.7. **PROVISION OF ANDROID BASED MOBILE HAND SETS.**

To augment the information networks between the anti-depredation striking forces, it is suggested to provide 20 nos of Android based Mobile handsets to the D.F.O., Rairangpur Division by the User Agency M/s Lal Trades Agency (Pvt.) Ltd. @ Rs. 15,000 each and a sum of Rs. 3.00 lakhs is kept for the purpose.

4.2.8. **PROVISION OF GEN SET FOR M&E CELL OF DIVISION OFFICE.**

To augment continuous power supply to the monitoring & Evaluation cell of the Division Office, Rairangpur Forest Division, it is proposed to supply one Kirlostar soundless DG Generator set of 20KW including fitting and fixing charges by the project proponent @ Rs. 2.0 lakhs , and the total cost is Rs. 2.0 lakhs for the same.

4.2.9. **PROVISION OF POL.**

To have immediate smooth function of the anti-depredation activities it is proposed to provide POL on demand by DFO, Rairangpur Forest Division for the anti-depredation speed moving vehicle at a lump sum cost of Rs. 1.0 lakh by the project proponent for one year only.

Financial Forecast

FINANCIAL FORECAST OF ACTIVITIES TO BE IMPLEMENTED BY THE PROJECT PROPONENT IN PROJECT AREA WITHIN THE JURISDICTION OF RAIRANGPUR DIVISION

Sl. No	Interventions	Unit	Rate (in Lakhs)	Amount in lakh
1	Supply of Ultra sonic sound elephant repellent with high frequency including cost of maintenance Rs. 4,000/- over the plan period.	4 units	0.40	1.84
2	Establishing Bulk messaging System for immediate message spreading from field to all grass-root level forest Officials, ROs, ACFs & D.F.O., Rairangpur including the maintenance cost of Rs. 2,000 per year over the plan period	1 unit	2.20	2.20
3	Provision of Solar Street Lighting System in 5 strategic Villages such as Dudhijharan, Dhangrimuta, Kasiabeda, Kantasola, Chakidi @ 2 nos per each village totalling to 10 nos with maintenance cost of Rs. 4,000 per year.	10 nos	0.25	2.50
4	Provision of Long Range Rechargeable Flash Light torches 200 nos to be supplied to the strategic villagers/VSS members/elephants trackers to wade away elephants.	200 nos	0.01	2.00
5	Provision of Bee-Boxes alongside the Tatanagar-Badampahad Broad-gauge of S.E.Railway line through the V.S.S members/Villagers of strategic villages 5 nos such, Baghdega, Bhandhan, Chhanua, Budadar & Rahihigoda to wade away elephants and side by side generating some secondary income to the villagers.	20 nos	0.03	0.60
6	Supply of One SUV for speedy movement protection and anti-depredation activities to the D.F.O., Rairangpur	1 no	13.00	13.00

7	Purchase and supply of Android based Mobile handsets for quick message transmitting and immediate communication.	20 nos	0.15	3.00
8	Provision of one Kirloskar soundless Gen set 20 KW for the monitoring and evaluation cell of Rairangpur Division Office to enable constant power supply	1 no.	2.00	2.00
9	Provision of POL for the anti-depredation speed moving vehicle on lumpsum on demand from DFO, Rairangpur Forest Division			1.00
	Sub-Total			**28.140**
	Add 20% escalation			5.628
	Grand Total			**33.768 Or say 33.77**

(Rupees Thirty Three Lakhs Seventy Seven Thousands only)

For Lal Trades & Agencies (P) Ltd
Authorised Signatory

Divisional Forest officer
- Cum -
Wildlife Warden
Rairangpur Division

ANNUAL WORK PLANS AND ANNUAL OUT LAY STATEMENT OF FINANCIALFORECAST OF ACTIVITIES TO BE UNDERTAKEN OVER 10 YEARS SPAN IN THE PROJECT AREA. (TO BE IMPLEMENTED BY PROJECT PROPONENT, M/s Lal Trades & Agencies Pvt. Ltd).

Sl. No.	Particular of works	1st year (Amount in lakh)	2nd year (Amount in lakh)	3rd year (Amount in lakh)	4th year (Amount in lakh)	5th year (Amount in lakh)	6th year (Amount in lakh)	7th year (Amount in lakh)	8th year (Amount in lakh)	9th year (Amount in lakh)	10th year (Amount in lakh)	Total (Amount in lakh)
1	Supply of 4 nos Ultra sound elephant repeller with high frequency.	1.48	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1.84
2	Establishing Bulk messaging System for immediate message spreading from field to all grass-root level forest Officials, ROs, ACFs & D.F.O., Rairangpur including the maintenance cost of Rs. 1,000 per year over the plan period	2.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	2.20
3	Provision of Solar Street Lighting System in 5 strategic Villages such as Dudhijharan, Dhangrimuta, Kasiabeda, Kantasola, Chakidi @ 2 nos per each village totalling to 10 nos with maintenance cost of Rs. 4,000 per year.	2.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	2.50

Sl. No.	Particular of works	1st year (Amount in lakh)	2nd year (Amount in lakh)	3rd year (Amount in lakh)	4th year (Amount in lakh)	5th year (Amount in lakh)	6th year (Amount in lakh)	7th year (Amount in lakh)	8th year (Amount in lakh)	9th year (Amount in lakh)	10th year (Amount in lakh)	Total (Amount in lakh)
4	Provision of Long Range Rechargeable Flash Light torches 200 nos to be supplied to the strategic villagers/VSS members/elephants trackers to wade away elephants.	2.00										2.00
5	Provision of Bee-Boxes alongside the Tatanagar-BadampahadBroadgauge of S.E.Railway line through the V.S.S members/Villagers of strategic villages 5 nos such, Baghdega, Bhandhan, Chhanua, Budadar & Rahihigoda to wade away elephants and side by side generating some secondary income to the villagers.	0.60										0.60
6	Supply of One SUV for speedy movement protection and antidepredation activities to the D.F.O., Rairangpur	13.00										13.00

Sl. No.	Particular of works	1st year (Amount in lakh)	2nd year (Amount in lakh)	3rd year (Amount in lakh)	4th year (Amount in lakh)	5th year (Amount in lakh)	6th year (Amount in lakh)	7th year (Amount in lakh)	8th year (Amount in lakh)	9th year (Amount in lakh)	10th year (Amount in lakh)	Total (Amount in lakh)
7	Purchase and supply of 20 nos Android based Mobile handsets for quick message transmitting and immediate communication @ Rs. 15,000/- each.	3.00										3.00
8	Provision of one Kirloskar soundless Gen set 20 KW for the monitoring and evaluation cell of Rairangpur Division Office to enable constant power supply	2.00										
9	Provision of POL for the anti-depredation speed moving vehicle on lumpsum on demand from DFO, Rairangpur Forest Division	1.00										
	Sub- Total	**27.15**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**28.14**
	Add 20% wage escalation											**5.628**
	Grand Total											**33.768** **Or Say** **33.77**

(Rupees Thirty Three Lakhs Seventy Seven Thousands only)

For Lal Trades & Agencies (P) Ltd
Authorised Signatory

Divisional Forest officer
- Cum -
Wildlife Warden
Rairangpur Division

CHAPTER-5

INTERVENTIONS TO BE ADOPTED BY THE DIVISIONAL FOREST OFFICER, Rairangpur, IN THE PROJECT IMPACT AREA.

Besides this an action plan aiming at proper distribution of food, water and shelter as far as possible and achieving the desired composition of wild fauna population, **with special reference to Schedule-I fauna and endangered species has been dealt in this chapter.**

Now a days conservation of forests and wildlife need participatory based culture. Unless the local communities who are very much associated with the forest and wildlife since time immemorial are taken into confidence through this participatory based culture, no plan/project can be successful.

Hence while proposing different interventions for protection of forest and wildlife emphasis have been focused on the capacity building of adjoining forest dependent communities and their peripheral developments like Awareness Campaign in this plan.

The different mitigative interventions proposed to mitigate the adverse impact of mining in both the divisions are as under.

5.1 WILDLIFE HABITAT MANAGEMENT

1. Restorative intervention in the habitat:

The Nala flowing inside the forests becomes dry during summer months at most of the sites depriving the available wild fauna from water.

Therefore, habitat management creating a conducive environment for sustenance of wildlife and their proliferation is one of the important strategy in preparing this plan. The following measures for improvement of habitat securing food, water and shelter for the wildlife are suggested at the beginning.

2. Plantation in and around Nala and Swamp area :

In order to have sufficient food and fodder for the wild Elephants it is proposed to have planting of fodder and fruit bearing species like Banyan (*Ficus Benghalensis*), Bamboo (*Dendro calamusstrictus*), Elephant apple (*Dillenia indica*), Mango (*Mangifera*

indica), Kaitha (*Lemonia acidissia*), Kumbhi (*Careya arborea*), Wild Banana (*Musa velutina*), etc. in Badampahad RF. This has to be done near Nala sides and in swamp area with an estimate of 1600 nos of such plants in absolute gaps as per cost norm at ***(Annexure – B1)*** @ Rs. 1,19,209/- per Hectare and fencing at Rs. 284/- per plant(gabion). The total funds allocated for the particular intervention is Rs. 5.736 Lakhs over the period of 10 Years.

5.2 SOIL CONSERVATION MEASURES

1. Construction of Sub-Surfaced dykes :

Artificial recharge of ground water has now been universally recognised as a cost – effective method for augmenting ground water resources. The type of recharge structure suitable for an area depends on various factors such as geology, topography, slope, rainfall pattern and local ground water conditions. The need for artificial recharge, suitability of the subsurface formations and availability of non- committed run-off / surface water sources and the important considerations in selection of sites for implementation of artificial recharge schemes. The primary objective of a subsurface dyke is the creation of a subsurface storage reservoir with suitable recharge conditions and low seepage losses.

Valley shapes and gradients are used for site identification which are present in few numbers around Badampahar RF. Optimally, a valley should be well-defined and wide with a very narrow outlet (bottle necked). This reduces the cost of the structure and makes it possible to have a comparatively large storage volume. This indicates that the gradient of the valley floor should not be high since that would reduce the storage volumes behind a dam of given height.

The limitations on depth of underground construction deem that the unconfined aquifer should be within a shallow to moderate depth (down to 10 m bgl) and has a well-defined impermeable base layer. Such situations occur in hard rock areas and shallow alluvial riverine deposits.

The dyke is ideally constructed across narrow ground water valleys, generally not exceeding 150 to 200 m in width. On the basis of a thorough study of a water table contour map of the area, a narrow ground water valley section where the flow lines tend to converge from up gradient direction, usually coinciding with a surface drainage line, should be identified. The requirement of narrow flow section is usually fulfilled in watersheds in hard rock terrain having rolling topography where relatively narrow depressions separate hard rock spurs.

According to the field study 5 Nos of Sub Surface has been proposed at Rs. 1.00 Lakhs per dyke with a total allocation of Rs. 5.00.

Size of the Sub Surface Dyke

Length	: 20 Mtrs
Width	: 50 mtr
Depth	: 2.0 Mtrs
Depth level	: 0.05 Mtrs
Capacity	: 10 Litres per capita per day (lpcd)

2. Graded Earthen Bunds

Counter Bunding are carried out in many parts in India- notably in Maharashtra, Gujarat, Tamil nadu, Karnataka and Andhra Pradesh.It consists of building earthen embankments across the slope of the land, following the contour as closely as possible. A series of such bunds divide the area into strips and act as barriers to the flow of water, thus reducing the amount and velocity of the runoff.

Bunds area also constructed along field boundaries without reference to contour. These bunds are called peripheral bunds. They serve as fences, and give protection from water and wind erosion in low rainfall areas. They are not suitable in heavy rainfall areas. No cultivation is allowed on the earthen embankments of contour bunds. Therefore under contour bunds an area of about 5 percent is lost under the bunds and is not available for cultivation. Contour bunds can save soils from erosion to the extent of 25 to 162 tones/ hectare annually. It maintains soil fertility and increases water infiltration into the soil considerably,

Since the contour bunds are laid along the contours, they are level bunds.

Bund length: In general, 400 to 500m is the maximum length of bund. The bund retains the runoff and carries it over the distance equal to bund length in one direction. The length of bund should be such that the velocity of water flowing between bunds should be non- erosive.

Bund cross section: The height of bund should provide sufficient storage above the bund to handle the expected runoff. In normal practice sufficient practice is provided to take care of runoff from rains expected in 10 year recurrence interval. The cross section area of the storage space required can be calculated by the following formula

$$\text{Cross section area of storage space} = \frac{[\text{Runoff, cm}] \times [\text{Bund horizontal interval in m}]}{100}$$

The height of bund should permit frees board of about 20% as design depth [after allowing settlement of the ridge.] Specific at bund cross section are given in table:--

Table: specification for bund cross-sections

Depth of soil	Base width 'm'	Top width 'm'	Height 'm'	Side slope
1. Shallow soils [7.5 to 22.55cm]	**2.67**	**0.38**	**0.75**	**1 1/2 : 1**
2. Medium soils [22.5 to 45cm]	**3.12**	**0.6**	**0.85**	**1 1/2 :1**
3. medium deep soil [45 to 90 cm]	**4.25**	**0.6**	**0.9**	**2:01**

Allowable submergence of land: The amount of land submerged due to pending and duration of pending will affect crops. Therefore the level of waste weir and the amount of land to be submerged should be decided by the cropping practice to be followed and the infiltration rate for the soil.

For paddy lands it is desirable to store all the rain water for the use of the plants. Therefore the bunds should be of such dimensions as to permit no runoff. For other crops, the capacity of the bund should be decided by the average consumptive use of the crop proposed and the maximum length of dry period in growing season. The heights of waste weirs should be such that the bunds store just sufficient water to meet requirement of crop.

Critical Length: Another approach in fixing the spacing of bunds by determining the critical length of land between adjacent bunds. Increase in drainage area increases both velocity and amount of runoff gathering in marred channel. But the critical length approach, the attempt is to space bunds in such a way that the velocity remains within non-erosive limit.

"Graded bunds or graded terraces or channel terraces are the bunds or terraces laid along a pre-determined longitudinal grade very near the contour but not exactly along contour".

The graded bunds, commonly used in India are comparable to the narrow base terraces. They are used for the safe, disposal of excess runoff high rainfall areas and regions where the [Clay] soil is relatively impervious. Farming operations are not done on bunds or bund channels.

1. These terraces act primarily as drainage channel to regulate and conduct runoff at non erosive velocity.
2. To make the runoff water to trickle rather than to rush out.

A provision for 2 Kms of Graded Earthen Bunds is kept for preservation of Soil from erosion at a Lump sum cost of Rs. 5.00 Lakhs/ Kms for length of 2 Kms at total cost of Rs. 10.00 Lakhs for the total stretch.

5.3 WILDLIFE PROTECTION AND ANTI-DEPREDATION

a. Engagement of Elephant Trackers

To keep a track of elephant movement and to have speedy action on Elephant depredation activities it is proposed to engage 1 Nos. of elephant Tracker @ Rs. 9244.70 each month for 10 Years over the Plan period. The total costs laid out is Rs. 11.094 Lakhs over a period of 10 years. ***(Annexure – B2)***

b. Fencing of Unguarded open wells to prevent elephants and their cubs being trapped has been planned at a cost of Rs. 20,000/- each well in 10 Nos. of strategic locations of such open and unguarded wells in and around the project and project impact area. The net cost allocated for the same according to a Lumpsum basis is Rs. 2 Lakhs over a span of 10 years.

5.4 PREVENTION OF FOREST FIRE

Fire Protection: The fire protection is the most important aspect of forest protection and improvement of habitat. Almost all forest areas being surrounded by human habitations, due to shifting cultivation get burnt repeatedly during summer.

Fire is the most devastating agent for degradation of habitats. It is therefore, proposed to take up fire protection with right earnest. Prior to fire season, the V.S.S and Gram sabha including some revenue villages located and the forest fringe will have to be taken into confidence through awareness programmes and incentives to assist in prevention of forest fire.

Provision of fire blowers:

It is proposed to purchase required nos. of fire blowers as, a modern instrument in extinguishing forest fire and laying out fire lines inside forests in addition to conventional fire fighting tools. Purchase of fire fighting equipments – Fire Blowers specifically 10 Nos. at the cost of Rs. 60,000/- per blower has been suggested with a total financial outlay of Rs. 6.00 Lakhs over the span of 10 Years.

5.5 LOGISTICS SUPPORT

Awareness campaign : The first step could be to sensitize the local community particularly, the young ones in all the villages and hamlets located in Zone of Influence about the need for preservation of wild life and its habitat. They should be taught why to save forests from wild fire, encroachment and shifting cultivation, grazing. Besides discussion in Gram sabha meetings individual contact and motivation is to be done by local staff and wildlife protection squad to spread awareness. They can move in batches covering all the villages in a phased manner and evaluate response over a period of time.

Awareness through posters, street play, competition among students, film shows etc. can also be under taken. All important conservation events like Vanamahostav wild life week, world forestry day, world environment day etc. should be celebrated in each village and knowledgeable persons on the subjects be invited to interact with the communities.

It is proposed to have such awareness campaign in the peripheral villages within the Project and Project Impact area in 5 Villages per annum over the period of 10 years at a cost of Rs. 10,000/- each village calls for a net outlay of Rs. 5.00 Lakhs.

5.6 HOARDINGS AND SIGNBOARDS

- To make the general public aware of the presence of Wildlife it is proposed to put up Hoardings and Signboards on the internal road within the Impact Zone where wildlife and specially elephant movements are there. There is a lumpsum allocation of Rs. 1.00 Lakhs to carry out such activity over a plan period of 10 Years

5.7 MONITORING, EVALUATION MECHANISM RESEARCH AND TRAINING

A monitoring cell is proposed to be created at the Division Headquarters under the supervision of Head quarter Assistant Conservator of forests working in the Division. To begin with base line data on the following aspects will be collected through the Range Staff. The efficacy of the management proposed in this Plan will be assessed continuously through systematic observation of the changes, which will be recorded.

i) Vegetation indices.

ii) Sign survey of herbivores and carnivores at half yearly intervals on fixed line transects.

iii) Forest Fire

iv) Incidents of killing of animals and human being, crop and house damages, removal of timber from forest, habitat destruction and straying of animals into habitation etc.

v) Water flow regime and quality information will be collected from the environmental monitoring cell which will function at the Project Site.

vi) Organization of short capsule course, in which experts will be invited in relevant fields and shall impart training to the Foresters/Forest Guard/VSS member and protection squad regarding, fire fighting, census of animals and other protection aspects.

It is proposed have monitoring and evaluation to evaluate the outcome of this Management plan. Criteria and indicators for monitoring the outcome of the plan in terms of Improvement/restoration of habitat and reduction in Human-wild life conflict: Three criteria's as detailed below are to be followed:

i) Incident and Extent of Fire (Indication of frequency and area burnt).

ii) Grazing Pressure (No. of Cattle being grazed in the area). ***(Annexure XI – Cattle Population of Mayurbhanj District))***

iii) Illegal felling (No. of incident/cases) Base line data should be collected in the first year of implementation of the Programme in a format.

Bio-diversity studies/Bench mark surveys: Study and monitoring the execution of the proposed plan is done by resource personnel to assess the fruitfulness of the plan and to suggest any change, if necessary. GIS based maps, satellite maps on GIS domain is procured to know

the changing profile of the area in both dry and rainy seasons past years. The GIS lab along with resource personnel of office of the Principal CCF (WL), Odisha will render necessary assistance in the matter.

Inter-departmental co-ordination : Various Departments like Agriculture, Horticulture, Soil Conservation, Tribal Welfare, Rural Development, Education, Health and Family Wellfare, Community Development, Pachayat Raj etc. are working in the zone of influence. Effective cross-sectoral coordination is required for synergy among various departments operating in the area. A District level Coordination Committee (DCC) under the Chairmanship of District Collector is already in existence. Implementation of various developmental activities as suggested in this plan, relating to departments like Veterinary, Health, Horticulture Small Industries etc. should be reviewed in the DCC and appropriate measures taken for success of the programmes. The DFO of concerned division will take appropriate initiative in this regard.

Plan Period: The Plan has been prepared for a period of 10 years. Interim revision may be taken up after assessing the result of evaluation done through the monitoring cell. M/s Lal Trades and Agencies Pvt. Ltd. Will undertake to prepare subsequent plans in continuation to this plan one year before expiry of the subsisting plan.

FINANCIAL FORECAST OF THE INTERVENTIONS FOR THE PROJECT IMPACT AREA OF Badampahar Iron Ore Mines of M/s Lal Trades and Agencies Pvt. Ltd. to be implemented by DFO in Rairangpur Forest Division.

Sl. No	Interventions	Unit	Rate (in Rs.)	Amount in lakh
	Habitat Improvement			
1	Plantation in Badampahar RF at small rivulets and Nala side swamp area - 1600 nos plants of Elephant fruit and fodder species in absolute gaps @ Rs.74.50/- per plant alongwith gabions @ Rs. 284/- per plant	1600	358.50	5.736
2	**Soil conservation measures** a. Construction of Sub – Surface Dyke (Size-20m*50m*2m) in Badampahar RF @ Rs. 1.0 Lakhs per unit.	5	1,00,000	5.00
	b. Graded Earthen Bunds in Badampahar RF for 2 Kms stretch @ Rs. 5.00 Lakhs per Kms.	2	5,00,000	10.00
6	**Protection**			
	a.Engagement of 1 Nos. of Elephant Tracker @ Rs. 9,244.70/- per head per month for 10 years	1 no.	11,09,400	11.094
	b.Fencing of Unguarded open wells 10 Nos. @ Rs. 20,000/- each	10 nos	20,000	2.000
	Fire protection			
	a. Fire fighting equipments with 10 nos. blowers @ 60,000 each	10 no.	60,000	6.000
	Logistic Support			
9	Awareness Campaign for 5 Villages per annum @ Rs. 10,000/- per village	50 Nos	10,000	5.000
10	Hoardings and Signboards	L.S.		1.000
15	Monitoring and Evaluation		LS	2.000
	Total			**47.83**
	Add 20%			**9.566**
	Grand Total			**57.396** **Or** **57.40**

(Rupees Fifty Seven Lakhs Forty Thousands only)

For Lal Trades & Agencies (P) Ltd
Authorised Signatory

Divisional Forest officer
- Cum -
Wildlife Warden
Rairangpur Division

ANNUAL WORK PLANS AND ANNUAL OUT LAY STATEMENT OF FINANCIALFORECAST OF ACTIVITIES TO BE UNDERTAKEN OVER 10 YEARS SPAN IN THE PROJECT AREA. (TO BE IMPLEMENTED BY DFO, Rairangpur)

Sl. No.	Particular of works	1st year (Amount in lakh)	2nd year (Amount in lakh)	3rd year (Amount in lakh)	4th year (Amount in lakh)	5th year (Amount in lakh)	6th year (Amount in lakh)	7th year (Amount in lakh)	8th year (Amount in lakh)	9th year (Amount in lakh)	10th year (Amount in lakh)	Total (Amount in lakh)
1	Plantation in Badampahar RF at small rivulets and Nala side swamp area - 1600 nos plants of Elephant fruit and fodder species in absolute gaps @ Rs.61.29/- per plant alongwith gabions @ Rs. 284/- per plant	5.023	0.342	0.091	0.04	0.04	0.04	0.04	0.04	0.04	0.04	5.736
2	Construction of Sub – Surface Dyke (Size-20m*50m*2m) in Badampahar RF @ Rs. 1.0 Lakhs per unit.	2.50	2.50	0	0	0	0	0	0	0	0	5.00
3	Graded Earthen Bunds in Badampahar RF for 2 Kms stretch @ Rs. 5.00 Lakhs per Kms.	5.0	5.0	0	0	0	0	0	0	0	0	10.00
4	Engagement of 1 Nos. of Elephant Tracker @ Rs. 9,244.70/- per head per month for 10 years	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.10	1.10	11.094

Sl. No.	Particular of works	1st year (Amount in lakh)	2nd year (Amount in lakh)	3rd year (Amount in lakh)	4th year (Amount in lakh)	5th year (Amount in lakh)	6th year (Amount in lakh)	7th year (Amount in lakh)	8th year (Amount in lakh)	9th year (Amount in lakh)	10th year (Amount in lakh)	Total (Amount in lakh)
5	Fencing of Unguarded open wells 10 Nos. @ Rs. 20,000/- each	2.00	0	0	0	0	0	0	0	0	0	2.00
6	Fire fighting equipments with 10 nos. blowers @ 60,000 each	6.00										6.00
7	Awareness Campaign for 5 Villages per annum @ Rs. 10,000/- per village	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	5.00
8	Hoardings and Signboards	1.00										1.00
9	Monitoring and Evaluation	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	2.00
	Sub- Total	**23.337**	**9.652**	**1.901**	**1.85**	**1.85**	**1.85**	**1.85**	**1.85**	**1.84**	**1.85**	**47.83**
	Add 20% wage escalation											**9.566**
	Grand Total											**57.396** **Or** **57.40**

(Rupees Fifty Seven Lakhs Forty Thousands only)

For Lal Trades & Agencies (P) Ltd

Authorised Signatory

Divisional Forest officer
- Cum -
Wildlife Warden
Rairangpur Division

CUMULATIVE TOTAL OF FINANCIAL FORECAST OF ACTIVITIES TO BE UNDERTAKEN IN RAIRANGPUR FOREST DIVISION

A	FINANCIAL FORECAST OF ACTIVITIES TO BE IMPLEMENTED BY THE PROJECT PROPONENT IN PROJECT AREA			
Sl. No	**Interventions**	**Unit**	**Rate (in Lakhs)**	**Amount in lakh**
1	Supply of Ultra sonic sound elephant repellent with high frequency including cost of maintenance Rs. 4,000/- over the plan period.	4 units	0.40	1.84
2	Establishing Bulk messaging System for immediate message spreading from field to all grass-root level forest Officials, ROs, ACFs & D.F.O., Rairangpur including the maintenance cost of Rs. 2,000 per year over the plan period	1 unit	2.20	2.20
3	Provision of Solar Street Lighting System in 5 strategic Villages such as Dudhijharan, Dhangrimuta, Kasiabeda, Kantasola, Chakidi @ 2 nos per each village totalling to 10 nos with maintenance cost of Rs. 4,000 per year.	10 nos	0.25	2.50
4	Provision of Long Range Rechargeable Flash Light torches 200 nos to be supplied to the strategic villagers/VSS members/elephants trackers to wade away elephants.	200 nos	0.01	2.00
5	Provision of Bee-Boxes alongside the Tatanagar-BadampahadBroadgauge of S.E.Railway line through the V.S.S members/Villagers of strategic villages 5 nos such, Baghdega, Bhandhan, Chhanua, Budadar & Rahihigoda to wade away elephants and side by side generating some secondary income to the villagers.	20 nos	0.03	0.60
6	Supply of One SUV for speedy movement protection and anti-depredation activities to the D.F.O., Rairangpur	1 no	13.00	13.00
7	Purchase and supply of Android based Mobile handsets for quick message transmitting and immediate communication.	20 nos	0.15	3.00
8	Provision of one Kirloskar soundless Gen set 20 KW for the monitoring and evaluation cell of Rairangpur Division Office to enable constant power supply	1 no.	2.00	2.00

9	Provision of POL for the anti-depredation speed moving vehicle on lumpsum on demand from DFO, Rairangpur Forest Division for first one year			1.00
	Sub-Total			**28.140**
	Add 20% wage escalation			5.628
	Grand Total			**33.768 Or say 33.77**

(Rupees Thirty Three Lakhs Seventy Seven Thousands only)

B	**FINANCIAL FORECAST OF THE INTERVENTIONS FOR THE PROJECT IMPACT AREA OF Badampahar to be implemented by DFO in Rairangpur Forest Division.**			
Sl. No	**Interventions**	**Unit**	**Rate (in Rs.)**	**Amount in lakh**
	Habitat Improvement			
1	Plantation in Badampahar RF at small rivulets and Nala side swamp area - 1600 nos plants of Elephant fruit and fodder species in absolute gaps @ Rs.74.50/- per plant alongwith gabions @ Rs. 284/- per plant	1600	358.50	5.736
2	**Soil conservation measures**	5	1,00,000	5.00
	c. Construction of Sub – Surface Dyke (Size- 20m*50m*2m) in Badampahar RF @ Rs. 1.0 Lakhs per unit.			
	d. Graded Earthen Bunds in Badampahar RF for 2 Kms stretch @ Rs. 5.00 Lakhs per Kms.	2	5,00,000	10.00
6	**Protection**			
	c.Engagement of 1 Nos. of Elephant Tracker @ Rs. 9,244.70/- per head per month for 10 years	1 no.	11,09,400	11.094
	d. Fencing of Unguarded open wells 10 Nos. @ Rs. 20,000/- each	10 nos	20,000	2.000
	Fire protection			
	b. Fire fighting equipments with 10 nos. blowers @ 60,000 each	10 no.	60,000	6.000
	Logistic Support			

(Rupees Fifty Seven Lakhs Fourteen Thousands only)

9	Awareness Campaign for 5 Villages per annum @ Rs. 10,000/- per village	50 Nos	10,000	5.000
10	Hoardings and Signboards	L.S.		1.000
15	Monitoring and Evaluation		LS	2.000
	Total			**47.83**
	Add 20%			**9.566**
	Grand Total			**57.40**

ABSTRACT

CUMULATIVE TOTAL OF FINANCIAL FORECAST OF ACTIVITIES TO BE UNDERTAKEN IN RAIRANGPUR FOREST DIVISION GRAND TOTAL (A+B)		
PROJECT AREA	**33.77**	**91.16**
PROJECT IMPACT AREA	**57.40**	

(Rupees Ninety One Lakhs Sixteen Thousands Only)

For Lal Trades & Agencies (P) Ltd
Authorised Signatory

Divisional Forest officer
- Cum -
Wildlife Warden
Rairangpur Division