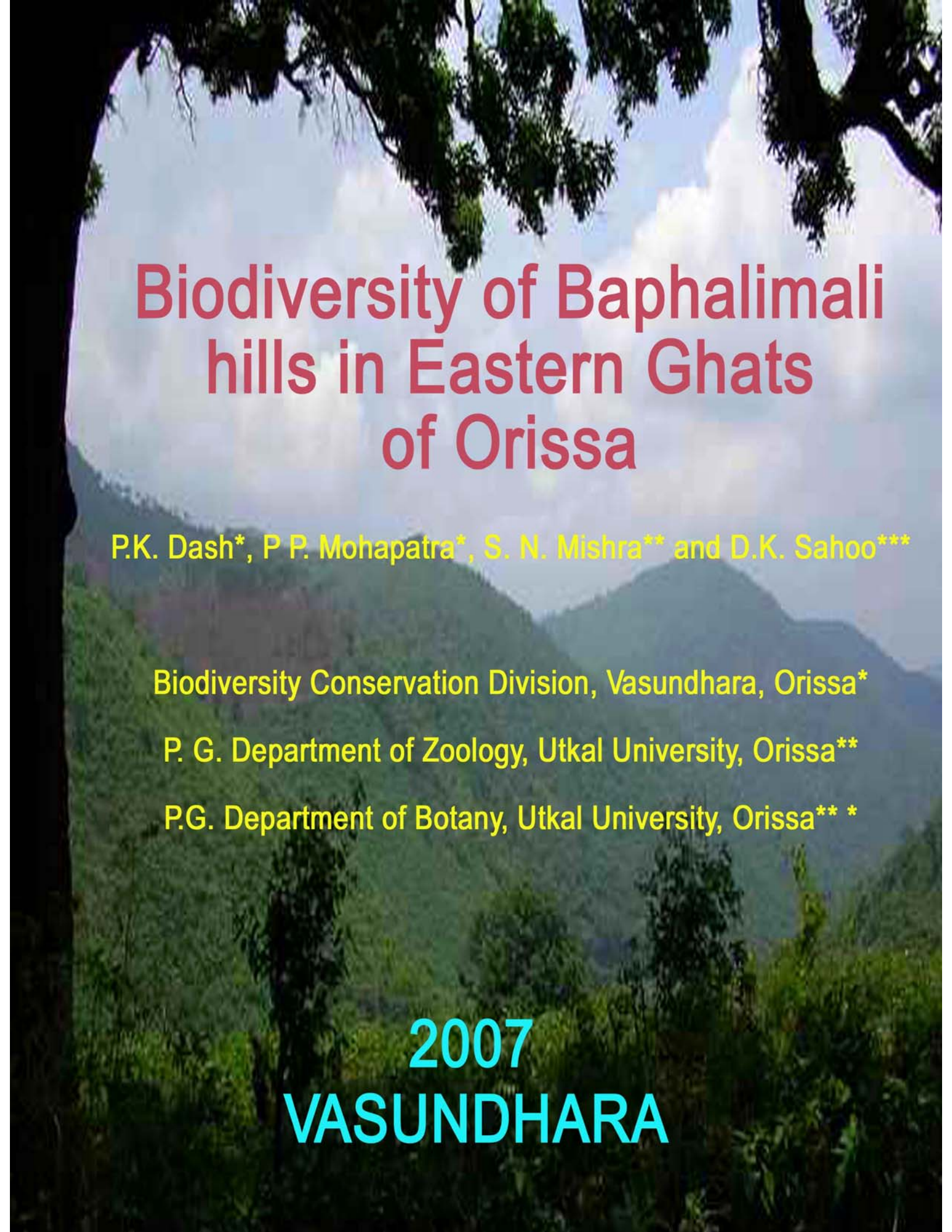

Biodiversity of Baphalimali hills in Eastern Ghats of Orissa

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Abstract

The floral diversity of Baphlimali hills consists of 200 plant species including 8 species of rare, threatened and conservation dependent plant species. Other salient feature of the study includes more than 40 species of medicinal plants and 12 species of Pteridophytes of medicinal importance, 32 species of orchids, 8 species of Bryophytes, 10 species of Fungi, 8 species of Lichens and 10 species of algae. The ethno-botanical data in respect of 40 plant species were collected and compiled deserve merit as it provides new sources of herbal drugs/ edible plants or other aspects of plant utilization, which may serve as guide to the practitioners of Ayurvedic / Unani medicines. Similarly the faunal diversity of the hills consists of 21 species of mammals, 12 species of amphibians, 30 species of reptiles, 12 species of herpetofauna and 15 species of birds. The plant species diversity varies between 2.79 and 3.36 during the study period. The importance value index varies between 1.77 and 81.61. The highest Importance value index of studied plants in study area recorded in Udri (81.61) for studied vegetation and lowest IVI recorded in location of Udri (1.77) during study period. There are some important cultural/religious and ritual sites present in the study area includes 4 caves, one shrine for ancestor worship and one historical monument which the tribal are worshiping.

Introduction

Baphlaimali is situated in the southwestern part of Orissa, falls in the Eastern Ghats of India between 19° 18’ to 19° 22’ N longitude and 82° 56’ to 82° 59’ E latitude and comes under Rayagada and Koraput districts of Orissa. The major part of the hill falls under Kashipur block of Rayagada district and the rest in the Kalahandi district. Baphlimali is among the rich bauxite deposit mines in the Eastern ghat, came in to limelight in 1977 by the publication of GSI report and is taken up by MECL for bauxite extraction. The highest peak of the hill is 1056 m above msl which provides a variety of habitat for flora and fauna of both South and North Indian elements. The forest type constitutes of dry mixed deciduous forest, patchy bamboo thickets, degraded forest, agricultural slops and shrub forest. The slopes of the hill is encroached and cultivated by different crops, legumes, oil seeds, pulses etc by the local villagers. There are no surface water bodies on the top of the platue, but many of the hill streams are originated from the

top storey of the hill. Apart from the perennial hill streams there are many rainfed water channels descend from the hill. The hill “Baphlaimali” is surrounded by the villages like Udri, Kendumundi, Chirka, Durmusi etc. in three sides and Indravati irrigation project on other side. Keeping in view of the above importance, the study was under taken to document the biodiversity of the hills.

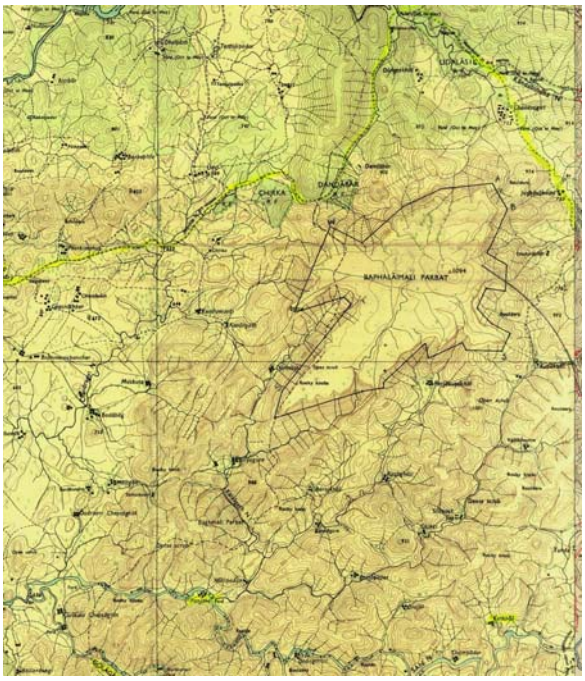
The survey was carried out with the following objectives

1. To assess the biodiversity of the area
2. To survey the ecologically sensitive plants and animals of the area
3. To find out any migratory route of mega fauna in the area
4. To observe the community interest in protecting the area

The survey was done in two phases for seven days to record the biodiversity of the Baphlimali area. We set our base camp at “Mukta Vidyalaya”, Udri. During the first phase of our survey we covered the lower areas of Baphlaimali near the village Udri, Chirka, Kendumundi and Durmusi. We tracked near hill streams to observe the rich biodiversity of the area. The GPS locations of the origin of the hill streams were recorded.

1. Survey by searching and sighting the animals and plants near hill streams and in forest routes.
2. Indirect evidences were observed like scat, scars and moulted skins of animals for identification.
3. By searching the caves for the cave dwelling animals and arboreal animals like bats.
4. Amphibians, reptiles and nocturnal animals were searched by locating their calls during night time.
5. Photo documentation of the biodiversity of the region.
6. Data was also collected from the secondary information sources by taking interviews of the older and experienced people of the adjacent villages.

Study area



Methodology

Though it was impossible to do a comprehensive biodiversity assessment of Baphlimali in a short span of time and limited resources, we took a fervent step to cover as much area as possible. We did random sampling across different forest pockets of the hill through transact walk and documented the flora and fauna along the line transact. The inventory was carried out in the following methods

1. Compilation of secondary data with respect to the study area from published literature and Government agencies
2. Generation of primary data by undertaking systematic ecological studies in the area
3. Searching and sighting the animals in the forest areas
4. Searching of caves, water holes, den sites and indirect evidences in the forest with local community for both primary and secondary sources of wildlife in the area,
5. For smaller animals field methods like lifting of stones, litters, tree holes, tree climbing etc were adopted when ever necessary.
6. Night surveys were conducted to document the nocturnal animals
7. Photo documentation of the flora and fauna both in diurnal in the natural habitats.

8. Collection of secondary information by interacting with the local community
9. Meeting with the forest staffs, where ever possible, to discuss the presence and movement of wildlife of the area
10. Identification of the bioresourses from experts of different national institutes.

Results and discussion

Baphlimali Mine Lease Area

Baphlimali deposit falls in the Survey of India Toposheet-651/15 and is bound by latitides 19^{o} 18N to 19^{o} 22N and latitudes 82^{o} 56E to 82^{o} 59E. The deposit is at the boundary of Rayagada and Kalhandi districts of Orissa, 90% of its falls in the Kashipur block of Rayagada district and the rest in Kalahandi district.

The Baphlimali hill forms a part of the Eastern Ghats belt in the peninsular shield. The Eastern Ghats extend from Central Orissa bounded by River Mahanadi in north to river Godavari in A.P in the south,running all along the coast. The potential of east coast bauxite deposits, which is a part of the eastern ghats came to light in 1977 by the publication of GSI report detailed exploration was taken up at Baphlimali by MECL as part of four year scheme on behalf of Govt. of India

Physiography & Mining lease area

Bauxite occurs on the plateau top as a blanket deposit. The plateau is oveal shaped. The plateau rises from surrounding valleys distinctly by about 200 m. It is generally flat on top with elevation varying from 990m to 1093 m above Mean Sea Level (MSL). The plateau is surrounded by on all three sides by high hill ranges and on the west overlooks the plains of jayapatna.

Drainage pattern

The run-off of rain water from the plateau top mainly flows southwards as the general slope of central part and southern part is towards south drainge from northern part of plateau is towards north North and east and from western part of plateau if flows westward. Apart farom the surface run-off, springs originating from the foot of the hill and other hills mainly join the Khandabind nallla about 6 km from away to the north and San river about 7 km away to the south.

Vegetation of the study area

The flora of the hill range exhibits a rich assemblage of plant species owing to its diversified topography with high mountain peak and the valleys with perennial hill streams. The vegetation of the hill range falls under the category of tropical deciduous forests but depending on the biotic and abiotic factors, the vegetation of the region can be divided into the following distinct types.

Dry deciduous mixed forest

The forest cover at foothills and some parts of the hill slopes of Baphlaimali are occupied by dry deciduous type of vegetation. Sal (*Shorea robusta*) and *Terminalia tormentosa* grows at lower elevation as dominant species along with the other tree species like, *Dalbergia latifolia, Adenia cordifolia, Gmelina arborea, Schleichra trijuga, Brassica latifolia, Diospyros melanxylon, Michelia champaka, Anogeissus latifolia, Mangifera indica, Terminalia arjuna, Pongamia pinnata*. The shrubs like *Helecteres ixora, Holarrhena antidysenterica, Lagerostroemia parviflora, Indigofera cassoides, Toddalia asiatica, Woodfordia fruticosa* are commonly encounter in the middle storey. The ground cover consists the under shrub or herbs like *Ageratum conyzoides, Andrographis paniculata, Cassia tora, Desmodium pulchellum, Petalidium barlerioides, Rungia pectinata* and *Sida cordata* with many grass species.

Moist peninsular Sal forest

The forest sub type occupies dominantly in the north-west and south west of hill range up to an elevation of 500 m above mean sea level. This forest is characteristically composed of more than 60 per-cent of Sal coverage; however the establishment of regeneration becomes difficult due to influence of biotic interference such as forest fire & shifting cultivation. High-level Sal is also found in the higher elevation and hill plateau above 800 m from MSL with stunted growth and poor quality. This condition has resulted in the formation of open areas with vast tract of grass land on the hill top which indicates the retrogression of the sub type.

Shrub woodland

The foothill and other exposed dry areas near Udri, Kendumundi and Dumsari area are under this type of vegetation. The under growth contains shrubby, spiny and unpalatable species such as *Cipadessa baccifera, Flacourtia indica, Lantana camara.*

Mimosa rubicaulis, Woodfordia fruticosa, Ziziphus oenoplia and few others. *Cuscuta reflexa* and *Cassytha filiformis* form tangled mass among the shrubs at few places.

Grass land

On the top of Baphlaimali, more than 400 acres of land is clothed with grassland interspersed with stunted trees and shrubs. The dominant plant community in the grassland is *Cymbopogon martinii* which occurs in association with other species like *Themeda laxa, T. arundinacea, Phoenix acaulis, Stachytarpheta indica, Eusteralis stellata, Tephrosia roxburghiana, Exacum perottetii, Bidens pilosa,* etc. Few stunted trees like *Shorea robusta, Buchanania lanzan, Syzygium cumini, Phyllanthus emblica* are found sporadically. The forest patch at the foot hill of Baphlaimali is a contiguous path with the Thuamul- Rampur forest Block and Karlapat Sanctuary of Kalahandi district.

Aquatic Vegetation

The fresh water aquatic plants recorded in the study area include the floating, submerged as well as the species of swampy and marshy habitats. The important floating species are *Nelumbo nucifera, Euryale ferox, Nymphaea nouchali, Aeschynomene aspera, Nepuntia oleracea, Ludwigia adscens, Nymphoides hydrophylla, Utricularia spp, Eichhornia crassipes, Pistia stratiodes, Lemma perpusilla, Spirodela polyrhiza, Sagittaria guayenensis* and *Aponogeton crispus.*The dominant submerged species found here are *Meriophyllum tetrandrum, Ceratophyllum demersum, Halophila ovalis, Hydrilla verticillata, Ottelia alismoides, Vallisnaria natans, Najas foveolata, Ruppia maritina* and *Potomogeton crispus.* Similarly significant species of swampy and marshy habitats include *Ammania baccifera, Ludwigia octovalvis, Coldenia procumbens, Ipomea*

Floristic Richness

Cryptogamic Vegetation:

The area shows many algae, fungi, bryophytes and ferns. Algae are present in aquatic bodies or in marshy places. Fungi, particularly from ascomycetes and basidiomycetes are located on ground or epiphytically. Lichens of crustose, foliose and fruticose types are present on different substrates such as tree trunks (Lichens, Ascomycetes and Basidiomycetes could be observed near hilly terrain). Bryophytes occur in wet areas and occasionally on barks of trees and old walls of houses. The commonly observed bryophytes in this area are *Funaria hygrometrica* and *Bryum argentium*. In total 7 species of Bryophytes were collected and identified during the field survey. This

includes *Conocephalum conieum, Dumortiera hirsute, Asterella angusta, Marchantia linearis, Marchantia palmate, Bryum argentium, Herpeteneuron toccoi*. Fern flora of the study area is insignificant. The aquatic weeds *Hydrilla sp ,Chara sp,* and *Salvinia* were observed in small ponds in agricultural fields. The algal flora of the study area include 10 species such as *Spirogyra proticalis, Stigeodonium sps., Batrachospermum sp., Ulothrix sps., Nostoc sp., Anabaena sp., Hydrodyctyon sp., Pithophora sps., Zygnema sp, Oedogonium sp.* The pteridophytic flora consists of 12 species and all are used for traditional medicines by the villagers residing in and around the study area for different ailments and diseases (Table-1). The lichen flora consists of 2 species i.e. *Parmellia sulctata* and *Parmelia saxitilis.*

Ethno botanical status:

The medicinal plants of the study area includes *Acanthospermum hispidum, Acanthus maderapatensis, Acyranthus aspera, Aderostoma larenia, Ageratum conyzoides, Anaphalis Adnata, Asparagus recemosus, Begunia picta, Bidens pilosa, Blumia aromatica, Blumia fistulosa, Blumia virens, Caesulia axilaris, Centella asiatica, Centipeda minima, Chirita homosa, Dilennia pentagyna, Drucera peltata, Gloriosa superba, Gynura nitida, Helictres ixora, Ipomoea quaroclit, Justicia diffussum, Justicia* sp., *Justicia*sp., *Laggera alata, Melastroma malabathricum, Phonex acualis Polygonum serpentine, Pterispermum acerifolium, Raphidophora gluaca, Rauolfia serpentine, Sida cordifolia, Smilex macrophyll, Tridex procumbens, Vernonia anthelmintica, Vernonia cinerea, Woundfodia fructicosa, Xanthium indicum,*

Table 1: Medically important Pteridophytes of Baphlimali

Sl. no.	Pteridophyte species	Parts used	Used for
1	*Diplazium esculantum*	Root paste	Skin disease
2	*Tectoria licutaria*	Root paste	Antiseptic
3	*Lepicerus nudus*	Root paste	Dysentery and vomiting
4	*Blechnum orientale*	Leaf	Fever
5	*Lygodium cernum*	Leaf paste	To suppress boils
6	*Lygodium fuxuosum*	Leaf	Stomach disorder
7	*Selaginella lepanda*	Whole plant	Antifungal
8	*Pteris quadriaurita*	Leaf paste	Antiseptic
9	*Thelypteris nudatum*	Root juice	Vomiting
10	*Thelypteris auduatum*	Leaf juice	Headache
11	*Adiatum philippensis*	Stem	Epilepsy
12	*Pteridium aquilinum*	Leaf juice	Snakebite

Plant Diversity:

Species diversity is a statistical abstraction with two components. These are the number of species or richness and evenness or equitability. For better understanding of plant diversity, the Shannon-Weaver index of diversity was used. The index considers two important characters of vegetation, *i.e.* floristic richness and proportional abundance of the species. Diversity index is increases with the floral spectra (more species means that more wide species diversity) that show that undisturbed scenario of ecosystem. The species diversity varies between 2.79 and 3.36 in studied population during period. The highest species diverisy was recorded Chandragiri area and lowest in Gopinathpur for herbaceous vegetation and in case of Perennial vegetation it varies between 2.85 and 3.29 (Table 2)

Table 2 Species diversity index of plant species in different study sites of Baphlimali

Location	**Diversity Index**
Herbaceous vegetation	
Near Village Gopinathpur	2.79
Near Village Chandragiri	3.36
Near Village Udri	2.85
Near Village Malegaon	2.86
Near Village Gopinathpur	3.05
Near Village Chandragiri	2.85
Near Village Udri	3.21
Near Village Malegaon	3.29

Phytosociological Studies:

Phytosociological studies were carried out by using least count quadrat method. Trees and shrubs were sampled by taking quadrates of $100m^2$ and in case of herbaceous vegetation by taking of 1 m^2 quadrates distributed randomly. Their girths (GBH at 132 cm from the ground) were recorded. The data obtained was further used to estimate Relative Frequency, Relative Density, Relative Basal area and calculation of Importance Value Index (IVI).

Importance Value Index:

The Importance Value Index (IVI) is a statistical quantity which gives an overall picture of the importance of the species in the vegetative community. It considers the relative values of density, frequency and basal area of every species in a given area. It

thus incorporates three important parameters which are measures of diversity and productivity of every species. In any community structure, the quantitative value of each of the frequency, density and basal area and basal cover has its own importance. But the total picture of ecological importance cannot be obtained by one of these vegetation structure in respect to varying environmental factors can also be studied through such study of basal area, density and frequency of the community. The Importance value index as such, gives the total picture of sociological structure of species in a community but it does not give the dimension or share of relative values of frequency, density and dominance. The dominant plant species observed in all sampling locations are *Shorea robusta, Adina cordifolia, Emblica officinalis, Anogeisuus latifolia, Albizia procera* and *Terminalia bellerica,Abutilon indicum, Cassia occidentalis,Andrographis paniculata, Azadirachta indica* from perennial and herbaceous populations. The importance value index varies between 1.77 and 81.61. The highest Importance value index of studied plants in study area recorded in Udri (81.61) for studied vegetation and lowest IVI recorded in location of Udri (1.77) during study period. The details of IVI are presented in **Table 3**

Table 3 Important value index of the study area

Location	Range of IVI	Highest IVI	Lowest IVI
Herbaceous vegetation			
Near Village Gopinathpur	2.46-40.04	*Crotalaria seceia*	*Tilia sp*
Near Village Chandragiri	2.53-47.15	*Zizyphus rotundifilia*	*Rungia repens*
Near Village Udri	2.51-81.61	*Rungia repens* and *Crotalaria*	*Cassia tora*
Near Village Malegaon	2.67-74.54	*Tephrosia purpuria*	*Tephrosia purpuria*
Near Village Gopinathpur	7.33-44.83	*Shorea robusta*	*Anogeissus latiflolia*
Near Village Chandragiri	3.41-36.76	*Shorea robusta*	*Lagestromia parviflora*
Near Village Udri	1.77-39.06	*Shorea robusta*	*Eugenia jumbolina*
Near Village Malegaon	4.88-38.33	*Shorea robusta*	*Adina cordifolia*

Orchid s of Baphlimali:

Baphalimali is found to be one of the richest area in Orchids after Similipal and Niyamgiri. During the survey we encountered 32 species of Orchids including 12 ground and 20 terrestrial species. The dominant species of the hills include *Dendrobium transparous* (most dominant), *Dendrobium herbaceum, Dendrobium macrostachyum, Cymbidium aloifolium* (indicator of matured tree), *Vanda tessellate, Vanda testacea, Nervellia cruciformis, Habeneria glandifloriformis, Peristyllus constrictus etc.*

Rare and threatened plants:

After the field survey and community interaction, we enlisted 8 species of plants coming under different threatened categories. They are *Chirita homosa, Rauvolfia serpentina , Gloriosa superba, Pureria tuberose, Piper longum, Pterocarpus marsupium, Sterospermum suaveolense* and *Mucuna prurience*

Faunal diversity of Baphlimali:

Increased rate of industrialization and the fast pace of habitat degradation has forced many species of animals to the verge of extinction. Wildlife being the important part of the ecosystem needs urgent attention for conservation. Baphlimali is a contiguous forest across Thuamul Rampur and Karlapat Wildlife Sanctuary of Kalahandi district makes it an important migratory path for elephants, leopards and other mega animals. The forest type provides a diversified habitat for a rich faunal composition. During the field trip 21 species of mammals were observed, which includes some of the rare and endangered animals like elephants, leopards and bear. It is learnt from the people of the area that elephants use the forest during some months of the year as foraging ground. The forest is also home for leopards and bears, which was confirmed by observing the indirect evidences. Antelopes like Barking deer, Mouse deer are also found in the habitat. There is a good population of Otters observed in the hill streams. Presence of Giant squirrels indicates the continuation of the top canopy of the forest. The area is now getting attention by the local people and different village level forest protection committee to protect the animals as well as the whole ecosystem. During the mining process, clearing trees will affect the biodiversity, since presence or absence of trees is directly linked to the animal diversity.

Check list of the mammalian fauna of Baphlimali

SL. NO.	SCIENTIFIC NAME	COMMON NAME	WPA STATUS
1	*Panthera pardus*	Leopard	Schedule-I
2	*Felis chaus*	Jungle cat	Schedule-II
3	*Elephas maximus*	Elephant	Schedule-I
4	*Melursus ursinus*	Sloth Bear	Schedule-I
5	*Muntiacus muntjak*	Barking Deer	Schedule-III
6	*Moschiola meminna*	Mouse Deer	Schedule-I
7	*Lepus nigricollis*	Hare	Schedule-IV
8	*Hystrix indica*	Porcupine	Schedule-IV
9	*Manis crassicaudata*	Indian Pangolin	Schedule-I
10	*Cuon alpanius*	Wild Dog	Schedule-II
11	*Canis aureus*	Jackal	Schedule-II

12	*Hyaena hyaena*	Striped hyena	Schedule-III
13	*Vivericula indica*	Small Indian civet	Schedule-II
14	*Paradoxurus hermophroditus*	Common palm civet	Schedule-II
15	*Herpestes edwardsii*	Grey mongoose	Schedule-II
16	*Herpestes smithii*	Ruddy mongoose	Schedule-II
17	*Ratufa indica*	Indian giant squirrel	Schedule-II
18	*Macaca mulatta*	Rhesus monkey	Schedule-II
19	*Sus scrofa*	Wild pig	Schedule-III
20	*Semnopithecus entellus*	Hanuman languor	Schedule-II
21	*Lutra* sp.	Otter	Schedule-II

Herpetofauna of Baphlaimali

The herpetofauna of Baphlimali is unique and diverse. Thirteen species of frogs were observed in the hill streams and the near by forest area. Among the reptiles we observed 30 species, including 14 species of lizard and 16 species of snakes. It is interesting to note that the top platue of the hill is unique habitat for some of the reptiles like *Liopeltis calamaria* and *Mabuya dissimilis* because of the typical stunted growth of plants and xeric vegetation. The list also encompasses Indian rock python, Spectacled cobra, Common krait, Russell's viper and Monitor lizard, which are included in Schedule-I and Schedule-II of Wildlife Protection Act.

Amphibians of Baphlimali

Sl. no	Scientific Name	Common Name
1	*Duttaphrynus melanostictus*	Common toad
2	*Fejervarya sp*	Unidentified
3	*Fejervarya sihyadrensis*	Paddy field frog
4	*Fejervarya orissaensis*	Paddy field frog
5	*Hoplobatracus tigerinus*	Indian bull frog
6	*Hoplobatracus crassus*	Jerdon's bull frog
7	*Euphlyctis cyanophlyctis*	Skipper frog
8	*Spaerotheca rolandae*	
9	*Microhyla ornata*	Ornate frog
10	*Uparodon systoma*	Balloon frog
11	*Calaula pulchra*	Painted frog
12	*Polypedates maculatus*	Tree frog

Reptiles of Baphlimali

Sl. no.	SCIENTIFIC NAME	COMMON NAME
1	*Geckoella nebulosus*	Leopard gecko
2	*Eublepharis hardwikii*	Fat tailed Gecko
3	*Hemidactylus brookii*	Brook's gecko

4	*H. leschenaulti*	Bark gecko
5	*H. frenatus*	Southern House Gecko
6	*Calotes versicolor*	Garden Lizard
7	*Psamophilus blanfordanus*	Rock lizard
8	*Chamaeleon zeylanicus*	Indian Chameleon
9	*Mabuya macularia*	Little Skink
10	*Mabuya carinata*	Common Brahmin Skink
11	*Lygosoma albopunctata*	Snake Skink
12	*Riopa punctatus*	Snake Skink
13	*Ophisops* sp.	
14	*Varanus bengalensis*	Common Indian Monitor
15	*Ramphotyphlops braminus*	Brahminy Worm Snake
16	*Python molorus*	Indian Rock Python
17	*Eryx conica*	Common Sand Boa
18	*Ahaetulla nasutus*	Common Vine snake
19	*Dendrelaphis tristis*	Common Bronzeback Tree Snake
20	*Ptyas mucosus*	Indian Rat Snake
21	*Lycodon aulicus*	Common Wolf Snake
22	*Liopeltis calamaria*	Gunther's stripe-necked snake
23	*Boiga trigonatus*	Common Cat Snake
24	*Boiga forestein*	Foresten's cat snake
25	*Xenocrophis piscator*	Checkered Keelback
26	*Macropisthodon plumbicolor*	Green Keelback
27	*Naja naja*	Binocellate Cobra
28	*Bungarus caeruleus*	Common krait
29	*Daboia russelli*	Russell's viper
30	*Trimeruserus gramineus*	Bamboo pit viper

Birds of Baphlimali

Sl. no.	**SCIENTIFIC NAME**	**COMMON NAME**	
1	Roseringed parakeet	*Psittacula kramerri*	Sch-IV
2	Black drongo	*Dicrurus adsimilis*	SCH-IV
3	Black headed myna	*Sturnus pagodarum*	Sch-IV

4	Brahmny Myna	*Temenuchus pagodarum*	Sch-IV
5	Cattle Egret	*Bubulcus ibis*	Sch-IV
6	Common Kingfisher	*Alcedo atthis*	Sch-IV
7	Common myna	*Acridotheres tristris*	Sch-IV
8	House crow	*Corvus splendens*	Sch-IV
9	House sparrow	*Passer domesticus*	Sch-IV
10	Indian Cuckoo	*Megalaima merulinus*	Sch-IV
11	Indian keol	*Eudynamys scolapacea*	Sch-IV
12	Jungle crow	*Corvus macrorhynchos*	Sch-IV
13	Little Egret	*Egretta garzetta*	Sch-IV
14	Red Jungle fowl	*Gallus gallus*	Sch-IV
15	Rock Pigeon	*Columbus livibus*	Sch-IV

Forest protection committee operating near Baphlimali

Seba Yubak Sangha

(Operating from 2003 but the registration is under process)

President: Lambodar Nayak

Secretary: Budu Muduli

Members: 22 persons

Forest area protected: Udri Gramya Jungle

Udri Gramya Jungle

Operating under Water shade project

Area-7 ac

President: Ghanashyam Sahu

Secretary: Padmanava Nayak

Forest protected: Udri Gramya forest

Sensitive Locations/Cultural Important Places:

There are no buildings of public interest and monuments notified by archaeological department in and around the mine lease area or study area.

However, there are some important cultural/religious and ritual sites present in the study area. HINDALCO has extensively studied the area to identify these locations by engaging an anthropologist. The following are some of important religious / ritual sites.

Thakur Shrine: This shrine is a place for ancestor worship. The shrine itself is a small replica of a Khond hut and a set of wooden mundas.

Ranbanus Spot: This is a landmark signifying an ancient war between the local Rajahs (kings). The landmark is a large rocky outcrop. The landmark is located on a hill slops, which is at an elevation of about 4-m above the road level.

Baphalaimali Caves: There are about six caves with their openings a couple of meters below the plateau surface of the Baphalaimali Hillock. Four caves are situated on the NW side of hillock and two are located in south of hillock. The caves located in NW are largely areas of ritual significance.

Cave No.1: This cave is called Rani Par and measures at least 18-m x 15-m. The roof of the cave is more than 3-m high. This is a Public cave and the annual Mali Jathara (fair) is celebrated in the month of January. The cave is believed by tribals to have a female supernatural force.

Cave No.2: This is called Bajana Par. Pengo Poraja group enthnic tribals consider this site as most important cave and is about 15-m x 15-m. Tribals do not generally enter this cave.

Cave No.3: This is just called as Par. This is a resting cave but the tribals do consider this also an important cave.

Cave No.4: This is known as Raja Par. This is a very high roofed and large cave. The most important aspect of this cave is the presence of large rock in the centre. This is considered by the tribals as the Durbar hall of ancient Rajas.

APPENDIX-1

List of hill streams

Sl No of Hill streams (HS) visited	GPS Locations	Altitude in m	Stream longevity
HS-I	19° 22’ 03” N 82° 56’ 18” E	701	Perennial
HS-II	19° 21’ 59”N 82° 55’ 42”E	654	Seasonal
HS-III	19° 21’ 58”N 82° 55’ 41”E	653	Perennial
HS-IV	19° 22’ 22”N 82° 56’ 15”E	670	Perennial
HS-V	19° 20’ 08”N 82° 55’ 55”E	717	Perennial

APPENDIX-2

Location of bauxite testing on Baphlaimali

Sl no. of bauxite tests	GPS Location	Altitude in m
1	19° 20’ 55”N, 82° 57’ 19”E	1049
2	19° 20’ 53”N, 82° 57’ 22”E	1054
3	19° 20’ 57”N, 82°20’ 57”E	1049
4	19° 20’ 59”N, 82° 57’ 15”E	1045
5	19° 20’ 01”N, 82° 57’12”E	1055
6	19° 21 ‘ 06”N, 82°57’ 16”E	1052

APPENDIX-3

Predominant plant species near Baphlimali mine lease area

Sr.No	Scientific names	Family	Life form
I. Commercial Crops (including vegetables)			
1	*Allium cepa*	Liliaceae	Geophyte
2	*Brassica nigra*	Cruciferae	Therophyte
3	*Cajanus cajan*	Fabaceae	Therophyte
4	*Carica papaya*	Caricaceae	Therophyte
5	*Catharanthes pusillus*	Compositae	Therophyte
6	*Daucus carota*	Umbelliferae	Geophyte
7	*Lycopersicum esculentus*	Solanaceae	Therophyte
8	*Raphanus sativa*	Cruciferae	Geophyte
II. Plantations			
	Nil	-	-
	Natural Vegetation/Forest Tyepe		
9	*Abutilon indicum*	Malvaceae	Phanerophyte
10	*Achyranthes aspera*	Amaranthaceae	Therophyte
11	*Ageratum conyzoides*	Compositae	Therophyte
12	*Alstonia scholaris*	Apocyanaceae	Phanerophyte
13	*Anoegeissus latifolia*	Combretaceae	Phanerophyte
14	*Argemone mexicana*	Papevaraceae	Phanerophyte
15	*Asparagaus racemosus*	Liliaceae	Therophyte
16	*Blumea lacera*	Compositae	Therophyte
17	*Boswellia serrata*	Burseraceae	Phanerophyte
18	*Cassia auriculata*	Caesalpinaceae	Therophyte
19	*Cassia occidentalis*	Caesalpinaceae	Therophyte
20	*Cassia tora*	Caesalpinaceae	Phanerophyte
21	*Cleome gynandra*	Capparidaceae	Therophyte
22	*Datura metal*	Solanaceae	Therophyte
23	*Diospyros Montana*	Lythraceae	Phanerophyte
24	*Eclipta alba*	Compositae	Therophyte
25	*Emblica officinale*	Euphorbiaceae	Phanerophyte
26	*Euphorbia neruri*	Euphorbiaceae	Therophyte
27	*Euphorbia tricauli*	Euphorbiaceae	Hemicryptophyte
28	*Holarrhena antidycenterica*	Asclepiadaceae	Phanerophyte

Sr.No	Scientific names	Family	Life form
29	*Impatiens balasamania*	Balsaminaceae	Therophyte
30	*Indigofera tinctoria*	Caesalpinaceae	Therophyte
31	*Lannea coramandalica*	Anacardiaceae	Phanerophyte
32	*Leucas longifolia*	Labiatae	Therophyte
33	*Leucas stelligera*	Labiatae	Therophyte
34	*Madhuca latifolia*	Sapotaceae	Phanerophyte
35	*Memycelon edule*	Melastonellaceae	Phanerophyte
36	*Mimosa hamata*	Mimosaceae	Therophyte
37	*Mitrgyna parviflora*	Rubiaceae	Phanerophyte
38	*Ocimum americanum*	Labiatae	Therophyte
39	*Oldenlandia umbellate*	Convolvulaceae	Therophyte
40	*Oldenlandia corymbosa*	Rubiaceae	Therophyte
41	*Oxalis corniculata*	Oxalidaceae	Therophyte
42	*Phyllanthes emblica*	Euphorbiaceae	Phanerophyte
43	*Phyllanthes nirurii*	Euphorbiaceae	Therophyte
44	*Physalis minima*	Solanaceae	Therophyte
45	*Portulaca oleracea*	Portulaccaceae	Therophyte
46	*Tephrosia purpuria*	Fabaceae	Therophyte
47	*Terminalia chebula*	Combretaceae	Phanerophyte
48	*Terminalia tomentosa*	Combretaceae	Phanerophyte
49	*Tribulus terrestris*	Zygophyllaceae	Therophyte
50	*Tridax procumbens*	Compositae	Therophyte
51	*Zizyphus nummalaris*	Rhamnaceae	Phanerophyte
52	*Zizyphus rotundus*	Rhamnaceae	Phanerophyte
53	*Zizyphus xylophora*	Rhamnaceae	Phanerophyte
54	*Cenchurus ciliaris*	Poaceae	Hemicryptophyte
55	*Cyanodactylon sp*	Poaceae	Geophyte
56	*Cymbopogon jwarancusa*	Cyperaceae	Hemicrptophyte
57	*Dactylectinium annualatum*	Poaceae	Therophyte
58	*Dichanthium annulatum*	Poaceae	Hemicryptophyte
59	*Digetaria indica*	Poaceae	Hemicryptophyte
60	*Digetaria Segetaria*	Poaceae	Hemicryptophyte
61	*Eragrostis biferia*	Poaceae	Therophyte
62	*Eragrostis japonica*	Poaceae	Therophyte
63	*Shorea robusta*	Dipterocarpacaeae	Phanerophyte
64	*Fibrystylis dichotoma*	Poaceae	Hemicryptophyte