

Chapter-3

Bhitarkanika – Mangrove Vegetation

As per the ‘The State of Forest Report, 1999 and 2001, FSI, Dehradun’ the **district-wise cover of mangrove forests in the State of Orissa is:**

Baleshwar	3 Sq. Km
Bhadrak	18 Sq.Km
Jagatsinghpur	10 Sq.Km
Kendrapara	184 Sq.Km

However, as per the data provided in the Atlas of Mangrove Wetlands of India, Part-3 Orissa published in July 2004 (page 5), the mangrove vegetation is found in the river basins of Orissa as follows:

Devi Mouth (Puri district)- 3.46 sq. km.

Mahanadi Mouth (Kendrapara district) – 51.24 sq. km.

Bhitarkanika (Kendrapara district)- 149.87 sq. km.

Dhamara mouth (Bhadrak district) – 29.35 sq. km.

Budhabalang Mouth (Baleswar district)- 1.35 sq. km.

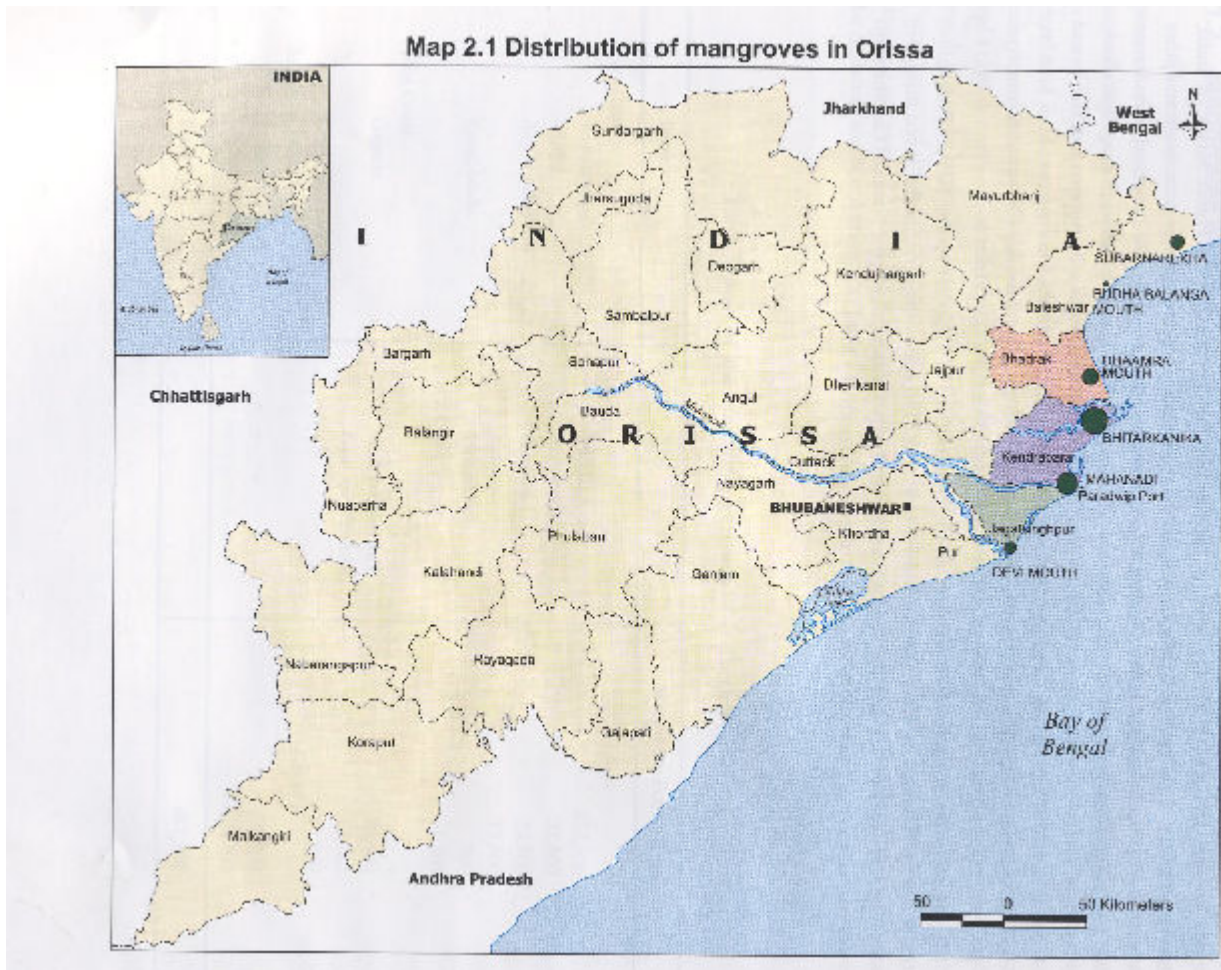
Subarnarekha Mouth (Baleswar district)- 7.76 sq. km.

To be more specific, the estuaries of the following rivers of Orissa have mangrove vegetation:

- River Mahanadi
- River Devi
- River Brahmani
- River Baitarani
- River Subarnarekha
- River Budhabalanga

The location of the mangrove vegetation in the above river basins is indicated in the map given below.

The Bhitarkanika system is the largest mangrove patch in the State and broadly comes under Kendrapara district. The Kendrapara district shelters also the next largest mangrove patch of the State, which is located on the Mahanadi mouth basin. According to the above mentioned Atlas, floristically the mangrove forests of Orissa harbour both exclusive and associated species. The exclusive species are 32 nos. while the associated species are 29 nos.



Source: Atlas of Mangrove Wetlands of India, Part-3 Orissa, M.S.Swaminathan Research Foundation, Chennai, July 2004

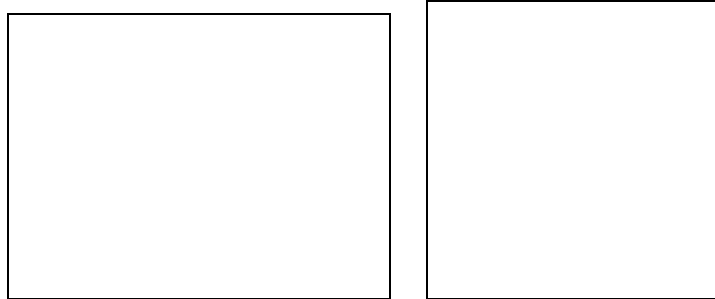
A variety of plants are seen putting up luxuriant growth in the inter-tidal habitat of Bhitarkanika. These species are endemic to the area and are called mangroves. Some species occurring outside the inter-tidal area are called associates of mangroves. As many as 62 species of mangroves and its associates are found in Bhitarkanika Sanctuary. The mangroves are specialized plants which can tolerate inundation and salinity. Their adaptation to salinity condition becomes possible due to their resistance to concentration of salt, entering roots and secretion of salts from their leaves. Mangrove seeds germinate on the trees, before they are disseminated. They grow a spear like hypocotyls, which when dislodged, gets embedded into mud and develop anchoring roots. Many mangroves have stilt root, which are aerial and acts as anchoring structure to withstand wave action.

Some mangroves have inverted wedge like projections on the ground from the underground root system, called pneumatophores. The plants breathe in oxygen through the pores of pneumatophores during prolonged time of submergence of the root system.

The mangrove eco-system is highly fragile, since the essential factors for its maintenance are fresh water influx from adjoining land and tidal inflow



from the sea. Changing the regime of either factors, whether in quality or quantity is likely to cause a corresponding change in the mangrove system. In Bhitarkanika the water salinity exhibits a gradual change from near fresh water to very saline condition, thus the vegetation has evolved and adapted to withstand wide salinity gradients. Some plants have specialized to thrive in narrow limits of both low and high salinities. It explains the rich plant diversity of Bhitarkanika mangroves. Spatial diversity is seen to be of high order. However, evenness component appears to be low based on cursory observations. High diversity of plant communities is reflected in high diversity of animal life, noticeable so at least in avifauna.



Detritus is the principal energy source in the mangrove eco-system. This is the degraded product of mangrove litter, broken down by host of bacteria, fungi and protozoa to tiny protein-rich organic matter, which is then absorbed in clay particles. The Detritus feeders e.g. shrimps, prawns, nematodes and forage fish like grey mullets, mud skippers, through several cycles of ingestion, exhaust the nutrient laden detritus. Many fishes and crabs feed either directly on detritus or on detritus feeders. Large game fish (Bhekta for example) feed in detritus feeding fish. The off shore waters having a mangrove coast line also benefit through the out dwelling of nutrient laden detritus. Mangroves therefore have a great ecological and economic value through its contribution to the detritus food chain, supporting rich estuarine and adjacent marine fisheries.

Sheltered water of mangroves provides nursery grounds for commercially harvested prawns and shrimps, which breed only in the sea. Several fish come to the estuary to breed viz; Bhekta and Hilsa. Abundant fisheries on a sustainable basis is important to the economy of the people living around mangroves. About one lakh people depend directly and indirectly on fishing in undivided Cuttack and Balasore districts.

Mangroves play a pivotal role in alleviating the economic condition of local Fishermen community.



Mangroves have been called as "Land Builders". The roots of mangrove secrete an acid, which modifies the coarse particles into finer ones and help in soil formation. The tangles of stilt root also help in sedimentation of particulate matter. Networks of mangrove roots provide firm anchorage to the coast line and also river bank by effectively arresting lateral erosion. The mangroves help protection against flood damage and exercise a moderating influence in the cyclonic disasters, though periodic occurrence of severe cyclones contributes to the shrinkage of area of mangrove vegetation.

Services offered by the Mangrove Ecosystem

Protection Against Wave and Wind Erosion

Undisturbed and natural mangrove forests might act as the seaward barrier and check considerably the coastal erosion and minimise the tidal thrust or strong storm hit arising from the sea (Macnae, 1968). Mat like spreading of root system in the form of pneumatophores, stilt roots and soil binding ability of mangrove species check soil erosion and ensure stabilisation of the coastlines. Mangroves help in maintaining suitable condition in the agricultural fields close to the coastal areas by preventing sand particles and saline water from entering into the agricultural fields.

Protection Against Storms and Cyclones

Mangroves in the coastal area check the wind velocity and protect the nearby habitation from cyclonic winds (Snedaker, 1987).

Food, Shelter and Habitat for the Wildlife Including Avifauna

Fallen leaves and other plant materials decomposed by the micro-organisms act as food for various types of marine organisms including fishes and prawns. Mangrove roots in the form of stilt roots and pneumatophores provide excellent breeding and resting ground for various types of fishes, crustaceans and other marine fauna. Thus, mangroves support life in marine environment. Mangrove detritus and the subsequent mineralized nutrients are exported out of the mangrove ecosystem through tidal flushing.



The knee roots of *Bruguiera gymnorhiza* provide for oxygen uptake by the mangrove roots

Mangrove ecosystem is a storehouse of variety of fauna and flora with great ecological and economical significance. Different types of birds can be seen in the mangrove forests. Mangrove forests are an important habitat for mammals, birds, reptiles, fish, molluscs, insects and micro-organisms. Wild boars, small carnivorous animals such as civets, fishing cats, otters and mongooses are common in mangrove forests. Crocodiles and alligators are some of the most important reptiles that naturally inhabit the mangrove ecosystem. The salt water crocodile, (*Crocodilus porosus*) is found in almost all the creeks of Bhitarkanika sanctuary.

Sl.No.	Scientific Name	Common Name	Habit	Family
1.	<i>Acanthus ilicifolius</i>	Harakancha	Herb	Acanthaceae
2.	<i>Acanthus volubilis</i>	Harakancha	Herb	Acanthaceae
3.	<i>Acrostichum aureum</i>	Kharkhari	Fem	Polypodiaceae
4.	<i>Aegialitis rotundifolia</i>	Banarua	Tree	Plumbaginaceae
5.	<i>Aegiceras corniculatum</i> (A.majus)	Kharsi	Tree	Plumbaginaceae
6.	<i>Amoora</i> (<i>Aglaia cucullata</i>)	<i>cucullata</i> Ooanra	Tree	Meliaceae
7.	<i>Avicennia alba</i>	Kala bani	Tree	Avicenniaceae
8.	<i>Avicennia marina</i>	Singala bani	Tree	Avicenniaceae
9.	<i>Avicennia officinalis</i>	Bada Bani	Tree	Avicenniaceae
10.	<i>Brownlowia tersa</i>	Lati sundari	Herb	Tiliaceae
11.	<i>Bruguiera cylindrica</i>	Dot	Tree	Rhizophoraceae
12.	<i>Bruguiera gymnorrhiza</i>	Bandari	Tree	Rhizophoraceae
13.	<i>Bruguiera parviflora</i>	Kaliachua	Tree	Rhizophoraceae
14.	<i>Bruguiera sexangula</i>	Bandari	Tree	Rhizophoraceae
15.	<i>Caesalpinia crista</i>	Nentei	Creeper	Caesalpiniaceae
16.	<i>Caesalpinia crista</i>	Gilo	Creeper	Caesalpiniaceae
17.	<i>Cerbera manghus</i>	Pani amba	Tree	Apocynaceae
18.	<i>Ceriops decandra</i>	Garani	Tree	Rhizophoraceae
19.	<i>Ceriops tagal</i>	Garani	Tree	Rhizophoraceae
20.	<i>Clerodendron inerme</i>	Chiani	Creeper	Verbenaceae
21.	<i>Crinum asiaticum</i>	Pani kenduli	Herb	Amaryllidaceae
22.	<i>Crinum defixum</i>	Pani kenduli	Herb	Amaryllidaceae
23.	<i>Cynometra ramiflora</i>	Singada	Tree	Leguminosae
24.	<i>Cynometra iripa</i>	Singada	Tree	Leguminosae
25.	<i>Cyperus compactus</i>	Tianshi ghasa	Grass	Cyperaceae
26.	<i>Cyperus corymbosis</i>	Keutia ghasa	Grass	Cyperaceae
27.	<i>Dalbergia spinosa</i>	Goera kanta	Creeper	Papilionaceae
28.	<i>Derris hetrophylla</i>	Katira nai	Creeper	Leguminosae
29.	<i>Derris scandens</i>	Katria nai	Creeper	Leguminosae
30.	<i>Dolichandrone spathacea</i>	Gosiga	Tree	Bignoniaceae
31.	<i>Excoecaria agallocha</i>	Guan	Tree	Euphorbiaceae
32.	<i>Fimbristylis ferruginea</i>	Luni ghasa	Grass	Cyperaceae
33.	<i>Finlaysonia obovata</i>	Lata rai	Creeper	Peripocaceae
34.	<i>Flageliaria indica</i>	Bahumruga	Crepper	Flagellariaceae
35.	<i>Heritiera fomes</i>	Bada Sundari	Tree	Sterculiaceae
36.	<i>Heritiera kanikensis</i>	Kanika sundari	Tree	Sterculiaceae
37.	<i>Heritiera littoralis</i>	Dhala sundari	Tree	Sterculiaceae
38.	<i>Hibiscus tiliaceus</i>	Bania	Herb	Malvaceae

Pictures of some mangrove species of Bhitarkanika

(The Number allotted against each picture corresponds to the serial number in the list of mangrove plant species given above. Source: <http://www.bhitarkanika.org>)



No.5 *Aegialitis rotundifolia*



No.1 *Acanthus ilicifolius*



No.6 *Amoora cucullata*



No.7 *Avicennia alba*



No.10 *Brownlowia tersa*



No.11 *Bruguiera cylindrica*



No.12 *Bruguiera gymnorrhiza*



No.13 *Bruguiera parviflora*



No.14 *Bruguiera sexangula*



No.15 *Caesalpinia crista*



No.16 *Caesalpinia crista*



No.17 *Cerbera manghus*



No.18 *Ceriops decandra*



No. 20 *Clerodendron inerme*



No.21 *Crinum asiaticum*



No.23 *Cynometra ramiflora*



No.24 *Cynometra iripa*



No.25 *Cyperus compactus*



No.26 *Cyperus corymbosis*



No.27 *Dalbergia spinosa*



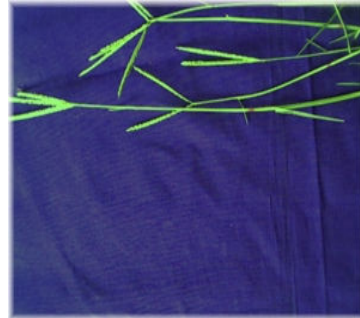
No.28 *Derris heterophylla*



No.30 *Dolichandrone spathacea*



No.31 *Excoecaria gallocha*



No.32 *Fimbristylis ferruginea*



No.33 *Finlaysonia obovata*



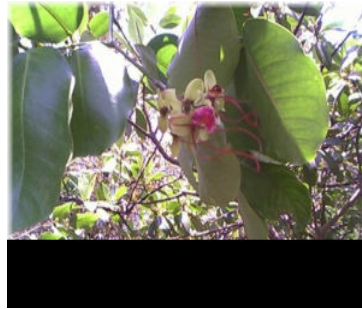
No.34 *Flagelaria indica*



No.35 *Heritiera fomes*



No.36 *Heritiera kanikensis*



No.39 *Intsia bijuga*



No.41 *Lumnitzera racemosa*

Sources:

- *Mangrove Forests and Wildlife of Orissa (Oriya)* by Mr.N.C.Mohanty published by Project Swarajya, Cuttack, Orissa 1992
- <http://www.bhitarkanika.org>
- *ENVIS Forestry Bulletin, Vol.4, 2004*
- *The State of Forest Report, 1999 and 2001, Forest Survey of India, Dehradun*
- *Atlas of Mangrove Wetlands of Ondia, Part-3 Orissa, M.S.Swaminathan Research Foundation, Chennai, July 2004*