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Assessment and Conservation of Mangroves of Hukitola island in Mahanadi Delta

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ABSTRACT

Hukitolaisland of Mahanadi delta in the state of Odisha harbors a significant portion of the mangrove forests of India. Past floristic studies reveals that mangroves of Mahanadi delta was much rich in remote past .In course of time, these have been subjected to severe biotic pressures which includes the establishment of Paradeep Port, Paradeep Phosphates Ltd., settlement of immigrants, conversion of mangrove forests into paddy fields, piscicultures as a result of which the present mangrove vegetation is extant in most denuded condition in various locations of this region which needs an urgent attention for conservation. Mangroves of Hukitola island possesses a special significance as it is free from human settlement and as such is an ideal site for *in situ* conservation.

Key words: **Conservation, Assessment, Mangroves, Hukitola Island, Mahanadi delta**

INTRODUCTION

Mangroves are peculiar groups of salt tolerant plants having special ecological adaptations and as such constituteimportant vegetation which are found in different estuarine belt of the world. These are important source of timber, fire wood, tannin etc. Besides, these groups of plants play an important role in the coastal environment by protecting shore line and checking the intensity of tropical cyclones. As per the status report of the Ministry of Environment and Forest, Government of India (1987), mangroves of India constitute 7% of the world mangroves covering an area of 6740 sq.km [1].According to the India State of Forest Report,2019, the mangrove cover in India is 4,975 sq. km., which is 0.15% of the country's total area.This fact indicates that there is significant decline in the mangrove cover in India since last three decades [2].

The state of Odisha in India is lying between 26° 00' N latitude and 94° 20' E longitude. It extends over an area of 155,707 sq. km accounting for about 4.87% of the total area of India.The coastal areas of Odisha are interrupted by several rivers and rivulets,the Mahanadi, Brahmani, Baitarani, Budhabalanga, Rusikulya and Subarnarekha. Chilika, the largest brackish water lake located in the east coast, deserves special mention. All are mixed with the Bay of Bengal forming deltas, which have thick mangrove forests [3]. According to the report of Forest Survey of India (2001), 219 km2 of area are under mangrove vegetation cover along the coastline of the state. Five districts of the state of Odisha viz. Balasore, Bhadrak, Jagatsinghpur, Kendrapara and Purihave mangrove distribution along their coasts. The highest area cover by mangrove is in Kendrapara district (192 km2), followed by Bhadrak (19 km2), Jagatsinghpur (5 km2), Balasore (3 km2) [4].

Mahanadi delta in the Kendrapara district of Odisha harbors an important mangrove vegetation in the Indian sub-continent. It lies between $19^0$45'-20^0 30' N latitudes and 85^0 15'E -86^0 50' E longitudes covering an area of 13600 sq. km. (Fig-1). Carbon sequestration by Mangroves of Mahanadi delta calls for the conservation and restoration of mangroves to minimize Carbon Dioxide level in this region [5].

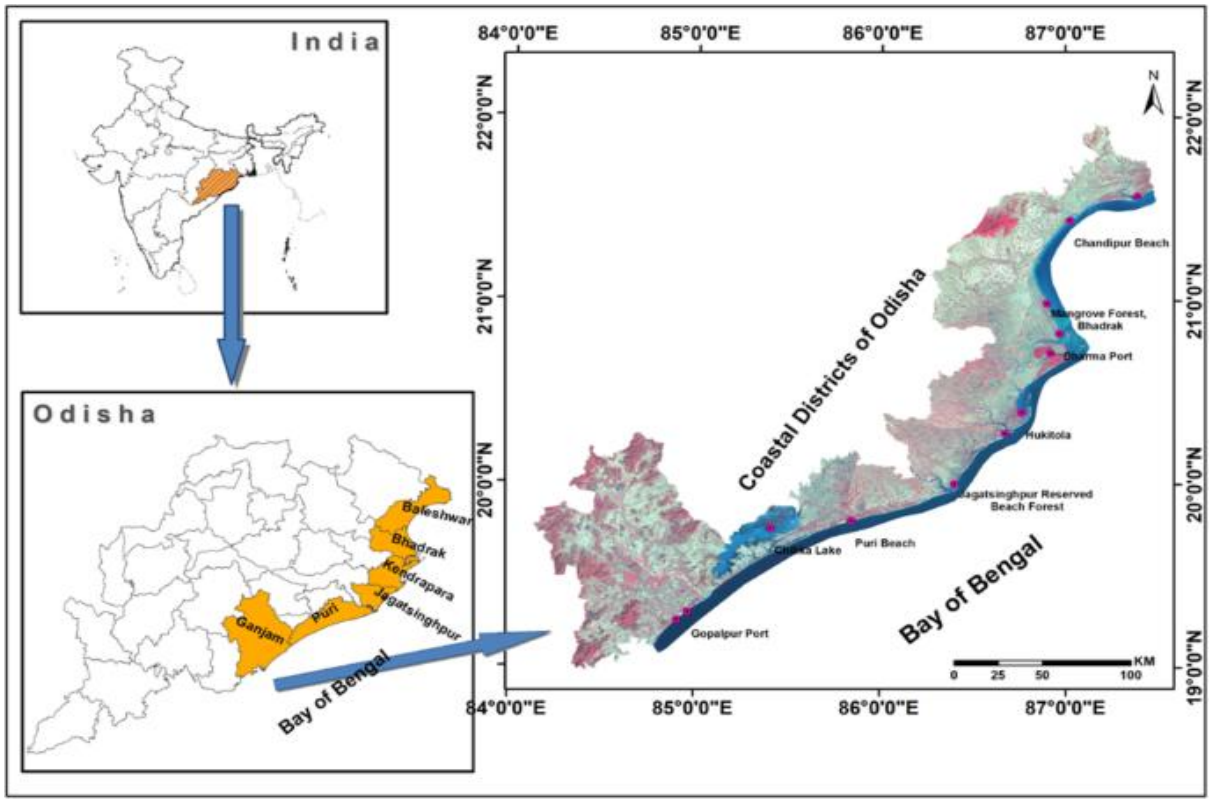

Fig.1: Distribution patterns of mangroves in Odisha coast

The distribution of mangroves shows much variation in different locations of Mahanadi delta such as Paradeep, Batighar, Jambu, Ramnagar, Khararnasi and Hukitola island.

Among these locations the Hukitola island harbors a significant portion of the mangrove forests of Mahanadi delta.From the past floristic studies conducted by earlier workers such as Haines (1921-25), Mooney (1950), Banerjee and Das (1972), Rao and Banerjee (1982), Choudhury *et al* (1991, 1993), Choudhury (1994), Subudhi*et al (*1992)it is evident that mangroves of Mahanadi delta were much rich in remote past [6-13]**.**Since past few decades, Mangroves of Mahanadi delta have been subjected to severe biotic pressures which includes the establishment of Paradeep Port, Paradeep Phosphates Ltd., settlement of immigrants, conversion of mangrove forests into paddy fields as a result of which the present mangrove vegetation is extant in much denuded conditions which needs an urgent attention for conservation[14-19].

Keeping the above facts in mind floristic studieshave been conducted since past two decades in Hukitola island and other regions of Mahanadi delta toget a comprehensive idea about the distributional pattern of mangroves, theirsocioeconomic importance, the impact of various biotic factors on the mangrove vegetation and to develop various strategies for its conservation.

MATERIALS AND METHODS

Literatures pertaining to past floristic studies in Hukitola island and other regions of Mahanadi delta have been consulted to have a clear idea about the distribution and the status of mangroves and their associates in past. Regular field trips have been conducted in different seasons of the year to identify plants of ecological, medicinal and other socio-economic importance along with distributional data in and around Hukitola island. Special attention has been given to the sociability, distributional patternand abundance, flowering and fruiting time. Plants collectedfrom these areas have been identifiedby consulting the regional floras (Haines, 1921-25; Mooney, 1950; Saxena and Brahmam, 1994-96) and are recorded in the Table-1[6-7,20].

RESULTS AND DISCUSSION

During the present investigation 36 species of mangroves and their associateshave been reported from Hukitola islands. It has been observed that Hukitola Island harbors quite a good number of potential medicinal plants and other plants of various socio-economic importance. These include some mangrove species and their associates [17,19].Flora of Hukitola island possesses a special significance as it is free from human settlement. Hence, vegetation of this island comparatively less interfered in comparison to any other locations in the Mahanadi delta.

This area of course, is less interfered by biotic pressures than any other areas of Mahanadi delta due to geographical isolation. Because of geographical isolation, Hukitola Island is an ideal site for *in situ* conservation of mangroves and their associates.

Table –1: Mangroves and their associates in Hukitola island of Mahanadi delta

Sl. No.	Name of the Species	Family	Habit	Economic importance
1.	*Acanthus ilicifolius*L.	Acanthaceae	Shrub	Soil binder, medicinal
2.	*Acrostichumaureum*L.	Polypodiaceae	Shrub	Soil binder
3.	*Aegialitis rotundifolia* Roxb.	Plumbaginaceae	Shrub	Honey and fuel
4	*Aegicerascorniculatum*(L.) Blanco	Myrsinaceae	Shrub	Honey and fuel
5.	*Avicenniaalba Bl.*	Avicenniaceae	Tree	Timber and fuel
6.	*Avicennia marina* (Forssk.) Vierh.	Avicenniaceae	Tree	Timber and fuel
7.	*Avicennia officinalis* L.	Avicenniaceae	Tree	Timber and fuel, medicinal
8.	*Bruguiera cylindrica* (L.) Bl.	Rhizophoraceae	Tree	Timber and fuel
9.	*Bruguieragymnorrhiza*(L.) Savigny	Rhizophoraceae	Tree	Timber and fuel
10.	*Caesalpinia bonduc*(L.) Roxb.	Caesalpiniaceae	Shrub	Soil binder
11.	*Caesalpinia crista L.*	Caesalpiniaceae	Climber	Soil binder, medicinal
12.	*Ceriopsdecandra*(Griff.) Ding-Hou.	Rhizophoraceae	Shrub	Timber, tanin and fuel
13.	*Ceriopstagal (*Perr.) C.B. Rob.	Rhizophoraceae	Shrub	Timber, tannin, fuel and medicinal
14.	*Clerodendruminerme*(L.) Gaertn.	Verbinaceae	Shrub	Fuel and medicinal
15.	*Cynometrairipa*Kostel	Caesalpinianceae	Tree	Timber, fuel and paper pulp
16.	*Cyperus malaccensisLamk.*	Cyperaceae	Herb	Soil binder
17.	*Dalbergia spinosa* Roxb.	Fabaceae	Shrub	Fuel and soil binder
18.	*Excoecariaagallocha* L.	Euphorbiaceae	Tree	Timber, fuel charcoal, medicinal, very much useful in artificial regeneration of mangrove forests
19.	*Heritiera fomes* Buch. - Ham.	Sterculiaceae	Tree	Timber, Charcoal and check soil erosion
20.	*Heliotropiumcurassavicum L.*	Boraginaceae	Herb	Soil binder
21.	*Hibiscus tiliaceus* L.	Malvaceae	Tree	Fuel, stem yields coarse fiber
22.	*Ipomoea pes-caprae*(L.) R. Br.	Convolvulaceae	Herb	Good sand binder in sea coast and river banks, leaves medicinal
23.	*Kandeliacandel*(L.) Druce	Rhizophoraceae	Shrub	Timber, fuel, charcoal, tannin and medicinal
24.	*Merope angulata*(Kurz) Swingle	Rutaceae	Shrub	Timber, fuel and tanin
25.	*Myriostachyawightiana*(Nees ex Steud.) Hook. f.	Poaceae	Shrub	Soil binder
26.	*Phoenix paludosa*Roxb.	Arecaceae	Shrub	Timber, fuel and check soil erosion
27.	*Porteresiacoarctata*(Roxb.) Tateoka	Poaceae	Grass	Fodder, forage, good soil binder
28.	*Rhizophora apiculata*Bl.	Rhizophoraceae	Tree	Fuel, charcoal and tanin
29.	*Rhizophora mucronata*Poir.	Rhizophoraceae	Tree	Fuel, charcoal and medicinal
30.	*Sesuviumportulacastrum*(L.) L.	Aizoceae	Herb	Soil binder, and tender plants edible

31.	*Sonneratiaalba Smith*	Sonneratiaceae	Tree	Timber and fuel
32.	*Sonneratiaapetala Buch*. -Ham.	Sonneratiaceae	Tree	Timber, fuel and fruits edible
33.	*Suaeda maritima* (L.) Dumort.	Chenopodiaceae	Herb	Soil binder
34.	*Tamarixtroupii*Hole	Tamaricaceae	Tree	Fuel and medicinal
35.	*Thespesia populnea*(L.) Sol. Ex Correa	Malvaceae	Tree	Timber, fuel and medicinal
36.	*Tylophoratenuissima*(Roxb.) Wt. &Arn. ex Wight. Contrb.	Asclepiadaceae	Twiner	Medicinal

Loss of mangrove vegetation has intensified the rate of various environmental hazards like tropical cyclones, encroachment of sea towards land, floods etc. This is clearly evident from the devastations caused in the last Super cyclone of October '99 which was accompanied with high speed of wind and unusual rise of sea water from the Bay of Bengal that has washed away many lives of human beings, cattle and other animals. Large number of trees have been uprooted and severely damaged in the coastal regions of Odisha. It is to be noted here that the Bhitarkanika area and its adjoining regions in the state of Odisha was least affected in the Super cyclone due to thick mangrove vegetation.It is a matter of significance that the mangroves of Hukitila island had played a key role in the protection of the adjoining regions from the impact of last Super Cyclone in the state of Odisha.

CONCLUSION

During the present investigation it has been observed that mangroves of Mahanadi delta have been depleted at an alarming rate due to the operation of various biotic factors cited earlier. Restoration of mangroves in the degraded areas of Mahanadi delta such as Pardeep, Jambu, Ramnagar, Kharnasishould be done on top priority by growing some species of mangroves and their associates which are better adopted in these region .As stated above, mangroves of Hukitola island have a special significance due to its geographical isolation. As such *in situ*conservation of the existing mangrove vegetation is much essential for the conservation of this unique biodiversity. It is also a matter of great concern that there is proposal from some sectors to promote ecotourism inHukitola island. Care should be taken to promote *in situ* conservation of mangroves and their associates in this area. Regeneration of some species of mangroves and their associates which are better adapted in and around Hukitola island should be done for the conservation of biodiversity and protection of the coastal environment in this region.

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