Original Research Paper

Volume : 5 | Issue : 12 | December-2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 78.46

SPATIAL DISTRIBUTION AND ASSESSMENT OF MANGROVE ECO-SYSTEM IN ODISHA COAST – A GEOGRAPHICAL ANALYSIS

Geography

KEYWORDS: Mangroves, Ecosystem, Fauna, Flora

Dr. Sridhar Samal

Head, Department of Geography Kendrapara Autonomous College Kendrapara, Odisha

ABSTRACT

Mangroves are specialized forest eco-system which is salt tolerant and grow mainly in tropical and sub-tropical inter-tidal regions. Mangroves are immensely important bio-climatic eco-system in a typical geographic situation in the coastal region of Odisha. The resilient Mangroves serve the protective functions to a great extent as it protects the hinterland against cyclonic storms and other natural catastrophes acting as an effective shelterbelt. It is evident from the past unprecedented super-cyclone of October 1999, where the Mangroves haul withstood the onslaught of cyclonic wind and saved the life and property of millions. The complex food chain of the mangrove eco-system supports a large variety of fauna and flora. Mangrove wetland performs a host of protective as well as productive functions and considered as land builders. The characteristic of mangroves attributed to the type of vegetation having still root, pneumatophores, vivipary germination and salt creating glands. The species most commonly found in mangrove system play dominant role in building landmass, arresting soil erosion and controlling flood and cyclone damages. Mangrove ecosystem of coastal Odisha must be conserved in the interest of economic upliftment of local people and development of the area in a sustainable manner.

INTRODUCTION:

The coastal and deltaic areas of Odisha constitute transitional environment at the interface of terrestrial and marine ecosystem. The coastal Odisha exhibits a very complex and fragile mangrove ecosystem in the Indian subcontinent. The mangrove track in this region with a network of rivers, streams, creeks and creeklets signify the special character of ecology. These areas are well known as mangrove wetland which performs a variety of productive as well as protective functions. The mangrove ecosystem is a repository of biological diversity. The coastal Odisha saline belt gives a completely different picture of natural vegetation. Mangroves are group of specified plant communities confined to intertidal regions of Odisha which is considered as land builders. Mangrove species are mostly common in the wetland all along the coastal belt of Odisha which play significant role in building landmass, arresting soil erosion and controlling flood and cyclone damages. The unique wetland habitat with lush-green mangrove forests is locally known as 'Hental Bana' is a best example of unique and interesting site for understanding the complexities of linkages between social and natural phenomena. The Odisha coast which exhibits land-Ocean interface makes the zone very uncertain, complex and also vulnerable to natural and human processes and calls for urgent response. This critical interface makes the region biologically very productive and protective to local communities considering the ecological, biological, geological and geomorphological importance of the region. In this study, attempts have been made to assess the spatial distribution of mangrove ecosystem and the impact and role of mangrove forest on local ecosystem and environment and to suggest measures to protect and conserve the coastal ecosystem. It is therefore an absolute necessity to maintain the ecological balance in this fragile bio-climatic region by way of reducing biotic intervention and minimizing man-animal conflict.

Objectives of the study:

The study was organized with the following objectives:

- To study the spatial distribution of mangrove ecosystem in Odisha coastal region.
- To analyze the impact and role of mangrove forest on local ecosystem and environment.
- To study and assess the management policies and plans adopted so far to protect and preserve the mangrove ecosystem of Odisha coast.
- To suggest measures and policy options for ensuring a sustained growth and preservation of mangroves in Odisha coastal region.

Database and Methodology:

The methodology involves a detailed review of literature on coastal mangroves and mangrove ecosystem in order to obtain a view of the functions that these ecosystem performs, and analysis of work done so far by earlier researchers on the subject and in the region. The study is based predominately on data collected from secondary sources such as published journals, reports and articles from Government and Non-Government sources such as Statistical Abstract of Odisha-2012, Odisha Economic Survey-2016, Chief Conservator of Forest Odisha and NGOs. Interpretation and analysis of data collected by suitable quantitative technique in tabular forms have been incorporated to make the data meaningful.

The Study Area:

The Odisha Coastal Plain lies between 19°N to 22 N latitude and 84° 45' E to 87.2d E longitude. This physiographic unit of Odisha Coast consists of combined deltas of the Mahanadi, the Brahmani and the Baitarani and flood plains of the Subarnarekha, the Budhabalanga and the Rushikulya. This coastal region is traversed by the rivers and many smaller streams and their distributaries. The topography of coastal Odisha is dominated by the fluvial actions of meandering streams and littoral actions of tides, waves and currents. The coastal plain is basically occupied by the tertiary and recent alluvium brought down by the distributaries of the rivers of coastal plain. The saline soil predominates along the coast with an average width of 10 – 15 K.ms from the aeolian and sandy coast of 5 Km width all along the coast in a narrow stretch of land. The relief of coastal Odisha reveals a 50 Mts. The region of Odisha coast because of its geographical location, ecological diversity and environmental importance, occupies one of the most promising and prosperous regions of the state. This geographical unit constitutes basically combined deltas and flood plains of the Mahanadi, The Baitarni, The Brahmani, The Rushikulya, The Subarnarekha, The Budhabalanga rivers systems and flood plains of the tributaries of these rivers. The Odisha coastal districts extends over the districts of Ganjam, Puri, Jagatsinghpur, Kendrapara, Bhadrak, Balasore and clearly delineated by the 480 K.ms shoreline of Bay of Bengal in the east. The topography of the coastal plain of Odisha is dominated by fluvial actions of the meandering creeks and littoral action of tides, waves and currents.

Results and Discussion:

The Districtwise distribution status of mangrove forest in Odisha indicates a major concentration in the coastal regions of Bhitarkanika in Kendrapara district, having 187 Sq. K.ms of Mangrove cover which constitute about 84% of the total coverage of the state, other 16% of total cover spreads over the coastal regions of other four coastal districts of Balasore, Bhadrak, Puri & Jagatsighpur with only 4 Sq. K.ms, 23 Sq. K.ms, 01 Sq. Km, and 07 Sq. K.ms respectively. In Kendrapara district, 164 Sq. K.ms consist of dense

mangroves whereas 23 Sq. K.ms is open mangroves. The total dense mangroves cover in all five districts of Odisha is 179 Sq. K.ms, whereas open mangrove cover is found to be 43 Sq. K.ms only.

Table – 1.1 District-wise Distribution of Mangrove cover in Odisha
(Area in Sq. K.ms, 2011)

Name of District	Dense Mangrove	Open Mangrove	Total
Balasore	02	02	04
Bhadrak	10	13	23
Jagatsinghpur	02	05	07
Kendrapara	164	23	187
Puri	01	00	01
Total	**179**	**43**	**222**

Source: Statistical Abstract, Odisha – 2012

Table – 1.2 Mangrove cover in different States/UTs, India (Sq. K.ms)
(2001 – 2011)

Sl. No.	State/UTs	Assessment year-wise/Geo. Area				
		2001	2003	2005	2009	2011
01	Andhra Pradesh	333	331	354	353	352
03	Gujrat	911	916	991	1046	1058
05	Maharastra	118	158	186	186	186
07	Tamilnadu	23	35	36	39	39
08	West Bengal	2080	2120	2136	2152	2155
09	Andaman & Nicober (UT)	789	658	635	615	617
10	Punduchery	01	01	01	01	01
12.	Damon & Diu (UT)	0	`1	1	1	2
	Total	**4482**	**4448**	**4581**	**4639**	**4663**

Source: India State of Forest Report - 2011

Mangrove cover in different states and UTs from 2001-2011 indicates mixed figures. The trend of growth of mangrove cover as estimated by India state of forest report shows a steady growth in some selected states and UTs where some states and UTs register a declining trend. It is estimated from the above table 1.2 that the total mangrove cover is highest in West Bengal with 2155 Sq. K.ms followed by Gujrat with 1058 Sq. K.ms. The UT of Andaman and Nicober stands with a mangrove cover of 617 Sq. K.ms stands third in all India basis where Odisha has a mangrove cover of only 222 Sq. K.ms with fifth position in 2011. It is also revealed that growth trend of mangrove vegetation is very steady in the states and UTs of West Bengal, Maharastra, Gujrat, Andhra Pradesh, Goa, Odisha whereas states and UTs like Kerala, Andaman & Nicober and Pudicheri have a delining trend of growth. The total mangrove vegetation cover in India in 2011 estimated to be 4663 Sq. K.ms which is concentrated over ten states and two UTs of India. It is also revealed from the table that the mangrove coverage in the state of West Bengal is the largest during 2001-2011 and there is a continuous increase in every successive year from 2001 to 2011. In Gujrat, the trend of growth of mangrove coverage indicates an increase over the preceding years during the same period. But the situation of mangrove coverage in Andaman & Nicober islands reveal a sad picture of declining trend from 789 Sq. K.ms. In 2001 to 617 Sq. K.ms in 2011. The overall picture of mangrove coverage in Indian states displays a mixed growth trend. In some pockets the trend is even discouraging with declining stage.

Table – 1.3 Mangrove cover in Odisha (Sq. K.ms) (From 1989 – 2011)

Assessment year	Geographic Area	% of Geographic Area
1989	192	0.12
19991	195	0.12
19993	195	0.12
1995	195	0.12
1997	211	0.13
1999	215	0.14
2001	219	0.14
2003	207	0.13
2005	203	0.13
2009	221	0.14
2011	222	0.14

Source: Statistical Abstract of Odisha – 2012

Table-1.3 reveals the fact that mangrove cover in Odisha from 1989-2011 registers almost a low percentage of growth over last two decades which varies between 0.12 percent to 0.14 percentage of total geographic area of the state. The mangrove cover and its spatial distribution along Odisha coast register a negligible increase over a period of twelve years from 1984 to 2011. The mangrove cover in the year 2003 registers a declining trend against preceding year and the same trend continues up to 2005 with a coverage of 203 Sq. K.ms. There is a slight increase of growth in 2009 and in 2011 with a meager growth of 221 and 222 Sq. K.ms. Respectively from the table it is also established that during the same period from 1989 to 2011 there is an increase of only 2% of coverage area of mangroves which is far from satisfaction.

Summary, Findings and Conclusion:
Basing upon the discussions in the previous chapters, it can be summarized that:

- The mangrove system of Odisha Coast has suffered in the hands of encroachers. This region has witnessed heavy influx of migrants from East Bengal and before abolition of Zamindari, large tracks of mangroves were leased to the migrants for agricultural purposes. As a result, the entire coastal belt mangrove vegetation suffers from heavy biotic pressure.
- With high growth of population mostly migrated population in and around the mangroves region, there has been frequent interface of man and animals and their habitat, the conflict is bound to arise.
- All the households of the area are mostly dependant on mangrove forests for firewood and timber. Besides there is a strong tendency of the local people to expand agriculture by encroaching more and more forest land. This tendency has resulted in reduction of mangrove coverage area to a great extent.
- There is a huge livestock population dependent on forest as there is no sufficient pasture land. During the cropping season these cattle depends on the mangrove forest for fodder. As a result, heavy degradation of mangroves occurs all along the coastal districts of Odisha.
- This area of coastal plain is frequently affected by natural disasters like flood, cyclone, tidal ingression which damage the mangroves to a large scale. There is no such agency to take up the restoration of mangrove plantation and protection measures in long term basis to preserve the ecosystem intact.

References:

1. Odisha Economic Survey (2015 – 16), Planning and Convergence Department.
2. Dr.S.Samal, Unpublished Ph.D. Thesis (2013) Sustainable Tourism Development of Kendrapara District in Orissa.
3. Statistical Abstract – Odisha (2012), Director of Economics and Statistics, Odisha.
4. M.C Dash, Fundamental of Ecology, 1998, Tata McGraw – Hill Company Limited, New Delhi.
5. G.C Ray, Geography of Orissa, 2009, Kitab Mahal, Cuttack.