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RESEARCH ARTICLE

TOURISM IN COASTAL WEST BENGAL OF INDIA: ISSUES, OPPORTUNITIES AND CHALLENGES

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ABSTRACT

Like all other coastal areas in different parts of the world, the southern coastal tract of West Bengal has also been attracting the visitors and recreationists not only from home but also from abroad which can significantly contribute to the development of tourism as well as regional development in the area under study. Digha, Shankarpur, Mandarmani, Talshari, Bakkhali, Gangasagar, are major such sites of beach tourism along with wildlife ecotourism in the world- famous Sundarbans in the southern parts of 24-Parganas Districts. The present paper attempts to highlight the nature, scope and extent of tourism development in coastal West Bengal along with environmental concerns and their management for the sustainable development of ecotourism. This is a study based on available data and information from the secondary sources substantiated with primary level observations. The objectives in the present context are the management of coastal tourism in general and coastal resorts in particular without hampering the coastal environment in the light of eco-friendly tourism development.

INTRODUCTION

One of the three important 'S's in tourism attraction is the 'Sea' along the coastal areas of many countries where vast sea beaches attract many recreational tourists. In addition, here one can enjoy the sea waves, tides, vast sandy beaches with healthy and comfortable weather. The beauty of sun set and sun rise also attract the tourists. So here all the three Ss are present (Rajesh, 2009). Sometimes beaches in the tropical countries attract foreigners for sun bathing, Ayurvedic treatment *etc.* So from the time immemorial people visit the sea beaches and coastal areas for recreation. In West Bengal, coastal area covers the southern part of South 24 Parganas and East Midnapore District. The southern portion of the South 24 Parganas consists of many islands and inlets with vast marshy land and Mangroves, popularly known as Sundarbans. This is an area of rich biodiversity and a biological hotspot. Here nature-based wildlife tourism as well as coastal recreational tourism has been developed. On the other hand, the coastal area of East Midnapore has several beaches of tourist attraction. In both the districts, the places of attraction are *Gangasagar*, *Bakkhali, Talshari, Digha*, *Kanthi*, *Shankarpur*, *Mandarmani*, *Junput*, *Kanthi*, *Nayachar, etc.* (Fig.1). In these areas along with the traditional beach tourism the fishing tourism has also been developed.

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Objectives

For the last two decades the coastal areas of West Bengal faced a rapid growth of mass tourism. Large flow of recreational tourists as well as excursionists visit the popular coastal areas like Digha, Mandarmani, Shankarpur *etc.* for recreation and picnicking which has created huge pressure on the fragile ecosystem of the coasts. The loose beaches are becoming more and more vulnerable. Uncontrolled and illegal construction of hotels and resorts, tapping up huge groundwater from underground as well as the heaps of garbage are destroying the scenic beauty and purity of the beaches along with severe erosion of the same. In this context the authors have tried to assess the extent of tourism development in the coastal areas of West Bengal along with the major burning issues relating to this mass development of tourism. So the objectives of the present study are:

- Extent of tourism development in coastal West Bengal
- Environmental concerns on the coastal areas
- Management of coastal areas in the line of sustainable ecotourism

Database and Methodology

Empirical method of research has been adopted for the present study and to do this both secondary database as well as field level information are used. Secondary data has been collected from different reports, research articles, books and websites. Both state government's websites as well as district websites

are useful in this regard. The authors have visited some of the coastal resorts for field verification as well as for collecting necessary primary information. For analysing and representing the data MS Excel, Adobe Photoshop, Google Earth, MapInfo, PCI Geomatica softwares are used.

Tourism in the Coastal Areas

Coastal environment act as magnet for tourists and recreationists for centuries but its role in leisure activities has changed in time and space in twentieth century (Hall *et al.,* 1999). To define tourism in coastal areas Pearce and Kirk, 1986 (cited in Hall *et al.,* 1999) identified three elements in the coastal environment:

- The *Hinterland* where accommodation and services are provided
- The *transit zones* or dunes and
- The *recreational activity zone* i.e. beach and sea.

Pearce, 1989 (cited in Rajesh, 2009) considered coastal tourism as the most significant form of tourism, with domestic and international tourist flows in many countries dominated by visitors seeking the eternal lure of the sun, sea and surf. Though the coastal tourism mainly focuses on the beaches for the last 50 years, the coastal and marine environment as a whole has become one of the new frontiers of world tourism industry (Hall *et al*., 1999). The main factors motivating tourists and recreationists to visit beaches are the cleanliness of site, type of beach material available, natural settings and familiarity with the site (Hall *et al.*, 1999). 'Over the past thirty years the coastal countries have shifted from traditional maritime activities such as fishing and boating, to a more service-oriented and tourism-dependent economy (Klein, 2004). Coastal areas of USA sharing increasing rate of international tourism and thus expenditure of beach nourishment also increases (Klein 2004).

Coastal Resorts of Wet Bengal: A Brief Outline

The study area for the present research work is the southern part of West Bengal which has long coastline with the Bay of Bengal and geographically is a part of Ganga estuary. Coastal West Bengal covers an area of 0.82 million hectare and extends 220 km (Chakraborty, 2010). The coastal area of West Bengal falls in two districts- East Midnapore and South 24 Parganas (Fig. 1).

East Midnapore Coast

The coastline of East Midnapore is 60 km long extending from Digha to the west bank of Hoogli estuary and is characterised by sand dunes, beaches, long shore currents and low vegetation coverage. The fine sand beaches of Midnapore have gentle foreshore slopes and provide a firmly packed hard sand surface for safe walking, playing, bathing and car driving. The East Midnapore coastal tract represents different habitats with contrasting ecological features (Chakraborty, 2010).

The major habitats are

- Talshari is located at the confluence of Subarnarekha estuary with the sea, a degraded tract of mangrove swamp is still in existence around the estuarine link of Talshari tidal and intertidal flats.
- Digha (Old and New): The Digha village was a health resort under the British Rule and was a popular weekend beach resort in West Bengal. The modern Digha thus is started to develop during the 18th century onwards.
- Shankarpur: 16 km eastward from Digha, is a well known fishing harbour and newly developed tourist spot.
- Mandarmani: It is a seaside resort village in the state of West Bengal, India and argued that it is the longest driveable beach in India. Geomorphologically, this area has relatively low waves than nearer tourist beach of Digha.
- Junput is a small village and a fish-landing centre, located 15 km east of Kontai. A good patch of mangroves has come up in the intertidal zone.
- Tajpur: Tajpur is the latest addition in tourist map of Bengal. The prime attraction of Tajpur is its pristine sea beach fringed with a dense forest of tamarisk trees. The beach is infested with infinite number of red crabs whose presence makes the beach look crimson (Chakraborty, 2010).

South 24 Parganas Coast

On the other hand, the coast of South 24 Parganas is comprised of islands, tidal inlets, and thick mangrove vegetation coverage (Chakraborty, 2010) and named as Sundarbans. The total area covered by Indian Sundarbans is about 4200 sq. km of dense mangroves. Sundarbans is a nature's school for eco-tourists (*tourism.gov.in, 2012). In the South 24 Parganas there are some coastal resorts along with the Sundarbans bio reserve and wildlife sanctuary. These are:*

- Nayachar Island covering an area of 46 sq. km is situated at the middle of the macro-tidal estuary of Hoogli River within the system of Bengal Delta. This is a relatively new, started accretion from 1945. It has a rich biodiversity with salt marsh grass and swampy mangroves. This is a place of poor fishermen and potential eco-tourist destination.
- Ganga Sagar is a famous Hindu religious site at Sagar Island and this is the place where Gangasagar *Mela*, the largest fair in West Bengal, is held on the occasion of *Makar Sankranti* (mid January). The fair attracts lakhs of pilgrims from all over India. Sagar Island is included in the Sundarbans delta system.
- Bakkhali: It is situated on the southern tip of Namkhana Block with small beach. Jambu Island, Henry's Island, Gangasagar, Nayachar are minor resorts of South 24 Parganas area (Pahari *et al*, 2012).

Development of Tourism in Coastal West Bengal: Empirical Findings

Two groups of tourists visit these areas: one group who are basically recreationists visit Digha and surrounding coastal resorts and the second group who are eco-tourists and seek to enjoy the wild lives in Sundarbans Bio-reserve.

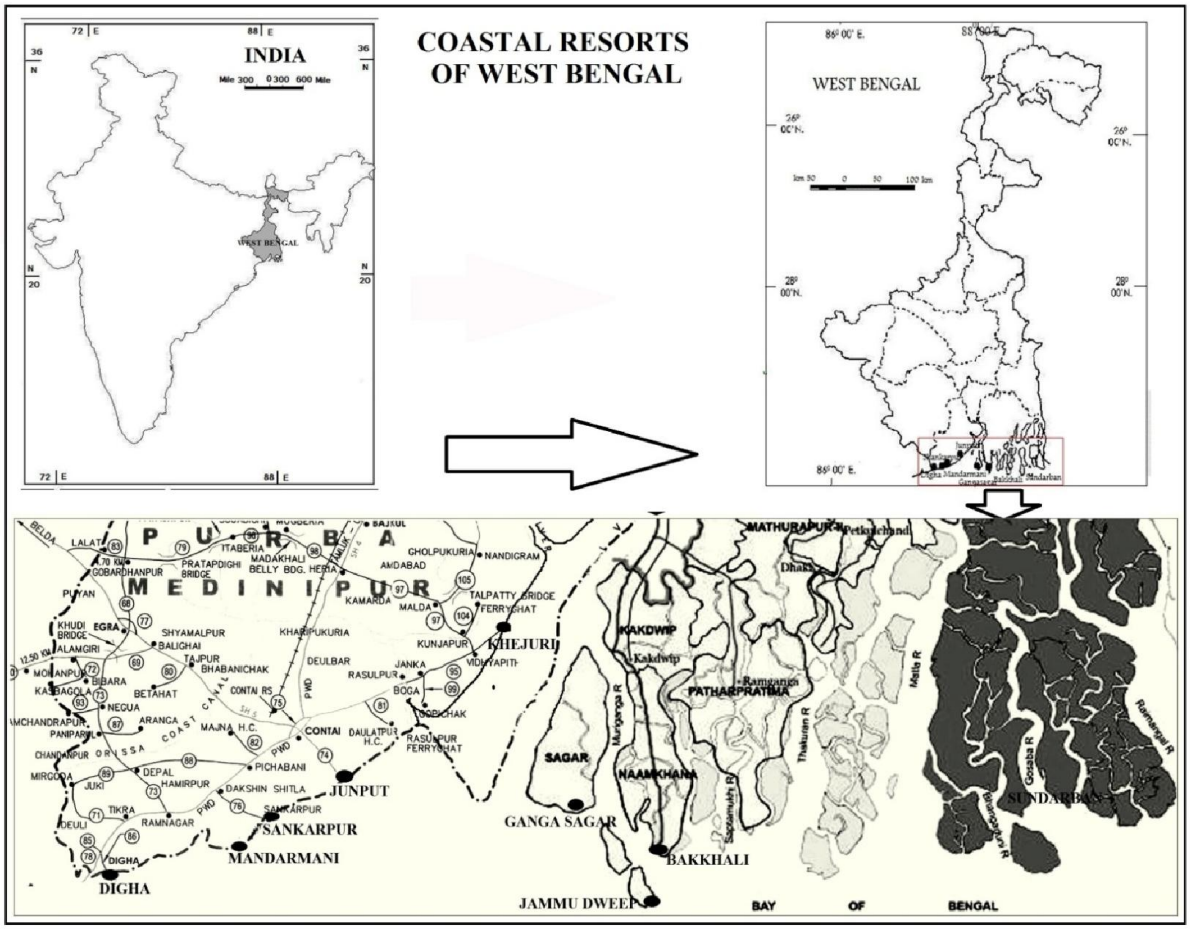


Fig.1. Location of the Study Area

East Midnapore Coastal Resorts

Digha was a village which was used as health resort during the British period and since then people started to visit this place for weekend trip and picnicking due to the attraction the triple 'Ss' and after independence the development of Digha started rapidly. Large number of hotels/lodges developed along with rapid urbanisation. The uncontrolled development without caring environmental resilience in the area led to attrition of beach of Old Digha and thus the tourism activity shifted to nearer beach called New Digha. With the increasing tourists flow to the coastal areas new destinations have come into existence- Shankarpur, Junput, Mandarmani, Talshari *etc.* With increasing tourists' visit the tourism infrastructures like, hotels are established rapidly at the above mentioned destinations. Most of these hotels are multi-storeyed and some of them are star hotels (Table 1). Digha gradually turned into a hotspot for tourists seeking recreation. At Digha-Shankarpur-Mandarmani coastal resorts the tourists flow has increased from 8 lakh to 32 lakh during past five years (The Statesman, 1.1. 2012).

Table 1. Accommodation, 2012

Coastal Resorts	3-star Hotels	2-star Hotels	Other	Total no. of Hotels
Mandarmani	5	3	28	36
Digha	6	7	12	25
Shankarpur	0	0	9	9

Source: http//makemytrip.com

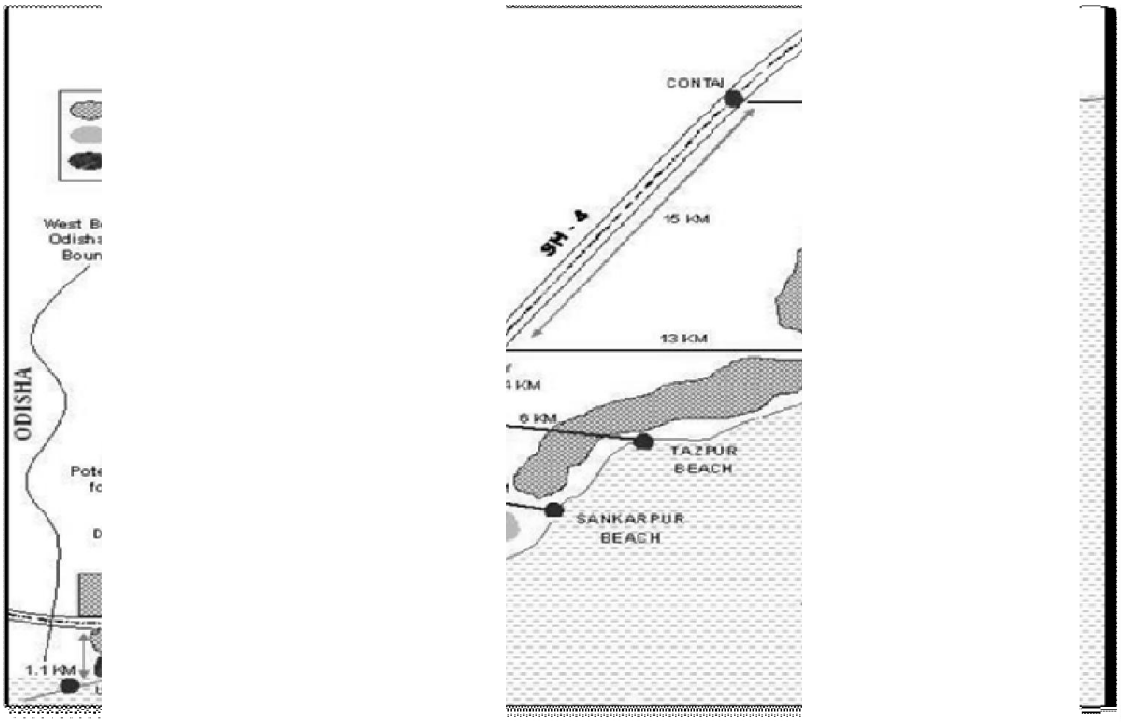
South 24 Parganas Coastal Resorts

The Bakkhali area is gradually attracting tourists, the major share of which are the middle-class people from Kolkata and surrounding districts and most of the them use it as weekend outing. Though tourism contributes least amount in the economy of the area but the trend of contribution is positively increasing. Both the tourist arrivals as well as the number of hotels are increasing along with the active involvement of local people. The tourist flow in the year 2010 is about 40,000 out of which 97% is domestic and 3% is foreign (Pahari *et al*., 2012). Gangasagar is the famous pilgrim centre where people go to earn virtue and for scenic attraction (Kundu, 2012). Sagar Island is well known for its 'Gangasagar mela' which is held at the last day of the month *Pousa* i.e. *Pousa Sankranti* although the general flow of tourists are being continued throughout the year for viewing the *'Kapilmuni Ashram'* and to enjoy other beauties of the area like, Sagar light house, solar plant, wind mill, Casuarina forest, deer park and sand dunes covered with Ipomoea biloba attract the local as well as outsider (Kundu, 2012). Here accommodation is provided by the Ashrams as well as some private lodges (85%) and the government (15%) (Kundu, 2012).

To enter Sundarbans one has to go Sonakhali via Canning, or Bagna via Dhamakhali. For the entrance into the areas of reserve forest one has to collect permit from Forest Department. Most of the tourism activity is limited in the

buffer zone where there are average visitors per year is 34390 between 1992 and 1997 (Project Tiger, 2001, cited in UNESCO, 2010) and about 40,000 were reported by UNESCO in 2002. There are eco-tourism centres at Sajnekhali, Dobanki, Netadhopani and Burir Dabri in STR and Bonie camp (Sundarikati), Bhagabatpore Crocodile Project, Lothian Island sanctuary and Kalash beach (State Forest Report, 2006-07) and lodges at Sajnakhali entry points, Bakkhali and Piyali. Visitors are to stay overnight on sightseeing boat (UNESCO, 2010).

watching on sand dunes resulting in the collapse of dunes, bathing in beaches, car driving and horse riding have been developed and threatening the coastal environments (Chakraborty, 2010). The drastic reduction and lowering of Old Digha beach is a result of such uncontrolled human activities. Waste disposal from the tourist centres of Digha and nearby fishing harbours contributes pollutants into the nearby estuaries and salt marshes (Chakraborty, 2010).



Source: Ministry of Tourism, Government of India,2012

Fig. 2. Coastal Resorts in East Midnapore

Environmental Issues related to Tourism Development in Coasts

The increasing flow of tourists in West Bengal has led to the inflow of tourist in the coastal areas also, which results in the increasing pressure on coastal environment (Table-2). The growth of hotels along the coasts violating the CRZs is another burning issue in the coastal areas. Beach and dune erosion are the major environmental concern of this region because of anthropogenic activity, recreational exploitation and unplanned urbanisation (Chakraborty, 2010). Steady decline of total landing of different fishery resources at Digha-Shankarpur-Junput Coastal areas is observed due to huge amount of eroded sediments and fly ash along with industrial discharges in the areas (Chakraborty, 2010). Digha Coast is the second highest revenue-earning tourist spot of West Bengal after Darjeeling. Accordingly different forms of tourism activities like, unprecedented construction of hotels and lodges just within the range of few hundred meters behind the sea wall, heavy installation of tube wells into the dune bank resulting in the collapse of subsoil layers, picnicking under the shade of casuarinas trees on the dune surface, walking and bird

Around 40 lakh people visit this coastal spots annually and huge extraction of ground water by the hotels owners as well as villagers, municipalities results in the percolation of salt water into the ground water and cause ground water salinity (Chakraborty, 2010). Digha, once called the "*Brighton of the East*" has turned into a garbage dump with plastic and litter everywhere due to abrupt rise in tourist flow. The famous casuarinas forest off Digha coast has lost its charm (The Statesman, January-1, 2012). The other part of Bengal Coast is Sundarbans which has also been badly affected by the visitors. Currently Sundarbans is nothing more than a picnic spot and visitors who go to the Sundarbans do so to have fun without bothering about the ecology. During the day, they feast on board, litter the creeks and rivers with thermocol plates and plastic bottles and dancing to loud music at night while the boat is anchored mid-river (Times of India, 29.11. 2012). Not only Sundarbans, pollution problem is a universal problem in all tourist destinations in West Bengal.

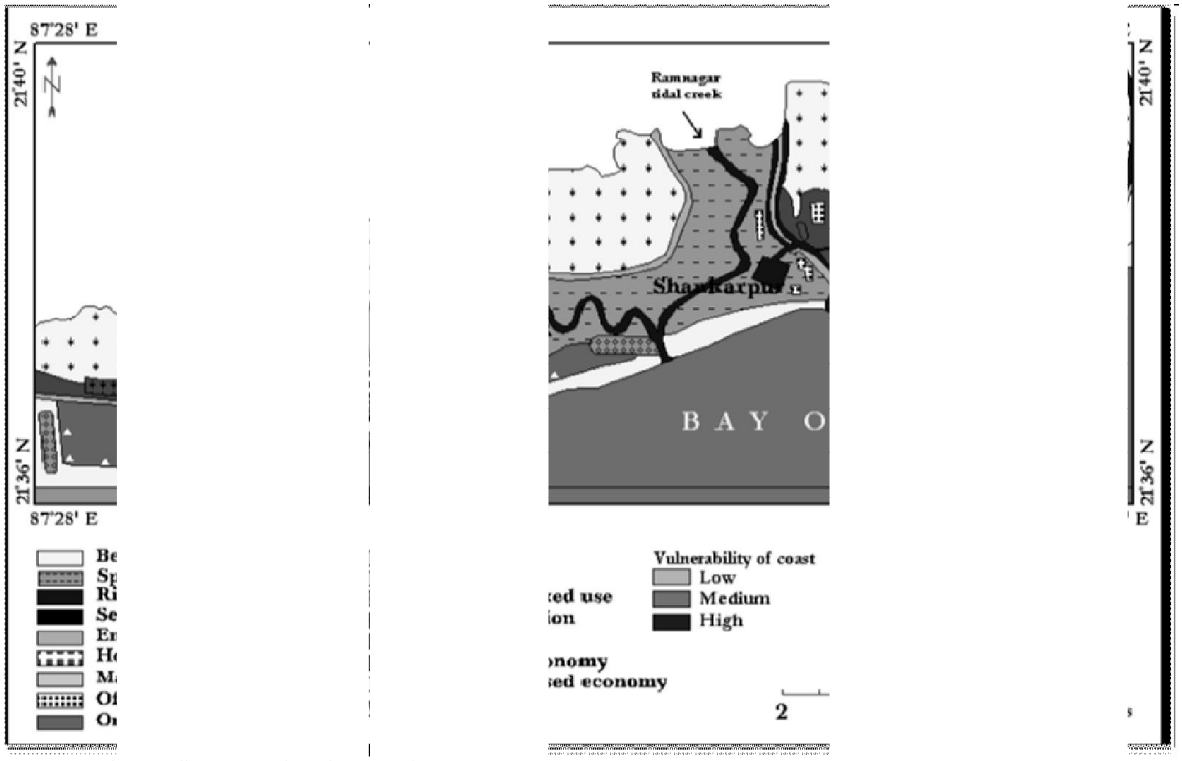
Violation of CRZ in West Bengal Coasts

In view of the degradation of coastal environment and uncontrolled construction activities along the Coastal areas,

Table 2. Major opportunities and challenges in coastal resorts of West Bengal

Locations	No. of Visitors (Per Annum)	Quality of Infrastructure	Visitor Attractions	Demand Driver	Main Challenges
New Digha, Digha	10 lakh	Power supply: Needs improvement Internal Road: Adequate Civic Amenities: Poor	Sea Beach with undulating waves, Marine Aquarium, Science Centre, Amaravati lake and park, Toy train, National Cashew Garden, Colourful sails of fishing trawlers, Rising sun through the screen of Casuarina trees. Chandaneswar Mahadev Mandir	Weekend getaway for middle-class	Sea encroachment Dirty Beach, Shacks Poor Waste Mgt. Crowded
Shankarpur	1-2 lakh	Power supply: Poor Internal Road: Adequate Civic Amenities: Poor	Fishing Harbour, Mohana & Vishwa Matswa Bazar, Beach walk, Red Crab	Potential Attraction for the Nouve-rich	Poor Accessibility Poor Waste Mgt.
Tajpur	1.5 lakh	Power supply: Needs improvement Internal Road: Adequate Civic Amenities: Poor	Spectacular beach with casuarina trees.	Potential Attraction for the Nouve-rich	Sea encroachment Poor Waste Mgt.
Mandarmoni	3-4 lakh	Power supply: Needs improvement Internal Road: Adequate Civic Amenities: Poor	16 km long sandy beach with tranquil sea and softy waves	Potential Attraction for the Nouve-rich	Sea encroachment Poor Waste Mgt.
Junput	Less than 50,000	Power supply: Needs improvement Internal Road: Adequate Civic Amenities: Poor	Fish processing industries White sandy beach	Exclusive, Quiet un-spoilt Resorts	Poor Accessibility Poor Waste Mgt.

Source: Ministry of Tourism, Government of India, 2012



Source: Chattopadhyay, 2012 based on map from DSDA

Fig. 3. Land use and vulnerable points at Digha Coast

MoEF issued the CRZ notification declaring coastal stretches as Coastal regulation Zones and regulating activities in the CRZ. As per this 500 M on the landward side from the High Tide Line and the land area between the Low Tide Line and High Tide Line including 500 M along the tidal influenced water bodies subject to minimum of 100M on the width of the water body whichever is less is declared as CRZ areas. Based on several ecological parameters, the CRZ areas are classified into four categories namely:

CRZ-I- A- The areas that are ecologically sensitive and the geomorphological features which play a role in maintaining the integrity of the coast;
CRZ-I- B- The area between Low Tide Line and High Tide Line;
CRZ-II- The areas that have been developed up to or close to the shoreline;
CRZ-III- Areas that are relatively undisturbed and those do not belong to either CRZ-I or II which include coastal zone in the rural areas (developed and undeveloped) and also areas within municipal limits or in other legally designated urban areas, which are not substantially built up.
CRZ-IV- A- The water area from the Low Tide Line to twelve nautical miles on the seaward side;
CRZ-IV- B- Shall include the water area of the tidal influenced water body from the mouth of the water body at the sea up to the influence of tide which is measured as five parts per thousand during the driest season of the year (MoEF, 2006).

Coastal tourism plays a significant role in the economy of many states of India including West Bengal but it may also degrade resources and cause environmental pollution (Noronha, 2000). Tourism development may result in haphazard tourist infrastructure development along the coast. In Mandarmani of West Bengal such growth is prominent. Some of the hotels and resorts along the beaches are found to dump their waste into the sea. Litter on the beach may affect not only the aesthetic beauty of the beach but also sand dune vegetation. Due to excessive anthropogenic interventions in recent times Digha is facing multitude of problems that have serious repercussions on the coastal ecosystem. Blatant usage of natural resources, flagrant violations of CRZ rules, unauthorized constructions along the sea shore, discharge of solid waste in a brazen manner is someway pushing Digha on the brink of an impending catastrophe that is beyond redemption (DSDA project summery, 2005). Gangasagar Island is categorised as CRZ-I subject to continuation of existing traditional rights, special rights and customary uses. For Digha Development Area, sectors A-l, B-5, F-1, H-1 and N are categorised as CRZ-III.

Management of Coastal Zones through Tourism Development

If tourism is properly controlled, it can create the conditions necessary to support the process of conservation through productive planning and comprehensive management (Salam, 2000). Ecotourism interests can also convince local people that their resources are as, if not more, valuable when intact than when extracted from the ecosystem. When a user fee or visitor admission fee structure is imposed, real economic incentives for protected areas can catalyse their formulation. Thus it encourages the use of indigenous guides and local products. It claims to combine environmental education with minimal travel comforts, help protect local flora and fauna and provide local people with economic incentives to safeguard their environment. Local people, including poachers, may act as guides, thereby benefiting economically, and consequently they will protect the wildlife as well as the forest. The relationship between tourism and conservation can be a symbiotic one. The benefits that a well-managed coastal area can accrue to the tourist industry are clear; however, tourism can also facilitate the protection of coastal areas (Salam, 2000).

Promoting Eco-Tourism and Avoiding Mass Tourism

Ecotourism interests can also convince local people that their resources are as, if not more, valuable when intact than when extracted from the ecosystem (Salam, 2000). When a user fee or visitor admission fee structure is imposed, real economic incentives for protected areas can catalyse their formulation (Salam, 2000). Ecotourism hopes to change the unequal relationships of conventional tourism. Thus it encourages the use of indigenous guides and local products. It claims to combine environmental education with minimal travel comforts, help protect local flora and fauna and provide local people with economic incentives to safeguard their environment (Salam, 2000).

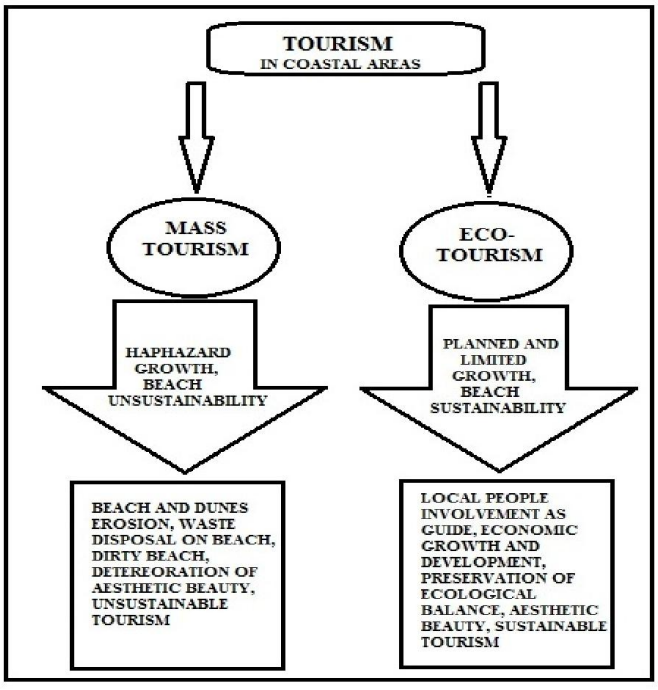


Fig. 4. Eco-Tourism versus Mass Tourism

Nature based tour operators must possess strong knowledge of, and an even stronger affinity for, natural areas (Salam, 2000). The knowledge must extend to the natural history of the area, flora and fauna, and an understanding of the ecological processes that sustain their existence. Operators must not only have a dedicated love and knowledge of the areas visited but also posses the skills necessary to cope with the rigors of

managing a tour (Salam, 2000). Operators identified a variety of competencies, including vehicle maintenance, bushcraft, the pitching of tents, the assessment, management and avoidance of risk, cooking, cleaning and skills that minimise impact on the environment (Salam, 2000).

Conclusion

Erosion in the coastal areas of West Bengal is a common problem although not all erosion causes are related with tourism despite large scale mass tourism and the unplanned infrastructure development violating CRZ norms may accelerate the coastal erosion. As already mentioned above the unplanned growth of hotels and other associated tourism infrastructures cause threats to coastal ecosystem, beach sustainability and aesthetic beauty of the coasts. These all put impact negatively on the coastal habitat as well as tourism. Driving, playing and constructing on the dunes may accelerate the coastal erosion. The huge potentiality of tourism development in West Bengal Coast must be utilised to raise the economy of the coastal people and management of the coasts.

Comparatively low rate of erosion is found in New Digha due to gentle slope of beach, low energy spilling breaker and wider beach. In Shankarpur East upto Jalda, the condition is between that of Old and New Digha and due to impact of wave at a high angle here, the erosion is more. Due to moderate wider beach with gentle slope the spring tide reaches the unprotected coastal cliff as a result high rate of erosion occurs (Samanta *et al*., 2012). Taking into account this issue the Government of West Bengal should take immediate step to control the abuse of beaches by the tourism activities for the sake of beach sustainability and sustainability of tourism. Here one thing can be highlighted that part of Digha Planning Area from new Digha Youth Hostel to Hotel Sea Hawk-Barrister colony may be declared as CRZ-III according to the guidelines of Ministry of Environment and Forest, Government of India and the rest should be categorized under CRZ-II. The area between 200 to 500m may be allowed as a restricted area for multi-storied buildings. In this area the buildings may be constructed only with the prior permission of Ministry of Environment and Forest, Govt. of India and it should not more than 7.5m tall (Samanta *et al*., 2012). A long continued and intensive investigation is needed to understand this interplay between coastal and sub-aerial process in order to propose a rational management plan for reduction of erosion or damage. The coastal Sundarbans which fall in CRZ-I is more vulnerable and thus needs special attention. The large scale tourism development should be prohibited in this ecologically sensitive rich biodiversity zone. The mega tourism projects in this area should be stopped immediately. Only responsible eco-tourism can be introduced in small scale for better management of the coastal ecosystem as well as sustainability of tourism.

REFERENCES

Binns, Tony and Etienne Nel. 2002. Tourism as a local development strategy in South Africa, *The Geographical Journal*. 168(3):235-247

Chakraborty, S. K. 2010. Coastal Environment of Midnapore, West Bengal: Potential Threats and Management, *Journal f Coastal Environment*. 1(1): 28-38

Digha Shankarpur Development Authority (DSDA). 2005. Project Summery, 2005

Hall, O. M. and Page, S. J. 1999. *The Geography of Tourism and Recreation: Environment, Place and Space (2nd ed)*, Routledge, London and New York. pp283, 293-294

Http//.citeseerx.ist.psu.edu/viewdoc/download?doi= 10.1.1.124.4226

http//makemytrip.com

IL & FS Infrastructure, 2012. *Identification of Tourism Circuits across India, Interim Report, West Bengal.* Ministry of Tourism, Government of India (retrieved on 22.11.12 at 11 pm, from *tourism.gov.in/writereaddata/CMSPagePicture/file/.../WestBengal.pdf)* pp13, 23, 32, 36-37

Klein, L., Y. Jeffrey P., Osleeb and M. R. Viola 2004. Tourism-Generated earnings in the Coastal Zone: A Regional Analysis, *Journal of Coastal Research*, 20(4):1080-1088

Kundu, S. K. 2012. A Study on Tourism Potentialities and Problems in Sagar Island of West Bengal, *Golden Research Thought*, 1(8).

Noronha, M. L. *et al*. 2000. *Coastin*, A Coastal Policy Research Newsletter, TERI, New Delhi p.3

Pahari, D. P. and Bandyopadhyay, S. 2012. Prospects of Tourism, Its Environmental Problems and Management at Bakkhali Coast, 24 Parganas in West Bengal, *West Bengal: Geo-Spatial Issues*. ed. N. C. Jana. Department of Geography, The University of Burdwan, Burdwan.

Rajesh, K. 2009. *Coastal Tourism in Kerala: Its Impact on Economy and Environment* (PhD thesis), Faculty of Social Sciences, Cochin University of Science and Technology, Cochin-16. Pp.22-23.

Salam, M. A. G. Ross and M. C. M. Beveridge. 2000. Eco-tourism to protect the reserve mangrove forest the Sundarbans and its flora and fauna. (accessed from www.aqua.stir.ac.uk/public/GISAP/pd on 7-1-2013) pp. 5-9

State Forest Report, West Bengal 2006-07. Directorate of Forest, Government of West Bengal.p126.

UNESCO. 2010. *Sundarbans National Park: West Bengal, India.* United Nations Environment Programme, World Conservation Monitoring Centre. p6

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