

Digha Sankarpur Littoral Tract A Geographical Case Study.

Manojit Mandal¹ Mr. Pijush Kanti Dandapath²,
Dr. Shashi Bhushan³

¹ *Research scholar , Department of Geography, Ranchi University, Ranchi, Jharkhand, India.*

²*Research scholar of Ranchi University, Ranchi, Jharkhand, India and
Assistant Professor of Geography, Bajkul Milani Mahavidyalaya, West Bengal, India.*

³*Associat Professor, Department of Geography, K.O. College, Gumla,
Ranchi University, Ranchi, Jharkhand, India.*

ABSTRACT: *This paper assesses the relationship between coastal physical condition and cultural aspect. In depth study along on coastal dune morphology along Medinipur coastal track shows that sea levels remained very dynamic during the Holocene period. Evidence of Holocene sea level changes is found which were responsible for the origin almost parallel distinct dune colonies through the geological past along this coastal track. The existence of tropical-monsoon climate with its seasonal phenomena plays an important the barrier property of dunes as well. In these paper possible biological interactions between sand mass of dunes and vegetation in different stages of development has also been dealt. The present paper is an attempt to understand and examine the nature based resources development of Digha-Sankarpur, West Bengal coast which is an emerging industry and a wide scope of Eco-tourism and natural resources along the coast of Digha-Sankarpur, WestBengal.*

Keywords: *Coastal dunes, sea level change, vegetation, seasonal change, coastal track.*

I. INTRODUCTION

To harness the scenic beauty of coastal belt eco-tourism industry has developed at Digha-Sankarpur with enormous potential and economic, socio-cultural process of this place and its surroundings. Digha-Sankarpur is twins small sea side resort in the state of west Bengal, India. The coastal stretch of West Bengal with a length of about 350km comprises the two districts- Purba Medinipur(East Midnapur) and Dakshin Chabbisparagana (South 24 Paraganas). This region (Like- Digha, sankarpur,Tajpur, Mandermony, Sagar Island, Bakkhali etc) is a transitional zone in-between sea and land where the Casuarinas and mangrove forest are whispering, sea are roaring, the flora and fauna are blooming and where visitors can rejuvenate yourself in the company of sand, sea and sun in the pristine open air which has kept her doors wide open to established the eco-tourism destination.

The coastal area of West Bengal extends over 0.82 million hectors and 220km of coastal line. Muddy coast accounts for 350 km, of which 90% are treated as marshy zone having halophytic vegetation and their associated flora and fauna; only around 40km is considered as sandy belts. It includes two coastal districts – The South 24 Parganas, supported by Sundarban Mangrove Ecosystem and Midnapore Coast having sand flats and degraded mangrove patch. Indian part of Sundarbans occupies mangrove area (4262km²) slightly more than that (4109km²) of highly reclaimed counterpart in Bangladesh (Chaakraborty,2011).

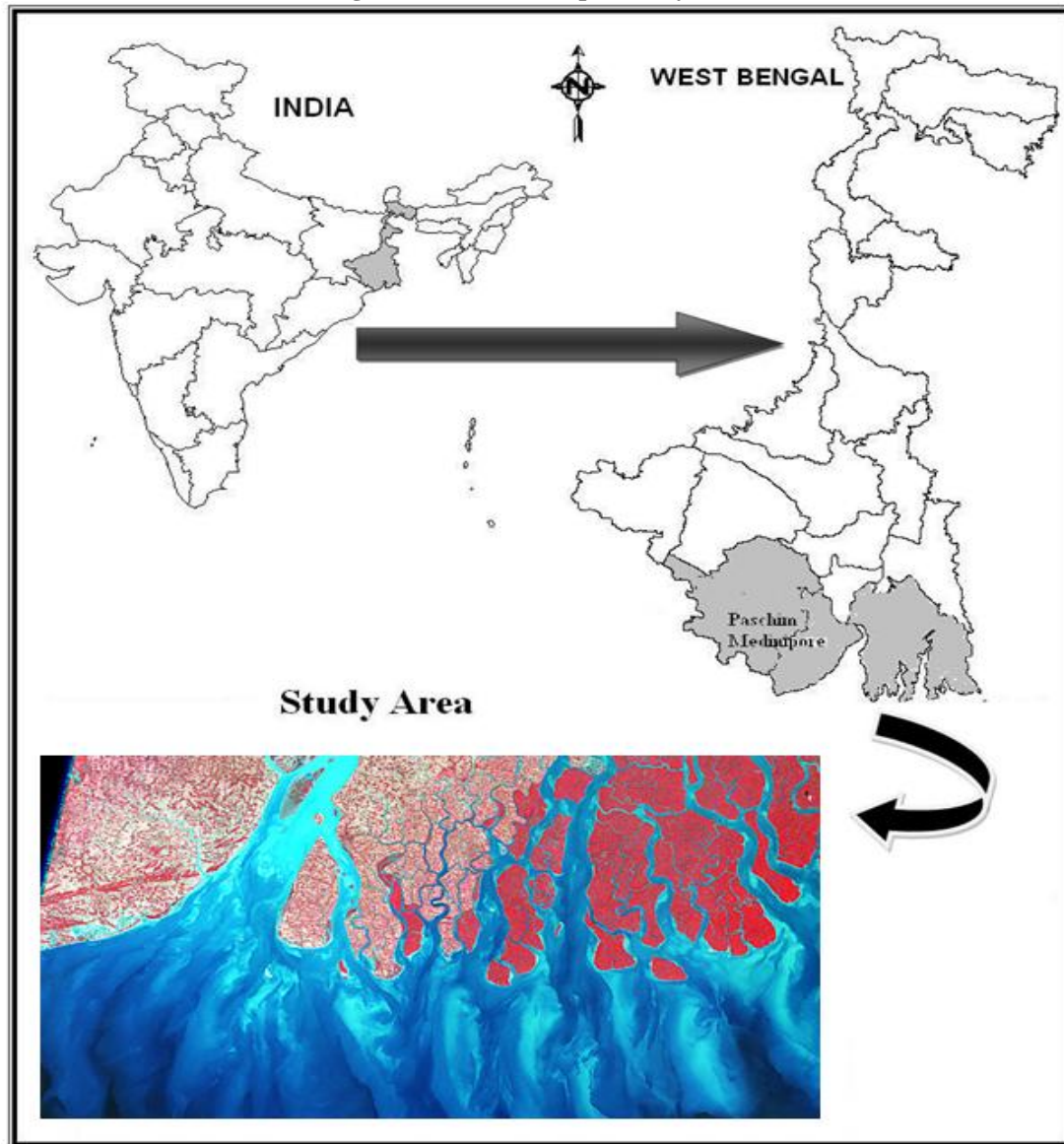
The coastal belt of Midnapore district represents 27% of West Bengal of coastal tract (60km) extending along the west bank of Hooghly estuary from New Digha and then curving around Junput, Dadanpatrabarh, Khejuri and Haldia on the east to the further north east upto Tamluk or even on the bank of Rupnarayan. In West Bengal, three seasons are very much pronounced (premonsoon, monsoon and postmonsoon), each with four months duration and are mainly governed by rainfall and temperature (Chakraborty et al., 2010).

II. LOCATION AND REGIONAL SETTING

Digha – Sankarpur area is a part of Contai coastal area of Purba Medinipur district, West Bengal. This area lies in the coastal tract of adjoining Bay of Bengal and boarder of West Bengal and Orissa. The costal area of Digha-Shankarpur-Chandpur – Jaldha(Fig 1) is located in the SOI toposheet No. 73-O/6 and 73-O/10. The extents of the study area is between latitudes -21036'50"N and 21030'00"N and longitudes 87029'40" E and 87037'00"E . The width of the area is 2.5 to 3.0 Km from the low tide level and length is 14 Km from the Orissa border to the Jaldha Mouza. The Digha planning area comprises of 42 mouzas under Kanthi sub-division of which 17 mouzas are in Ramnagar Police Station and 25 mouzas are in Digha Police Station. Total area of this

planning area is 8752.63 acres. The area includes both of urban and rural areas. The urban area is situated along the coast in the western part, known as Old and New Digha.

Figure 1. Location Map of study area.



III. OBJECTIVES

Geography presently considered as a science which deals with the natural phenomena of the earth and its inheritance who live on it man is taken the central figure among all creatures of the planet but the relationship between man and this environment extremely complicated. It is, therefore of greatest significance in geography to bring a close relationship between man and environment which surrounding him. As the environment varies from place to place the interrelationship between man and surrounding also changes. These variations are the main attraction for field study and the analysis of the degree of relation in the intensity of influencing the main mode of livelihood by the different elements of environment is the main object of field study. Selection of the area for field study depends upon the following points-

- i. To study the geology of the area.
- ii. To study how the underlying geology reflects the landform pattern of study area
- iii. To study the process of urbanization and assessment of the existing condition depending upon the existing landform.
- iv. To study the life-style of people.
- v. To identify the urban problems.

IV. METHODOLOGY

The studied the land use, socio-economic as well as socio-cultural condition of the area. Now only that present problem of the area are also studied. However before mapping, variables are grouped into and broad division-(i) general physical characteristic, (ii) population characteristic, (iii) occupational structure, and to do this various statistical method are used and also applied various cartographical techniques for comparative study.

V. HISTORICAL BACKGROUND OF DIGHA – SANKARPUR AREA:

Digha was known as a holiday resort since Eighteenth century. During the British rule The East India Company constructed a few houses at this remote village just to enjoy the calm and quiet sea in their holidays. Warren Hasting the first Governor General of British India has constructed his holiday bungalow near sea beach in 1775. This is now approximate 2 km. in to the sea. The scope of exploring the natural beauty of the sea those was not considered effectively till 1923 when an English business man residents in Kolkata, realised covered this nature's queen from information published in some old news paper and journals. The dynamic business man related the potentiality and scope of tourism development that this rural coastal belt was capable of confine than District Authority of Medinipur to take the initial measures for development of Digha.

VI. GEOLOGY

The study area consists of sand, silt and clay covering successively by beach. Zone of dunes and inter dune belt of recent formation. However in the Sankarpur area the development of dune feature is less conspicuous. Geology they are marine region together with some fluvial and aeolian sediment. To north of the dune belt there lies the older Pleistocene formation belonging to Eocene age up to 10 km. north of Digha.

VII. PHYSIOLOGY

The general surface of the region is more or less flat with a very gently gradient towards the clay, embankment made for protection from high tide waves and sand ridge are the only exception. The sand ridge dunes from east to west though the old and new Digha upto Subarnarekha basin in the west. The study area is a dissected by a number of tidal channels – Ramnagar Khal, Sankarpur khal, Jalda Khal etc. A Digha proper beach is slightly less wide and widens westward to a width of over one km. The sand dunes are the most outstanding morphological feature of the coastal tract. These dunes generally rise upto 12 km. though the height descends toward the east. The inter dune tract is flat and generally dry the dunes may shift their location under the influence of strong summer wind. The dunes are transfers in future with in an assigned distance from sea the characters of the dunes change. They are most suitable and more under vegetation cover toward north.

The Old Digha's coast is severally eroded by the erosion sea winds. It is also threatened by dunes migration. An attempt has been made to construct long blocker-byke on the limit of wave approach but the system is not suitable to prevent the natural dynamic of sea. For the stabilisation of the dune casuarina trees are not much suitable in the cyclone prone coast as most of the large casuarinas are uprooted by storm or cyclone.

VIII. SEA BEACH

The beach area of Digha is known to be a marine erosion prone area. The report is lying midway between the huge Ganga delta in the east and Mahanadi delta in the west. The materials of beach consist of mainly sand with clay and the dune material is made up of fine sand. The beach in the area is smooth and uniformly sloping (average 1:75), on the other hand side, the beach is bounded by dune cliffs. The shore line from Mohana to the east in Sankarpur region is relatively stable. In the far west near the Digha border it is accretion and meandering. But the entire strip, where the Digha townships is located in between is an eroding type, which is main concern for this report.

IX. SAND DUNES

Sand dunes run parallel to the coast through Digha from east to west. The dune in this region creates problems for the township area. Dunes are migratory and after engulf the surrounding land and this is due to wind blowing from the sea. These features are mainly conspicuous in the last of Moharaviz. The village Gobindapur which has been invaded by marching dunes. They have engulfed and degraded the agricultural lands which have become bounded by the village.

To sustain the development of the area certain measures have to be taken. The stabilised dunes should be left intact and no development which will change the shape size and contour for the dunes shall be allowed. Afforestation the most effective method for the checking the movement of sand to stabilise the sand dune should be encouraged and a great action has been taken to that right from the Orissa to Chandapur point in Sankarpur area.

X. SOIL

The soil in this area comes of interaction of river and tides. Therefore soils of the area under study are (a) alluvial soil (b) sandy soil (c) saline soil. Alluvial soil is mainly found to wards in land form the coast. This is very fertile from the coast in nature and therefore different type of crops mainly rice, vegetable are grown. Sandy soil is available on the sand dunes and is generally devoid of organic matter. In the belt of spill basin and along the shore line where tidal water plays a grace role. Saline soil is found in this area a no of salt pan is located.

XI. CLIMATE

The salubrious climate of this coastal belt in the prime factor which advocates development of Digha-Sankarpur as a resort for the summer days (March-June) normally the temperature dose not exceed 30o C and in winter (Nov-Feb) it seldom falls below 20o C. this your during winter the temperature drops below 10oC which is the lower in the decade. During the summer month moderate wind blows form the south-west and normally continues during the monsoon (June- Oct) and winter gentle bracts from north to south-east. The monsoon generally starts in the first week of June and normally condition up to September and some time extends upto middle of October but the trend trend of maximum intensity of rainfall recorded in the area identifies the period between July to September.

The monsoon is generally associated with depressions which rarely intensifies to a cyclonic storm but at the initial stage and the recession stage of the monsoon. The accurate of medium intensity storm with strong wind blowing from south-east to north-west is very common in the stage area. The occurrence of heavy cyclone at least once is every attenuate your is very common feature of this region and is about 4th times higher then the Arabian sea. The high intercity cyclonic storm generally originate is the Bay of Bengal with in 200 Km to 500 Kms from the shore line during the pre-monsoon or post monsoon period.

XII. DRAINAGE

The area a general slope from north to south. The Digha-Sankarpur canal runs from north to south keeping Old Digha in the west and Sankarpur runs the Jalda khal. Actually all those canals are tidal creeks. Through which the tidal water enters inland during tide and cyclones. These canals and there surrounding areas form spill basin as shown in the map.

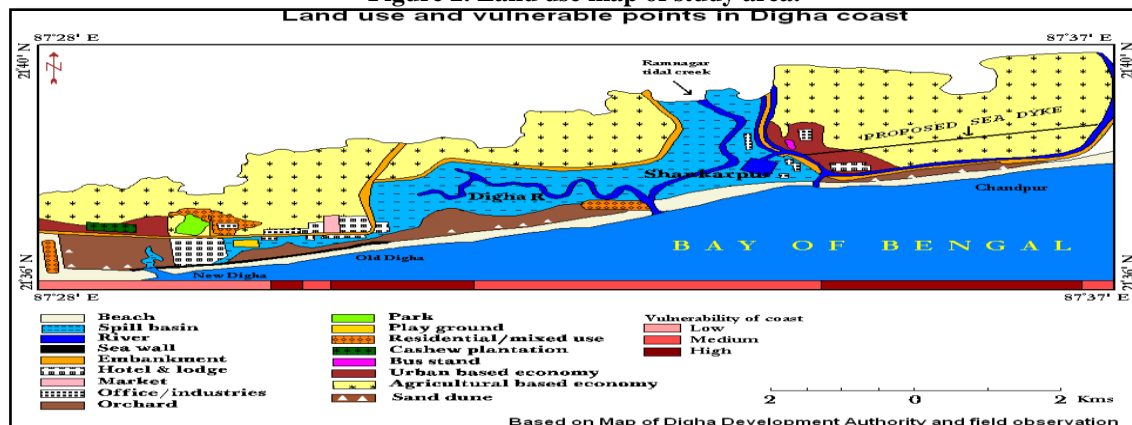
XIII. EMBANKMENTS

To protect the agriculture land and other lands from the coming sea attack the central area and some part of the inter or region are hounded by sea dykes or embankment, which enclose 60.30har of land (1.6%) and these embankment are also used as roads in area. The embankment runs from Old Digha to west of jurats enclosing spall bar in Digha-Sankarpur area. Jalda estuary and Dadanpatrabard soit pan.

XIV. EXISTING LAND USE OF THE AREA

Land use is most important aspect by which we know the actual use of the land at present stage and which is essentially regeared under section 28 of the West Bengal town and country planning Act 1979. Digha-Sankarpur region comprise parts of two police station, village and post office –Digha and P.S.-Ramnagar. The enter area has 42 mouza. The study area covers 37 sq. km. of which 23.3 sq. km. belongs to Digha P.S. and 13.7 sq. km. to Ramnagar P.S. The prulongment pattern of the land use in this region is agriculture along with fishery and forest areas. Nearly 288 hectors of land or 8% is eroded away by the sea. The urban area is situated along the westing the western part protected by embankment and known as Old Digha and New Digha township.

Figure 2. Land use map of study area.



i. Mouzas belongs to the area:

Paschim Gobardhanpur, Khadalgobra Bhagi, Bahrapur, Pasandpur, Ratanpur and part of Jatimati, Champabani and they are all located along the coastal line in western part of the area.

ii. Residential area:

The western part (New and Old Digha) where the urban area is situated may be called a developed and only 275.48 hector (7.47) of the land are used as residential area. It includes both urban and rural settlement in the entire area close to the west. The settlement is urban area in nature whereas north of urban settlement lies the settlement. The settlement pattern is compact in pattern in urban area and in rural area most of the settlements are linear in pattern.

The rest of the build up area in this region is occupied by numbers of hotels and holiday home as tourism as industry grew here and used for commercial process. Shops and markets grow here and commercial activities grow all along the main thoroughfare viz. Ferozsho road in both Old and New Digha. In addition to these several government buildings can be found which are used for administrative purposes side by side with day by day public works. These include post office, bank, hospital, police station, which come under urban public utility functions of this region. The 'Mohana' (spill basin) is depopulated due to physical conditions. The rural settlement preserving rural characteristics and standards limits in most patterns wherein the village is narrow and forms enormous difficulties for introducing modern urban services.

iii. Agriculture:

From the table it has been found that the area is predominantly agricultural comprising 1827.97 hector of land on 47.63% of the total area the eastern part of the region, known as Sankarpur region is predominantly occupied by agriculture other rural activities. Though a limitation of this region is occupied by government lodges and ice factories. The land is rich and well supplied by irrigation water through canals and numbers of tanks, scattered in this area agriculture is predominant in the western part along northern fringes of urban area. Plantation agriculture is found in this area paddy is the main crop.

iv. Industrial and public utilities:

The region has no major industry. Fishing is the main industry here. Some ice factories relative to fishing industry are located along the Digha Contai road near Alankarpur and Sankarpur. Public utility includes hospitals, educational institutions, administration and communication functions. In this respect only 26.34 hector of land (0.71%) are used and is mainly found in the developed area in Old and New Digha.

v. Commercial Activities:

Commercial activities predominate in both Old and New Digha township areas and about 22.55 hector of land (0.61%) is used for this purpose. The area has a daily market in Old Digha side by side the New Digha is also growing day after day commercially. The daily market functions are also seen during the season when the tourist flow increases. All market functions in the rest of the region in rural areas are met by the weekly 'HATS' and other permanent market centres in Ramnagar town which lies outside the Development Authority area.

vi. Transportation:

Digha-Sankarpur area is connected by metalled road to Kolkata in the north and Medinipur town in the north-west. The Digha-Howrah is extended upto West Bengal border and enters in Orissa. The Government bus terminals were created at New Digha (SBSTC) but CSTC are terminated at Old Digha near cheap canteen. The private bus terminal is located at Orissa border. Recently a by-pass road connecting New Digha and Old Digha has been constructed to extend the town towards north. Sankarpur region where the fishing member is nearly constructed the area is connected by a new metalled road to the Digha – Contai road at Houdda mail and it is the only road connecting Sankarpur with the rest of the region. Another metalled road connecting Chandpur cant near the sea coast. The Digha-Contai road near Baleswar in the eastern part is used mainly for transporting fish to the urban centre. Rail station of Digha is located at middle point of Old and New Digha. This rail line is connected to South Eastern Railway main line at Panskura.

vii. Forest

The forest resulting from afforestation prevents wind and sea erosion and is mainly found in the western part of the 372.77 hector (10.11%) . the mouza Paschim Gobardhanpur excluding some parts is entirely covered with forest.

viii. Fishery:

Fishery is one of the important livelihoods here. It occupies 493.18 hector or 13.38% of land. Here the fishing port with all modern facilities known as Sankarpur harbour. Which is connected by a metalled road and a

canal to the Digha-Contai Road is situated and it reaps the fishing in destroy harbour but sea fish market is located in Old Digha for better communication. All sea fish catch are collected in Old Digha dispatched to different consumed.

XV. INDUSTRIAL FACILITY AT DIGHA:

Industrial facilities are available at Digha area not adequate. Though it is growing up as an urban centre.

(1). **Drainage and Sewerage** : the public health engineering department of West Bengal has already prepared a comprehensives master surge scheme for Digha township for chundering the polluted water to the sea after being thoroughly treated. Since it will tasse timber tow cast surface drainage system around the Foreshore Road to meet the present demand is also couriered. Regarding sanitation facilities it is found that more then hundreds of establishments have their own sanitary facility. The real if the unhitch are facilities with others and the remnants course major nuisance in the back sides and eashewrina Jungles.

(2) **Water Supply**: Underground storage in the only sources of drinking water at present. There is only Deep tube well with a capacity of 1,30,000 litres per day, which is too meagre to meet the need f tourist as well as the local residents. Other sources is shallow tube well some private and others public which are provided at public location. Singling of another deep tube well has already been unroistered and a suitable place is to be taken where the water will to be slot free. Moreover a proposal for the 2nd deep tube well will start functioning very soon.

(3). **Power supply** : Digha gets its power supply mainly from D.V.C. All hotel, lodges, offices and residences are well connected the eclectic lines. The sood illumination and beach lighting are hardly satisfactory. Though the position of power supply is better get the low voltage problem and intermittent power failure are the main cause for poor condition. Lack of power supply, some time comes much trouble to the tourist population. Some measures have been advocated amongst which a substation in Digha is most important.

(4). **Health facilities**: Digha is provided with only one hospital which serene the people of Digha and its surrounding region. The hospital is 50 beds with staff of 5 physicians and 33 nurses. But demand this area is high and the authority is compelled to provide additional bed. The hospital has a X-ray unit, 130 dotents priest of which only 50% get admitted number provision for a separate maturity word and isolation cares ward crusts. Only medical treatments are done and all type of surgical and other acute cases are transferred to contain Sub-Divisional hospital 35 km. away.

(5). **Educational facilities**: The education facilities is the area are to some intent satisfactory. In the Digha Development Area (including Sankarpur area) there are two high schools and one junior high school with total man strength of 2500 and two high school of 3400. All the school are co-educational and some have laboratories and work shop facilities. Besides Ramnagar, on the out side of Digha, there assists a college with 1650 students and serves the area in the field of higher education.

XVI. POPULATION

Digha-Sankarpur Planning area is composed of a compact ship of land laying along the coast of Bay of Bengal compning 42 mouzas of Padima – I G.P. 16 of Padima- II G.P. and remaning 17 of Jalgachhari –II G.P. or 25 mouza of Digha police station and 17 mouza of Ramnagar P.S. This are with a total coverage of 3701.49 hector (3247.07 hector rural to the remaining urban) cohabits a typical rural characteristic creations the urban non-municipal unit of Digha Township. Population of Digha planning area pav decade from 1951 with the decadal growth cartage given data.

YEAR	POPULATION	GROWTH	GROWTH RATE (%)
1951	7190		
1961	10535	47.45	35.25
1971	14692	41.57	39.46
1981	17426	27.34	18.61
1991	22386	49.6	28.46
2001	30336	79.5	26.29
2011	46532	116.9	31.62

Table 1. Population growth of study area.

In is beyond any about that the activities related to tourism are the most dominating function with in the Digha Sankarpur area which was rightly nominated by the Government of West Bengal as controllec area in 1965. When the rough of tourists has become a regular feature of Digha, it is time to conceive of an alternative sea resort at Sankarpur. Sankarpur has fremenous potentiality to develop as the twin sea resort of Digha , if it is

provided with adequate infrastructural support backed by suitable promotional campaign. The govt. of west Bengal as well as Digha Development Authority had already considered seriously the prospect of Digha-Sankarpur Twin resort and principally agreed to project resort to attract the coastal tract as a sophisticated modern beach resort to attract the affluent section of tourists from all over India the Tourism Countries.

XVII. TOURISTS TRAFFIC

From the skites Digha emerged as the most popular weekend resort of West Bengal. In the early societies total tourists inflow increasing. The along trippers at Digha was in around on thousand tours and per year become almost double in the made seventies with in the span at the next 10 years. The annual inflow of the tourist traffic at Digha crossed one million mark and the current annual inflow of tourists is expected to reach more than 3 million. A simple day trip to enjoy the sea is a unique feature of tourism at Digha. More than 1/3 of the total tourist s traffic belong to this category called along trippers. Except 'Khanika' a day trippers hut under the management of the Administration. Digha Development Scheme, there is hardly any facelifting to satisfy the need of the day trippers recent decision to plan picnic sport at new Digha and public pay total will be marginal support to the basic needs to the day trippers.

XVIII. GENERAL PROBLEMS

Following are the main problems of the existing Digha sea resort.

- a) Erosion of sea beach: This is the most critical natural phenomenon on which the future of the resort depends. The measure of protecting the erosion of sea beach by laterite blondest was to reduce the pace of erosion from Old Digha to New Digha but the stench of beach from Old Digha to Mohana is not property perfect, though recently a number of wave breakers have been counteracted.
- b) Occasional cyclone storm: This coastal belt lies with in cyclone prone zone and the frequently of cyclone formed over Bay of Bengal is nearly four time more than Arabian Sea. At last one cyclonic storm with severs intensity has becoming a regular. Tell casuarinas tree one of the major attraction of this report are severally affected by the cyclones. The cyclone of vertical growth of this report. (i) No local warning system has been introduced to the tourist, fisherman and the local people well in advance to this type of naturel hazards. (ii) though the truanity of the cyclones and floods is much on the higher side on provision has been made to remove the flood or cyclone affected population including the tourists to a safe shelter.

XIX. CORROSION OF STRUCTURE

This adverse effect is due to high saline air of this region. The average main tenace to prefect the structure from the corrosive air is high.

i) Inefficient transport system:

The prospect of any tourist's town largely depends on the regional inter-connections and the efficiency of mass transport system. At present no system other than bus services is available of carry tourists and the State High Way 4 is the only effective regional link connecting the planning of the trip to Digha. So far as tourists is concerned is neither speedy nor comfortable. There is absolutely no provision for reaching Sankarpur from Digha except the road connection via Ramnagar. Except a few trackers only open van riskahowr are available at Choudha male near Ramnagar as local transport to carry goods and passengers including tourists which hardly match the status of any holiday resort.

ii) Inadequate Tourist Accommodation:

Beside the capacity quality is an important criterion to satiety the tourists for their comfortable stay sacristy of accommodation is very common in some special days vit New Year Day, Republic Day, Independence Day, X-Mas Day etc. When tourists have to more out to local village to manage an overnight shelter or spend the whole night on the sea beach under the open sky. There is a shortage of sophisticated super luxury hotel with adequate amenities and facility to attract rich affluent and elite alar of tourists and corporate people and at the same time cheap dormitory type of accommodation is also limited where large group of tourists travelling by reserved busses can spend a might.

iii) A report with-out adequate facility for recreation and amusement:

For any resort the major tourist's attraction is the variety of recreational facilities. Digha at present is silly looking in this facility.

- a) *Unimpressed shopping centre:* Shopping has become an interal part of the travel plan of the tourists. Local handicrafts especially the conch shell items mats and the local agricultural product cashew muts are popular among the tourists but the total seal has not reached the level of expectation as the existing shopping centres faild to inpress the tourist in general. Except meena Bazar at Nehru Maidun there is no organised market in the planning area.

- b) *Unhygienic sewer system:* There is no systematic provision for disposal of refuse the risk factor for public health hazard is on the higher side.
- c) *Fragment power cut and insufficient illumination:* Fragment failure of electric supply is the major hindrance to tourists promotion schemes the tourist from enjoying the available facilities.
- d) *Dull and monotonous appearance of the area:* The resort appears a bit dull and monotonous with out attractive sign boards glow signs and adequate street furniture. Undeveloped urban vacant land in the hearts of the resort is also responsible for this dull appearance, specially in the lean tourists period.
- e) *Poling for planning of Digha-Sankarpur area:* Digha is the only planning and developed sea resort of West Bengal. The development was initiated in the second half of this century by the government of West Bengal. To control the unplanned growth of the urban function a land use plan for Digha control area was designed in the mid-seventies and was subsequently revised and dated in 1989. The existing development of Digha township in the effect of the partial implementation of that plan. The recent extension of planning jurisdiction in the more than side of the existing township and the inclusion of Sankarpur on urban plated region sea beach are positive steps in the right direction to promote tourist industry along the sea coast and to disperse other urban function in the rural hinterland adjacent of the existing urban centres as an effective measure to accelerate the physical development of those backward area.

iv) Strategy for future development:

Following strategies are taken by the Digha Development Authority for the development of the area:

- a) Adequate areas are kept reserved to accommodate various recreational facilities for the tourist and the local residents.
- b) Priority is given to the sea-fishing and agricultural activities to support the local economy other than tourists.
- c) No hazardous industries are permitted within the jurisdiction of the planning area.
- d) The proposed railway connection between Digha and Tamluk is expected to be finished by 2003 and the hotel industry in this area will progress rapidly.
- e) Commercial activities, especially for promotion of attractive shopping facilities for the tourist's super markets with shopping plaza are conceived in the planning area.
- f) No development other than residential is suggested in the existing settlement area including rural settlement.

XX. ESTIMATION OF THE FUTURE REQUIREMENT:

The future of any tourist town largely depends on the quality and capacity of tourists accommodation. The hotels, lodges and holiday home at Digha – New Digha at present can accommodate more than seven thousand tourists per day. Sankarpur as high potentiality to less development as masque sea resort of West Bengal to attract the affluent elite section of nature tourists is provided with super luxury hotel with modern relocation facilities. Efficient mass transportation system is an important element for promotion of tourists at Sankarpur. Thought out day just a few private buses connect Sankarpur with Contai via Ramnagar and the line bus scheduled to run between Howrah and Sankarpur hardly follows any requirement. Immediate attention to raise the frequency of super fast Deluxe Bus service at this area is required to pull the tourists to this growing tourists centre. Regular Luxury Bus services can carry satiable tourists from Digha to Sankarpur to Mandarmani as another sea resort. The success of any resort is directly related to the scope of adequate recreation and amusement well-maintained interesting and right quality amusement facilities can change the dimension of the planning area. Provisions to accommodate recreational facilities like golf course amusement park, Bird sanctuary, Mini-Zoo, Water sports complex including sea exploration Toy train, Ropeway Eco-park including Model village with solar panel wind mill etc, may prove to be ideal and popular incentives for future development. Other important functions like some specific institutions of social importance can be accommodated within the planning area.

XXI. CONCLUSION

Such a development took place without appropriate land use planning. The Geological Survey of India in its report on the Digha coastal belt pointed out that the active processes of erosion and accretion have been accelerated by several man-made interventions including removal of sand dunes, leading to mushrooming of construction near the coastline. The exact impact of tourism on the coastal belt of Digha cannot be quantified but, the continuing dumping of solid waste and raw sewage in the coastal water bears testimony to an alarming situation which increases with every tourist season. The Digha-Junput coastal tract is being eroded by sea-water resulting in lowering of the beach and recession of the bank. The rate of erosion has been found to be about 17 meters per year at some parts. Besides erosion, beach lowering (submergence) by about 15 to 20 cms per year appears to continue unabated (Bhattacharya S, 1992). Apart from coastal erosion caused by wave actions and

storms, removal of sand for construction of roads and hotels, exploitation of Casuarinas trees on the dune-tops for fuel wood and building materials also cause destruction of sand dunes and erosion of beach. Artificial methods of beach protection at some places also accelerate coastal erosion elsewhere. Coastal accumulation is occurring at Shankarpur. Increasing pressure of human activities on the Hugli unstable coastal zone has been assessed by IIT, CSME and GSI during last 15 years, but no effective action plan for controlling the phenomenon is yet visible.

So, now days the coastal plain of West Bengal suffers by many problematic issues which have created conflicts between various resource users and interest groups, between developers and ecologists/environmentalist, engineers and geoscientists and land owners and economists in West Bengal. The coastal zone management in West Bengal has been suggested under both regulatory and non regulatory system. Under regulatory system, it is recommended that critical ecosystem like mangrove forest in Sundarbans and sand dunes in Digha etc. should be protected from any changes. Aquaculture should also be regulated with a total ban on conversion of mangrove area, controlled abstraction of groundwater and appropriate treatment of effluents before being discharged into the surface water system. Similarly, regulatory measures should also be adopted to control dredging activities, discharge of burnt oil, leakage of oil due to bad maintenance of vessels, limiting setback lines for coastal construction etc. It is also emphasized that EIA study should be made mandatory for any large coastal project. Under the non-regulatory measures, control of urban run-off, erection of flood protection barrier, formulating oil spill contingency plan, use of remote sensing for identifying potential fishing zone, appropriate storm forecasting, restoration of derelict wetland can be listed as major recommendation. Simultaneously steps are to be taken for technical training on coastal zone management increasing awareness in the community and ensuring a system of monitoring.

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