Chapter-6

Management and recommendations

6.1. Management plans and recommendations for the urban centres

In the urban areas of Digha, Contai and Haldia, the Digha-Sankarpur Development Authority (DSDA) and municipality authorities are taken several management plans considering the urban development and environmental issues. However, those plans are still not sufficient to manage the urban areas in the recent context. Therefore, some recommendations have given to betterment of the urban centres regarding sustainability.

6.1.1. Existing management plans at Digha coastal stretch

There are existing management plans for the reduction of conflicts between various resource users or stakeholders within the coastal zones. The purposes of Coastal Zone Management Plan (CZMP) were to prepare the baseline data, identification of High Tide Line (HTL) and Low Tide Line (LTL), ecologically sensitive areas, demarcations of critically coastal vulnerable areas and the hazard line as per the requirement under the provision of the Coastal Regulation Zone (CRZ) notification in India. The urban areas of Digha were protected by the long sea-wall to protect the shoreline retreat through surrounded by ecologically sensitive areas (e.g. sea-beach, tidal flat, sand dunes, creeks, mangroves and salt marshes) along the seashores. However, the CZMP were unable to protect the livelihood of traditional resource users under the marginal economy in the coastal belt. The baseline data was generated by Survey of India (SOI), Geological Survey of India (GSI), and National Centre for Sustainable Coastal Management (NCSCM) under the provision of the requirement of CRZ rules.

In 2009, Integrated Coastal Zone Management (ICZM) plans were introduced in the coastal belt of Digha and in adjustment areas to manage the ecologically sensitive areas, to extend the sea-wall structures along the shoreline, to improve the capacity development of marginal workers, and to beautify the seafront parts of the coastal zones. So far as the following plans are implemented in the beach resort town of Digha for tourism destination development. These are included as follows;

- Development of eco-tourism park at Udaipur and improvement of amenities (e.g. ropeway, boating) in Amarabati Park at New Digha;
- Beachfront area development from Sankarpur to Udaipur;
- Afforestation of mangroves in the suitable locations of backshore tidal flats;
- Signage boards have been installed along the roadsides and beach fringes to provide the appropriate information to the beach users;

- Conservation of indigenous vegetations for the surface stability of sand dunes in the form of long-rooted grasses, xeric shrubs, mesophytic shrubs, surface creepers and landscaping along the open space of urban areas.

6.1.2. Recommendations for Digha coastal stretch

Following steps also should be considered for better management in the coastal urban centre of Digha along the seashores. Such as:

- Estimation of sediment budget and cell circulation systems along the seashores will be useful for assessment of the future state of the coastal sections under morphodynamics.
- Attempt to promote the development of sand dunes by identifying the open and wide space suitable for undisturbed extension and development of dune fields in the backshore areas.
- Suitable treatment plants of urban wastes should be installed immediately without discharging the wastes into the intertidal region in an untreated condition.
- Improvement of the communication system to communicate with the fishermen community during open marine fishing in the period of storm breaks in the coast.
- Assessment of groundwater status in the coastal belt is needed to support the ever-increasing tourism pressures around the urban sections of Digha-Sankarpur and Mandarmani areas.
- Involvement and direct participation of the local people in tourism transport and travel, trade and communication are also needed for community development in the urban fringes of coastal parts.
- The environmental regulations of the coastal zones, factors and wetlands should be strictly implemented to restore the sensitive coastal environment.

6.1.3. Existing management plans at Contai municipality area

The Contai urban centre is located on the inland dune fields of Contai coastal plain in the form of municipality town. The urban areas of Contai are extended into elongated shape as per the extension of older sand dunes in the region. Consumption of groundwater, waste and land cover modifications are major environmental issues of the urban centre. The existing management plan for Contai includes Integrated Housing and Slum Development Programme (ISHDP), State Finance Commission (SFC) through the co-operative bank in support of the development activities at the individual level; waste dumping facilities by municipality authority and urban amenities development. The northward and southward extension of the town may suffer in flooding and ponding during the incidence of monsoonal storm rainfalls.

6.1.4. Recommendations for Contai municipality area

Following steps should be considered for better management in the municipality town of Contai. Such as:

- The municipality administration should take care of the drinking water problems facing by the local people in Uttar Darua and adjacent areas.
- The availability of the saltwater bodies in the subsurface areas of the region may influence the specific nature of plantation like coconut trees, cashewnut trees, and other vegetables in the expanse of urban concentration in the eastern part of Contai municipality.
- The sand mining for lowland filling should be controlled in the sand dune belt of municipality areas. The dune habitat supports a specific self-sustaining ecosystem within the area.
- The water-logging problems of the low-lying areas (3 – 5 m) towards north and south of the sand ridge belt could be solved by the specific engineering structures of the houses. The Digital Elevation Model (DEM) generated channels (Fig. 6.1) may be partially utilized to drain out the municipality sludge.

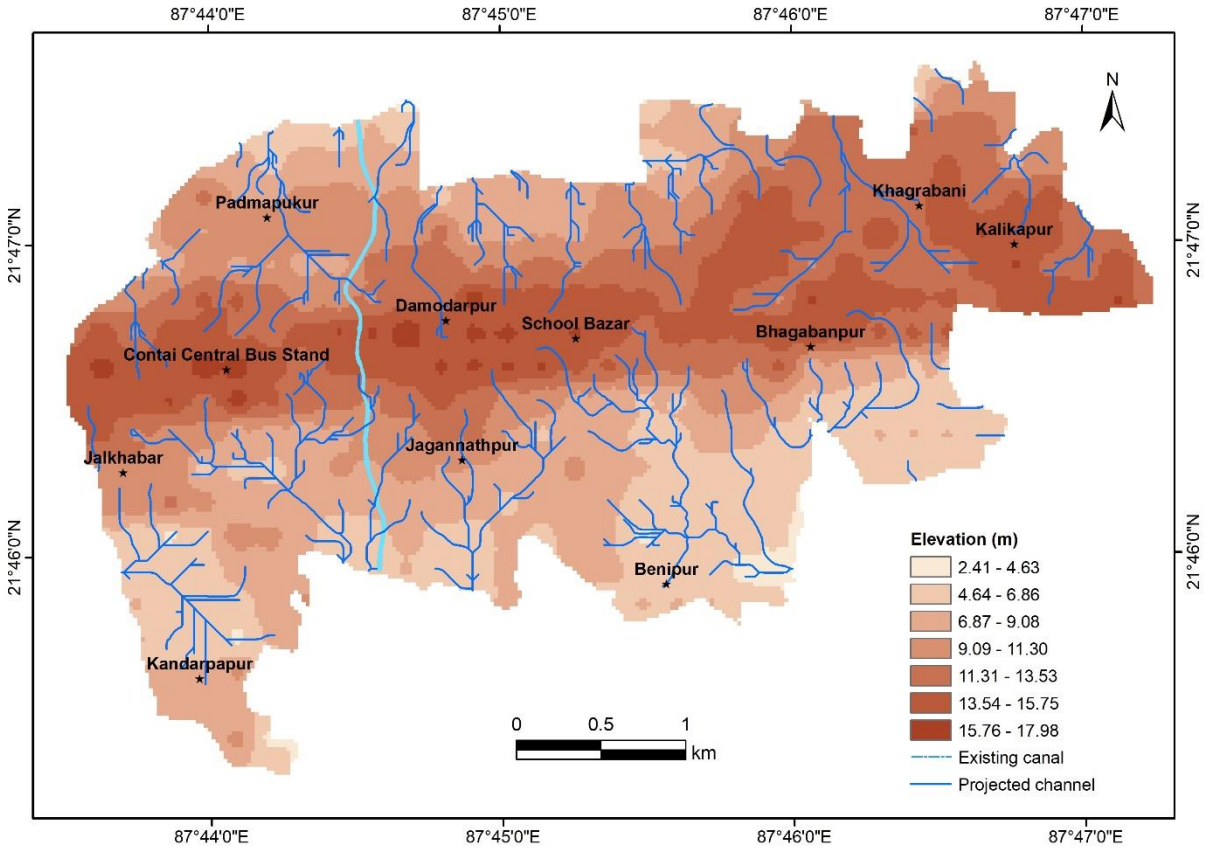

Fig. 6.1: Existing and DEM-based projected channel network at Contai.

- The pre-expansion period of Contai municipality area was noted for existence of dense cashewnut trees over the dune ridges. Now, the dune ridges are highly modified for the growth and expansion of urban fringes, and not supporting the concentrated growth of cashewnut trees. The occurrences of the cashewnut trees over the dune surface can stabilize the wind-blown sand particles and provided to act as physics barrier against the storms. Therefore, this particular vegetation species should be restored in the open space.

6.1.5. Existing management plans at Haldia urban centre

Haldia urban area is located on the sensitive estuarine coastal belt of West Bengal on the bank of river Hugli and the confluence of river Haldi. The entire area of the river bank was dominated by estuarine fringed tidal wetlands in the near past (even before 1975). The urban belt of Haldia is now expended over the low-lying areas and wetland tracts by modifying the natural landscape of the sensitive environment. Currently, the study shows that the urban area of Haldia suffered from groundwater depletion, untreated waste dumping, air and water pollutions nearby the port and industrial sectors, wetland filling and modification, and vis-a-vice by water-logging problems after the expansion of urban areas in unlimited conditions.

The existing management programmes implemented in the Haldia municipality areas to maintain the service sectors and other amenities of the urban belt. The drinking water supply is maintained by surface water storage tanks in the adjacent areas of the urban belt and groundwater extractions from the local areas in an unlimited way to fulfil the demands of ever-increasing population pressure of the urban belt. The waste treatment plant is also located to serve the waste management problems, but the treatment plant is unable to manage the huge volume of wastes produced by the urban population at present. The municipality sewerage systems are partially covered and uncovered. However, the systems do not permit to discharge all the volume of sewerage watery wastes through the existing network of channels. There is also the existence of the ISHDP, but all the demands are not fulfilled by insufficient funds by this programme.

6.1.6. Recommendations for Haldia urban centre

Following steps should be considered for better management in the Haldia municipality town. Such as:

- As the Haldia town is based on the port development and industrial hubs, the air and water pollution levels have been increased day by day due to expansion of several activities related to urban-industrial growth on the bank of river Hugli. Therefore, the uses of green technology in industrial expansion and buffering of vegetations around the industrial complex can reduce the impact of air pollution in the region.

- There must be the treatment plant of factory waters before discharging the effluents into the estuarine environment to reduce the water pollution in the sensitive coastal belt.
- The unlimited wetland modifications may produce environmental complexities like inundations vulnerability, land subsidence, habitat destructions, and the loss of chemical functions of the wetlands which detrimental to the urban society. Therefore, the wetland restoration should be a specific programme of the municipality administration to maintain the healthy environment of the urban area.
- To reduce the groundwater depletion of the urban belt more and more surface water uses with proper treatment may be suggested for the urban belt of the sensitive environment. The over-extraction of groundwater also may invite the encroachment of saltwater into the aquifers with the constant and steady rise of sea level.
- Restorations of tidal spill grounds, wetlands and the drainage functions of the tidal channels are needed immediately to protect the inundation problems in the interior parts. In this purpose, the DEM based drainage network (Fig. 6.2) may be utilized to drain out the inundated water following the natural slope of the landscape.

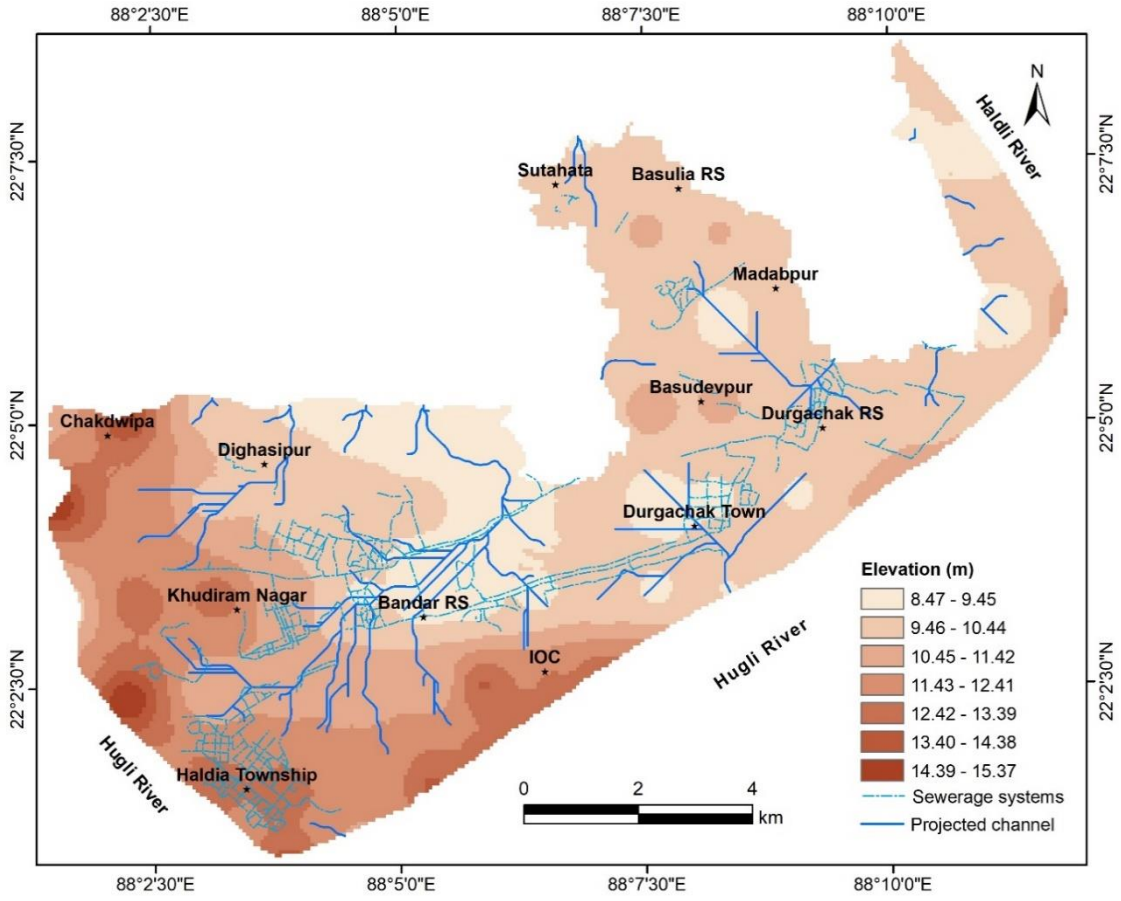

Fig. 6.2: DEM-based projected channel network along with the existing sewerage system at the Haldia municipality area.

- All the CRZ and other environmental regulations should be strictly followed in the coastal urban centres for their survival and adjustment against climate change and sea level rise.

6.2. Conclusions

The urban areas of Digha and Haldia are located under the extension of CRZ areas in West Bengal. The sensitive tidal flats, sand dunes and mangrove creeks are occupied by the extension of urban areas and infrastructures at present. Many hotels and buildings are located in the adjacent areas of HTL on the sea face and Hugli estuary banks under the sensitive coastal zones. As the shoreline of Digha-Sankarpur-Tajpur tract is protected by seawall structures, the unprotected parts of the other areas getting eroded at present very significantly with removal of sands from beaches and dunes in the coast.

The land use and land cover conversions of Digha, Haldia and Contai include the dune belts and wetlands to built-up areas; coastal wetlands converted into fisheries, and agricultural land with dune habitats converted into built-up areas at present have modified the natural spill grounds of tides and the physical barrier effects of dune ridges. Such a significant rate of conversion has produced several environmental problems which are associated with increasing risks and vulnerabilities at present.

The urban wastes and urban drainage needs proper management in this sensitive environmental compartment. Anthropogenic activities of dune excavation and sand mining have created several blowout patches, and the overwash deposits are also increasing the dune degradation along the seashores at present.

The mangroves and saltmarshes of the tidal flat of the Hugli-Haldi estuary complex should be restored to protect the urban fringes of Haldia from erosion and inundation. The health of shore fringe sand dunes and wetlands of Digha also should be restored to reduce the erosion vulnerability of the coastal zones.

There must be a specific programme of DSDA to tackle the advancing sea for the shake of the promotion of beach tourism. The sea-beaches of Digha coast and tidal flats of Haldia municipality town are significantly reduced in width (Digha about 170 m and Haldia about 30 m) during 1973 – 2018. Various engineering structures of sustainable character should be adopted to reduce the erosion rate and beach lowering process.

The shorefront positions of Digha-Sankarpur-Mandarmani coastal stretch are highly vulnerable to erosion, dune degradation and tidal inundations at the extreme cases (during

storms, Highest Astronomical Tide (HAT) phase, and southwestern monsoon). The low-lying areas of Contai municipality are lying only 3 m above Mean Sea Leve (MSL) in the coastal plain, thus reflected as highly vulnerable tracks to the rainwater floodings during the break of cyclones and vagaries of monsoonal rains. However, Contai town is now expanded towards the low-lying areas of north and south. The low-lying areas of Haldia municipality (within 3 m height) with central wards behind the industrial sites are also vulnerable to water-logging and tidal inundations during the occurrences of storm rainfall and high spring tides of monsoon phase.

Thus, the coastal urban areas and their sprawling have occupied sensitive and fragile environmental compartments of the present coastal zones (e.g. Digha, Contai and Haldia) in Medinipur littoral tract of West Bengal. All the urban areas of the present study were established in 1956 (Digha), 1958 (Contai) and 1997 (Haldia) based on tourism significance, residential cum administrative importance and port-industrial functions in the coastal plains of Purba Medinipur district. As the urban centres were established without assessing the environmental sustainability under fragile coastal zones, they are facing the acquit problems of erosion, inundation, groundwater depletion, saltwater encroachment into the aquifers and habitats loss at present under the vulnerabilities of sea level rise and micro-climate variability.