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THE CHANGING SCENARIO IN ENVIRONMENT OF NAMKHANA ISLAND, SOUTH 24 PARGANAS, WEST BENGAL – A REVIEW

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Abstract

Environment, the immediate beyond, surrounds us not only with its physical aspects but often shape individual's or communities' growth, proliferation and attainment of perfection. The approach of environmental determinism and thereafter the growth of environmental education ratifies that kinds of environmental dependence. Namkhana, one of the major Islands of Sundarban, which is a part of the world's largest deltaic area and altogether a heritage site deserves special attention in terms of changing socio-economic conditions. Active deltaic, maritime as well as coastal nearness and the frequent hazardous environment have more or less act as a determining effect on the livelihood pattern of the inhabitants of Namkhana Island. In this paper the canging environmental condition has been derived. The analysis shows that the changes character are not observed not only in phycal environment, but also in demographic and socio-economic environment.

Keywords:
Determism;
Hazard;
Deltaic;
Meritime;
Demographic.

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1. Introduction:

Namkhana, one of the southernmost Islandic landmasses facing the Bay of Bengal in the south is interfaced with burgeoning human habitation during the last few decades and the urge of restoring the prevailing environment. Erstwhile dependence on the river and oceanic water for their daily sustenance from time immemorial has been changing in the wake of alternative option from the fields of agriculture or other activities. Better job opportunities have proved beneficial in lieu of age-old ancestral inheritance. The influences of outer world in the event of highly developed physical connectivity and growing consciousness among the people have helped to opt better, secured and hazard free means of economic activities. The rapid engulfment procedure into the confined land masses of the Island by the ever approaching oceanic masses is one of the menacing phenomena which may have close insight among the dependent population. Again, the tendency of migration from these types of low lying situations in the event of sure submergence for global warming is another reason of changing livelihood pattern.

2. Study Area:

The study area lies between latitude 21º04' 50" to 21º 40' 10" N and longitude 88º13' 50" to 85º 16' 15" E. This is a part of Bengal Basin, South 24 Parganas district, West Bengal. A network of estuaries, tidal rivers, and creeks intersected by roughness thunderous channels, it encloses flat, marshy Islands covered with dense forests. Along the coast the forest passes into a mangrove swamp and the tract of forest and saltwater swamp forming the lower part of the Ganges Delta, along the Bay of Bengal from the Hooghly River Estuary (India). Bakkhali beach resort located on one of the Islands jutting out into the Bay of Bengal is gaining in popularity, with improvements in transport links with Kolkata. Total area of the study area is 146 $km^{2.}$ The Island lies between Hetaniya Dooaniya River in north and Bay of Bengal in the south. East and west boundary of this Island is determined by Saptamukhi River and Bartala River respectively. Island had been reclaimed in two phases. All Island area had reclaimed in first phase from 1873 to 1939AD except north western part and southern tip of this Island which had reclaimed in the second phase from 1945 to 1951 (Information from the reclamation map of Sundarban prepared by Mukherjee, 1976, collected from Das and Bandyopadhay, 2012).

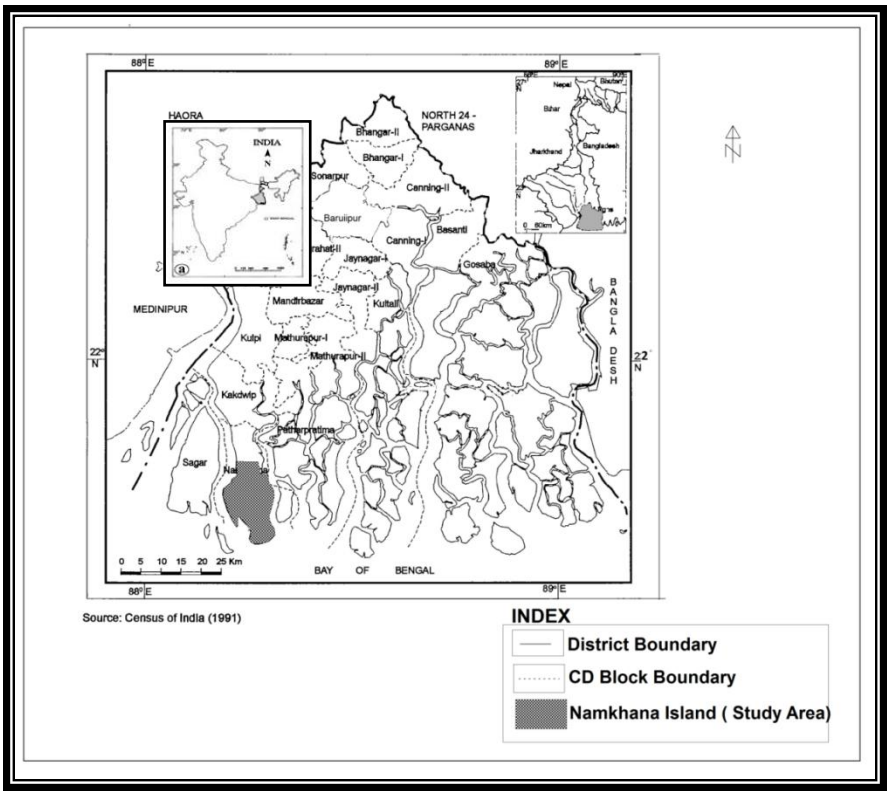

Figure 1: Location Map of the Study area (Based on Census of India Map, 1991)

3. Objectives:

- To delineate the area of Namkhana Island with all its physical and manmade elements.
- To find out the changing physical environment.
- To investigate the causes and effect of changing environmrnt.
- To highlight the demographic and socio-economic changes and impacts.

4. Changes in Physical Environment:

Namkhana Island is one of the remote Islands of Sundarban delta complexes. According to geomorphology Namkhana Island is located in active delta region in Western Sundarban. Before the reclamation of this area, the environment was stable, but in the recent time. Frequent hazards are generally occurred such as flood, cyclone, embankment breaching, and drought etc. Highly increase of population is also influences on disastrous natural phenomenon. Impact of climate change also created number of problems in this Island. Economic activities are being interrupting by these hazards. Peoples are not interested in agriculture. Fishing is also losing its importance.

Many people have left these occupations. Island dwellers are migrating to get more jobs due to low profit in agriculture. Cultivated land decreased due to salinization, river bank erosion, sea level rise, shore line shifting. Production is reducing. The major changing scenario and their impacts and probable solution are as follows.

Shore Line Change:

Namhana Island is one of the active Islands of the south western Sundarvban. . It is important that Namkhana is connected to main land almost directly over the Hetaniya-Doaniya River. Bandyopadhay (1996) used the SoI map of 1943 for analysis of evolution of drainage of this Island. He also used superposed the satellite data on the topographical map to extract the drainage system. Census report of India (1971) has published the map of this Island in. After that Hazra (2002) prepared a map based on satellite data. Again Hazra et al (2010) published and prepared map of this Island based on satellite data and they also detected the change of the area of the Island. Recently a map has been made by Landsat satellite image data which was captured in 2017. These maps and images have been digitised in Q-GIS software. The combination of maps is showing the area of the Namkhana Island has been changing and still now acting. Recently another work has been done by Chatterjee and her co-author (2015) by analysing the different satellite images which were captured in different year. From her satellite data analysis it is found that the area of Namkhana was in 151.63 km^2 in 1979 where it was 145.6 km^2 in 2011. It has loosed almost 6.63 km^2 land in last 32 years. Bandopadhay *et al.* (2014) worked on shore line shifting of Namkhana Island.

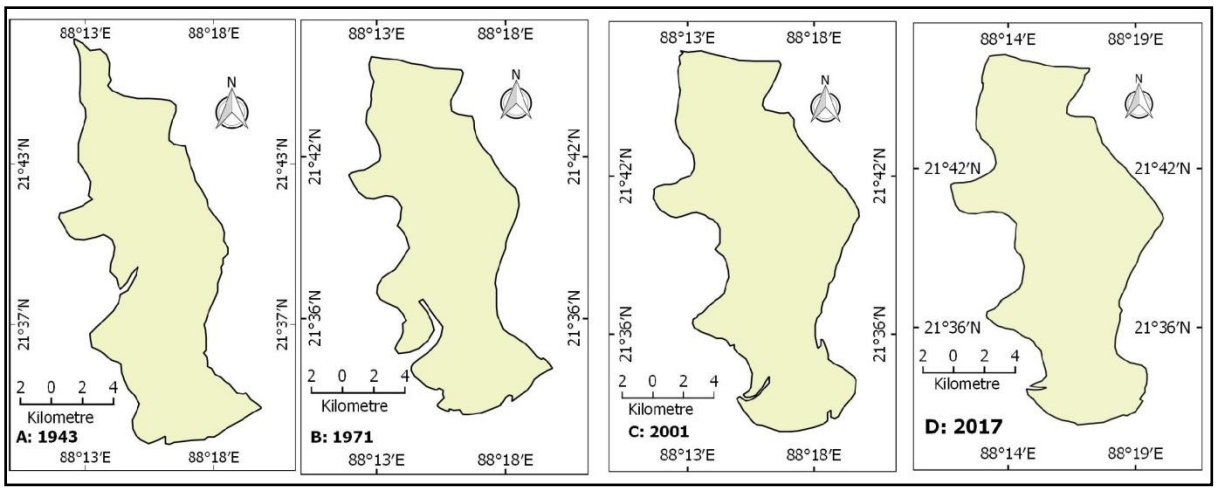

Figure 2: Shore line change (Source: A – Bandyopadhay, 1996; B – Census of India, 1971; C – Hazra, 2010; D – Satellite: Landsat 8, Sensor: OLI and TIRS, 2017)

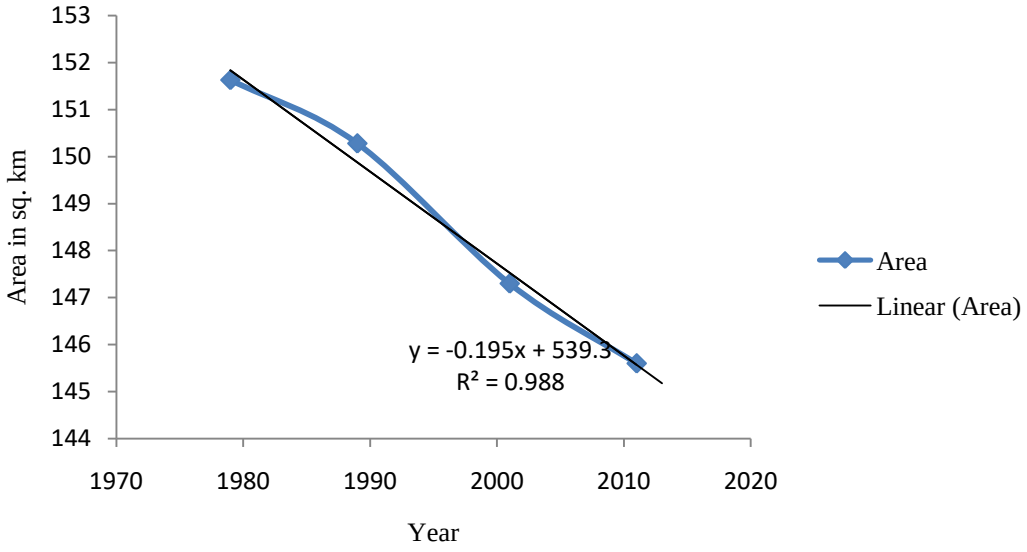

Figure 3: Changes in Area of Namkhana Island (Chatterjee, 2015)

Coastal Erosion:

Southern tip of the Island is facing to Bay of Bengal. This coastal area covered four mouzas or villages under Frezergunj Gram Panchayet. This area is vulnerable due to coastal erosion. Different types of data and map like mouza map, topographical maps, and satellite images show that last coastal erosion has been taken place. The areas of mouzas are still decreasing. Most affected mouza is Lakshmipur Abad and Henry Island. The main causes of this coastal erosion

are abandonment of sediment-replenishing western distributaries of Ganga, due to western tilting of the Delta and off-shore interception of westward transportation of sediment by the swatch of No Ground submarine canyon (Bandyopadhay, 1991; Das and Bandyopadhay, 2012). Chakrabarti (1991) concluded that the Bakkhali coast retreated parallel to itself some 250 m within this interval by compared 1968-69 Survey of India map (1:50,000) and 1975 aerial photos (1:25,000) with Geological Survey of India beach maps (1:5,000). Paul (2002) compared 1930-70 Survey of India map and 1971-1995 aerial photos and he observed that the shoreline rate of recession is 9.7 m/yr and 5.4 m/yr – 8.5 m/yr in the above mentioned year. Pahari (2012) has pointed out that coastal erosion in not related to deforestation. He examined that shoreline water Shoreline water table alteration, development intervention, other human induced landuse changes, sediment characters and the high water level situations include the other factors of the shoreline erosion.

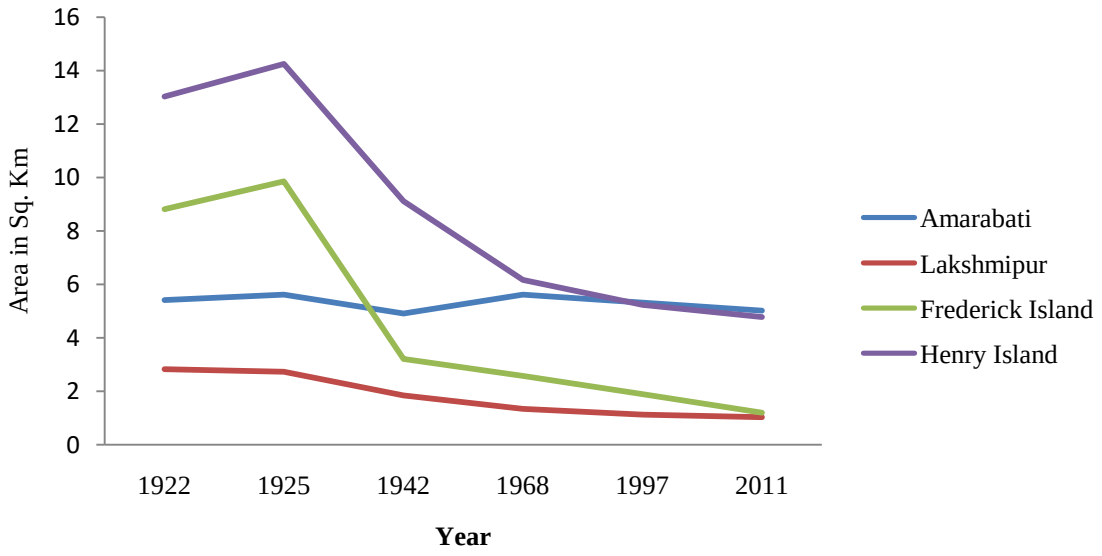

Figure 4: Changes in Area of Mouzas Due to Coastal Erosion in Southern Part of Namkhana Island (Data base source: Bandyopadhay (1991); Pahari (2012)

Natural Hazards and its impacts:

This Island is suffering from cyclone and its impact. Some report revealed that frequency of cyclone increased. During 1999 – 2009 total 13 cyclonic storms occurred in Northern Bay of Bengal. Last devastated sever cyclonic storm was Aila. Cyclonic storms are caused to flood. During Aila 2 metre storm surge creates flood (Bandyopadhay, 1998; Paul, 2002; Sarkar, 2012; Pahari, 2013; Das and Bandyopadhay, 2012)

Global warming and climate change also affects the Sundraban. Therefore here another hazard is sea level rise. It has been identified that recently sea level rise rate is 8.63 mm per year. Air temperature has increased. Rainfall occurrence is now being very irregular. Due to irregular rainfall agriculture practices are changing. Farmers are starting their cultivation lately. Sea level rise is inundating low lying area of Island. Sometimes embankments which are public defence are breached due to erosion and tidal bore. (Hazra, 2002; Hazra et al. 2010; Pahari, 2012;)

Impact of recent cyclone Aila:

Recent severe cyclonic storm affected this Island aversely. Marginal area along the river were flooded and inundated due to embankment breaching. Land use has been changed. Few crops have been stopped to cultivate. Salinity of agricultural land was increased. Now the peoples are trying to recover those effects.

Land use change:

Hazra (2010) in his project entitled 'Temporal Change Detection (2001-2008) Study of Sundarban' studied by analysis of satellite images. He detected the changing scenario on land use. The following figure shows that there are four major land use category in Namkhana Island. Land use has been changed due to both natural and manmade factors. Dense forest and settlement area are increased. Agricultural land and fishery area decreased.

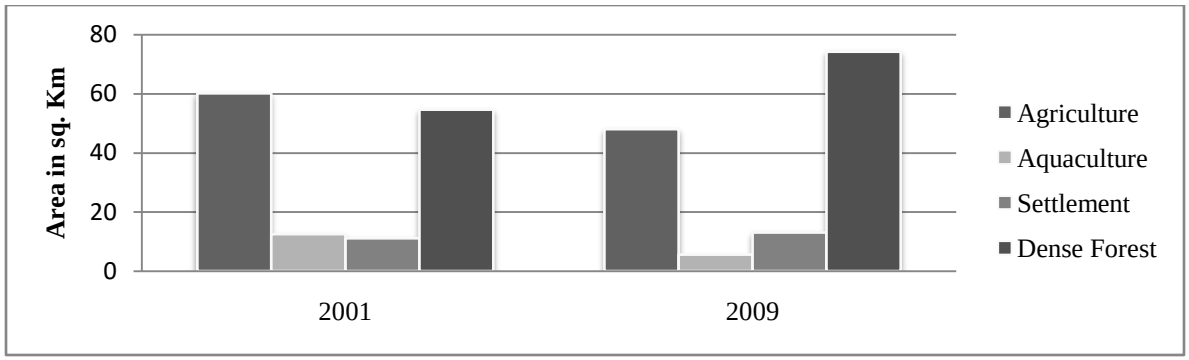

Figure 5: Land use changes in Namkhana Island (Hazra et al, 2010)

6. Demographic change:

From the Census Report (District Census Handbook, 1951 to 2011) it is seen that population is increasing way. Population has increased almost 6.5 times from 1951 to 2011. In between 1991 and 2001 population growth was highest. Literacy is very high among the other block of South 24 Parganas. In 1991 the total literacy rate was 62.90% whereas male literacy was 77.39% and female literacy was 46.30% (Human Development Report, South 24 Parganas, 2009). The total literacy rate was 79.38%, male literacy was 89.55% and female literacy was 68.69%. Last census report in 2011 showing that total literacy is 75.54%, male literacy is 80.68% and 70.19% for female literacy (Mondal, 2017). But it is not clear the causes of declining literacy level in Namkhana Island. Banerjee (1998) in her study emphasised on migration pattern of people of the Sundarban. She also included Namkhan Island for migration study purpose. Centre for Science and Environment has reported in 2012 that people of Sundarban are migrating to other states or towns or outside the country for job. Guha (2016) also studied in migration. There is an important thing that migration trend has been changed. Many people including child and women are migrating from this Island to other states. Some peoples who have primary or secondary education are going to foreign country for better job opportunity. Inhabitants are now interested in agriculture or other economic activity here. They migrated for high wages than this Island.

Table 1: Year wise total population

Year	1951	1961	1971	1981	1991	2001	2011
Population	27775	40609	56678	74156	96750	160627	182830

Source: District census Handbook, census of India, 1951 to 2011

Socio-economic change:

Environmental change can divert the economic structure as well as social phenomena. Gupta (2015) has assessed that females are greatly participating in changing economy. Females are now actively engaged in both agriculture and fishing and also in secondary and tertiary eco0mic activity. Namkhana Island is now affected by environmental impact. Economy of this Island is depended on Agriculture. Fishing, household industry and others are secondary level of economic return. But now people of this Island are want to migrate to Kolkata or outside the West Bengal or outside India as labourer in different types of industry for more earnings. Agricultural land has been decreasing for past few decades. Peoples are not interested in agriculture for less profit. Recent census report (2011) showing that agriculture and cultivation related population number changed in comparison between 2001 and 2011. Therefore livelihood pattern has been changed.

So in concluding remarks it is said that the environmental scenario of Namkhana Island is changing. Environmental impacts are seen on both physical and socio economic sector.

Conclusion:

Environment, be it the physical, social, cultural or economic one is a changing phenomenon with the passage of time. Physical environment whether it is congenial or adverse in nature may affect the other mentioned environment with its all components. Namkhana Island though not yet has changed physically in a drastic way but has a far long influence with its ever changing minute elements. The Islandic people of Namkhana may find a way out to cope with better alternatives from this study in the lines of nourishment and perfection.

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