



## Consequences of Premature Reclamation at Rangabelia - Uttardanga, Gosaba Island, West Bengal

Kanailal Das<sup>1</sup>  
 Karabi Das<sup>2</sup>  
 Dr. Ashis Paul<sup>3</sup>

<sup>1</sup>Research Scholar, Department of Geography & Environment Management, Vidyasagar University, West Bengal

<sup>2</sup>Research Scholar, Department of Geography, University of Calcutta, Kolkata

<sup>3</sup>Professor, Department of Geography & Environment Management, Vidyasagar University, West Bengal



## Article Info

## Article History

Received on:

12 October 2015

Accepted in Revised Form on:

15 January 2016

Available Online on and from:

21 March 2016

## Key Words

Slum

Urban Reconstruction

Landuse

Urban Development

Neighbourhood

## Abstract

*The Indian Sundarbans with a shore length of 130 km is topographically a low lying flat alluvial plain, dissected by a large number of tidal rivers, estuaries and creeks. Gosaba, one of the main deltaic islands in this region, is bounded by Matla to the west and Zhilla rivers to the east. The objective of protecting the agricultural land from salt water flooding has led to the construction of embankments along the channel banks. That has reduced the spill area of rivers leading to in channel siltation and thus the tidal floodplain devoid of silt is always at a lower level than the level of the rivers. The human interference is responsible for the change in behavior of the rivers, as is already seen in Rangabeliya, where the area approaching Uttardanga is becoming narrower day by day. As evident from SOI toposheet of 1969 the distance between rivers Bidya and Gomor near Uttardanga was 0.6 km. This phenomenon was further studied from maps of Google Earth and it was found that the distance has been decreasing from 0.43 km to 0.38 km within a span of 12 years from 2003 to 2014 at a rate of 0.18 km from the year 1969. The perimeter of Gosaba- Rangabeliya taken together has not changed much. There is every possibility that these two rivers would merge in future leading to the formation of a new island of Uttardanga within an island of Gosaba Rangabeliya. During Aila 2009, the area in between rivers Bidya and Gomor got completely submerged under the saline water when the depth of stagnant water was 1.5m. The present study takes into account this phenomenon in detail. Various measurements were done on maps from Google Earth and SOI toposheet. Land use and land cover classification was done from images from USGS and questionnaire survey has been conducted to collect the perception of different respondents for identification of the problem.*

© 2015 ISSS. All Rights Reserved

## Introduction

Rivers in Sundarbans are tidal in nature having a bi-directional flow. The Community Development block of Gosaba is bordered by rivers and tidal creeks. The village of Rangabeliya is facing the risk of encroachment by two rivers Bidya in the west and Gomor in the east. The rivers have been coming nearer over the years leaving the people in utter misery and will lead to the loss of land, roads and settlements.

## Objectives

The main objectives of this paper are -

a) To assess the physical characteristics of the study

area.

b) To identify the major problem of the study area- the risk of meeting of two rivers ( Bidya & Gomor ).

c) To analyze the pre and post Aila scenario of the study area.

d) To identify the attempts to cope up with the problem and analyze the management options.

## Methodology

In the pre-field stage the SOI toposheet of no. 79<sup>B</sup>/16 was collected from the office of National Atlas and Thematic Mapping Organization. Census data and high resolution images from Google earth and USGS

satellites especially LANDSAT 5 were collected. Photographs were taken and household surveys were carried out in the field. In the post field work tabulation of data, map generation, analysis and interpretation of maps was done.

### Location of the Study Area

Rangabeliya is a village panchayat of the Community Development block of Gosaba. Rangabeliya consists of mouzas of Rangabeliya, Pakhiralaya, Uttardanga and Bagbagan. The location of Rangabeliya is 22.57°N and 88.36°E (Fig. 1). It is bounded by Bidya river to the west and the river Gomor to the east. The population density of Rangabeliya for the years 2001 and 2011 are 749.12 and 798.24 respectively. The locational vulnerability indices which were counted taking into account the length of the riverbanks and the population density of the area are 75.66 and 75.83 for the respective years of 2001 and 2011. This indicates a meager rise in population and moderate to high locational vulnerability.

### History of Settlement in Gosaba and Rangabeliya

Daniel Hamilton, a Scotsman took lease of land having lot nos. 144 (Gosaba) and 143 (Rangabeliya) on 13<sup>th</sup> April, 1903. In 1903, Hamilton bought 40 sq. km (10,000 acres) of land from the government including the islands of Gosaba, Rangabeliya and Satjelia. In between 1903-1907 the forest of Gosaba and Rangabeliya were cleared for Rangabeliya settlement. To protect the settlement from saltwater incursion, embankments were constructed along the rivers Bidya, Gomor Durgaduani and the creeks inside the island. There were some temporary huts established at Arampur by the fishermen of Masjidbati of Basanti block, agriculture became successful since 1908.

### Similar Cases as the Study Area

There are several places in Gosaba where the rivers are coming nearer creating panic among the people (Fig. 2 and Table - 1).

### The problem

Both Bidya and Gomor are tidal rivers and so shifts in their courses are common. Bidya keeps shifting eastwards and Gomor shifts westwards. The land in between which is the settlement of Uttardanga is getting constricted over the years (Fig. 3 and 4 and Table - 2). There remains a risk of the formation of a new island in near future at the point of meeting of both the rivers. It has been observed that Gomor is shifting more and at a faster rate than Bidya.

### The case of Jatirampur

Jatirampur bend has shown an interesting fluvial dynamics over the years. When the SOI toposheet (79B/16) of the year 1969 was seen this bend was wide and had a meandering stretch of tidal flow surrounded by muddy deposits (Fig. 5). A thin creek covered by

small huts on either side formed the border between the village panchayats of Gosaba and Rangabeliya in 1969. Over the years another small stretch of water has debouched from this wide stretch and a shoal has developed in the year 1999 (Fig. 6). The major flow of water maintained a sinuous course then but in the year 2009 a gradual straightening of the course has been observed (Fig. 7). The debouched stretch seen in 1999 has become thin in the year 2009 with vegetation in between two bends. The major flow now strikes Satjelia island and is reflected back towards Rangabeliya and this can be a cause of increased erosion.

### Landuse and land Cover Characteristics

Pre and post Aila scenario of the study area have been shown by classifying the LANDSAT 5 images using Geomatica 2012. The classification for 19<sup>th</sup> February 2009 shows that vegetation cover is found near the riverbanks whereby it covers 39.84 % of the total image. Agriculture is found sporadically bordered by marshes and fallow land (Fig. 8). The supervised classification of 11<sup>th</sup> June 2009 shows that most of the area had been submerged under water. Nearly 43.08% of the image shows water inundated areas (Fig. 9). A meager recovery from inundation can be noted by the map of 15<sup>th</sup> September 2009. The water inundated area covers 33.88% of the total image as the water inundation during Aila is combined with the rainwater of August September (Fig. 10)

### Capacity Building

Rangabeliya and Pakhiralaya record the highest lengths of embankment damage which are 1000 km in each case (District Disaster Management Plan, South 24 Parganas, 2012) (Fig. 11). This shows that in comparison to the other sites of embankment damage Rangabeliya is the worst victim and this is a sign of worry for the residents. In the event of any hazard Rangabeliya shows a low capacity building as according to the census data near about 8700 people are likely to be exposed to risks while 6006 people can be evacuated (Fig. 12). This is indeed a negative sign. The embankments of the study area are earthen and are in very poor condition. At certain places the embankments are characterized by piping and further slumping while the bamboo wrappers meant for the protection of embankments are left in dilapidated condition. The local people try to protect the embankments by polythene sheets only.

### Peoples' Perception

The people of Rangabeliya are poor people having income within 5000 rupees mostly and very few people have an income of 5000 - 10,000 rupees. So far, as many as 3 to 5 embankments have got breached (Fig. 13). About 5 - 15 kathas of land have been lost due to repeated embankment breaching and water inundation. The local people have opined that the river Gomor is

shifting more and at a faster rate than Bidya. The local people haven't received adequate government aid. Some 15 years back the government had started acquiring for constructing embankments but nothing had been materialized. Tushar Kanjilal of Tagore society had attended Holland meet and it was decided that a canal would be constructed to make the rivers to meet each other. Crores of rupees had been arranged for this but no further work had been done. The local people have opined that the rivers may or may not meet together. Some opine that the rivers shall meet in near future while others say that they may take many years to meet.

### Management and Conclusion

Management options like concrete embankments, spark piling, wooden piling, porcupine meshes have been used but all have failed (Fig. 14). Porcupine meshes have succeeded partially. Some have suggested that the rivers should be made to meet to curtail the rising cost as of protection. As the land is

fertile and costs 120,000 rupees per bigha, the land should be well protected. The local people want strengthening of the embankments and increase of their heights coupled with more government aid.

### References

1. Bagchi, K (1994) : The Ganges delta, University of Calcutta.
2. Danda A. A. ( 2007) : Indian Sundarban Delta: A vision.
3. Rudra K (2012): The proposal of protecting Sundarbans by the stronger embankment - myth and reality published in Proceedings of the Seminar "Community Awareness in Sundarban" ed. S. Chatterjee, VU.
4. Paul A. (2002): Coastal geomorphology and environment published by acb publications.
5. Maiti R., Das T, K. and Maji A ( 2012) : Managing embankment breaching in NE Sundarbans published in Proceedings of the Seminar "Community Awareness in Sundarban" ed. S. Chatterjee, VU.

Table – 1 Places Where Rivers Are Coming Near

Places	Rivers
Kachukhali	Bidya & Durgamandal Khal
Sambhunagar	Karatal & Bidya
Radhanagar Taranagar	Durgamandal & Mollakhali Khal
Rangabeliya Village	Bidya & Gomor (Hutta Khal)

Table 2 – Fluvial Dynamics of Bidya and Gomor Rivers

Rivers	Length of Concave Bends	Width of Bends
Bidya	0.50 km	0.3 km
Gomor	1.10 km	0.5 km

(From SOI Toposheet, 1969)

Table 3 – Distance Between Two Rivers Over The Years

Years	Distance between Two Rivers
1969	0.60 km
2003	0.43 km
2014	0.38 km

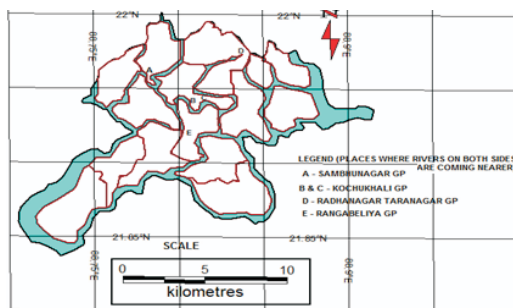


Fig. 2: Places in Gosaba, where Rivers are coming nearer



Fig. 3: Bidya and Gomor in 1969



Fig. 4: Bidya and Gomor in 2014



Fig. 5: Jatirampur Bend in 1969

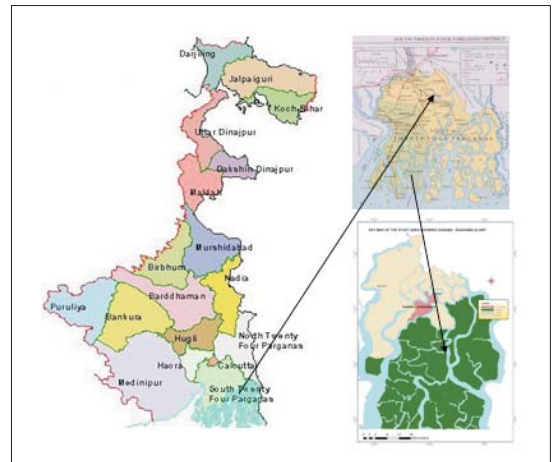


Fig. 1: Location of the Study Area





Fig. 6: Jatirampur Bend in 1999

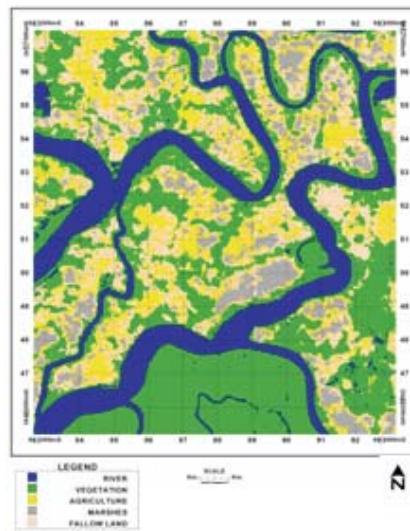


Fig. 8: Pre Aila Situation of the Study Area (Feb, 2009)

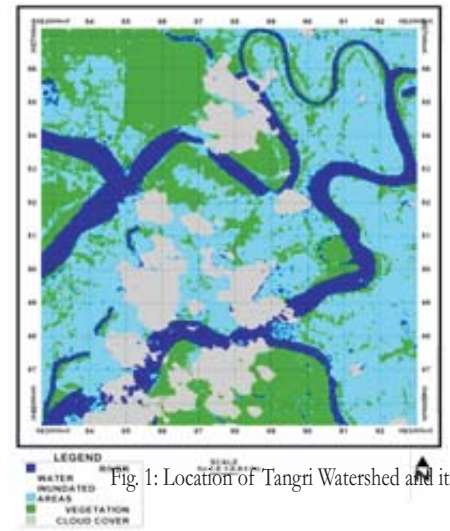


Fig. 9: Aila Situation of the Study Area (June, 2009)



Fig. 7: Jatirampur Bend in 2009

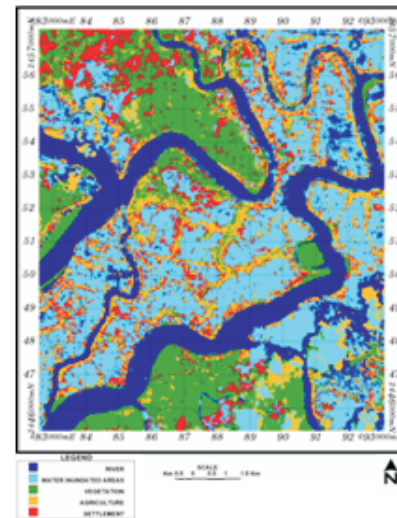


Fig. 10: Post-Aila Situation of the Study Area (September, 2009)

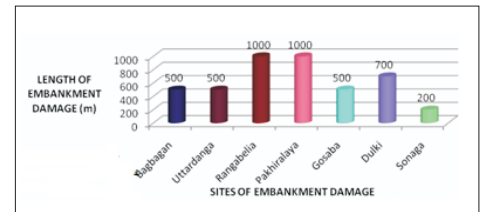


Fig. 11: Length of Embankment Damage

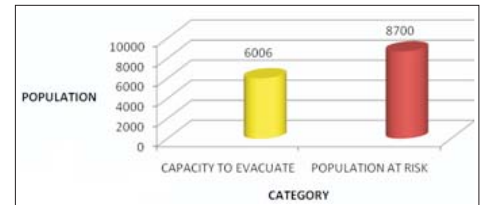


Fig. 12: Extent of Capacity Building

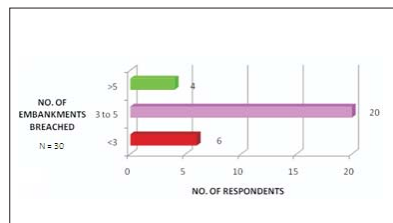


Fig. 13: No. Of Embankments Breached

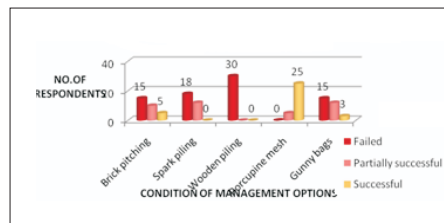


Fig. 14: Condition of Various Management Options



Fig. 15: Places where Rivers coming nearer



Kanailal Das  
Research Scholar  
Department of Geography & Environmental Management  
Vidyasagar University  
West Medinipur, West Bengal  
Email: brmistri@gmail.com

www.h-net.org/.....ID=201577



Karabi Das  
Research Scholar  
Department of Geography  
University of Calcutta  
West Bengal  
Email: karabidas139@gmail.com



Dr. A. K. Paul  
Professor,  
Department of Geography & Environmental Management  
Vidyasagar University  
West Medinipur, West Bengal  
Email: brmistri@gmail.com