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Shifting Courses of Ganga River, It Causes and Resultant Hazards of Manikchak Block, Malda District, West Bengal

Sriparna Mitra

Research Scholar, Department of Geography, University of North Bengal, India

Abstract

Shifting course of river Ganga is causing a large scale disaster in terms of flooding and bank failure in Malda dist. River bank erosion and flooding in Malda dist have become a chronic phenomenon since early '60s and the problem turns into disaster during last few decades. In every year the large numbers of local inhabitants are being severely affected due to bank erosion, particularly along the river bed of the Ganga in the present study area.

Introduction: Flood and bank erosion since pre historic period had become one of the major aspects of discussion for its direct interaction with physical and socio-cultural environment. Bank failure and the bank erosion are in facts are very common phenomena since long time in Malda district.

Objectives: There are several objectives in shifting courses of Ganga river and its resultant impact on the study area.

Analysing how the bank erosion display the hazardous picture and associated problem regarding human society in terms of loss of property.

Emphasizing the positive causative factors of bank side erosion.

Describing the way of proper river management system helps to reach the region in its development.

Methodology:

i) **Pre-field study:** Study of the thematic map and toposheet (SOI) Preference no.72 O/16 associated with field record of river shifting on block wise mouza map within the requirement of research. Information have been collected from different Govt. office

Like-water & Irrigation Dept., Malda, D.L.R.O.,B.L.R.O. and Block Office, Gram Panchayath office of Malda were also taken in to considerations.

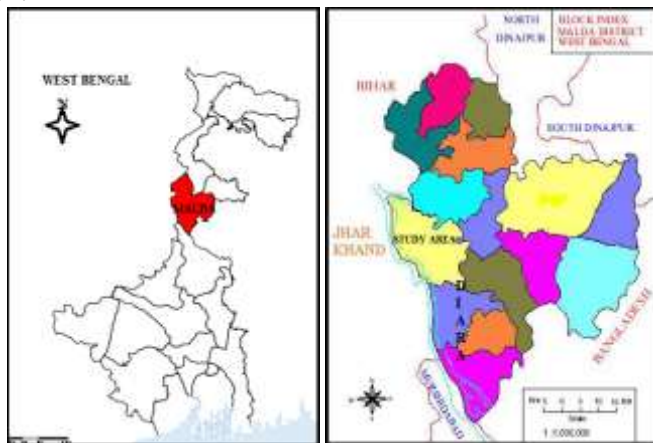
ii) **Field study:** Primary data were generated by interviewing people upon properly desire questionnaires through intensive field survey.

iii) **Post-field study:** The data were analyzed in relation to the various research questions and techniques.Both descriptive and inferential techniques were employed in the data analysis and the study of various records historical description and report from different secondary sources.

Litereture Review: Many workers academicians and researchers have carried out studies on bank side slumping and its hazardous impact.1.The Encroaching Ganga and Social Conflicts: The Case of

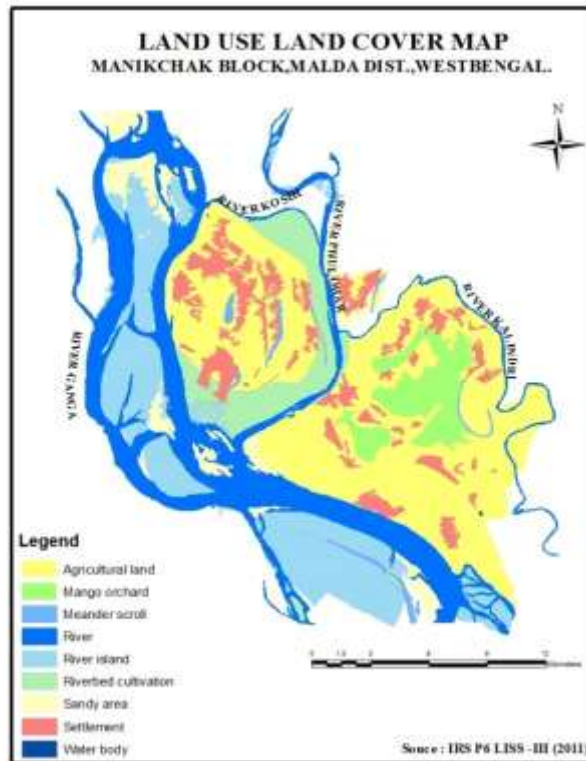
Shifting Courses of Ganga River, It Causes And Resultant Hazards of Manikchak Block,..... Sriparna Mitra
 West Bengal, India by K.Rudra. 2. Bangla Desher Nod-Nodi O Porikolpona by K.Bhattacharya. 3. Samprotik Bonnar Poriprekhhite Maldoher Nod-Nodi by K.Basak. 4. A report on The impact of Farakka Barrage by M.Banerjee. 5. Bank erosion of river Ganga by Mukhopadyay & mukhopadhyay. These helps to describe, analyse and find out the major causative factors.

Study Area: Malda district has been chosen as the study area with reference to sites study of Manikchak block. The district Malda is situated keeping Jharkhand in the west, Bangladesh in the east and Murshidabad in the south where the river Ganga delineates in the western boundary and the northern part of the North Dinajpur District. From the view point of physical data, the district is divided into three identified parts namely- Tal ,Barind ,Diara. The study area is situated in the Diara Physiographic divisions. Diara is the alluviated land created mainly by the joint action of the river Ganga & Mahananda in the Pleistocene –Holocene period with many small depressions or lakes with alluvial flood plain. So from the pre historic period this block is under the playfield of Ganga river in Malda dist. Devastating flood and river bank erosion are the most common phenomena in every year in this block.



Land Use Pattern of The Study Area: The study area is under the Diara physiographic divisions. Diara means newly created land by the river action. So the area is mainly flood prone but the soil is very much suitable for agricultural activities. For this reason the whole areas are under the cultivated land. Here Mango orchard cultivation is also very much preferable by the local people. The areas

Shifting Courses of Ganga River, It Causes And Resultant Hazards of Manikchak Block,..... Sriparna Mitra mainly seasonally flooded are used as river bed cultivations. Mainly kolai , bhutta are cultivated there. The new island or new chars are mainly used as paddy cultivation. There are so many river islands are constructed by the Ganga in the study area. Bhutni-diara is the most important island.



The Earlier Course of the Ganga in Malda: A few rivers are running through the District of Malda, These are running mainly from the north or northwest to the south or southwest. The Ganges, Mahanada, Kalindri, Tangan, and Punorbhava are the main rivers of the district. Besides a few small tributaries and distributaries are also running through the district such as Fulohar, Bhagirothi, Pagla, Behula, etc.

The Ganga enters the state of West Bengal dashing the Rajmahal hills of Jharkhand along the right bank and flows for about 72 km. before it approaches the Farakka Barrage. The river does not get the opportunity of free swing downstream of the Rajmahal hills as the outlier of hard rock along the right bank does not allow the river to encroach westward. In the second decade of the Twentieth Century, the course of the Ganga between Rajmahal and Farakka was straight and aligned in a south-easterly direction. This course is described in the topographical sheet bearing No.72 P/13 (1:63360), surveyed in the year 1922-23. This was not the course of the river during the earlier centuries when Ganga flowed along an altogether different course dashing Gour, the mediaeval capital town of Bengal. Rennell (1788) wrote that, "Gour, the ancient capital of Bengal, stood on the old bank of Ganges: although its ruins are 4 or 5 miles from the present bank." Prof.R.K.Mukherjee (1938), the eminent historian, noted in his book entitled "The Changing Face of Bengal", that, "Leaving the hills of Rajmahal, Ganges seemed to have passed northwards through the modern

Shifting Courses of Ganga River, It Causes And Resultant Hazards of Manikchak Block,..... Sriparna Mitra Kalindri and then southwards in the lower course of Mahananda, east of the ruins of ancient Gour". Once the state of "GOUR" was situated on the western bank of the river Ganga. But now a days that very river Ganga kept the state of Gour on its easternbank and is flowing 25 km away after repeated change of its course.

So we consider all the water body or 'danra' is created from the paleo channel of the river Ganga which covered the geographical area of Kaliachak and Baisnabnagar P.S, according to present map of Malda district. In favour of this consideration we produce the first evidence is that, the soil of Kaliachak and Baisnabnagar is mainly alluvium soil which is either silted by flood of river water. Secondly no ancient idol evidence has been discovered from these two areas though the historical place 'Gour' is situated very near. Moreover the ancient idol of Hindus and Buddhist have been discover from almost all the places of Malda district except these two areas.

Soi Toposheet –Wise Details of the Shifting of the Ganga River in the Study Area

SL No.	Area Reference	Time Sequence	Remarks
1.	West of Baikunthatola	1.1974 to 1997 2.1997 to 1999 3.1999 to 2003	East ward shift of 1 km along left bank of river Ganga. Further east ward shift about 250m, damage circuite embankment. East ward shift by 500m.
2.	NW of Gobardhantola	1.1974 to 1997 2.1997 to 1999 3.1999 to 2003	East ward shift of 2.5km left bank of river Ganga. 200m eastward shift. 250m eastward shift.
3.	Dakshin Chandipur	1.1974 to 1997 2.1997 to 1999 3.1999 to 2003	Eastward shift of 750m along left bank of Ganga. Further eastward shift of about 200m engulfing abandoned meander scroll. It has eroded the northeastern part of Dakatia Char.
4.	Mathurapur	1.1974 to 1997 2.1997 to 1999 3.1999 to	Eastward shift of 250m along left bank of Kalindri river. Eastward shift by about 100m. Eastward shift by less than 50m.

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		2003	
5.	Janakiramtola	1.1974 to 1997 2.1997 to 1999 3.1999 to 2003	300m eastward shift along left bank of Ganga. 750m to 1km eastward shift. No significant change.
6.	Gopalpur	1.1974 to 1997 2.1997 to 1999 3.1999 to 2003	Eastward shift along left bank of Ganga by 1.75km. Eastward shift by about 300m. No significance change.
7.	Daulattola	1.1974 to 1997 2.1997 to 1999 3. 1999 to 2003	Eastward shift along left bank of Ganga by 900m. Eastward shift by about 1.4km. Eastward shift by about 350m.

Source: Department Of Science &Technology, Westbengal





Resultant Impact or Cosequences of Bank Erosion

Problems And Rights of Rehabilitation: After having been displaced from their original homes by the recurrence of flood events in 1998, 1999 and 2001, the respondents at the time were living in makeshift hutment colonies at safer locations along public roads and along Embankment No.7 beside the Ganga - such resettlement colonies being a common sight along many retired embankments in this region. Several insights emerged from this study about the nature of ongoing flood-induced migration and resettlement in erosion-prone areas of the Ganga Diara.



Embankment is The Only Shelter of The Local People: In the Embankment No.7 colony, all residents were still living in smaller makeshift hutments built of flimsy bamboo and plastic that could scarcely hold back the rain. No family had been able to buy back any land, although all of them had acquired livestock ranging from cattle to goats, as a means of sustenance and additional earning. All families hoped to reclaim land one day from the *chars* that would rise subsequently from the river

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All families in the resettlement colony had undergone direct asset losses of some kind, because of flood or erosion. 8 out of every 10 families had lost some or all of their agricultural land, while nearly half of them had also lost their homes. Only one family reported asset gain subsequent to the flood experience, in the form of a loan received for rebuilding its home. Most land losses had occurred near the older resettlement colony in Dakshin Chandipur. The residents of the other colonies were poorer, and few of them had consequently had land to lose.

Demographic and Occupational Change in the Study Area: The recent trend of the Ganga near Manikchak has been to attack its left bank. Through most of the riverine villages in Manikchak block, there has either been subdued increase or dramatic decline in population. Population decline has occurred mainly in Dharampur, Manikchak and Gopalpur areas, all of which, as seen earlier, are erosion-prone. In Manikchak *mouza* however, the decline in males exceeds the decline in females, offering strong evidence of male outmigration from the area in the aftermath of erosion. From Dharampur and Gopalpur on the other hand, entire families have left. This pattern is due partly to the local migration of males from the erosion-affected stretch to areas where work can be found, and by the evacuation of their families to safer inland places. Decline in the number of cultivators has occurred in all riverine villages in Manikchak, except Dakshin Chandipur. In the erosion-affected villages of Dharampur, Manikchak and Gopalpur, the decline has been noticeably sharp and is accompanied by steep decline in the number of agricultural labourers, providing evidence of increasing livelihood pressure and migration.

With land units in the area having shrunk because of erosion, and wages being depressed by the death of agricultural work, resettled families who depended mainly on cultivation for their livelihood had the lowest post-flood earnings. The situation of families who depended on some form of riverine activity like fishing or boat operation for livelihood had also deteriorated after the flood. Because of the overall lack of work and consequent economic pressures, the out-migration reported from the Diara region was high, and more than half of the respondent households had one or more individuals from their family working in faraway places like Kolkata, Varanasi, Mumbai or Delhi. Some of the respondents to the Diara survey had personally worked outside the district for some time, and reported that 70 percent of those who migrated from the Diara went to places outside West Bengal for work, because of the lack of local alternatives. Much of this migration was apparently seasonal, and took place during the lean season when there was a shortage of rural work. Therefore, the migrants returned during the agricultural harvest season, or in the case of Manikchak – during the mango and *litchi* season. Over the years, migration pressures were reported to have increased because of lack of irrigation in the *diaras* and the escalating cost of cultivation. The impact of constant erosion losses was also a contributing factor, since few large landholdings were left that could absorb the huge population of wage labourers. Migration pressures in the Diara are thus just one manifestation of a trend that is spreading slowly to many other parts of the district. Labour migration from the Malda district largely takes place because of economic reasons.. As one male respondent put it, “nobody would go outside to work if they could earn enough”.

Land Right Issues on New Ganga Chars: On a river that is prone to meander as widely as the Ganga, the boundary aspect brings up further contentious issues. The midstream rule is generally applied to resolve boundary issues whenever a river runs between states of districts. However, when the deepwater channel of the river begins to wander, along with the formation of *chars* and *diaras*, the territorial questions become complicated. Thus over the stretch of the Ganga that flows through West Bengal between Bhutni Diara and Jalangi in Murshidabad, there have been several past adjustments of territorial boundaries between Malda and Murshidabad districts, and between West Bengal and undivided Bihar. Between 1921 and 1931, when the main channel of the Ganga was

Shifting Courses of Ganga River, It Causes And Resultant Hazards of Manikchak Block,..... Sriparna Mitra attacking its right bank, the territorial boundaries between West Bengal and the erstwhile Santhal Parganas (now Jharkhand state) and Purnea districts of Bihar were adjusted to the advantage of Malda district. The huge river island of Bhutni Diara was a territorial gain from that time. With the reversal of that swing by the Ganga, those gains and losses are liable to swing the other way.



Causes of River Bank Erosion: A flowing river is always dynamic and therefore anti-erosion measure can never be stable for long time. They require constant maintenance. It is interesting to mention that the comparative analysis of PS/ thana map (1939-40), SOI toposheet (1971-72) and the upto date satellite images reveals that the shifting of the Ganga river in the aforesaid area is accelerated possibly due to the anthropogenic activities in terms of construction of ‘circuit embankment’ around the ‘Bhutni char’ (a permanent channel bar) in 1972 ignoring the play field of such a major river. The construction of the ‘circuit embankment’ has confined the flood time flow along the constricted channel enhancing the thrust causing bank erosion instead of accommodating the water spread during high discharge time. The Farakka barrage is also a massive human interference which altered the previous flow pattern of the river. As a result the meandering pattern, the hydraulic and the hydrological feature, channel geometry, sediment load and filtration etc changed to accelerate erosion.

The study of the natural selection of the left bank and right bank of the river upstream and downstream of FARAKKA respectively reveals the existence of sandwiched fine sand layer partings of about 1.0 m thickness within the silty clay sequence. During recession of the water after the initial high discharge, removal of the fine sand /silt layer accelerates the process of bank failure. Necessary protection of this fine sand /silt layer is inevitable to reduce the bank failure in the region.

Measures Taken: As stated the Govt. of West Bengal Constructed a marginal embankment on 1972 on the left bank, starting from the left afflux bund upto Kalindri regulated to prevent stills on adjacent land. Previously the north east frontier rail line and the national high way no.34 passed through the Malda. Construction of the left afflux bund of the Farakka barrage was completed in 1975. It had very high crest level, which was decided on the basis of the Highest Flood Level(HFL) at Farakka which is much higher than rail line and Nh-34. Flood affected people take shelter on the embankment and many of them had been taken permanent shelter on top and the side slopes.

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 From 1972, a number of spurs were constructed at various places including the bank side between Kaliachak near to Farakka and Manikchak on a length of 30 km but most of these were out slanted and erosion or breaches remained unchanged. Other protective measure submersible and short spurs were built too, but these were also damaged and out slanted and the deep channel gradually advance towards the country side, eroding vast stretches of land. Seven long spurs were also constructed with the earth embankments up to 10 km from the barrage axis between 1975 and 1978 for arresting severe erosion. But these were also damaged and erosion could not be checked. The local people make a new procedure to check river bank erosion– ‘Deep-treesing’ by using bamboo and boulder.



‘Deep-Treesing’-Erosion Control Procedure by Local People

Proposed Remedial Measures:

The Proposed remedial measure is sub divided into two types.

Short term measure:

1. Renovation of all existing spurs left bank up stream and right bank downstream.
2. Bank revetment at selection reaches on both up stream of Left Bank and downstream of the right bank.
3. Renovation of existing damage revetment works.
4. Construction of two spurs at Akhiriganj and Jalangi bazaar.
5. Essential dredging of koshi channel and char land upstream and downstream of barrage.
6. River behaviour studies model surveys and detailed investigation and updating all requisite technical data.

Long term Measure:

1. Extension of the left guide bund on up stream.
2. Bank revetment, work of 10th marginal embankment on upstream left bank and remaining reach from Farakka to Jalangi bazaar on downstream right bank.
3. Dressing of upstream and downstream of barrage at suitable location.

Thus the short term measure recommended by the Expert Committee was similar to those by the Pritam Singh committee in 1980. But most of the works have not been taken up yet for constraint of fund and because of diverse views of other expert in the field.

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