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IMPACT OF FLOOD AND BANK EROSION ON HUMAN LIFE: A CASE STUDY OF PANCHANANDAPUR AT MALDA, WEST BENGAL, INDIA



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ABSTRACT

River bank erosion, is the wearing away of bank materials of a river. It is a dynamic process affecting the concave side of the bank, while depositing sediments on the opposite side. The present study is mainly focused on those people who are harmfuly affected by river bank erosion. It tries to show that how people combat with dynamic nature of river in each year and how they lead their life with facing this problem. The study tries to make a link between people's livelihood and life style pattern and seasonal variation of river shifting pattern, it basically show how livelihood pattern and life style of flood affected people change in Pre flood, Flood and Post- Flood conditions and also observe how they utilize their land after flood.

This study will also measure the socio-economic condition of flood affected people. It basically measures their lifestyle. Significance of this measure is that it shows socio economic condition of those people who are settled with their land in just beside the river bank is much poorer than those people who are settled far away from river bank. This study is to show the migration pattern of people for this flood. This study divided into two perspective. The first one is that people are migrated temporally at some extend from river and after flood period, they again come back to their existing place or second one is that they are shifted to other places from their living land. This kind of micro level studies are very limited in West Bengal. This issues are differ the importance of present study from existing studies.

KEYWORDS :Demographic and socio-economic profile of flood affected people, Losses of residents, Economic & Survival migration, Environmental refugee, Human adjustability.

INTRODUCTION

The river Ganga, Bhagirathi and Hooghly, in West Bengal resorts to massive bank erosion at an alarming scale in Malda, Murshidabad, Nadia, Burdwan and Hooghly and contributes to a dominant irreparable loss of farm lands of a very high quality each year. It has been estimated, that about 43% of the total geographical area of the state has been declared as flood prone. Panchanandapur area in Malda district is similarly hit by this environmental hazard and its associated problems of mass displacement of the poverty stricken rural population with their land, cattle, houses and other assets lost. This paper is an endeavor to highlight their pangs and bring out the ways these poor mass combat the devouring river. The affected people by river bank erosion lost out in many ways, both in materials term as well as in social terms. Some lost family members; others lost homes, crops, land, trees, poultry and livestock. In general, there was a reduction in assets, savings and income. The residents of river bank were, in some cases, able to read the flow of the river and predict the likely places that would be washed away. Lack of access to employment was reported as the single most important loss in the post-displacement situation. Displacement brought about major changes in family structures, particularly through labour migration. Lack of income causes some male members of households to abandon their families. Other negative impact includes loss of privacy and insecurity for women, children and psychological problems. Access to education is also affected by bank erosion. The present study will examine the impact of flood and land erosion on the people and their livelihood. The land loss and displacements will be considered. Some demographic parameters will be discussed including flood and erosion induced out-migration of those people who are residing along the riverbank of the Ganga in the district of Malda. Malda has been chosen because its people have so often been a victim of floods and land erosion. The study will try to show that how the floods and erosion happened displacement of people, losses their poverty and livelihood and what kind of government strategies have been taken for affected people.

OBJECTIVE:

The study seeks to understand the socio economic impacts of river bank erosion and to have an idea about the adaptability and resilience of the inhabitants. The basic objectives of this study are as follows:

1. To draw the contours of human adjustability in the area with accordance of riverine flood and bank erosion.
2. To understand peoples' perception regarding flooding and erosion in the study area.
3. To show the socio-economic conditions of flood affected people.
4. To show the migration pattern to assess the volume of environmental refugees in the flood affected region. (Environmental Refugee).

REGIONAL BACKGROUND OF THE STUDY AREA:

Spreading over an area of 3733 sq.km with a population of 32.91 lakh according to 2011 census, the district of Malda covers 4.2 percent of the total landmass of the state of West Bengal and is home to 4.1 percent of the total State population. Located between latitudes 24° 40'20"N and 25° 32'8"N, and longitudes 87° 45'50"E to 88° 28'10"E, the district is bounded to its due south by the district of

Murshidabad across the river Ganga, by Bangladesh and Dakshin Dinajpur district to its east and northeast, by Uttar Dinajpur district to its direct north and by the states of Bihar to its direct west and Jharkhand across the Ganga to the southwest.

Below Rajmahal hills up to Farakka Barrage, the course of Ganga passing through Manikchak, Kaliachak-II, and Kaliachak-III blocks, of Malda district has been taken as the study area. For the present study, Panchanandapur area in Kaliachak II block has been point out. This Panchanandapur area is one of the flood affected area of Malda district because this area is highly affected by bank erosion. Its latitudinal and longitudinal extentions are 24.9489029 N and 87.9813749 E respectively. It belong to Jalpaiguri division. It is located 9 km towards south from District Head Quarters English Bazar and 311 km from state capital Kolkata. At first time in 1963, the Panchanandapur region, 20 km upstream of the Farakka barrage, came under the threat of erosion when the reach between Rajmahal and farakka was straight, the river started meandering towards the left bank.

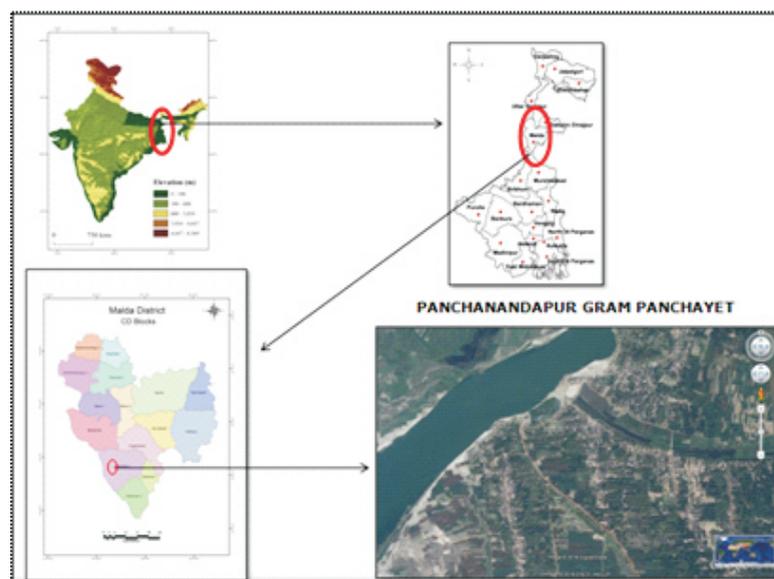


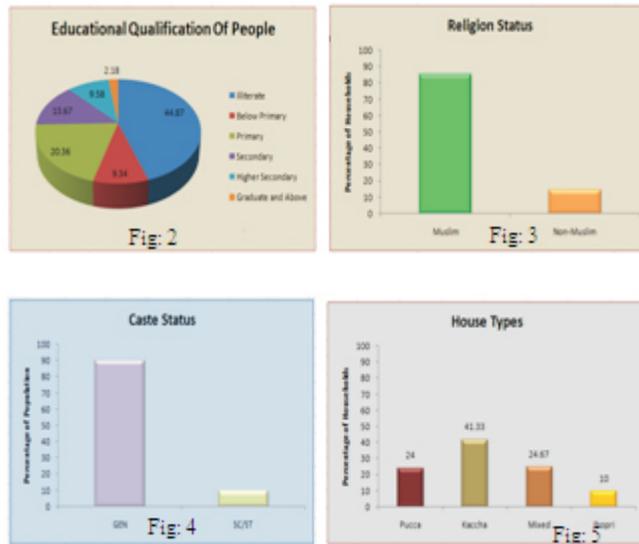
Fig: 1, Regional background of the study area

DATA SOURCES AND METHODOLOGY:

In the present study, data and maps are collected from both primary sources and secondary sources. Primary data are generated by interviewing people upon property, livelihood and life style desire village schedule and household based questionnaires through intensive field survey and also our personal observations. River shifting status are also tried to understand through the discussion with village people because they are regular observers. On the other hand year wise flood related secondary data are collected from Census of India and some existing flood or bank erosion related literatures. For represent the socio-economic profile of flood affected people and different aspects related effect of flood on those people, I used some tables and charts. Source of most of the tables in our study are our field survey and very few amount of table are taken from the topic related existing literature.

RESULT AND DISCUSSION:

Demographic and Socio-economic profile of Study area:



For the present study, we have done the field survey on some selected villages of Panchanandapur. The villages are Subhanitola, Vest Para, Hakimtola, Sultantola, Mistiripara and Kacharitola. From the field survey, I got also educational qualification of people which represents in Fig: 2. 11 Primary Schools, 1 Madrasha school, 2 High schools are situated in Panchanandapur area. I have done 150 household surveys from selected six villages. Among the total number of households, 44.87% of people are illiterate, while 9.34% of people are belongs under below primary level education, 20.36 % of people are belongs under primary level education, 13.67% of people are belongs under secondary level education, 9.58% of population are belongs under higher secondary level and only 2.18% of people are belongs under graduation level education or above. So large amount of people are illiterate and moderate educational status are observed in the area. Insecurity of life due to flood or bank erosion affect on the educational structure.

The above Fig: 3 shows that religion and caste structure of Panchanandapur area in Malda districts. In Fig: 2, it shows that the majority of population in this area is from Muslim background. 85.33% of households belong under Muslim Community. Majority of Muslim population live in Hakimtola, Sultantola and Kacharitola. On the other hand 14.67% of Non-Muslim population is found in this area. They are basically Hindu Population and very few amount of tribal population.

The Caste structure of Panchanandapur is presented in the Fig: 4 according to 2001 census. Among the total population, 90.06% of people belong under General Category. While 9.94 % of people belongs under SC/ST categories. The causes of disparities of caste structure are that the area is mainly Muslim dominated and SC/ST categories are less found in Muslim community. Majority of SC population are found in Hindu community and some extent in Muslim community.

The above Fig: 5 show that housing pattern and people’s income status of Panchanandapur area in Malda district. Actually this segment gives an economic profile of people of that flood porn area. In Fig: 4, according to our field survey, 24 % of households are Pucca, while 41.33% of houses are Kaccha, 24.67% of Houses are mixed character and on the other hand some Jhopri houses are also found in the region. The cause of this living pattern is poor economic condition of the people and insecurity of life and living places due to flood or bank erosion. Jhopris are basically found besides or near river bank area.

According to field survey, 14% of household’s monthly income is below 2000 rupees, while 36.67% and 35.33% of household’s monthly income are 2001 to 5000 rupees and 5001 to 10000 rupees respectively. On the other hand, very less amount of households earn > 10000 rupees per month in Panchanandapur. It shows that 9.33% and 4.67% of households earn 10001 to 15000 and >15000 rupees per month. So overall economic condition of people in Panchanandapur is very poor.

Economy of Panchanandapur area is primarily an agrarian. The subsistence agriculture produces mainly cereals and pulses such as paddy, wheat and pulses etc. Vegetables are grown at large scale that is supplied to the markets at Malda. As evident from the field survey, as high as 73 per cent work force are engaged in agriculture, 15.5 per cent in Beedi Rolling, 3 per cent in fishing, 6.5 migratory labour and 2.0 are engaged in other sectors. Seasonal out migration of labour force is a common phenomenon today in this region due to flood or river bank erosion. Most of them go to Maharashtra, Gujarat, Punjab, Haryana, Delhi and Bangalore to earn their livelihood. No proof of permanent residence is available with them which deprived them of government jobs and facilities.

Peoples’ perception regarding flooding and erosion in the study area:

A. Erosion Impact Ranking:

Wider perceptions among the village residents about the cumulative impact of riverine calamities on their social and economic lives were assessed through an erosion impact ranking made on the basis of information collected during the survey. The overall impact rankings were determined from the factors to which each respondent attached highest importance. Land losses were thus identifiably the greatest burden borne as a result of riverine erosion by the affected population in selected villages of Panchanandapur area.

Table: 1 Erosion Impact on Panchanandapur Residents

Erosion Impact	Ordered Ranking	Percentage of Response
Land Losses	84	56
Human Displacement	28	18.67
Crop Losses	8	5.33
Loss of Hope	6	4
Livelihood Losses	16	10.67
Livestock Losses	6	4
Human Losses	2	1.33

Source: Field Survey

Above table shows that 56 percent of the respondents giving highest impact rankings to the land losses sustained in the region. Human displacement because of erosion, involving widespread resettlement or migration of the population, came next on the impact ranking scale and was given highest priority by nearly 19 percent of the affected residents. Crop losses occupied third position, together with the despair and loss of hope that represented the psychological overburden of erosion calamities. However, the proportion of Panchanandapur residents that attached highest priority to these was smaller, since most residents in the region are landless and do not cultivate crops of their own. Long historical experience of living close to a turbulent river that has alternately blessed and wreaked destruction on the region appears to have given the Panchanandapur population considerable resilience. Therefore, the number of residents who felt total loss of hope was few.

Livestock losses were given priority by a smaller fraction of residents but livelihood losses were given greater priority by the residents, since most respondents were poor and had little left to lose. In the case of livestock, Most either managed to save their livestock or had no livestock to lose, and were also able to find alternative wage work which partly compensated their livelihood loss.

B. Asset Losses of Residents:

Table: 2, Cumulative Asset Losses of Residents

Asset Type	Pre-Flood Valuation (Rs)	Post-Flood Valuation (Rs)	Loss Valuation (Rs)
Houses	2906660	1264000	-1642660
Agro Implements	2180356	1263363	-916993
Machinery	134966	85666	-49300
Boats	16000	18342	2342
Rickshaws	27345	7346	-19999
Total	5265327	2638717	-2626610

Source: Field Survey

The greatest depreciation between pre-flood and post-flood asset values had occurred in the case of the houses occupied by the respondent households, which had lost more than 56 percent of their cumulative value after the riverine calamities. Thus their current cumulative valuation thus stood at Rs.12.64 lakh for all survey households, down from the original valuation of Rs.29.06 lakh before the floods. Depreciation in value of agro implements was on the order of 42 percent, accompanying a loss of asset value by Rs.9.17 lakh. Despite the cumulative loss being less since few respondents had prior holdings of these, even major machinery like power tillers, pumpsets, etc, had lost 37 percent of the prior value. Vehicles like rickshaws & cycle-vans which were plied for a living by a few respondents, had similarly lost 70 percent of their prior value. However as a consequence of the calamity, the need for boats had risen, leading to an increment in their asset value. Thus for all items for which the quantification was made, total asset losses amounted to over Rs.26.27 lakh for all households, implying depreciation in the total value of their physical assets to half of the value they had held before the calamities had struck.

C. Livelihood Choice of Residents:

Table: 3, Livelihood Choices of Residents

Work Type	Primary Occupation	Secondary Occupation
Wage Labour	85	38
Agriculture	19	10
Artisanship	16	8
Service	9	9
Petty Trade	8	8
Miscellaneous	13	-

Source: Field Survey

Thus over 92 percent of all respondent households depended on wage labor either for primary or secondary livelihood, in contrast to which only 16 percent still practiced cultivation in any form. While 82 numbers of respondent households depend on wage labor as primary occupation and 38 numbers of respondent households depend on wage labor as secondary occupation, on the other hand

19 numbers of respondent households still engage in agricultural work for their primary livelihood and 10 numbers of households engage in agriculture for their secondary occupation. Only 10 percent of respondents did not participate in wage labor in any way. Most households in this category were involved in either artisanship or trade. In the Panchanandapur area, livelihood choices being limited and livelihood opportunities few, less than half of the respondents had earnings from a secondary occupation.

D. Migration Pressure on People:

Because of the overall lack of work and consequent economic pressures, the out-migration reported from the Panchanandapur 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 villages survey had personally worked outside the district for some time.

Table: 4, Migration Pressures on People

Reason of Out-Migration	Order Ranking	Percentage of Response
Livelihood	64	47.06
Marriage	21	15.44
Education	12	8.82
Service	12	8.82
Nil	27	19.86

Source: Field Survey

Economic Migration:

Regarding migration it is seen that in the study area, both economic migration and survival migration are found. For sustaining the contour people have moved outside the local area notably Kerala, Bangalore, and Mumbai etc. for work. It is especially visible in Muslim community and in Panchanandapur area, majority of population belong under Muslim community. Prominent occupation in Panchanandapur region is agriculture and related occupation. In every year due to flood or bank erosion, large amount of agricultural land is damaged which affect whole livelihood pattern in the region. Although this incidence is seasonal but its effect long term. So there is a lack of employment opportunities in the region due to flood and bank erosion which causing a lot of hardship for the people. With limited livelihood options, there is widespread poverty and even distress among families in the region. All this above factors have contributed to the migration off people from the region.

Table: 5, Village wise distribution of Households Respondent regarding Migration of Family Members in Search of Work

Villages	Family Members migrated to Abroad in Search of Work during Flood		
	Yes	No	Total
Suwanitola	18	12	30
Sultantola	21	9	30
Kachalitola	14	16	30
Hakimtola	12	18	30
Vestpara	11	19	30

Source: Field Survey

The above table shows that in all the selected villages of Panchanandapur area, households' survey opined that although earning persons of their families are migrated to abroad in search of work during flood season, but on the other hand, some families also opined that there is no migration for search of work from their families. Those people said that they do not anything during flood season. Women of those families engage in Beedi binding work as their livelihood and men persons are also help them in this work. But in Sultantola village, maximum households opined that there is migration from their village to abroad in search of job and after one or two month they come back.

SURVIVAL MIGRATION:

Another kind of migration is happened every year in Panchanandapur area which is Survival Migration. In riverine villages of Panchanandapur area, for physical survival nearly 70% of people have involuntarily migrated to higher place of local region and safely neighbour villages or relatives houses. This type of involuntary migration is common by bank erosion in Panchanandapur region. According to people perception, it has seen that the social cohesion has increased especially during flood time in the flood camp or among the bank erosion victim.

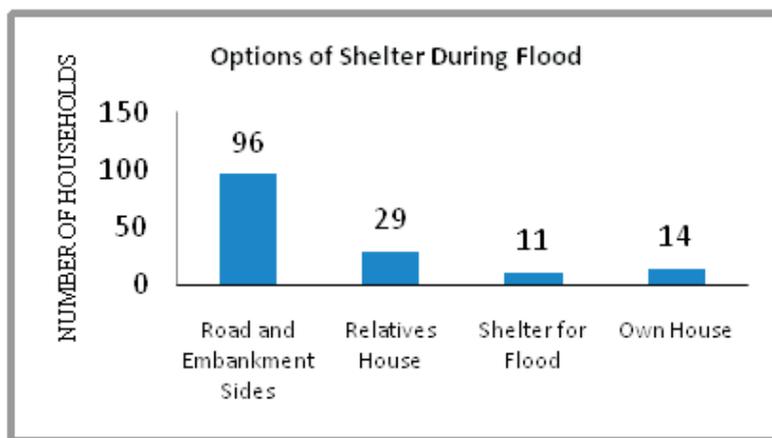


Fig: 6,

Source: Field Survey

The above table shows that the options or places which people choose for the shelter at the time of flood or bank erosion. According to household survey, it shows that almost 64% of household's people are shifted their shelter on the Road side and higher place of embankment at the time of flood. While almost 20 % of families go to their relative's house for shelter. On the other hand very less amount of families according to field survey lives in their own houses at this natural disaster time. Actually the families in this category lives some distance places from river. In Panchanandapur area, any special arrangements of places are not allotted for the time of flood. So some amount of families are shifted their shelter into local school buildings. These all people are done temporary migration for only the time of flood. After complete the flood season, they again try to come back into their own places. So this is one phase of migration of people in study area.

Permanent Migration of Families due to Bank Erosion and Creation of Environmental Refugee:

From the perception and survey about impact of flood and bank erosion on human life and livelihood among the various villages of Panchanandapur region, it clear that the study area is one of

the most vulnerable zone of Malda district. The large numbers of village dwellers are displaced permanently by river bank erosion and flood. Despite this, to them flood is comparatively less disastrous than bank erosion because flood makes temporary homeless but bank erosion make people Environmental Refugee (Islam and Rashid, 2011). I am discussed this segment not only from our study area perspective but also from whole district perspective.

Among the physiographic divisions of Malda district, Diara tracts are most vulnerable tract of Malda and among the Diara tract; Manikchak and Kaliachak II blocks are mostly affected by the flood and bank erosion. This paper’s study area Panchanandapur is under the Kaliachak II block. in table no 13. According to DHDRM, 2007, 15 and 20 mouzas are badly affected by bank erosion in Manikchak and Kaliachak II blocks respectively, while large amount of area in Manikchak and Kaliachak II blocks are affected by river bank erosion and on the other hand 3330 and 7378 number of families lost their land by the bank erosion in this two vulnerable blocks of Diara in Malda. This land losing families are totally displaced and migrated from this region, because they have not enough economic condition to resettle in this region. So this people ultimately make Environmental Refugee. “The term Environmental Refugee refers to the movements of refugees and internally displaced people (those displaced by conflicts) as well as people displaced by natural or environmental disasters, chemical or nuclear disasters, famine, or development projects" (FMO, 2007). The study area Panchanandapur area shared the number of displaced people of Kaliachak II block, so in this area also make displaced people into Environmental Refugee due to bank erosion.

Table: 6, Village Wise Distribution of Respondent Households regarding Permanent Migration from the Village

Villages	Household response of Permanent Migration from the Village			
	Yes	No	No Response	Total
Suwanitola	16	14	0	30
Sultantola	22	7	1	30
Kachalitola	21	9	0	30
Hakimtola	15	15	0	30
Vestpara	24	6	0	30

Source: Field Survey

The above table reveals the permanent migration families from their places in Panchanandapur area. According to opinion of households collated in the table, most of the household in all selected villages revealed that according to their knowledge there exists permanent forced migration of families from their villages due to bank erosion. According to them, most of those permanent migrant families or Environmental Refugees has migrated into Kerala, Bangalore, Goa etc for search of livelihood and resettled in slum area of those cities. Some of them are also migrated from their local region to other safe area of West Bengal.

SUGGESTIVE MEASURES:

The erosion has taken an alarming magnitude because of low level of technological adjustment and ill- directed planning. While the total river taming is hardly possible, considering a tremendous eroding force of the Ganga, the local people have to learn to live upon continuous adjustment with erosion. The response of the Government should be proactive. The low-cost house building, with easily detachable and movable Materials, like corrugated sheets, bamboos, wood etc. may be provided on the chars. The futile ventures of bank restoration spending a large sum of money every year should also

be avoided. The Government pays more attention to protect non-displaced, and the relief generally provided for the displaced persons seem to be meagre.

The minimum facilities for living, like drinking water, sanitation, school, medical centre, market etc. should be provided to the erosion victims on the Charlands. Establishment of police outposts or B.S.F. camp may also develop a sense of security among the settlers. As the extensive areas of the Chars remain submerged during the rainy season, arrangement for elevated flood shelter is of absolute necessity. The school buildings may be so constructed that it can serve the dual role. As land is the most important life supporting resource the displaced persons may be granted their rights (Pattas) without any delay, so that the conflict over the possession of land may be reduced.

The engineering measures, which involve huge capital investment, can partly or temporarily protect the non-displaced persons. But better preparedness and scientific resettlement strategies may improve the socio-economic status of the thousands of erosion-victims living a threatened life on the Charlands.

CONCLUSION:

Though people have lost almost everything, there has evolved a strong bondage between the neighbours, as if the total neighborhood is a single family. Their distress, the common cause of suffering and their continuous struggle through generations, have made them united, resilient and this is the strength with which they fight for existence against the mighty Ganges and staying together is the only means of coping with this environmental problem. Many steps are being taken by the government to minimize the rate of erosion. However, compare to other area of Malda district, Panchanandapur area gets lesser importance. In future, we shall look forward to bold Government schemes and planning for doing away with this all devouring menace.

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