Proceedings of the 7th International Conference on Asian and Pacific Coasts (APAC 2013) Bali, Indonesia, September 24-26, 2013

ENVIRONMENTAL REFUGEE: A STUDY OF INVOLUNTARY MIGRANTS OF SUNDARBAN ISLANDS

M. K. Bera [1]

The impact of rising sea level in Sundarban region has been experienced by the extensive land erosion and land encroachment by the rivers and sea. The rapid land erosion reduces the size of the island which forces people to leave the area. It is the embankments which have been shifted towards the villages and the rivers and sea capture the hamlets close to the embankments. Once a large area encroached by the rivers and sea, people become refugee and move from affected villages to safer location at the same island or some other islands as per their convenience and capability to purchase the land. But there are people who do not leave the village and move according to the movement of new embankments. The research has been conducted by following ethnographic approach in villages in Sundarban region to see the demographic changes among the affected villages and neighbouring villages at the same island and to see the patterns of migration from affected villages to safer locations. It is found that, migration from affected village to non-affected villages depends on livelihood strategies among the villagers. Though affected people find permanent safer location at the mainland or safer place at same island or others island, they do not leave the affected area because of their livelihood opportunities at the affected villages. It is also found that, the migration towards the safer locations of the same island increases the population density in the non affected villages and the value of has increased due to the high demand of land.

Keywords: Environmental refugee, disaster, coastal flooding, Sundarban, migration.

INTRODUCTION

The migration caused by environmental degradation has been conceptualized by the climate change migration, environmentally induced migration, ecological or environmental refugees and climate change refugee. Though there are ambiguities in definition of these terms, the concept of 'climate change refugee' has been widely accepted. UNEP defines that "those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/ or seriously affected the quality of their life."

But, Tacoli (2009) has looked into in-depth understanding of climate change refugees and he argues that, though there is direct relationship between 'climate change', and 'migration', adaptation strategies reduces the needs to leave the natural hazard affected area. The migration also requires financial support and social support system which are reduced due to natural calamities. Though migration is an existing phenomenon, climate change is considered as an induced factor for migration from disaster affected area to safer location. The nature of the movement is influenced by accessibility of the destination, social and linguistics ties and economic activities at the destination. The climate change migration is mainly internal and regional rather cross border (Warner et al. 2009a; Warner et al. 2010; Kniveton et al. 2009; Kailin, 2009). Weiss and Reyes (2009) have emphasized on existing social and physical vulnerability, poverty, and inequality which is compound with the degrading environment causes pressure on affected communities to move away from the fragile area.

There is an important relationship between livelihoods and climate change which has influenced by the global environmental degradation. The IPCC report (2007) warns that, climatic variability causes reduction of agricultural production which has been experienced in Sahel region of Africa, aquifer depletion in Yemen, reduction fish production and others. The global south becomes vulnerable to losses and destruction due to combining outcome of existing social vulnerabilities and varied climatic conditions. The combining outcome also influences the patterns of migration which include seasonal, temporary and permanent. The aim of the paper is to see the experience of climate change in fragile areas in South Asia and trends of migration due to climate change.

[1] PhD Student, Tata Institute of Social Sciences, mohan.bera@gmail.com .

Research Design

Selection of the Research sites

According to South 24 Pargana District Human Development Report (2009), Sundraban region is prone to disasters due to sea surge and cyclone. The disaster phenomena are also closely linked with breaching river embankment which causes saline water floods in the village. So, the river embankment is one of the main concern for protecting the saline water flood in the region. As a result, the research has concentrated on the responsible authorities who manage the river embankment for protecting communities from the high tide water. There are two authorities who manage the river embankment: West Bengal Irrigation and Waterways Department (Dept. of I&W); and Panchayati Raj Institutions (PRIs). Department of I&W and PRIs manage the river embankment at the selected area by their own strategies and sometimes both departments work together at the same area.

According to South 24 Paragana District Human Development Report (2009), Kakdwip and Caning Sub-division are the most affected due to the breaching of river embankment. According to the report Kakdwip sub-division is most prone to disaster due to tidal bores and soil erosion. Whereas Canning sub-division is prone to disaster due to tidal bores, scouring, encroachment of river bank for fishing and fishery, and soil erosion. So, The Kakdwip sub-division has been selected for conducting the research, because Pathar Pratima block, Sagar Block, Namkhana block and Kaddwip block of this subdivision have been facing similar type of hazards.

The highest length of breaching embankment is found in Patharpratima block and lowest length of breaching embankment is found in Sagar Block. According to South 24 Pargana Human Development Report (2009:225) the highest Average Vulnerability Index is found in Patharpratima (i.e., 0.606) and lowest Average Vulnerability Index is found Sagar block (i.e., 0.355). So, the Patharpratima and Sagar Block of Kakdwip sub-division have selected for conducting the research. The Ghoramara GP and Dhablat GP of Sagar block and G-Plot GP of Patharpratima block have been selected on the basis of losses of physical area due to rapid land erosion.

Research Method

Ethnography is a social science research method. It relies heavily on up-close, personal experience and possible participation and observation by the researcher. The ethnography approach involves extended observation in which researcher concentrates on the day to day activities of the people. The ethnographer becomes part of the community and uses standard categories for cultural description (e.g., family life, work life, communication network, social network and social status system). So, the Realistic ethnographic approach has been selected for conducting the research. The observation, informal interaction and un-structured in-depth interview will be the main techniques for capturing the reality of social life and the difficulties to cope with disaster impact. The Realistic ethnographic approach helped to understand the process between the efforts taken by Irrigation Department and Gram Panchayat and their stakeholders in reducing the flood disaster impacts.

Sampling

Collecting the data is an important task of the research because it helps to better understand the theoretical framework (Bernard, 2000). The selection of source of data and its justification is required for in-depth understanding about the data. The purposive sampling will be applied to explore the data from the specific categories of respondents for fulfilling the research objectives. A purposive sampling is a key informant survey where targeting individual is knowledgeable about the issue. The sampling technique does not concentrate on the number of respondents. It is the researcher's strategies to identify the respondent who provides the information by their knowledge and experience. The research has followed mainly three purposive sampling techniques: Criterion Sampling, Stakeholder sampling, and Expert sampling.

Data Collection Techniques

The study follows ethnographic approach for collecting the primary data. The rapport building with the villagers is an important step in this research. The research is also concentrating on level of communication between affected and PRI in the disaster impact reduction. So, the 'informal interaction' will be done to build the rapport with the villagers. The rapport building process has been started when the researcher started visiting those Gram Panchayats for many times. The un-structured in-depth interviews have been conducted for collecting primary data and the interview schedule has been used for taking help. The filed notes have been used for capturing the primary data.

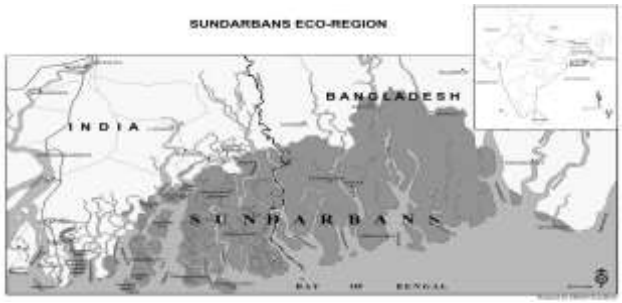
Data Analysis

The data analysis in ethnographic research paradigm starts while researcher started writing the field notes and diary. Though writing the field note is a technique to capture the raw data, while writing the notes, researcher also started thinking on the raw data. So, writing the

filed note is the early stage of data analysis in the research. The most common form of qualitative data used in analysis is text which includes transcription from the interviews or filed notes of ethnographic work or other kind of documents. The units of analysis of the research are 'individual' (male and female); 'family'; and 'hamlet'.

Research sites

The Indian part of the Sundarban is a part of the Ganga-Brahamputra delta region which is geologically very young. The geographical location of this region is 20^0 20'- 22^0 06' N Lat and 88^0 20-$89^0$11' E Long. The region is divided into many deltas (i.e. islands look like Greek letter Delta) by the estuaries which are connected to Bay of Bengal. According to National Remote Sensing Agency (NRSA), total 102 deltas are there in Indian Sundarban region.



The human settlement of this region has been started after the mid-nineteenth century by migrating people from Midnapur district, Howra district, Hoogly district, 24 Pargana district and Jharkhand. They reclaimed mangrove forests land and transformed into productive agricultural land. The whole region is divided into two parts: i) land captured by human settlement and ii) protected mangrove forest. There are 54 deltas captured by human settlement and rests of the deltas are protected mangrove forest.

The Sundarban delta region is one of the highly cyclone and sea water flood prone region in West Bengal. Synchronization of timing of flood waters in the river with high tide in estuaries often lead to breaks in the embankments. This situation is further aggravated during the cyclone. The serious flood disaster occurred in 1982 when most of Sundarban Deltas were affected by breaching embankment and flood. The flooding by saline water added extra burden and making more vulnerable groups who are living in below poverty line and dependent on agriculture. As most of the people are dependent on agriculture, whole economic activities depend on embankments.

Though large number of villagers directly and indirectly dependent on agriculture, huge pressure of population and limited access of agricultural land forces people to find secondary source of livelihood. The agricultural productivity is low due to rich salt content into the soil. Though people do pisciculture, lack of enough capital and land it has not been done commercially. As per the Central Soil Salinity Research institute, Canning people of this area seasonally migrate on an average 148 days in a year. As per the Census-2001, 40% people are agricultural labourer and they are either land less or marginal farmer. But it is also found that, rural people do not have only one source of livelihood and therefore a farmer can be agricultural labour, fisherman, or any other non-agricultural work. So, existing livelihood vulnerability becomes more problematic due to river encroachment and floods.

Impact of Climate change in Sundarban

The studies conducted by Hazra et al (2002) have claimed that, temperature is increasing @ 0.019^0C per year in Sundarban region and the intensity of cyclones is also increasing. The increasing temperature and cyclone intensity causes sea surges and coastal flooding in Sundarban region. The studies also observed that, the increase rate of land erosion causes physical land loss in this region. The western part of islands is most vulnerable to erosion than eastern part of islands. Two islands namely Lohachara and Bedford (total 6.212 sq km) has submerged due to heavy land erosion. The researchers also claimed that, 251.961 sq km land encroached by the river and sea by 1969-2009 which created large number of landless households and refugee.

a) Total loss of Indian Sundraban from 1969 to 2009→ 251.961 sq km
b) 1969 to 2001→ 167.709
c) 2001 to 2009→ 44.042

Southern islands – 1969→ 788.192 sq km
Southern islands in 2009→ 692.38 sq km
Year Wise Estimation of areal land loss of the southern most vulnerable islands in Indian Sundarbans (area in sq km)

Island	**2001**	**2009**
Dakshin Surendranagar	44.339	42.015
Sagar	244.435	239.091
Namkhana	150.155	145.488
Mausuni	28.923	28.283
Luthian	35.008	36.934
Ghoramara	5.339	4.564
Dhanchi	36.084	34.180
Dalhausi	67.101	62.201
Baluchery	26.915	23.287

Name of the island	*Breach area 1986*	*1996*	*2009*
Sagar	4.191	2.818	1.711
Jambu island	1.696	1.104	0.202
Mausuni island	0.572	0.510	0.100
Namkhana island	1.771	1.758	0.993
Louthian island, Dakshin Surendranagar, and Dhanchi	0.543	1.84	1.214
Haliday and its adjacent island	0.299	0.349	0.003
Bulchery and Kalas	1.521	1.605	0.376
Dalhausi and Bhangaduri island	0.826	0.777	0.540
Total	11.419	10.501	5.145
Bhanaduni	31.316	26.159	
Jambudwip	6.242	4.979	

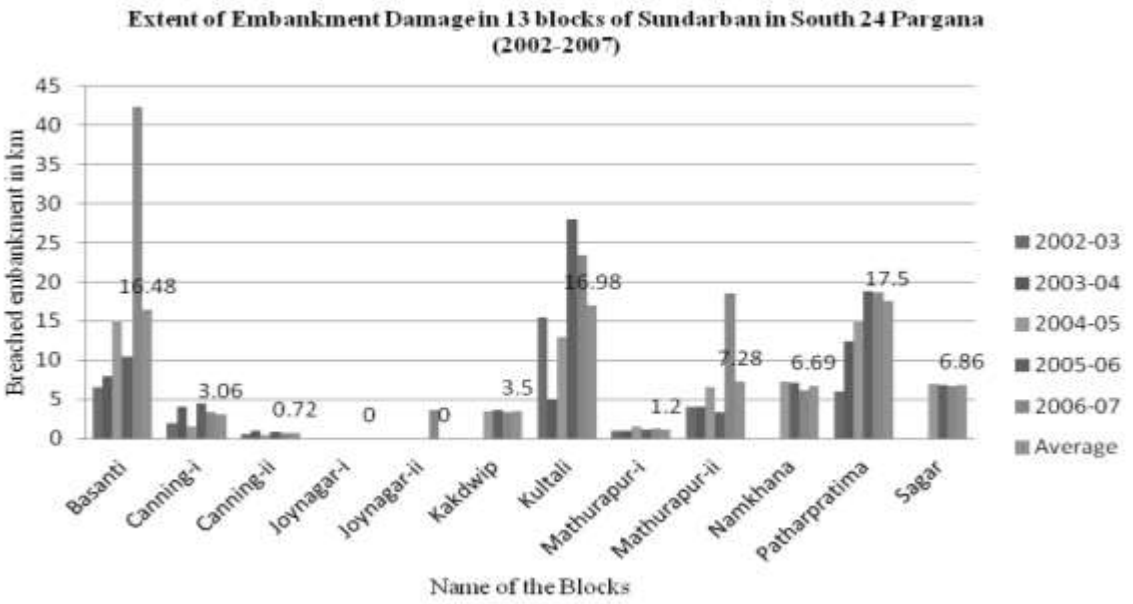
Source: habitat loss of olive ridley (Lepidochelys Olivacea) along the coast of the West Bengal: is global climate change responsible? By Sachinandan dutta and Sourav Maity

The studies also claimed that, sea level is rising @3.14 mm per year and increasing sedimentation load on sea-river bed is 0.1mm per year. So, the annual rising of sea level is 3.24mm per year which often causes saline water flood risk during the monsoon season as well as during the cyclone with synchronization of high tides. The researchers have established correlation between the increasing sea level and land erosion which mainly observed in the south and south-eastern part of Sundarban. The most affected blocks are Sagar, Namkhana, and Pathar Pratima, Kakdwip of Kakdwip Subdivision which are part of geologically active region.
The land erosion has direct impact on breaching river embankment or dykes and loosing agricultural land. The erosion depends on type of soil at the river bank, existence of sand dunes at the bank, existence of mangrove forest at the river bank, direction of tidal wave, location of Char in-front river bank, navigation routes, construction of Jetti and Bridge and encroachment of river bank for fishery, agriculture, road; types of embankment and also season. Though natural factors are directly responsible for breaching embankment, human activities are also similarly responsible. The factor for breaching embankment is not same in all the blocks and it is not same at all the sides of an island. For example, navigation route and diverting river water is very much responsible at the northern and north-western side of Ghoramara island, sandy soil at the southern part of the island is not enough protective to strong sea wave. Land erosion at interior part of the island starts from the river bed towards to river embankment which causes landslides. But the sandy soil at the riverbank of the river close to sea or at seashore swept by the strong river wave and encroach the land. Though landslide is not the major problem at the riverbank close to the sea or sea shore, embankment is not so protective to strong wave during the high tide. Land erosion and breaching embankment at interior part of Sundarban is mainly because of clearing forest for firewood and fishery. Many small rivers were also blocked for development of road communication, land reclamation which stopped the permanent loss of river embankment and erosion.

Reasons of breaching embankment in Sundarbans area in South 24 Pargana

Block	*Reasons for embankment*
Canning-i	Fishery
Basanti	Scouring
Joynagar-ii	Scouring, silting and Breach
Joynagar-i	Fishery
Kultali	Weakening, Raincuts, Breach, Scouring and Fishery
Gosaba	Tidal bores
Namkhana	Erosion and tidal Bores
Patharpratima	Erosion and tidal Bores
Sagar	Tidal Bores

Source: South 24 Paragna Human Development Report, 2009: 220. cf Disaster Preparedness and Response Plan-2002, South 24 Parganas, Government of West Bengal.



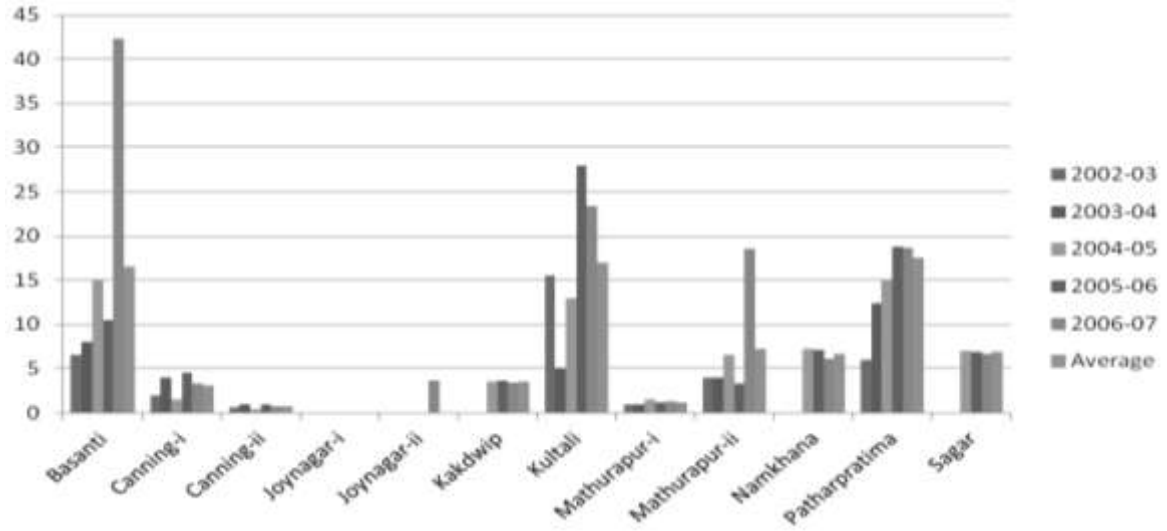
Source: South 24 Pargana Human Development Report, 2009. cf Department of Irrigation and water ways, GoWB. Page 221

Though breaching embankment is very common in Sundarban region, people are not similarly affected at the same island. The hamlets close to the river embankment or sea shore are most vulnerable to breaching embankment and the household those who have agricultural land close to river embankment are more affected than others. Destruction of embankment causes saline water inundation and also physical loss of land due to encroachment. Though saline water inundation and river encroachment created problem in flood affected hamlet or village, all families are not affected equally because the impact depends on their loss of resources and livelihood.

Though breaching embankment is very common in Sundarban region, people are not similarly affected. The hamlets close to the river or sea shore are most vulnerable to breaching embankment and causes saline water inundation and physical loss of agricultural land and destruction.

Rapid land erosion and its Impact

The climate change has been experienced by the increasing frequency and magnitude of catastrophic events, increasing level of high tides and rapid land erosion at river embankment. The destructive natures of flood have also increased due to the increasing magnitude of natural catastrophes and land erosion. The rapid land erosion destroys the river embankment and causes saline water inundation or floods in the river side hamlets. The supportive embankment or ring bunds are constructed back to the river embankment which avoids the floods in the village. But the construction of river embankment encroach the agricultural land and the affected villager directly affected due to the loss of livelihood. Though construction of ring bund is important to avoid the loss of livelihood in large affected area, the overflow of saline water during the high tides causes extensive destruction in the river side hamlets. It happens during the first moon to third moon and the situation becomes destructive with cyclone and heavy rain. The destroyed embankment is not repaired and reconstructed immediately after the destruction because of delayed allocation of the money to start the work. Therefore villagers experience the flood until the repair work is started. The flood happens for long period of time destroyed the conventional source of livelihood and the situation becomes permanent after constructing new embankment which encroach the land to construct. Therefore there is extensive livelihood crisis due to saline water inundation and loss of agricultural land. Though affected villagers find alternative livelihood to reduce the impact of loss and destruction, they loose their alternative source of livelihoods due to chronic destruction of embankment and floods. The continuous river encroachment and delayed repair and reconstruction causes crisis of natural resource based livelihoods, physical resource and financial asset based livelihoods.



Source: habitat loss of olive ridley (Lepidochelys Olivacea) along the coast of the West Bengal: is global climate change responsible? By Sachinandan dutta and Sourav Maity

Loss of agricultural land

Agricultural land is the most important source of livelihood and therefore loss of agricultural land causes loss of agricultural production, loss of water, loss of physical assets and loss of sources of earning. The loss of agricultural land happens due to rapid land erosion and river encroachment. The river encroachment happens due to rapid land erosion at river banks and construction of ring bund to avoid the impact of destruction of existing embankment and floods. The river encroachment reduces the family assets and agricultural production. Though there many dimensions in loss of agricultural land, it causes adverse impacts on existing livelihoods include a) loss of family and community assets; b) loss of food production; c) loss of income generation; d) loss of trading place; e) loss of mangrove forest; and f) loss of public and private physical assets.

Loosing agricultural land is common to the villagers at the river side hamlets. The loss depends on total land holding which causes permanent economic loss of the affected villagers. The loss of land happens due to loss of physical area of land and decreasing value of the land.

The river embankments are shifted rapidly towards the village and it reduces the economic value of land close to river embankment because of high vulnerability to river encroachment. The land owners can not sell their land or keep for mortgage if the vulnerability of river encroachment is very high. Sometime there is no customer to buy the land and the value of the land becomes zero. The landless and homeless villagers at river side hamlets shift into safer location. But the value of land increases with the increasing distance from river embankment and therefore a large numbers of villagers either live at close to embankment or at the embankment. The loss of physical area is happening for long period of time. The loss has increased rapidly during last two decades. As a result, land owners of the vulnerable hamlets slowly become landless and homeless. Once the affected families loose their land, they left their livelihood dependency on agricultural land. But most of the affected villagers have multi-livelihood dependency because of the reducing agricultural.

The decreasing value of the land is maintained by its utilization for non-agricultural activities. Though there is vulnerability to river encroachment, market value of land is maintained due to commercial utilization of land and increasing capacity of the villagers to buy the land.

The land ownership is an important factor to understand the impact of loss of land. There are many villagers at flood affected hamlets who do not have Rayat land and many of them are patta holders or share croppers. There are also agricultural lands which have been identified as vested land during post landlord abolition and pattas have been distributed among the needy families. The price of the patta is lesser than Rayat land and therefore landless villagers at flood affected hamlets prefer to purchase the patta. As the patta can not be sold out, there is mutual understanding between landowner and buyer to handover the ownership. There are also bhag chasi or share croppers at the flood affected hamlet who stop giving share to the owner and cultivate permanently. Therefore the vulnerability of loss of land varies among the villagers.

Loss of food production due to loss of land

Loss of land causes permanent loss of agricultural production to the villagers who dependent on agriculture as the main source of livelihood. Because agricultural production fulfills the food requirements of the producers and they sell the surplus production for getting income generation. The loss of land reduces the work opportunity into the village and increases the numbers of land less farmers who creates pressure on existing labour market in the village. As a result surplus labourer either goes out for earning money or involves into non agricultural activities. The decreasing agricultural land has created crisis of food to the villagers at affected hamlets. Though the villagers have small agricultural land, they cultivate for two times and used HYV seeds to fulfill their needs on food grain and earning money. All the family members involve into the cultivation to avoid extra expanses for food production.

Impact of loss of physical land on fishery

Fishery is the commercial pisciculture which include fresh water fishery, saline water fishery and mixed water fishery. The fresh water fisheries are not popular due to river encroachment and saline water floods. Therefore most of the fisheries are saline water fishery and mix water fishery. Though there are facilities and potential productivity of fish into saline water fisheries, it is not done because of river encroachment. The mixed water fisheries are made by converting saline water affected ponds where mixed water fish species are kept. Though the villagers at flood affected hamlet extract the saline water from their ponds, the bad drainage system and chronic flood water mixed with the fresh water pond. Therefore villagers prefer to cultivate fish species which could survive into fresh water as well as saline water. There are also fresh water fisheries which are mainly managed by trained farmers for commercial use. These fisheries are practiced very close to the river embankment by connecting small pockets or '*Chauko'* as pond. Though theses type of fishery is risky, villagers produce fresh water fish. The river encroachment also reduces the crab production at the affected hamlet. But the villagers have converted their saline water ponds for crab culture.

Impact of loss of land on physical assets

The rapid land erosion and river encroachment destroyed physical asset of the affected villagers which includes individual house, school building, road, community hall, market place, government buildings. Though there is rapid rate of land erosion at the vulnerable location of the flood affected hamlet, the affected villagers get enough time to shift at safer place. The encroachment of the physical land and house affected villagers in two ways: a) loss of physical land and b) loss house.

If the villagers loose their house, they have to find new place and space for constructing house. Most of the villagers at river side hamlets are landless may be holding very less agricultural land. Therefore, if they unable to buy land, they find location at the river embankment or at road side to construct their house. The construction of new house also increases the unproductive land which reduces total agricultural production. On the other hand road side shelters are not spacious and therefore they can not keep animal into their house.

The government buildings are shifted in interior part of the village to avoid the impact of river encroachment. The location of school building depends on the availability of donated land in the village.

The river encroachment destroys the concrete sluice gate which stops permanent drainage system and therefore villagers construct temporary sluice gate to maintain drainage system. But the sites for temporary sluice gates are very weak and vulnerable to destroy during the high tides. The construction of new sluice gate requires enough space and budget which is delayed for long time to construct. But there are sites where concrete sluice gates are installed for many times and causes chronic situation. As a chronic floods and river encroachment causes livelihood crisis which influences villagers to shift at safer location to stay.

Impact of loss of land on source of income

The ring bund is made to avoid the flood which causes loss of agricultural land and food grain production which creates pressure to find the alternatives. The food grain sellers become food grain buyer. Physical loss of agricultural land has impact on existing job market in the village. The loss of agricultural land creates pressures on all the family members to engage into the agricultural activities. As result, numbers of agricultural labourer have increased who create direct impact on existing labour market into the village. The families those who lost their land by the river encroachment, they don't hire agricultural labour for cultivation. Most of the cases the family members do the jobs. As a result, daily wage labourers do not get job from his village and the numbers of labour increase with the decreasing agricultural land. Therefore labourers loose their burgeoning power and involve into the work with reduced wage rate.

There are land owning families who never worked in agricultural filed. They hire the labour and finish the agricultural work. As the male members of these

families do not have habit and experience of work in agricultural field, they can not go for work during post flood phase. They started dependent on existing monetary deposit. But the inability to maintain the family needs, influences them to sell the property. If the floods happen for long period of time, the family can not find the way to recover from the loss.

The chronic floods events have changed the agricultural land based livelihood because of loss of agricultural production for long period of time. The reduced agricultural production during post flood phase is not sufficient to the affected villagers. As a result, most of the farming families have engaged into deep sea fishing as their livelihood. But, the involvement into deep sea fishing depends on capability to deep sea fishing and availability of fishing boat. Historically villagers of these flood affected villages never practiced commercial fishing. It was started by the influence of East Bengali fishermen who used to sell the fish and collected food grains and other materials from the village. Latter many villagers involve into fishing due to chronic saline water floods and they move into their convenient place for fishing.

Loss of livelihood and impacts on the trend of migration

River encroachment forces people to shift in safer location. But the affected families do not leave the encroached land immediately and they wait until finding a safer location. There are also villagers who left the vulnerable location before encroachment and most of them settle close to their earlier place of location because of availability of livelihoods. There is also mass shifting during the encroachment and destruction at large area and affected are rehabilitated in the same village or island. But individual affected families do not go too far from the affected area because of their attachment of their neighbour and livelihood opportunity in the village. Though they get offer safest location to stay, they accept the offer and again come back their because of source of livelihood. River encroachment moves towards village and safer location is again affected. As a result people move towards the village as per the new embankments are constructed. Therefore there are many villagers who have constructed their house and shifted their location for many times.

Shifting at safer location becomes huge pressure to the family members because of finding location, distance from source of income, relatives or neighbours close to the embankment. Usually affected families do not leave the place immediately after the destruction and if anybody of their close relative or neighbour leave the place, the others take decision to leave the place. It is very important step for a family because they leave conventional source of their livelihood and move into uncertainty to stay at safer location. But they take decision once the conventional source of income becomes poor. Shifting into a safer location without livelihood opportunities is equally loss for the villagers. The limited opportunities at resettlement area create about the place.

There are families who have lost their land due to river encroachment. But they do not leave the village permanently. They shift their family members at different place as per the availability of land. Though they shifted at different parts of the region, no family is independent because of lack of resources. The boys of the affected area have tendency to get marry at safer village and shifted there as per the availability of land to construct the house only. Most of the cases they demand land as dowry to stay at safer place. Once they get the land, other members also shift there.

Case 1: *Mani Mandal belongs to G-Plot-Gobordhanpur. He got married in chandanpiri, Namkhana. First they bought land in Chandanpiri, Later they bought land Daspur, G-Plot which is close to his father-in-law house. When his younger brother got married in Narayanpur, Namkhana and there was a condition to give one bigha of land to his brother as dowry. Presently elder shifted at Daspur, Third brother shifted at Chandanpiri and younger brother shifted in Narayanpur. All of his brothers have shifted in different places once the main house is encroached by the river. They do not have agricultural land Gobordhanpur, but they produce food grains in Daspur and Namkhana and supply to them. As the Gobordhanpur is highly vulnerable to breaching embankment, there are huge opportunities of daily wage work in the village and they get their livelihood.*

Alternatives to stay at risk

River encroachment causes landlessness among the affected villagers at roadside. As a result villagers shifted into *Pukur Paar* (pond shore) for safety. Though many families have shifted into interior part of the village, it depends on economic status of them. The landless villagers do not leave the *pukur paar* immediate after the floods. They buy vested land or patta land which is cheaply available in the flood affected village. Usually landless villagers do not find any difficulty to buy the vested land.

Stay at risk for livelihood

Though the villagers have lost agricultural land, they do not leave the place permanently because of source of income. The villagers have their land at the

safer place but they shift their house as per the shifting river embankment. Though they belong to different caste and community, they find space to stay with the villagers at the affected area. They follow the local culture and maintain the good relationship and continue the business.

Case 2: *The main source of income is fish and crab trading in South Sitarampur and Gobordhanpur. Though he belongs to East Bemgali, he has learnt Midnapur dialect and he has adopted local majority culture (i.e., Midnapur). Though his agricultural land has been encroached by the river, he is not leaving the place because his livelihood comes from this area. As a result, he has adopted himself and his family with local culture to whom he has to work in every day.*
Few years back, he had no relationship with West Bengali, but presently they have good relationship. His two sons go for deep fishing and he has fish business. As a result, he becomes close to the local people and culture. Though he does not like to West Bengali Culture, daughter-in-law and son-in-law are West Bengali'.

There are chronic flood affected hamlets which become less destructive compare to previous years. Though river side hamlets are vulnerable during the post flood phase, people live at the embankment or at the hamlet close to the river embankment. Most of the families do not have agricultural land and they depend on fishing at the sea shore. Many of them have bought agricultural land at safer part of the village, but they do not leave the river embankment due to source of income.

Though government has arranged for resettlement, many of them rejected and settling at road side or at embankment. It is mainly because of crisis of livelihood, bad road connectivity at the resettlement hamlets. Many of the villagers also have experience of the existing resettlement area and livelihoods crisis. Therefore they search for alternative place to stay with connection of their livelihood.

Case3: *Government has started distributing plot at Chandipore for the affected villagers belong river encroached hamlet. The plots are reclaimed from a small estuary where land productivity is very low due to high salt content. This area does not have good road connectivity with the place for local source of livelihoods. As a result many villagers do not find suitability of their resettlement because Chandipore is quite far from the river where villagers can not earn by doing net making (jaal gara kaaj) or can not be involve into earthen work at river embankment.*

Migration with social tie

Though there are lots of difficulties affected villagers do not want to leave the place. They are taking more time to shift at place where all the families could accommodate at the same place. It is very difficult for a family to buy a bigha of land, but if they buy together by contributing money they will be able to buy the big plot and the land will be divided among the families. As the families are so united and emotionally attached each other, no family wants to leave individually. The families are scared about the breaking their unity. The families dependent on sea for their livelihood and they want to shift at close to the affected hamlet.

Crowded village

There are villagers who bought land in main land and sometime they also got space at rehabilitation area. But many of them do not leave the place and shifting into the interior part of the village. As a result, interior part of the village becomes crowded. Though villagers were scattered during pre flood phase, they started staying at one place. The livelihoods of these villagers directly and indirectly come from the affected hamlet or river embankment and income generating activities in the interior part of the village.

Migration with distance of source of livelihoods

Flood affected villager at close to river embankment find space close to the affected area because of their availability of livelihood in the flood affected area. The price of the land is quite higher at the interior part of the village which can not be affordable by the landless villagers at the flood affected hamlet. Though many of the villagers manage to shift at safer location close to vulnerable location, the chronic floods events capture the area. The '*Habu Dubu*' is very common in the flood affected area which means sinking into water. But the *Habu Dubu* also includes the crisis due to floods and financial crisis. The temporary shelter is also identified as *Habu Dubu* because of its location at roadside and river embankment. Therefore the villagers from chronic flood affected area move into very far from the affected area to avoid continuous loss of land and reduces due to river encroachment.

Though many of them stay at road side for long time, they deposit money to buy at safest location of the island which well connected with the source of livelihood.

Displacement, migration and livelihoods

There is also mass displacement due to construction of ring bund affected area. The displaced people are given land to stay safely which is called as *Colony.* The

Colony is far from conventional source of livelihood. The villagers in the *Colony* have changed their source of income and adopted available source of livelihood. A fisherman becomes rickshaw puller because there is no source to access of catching fish.

Livelihood opportunity is dependent on availability of resource in the village and its access. Therefore migration behaviour also varies among the villagers. The landowning families or farming families have shifted in interior part of the village or in other island. But the families depend on fishing activities either do not leave the village or shifted at close to affected area or source of accessing livelihood. But there are also villagers who shifted in interior part of village and also have temporary shelter close to river because of continuing fishing activities.

But the families at *Colony* do not get enough agricultural land at interior part of the village where farmers do not get enough land cultivation and involve into fishing for their livelihoods. As a result most of the villagers become depend on rickshaw pulling and daily wage labour work.

CONCLUSION

The rapid land and breaching river embankment affected on sources of livelihood which forces villagers to move away from the hamlets. Though the villagers have been trying to adapt with crisis livelihood, they can not recover from the loss. The migration of the affected villagers is influenced by the livelihoods and opportunities practice in the village. Though government has provided the rehabilitation, the location of those places are not well connected with the source of livelihood. Therefore villagers accepted the governments' rehabilitation schemes but they stay at vulnerable location for getting their livelihoods.

REFERENCE

Afifi, Tamer and others (2012). Climate change, vulnerability and human mobility: perspectives of refugees from the east and horn of Africa. UNHCR. Report No. 1 June 2012

Hazra et al (2002). Sea Level and associated changes in the Sundarbans. Science and Culture. Vol 68, no 9-12, 2002, p 309-321

Kailin, W. (2009). Climate change, natural disasters, and internal displacement. Speech to the Committee on Migration, Refugees and Population, 24 June. Available from http://www.brookings.edu/speeches/2009/0624_internal_displacement_kalin.aspx.

Kniveton, D., and others (2009). Climate change and migration: Improving methodologies to estimate flows. IOM Migration Research Series, No. 33. International Organization for Migration, Geneva. Laczko, F., and C. Aghazarm, eds.

Tacoli, C. (2009). Crisis or adaptation? Migration and climate change in a context of high mobility. Environment and Urbanisation, vol. 21, No. 2, pp. 513 – 525.

UNEP, Environmental refugee. July 31st, 2012. available at http://www.liser.eu/

Warner, K., and others (2009b). Researching Environmental Change and Migration: Evaluation of EACH-FOR Methodology and Application in 23 Case Studies Worldwide. In Migration, Environment and Climate Change: Assessing the Evidence, Laczko, F. and Aghazarm, C., eds. IOM, Geneva.

Weiss, T.L., and J.D. Reyes (2009). Breaking the cycle of violence: Understanding the links between environment, migration and conflict in the Greater Horn of Africa. In Horn of Africa and Peace: The Role of the Environment, Dahre, U.J. ed. A report of the 8th annual conference on the Horn of Africa, 7-9 August. Lund: Lund University. pp. 97 – 108.