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IMPACT OF FLOOD AND EROSION ON HUMAN SETTLEMENT PATTERN: A CASE STUDY

Dr. Chusmita Konwar
Assistant Professor, Department of Anthropology, United Tribal Degree College, Bilmukh, Dhakuakhana, Lakhimpur, Assam, Pin. 787053, India

***Abstract*:** The problem arising out of recurrent floods have been seen in most parts of the riverine areas of the Brahmaputra valley of Assam in India. Floodplains which are recognized as the artery of human life on the earth are usually affected by floods of low to moderate intensities. Patterns of settlement, land use, communication network, and various socio-economic developments in any floodplain are, therefore, seen to have been shaped, to a great extent, by the nature of floods and the floodplains on the one hand and by the ingenuity of the floodplain dwellers on the other. Here, in this paper a humble attempt has been made to examine and annalyze the salient features of flood and its impact on their settlement pattern as well as mode of adjustment of the people based on field data from Dhakuakhana Sib-division of Lakhimpur District, Assam, India.

***Key words*:** Water, River, Brahmaputra, Flood, Flash flood, Erosion, Sand casting, Hazard, Embankment, Adaptation, Settlement, Migration, Channel, shifting, etc.

Introduction:

Within the contemporary concern for human response to environmental development studies, many problems relate to the interaction with man with the land and water. One of such problems may be related to floods. Floods in the plain areas act as both the hazards and boon. They create erosion hazard on the agricultural lands and river banks. The river bank erosion in continuity creates in turn shifting of river banks and channels, thereby, causing extensive wasteland in the form of ox-bow lakes or 'beels', swamps, sand deposits, bars etc. Floods and their associated problems also cause human migration, change of economic pursuit etc. Thus, flood which exercise a great impact on ever increasing human occupancy on the floodplains cause serious environmental and socio-economic problems and prospects as well in most parts of the river basins. Most of the floodplains are yet to be

brought under proper management. For this reason, most of the people of third World countries have to suffer from the series of hazards due to poor economy vis-à-vis inability to mitigate the problems in the countries (Gogoi, 2008:3-4). Of late such problems have been able to attract due attention of the Anthropologists and other field scientists with a view to identify, evaluate and manage the problems.

Although flood is a physical phenomenon, yet it possesses a great impact on socio – economic condition, human activities and the physical environment. So far as India is concerned, it is the second largest flood affected country in the World (C.S.F., 1991, cited in Kar, 2012: 196). Her average flood affected areas is 96·6 lakh hectares and damage to crops 37·6 lakh hectares, (Patel and Puruhit, 1986). Similarly, among the natural hazards, flood is the most dominant one in Assam. Over three-quarter of he plain areas in Assam is flood prone. In order to understand the nature and intensity of flood hazard, it is essential to trace the history of flood, its extent, size and damages.

Assam is located in the north-eastern region of India in the eastern Himalayas (Das and Misra, 2003:67), floods affect this part of Assam every year; flash floods are also a normal component of the flood regime. Sand casting, although not a new phenomenon, has become increasingly devastating since the mid 1990s, especially on the northern banks of the eastern Brahmaputra valley. These hazards affect all aspects of the land, lives, and livelihoods of communities living in the region to a significant degree. Both floods and flash floods cause for leave people homeless and displaced, destroy crops, damaged public property, and damage development infrastructure. The victims who become destitute suffer from trauma and shock. Annual cycles of hazards cripple people's resilience and intensify the poverty spiral. There are thousands of hectares of fertile land in hundreds of villages with crops, settlements, and infrastructures have been lost to the river due to frequent shifting in the river course and erosion of river banks. Moreover, sand casting has proved to be one of the worst hazards because it results in degradation of thousands of acres of farm land and wetlands due to deposition of debris, mainly coarse sand particles, by flood waters. The indigenous communities living in these areas have developed mechanisms over time that have become ingrained in their lifestyles and traditions – for example, housing, agriculture, livestock rearing, food storage, and weather and flood predictions – and these help them to cope with and adapt to the immediate and long-term impacts of such hazards.

Objective of the Study

This study has been undertaken to investigate and examine the impact of floods on socio-economic life of the people and their impact on formation and distribution of human settlement and mode of adjustment in the flood affected areas of Dhakuakhana Sub-division of Lakhimpur District, Assam, India.

Microfield

Dhakuakhana is located in the district of Lakhimpur comprising large number of villages and some small growing towns. The major economy of this region is cultivation of rice and other paddy crops and hence inundation of paddy field by flood during the period of cultivation brings tears to the people. From Dhakuakhana four villages namely, Matmora Village, Bahpora (No.1) Village, Bahpora (No.2) Village and Narayanpur Chapori village are purposely selected so as to represent the diversified nature of data. The population consists of various communities; the Matmora village is entirely populated by the Mishing community, a major ethnic tribe of Assam. Bahpora (No.1) village is a non tribal village with a population of Kaibartta (a traditional fish trading community with scheduled caste status) and Bahpora (No.2) village and Narayanpur chapori village are entirely populated by Ahom community.

Materials and Methods

For the present study data were collected through primarily and secondary sources. The primary data are collected through household survey schedule, observation, interview (unstructured), informal discussion, etc. the secondary data are collected from official as well as from other sources including published books, journals, internet etc.

Findings

The pattern of formation and distribution of human settlement has been indicative of the nature of human struggle for adjustment with the nature. The physical controls like rivers, their floods and erosions are found to influence road networks which ultimately affect concentration of settlement and mode adjustment of the people over the studied area. The later development of transport network in the area is found to be responsible for further dispersion of settlements from the old concentration of the river banks. Floods and bank erosion act as a compulsive factor for this dispersion.

Here it is seen that the negative impact of flood is achieved in case of settlement pattern of the studied villages because of concentration of the villages very near to the rivers since historical past. The village Matmora has changed its settlement location due to the movement of the Brahmaputra river. Due to such reason they faced problems like lack of land and property, reconstruction of their houses, adjust in a new environment, etc.

In the studied villages the houses are built with the materials of bamboo, wood, reeds, and mud. The mud plastered houses made of reeds and bamboos generally give away easily when they come in contact with flood waters. After being affected by floodwater these houses either fall down or become useless. Such houses have no capacity to resist inundation. The Mishing community of Matmora village lives in silt houses therefore floodwater cannot come in contact although an unsuitable situation is faced by them. After each and every flood, the people of the studied villages suffer a lot due to lack of shelter. With the loss of shelter they also simultaneously lose their livestock, harvested crops etc.

It is interesting to examine that how cultural norms and traditions determine the way people build their houses and influence their physical adaptation to floods. The Mishing communities in Matmora live in their '*chang ghar*' following their tradition. The non-tribal people (Kaibarta and Ahom) in the Bahpora (No.1) village, Bahpora (No.2) village and the Narayanpur Chapori village do not live or do not like to live in a '*chang ghar*' because it is not their tradition and they are not habituated to live in '*chang ghar*'. They live in a ground-based mud house which is an Assamese traditional house. Though, people do acknowledge the utility of living in a '*chang ghar*' in a flood prone area. They do not like to live in '*chang ghar*' like Mishings do, because they think it will not be comfortable and convenient. According to non-tribal villagers cleanliness, hygiene, and good sanitation practices cannot be ensured in this style of living. Again in the mind set up of others, especially elderly people who are more conservative, the tribal-nontribal divide is strong and they consider it a social norm not to stay in a '*chang ghar*'. According to them, it is virtually tabooed to follow the Mishing way of living. It is considered to be below their status to follow a tribal tradition. Although, these are the minority views, coming from the elders of the family, they do influence the adaptive decision making in a family or community.

Some of the young people of both the Bahpora villages confess that if the situation becomes worse regularly, a time will come when they shall be compelled to live in 'chang ghar' permanently like Mishing

community does. Nevertheless, they will not like to break the norms of their society and culture until it becomes absolutely necessary. One young couple in Bahpora (No.2) express the hope that the newly constructed embankment in Matmora will reduce the fury of floods in coming years so that it will not be necessary for them to think about the living in '*chang ghar*' at all. Other households, who have no doubt about living in '*chang ghar*' or stilt houses, cannot do so because of the cost involved in making one. The raw materials, such as bamboo and timber are becoming scarce, so it will not be affordable for them to build one. They would rather invest money in raising the earthen or concrete foundations of their existing house.

It is also interesting to see that although these non-tribal villagers do not live in the stilt houses, yet they build their granaries on stilts to safeguard their crops and seeds that are too valuable to be kept in normal houses. The granaries of the studied villages are big and therefore, during the time of high flood they can use it as a shelter. Again, in these three non tribal villages the bamboo platforms are raised three or four feet above the floor of the house with adjustable height. They use these to keep their valuable and essential commodities safe when flood waters submerged the floor of the houses. People stay on these inner platforms or stilted granaries with their families and valuables and manage to cook there for weeks and months together during floods. People endure a lot of hardship when they are confined to their stilted granaries or in- house raised platforms for long time during floods. It is observed that living on in high platforms is more inconvenient than the other alternatives. Similarly small inner platforms which are more inconvenient are the only option for majority of people because the more convenient large stilted granaries are expensive to construct. Again, another interesting practice observed in the Matmora village is that many people dismantle their houses on the eve of a major flood or when the house is certain to be washed away by the river. They take away all the important components of the house like roofing materials, wooden poles, pillars and trusses and split bamboo mats from floors of the '*chang ghar*' and keep those materials in safe places so that they can reuse them to construct another house in a new area.

The Mishing community has a well defined traditional practice of storing food and seeds on a hanging three tiered bamboo platform (Plate :1) with the shelves placed at various height over the fire place in the kitchen of the '*chang ghar*'. But in case of other communities (Ahom and Kaibarta) of the studied villages there is only single tiered hanging bamboo platform which they call as '*dhua chang*' .The lowest shelf placed directly over the fire place at a height of about four feet is called a '*parab*' (for Mishing community). Raw fish is dried as well as paddy

in rainy season as objects on this shelf get direct heat from the fire place. Utensils are also kept there. The shelf directly above '*parab*' is called the '*rabbang*' (for mishing community) where pitchers filled with '*apong*' (the traditional wine of the Mishing) are kept here in winter to keep the wine warm and to prevent it from becoming sour. In summer, the pitchers of '*apong*' are placed on the floor of the '*chang ghar'* to keep it cool. The uppermost shelf is called the '*kumbang*' (for Mishing community) and this is where vegetables are kept. People keep bags of rice on it so that the rice is not damaged by floods and occasionally seeds of vegetables are kept too. Food storage systems of the Mishing have changed with changing circumstances. Food is stored in case of emergencies and in the event of having to move to another location. The other communities of the studied villages have similar storage arrangements, though usually they use only one bamboo shelf. The people of these communities' store their crops mainly paddy and seed in granaries placed on stilts and items like rice, salt and potatoes on raised platforms inside the house for immediate use. The people of these villages used '*tom*' (a conical container made of bamboo) for storing paddy seeds. Jute sacks and polythene bags are also used by them. Containers made of tin are used to store rice and vegetables are kept in baskets made of bamboo and cane. Dry foods are kept in cloth bags. Women especially take the responsibility for storing the foods. In the studied villages we do not observe any major conflict, only certain minor issues related to land or distribution of relief materials sometimes arise but are not significant. In general, the 'Namghar' (A Namghar is a traditional community prayer hall and an important socio-religious institution in Assamese society, a contribution of the Neo-Vaishnavite religion propounded by Saint Sankardeva in the 15th and 16th centuries), Youth Club or youth activity centre for the general caste group (Kaibarta, Ahom etc.) and the Morang Ghar and the 'Kabang' for the Mishing are the local institutions for settling disputes amongst villagers. 'Namghar' is still a dominant social institution in Bahpora(No.1), Bahpora(No.2), and Narayanpur Chapori villages. In Matmora among the Mishing community, the influence of the 'Kabang' or the 'Morang Ghar' has rapidly declined. It appears that the drastic impact of the floods in the village has rendered the people too occupied with the problems of survival than to worry about social concerns. Further, the general norms imposed by these institutions have lost their relevance in the terrible straits in which the community finds itself.

All the ethnic communities of the studied villages have lived on the river banks and the vicinity of the water bodies over centuries, and this has led the evolution of adaptive strategies in terms of housing types, cultivation practices, crop selection, water and river-based livelihoods (fishing and driftwood collection), and development of

physical skills (rowing, raft and boat-making and swimming) through collective learning and experience. Although, the most obvious rationale for living on river banks is the availability of fertile lands, especially in case of the Mishing community, there is a traditional bond of community with the river. In fact, the root words of Mishing, that is '*Mi*' and '*shing*' which means 'man' and 'water' or 'river respectively. Therefore, the word Mishing means people who live in side by side of water or river. Similarly, the word '*Kai*' means 'water' and '*barta*' means 'to exist', therefore, the depicting the historical linkage of the Koibarta community with water-based livelihood (mainly fishing).The communities of the studied villages have a strong bond of attachment to their native places and this is an integral part of their ethnicity. The sentimental attachment to the soil is strong for the older generation, therefore, they find it difficult to leave the village and migrate to other areas in spite of the problems they are facing. So, this strong ethnocentric sense prevailing in a great proportion of each community has in a way motivated them to cope better with floods and other water-induced stresses. The compulsion to stay in their native place has made it more important for them to adapt to more efficient ways to water-induced hazards. Though, in extreme situations, immobility resulting from such sentiments could prove to be harmful for survival. People help each other in times of need that those having boats have an advantage in these areas. People are liberal about sharing their boats with poor families and those having boats help others while rescuing and evacuating people. In the studied areas the rich-poor divide is not sharp and those who are comparatively well off help others with food, money, and in many other ways.

The Mishing community of the Matmora village has so far adapted well to the movements of the rivers by moving and migrating. A large section of the Mishing community in Matmora village is now in favour of resettling elsewhere to get rid of the curse of floods, erosion, and sand casting. However, relocation of other places is not feasible for all of them, even if they want to do so because of lack of suitable land or rehabilitation packages.

Most of the people of the studied villages would like to call themselves poor because they have lost regular sources of income or not having a regular income. Therefore, in simple words the poor families do not earn anything if they do not find work. From the field investigation it was realized that the below poverty line (BPL) families that is being poor, actually means not being able to afford two square meals a day or to manage to make or buy *'apong*', which is a daily habit in the community. The general indicators of poverty are, lack of two square meals, inability to send children to school, not being able to rebuild or repair the house, not owing a boat, and not

being able to celebrate the cultural or religious festivals [37(66%) family from Narayanpur Chapori village; 55(54.45%) from Bahpora (No.1) village; 28 (26.92%) from Bahpora (No.2) village and 70 (87.5%) from Matmora village fall under this category]. There is a general thinking that families who have members with jobs or business with regular income are not poor, they are rich in local context.

In the studied villages some women from poor families find domestic work in other families but they are never treated as maid servants. The Mishing Communities in the Matmora village has strong clan affiliations. Those families having well-built stilt houses (Mishing community) or raised platform house (Kaibata and Ahom community) give shelter and food to a number of other families, which are either homeless or have decrepit houses that cannot withstand the current flood waters. Those settled permanently on the embankment do not hesitate to share space harmoniously with others. Many of the distressed families in the studied villages find shelter and support from their relatives in the other places. In the opinion of the people cohesive social relationships have remained more or less intact and this can be observed when disasters strike.

Most of the villagers lived in joint family in earlier time but now a days they prefer to live in a nuclear family (Table:1). Because of impact of flood they cannot maintain a larger family. Another reason for preferring nuclear family is the government's policy of paying compensation to the individual family or household. Similarly, due to the impact of flood, in case of Marriage, the most of the villager prefer to marry within their neighbouring houses or neighbouring villages or in young age because of bad communication system or due to illiteracy

Conclusion:

In conclusion it can be said that environmental degradation had ruined their life and displaced them from their ancestral home and forced displacement had also affected their family bonding to a great extent in such a way that many joint families were broken due to financial and habitation problems. At the same time some families intentionally got separated to get the benefit from the government such as land, compensation, monetary help etc. Moreover, the drinking water sources are not adequate in the villages. Water for domestic consumption is not easily available during and immediately after floods.

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Photo plate

Plate 1: The three-tier food storage system in a 'chang ghar' of the Mishing community of Matmora Village

Table: 1

Distribution of Family according to Type and Composition

Sl No.	Type	Composition	Narayonpur Chapori Village		Bahpora (No.1) Village		Bahpora (No.2) Village		Matmora Village		Total	%
			No. of family	%	No. of family	%	No. of family	%	No. of family	%		
1	Nuclear family	Husband, wife and unmarried children	31	55.36	57	56.44	65	62.5	56	70	209	61.29
2	Joint family	Husband, wife and married and unmarried children and grand children	1	1.79	4	3.96	5	4.81	3	3.75	13	3.81

		Husband, wife and married children and grand children	11	19.64	27	26.73	19	18.27	10	12.5	67	19.65
		Husband, wife and husband's brother's wife and their children	1	1.79	2	1.98	3	2.88			6	1.76
		Widow/ widower with married children and grand children	11	19.64	6	5.94	2	1.92	8	10	27	7.92
3	Broken family	Widow/ widower with unmarried children	1	1.79	5	4.95	6	5.77	3	3.75	15	4.4
		Widow/ widower without children					3	2.88			3	0.88
4	Miscellaneous family	Without parent unmarried children					1	0.96			1	0.29
5	Total		56	16.42	101	29.62	104	30.5	80	23.46	341	100