JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

FLOOD HAZARDS AND THIER ASSOCIATED PROBLEMS: A CASE STUDY

Dr. Chusmita Konwar
Assistant Professor, Department of Anthropology, United Tribal Degree College, Bilmukh, Dhakuakhana, Lakhimpur, Assam, Pin. 787053, India
Professor Nitul Kumar Gogoi
Department of Anthropology, Dibrugarh University, Dibrugarh, Assam, Pin.786004, India

Abstract: This study has been undertaken to investigate the salient features of flood and socio-economic life of man and flood hazard relationship based on field data from Dhakuakhana Sub-division of Lakhimpur District, Assam. Floods, flash floods, river-bank erosion, and sand casting are the most frequent water- induced hazards in the eastern Brahmaputra basin in Assam. All of 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 leave people homeless and displaced, destroy crops, damaged public property, and damage development infrastructure. Victims who become destitute suffer from trauma and shock. 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.

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

Introduction

The water is the vital ingredients for the survival of human being but sometimes it may cause woe to the human life not due to insufficient water but due to abundant water which in turn causes the natural disaster called flood.

Flood may be defined as the overflow of water from a river or, from any other water body due to excess rainfall or melting of or any other causes in its catchment. The overflow of a river is determined by the magnitude

of flow in relation to its channel capacity together with the characteristics of the natural or artificial levees (Kar, 2012:195).

Floods become a hazard when they create unfavourable condition on human activity and cause damage to life and property. Therefore, flood hazard must not be considered as a physical phenomenon, but also a socio-economic factor of practical significance.

Water related problems are often described as natural disasters, turn out to be social disasters as well. In India has been found a lot of water related problem due to shortage and abundance in water. Western part of the country is facing shortage of water and the eastern part facing surplus of water in the form of flood. The western part mainly comprises of Rajasthan, Delhi, Uttar Pradesh, Bihar, shows shortage of drinking water and the eastern part shows abundant source of water. The North Eastern part of India mainly comprises of Assam, and its neighbouring seven states are getting sufficient amount of rainfall in monsoon and hence, the rivers become sufficient in water and causes flood in Assam. Assam has been suffering from serious floods and their associated problems since historical time mainly because of high monsoon rains and the existence of mighty Brahmaputra, the Barak, and their tributaries flowing over their narrow and constricted valleys. The district of Assam which are at the upper reaches of river Brahmaputra like, Dibrugarh, Sivasagar, Jorhat, North-Lakhimpur, Dhemaji, Golaghat, and the Island Majuli are the worst sufferer of floods caused by mighty Brahmaputra.

There are increasing reports of floods caused by damming of landslides in the foothills of the Arunachal Himalayas. As a result flash floods have increased in the hills affecting vast areas of the flood plains. The intensity, frequency, and duration of riverine floods have also changed. Sediment load in the rivers has increased due to denudation by intense rainfall of fragile and tectonically dynamic hill slopes, scaling up the affects of sand casting.

Flood often destroy agricultural fields, damage public property and life regularly. Not only that, the loss of life and property is increasing at an alarming rate. Various agencies and countries are trying to reduce the flood damage using various techniques, known as structural devises. But non-structural devises are also equally important to reduce flood damage. The damages and financial losses can be reduced by various responses to the hazards (Ward, 1978, cited in Kar, 2012: 195). At present, throughout the globe experts are of opinion that

structural measures alone cannot provide safeguards against floods. The rate of damage due to floods in America, even after so much care of the Task Force (1966), is in increasing. Not only in America but also in many other countries of the World similar situation prevails (White, 1964). In the case of India, The problem of flood hazard is so acute that of Government of India has established the 'Rashtriya Bar Ayog' (National Flood Commission) in September, 1981.

Objective of the Study

In this paper a humble attempt has been made to examine the impact of floods on socio-economic life and their associated problems namely, the bank erosion, sand deposits, channel shifting towards human occupation and dynamics in terms of population migration, land use, settlement in the flood affected areas of Dhakuakhana Sub-division of Lakhimpur District, Assam.

Microfield

Dhakuakhana is a place in the district of Lakhimpur comprising large number of villages and some small growing towns. From Dhakuakhana two villages namely, Matmora Village and Bahpora Village (No.1), 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).

Materials and Methods

Data for the present study 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

Socio-cultural impact having wider consequences for the state as well as for the studied areas is the growing frustration and unrest among the youth from flood affected families. There are various instances of unemployment, impoverishment, and grievances against bad governance leading some youths to join insurgent

group and such groups try to recruit young men and women from poor families alluring them with money and guns (Das, et al. 2009:22). Some of the socio-cultural scenarios of impact of floods are discuss in below.

Impact of Physical Environment on Population Distribution

The overall physical environment composed of peculiar relief, drainage, flood and erosion, river channel shifting in addition to other has its distinctive effect on the population distribution, settlement pattern and peoples' quality in an area. The cultural elements like transport, market and market centres, urban centres also act as factors, to a major extent, are dependent on physical factors. Thus, the environmental events and their associated pattern do have great impact on the growth and distribution of population in micro-regional context of the region (Gogoi, 2008 :145).

Floods being one of the most volatile factors of physical and hazardous nature, do frequently affect the distribution and growth of the population in the riverine area like the studied areas of the Dhakuakhana sub-division. The studied areas being under the influence of heavy downpour and resultant floods is not free from their far-reaching consequences. This impact is also reflected in the micro-regional distribution of density and other characteristics of the population.

The studied villages belong to the active floodplain zone, therefore, recurrent floods, river banks erosion and resultant channel shifting is the regular episode in the area. Like any other parts of Assam, the Dhakuakhana sub-division has also been occupied by a number of social groups or communities. The people of the studied villages are Hindu irrespective of different community composition. The Mishing community (Matmora village) belongs to scheduled tribe with a total population of 427 of 80 households. Kaibartta community (Bahpora No.1 village) belongs to scheduled caste with a total population of 506 of 101 households.

Various micro climatic situations and the frequency of floods affecting transport network have been responsible to a great extent in the distribution and redistribution of the population in the studied villages of the Dhakuakhana sub-division. The scheduled caste population having fishing and pottery etc., as their traditional occupations are found to concentrate in low-lying areas as well as in river bank. But now a days they are involved in any kind of activity as an earning source for their livelihood due to impact of flood.

The Mishing community always preferred river bank for their settlement and Matmora village is not an exception. The people of the Matmora village live just clinging above the embankment with their traditional stilt houses called '*chang ghar*' (Plate 2), a type of house ideally suited to adapt to flood waters. A '*chang ghar'* is usually a thatched house built on stilts made of wood and bamboo. The average height of the plinth is from six to eight feet above the ground, the height in general conforming to highest flood level of the area adjudged from long term observation and experience of past floods. The floor of the house is made of bamboo and wood, adjustable and can be raised to cope with rising flood waters. The '*chang ghar*' is an ingeniously designed and multipurpose house that makes it possible for the inmates to stay protected amidst flood waters and which allows enough light and aeration into the house. The house has the provisions for kitchen, living room, and food store and also supports livestock rearing and storage of essential household goods in the basement. The kitchen is located in the middle of the living room making the living space comfortably warm against the general cold ambience of riverine areas especially in the night. Under the influence of modern housing styles, the traditional '*chang ghar'* has undergone changes in terms of building materials and style. Those who can afford used concrete pillars in place of bamboo or wooden stilts and corrugated iron sheets as roofing material in place of thatch to enhance.

The Kaibartta community of the Bahpora village (No.1) village do not live in stilt houses. Most of the people live in '*kutcha*' (Plate 1) or mud houses. A few of them live in traditional Assamese houses and other houses have mixed structural elements and designs demonstrating the economic status of the family with primary concern for safety from flood waters. For instance, some houses recently built have an earthen foundation wall with brick. Again in some mud houses the earthen foundation is strengthened with bamboo post as a measure against soil erosion. To provide the much-needed elevation for protection from water, the foundations of the houses are raised three or four feet above the ground in general so that water does not enter the house in normal flood. The height of the plinth in different houses depends on the economic status of the family as well as the willingness of the household to invest in raising the plinth. These houses are made up with locally available materials such as, bamboo, cane, reed, wood, and thatch, the exception are bricks and concrete.

Due to the high platform of their houses the normal flood waters cannot easily come in contact with the houses but the flood waters covered the surrounding of their houses as a result the environment become

unhygienic or unsuitable for their living. The landscape started to change significantly. The land immediately facing the river water becomes sandy and the river advances towards the villages eroding the embankment as well as roads and other areas. The sand casting becomes a serious menace due to flood in the studied villages. The landscape changed completely into a desert like with sand all around. Transport is only available in the form of private vehicles mainly bicycles and motor bikes and a very few public transports from town to the river front. Horse-drawn carts have replaced the traditional bullock cards because horses walk better and faster on sand than bullocks. Similarly, the studied villages were rich in natural resources namely, forest cover, vegetation, and home orchards. But, it has now become barren, devoid even of common trees, vegetation, and biodiversity due to changes in the micro climate and gradual loss of soil productivity. The flourishing home orchards and home gardens in the front and backwards of each household exist only in the memory of elderly people. In earlier time the people of the studied villages produced surplus amount of paddy and other products from horticulture. The nearby forest provided them fuel wood, fodder, cane, bamboo and other forest products. With increasing impact of flood and consequent impoverishment, the forests were overexploited and completely denuded by flood. Common trees such as papaya, areca nut, banana, and coconut, which were an integral part of the studied villages are absent or rarely seen in the studied villages. The old trees died after being submerged under water for months together year after year and fresh saplings get little opportunity to survive.

In the studied villages both men and women are affected in different ways and to different extent in activities related to family responsibilities and livelihoods. Women are severely affected both during and after floods because of the physical and mental hardships. They faced problem in looking after the family kitchen and the children. Usually, the women who are engaged for collecting water for drinking and other domestic purposes during the flood time. The women of the Matmora village collected water from the Brahmaputra river for domestic purpose and they wash their cloth and utensils in the river (Plate. 5). Women from Bahpora village (No.1) go out in search of tube wells, and ring wells that are placed higher up from the flood lines and sometimes these wells are located kilometers away from the villages. In a typical marooned situation which continues for several days to several weeks they experience a lot of difficulties in cooking, attending to children and taking care of livestock and poultry. Hardship increases all the more when they are taking shelter on raised bamboo platform [Kaibartta community (Plate: 7)] inside the house as this is often a makeshift arrangement within a narrow space.

Maintaining health and sanitation (Plate.6) is the greatest challenges for women during floods. They have to sail to isolated places or to places covered by trees to bathe or to respond to nature's call. Again, life becomes very difficult for pregnant women especially in flood times.

Flood also creates lots of problem in the education of the people in such a way that most of the people remain illiterate. Table 2 shows that illiteracy in Bahpora village (No.1) is 75 (14.85%), and Matmora village is 104 (24.4%). Only a small number of population who completed graduation such as, 62 (12%) from Bahpora village (No.1), and 11 (2.61%) from Matmora village. Population with master degree is 6 (1.2%) from Bahpora village (No.1), and 1 (0.23%) from Matmora village. This is said to be due to the prolonged water logging at the schools, colleges and roads. Even when the flood water recedes the students of the villages cannot go to schools because the roads remain not commutable.

Impact of River Channel Shifting and Bank Erosion on Human Occupancy

The studied villages of the Dhakuakhana region being under recurrent threats of river bank erosion and channel shifting have been changing in the pattern and process of human occupancy over time and space. Actually, for the settlers of these studied villages, these two phenomena have been serious hazards. These hazards owe their enhancement to the effects of the great earthquakes of 1950 which wiped away of many settlers of the areas.

The instability of the river Brahmaputra coupled with the silt and sand strata of its bank is the main cause of considerable bank erosion in its valley. The shifting of the channel of the Brahmaputra river is most important cause for the damage of land and the people of the of the studied villages especially the Matmora village.

The active floodplain zone occupied considerably by a high concentration of population has suffered from bank line shifting and erosion resulting in washing away of many areas. For example, the existing embankment that is Matmora embankment got worn out in many places due to human pressure. This embankment was built in 1962 and at that time passed through several villages including Matmora village. Almost the entire landmass of the Matmora village has been engulfed by the Brahmaputra over the years living only five households in the south-western corner of the village. The history of the Matmora village in the last 60 years is a history of continuous alterations in geography by the Brahmaputra River, rewriting the fate of the people as it redefined the

morphology of the village. It is also the history of people's struggle to survive and sustain on the bank of the river through adaptation. People had to shift their village periodically, depending on the movement of the river and its branches (braiding channels and distributaries) and consequent cycle of erosion and deposition. Therefore, people generally depend on their own observations of the weather and environment, intelligence, and traditional knowledge, and, to some extent, on folk beliefs to predict rainfall and floods. The village Matmora was originally (in the 1950s) located on the bank of the River Brahmaputra about 10 kilometers to the east of the present studied site. With the construction of the first embankment on the Brahmaputra in that area in 1952, the westward movement of the river began to break through the confinement imposed by the embankment. The embankments were reconstructed at four different stretches in the area to date to keep pace with the movement of the river. Consequently, the original location of this village was engulfed by the river and the people from the village shifted to new places, always on the river bank, moving back westwards with the river. The river advanced towards Dhakuakhana town by 10 kilometres at least in the last 10 years. The embankment was constructed four times, and the village Matmora was dislocated six to eight times. Floods become more acute and frequent (three to five deluges a year) after the catastrophic floods of 1998 when a stretch of the embankment, about two and half kilometers long got washed away rendering the whole embankment in that area weak. Since 1998, not only the Matmora village but also other study villages have experienced floods annually with the average period of inundation each year being more the 50 days.

Being breached and washed away by the river in 1998 the people of the Matmora village in the last 20 years migrated to different places both near and far. Some people resettled themselves in nearby villages and on the embankment, while others left for other areas. A wider portion of the same stretch was swept away by the river again in 2007, 2008 and 2012 leaving the people open to the river. The All Assam Miri High School, which is more than a century old has moved nine times. It came to its present location in Khamon Birina after the 1998 flood.

In this context of dynamic riverine environment to raise the question about the land right and land access in a situation of continuous loss and gain of land is a futile attempt. While many villagers of the Matmora village are constantly losing land and being compelled to shift to other places, some stray populations (Mishing community) have occupied newly created sand bars (river islands) in the river. It is considered a traditional right

for the Mishing community to occupy unused riparian land to establish new settlements or for agriculture which they have been doing so far for many years. It is seen that there is no any strict rules or low regarding land right over mid river islands which are temporary entities. Further, in the earlier time there was no population pressure or not much competition from other communities over land on river bank. Again it is observed that the Mishing community has a strong sense of relationship and a strong sense of kinship, cooperation and support for their fellow community members. Therefore, it was not a big problem for the people rendered landless and homeless by the rivers to settle down in another area. Therefore, all these factors have helped them to adjust in floods and erosion affected situation. Though, in the changed situation, land has become scarce and the population has increased and hence there is not enough land in the area where people can establish a new village. For this reason some of the people migrated in small numbers to different places.

When the river got flooded in the year 1998, at that time about 150 families were residing in Matmora village. But only five families managed to stay back in the remnants of the village after 1998 and the rest migrated to various places. In 1998 flood the Matmora village lost 801^{B}-4^{K}-4^{L} of land. The people shifted or moved to other places only when it was no longer possible to stay in their homes. The table (4) shows that in 2012 flood the total number of displaced families from the Matmora Village is 27 families. In these 27 families there are altogether 124 individuals, out of which 61 (49.2%) are male and 63 (50.8%) are female. Among 27 families 7 families resettled in the neighbouring village, Kangkan Chapori Village and other 20 families resettled in Khamon Birina Village.

Similarly, the above situation was also faced by the Kaibartta community of the Bahpora Village (No.1) but only difference was that they managed to stay back in their village.

The ongoing shifting of the river bank had caused many villagers to go away from their original habitat within a span of few years. The erosion is still going in the villages.

Impact of Flood and Bank Erosion on Population Migration

The migration of the people from flood prone areas of the studied area was evident from the declining trend of number of households in some villagers. This migration step has been taken by the people due to flood damages which are found to be serious. Therefore, the population migration occurs towards the flood-free zone.

In case of Matmora village in 2010 the total household were105 but now the number has decreased to 80 due to flood. These studied villages have been suffering from sever to occasional floods and river bank erosion since time immemorial. On the other hand the field study revealed a spectacular increase of households as well as of population in the villages on the active floodplain. The people who are driven by frequent floods and river bank erosion, first flock together in some comparatively less distributed neighbouring villages and then use to migrate slowly to other safer places, especially to other moderately flood affected or flood free areas. Therefore, there is a rapid growth of population in Bahpora (No.1), village in the Dhakuakhana region. While the other village (Matmora village), there is negative growth.

The Dhakuakhana town, which is located in the flood free zone, has been the attraction of comparatively rich people of both the flood affected and non flood affected areas.

Apart from these, one of the significant things that has been observed in the field is that in these affected areas youths migrate to different parts of Assam and outside in search of jobs to support themselves and their families who are impoverished due to the impact of flood, erosion and land degradation. Youths belonging to the age group about 17-30, all male and unmarried, mostly migrated to Kerala, Chennai etc., [11 (4.16%) from Bahpora (No.1) 16 (3.16%) village migrated to Kerala, 2 (0.39%) to Chennai and 5 (0.99) to Guwahati (who worked on different companies); and from the Matmora village 4 (0.93%) migrated to Kerala]. Most of them are engaged in plywood and rubber factories with a modest income of rupees 5000-8000 per month. Some of the girls also migrated to the other places for earning and they are involved in some activities like working in beauty parlor, or weaving centres [2 (0.39%) from Bahpora (No.1) village; and 3 (0.70%) from Matmora village]. Migration for employment is usually temporary with the individuals spending some time in their village before returning to their seasonal jobs. Again, it is also found in case of Matmora village and Bahpora (No.1) village that the young men venturing out to other districts of Assam work mainly as rickshaw and hand-cart pullers and other menial labour. The migration of young people has also created a deficit of manpower for agricultural work and this has increased the workload on parents. And their remittances are used mainly to repair the houses, maintain the livestock, and buy foodstuff.

Conclusion:

Therefore from the above it can be concluded that environmental degradation had ruined their life and displaced them from their ancestral home; the farmer have lost not only their agricultural land but also their socio-economic condition has gone below the sustaining level affecting their cultural and spiritual life and also the education of the children. Parents could not afford higher education to their child due to financial constrain. The majority of the individuals were turned out as landless labourers thereby affecting their ancestral occupation and status in the society. The forced displacement had also affected their family bonding to a great extent. Many joint families were broken due to financial and habitation problems. Some families intentionally got separated to get the benefit from the government such as land, compensation, monetary help etc. Further, the drinking water sources are not adequate in the villages and water for domestic consumption is not easily available during and immediately after floods. The fact that it is the women who traditionally collect and manage water for the family means they consider water scarcity to be one of the priority issues.

References

Das, P.,D., Chutia, and N. Hazorika, 2009, ***Adjusting to floods on the Brahmaputra plains, Assam, India***, Kathmandu:ICMOD:22.

Gogoi, B., 2008, ***Flood Hazards in Assam and Their Impact on Human Occupance*** (ed), Kaustabh Prokashan, Dibrugarh, Assam: 145.

Kar, M., 2012, ***The Brahmaputra: Flood and its Preventive Measures***, EBH Publishers (India) Guwahati: 195.

Task Force, 1966, Federal Flood Control Policy, A United National Programmed for Managing Flood Losses, 89th Congress House Doc, No.465, UAGPO, Washington, D.C.

Ward, R.C., 1978, ***Floods: A Geographical Perspective***, The Macmillan Press Ltd. London, XI-V:6-16.

White, G.F., 1939, Economic Aspect of Flood Forecasting, ***Trans. Am. Geography Union***, Vol- 20: 218-233.

Photo Plates

Plate 1: A Typical Assamese house with raised plinth

Plate 2: A Typical Mishing house in the Matmora Village

Plate 3: Flood affected house from the Bahpora (No.1) village

Plate 4: Flood affected houses from the Matmora village

Plate 5: Washing of cloth in the Brahmaputra river by the woman of Matmora village at the time of flood

Plate 6: Shows toilet which is used by the people in Matmota village at the time of flood

Plate 7: Bamboo platform inside the house in the village of the Kaibartta community

Table: 1

Distribution of Population by Sex

Sl. No.	Name of the Village	Male	%	Female	%	Total	%
1	Bahpora(No.1) Village	268	52.96	238	47.04	506	100
2	Matmora Village	212	49.65	215	50.35	427	100
3	Total	480	51.61	453	48.55	933	100

Table: 2

Distribution of population by Sex and Education

Sl. No.	Educational Quality	Bahpora(No.1) Village				Matmora Village				Total	%
		M	%	F	%	M	%	F	%		
1	Too Young to Study	25	4.9	27	5.34	26	6.09	17	3.98	95	10.18
2	Illiterate	23	4.55	52	10.27	44	10.30	60	14.05	179	19.18
3	Up to L.P.	39	7.71	30	5.93	40	9.37	48	11.24	157	16.83

4	Up to M.E.	22	4.34	17	3.36	11	2.57	20	4.68	70	7.50
5	Up to class X	45	8.89	21	4.15	47	9.29	38	8.91	151	16.18
6	HSLC	33	6.52	28	5.53	18	4.22	15	3.51	94	10.07
7	H.S.	43	8.50	32	6.32	20	4.68	11	2.57	106	11.36
8	Graduate	33	6.52	29	5.73	5	1.17	6	1.41	73	7.82
9	Post Graduate	4	0.79	2	0.39	1	0.23	-	-	7	0.75
10	Other	1	0.19	-	-	-	-	-	-	1	0.12
11	Total	268	28.72	238	25.51	212	22.72	215	23.04	933	100

Table: 3

Distribution of population according to sex and occupation

Sl. No.	Category	Bahpora (No.1) Village				Matmora Village			
		Primary		Secondary		Primary		Secondary	
		M	F	M	F	M	F	M	F
1	Agriculture	104	122	39	-	-	-	6	-
	%	20.55	24.1	20.85	-	-	-	1.40	-
2	Business	8	-	4	-	4	-	1	-
	%	1.58	-	2.14	-	0.9	-	0.23	-
3	Service	32	8	5	-	6	3	-	-
	%	6.3	1.58	2.67	-	1.4	0.70	-	-
4	Daily wage earner	4	-	8	-	90	-	3	-
	%	0.79	-	4.28	-	21.08	-	0.70	-
5	Housewife	-	122	-	9	-	87	-	-
	%	-	24.1	-	4.81	-	20.37	-	-
6	Dependent	45	43	-	-	32	28	-	-
	%	8.89	8.5	-	-	7.49	6.56	-	-
7	Student	75	65	-	-	83	94	-	-
	%	14.8	12.84	-	-	19.41	22.01	-	-
8	Total	268	238	56	9	215	212	10	-
	%	16.05	14.25	14.01	4.81	12.69	12.87	2.15	-

Table 4

Distribution of Displaced People of Matmora Village by Sex

Total no. of family	Male	%	Female	%	Total	%
27	61	49.2	63	50.8	124	100