

Flood Hazards Mitigation with Traditional Measures: A Study in Nagarbera Region of Brahmaputra Valley, Assam, India

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Abstract:

Seasonal flood is an important environmental hazard in Nagarbera region of Kamrup district Assam. To mitigate flood hazards, flood victims have adopted some traditional measures which are significant for the region. The objective of the paper is to highlight the traditional measures adopted by flood victims in the region and examines their practical importance. A survey cum investigation was conducted in 9 sample flood affected villages in Nagarbera revenue circle of Kamrup district, Assam during 2010 for flood hazards study. Data/information was collection from 300 randomly selected families. The study reveals that the traditional measures viz. construction of houses in cluster on some raised ground at a height up to 5-6 meters from the level of the agricultural fields, shifted to the loft within the house called 'Chang', shifted their domestic animals to the boats, banana rafts, machine boats and to the high land, purify flood water

with traditional methods, changing cropping pattern have partially mitigate the seasonal flood hazards in the study area. A systematic integrated research, considering traditional measures is urgently necessary for the study area.

Key words: Flood hazard, Mitigation, Traditional measure, Nagarbera, Assam

Introduction:

Flood is one of the most important environmental problems in Brahmaputra valley of Assam, occurred in every alternative year. About 3,150,000 hectares of land in Assam is flood prone. Historical records reveal that the process of siltation caused by flood waters along river beds has also become a big problem especially after the 1897 earthquake in Assam (Gait, 1905). As per census report of Assam 2001, one third of the total area was affected by flood. During the year 2002, a total of 674.148 hectares of land area were affected by floods and estimated loss was Rs 18,678.60. The region is mainly composed of Alluvium of Quaternary period (Bordoloi, 1995).

District Disaster Management Authority of Kamrup District, Assam reported that during the period of 2012-2013, the total flood affected population of the Nagarbera revenue circle was 62523. As per government of Assam record, during the period of 1995-2010, the grand total loss due to flood in the circle was Rs. 6, 90, 94,870. It is observe that after the great earthquake of 1950, the river has shifted its cours and formed new alluvial land. Local people occupied this land for agricultural purposes. Nagarbera is a chronically flood hazard region of Kamrup district. There is a close relationship between the river and flood-plain dwellers. Socioeconomic activities of people are mostly controlled by the river. One of the most important drawbacks on the development of the economy of this area is the flood hazard, which persists for a couple of months

every year and paralyzing all developmental activities. Having active flood prone area, numbers of flood victims are increasing in the region. Communities and tribes of the flood affected villages adopted some traditional measures during flood period which are scientific and practical oriented.

The Study Area

The study area Nagarbera circle in Kamrup district of Assam is an active flood prone and water logging area, situated located on the Southern bank of the river Brahmaputra. It extends from 90°55' E- 91°50' E longitude and 25°3' N- 26°08' N latitude. Annual rainfall of Kamrup district ranges between 1500 mm to 2600 mm. temperature ranges from 6° to 39° and relative humidity is 75% (Census report, 2011). The physiography of the area is dominated by the *Charland* or alluvial flood plain features. The courses of the river Brahmaputra and its tributaries are main topographic features of the study area. There are number of sandbars and fertile sandbars (*Charlands*) within the channel of the river Brahmaputra which exhibits a well developed braided channel pattern. The countable hill of the area is Nagarbera hill which is situated on the Northern west part of the study area. Large number of wetlands that are locally called *Beels* is the another important physiographic feature of the region. These Beels and Swamps within the flood-plain possess best natural reserves of local fish population. The river Brahmaputra along with its tributaries, Kulsi, Jaljali and their sub tributaries have created flood in the region.

The review of relevance literature reveals that many researchers have published their research works on Brahmaputra flood and environmental hazards. The works of (Bordoloi, 1995; Taher and Ahmed, 1998; Sinha, 2001; Ahmadi Nejad, *et.al.*, 2002; Bhadra, 2011; Bhadra, *et. al.*, 2011; Kalita, 2014) on flood hazards of Assam are directly and indirectly

related to this study. The study is significance for decision makers of government in realistic formulation of short and long term plans for mitigation flood problems in the region with integrated approaches.

Purpose of the Study:

The main purpose of the study is to highlight the traditional measures adopted by flood victims of the region other than structural and non-structural measures and examine their practical importance. The study is significance for planners and decision makers of government for effective flood control and hazards management in the region.

Methodology:

During 2010, a survey cum investigation was conducted in Nagarbera revenue circle of Kamrup district, Assam. Both empirical and field survey methods were followed for the study. In the first stage secondary data/information were collected from government records and reports. For primary data/information collection, 28 flood affected revenue villages of the circle was categorized in to 3 groups as acutely flood affected (10 villages), moderately flood affected villages (10 villages) and partially flood affected villages (8 villages). From the categorized flood affected villages 9 sample villages were selected in such a way that it represents the whole flood prone area. The sample villages are viz. Sagunbahi, Badlapathar, Mandira Reserve NC, Jaljali Khola Reserve, Jamlai, Bhokhuradia, Tupamari, Nagarbera and Pijupara. Considering different interrelated socio-economic and health care parameters, primary data/information was collected from 300 randomly selected households with purposefully designed questionnaire cum schedule. Total 1351 respondents were considered for the study.

Result and Discussions:

During flood season, the region is totally disrupted, losses prosperities and life, disconnected with the other parts of the state. Besides the direct economic losses, there are some indirect losses caused by floods viz. lowering the living standard, isolation, diminishing social behavior as well as working capacity of the inhabitants of the region. Lack of adequate grass-land, grazing fields, shortage of fodder lack of usual shelters and sheds of animals and drinking water problems for man and animals, maintenance of live-stock during and after flood are the common problems which are faced by flood victims during seasonal flood of the study area. Having chronic seasonal flood hazards, the flood victims of the study have not leave their villages, for which numbers of flood victims are increasing during the last few decades.

Significance of Traditional Measures

The study reveals that communities and tribes adopted some of the traditional measures for flood hazard management and mitigation in the study area. During field visits, it has seen in the acutely flood affected villages communities and tribes constructed special types of houses, especially in the “*Char*” areas. Generally flood victims constructed houses in cluster on some raised ground at a height up to 5-6 meters from the level of the agricultural fields. Along with the rising of flood water, people shift to the loft within the house called ‘*Chang*’. For flood hazard mitigation and management, people of the sample villages constructed their houses at a height of 2-3 meters above the flood water level, making bamboo plat-form inside their houses to preserve the food stuffs and other essential requirements. When the flood water submerged their floor of their houses, making fleets with banana plants which they use in various purposes like preservation of food stuffs, transportation of essential commodities, providing a secure

place for the domestic animals like cattle, goats and poultry etc. Again such banana fleet helps the poor flood victims of the area to shifting of their essential commodities to safe places. Animal rearing in flood period is generally performed in local boat, banana rafts, machine boats etc. Most of the villagers installation of tube-well on higher plat-form much above the height of their *Basti* to use it only in a special occasion like during high flood.

It is again found that people makes some water storage tank or kept big size earthen pot with traditional method for the treatment of drinking water by applying chemicals like lime powder, bleaching powder, potash, chlorine tablets etc. Some families used to make raised bamboo plat-form as their toilets near their house which are as high as 7-8 meter so that flood water cannot touch its platform. For living with flood prone environment, most of the flood victims of the study area have changing their cropping pattern and more stress in cultivation of *Rabi crops* instead of traditional flood base *Kharif* cultivation. Hybrid varieties of paddy such as *Errii*, *Joya*, *Ranjeet* etc are used by cultivator. Cultivation of *Errii* rice and *Ranjeet* is common in flood free period i.e. during January to May. Even they do not depend upon the natural rain or normal flood water; they used to supply required water by using cello-tube. During 2010, there are four waves of floods in Nagrbera area; which are not so high but their presence was so long that the cultivators of this area could not even grow any rice paddy even in their second attempt till the end of the September. However, since the few years back the people of this area tried their best for the *shifting of Kharif crops to the Rabi crops*. Of course the normal floods which are regular and expected, bring benefit to the area. The flood victims of the study area use the flood plains as it is most productive.

In addition to the principal occupation agriculture, a handful of people in this area are engaged in different jobs. Flood victims of the villages not only apply their traditional

measures but also aware for water borne diseases and other flood related problems. People use smoke to chase away flees mosquitoes, and other insects, further the pet animals are also vaccinated before the commencement of the flood for protecting them from various flood prone diseases.

The study area is severely affected by flood hazards which need massive efforts in terms of technological inputs and administrative planning and social awareness. The structural measures are quite insufficient for the region. The flood hazards in the study area is found to be somewhat abnormal in respect to other parts of the flood prone area of the valley, as most of the time floods are not found to be as high as the danger level but exists for long term. This type of low floods for long term water accumulation needs special protection measures and their management based on proper hydrological and geomorphologic assessment of the problem should be adopted to protect the economically backward and chronically flood affected area. From the study based on investigation it has seen that people of the area generally infected by various diseases during the flood, while more than 43% of people of the sample villages suffer from water born diseases. Despite the above problems, seasonal flood has disrupted the socio-economic life in the study area.

It has seen that Government's policy of rescue, relief and rehabilitation are functioned only during high flood but since the area concern, it requires special attention during rainy season. In addition to long term structural measures attention should be given to the short term measures, considering traditional measures adopted by flood victims. Few measures and activities are urgently necessary for the region is construction of more raised platforms, implementation of crop insurance, more agricultural loans to the flood affected poor peasants at government subsidy, special attention should be given for up gradation of indigenous methods and measures. Besides implementation of policy of management, Government

and other agencies should come forward with alternative economic activities like fish farming, dairy farming, a forestation, cottage industry development etc. planned manner to boost up the economic condition of flood victims as well as to minimization of flood hazards in the area.

Conclusion:

The flood management and mitigation strategies are not sincerely and honestly executed by state and central government of India for which seasonal flood hazards stand as barrier for economic development in the study area. A systematic integrated research, considering traditional measures is urgently necessary for the study area.

Acknowledgements:

The authors acknowledged the respondents of the sample villages of Nagarbera revenue circle for their helps and cooperation during the period of primary data/ information collection.

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Annexes

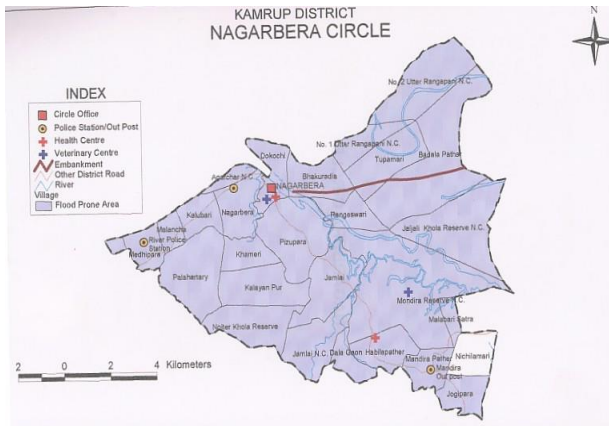


Fig-1.: The Study Area Naberbera Revenue Circle of Kamrup District, Assam, India



Plate-1: Few Photographs of Traditional Measures of the Study Area During Seasonal Flood, 2010.

(Photograph 1 & 2 Submerged Homeland & Crop Land. Photograph 3 Use of Banana Fleet as a Means of Transportation, During Flood. Photograph 4 Use of Small Boat as Means of Transportation.)