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Types and Sources of Flood in Murshidabad, West Bengal

KEYWORDS: Murshidabad, Types of Flood, Sources of Flood

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ABSTRACT *Flood is defined as abnormal high stage of flow which overtops the natural or artificial river banks in any reach and causes immense loss of crops, property, human lives and lines of communication. It is a natural event that results from excess runoff generated from a drainage basin due to severe combination of critical hydrologic and meteorological conditions over the region. Murshidabad district is affected by frequent heavy flooding, drainage congestion and bank erosion, resulting in extensive submergence of land, loss of life and property and dislocation of the communication system. At times, the period of flood above danger level is 40 to 70 days. The present study aims to find out the main sources of occurrence of flood other than rainfall and their regional distribution. The paper identifies river bank erosion, overflow of western tributaries and discharge from dam, water logging from feeder canal, decay of spill channel and drainage congestion and overflow from the Ganga/Padma as the main sources of flood in Murshidabad. This study will help formulate of plans for flood management according to the types of flood in the district and further detail study of sources of flood.*

INTRODUCTION

Two main rivers in Murshidabad are the Ganga-Padma and the Bhagirathi with the tributary Bhairab forming the main channel. The eastern tract between the Bhagirathi, the Ganga and the Jalangi permeated by several other offshoots of the great river is in no way different from ordinary alluvial plains of Bengal. The whole area lies low and is exposed to annual inundations which sometimes cause much suffering. The eastern half of the district known as Bagri may be described as an isosceles triangle. The Ganga/ Padma and the Bhagirathi form the two equal sides; The Jalangi forms the entire base. The Bagri is low-lying and alluvial, with a humid climate and a fertile soil, which is liable to be flooded by the spill of the Bhagirathi and other rivers.

The western part of the district called Rarh Region is drained by western tributaries of River Bhagirathi. The Farakka barrage in the north monitors the flow of water into the river Bhagirathi through the feeder canal. Here the rivers are fed by the discharge from Mayurakshi system through Tilpara, Baidhara and Deucha barrage and ultimately gets emptied into the Bhagirathi through the river Babla. About 1,800 sq. km. of area in the neighbourhood of Kandi town lying on the west bank of the river Bhagirathi is flooded by the combined discharges of the rivers Mayurakshi, Dwarka, Brahmani, Gambhira, Kopai and Bakreswar of which Mayurakshi is the main contributor.

An empirical scientific analysis reveals four major causes contributing to this disaster. These are: (a) Heavy rainfall, (b) Excess water released from the reservoirs of Massanjore dam and D.V.C., (c) Decay of drainage channels, (d) Human intervention intercepting the hydraulic regime.

OBJECTIVES & DATABASE

The main objectives of the paper is-

1. To find out the main sources of flood in Murshidabad district of west Bengal
2. To analyze the different natures of flood in the study area.

The study is based on primary as well as secondary sources of data. Collection of primary data consists of field visits. The sources of secondary data are different Government Reports such as Publication from Irrigation and Waterway Department of West Bengal, District Disaster Report, various articles from journal etc.

STUDY AREA

At the apex of the Ganga delta, Murshidabad district stretches between 23˚43′- 24˚50′ N and 89˚49′- 88˚46′ E in central West Bengal. Its area is 5,324 km2 and it comprises of 5,864,291 people (2001), living in 26 Community Development Blocks. Geomorphically, the district occupies the interfluve region between the Padma-which roughly constitutes its eastern boundary-and the Bhagirathi, the northernmost distributary of the Padma. Some floodplains of the rivers joining the Bhagirathi on its west bank-Banshloi, Pagla, Dwaraka, Mayurakshi, and Babla-are also included in the district.

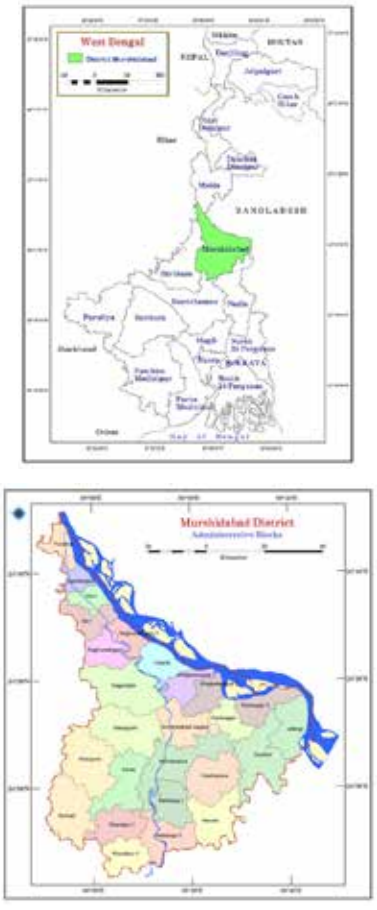

Figure 1: Description of the study area

Volume : 3 | Issue : 2 | February 2013 | ISSN - 2249-555X

DISCUSSION

River bank erosion

About 24 lakh people of Murshidabad now live along the banks of Ganga. To protect this 174 km. stretch, 1740 crore is estimated. But in the budget the sanctions for this Irrigation Department was a measure of Rs. 396 crore only. Actually every year between July to September 15 lakh cusec water pass through the poor alluvial basin of Bengal gap which increases bank slumping five times than the dry month.

From 1931 to 1977, 26769 hectares lands have been eroded. Many villages have been fully submerged. Thousands of people have lost their dwellings. 1980- 19990 is a decade of erosion of this district has badly affected Giria, Sekhalipur, Khejustala, Mithipur, Fajilpur, Rajapur, Akheriganj, Parashpur villages. In 2002-2003, 694 families are completely submerged and shifted to other places. 612 families in 2003-04 were shifted their dwellings loosing land, livelihoods. During the year 206-07, 1354 families are shifted due to river bank erosion and consequent flooding in Jalangi block and 3 mouzas are fully washed away. In 2007 severe erosion occur in Lalgola, Bhagawangola II, Farakka, Raninagar II blocks. During 2008 Bamnabad of Raninagar II block is affected by erosion and 168 families are shifted. Total 1245 families are affected in Lalgola, Bhagwangola I and Bhagwangola II block in this year.

Overflow of Western Tributaries and Discharge from Dam

Floods in the western part of the Bhagirathi are caused by a number of flashy rivers having their origins in the Chhotonagpur Plateau. Earlier a large number of detention basins on the courses of the rivers used to absorb the flash floods and gradually released the same when flow of Bhagirathi reduced. The natural sequence of floods of different rivers in this region was that the floods of the Pagla-Bansloi and Ajay drain first, followed by the floods of the Mayurakshi-Babla system and the floods of the Brahmani-Dwarka drain last of all. The progressive deterioration of the carrying capacity of these detention basins locally known as bils and Bhagirathi over long years aggravates the flood situation in this part. Encroachment of these low bils areas for livelihood is an historical event that can be traced back from the days of Lord Cornwalis. The local landlords with the power vested on them by the Permanent Settlement started to encroach into the detention basins for revenue maximization by constructing circuit embankments to reclaim the low lying areas of kharif cultivation. After independence, with population influx due to the partition of Bengal as well as by growth, detention basins were being increasingly encroached upon to bring them under kharif cultivation. The vast areas of land, which used to absorb the floods of these flashy rivers, got segmented with unscientifically aligned and designed circuit embankments.

Water logging from feeder canal

The nature of flood problem of the blocks Suti-I, Farakka is different in terms of the source. The rivers Bagmari, Gumani, Trimohini, Kanloi, Madhabjani cause havoc in this region. Except the Bagmari, all the rivers outfall into the Bhagirathi. But the outfall channels of these rivers are not in a healthy condition.

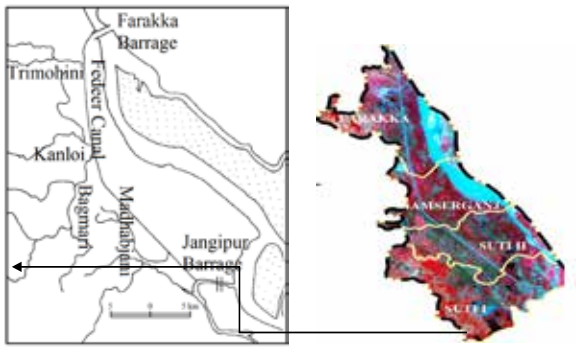

Figure 1: Drainage Condition behind the Feeder Canal
Source: Adopted from Rudra, 1999

The feeder canal constructed across the flow of these rivers, impede the evacuation of the floodwaters of this area. The catchments of the rivers Gumani, Trimohini and Kanloi are small but being flashy used to bring flows into the Ganga rather fast. When there is unusually high rainfall with corresponding high discharge, the floodwater spread in the surrounding areas. The obstructions created by the ash ponds of the Farakka Super Thermal Power Plant and the railway embankment cause spreading of floodwater along the toe of the right embankment of the Feeder Canal causing flood in the Suti-I. The discharges of the Trimohini and Kanloi are designed to flow into the Feeder Canal through inlet. Whenever the discharges of these rivers exceed the design capacity of inlets, the excess floodwater also deposit along the toe of the right embankment of the Feeder Canal. The discharge of the river Bagmari designed to flow in the Ganga along its course through a syphone across the Feeder Canal. This syphone is choked by silt in recent years. Thus, with the outlet to the Ganga being choked, the flood discharge of the Bagmari gets stagnated and spills to the basins of the river Pagla and Bansloi, creating a vast sheet of water amounting 100 sq.km.

Decay of spill channel and Drainage Congestion

The eastern region of Bhagirathi is a part of Moribund delta (Bagchi, 1945). The main rivers of this region are Bhairab, Jalangi, Chhoto Bhairab, Sialmari, Gobra Nala. All these rivers are distributaries of the main branch of the Ganga. The rivers are in their decaying stages and land building processes have ceased. The elongated depression area between the Bhagirathi and Jalangi rivers is demarcated as flood prone zone (Sanyal and Lu, 2006). The interfluves of the numerous distributaries are ill drained (Spate. et al, 1967) and frequently cause waterlogging during the southwest monsoon season in June–September, leading ultimately to stagnation and the development of palaeo-channels. The abundance of ox bow lakes and misfit river channels are also characteristic of this part of Gangetic West Bengal; stagnant water bodies and marshy land dot the landscape, some of which are spill channels of the Damodar River that had lost their headwater to silting or to a shift in its course (Spate et al., 1967).

The overall geomorphology of the study area depicts a degenerating fluvial system. These rivers and adjoining tract of the land is flushed by flood spills. The Bhairab was one of the most active delta builders and had quite a number of spill channels. Following the diversion into the Padma resulting in reduction and almost cutting off head waters supplies, the lower reaches of these rivers silted up by tidal action and these river courses began to deteriorate. The mouth of the Jalangi has also silted up. The Chhoto Bhairab originates from the river Bhairab but its mouth has largely silted up.

A suspended sediment budget for the Ganga– Brahmaputra catchment shows that of the 794 × 106 t/yr transported in the rivers of the Ganga catchment, 80 – 10% comes from the High Himalaya, 20 – 10% from the Lesser Himalaya and the proportions from the Tethyan Himalaya, Siwaliks, Plain, and Peninsular while unknown are each likely to be < 10%.

About 8% of the river sediment is deposited on floodplains and delta plains in Bangladesh. About 45% is deposited in the subaqueous delta and the Bengal Fan. The total measured flow of suspended sediment in the tributaries to the Ganga River is 488 × 106 t/yr. while the quantity of sediment moving in the Ganga at Farakka, near the Bangladesh border, is 729 × 106 t/yr of which 328 ×106 t/yr is transported down the Hooghly River.

This modern rate of fan accumulation is only ~ 20% of the rate over the last 17 × 106 years (Curray, 1994), showing that in the past there have been higher rates of transport. Over the last 7,000 years, however, deposition on the floodplain and delta-plain has been 26% higher than the modern rate; ~ 40 × 106 t/yr compared with 554 × 106 t/yr (Goodbred, 1989).

Volume : 3 | Issue : 2 | February 2013 | ISSN - 2249-555X

The rivers of Plain, like the Ganga catchment appear to be aggrading, thereby exacerbating the annual overbank flood. Aggradations may be the result of enhanced sediment delivery to the rivers as a result of land use, rainfall change, or neo-tectonics in the Himalaya. Or the aggradations could be caused by neo-tectonics on the Plain, warping the riverbed (Wasson, 2003).

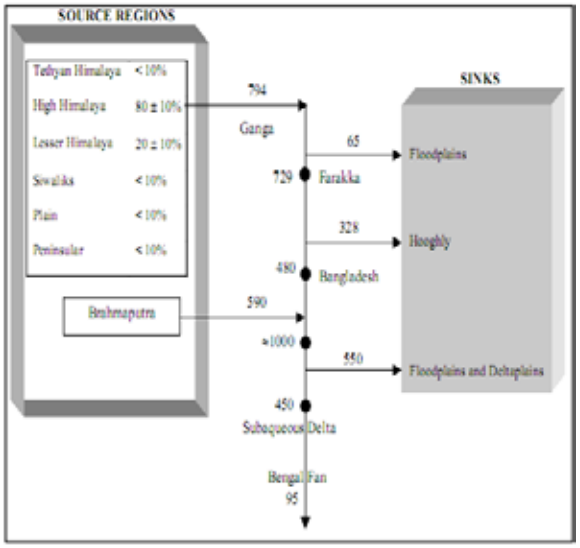

Figure 2: Sediment budget for Ganga-Brahmaputra Catchment
Source: Adopted from Wasson, 2003

Overflow from the Ganga/Padma
Due to heavy rainfall in the monsoon months the water level of River Ganga/ Padma rises. This causes high flows in the distributaries consequently. But these distributaries no longer active rivers and they are in degenerating stage. These rivers are not capable of containing this water from Ganga, finally causes flood in the blocks along the Ganga/Padma.

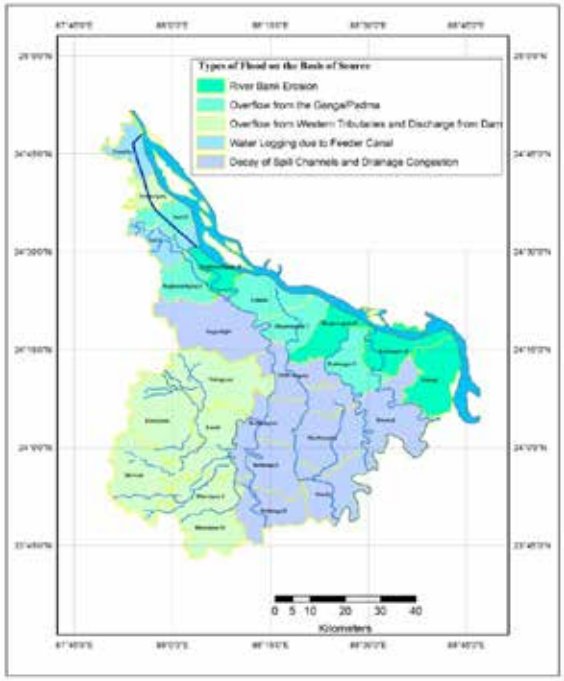

Figure 3: Types of Flood on the Basis of its Source

Source: Field Survey

CONCLUSION
The nature of flood in regional scale in Murshidabad is shown in the Figure No. 3. Each and every type of flood has its own characteristics and need unique plan for its management. Thus in future emphasis should be given on the sources of flood in the study area during formulation of flood abatement plans.

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