



## Flood Hazard in Amta-II Block of Haora District, West Bengal: Causes, Consequences and Management

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### Abstract

Damodar basin specially the lower Damodar basin area is one of most floods affected geographical region of west Bengal. The people of this lower damodar basin area are suffering seriously from this hazard almost every year. Damodar Valley Corporation was established in 1948 to reduce flood in this area. Some other steps have also been taken to reduce flood hazards. But flood is still a serious problem for this region. My study area is Amta II block which is situated to the north western part of Haora District. It is one of the most affected blocks of the district. Damodar River flows through the middle portion of the stated study area. The present study concerns about the causes, affected area, prone area, damage assessment, remedial measures of flood in Amta-II Block of Haora District.

**Keywords:** basin area, geographical region, affected area, prone area, damage assessment, remedial measures.

### 1.INTRODUCTION:

River was one of the bases for major ancient civilization. But presently river created floods are seen as generator of hazards and sometimes disaster. A river flood occurs when water levels rise over the top of river banks. Simply we can define flood as stagnation of water in a particular place for several days which affects human society most. Among different disaster occurred in India flood is most vulnerable. India holds second position in flood occurrence after Bangladesh (Centre for Science and Environment, 1996, Floods, Flood Plains and Environmental Myths). Lower Damodar Area of West Bengal is one of the most flood affected river basins.

### 1.1 STUDY AREA:



West Bengal has 37, 660 sq.km flood prone area out of 88, 752 sq. km (42.4% of the total geographical area) of total geographical area (Irrigation and Waterways Deptt. Govt. of West Bengal, Annual Flood Report, 2013). Lower Damodar Basin in South West Bengal is a permanently flood prone area. Amta II is a community development block that forms an administrative division in Uluberia subdivision of Howrah district in the Indian state of West Bengal. Latitudinal Extension is 22°30' N- 22°37'N and 87°50'N-88°00'N. Amta II CD Block has an area of 135.42 km<sup>2</sup>. Amta II panchayat samity has 14 gram panchayats. The block has 68 inhabited villages. Amta II CD Block is bounded by Udaynarayanpur CD Block and Khanakul II CD Block, in Hooghly district, in the north, Amta I CD Block in the east, Bagnan I CD Block in the south and Daspur II CD Block, in Paschim Medinipur district, in the west.

#### 1.2 OBJECTIVES:

- (1) To find out the causes of flood in Amta –II Block in Lower Damodar basin Area.
- (2) To identify flood prone area with the analysis of flood frequency.
- (3) To find out the effect of flood in this area.
- (4) To identify suitable measures for the flood management in this area.

#### 1.3 DATA BASE:

Relevant data for this work has been collected both from secondary sources. Published and unpublished Secondary data have been collected from District planning map of Haora District from survey of India, Annual Flood Report from Irrigation and Waterways Directorate, Government of West Bengal, Amta-ii community Development Block, District Statistical Handbook of Haora District from Bureau of Applied Economics and Statistics, Government of West Bengal.

#### 1.4 METHODOLOGY:

Quantitative as well as qualitative data analysis method has been used to explain the result of the study. Suitable cartographic and statistical techniques have been used for easily explaining the data. Location and thematic maps have been developed with the help of G.I.S technology. For better understanding the work has been enriched with illustration and photograph.

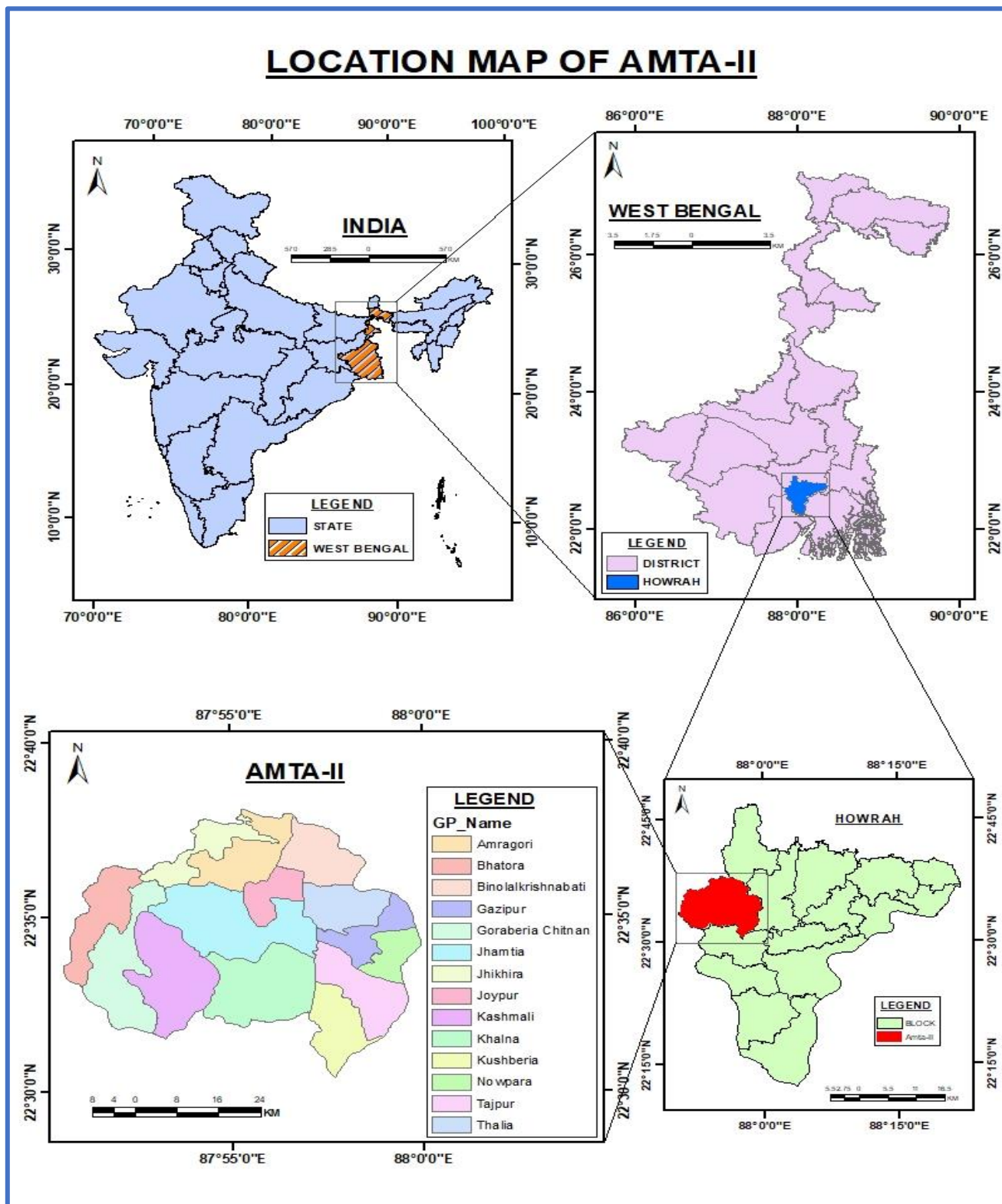
#### LITERATURE RIVIEW:

Flood means inundation of vast land area with water for long days (Singh, 2006). Flood may occur when water overtops and breaks levees during peak discharge period, resulting in some that water escaping its usual



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boundaries, or it may occur due to an accumulation of rain water on low lying riverine tract. India is located under the monsoon climatic region. Due to heavy downpour, when rivers and water bodies reach in extreme capacity to hold water and then excess water creates flood. Floods are occurred by the river which bring huge amount of sediment (Laha, Chatterjee and Bera, 2014). Flood also causes enormous damages to the life and property of human beings. The causative mechanism of flood may be physical and anthropogenic (Khan, 2016). Floods in this area occur only for high discharge from barrages of DVC and excess rainfall during monsoon period. The width of Damodar valley is increasing day to day while depth and gradient is also decreasing (Bera and Mistry, 2014).





## **RESULT AND DISCUSSION:**

### **2.1 FLOOD PRONE AREA OF AMTA-II BLOCK:**

YEAR	AREA IN SQ.KM	FLOOD AFFECTED GRAM PANCHAYAT
2000	101.47	Bhatora, G.B.Chitnan, Kashmoli, Khalna, Jhamtia, Amoragori, Thalia, B.K.Bati, Joypur, Gazipur, Tajpur, Nowpara, Kushberia, Jhikira
2013	65.21	Thalia, B.K.Bati, Bhatora, G.B.Chitnan, Amoragori, Jhamtia, Jhikira
2015	130.11	Bhatora, G.B.Chitnan, Kashmoli, Khalna, Jhamtia, Amoragori, Thalia, B.K.Bati, Joypur, Gazipur, Tajpur, Nowpara, Kushberia

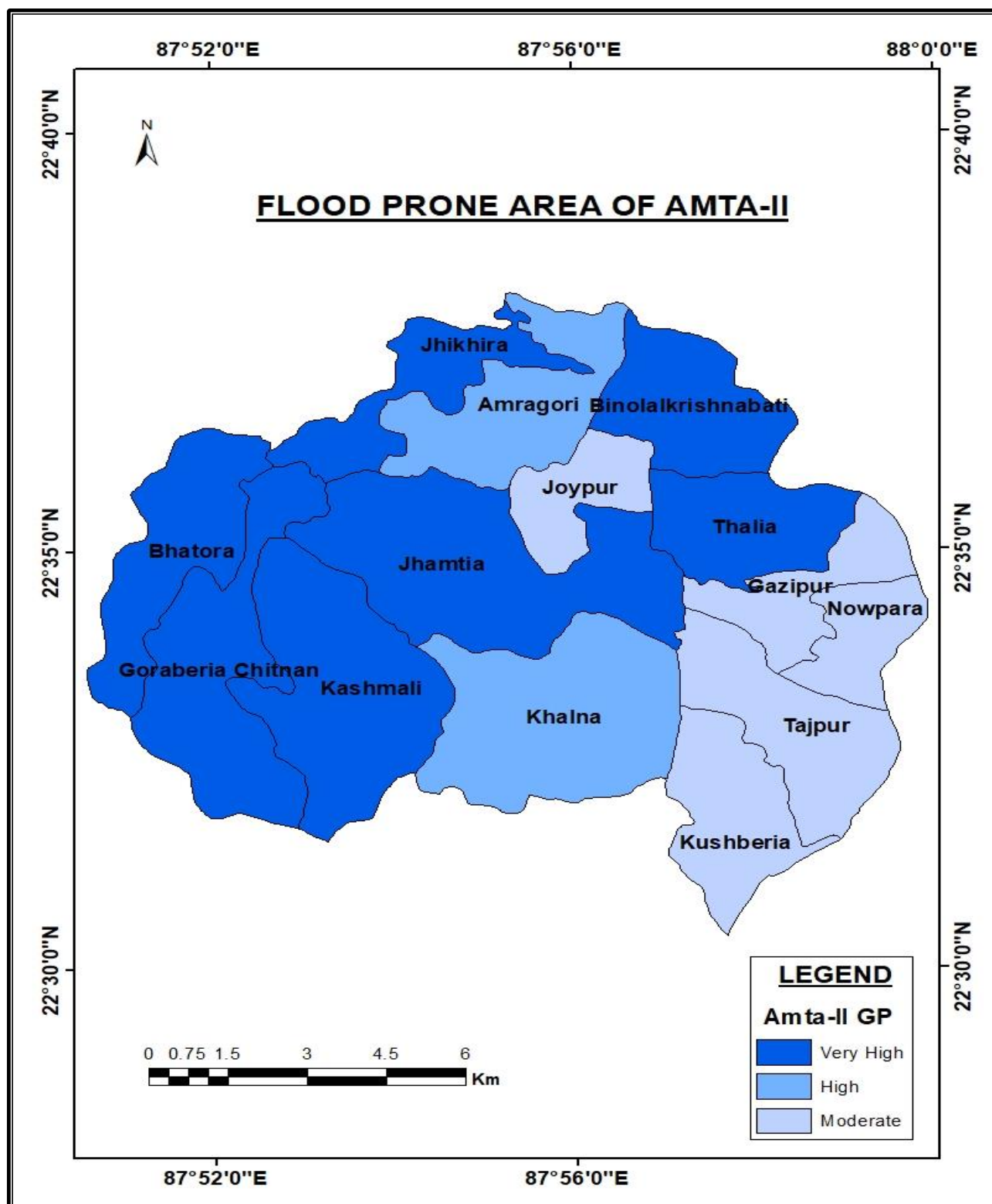
In lower Damodar region frequency of flood is very high in general. Among the selected blocks of Haora District situated in lower Damodar area .Gram Panchayats of Amta-ii Block are very much flood affected. During the same period of time, Tajpur, Kush Beria, Joypur, Gazipur and Nowpara Gram Panchayat of Amta-ii Block are flooded. It is also found that, Kashmoli, Khalna, Jhikira and Amoragori Gram Panchayat of Amta-ii Block has experienced devastating flood in 7-9 years. More than nine years flooded Gram Panchayats are Bhatora, G.B. Chitnan, Jhamtia, B.K. Bati, Thalia of Amta-ii Block.

*Source: based on the collected data from the respective Block office*

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## **2.2 CAUSES OF FLOOD:**

Causes of flood in the study area are natural as well as anthropogenic. The main causes are

### **(a)Huge Rainfall:**

During the month of monsoon (June to September) this area has received excessive amount of rainfall. Out of total rainfall almost 82 % rainfall occurred during the monsoon season. The study area of lower Damodar area has received an average annual rainfall of 1516.66 mm during 1978-2015. Devastating flood occurred almost in the same years and month when rainfall crossed 500 mm in a month.

### **(b)DVC's Main Dams:**

The average age of the dams in Damodar Valley Corporation is about 60 years. Due to excessive mineral extraction, deforestation and rapid urbanization in the upper basin, soil erosion has reduced the water holding capacity of the four main dams by 26.95% (Table 1). Open pit mines in the upper Damodar Basin are rapidly depleting the capacity of dams due to soil erosion. The overall situation of Damodar and its tributaries are quite alarming. Due to the construction of dams in the upper basin, the normal flow of rivers in low basin is affected badly. Due to the lack of discharge from the dams in the dry season, the natural flow is weak and the river channel is decayed in lower channel. Currently the riverbeds are wide but very shallow. In addition, the carrying capacity of the rivers has been alarmingly reduced due to the accumulation of airborne waste or debris from the surrounding areas. As a result, the Damodar and its branches can't carry the excess water in Monsoon. When the Damodar and other rivers flow eastwards with this excess water, bridges, culverts, railways and roads built across the rivers create obstruction to them. The





drains under these railways and highways are so small that they almost dilapidated due to lack of maintenance. So, it is not possible to drain the water through them, resulting in long standing flood water. At present, the situation is so worst that when the flood water (released from dams) comes suddenly, there is no room for it. It neither goes to sea smoothly nor even fall uninterruptedly to the main river. So, there is a prolonged water blockage in surrounding areas.

Table 1: Main Dams of D.V.C and their Characteristics

Dams	Year of Establishment	Primary Capacity (000 Cubic m)	Present Capacity (000 Cubic m)	Primay Depth in m	Present Depth in m	Maximum Water Discharge (Cubic m/Sec)
Tilaiya	1953	380710	305930	372.47	371.56	1348
Maithon	1958	1093540	803620	152.40	150.88	13592
Panchet,	1959	1193464	748375	135.64	132.59	16608
Konar	1955	247960	213560	427.94	427.06	6796
Total	2915674	2071485				

In this context, another thing to note is that here the dams were mostly built in the upper Damodar basin where the amount of rainfall is less than in the lower basin. Generally, the cyclones formed in the Bay of Bengal cause heavy rainfall in the lower basin before reaching the upper basin (Chhotanagpur Plateau) and soon the river basins become full. After that when the cyclone persists in upper basin, the dams are forced to release water due to excessive rainfall. The lower channels, which were already full of water with cyclonic downpour, become imprinted and floods occur. In some places the floodplains of the river are lower than the river basin, so that once the flood water enters, it cannot be easily drained. At this time, if there is a full Kotal (strong flood tide), then the lower basin water will take longer to get into the Hooghly River and the situation becomes critical.



**(c) Low Carrying Capacity:**

This area has been suffering from flood hazard due to low carrying capacity. The waited perimeters of Damodar have been reduced and carrying capacity of Damodar River has also been decreased. 2.1.3. Gentle Slope Due to gentle longitudinal slope 2feet/1500 feet to 2feet/1 mile of the study area of lower Damodar area, the drainage efficiency is very low.

**(d)Huge Siltation and Sand Deposition:**

Damodar River has also lost carrying capacity due to huge siltation and sand deposition. At Beghuahana, Jamalpur Police Station, Bhardhman, where Damodar (Amta Channel) and Mundeswari bifurcated from each other a mid-channel bar formed on the mouth of river Damodar and obstacle in free flow of water through Amta Channel.

**(e)Tidal Effect:**

In the days of new moon and full moon, the spring tide occurs in Rupnarayan River. When spring tide occurs in rainy season; the river water height crosses extreme danger level (5.54 meters) and devastated the island area.i.e. Bhatara and Ghoraberia Chitnan Gram Panchayats of Amta-ii Block.

**(f) Elevated Embankment:**

In the past both banks of Damodar were opened and no embankment was there. Number of distributaries and canals were joined with or bifurcated from Damodar and flood water easily moved to Bay of Bengal through Hugli River. But drainage problem had to be acquitted when lofty embankment was made (probably around 1865) in the left bank of Damodar. Because of that, the rivers and canals which were joined with Damodar were disrupted from Damodar and not able to drain water to Damodar. For the time being the rivers and canals got silted up and collapsed the drainage system.

**(g)Construction of Dams and Barrages:**



Before construction of dams and barrages over Damodar and its tributaries, there was free flow through the river and river was capable of carrying adequate flood discharge. After construction of dams and barrages, this flood carrying capacity of the river has reduced due to siltation. Not only the downstream and up stream of the river but also the dams and barrages gets silted up and the reserve capacity of flood water has reduced. For this reason, DVC administration is forced to release water from dams and barrages.

#### **(h) Converting the River Bed in to Cultivable Land**

People of the lower Damodar area used both bank 'char' as agricultural field. Human intervention in a river is very dangerous for a river. This activity destroys the carrying capacity of river and river gets silted up. Because of that flood water not freely moved towards out fall.

#### **(i) Spilling Points and Flood Prone Areas**

Spilling points means through where flood water enters into the villages. The spilling points, identified during flood in different years are Right Embankment of Lower Damodar River from Hanidhara, under Binola Krishnabati Gram Panchayat to Betai, under Nowpara Gram Panchayat, 7 km long and Ghola, under Rampur-Dihibhursut-Asanda Gram Panchayat to Akna under Singti Gram Panchayat, Rampur Canal Left Embankment, Circuit Embankment of Mahisamuri Khal at Malik Para and Pramanik Para under Tajpur Gram Panchayat, Gaighata Khal Embankment and incomplete Dakatia Khal.

### **2.3 DAMAGE OF SOCIO-ECONOMIC RESOURCES:**

#### **Impact of flood on social environment**

Although flood is a natural or quasi natural hazard but its effects are found everywhere (i.e., physical, social, economic environment.). In the study area the social environment and social spaces like school, market, transport network etc became totally unusable due to water logging condition during the period of flood. In 2015 about 65 villages were flooded in the study area. Fourteen-gram panchayats were affected due to flooding condition. (Bhatora, GB Chitnan, Kashmoli, Khalna, Jhamtia, Jhikira, Amoragori, Thalia, BK Bati, Joypur,



Gazipur, Tajpur, Nowpara, Kushberia ). About 221250 people became helpless during the flood situation. In 2017,2019 and 2021 these area were also flooded.

### **Education system**

There is total 35 primary and 153 upper primary school are present in this block. Due to the water logging condition during flood many school premises became water logged during flood period. Students who were engaged with higher education dethatched from their institutions. Total education system of this block has been hampered during the flood period in the year 2013,2015,2017,2019 and 2021 respectively.

### **Transport**

The flooded water damaged the rural roads in the region mainly Brick Road, Concrete Road and Earthen Road. About 10% brick road,7.89% earthen road and 11.45% concrete road damaged by flood.In 2015 17.89% brick road,17.24% earthen road and 10.89% concrete road damaged. In 2017 about 255 brick road,21% earthen road and 12.45% concrete road damaged by flood. the same picture have been seen in the year 2019and 2021.In many places of Amta -II block concrete road and cemented road damaged due to the flood

### **Health service**

In Amta II CD Block had 5 health centres, 1 clinic and 1 hospital with 87 beds and 13 doctors. It had 25 family welfare centres. Due to less connectivity during flood period no health services were provided to the residents of flooded area of Amta-II. It has been noticed that about 61.79% people suffered from fever, 15.73% by skin infection, 12.35% by diarrhoea etc. About 70% people received very poor health services from the local health care centers.

### **Drinking water**

Most of villagers suffered from the crisis of drinking water. Without any filtration they had to drink water which pushed them to diarrhoea type diseases. Only 17% resident used drinking water by boiling but 83% flood affected residents used without any filtration. During flood period some pouches of drinking water were collected by the villagers from government organizations, some local clubs and N.G.O. This picture was common in the study area in 2017,2019 and 2021 respectively.

### **Problems in daily life**

Residents of Amta-II block became helpless after the flood in 2017,2019 and 2021. Different types of problems were faced by the villagers during flood period. According to the official information from block



development office of Amta-II, 24.02% resident was suffered from food, 27.93% residents from the unavailability of drinking water, 20.11% from damage of sanitation and most of people from the damage of transport route.

### **Pollution**

Huge amount of air pollution took place when the height of flood water decreased. Most of crops, orchard etc. were decomposed by the flood water. Lots of paddy, jute, some vegetables and banana, jackfruit etc. were decayed in everywhere. Water pollution was a great problem during flood. These types of pollution were a great problem during flood. These pollutions were creating different kinds of diseases.

### **Electric service**

Electricity is one of most vital service during flood period. Electric service helps people to keep safe themselves from living creatures like snake, insects etc. A perception study was held to understand the electric service during flood. Some areas which fully submerged under flood water were disconnected from electricity. But the residents of semi submerged area under flood water got moderate electric service. In study area three electric posts were fallen. For this reason, a large part of area disconnected from electricity during flood period.

### **Impacts on Economic environment**

Economic condition of the study area was inverted like the social environment during the flood period. Economic transaction was totally collapsed in the flood period. Though there were some variations among the economic loss of this area. The residents of the study area faced different problems during flood period like crop failure, collapse of houses, loss of cattle and their shelters, loss of daily usable household articles etc.

### **Loss of properties and Agricultural products**

Total value of lost agricultural crops was 756.44 lakh rupees. Total value of the damaged houses was 152.68 lakh rupees. The value of damaged the fisheries was 221 lakh rupees during the flood in Amta -II block in 2015. The value of total loss of agricultural crops and properties was rupees 1130.20 in the year 2015. In the year 2017, 2019 and 2021 the residents of Amta-II block suffered from huge economic loss for repeatedly flood situation in the respective years.



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### **Relief and Rehabilitation**

Various problems were raised after water logging condition. Some residents became homeless, suffered from the crisis of basic nutrition and various diseases. Even some people had no sufficient food for their children. Some types of relief materials distributed by Government and NGOS which were not sufficient. Some residents took shelter in primary school. Some residents left the place temporarily and went to the home of their nearest relatives. In 2015 total twenty three camps were opened in the flooded regions of Amta-II block. Total 2076 persons took shelter in the relief camp. Twenty three gruel kitchen opened in the flooded area. Total 1689 persons were rescued in the study area. 26 boats were developed for evacuation. Total 6 medical teams were opened for the treatment of flood affected persons. Total 4 cattle camps opened where about 12514 animals were vaccinated and treated. Various relief measures were taken like 8661 pieces tarpaulin, 11400kg chira, 3570 kg Gur, 30 carton baby food, 41000 pouch water, 310 quintal rice, 260 bags fodder was distributed in the different flood affected region of the study area. Besides relief measures were taken through different N.G.O organization, Ramakrishna Mission, NSS Units of some colleges etc. These type of relief measures were taken in the years 2017, 2019 and 2021 respectively. But the relief materials were not sufficient for the flood affected family in the study area.

### **Recommendations**

The impacts of flood can be minimized by man's technological skill, better warning systems and various measures adopted by the government. Some measures which can be taken by man to reduce the impact of flood-

1. Flood forecasting news should be announced at least before twenty-four hours so that the residents can leave the place with valuable properties.
2. Permanent brick built rescue camp should be constructed to protect the flood affected people in future.
3. A good integration is needed among the local people, Government and NGO. So that the flood affected people can receive some basic needs like dry food, drinking water, first aid treatment etc.



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4. The depth of river valley should increase by digging of sedimentary deposition.
5. Mud built homes should be replaced to brick-built homes of the study area immediately.

### **Conclusion**

Amta-II block is situated in lower Damodar basin. As it is an agricultural land, most of villagers are depended on cultivation. Here the agricultural system is subsidence in nature. Every year agricultural crops of monsoon and post monsoon season are damaged due to flood. As a result, maximum farmer's family and villagers face huge economical loss every flood affected year. Proper management of embankment of Damodar River, digging of sediment in river channel to increase the depth of river, fully relief system for flood affected people, financial help from government and NGOs for the flood affected people of this village are needed. As the maximum people of the study area are poor, they wait for the relief materials like food and cloths during flood period. So adequate relief materials should be arranged and distributed properly to reduce the painful life of the helpless residents of the study area during flood period.

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