
FLOOD HAZARDS AND ITS EFFECT ON ARAMBAGH SUBDIVISION OF HUGLI DISTRICT, WESTBENGAL

Pompa MONDAL**Assistant Teacher of Bansdroni Chakdah Vidyamandir (H.S)****Abstract**

A flood is an overflow of an expanse of water that submerges land. The EU(European Union) Floods directive defines a flood as a temporary covering by water of land not normally covered by water. Flood is a natural hazard resulting from extreme geophysical events to create an unexpected threat to human life and property. One of the most common hazards of West Bengal (from South to North) is flood. One of the important flooded region of West Bengal is the Western part of Hugli district mainly Arambagh subdivision consist of six C.D blocks is flooded by mainly three namely Damodar, Darakeswar and Mundeswari. This region has to face almost every year in varying degrees. Traditionally, Damodar basin was known to be a curse. The basin of river Damodar has a very special shape and this influences its flood pattern. Many reasons are there like the short period massive rainfall, decrease of river width, Massive downpour, sudden release of water from upper catchment river's barrage (D.V.C, Mithon, Panchet, Kansabati), Poor natural drainage or siltation, limited flood storage capacity of dams etc. in this study area .The study describes the an efficient & scientific approach with suitable illustrations of map and real time flood inundations. This study area has been also selected as a case study to assess the environmental impact of flood in terms of physical and socio economical. An attempt has also been made to suggest some measures for the development of the study area.

INTRODUCTION: Flood is undoubtedly the most dreadful natural calamity in the state of West Bengal. It has been estimated that 42.43 percent of the total area of the West Bengal is flood prone area. Arambagh subdivision of Hugli district ,West Bengal faces severe flood every year by its three main rivers namely Damodar, Dwarkeswar and Mundeswari which can destroy the total environmental setup of this area. Many reasons are there mainly short period massive rainfall, decrease of river width, Massive downpour, sudden release of water from upper catchment river's barrage, Poor natural drainage or siltation etc. which causes submerge of land, shifting and widening of river channel, river bank erosion resulting in the loss of fertile top soil has severe consequences on the lives and livelihoods of people residing in the adjoining areas. The negative consequences can be lessened by an integrated approach to disaster management. Disaster management includes 4 elements such as: mitigation, preparedness, response and recovery. Different type of physical and climatic condition of the study area must be analyzed to build a good proposal of reducing flood.

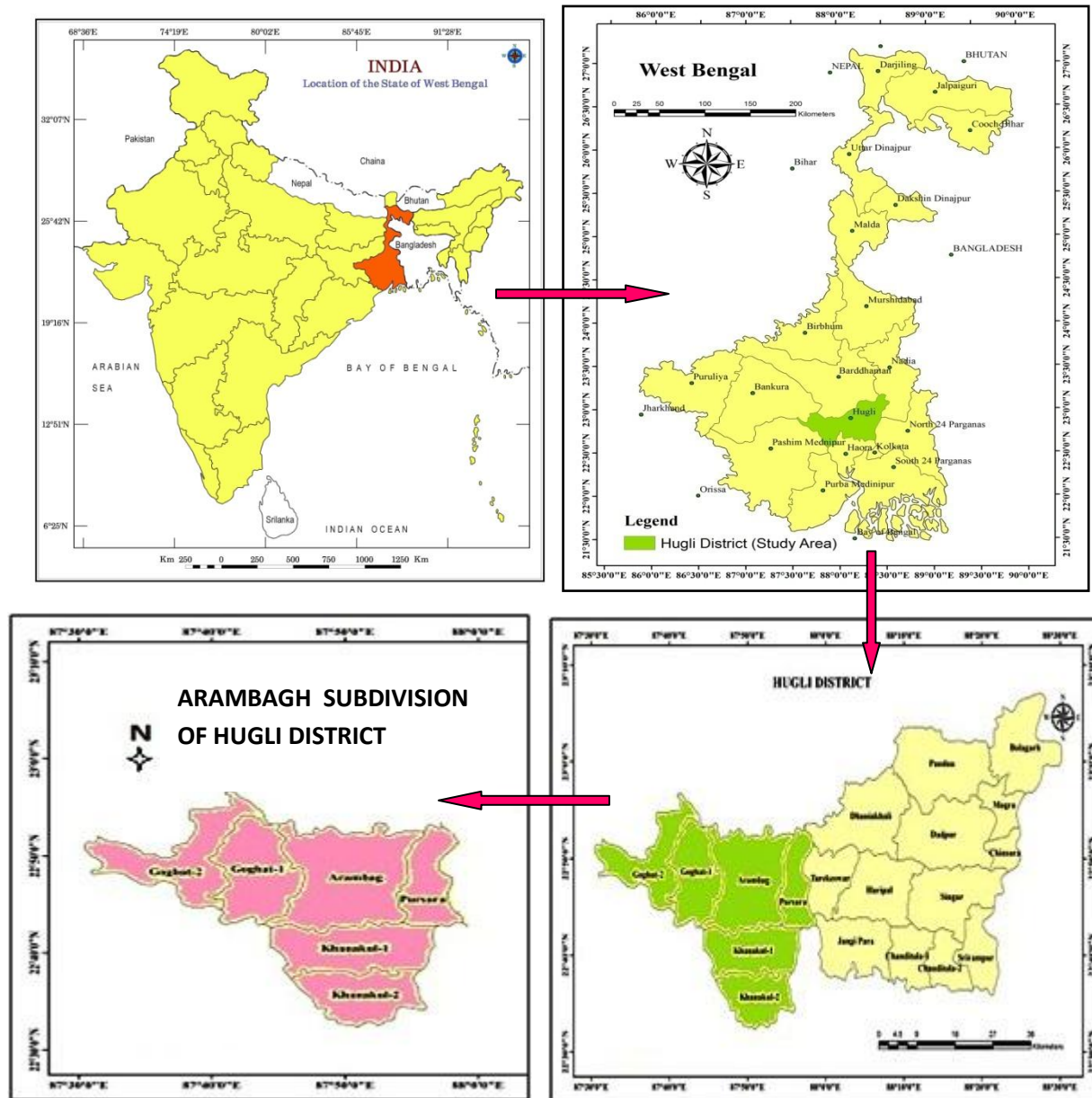
STUDY AREA: The study area is situated in the western part of Hugli district and having common borders with district of Burdwan, Bankura, Howrah, and Paschim Medinipur. It lies between 22^o36'30" to 23^o02'46" N latitude and 87^o30'20" E to 87^o58'07" E longitude. This subdivision consist of six C.D blocks (Goghat 1, Goghat 2, Arambagh, Pursura, Kanakul 1, and Khanakul II) and one municipality (Arambagh). Total geographical area of this study area is

1068.80 sq.km. It is separated from rest of the district by the river Damodar. This subdivision of Hugli district was formed in 1879 and 1900 its name was changed from Jahanabad to Arambagh. It has 63

Gram Panchayats and has a population according to the 2011 census; of 1198427 persons with the density of 1121 / sq. km.

Geologically, its Western part is made up of red soil and is relatively higher than rest area, Khanakul and Pursura consisting of alluvial plains. Generally the study area is a plain land. Slope of this area from North to South. The study area has an average elevation of 15.4 meters in Arambagh to 3.8 meters in Khanakul above mean sea level.

LOCATION MAP:



METHODOLOGY:

This study involves selected systematic steps for accomplishing the objectives of the study. This study has been done following by three methods, involving different interrelated methods for bringing out the major findings.

1. Pre-field study: This step includes collections of data, map, information, related books, publications etc. from different organization like survey of India, GSI, Meteorological office, 2011 Census handbook of hugli district to analyze the flood condition of the study area. Questionnaires prepared for data collection.

2. Field study: Based on pre-field study a field survey was made on this topic.

3. Post-field study: The real task of proving hypothesis and fulfilling the objectives is established here. On the basis of map and collected data tabulation, calculation, processing, analysis, hypotheses testing and presentation carried out in this step. Statistical techniques by modern computerized methods were applied as a process of analysis, interpretation, and presentation.

OBJECTIVE OF THE STUDY:

The main objectives of this study are

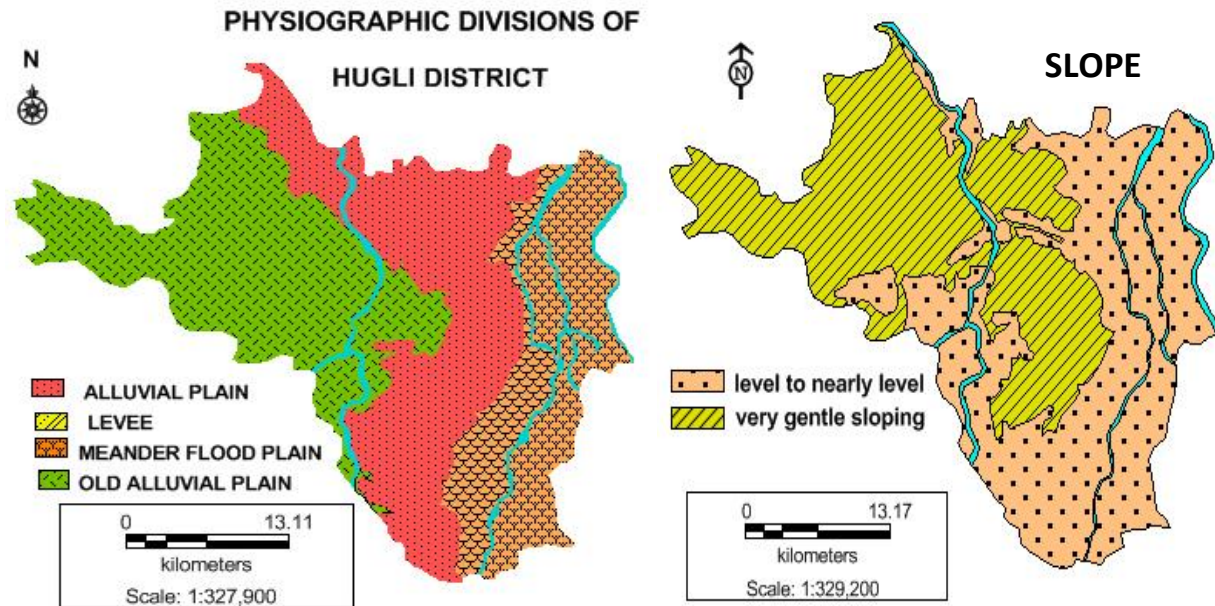
- To analyze the role of physical factors influencing flood in the study area.
- To identify the flood zone and to find out the flood intensity.
- To find out and examine the physical and socio economic problems related to flood in the study area.
- Flood damage assessment to find an overview on the scale of effect of the flood of this area.
- To propose some suitable real time action plan to mitigate and control the flood of the study area.

PHYSICAL ELEMENTS INFLUENCING FLOOD OF THE STUDY AREA:**GEOLOGICAL CONDITION:**

Geologically, western part is made up of red soil and relatively higher than rest area, which is consisting of alluvial plains. The entire district is built up with mixed alluvium. The study means Vindhyan alluvium developed by the Damodar are loamy, permeable and easily friable.

PHYSIOGRAPHY:

The district forms a part of Bengal basin developed by the riverine deposits of Ganga and its tributaries. The Arambagh subdivision of Hugli district formed by the river Damodar, Darakeswar, Mundeswari, Rupnarayan with their tributaries have a gradual descent from north-west to south and south east almost parallel to each other following the natural trend of the landscape. Western part of the study area is old alluvial plain, then alluvial plain, after that the meander flood plain.

**SLOPE:**

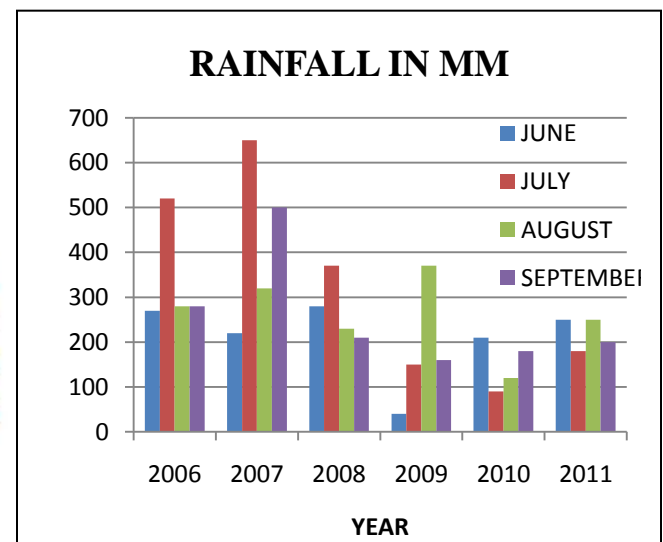
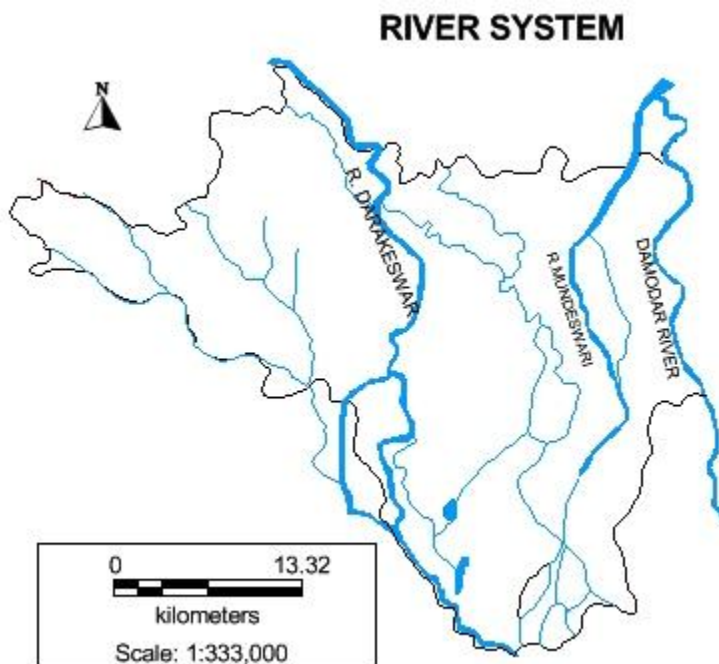
Slope of a land is an important parameter which influences the direction, velocity, erosion and depositional activity of river, water retention and infiltration etc. In one sentence it is says that slope of a land is the important influencing factor of flood. Nearly level (0-1%) and very gentle sloping (1-3%) land are the two slope classes identified in the study area. North west and middle part of the area is under very gentle sloping, rest of the part is nearly level.

DRAINAGE:

The drainage pattern is dendritic in general. The river Damodar, the Mundeswari, the Darakeswar and the Rupnarayan are the principal rivers of this sub-division most of which have been silted beyond their water carrying capacity causing devastating floods in the study area. The released water of DVC causes flood in Damodar, Rupnarayan and Mundeswari rivers and the released water of Kansabati river (Tenughat Dam) causes flood in Darakeswar river. Several canals like Harhara, Rampur, Tarajuli, Kana-Darakeswar, Harinkhali, Singerkhal flow through low lying areas and also causes severe flood at times.

Sl. No.	Name of the river	Name of the gauge Station	Zero level	Danger Level
1.	Darakeswar	Arambagh	37.50 Ft. (11.43m)	56.49 Ft. (17.52m)
2.	Darakeswar	Shaikpur	7.00 m	11 .37m(G.T.S)
3.	Mundeswari	Harinkhola	4.00 m (G.T.S)	12.80 m (G.T.S)
4.	Damodar	Champadnaga	8.775 m (G.T.S)	12.89 m

This guage station is maintained by Kolkata Port Trust.



CLIMATE:

As the position of Tropic of Cancer near this study area the climatic condition is 'hot & humid'. Generally, the summer continues during April, May and June and sees frequent thunder storm with rain at afternoon due to locally created low pressure on the Bay of Bengal. Average temperature in summer season is 33°C. The monsoon enters this area at the end of June. About 90% of total rainfall occurs during June to October. The average annual rainfall of this area is 1300mm. The winter is short starting from end of November to mid February. The average temperature in winter season is 15°C. Usually, there is no rain during winter. The figure 05 shows the average temperature of the study area in different year (2008, 2009, 2010, 2011 & 2012). It shows the variation of temperature in different month of the year.

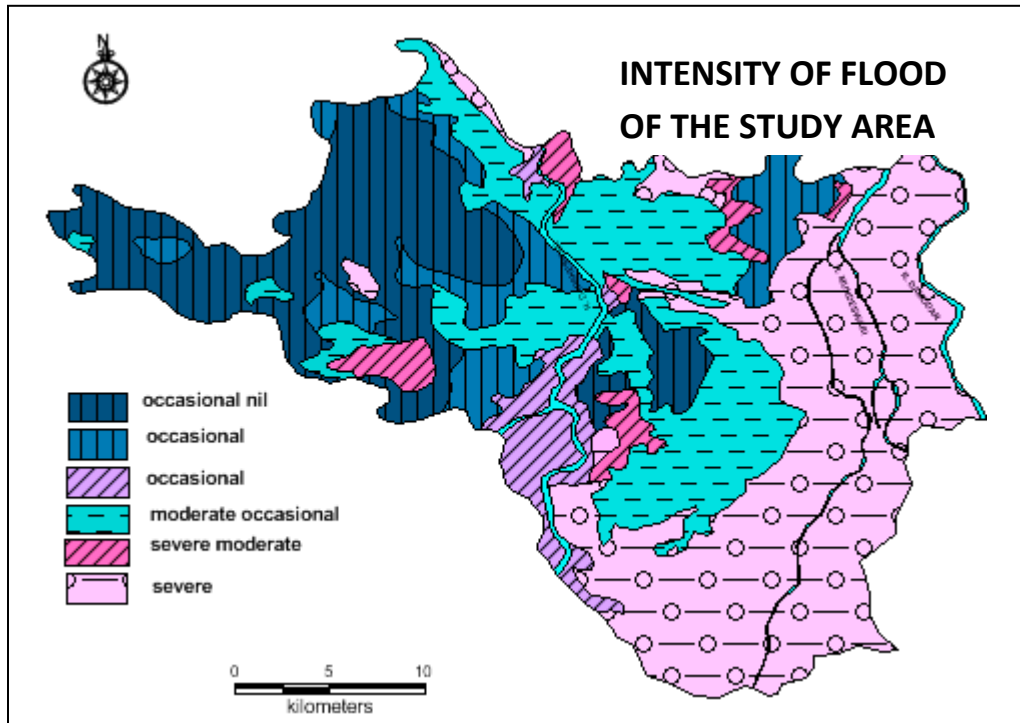
SOIL DRAINAGE:

Soil texture, landscape position and the depth of ground water table directly influence the entire drainage system is controlled by stream, rivers, canals and other drainage channels. The soils of Hugli district four drainage classes viz. poorly drained, imperfectly drained, moderately well drained and well drained. The study area mainly covered by moderately well drained. Well drained and imperfectly drained soil equally formed in the Arambagh subdivision.

The study area is covered by alluvial soil both newer and older. The older type of alluvial soil shows in western part of this subdivision, rest of the part is covered by newer alluvial soil formed by the main rivers in this area. Average thickness of the soil is 1-2m include sandy, silty, clayey and mixed loam of which the clayey to mixed loams are very common.

INTENSITY OF FLOOD:

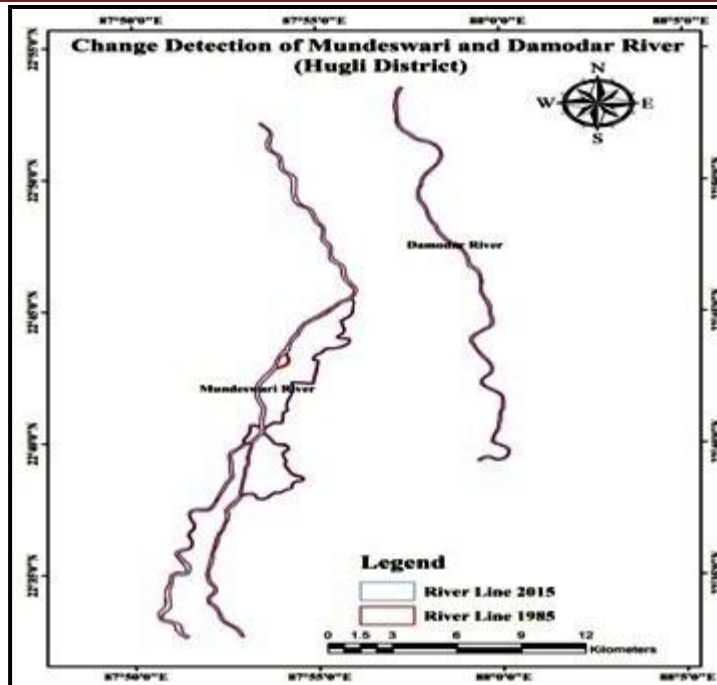
<u>Name of the Sub Division</u>	<u>Name of the Block</u>	<u>Name of the Affected Areas</u>
	Khanakul-I Block	Entire Area
	Khanakul-II Block	Entire Area
	Pursurah Block	Entire Area
Arambagh Sub-Division	Arambagh Block	Harinkhola, Arandi, Mayapur, Baternal, Mahadevpur, Malayapur G.P and part of Tirtol G.P.
	Goghat - I Block	Bali, Sheora, Nakunda, Dhadur, Kunusa G.P & part of Goghat G.P
	Goghat - II Block	Hazirpur, Mandaria, Kumaganj G.P sand part of Kamarpukur G.P.



IMPACT OF FLOOD ON THE STUDY AREA:

A. Physical:

Channel shifting: shifting nature of river shows almost in all over the world. In this study area main rivers like Damodar, Mundeswari, Darakeswar, Rupnarayan are not exceptional in this tradition. From the satellite imagery it shows that the main flow of the Damodar was restricted to the present Kana Darakeswar channel taking of bellow Selimbad and meeting the river hugli at Uluberia. The river Mundeswari shifted easterly due to back pressure of tidal flood. It also shifted westerly in Khanakul I block. Darakeswar river has changed its course towards east in Khanakul I and Khanakul II block.



Valley widening:

Valley widening is mainly form by lateral erosion of river. The groves of the flood plain of the river Damodar, Mundeswari, Darakeswar etc. are located within the channel bed but the groves were developed on the river banks. This is the main evidences of valley widening in the study area. It shows that so many plot numbers on the both side of this rivers which are plotted in the cadastral maps of the study area actually not shows in the same position.

Submergence of land:

This is the one of important problem of flood hazards. Most of area of the Arambagh subdivision including Arambagh municipality submerged due to inundation every year. For this reason agriculture base study area specially paddy cultivation damage largely.

Sandy splay:

Due to breaching of embankment thick layer of sand developed on river astride areas. For this reason fertile alluvial land converted into sandy land. Along the both side of Mundeswari and Darakeswar river particularly downstream of Champadanga and Arambagh respectively.

B. Socio economic:

Health:

Flood is the cause of water pollution. So, water based diseases like hepatitis, diarrhea, cholera, typhoid, stomach problem etc. are hampering the health of people in the study area. Lack of clean water and

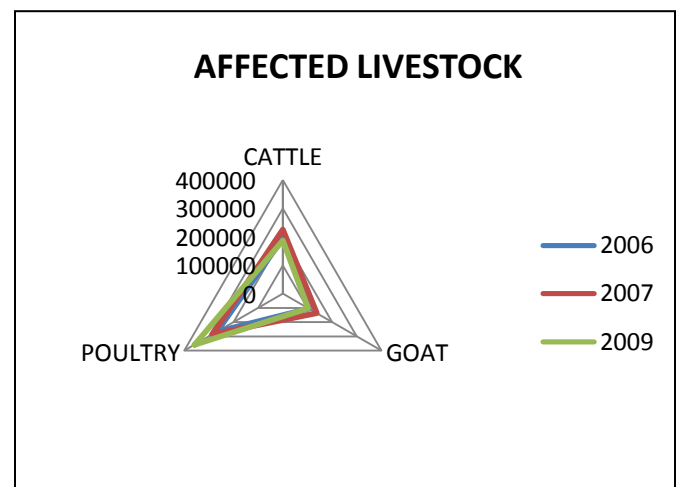
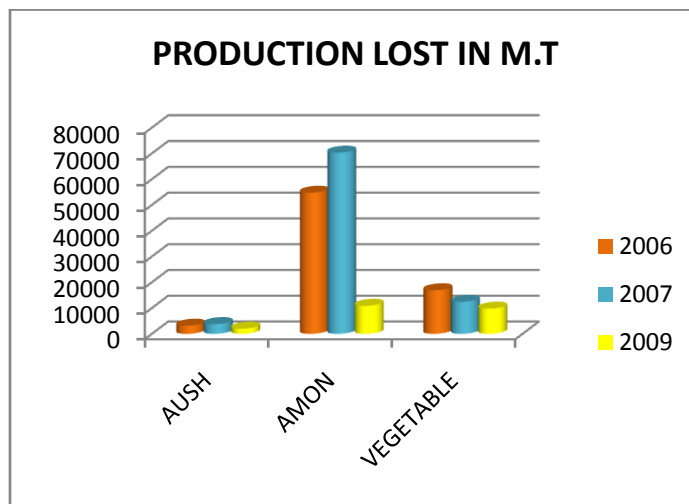
poor sanitation are the main causes of these diseases. Indirectly flood creates malaria, dengue, snake bite etc. due to stagnant of water. But number of hospital, health centers is too low. Most of these are submerged under flood water and consequently the apparatus medicines and other necessary goods are destroyed.

Livestock:

Main source of income of many families in the study area is livestock farming like goat, cattle, poultry, duck etc. In the flood period most of the domestic animals can't protect securely because they can be carried away with flooded water. Many domestic animals submerged by clay made walls of the houses when these are broken down.

Agriculture:

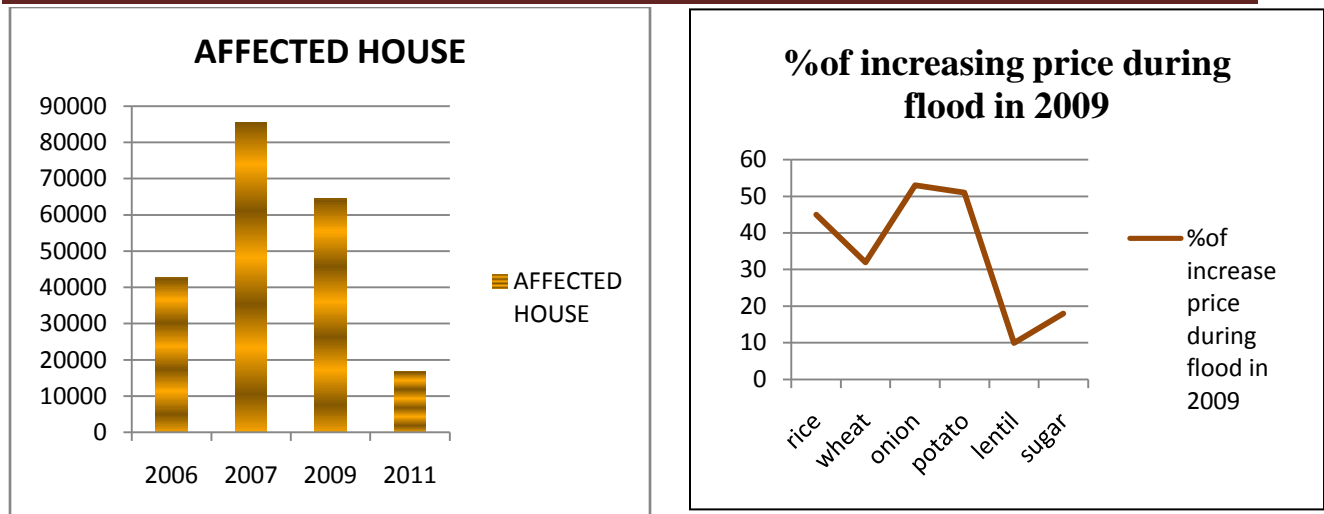
Study area is mainly agriculture based which is the source of income of most of the families. But every year the severe flood hazard totally damaged this cultivation specially Amon paddy cultivation because the season of this paddy cultivation and occurrence of flood in the study area coincide to each other. The magnitude and extension of damage crops vary temporally and spatially.



Settlement:

Major portion of the study is rural area and the main material of roof and wall are mud, clay, bamboo, wood etc. So, the houses are basically cachaa and damage easily by flood. Sometimes,

The house buildings are totally damaged and dwellers are bound to shift. Neighbor school buildings play an active role for sheltering the flood affected people.



Education:

School buildings are the main shelter of the people during and after the flood for certain period in the study area. But sometimes school buildings have been submerged under the water during the flood period. So, during and after the flood period for reconstruction of their buildings the educational institutions remain closed. For this reason no educational activities was done in these institutions.

Market situation:

After flood hazard prices of daily use goods increase tremendously. These goods are mainly rice, potato, onion, wheat etc. So, the people of the study area face a terrible economic condition during and after the flood. In contrast price of perishable food items such as banana and vegetables have fallen sharply in the blocks Pursurah, Khanakul I, and Khanakul II.

Some measures for flood mitigation and management:

- A close network of canals mitigates flood problem to a great extent as flood water flowing in the river can be distributed to different canals. Canal work as temporary reservoir & contains the flood water which moves downward. In this way it helps mitigating the effect of flood.
- Channel improvement will be most important process to mitigate the flood. It is done by deepening, widening and cleaning out of vegetation and debris from the river channel these change in the river channel increase the flood conveyance capacity of the river.
- River bank erosion resulting in the loss of fertile top soil has severe consequences on the lives and livelihoods of people residing in the adjoining areas. Channel improvement is supplemented by bank stabilization by constructing ripraps, planting deep root trees, on embankment. Vetiver plantation is a most important process to protect bank erosion.

- Another method is construction of dyke in the river bank. It reduces pressure from river bank and chance of erosion.
- By taking some legal step to protect the illegal practices like brick kiln industry, rice mill, cultivation on bank side etc. flood can be solve in the study area.
- Enhancement of carrying capacity and reduction of siltation of the Tilaya, konar, mithon, panchet etc. improve the flooding condition in the study area.

CONCLUSION:

In rainy season, heavy discharge of water from Durgapur, Maithon, Tenughat, Kansabati barrages overflows the rivers and causes breach of its embankments. Out of 63 gram panchayets of this subdivision more or less 53 gram panchayets and Arambagh Municipality itself are affected by inundation, embankment erosion or heavy flood. It is regular feature of the study area every year. The different departments specially Irrigation and Waterways, PWD, Health, ARD, Agriculture, Civil Defence, WBSedcl, Food and Supplies, district MGNREGACell should be work in unison to protect the flood hazard in the study area.

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