Chapter 4

Nature and Perception of Floods in Sundarban

4.1. Introduction
It is important to explore the past and present of a society to understand the risk of disaster. Peoples’ perceptions about the disaster help to follow the right strategies and efforts to manage it. Perceptions are important body of ideas and knowledge which highlights human behaviour in certain phenomenon (Hilhorst and Bankoff 2006:5). ‘People’s perception has three different social domain of knowledge that corresponds to science, governance, or local customs’ (ibid:5).

The perceptions (i.e., individual and collective) and attitude towards disaster risk vary with context (Cardona 2006:44; Flint and Luloff 2005:400). It also changes with location, distance from the river, and the livelihood activities of people. The perception of risk due to disaster is very complex, sometimes imaginary and sometimes real. The risk perceptions of people about disaster in Sundarban are seen as real because the people, as part of their everyday real life, have been dealing with the floods over generations. As the perceptions change with socio-economic background, the efforts and strategies of people also change. The rapid changes in coastal areas and on river banks also change peoples’ perception about disaster. Often, they cannot trust the efforts taken to stop the impact of disaster (Cardona 2006:48). This chapter explores the different perceptions of floods along the river and near to seashore in Sundarban. These perceptions connect the past and present in order to manage the flood.

4.2. Floods during the Colonial Period
As per the Embankment Act-1882\textsuperscript{21}, zamindars (landlords) were responsible for managing the embankments. They had to construct refugee houses for workers and farmers from the mainland,

\textsuperscript{21} Embankment Act-1882: The Bengal Act VI of 1873, Schedule I&II make mentioned about the construction of embankment and water courses in the Presidency of Fort William of Bengal. The Bengal Embankment Act is the extended version of Bengal Act VI. The Act is modified and included embankments of Sundarban region in 1915. ‘….the Sundarban as defined under the provision of Caluse2, Section 13, Regulation III of 1828, and were replaced by the Bengal Embankment (Sundarbans) Act, 1915, (Beng. Act IV of 1915), S.3(2), and are omitted.’ (The Bengal Embankment Act 1882, 1930).
which were converted into flood houses\(^{22}\) after abolition of the landlord system. The zamindars constructed big ponds to supply fresh water which is locally called as Tank Pukur (big pond). The shores of these ponds are higher than embankments which save fresh water storage from floods and hence work as a lifesaver during the floods. The reclamation started from the western side of Sundarban and therefore most of the Tank Pukurs are found in western part of Sundarban islands. Ghoramara is one of the oldest reclaimed islands in Sundarban. People started settling in this island in the late 18\(^{th}\) century and it increased after the destructive flood in South Bengal in 1942. There are many elderly people in Sundarban who saw the flood of 1942 with their parents. Flood is a chronic phenomenon in this region which has been experienced it over generations.

Reclamation started after the Permanent Settlement Act 1793 and rich Bengali businessmen from Calcutta and other districts took the lease for reclaiming the land. There was hierarchy among the landlords who engaged in reclaim of the forest and collected taxes from the settled farmers. Reclamation started from riverside which was at about 100 mtrs. distance from the river bank. There was landlord who controlled the entire island and there were also landlords who controlled the Gheris\(^{23}\) within the island. The landlords who owned 5000 to 10,000 bigha\(^{24}\) of land were called as Latdar. These Gheri landlords were called as ‘Chakdar’ who had about 500-1000 bigha of land within a Latdari. The Chakdars had to pay certain amount of tax to the Latdar. The Chakdar were mainly responsible for looking after the embankment to save their own farmers, but they did not construct any refugee house or Tank Pukur. As the Latdar were only interested in collecting tax without any investment, they hardly spent any money for flood houses or flood reduction. It is also found that Latdars requested the British Government to withdraw compulsory rule for constructing flood houses and ponds in their Lats. It is also observed that Latdari refugee houses on Tank Pukurs are not present in the eastern part of Sundarban. It was after 1953 (i.e., after abolition of Landlord system), that the Irrigation and Waterways Department (I&W) of the state government of West Bengal took the charge of looking after embankments in Sundarban. Historically, flood was a common phenomenon in this region, so breaching of embankment and floods during the post-landlord system era became an important factor for disturbing the ongoing development process.

\(^{22}\) Flood houses are the temporary government shelter utilized during emergency.

\(^{23}\) Gheri is the smallest geographical unit in landlord system in Sundarban.

\(^{24}\) Bigha is is a unit of measurement of area of a land which is used in India, Bangladesh and Nepal.
4.3. Different Types Floods and Responses

Flood is known as *Bonya* or *Plaban* in the local language. Flood in Sundarban region comes under the broader category of coastal flooding, but the definition of ‘flood’ does not match with ‘flood disaster’ as it happens in Sundarban region. Sometimes it covers a very small area and very few families close to embankments are affected by the saline water inundation. It also happens that saline water can not cross the walking roads parallel to embankments within the village. Sometimes, it affects only few bighas of agricultural land or resources close to the breached embankment. Though breaching embankment cause major floods; bad drainage, broken lock-gate or sluice gate system, and crab holes at the embankment also causes saline water inundation in the hamlets close to embankments. The amount of destruction due to saline water inundation is small, but the conditions of the affected families are not different from the impacts of major flood disasters. In 54 islands of Sundarban, floods of smaller scale take place every year. Villagers usually do not remember these floods, but the major devastating catastrophes are not forgotten because of the huge loses and destruction involved. The small floods create problems for small numbers of families, which is not even covered by the Gram Panchayat Office or the local media.

Villagers remember the years of the small floods based on the age of their children at the time of the flood or based on certain family related milestone event that occurred at the time of the flood or in the year of small flood. These milestone events include their wedding, or the death of a close relative, or the loss of agricultural land, or loss of valuable resources, the win or loss the political party in local elections. Sometimes villagers can not remember the year of the floods, but they remember the event that took place. People across different age groups forget the year of small floods which often get overlapped in their memory by the similar types or more destructive one. Losing their house is severely destructive to villagers and they can not forget the incident.

Villagers above the age of seventy cannot forget the flood of Bengali year of 1349 (1942 AD) which was considered as the most destructive flood in South Bengal in the last century. These elderly villagers only consider the flood of 1942 as the flood and remaining small floods as

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25 Flood: Flood is defined as a temporary condition of surface water (river, lake, sea), in which the water level and/or discharge exceeds a certain value, thereby escaping from its normal confines. However, this does not necessarily result in flooding. Flooding is defined as the overflowing or failing of the normal confines of e.g., a river, stream, lake, sea or accumulation of water as a result of heavy precipitation through lack or exceeding of the discharge capacity of drains, both affecting areas which are normally not submerged (Douben 2006).
Jalochas (overflow of river water). Drabek and Boggs (1968) argue that the disaster related ‘behaviour is largely a reflection of the day-to-day and pre-disaster interaction’. People perceive the risk of flood incident from their prior experience (Drabek and Boggs 1968). It was found that all types of floods do not have negative impact on the people, so the small incidents are not considered as floods by many people in Sundarban. The local government also did not officially record the loss of small floods in the village.

Though there are other factors causing floods in Sundarban, breaching of embankment and long delay in the repair work causes disaster. Delaying repair work on damaged embankment increases the area affected by every high tide. Therefore, the flood may happen for a very short time (i.e., less than one day) as well as for long period which may continue for more than one year. The effect of floods on the villagers depends on the distance of their houses from the embankment, loss of houses or agricultural land and shifting of their houses to safer places. Breaching of embankment does not always create flood or destruction in all villages and hamlets on the island. Therefore, flood does not become a disaster for all people who live in the affected hamlets. There were few incidents of extensive breaching of embankment which destroyed most part of the Sundarban region. Such incidents occur at the time of cyclones or other severe natural hazards (for example, less rainfall in post Aila situation in 2009 or storm immediate after the breaching embankment).

Monsoon is the most vulnerable season for breaching of embankment. Most incidents of the flood happen during the months of mid Shrabon (August) to Kali Pujo Kotal26 (October) as per the

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26 Kotal or Bhara Kotal: The diurnal rise and fall of sea level is a continuous phenomenon in the coastal area. It happens due to gravitational force of the sun, moon and rotating earth. The continuous rise sea level is called as high tide and fall of sea level is called as low tide. In Bengali, the high tides are called as Jowar and low tides are called as Bhanta. The experience of rising and fall of sea level differs place to place. Some of the coastline experience semi-diurnal tides (i.e., two almost equal high tides and two low tides in a day) or diurnal tides (i.e., one high tide and one low tide in a day) or mixed tides (i.e., uneven one or two high tides and low tides). The height of the average height of the high tide often changes during the cyclone in the coastal area.

The sundarban region experience the semi-diurnal tides. The height of the tides change in every day and it becomes highest or lowest in every two weeks cycle in a month. When the sun, moon and earth are in a condition of syzygy during the full moon and new moon, the height of the sea level becomes maximum. The tides are called as spring tides. In Bengali, Spring tides are called Bhara Kotal or Kotal. The height of the tidal level in Sundarban becomes higher during the first moon (Pratipad Tithi) to third moon (Tritya Tithi). As the Sundarban has many rivers, the tidal water does not return to sea during small duration between low tides and high tides. As a result, the height of the tide level becomes increased till third moon.

The height of the sea level becomes lower during every two weeks when moon is at third quarter and location of the sun and moon is at 90° from the earth. As a result, tides do not become higher and it is called as Neap Tides or in Bengali Mora Kotal.
Bengali calendar. The tidal waves become higher due to heavy water from up-stream of the Ganga river and its tributaries. As a result, increased tidal waves on the day of the first moon become very high which creates problems for embankments. The most destructive Kotal during the month of September to late October are locally known as Sanra-Sanri Kotal.

Many incidences of floods during the summer and winter seasons are mainly caused due to cyclone (please refer to appendix Table1). Flood could also occur during the Mora Kotal. Though incidences of flood are very common during the August to September, the destruction is not so much, as it happens during the April-May. This is because the salinity of the tide water is less than during the dry season (i.e., April to May). During the summer season, stagnant saline water dries and becomes more salty which poses health hazards in the flood-affected areas. Though there are debates and disagreement on which flood affects more, floods in both seasons are equally destructive in their own ways.

The Bhole system is important in every island, as it controls the drainage system. It works as an alternative to sluice gate. The non-functionality of sluice gate or Bhole often leads to encroachment of flood in the interior parts of the island, as it is connected to canal or drainage channel to drain the water from interior part of the village or island. When the uncontrolled tide water enters through the sluice gate or Bhole into the drain/canal, it causes flood in interior part of the island too.

The small channels, which drain sewage water into the river had been encroached for development of road and creation of cultivable land. Some of these drainage channels or canal were dug by landlord which have been encroached by people after the abolition of the landlord system. There are drainage channels which have been converted into ponds by the villagers and there is also dispute among the villagers to capture those channels. As a result, all these encroachments do not provide adequate channels passage to drain the Dhoyani Jaal (drain out extra salt content by rainwater) into the river. Most of these old drainage channels become flat and cannot drain sufficient water after floods. On the other hand, private land will have to be acquired by Irrigation and Waterways department if new drainage channels are to be made. Hence people resist digging

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27 Mora Kotal: See Kotal or Bhara Kotal

28 Dhoyani Jaal: Natural process of drain out of surplus salt content into the soil by rainwater.
of new channels. Sometimes, the geographical location of a village is also not suitable to build the temporary sluice gate. Villagers take the risk to drain the water by making Katan (making crevices on embankment), but it is difficult to find a person or group of people to look after those crevices. The families close to the embankment look after the crevices and blame each other. The existing inland drainage problem becomes severe during the major sea surge and post flood situation.

The broken or damaged sluice gates and damaged drainage channels causes flood during every full moon and new moon. The broken sluice gates and Bholes cannot stop high tide saline water which enters into the drainage channel and overflow on both sides. As a result, interior parts of the villages faces flood, which has more disastrous effect than floods close to the embankment.

Though floods could happen anytime during a day or night, villagers experienced more day time flood than at night. Villagers found that the height of daytime high tide is higher than at night and it is highest during the month of mid August to mid October. Sometimes, it has also happened that villagers close to embankment got up at night to find themselves engulfed by saline water. Most of the breaching of embankment takes place during the spring tide, but the first moon day to third moon day is most vulnerable period to destruction, as the height of high tide during the first moon is higher than full moon and new moon. In most of the cases, Purnima Kotal (spring tides during full moon) are stronger than Amabashya Kotal (spring tide during new moon). The situation becomes normal after the fourth moon (Chauthi Tithi) day and it is locally called as ‘Chauthir Jaal Jai Ulti’ which means tide water started decreasing after the fourth moon day.

There are walking roads parallel to the embankment, which strict coverage of the saline water inundation after breaching of embankment. As the height of the walking road is directly linked to protection of the village from floods, villagers increase height to the walking road during the floods. Sometimes villagers from chronic flood-affected hamlet cut the walking road as a result flood affect new areas.

4.4. Discussion
It is said that flood happens mainly during the monsoon season, but in reality, it does not have any specific season and time. If the embankment is unable to stop the strong tidal waves anytime during the year, it breaches the embankment and creates floods. Breaching embankment causes major flood destruction. Broken sluice gate system, crevices, crab holes in embankment also cause saline water floods at any time during the high tide. For hamlets without any protection of embankment
for long periods floods become a painful experience for four hours every day and at every night. Though villagers are aware about the flood season during the month of August to October, they cannot stop the overflow of tide water from river or drainage channel because of unavailability of adequate materials like gunny bags, which also causes floods in non-affected area. Therefore, floods in Sundarban may occur at any time and any season and cause disaster. The floods in Sundarban are not only because of destruction of the embankment or overflow of tidal waves during high tides; bad drainage system is also equally responsible for causing floods. The nature of disaster varies from place to place and it depends on the factors responsible for causing flood. The destructive nature of flood also varies in different season but the impact of flood in any place and in any season is almost the same. People have severe bad experiences with major floods, as a result, they do not view the small incidences of flood as a disaster.