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Probable flood analysis at Ghatal subdivision Paschim Medinipur: West Bengal

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Abstract :- Probable flood frequency analysis is widely used for flood estimation. Its particular advantages are that it is used in areas with a sparse data network and flow records, and that it provides a means by which flood estimates are made at gauge sites. Ghatal subdivision situated in the lower reach of river Shilabati, the annual floods of 40 years have shown that the frequency distribution of 2, 5, 10, 25 50,100year floods have been worked out by these probability methods. The methods reveal that at 25 years' recurrence interval flood discharge will be 1202.87cumec at 50 years, flood peak will be 1250.88cumec and at 100 years, recurrence peak flood in this area may be 1298.90cumec. Probable flood magnitudes are almost same from which probable losses in future are predicted. The predicted value of flood magnitude is said that after 5, 10, 25, 50, and 100 years, this area will be severely affected by flood occurrence. So floodplain users may be coped to predicted losses in future. Mainly two types of adaptation activities are identified through their participatory and sensitive situational analyses. One is autonomous and another one is planned.

Introduction :- Human societies is mainly affected by two extremes particular climate hazards such as droughts and floods. Flood hazards are extreme cumulative weather events causing harm and damage to people, property, infrastructure and land uses due to change in average weather conditions **(www.Care.org, 2008).** Magnitude of rainfall also bring changes in the frequency and intensity of these extremes. Floodplain dwellers are more vulnerable in these type of hazards because they have no always greater adapting capacity to manage the risks **(Bharucha, 2005).** Some of the hydrological variables (rainfall, gauge height and discharge etc.) are so empirically related that some of the standard statistical analyses are quite useful to establish their distribution and relationship **(Charlton, 2008).** Flood does not affect all dwellers within a community or same household because some of them have greater adaptive capacities than others **(www.floodsmart.gov).** Dwellers are more sensitive and strive to reduce disaster risks by using both local and knowledgeable decisions in pre-hazard, during hazard and post hazard period. Ghatal subdivision is largely prone to devastating natural floods on a regular interval because of its shape, geophysical condition and geographical location is experiencing with riverine floods mainly by the river Shilabati and its tributaries. This area is linked also river Kangsabati to the south and Dwarakeswar to the east. Flood discharge are recorded at three gauging stations Banka, Gadghat near Ghatal, and Bandar in this area. The area has an average elevation of 5 meters (16 feet). During monsoon period, water contributions from the river Dwarakeswar, Kangsabati and the Shilabati concentrates in this low land and create flood. Heavy to very heavy rainfall associated with average 5-6 days cyclonic storms and depressions appears during the monsoon season in this area. The flood of 1978 inundated the greater portion of the low-lying lands in the area due to abnormal rainfall. The inundation was more extensive and loss of life and properties are very high **(Flood Monograph, 2007).** It is important to analyse the nature of discharge along the main channel for understanding the potentiality of flood. The frequency analysis of hydrologic data is to relate the magnitude of extreme events to their frequency of occurrence through the use of probability distribution ((**Dalyrymple, 1960; Dury, 2000**). Significance of the geo-morphological effectiveness of a particular flood event is dependent on the magnitude or size of that flood. Great magnitude correlates with low frequency while small magnitude correlates with high

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Fig-2: House damaged by

Fig-3: Road affected by flood

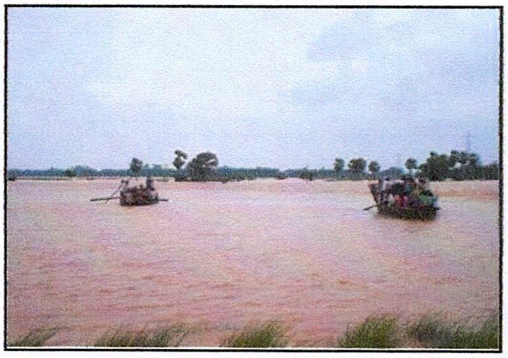

Fig-:4: Cropping Land affected by flood

Fig: 5: Institutional Centre affected by flood

It is extended on the lateritic flats up to the village Shimulia at Garbeta block1 of Paschim Medinipur, where the river has divided into two channels, then it follows alluvial low land up to Bandar of Ghatal. The subdivision extends between $22^0$30'30"N-$22^0$50'30"N latitude and $87^0$31'30"E-$87^0$55'E longitude (concerned Toposheets no 73N/6, 73N/9, 73N/10, 73N/11). The study are faces the fury of flood almost annually.

Magnitude Frequency Analysis at Return Period :- Great magnitude correlates with low frequency while small magnitude correlates with high frequency. This technique is most suitable to assume the probability of different sizes flood occurrence at different time interval or recurrence interval by calculating the flood return period. It is mostly used in engineering works to control flood. A longer record (at least more than 25 years of flood data of the highest peak discharges in each year for series of year at a single station is used in this technique Recurrence intervals or flood return periods are now calculated by means of this simple equation. T= n+1/m --------1, **(weibull, 1951)**.

[Here, T denotes recurrence interval, n= total number of flood records in the series, m = ranking order of a particular flood.]

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