FLOOD PREDICTION MONITORING

OF GHATAL BLOCK

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Abstract —
Natural disasters like floods are a worldwide havoc and a serious threat to mankind .Ghatal, block of Paschim Medinipur is one of the most flooded areas in the states of West Bengal, India. This article describes the utilization of geographic information systems (GIS) at flood simulation and visualization. The river system of Ghatal and the average annual rainfall are the most terrific reasons for a large area inundation. However hydrological–numerical models include information on flow velocity pressure and water depth from which the additional attribute flood intensity is calculated of. Digital terrain model (DTM) of ninety meter by ninety meter is the flood map generated by MIKE software. In this work we want to find out the road ways damaged due to area inundation.

Keywords- FLOOD; DTM; MIKE; FLOODMAP; INUNDATION; GIS;

Introduction--

Natural disaster is a major adverse event resulting from natural processes of the Earth. A goal of this project was to create a tool which shows the peril of floods and helps people in making their decisions. The state of West Bengal is one of the most flood prone states of India. More than 42 percent of its geographical area is identified as flood prone. Of the different regions of West Bengal which are flood prone, the Ghatal subdivision and its adjoining areas in the district of Paschim and Purba Medinipur are one of the most vulnerable. The frequency and magnitude of floods in Ghatal subdivision has increased considerably with the changing time. The study area (Ghatal block) under Ghatal subdivision is one of the most effective areas. Ghatal block is a closed area by the river systems of Silabati, old Kangsabati ,Dwarakeswar including Jhumi a distributary of Dwarakeswar River those are non perennial in character. The Government of West Bengal took steps to formulate a Master Plan for Ghatal area for mitigation of flood problems . Critical physiographic location of Ghatal block makes severity of floods and its effects are:
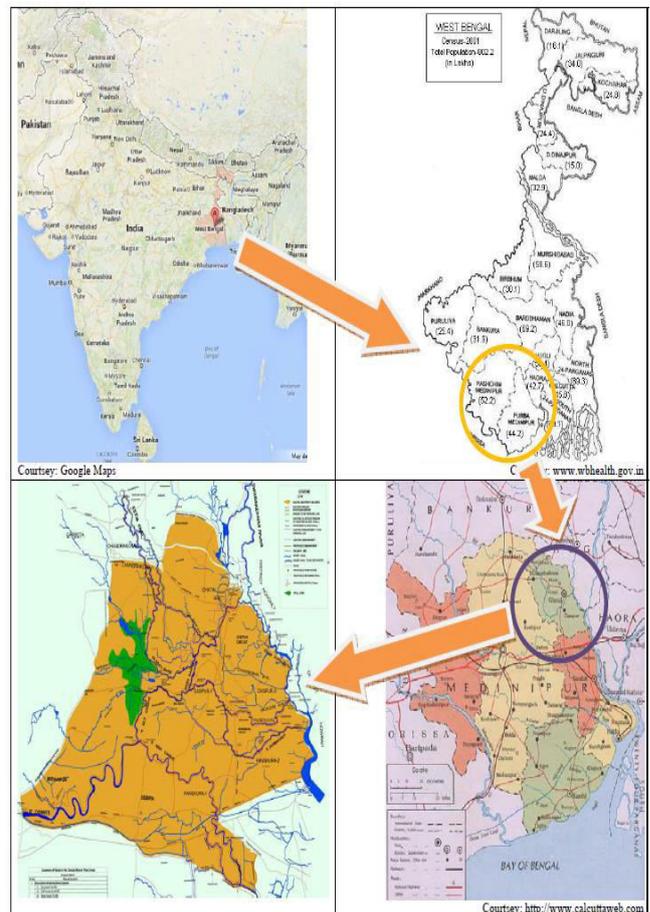

Figure 1. Location map of the Ghatal Master Plan region

Study Project Area--

The Ghatal project area is lies within latitudes 22°15' to 22°45' and longitudes 87°15' to 87°55', measuring 1659 sq. km. 83 percent of the project area is in the district of Paschim Medinipur and rest within Purba Medinipur district.The project area is bounded by the Chandrakona-Medinipur road in the west, Rupnarayan river in the east, the ridge between the Silabati (also called Silai) and Dwarakeswar basins and the

Ghatal-Chandrakona road on the north and the Midnapur High Level Canal, the NH6 in the south.Therefore, being located at the tail end of the Kangsabati (also called Kansai or Cossye), Silabati and Dwarakeswar basins, the project area has a long history of floods. Out of total area of 1659 sq. km, 1270 sq. km of the Ghatal Master Plan area is identified as flood prone. The general climate conditions of the area indicate that the maximum and minimum temperatures ranges between 12° C to 39° C, relative humidity 40 to 80 percent and average annual rainfall 1616 mm with maximum rainfall registered in the month of July at 354 mm to minimum rainfall at 5 mm in the month of December.
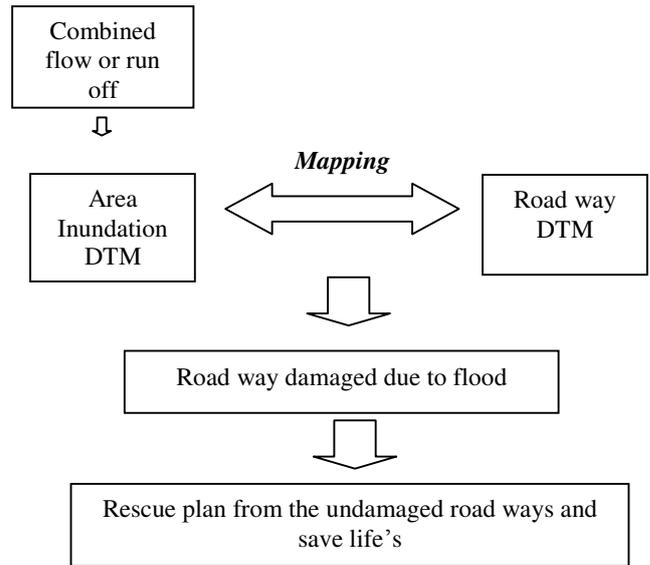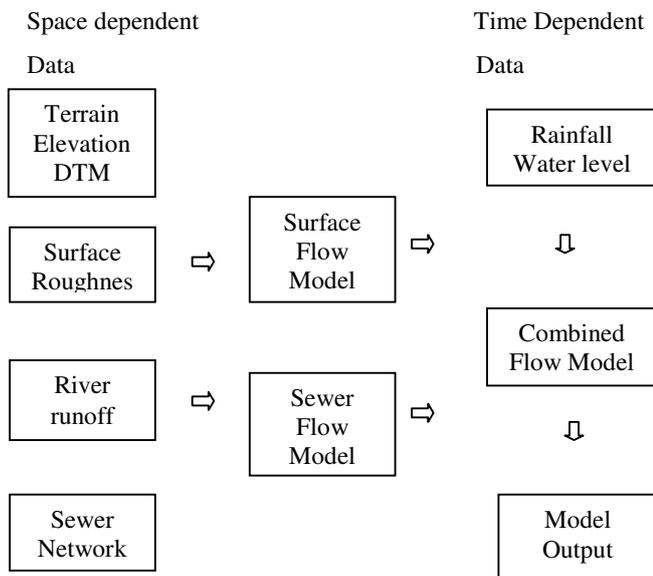
Location of Master Plan--
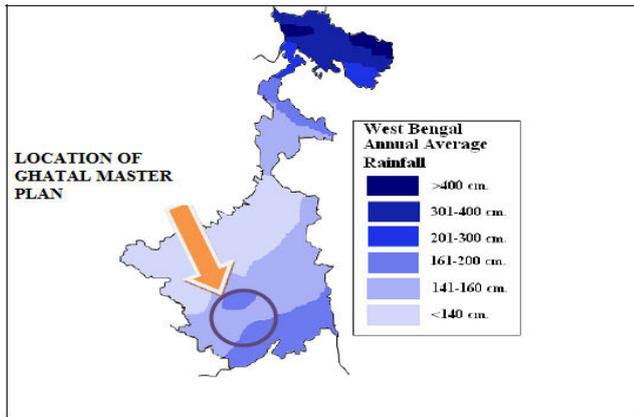
Project area with rainfall data

Modelling Of Ghatal—

A topography map of the region derived from a base map provided by the Irrigation and Waterways Directorate and supplemented by SRTM data is shown in Figure 3. The figure also shows in background the different rivers in the region and some of the administrative units.

Input Data—

Data preparation is necessary to make before the very beginning of flood model calculation. In the case of flood simulation it concerns geodata preparing, primarily the DTM, which was provided by Irrigation and Water ways department (I&W) Ghatal.The very first input that was used for the model was MIKE-11 a two dimention flow model or any the dimensional flow model of the larger model suite MIKE-FLOOD for the network of rivers. Data preparation is necessary to make before the very beginning of flood model calculation. In the case of flood simulation it concerns geodata preparing, primarily the DTM, which was provided by Irrigation and Water ways department (I&W) Ghatal. This format saves all terrain points in a raster form, in which the cell value accords with elevation of a given point. In this instance, one cell of raster corresponds to area of 2 x 2 meters .the dtm provided is generated in the resolution of 90 meter X 90 meter of area Ghatal, although Ghatal is a big place according to area so it's a quite higher resolution.
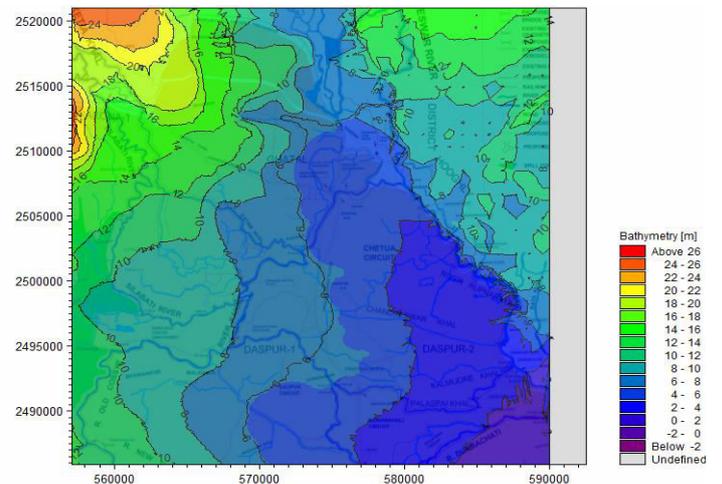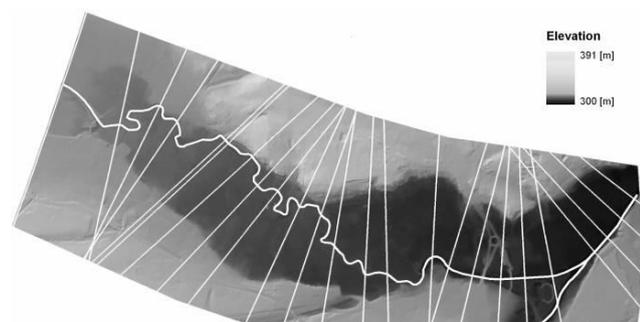
Terrain Model Of Ghatal--

Figure 3.Elevation counter map of Ghatal Master Plan Region upto a large extends in 90 X 90 meters.

For better resolution now dtm of 30 X 30 meters is available in srtm wesite.

Terrain Model Of River System--

Monthly Rainfall Data—

month	1	2	3	4	5	6	7	8	9	10	11	12
mm	11	17	22	46	107	209	268	236	296	92	17	2
°C	19.9	22.5	27.6	31.0	30.9	30.5	28.9	28.9	28.9	27.4	23.3	19.9
°C (min)	13.1	15.7	20.8	24.6	26.1	26.4	26.0	25.9	25.7	23.4	17.6	13.4
°C (max)	26.7	29.3	34.4	37.4	35.7	34.6	31.9	31.9	32.2	31.5	29.0	26.5
°F	67.8	72.5	81.7	87.8	87.6	86.9	84.0	84.0	84.0	81.3	73.9	67.8
°F (min)	55.6	60.3	69.4	76.3	79.0	79.5	78.8	78.6	78.3	74.1	63.7	56.1
°F (max)	80.1	84.7	93.9	99.3	96.3	94.3	89.4	89.4	90.0	88.7	84.2	79.7

Rain fall data of Ghatal in the year 2013

Conclusions--

A framework for real-time flood inundation forecasting model for Ghatal subdivision block of Paschim Medinipur described. Real-time temporal data comprising of rainfall and drainage channel water levels, which at present are being collected through a network of rain-gauge and water level sensors spread in the irrigation and water ways department of Ghatal subdivision and Medinipur municipality. But the gauge used must have digitalized calculation and mapping with relevant software of water pressure measurement. The proposed model is expected to provide advanced warning to the people of Ghatal block, who would be able to check the forecast of likely inundations through a dedicated website that can be accessed by the public through the internet. So that peoples are aware before the disaster.

References--

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