Title: APPLICATION OF GEOINFORMATICS FOR FLOOD STUDY AT TARAPUR UNION OF GAIBANDHA

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ABSTRACT

This study has been taken to develop vulnerability maps for agriculture using Remote Sensing (RS) and Geographic Information System (GIS) regarding different return period for flood hazard vulnerability assessment in a flood prone area, Tarapur union of Sundarganj thana under Gaibandha district of Bangladesh. The study mainly focuses on the development of a vulnerability function for preparing vulnerability maps for agriculture.

For the development of vulnerability function depth-damage relation has been followed. For establishing relationship between flood depth and agricultural damage, an extensive field survey has been carried out in the study area. Satellite images and other related data are also widely analyzed for establishing the relation more fruitfully. A Landsat and a Radarsat image of the study area have been used to identify agricultural land and for identification of flooded and non-flooded area.

Although the study area is located in a floodplain locality but the terrain is not so much flat. Due to this, depth of flood level varies in different location corresponding to a fixed level rise of water level. In this regard for the development of a depth-damage function, the study area has been divided into four categories based on the elevation. In monsoon (July to September), one meter rise of water level leads 100 % damage of all the crops in the very low lying river associated land. Whereas about 2 meter rise of water level causes 100 % damages of all the crops in low land and 2.5 meter and 3 meter rise of water levels causes 100 % damages in all medium and high land crops of the study area respectively.

For the development of flood inundation and flood depth map, Digital Elevation Model (DEM) and water level data of the study area have been collected form Bangladesh Water Development Board (BWDB). Water levels are used based on flood frequency analysis for 2-, 5-, 10-, 20-and 50-year return periods.

The agricultural land of the study area has been found in between the elevation>22.9 to <25.91 meter. Vulnerability function was based upon these land areas. The magnitude of vulnerability for agriculture of Tarapur union is found to increase linearly up to three meter depth of water and then it becomes horizontal.

From the vulnerability maps it has been observed that for all the return periods, the study area is very much vulnerable. And area close to river bank is relatively more vulnerable compared to the area far away from the river bank. Flood level due to 20-and 50-year return periods damages 100 % damages of crops.

This database addresses one of the key building blocks towards an improved understanding of flood processes and associated changes in flood characteristics and regimes in Europe: the development of a comprehensive, extensive European flood database. The presented work results from ongoing cross-border research collaborations initiated with data collection and joint interpretation in mind. A detailed account of the current state, characteristics and spatial and temporal coverage of the European Flood Database, is presented. At this stage, the hydrological data collection is still growing and consists at this time of annual maximum and daily mean discharge series, from over 7000 hydrometric stations of various data series lengths. The goal of the MSc in Geoinformatics programme is to provide high-quality, professional graduate instructions in geoinformatics that lead to productive careers and lifelong learning. Geoinformatics is a nascent, multidisciplinary field in which graduates must be prepared to apply knowledge in new contexts, work cooperatively and communicate effectively. Learning Outcomes. Graduates with an MSc degree in Geoinformatics will be able to: Explain the principles, theories, tools and techniques of geoinformatics. Apply specialised knowledge of geoinformatics to a wide range of disciplines. Use the skills required to work individually or as a member of a team. Apply creative and critical thinking in solving applications in multidisciplinary areas using geoinformatics. Flood hazard mapping and flood inundation modeling are the vital components in flood mitigation measures and land use planning. Advances in geospatial technologies (GPS, Remote sensing and GIS) has enabled the acquisition of data and analysis of the river basin for flood mitigation projects (either structural or non-structural) in a faster and more accurate manner. GIS facilitates integration of spatial and non-spatial geographical data such as rainfall and stream flows. Other information such as flood maps, infrastructures and land use, social and economic information can be inventorized for future use. Flood maps prepared using satellite images of real flood events and information from the ground are useful for flood damage assessment, future flood mitigation planning.