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Geospatial applications for the analysis of socioeconomic impacts due to flood risk in Ratnapura district in Sri Lanka

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Abstract

Floods are frequently experienced in the Ratnapura district which is in the central highlands of Sri Lanka. This is more significant during Southwest monsoonal period from May to August and one of the inter-monsoonal periods from September to November. There were two severe flood events recorded in 2003 and 2017 in Ratnapura district. With the experience of flood events, almost every year people live in Ratnapura district face many socioeconomic problems. Therefore, it is very important to identify the flood risk areas in this region to minimize these problems. Thus, this study was aimed to demarcate the flood risk areas in Ratnapura district. Initially flood hazard map has been prepared using most causative factors influence to create floods. To complete this task, digital thematic layers were prepared for these factors. Then using Multi Criteria Decision Analysis (MCDA) method and weighted overlay method flood hazard map for the Ratnapura district had created. Similarly, flood vulnerability map has been introduced considering most important flood vulnerability factors in the study area. As to achieve the final goal of this study, i.e. to demarcate flood risk areas, created flood hazard map and the flood vulnerability map are overlaid. Further, the created flood risk map was validated using information obtained from flood events occurred in 2003 and 2017. After the validation process, it was found that the created flood risk map has very high precision. and therefore, this map can be accepted to analyze the socioeconomic impact due to floods in the area. Different types of thematic layers such as landuse, road network, buildings, etc. were overlaid with the created flood risk map to analyze the impacts due to flood risk in the area. After this analysis, it was noted that many houses, schools, and some important buildings as well as part of the road network including carpeted main road towards main cities are within very high and high flood risk areas. Thus, flood mitigation strategies have to be implemented in these areas to minimize future flood risk in the Ratnapura district.

Keywords

impact, socioeconomic, hazard, risk