VULNERABILITY ANALYSIS AND RISK ASSESSMENT OF FLOODS IN RATNAPURA MUNICIPAL COUNCIL AREA

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ABSTRACT

Most of the natural disasters in Asia are related to flood causing maximum damage to lives and properties in comparison to other disasters. Many natural hazards affecting Sri Lanka are water related. An effort was made in this study to identify the vulnerability and prepare risk assessment for flood hazard in Ratnapura Municipal Council (MC) using Remote Sensing and Geographic Information System (GIS) techniques. Ratnapura MC is the center for commercial, trade and administrative activities in Sabaragamuwa Province. Floods are detrimental to Ratnapura MC's vulnerable social and economic development due to loss of lives and destruction of properties. Residential areas and commercial activities are situated along the riverbanks which are highly vulnerable to flooding.

Study area is spread over an extent of 34.5 km^2. It is located in the *Kalu Ganga* basin. *Kalu Ganga* is the third longest river in Sri Lanka and it discharges the largest volume of water to the sea. Ratnapura Town is located in wet zone and high annual rainfall is the main cause of flooding. Ratnapura MC has experienced five critical and, twelve major floods since 1900.

Identification of flood vulnerable areas is very useful for the society to take necessary actions for pre disaster activities such as mitigation and preparedness. The main objectives of the study were to generate flood hazard maps and identify the vulnerability of flood areas.

Generating the flood inundation area map was based on the 1:5,000 digital contour data and previous flood records in the study area. Flood zonation map was prepared by computer based system. Updating and error checking were conducted by a field survey activity using 1:5,000 maps of the study area and a questionnaire survey. Flood frequency analysis was done to identify the pattern of flood inundation in Ratnapura MC area. For vulnerability analysis in this research, the selected social vulnerability variables are population, buildings and public utilities. Risk analysis was based on the hazard and vulnerability analysis. *Grama Niladari* Division (GND) wise risk calculations were generated assigning weights for hazard and vulnerability.

GIS technology was used as a risk assessment tool. Land use and land cover, land type, school/college locations, hospital locations and important buildings, road network, population data (GND wise) and digital elevation model (DEM) are found to be very useful to identify various impacts of floods. Field survey data and historical records were also found to be very important for the successful analysis.