

Flood Vulnerability of the Ratnapura District: Application of Geographical Information Systems for flood Management

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Abstract

Sri Lanka has 65,000 sq.km of land area with many areas prone to manmade and natural disasters. The last few decades has witnessed the occurrence of an increased number of natural disasters in Sri Lanka. The Ratnapura District is highly prone to natural disasters such as landslides, floods and strong winds. The main objectives of the Study are to identify the disaster prone areas by their severity and to discover the real causes of flood disasters in the study area, with a view to developing a disaster management plan for the study area using Geographical Information Systems (GIS) technology. The Ratnapura District is 3,275 square kilometers in land extent. Thus this study has been restricted to two areas namely; the Ratnapura Municipality and the Elapatha Divisional Secretariat Division (DSD).

The Study is based on the data collected from both primary and secondary sources. Data was collected from published information sources, particularly on flood generation factors such as rainfall. The flood gauge levels required for the Study were obtained from gauges used by the Survey Department, Meteorological Department and the Irrigation Department of Sri Lanka. Other secondary sources consist of relevant literature and digital maps (1:10000) of the Surveyor General's Department of Sri Lanka. Primary data was collected through field surveys and interviews. Field observations were carried out to identify the drainage pattern of the Kalu Ganga, flood prone areas etc. Questionnaire survey was administered to ascertain the impact of floods such as; loss of lives, damage to property and houses, number of days

of inundation and water levels etc. ArcGIS 9.3, ILWIS technique and the statistical analysis software (SPSS 13.0) were used for digitizing, modeling, data analysis, mapping and interpretation. Hazard areas and risk areas were identified through maps and classified in to high, medium and low hazard zones. Areas with a high risk of flood hazard are located towards the center of the Ratnapura Municipality. The Randola and Hangamuwa areas of the Elapatha DSD also had to face similar impacts from the floods.

It is envisioned that the hazard maps produced through this research will help planners and decision makers to take rational decisions on mitigation of negative impacts of floods and in the Ratnapura Municipality and the Elapatha DSD.

Key Words: Vulnerability; GIS; Disaster; Floods; Divisional Secretariat Division.