GIS and Remote Sensing applications for Flood disaster risk management: A case study of Ratnapura City, Sri Lanka

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Introduction

Sri Lanka is prone to natural disasters commonly caused by floods, cyclones, landslides, droughts and coastal erosion for generations with increasing losses to life and property in the past few decades. Floods are more of a common occurrence in Sri Lanka than the other natural disasters. It has been one of the most costly disasters in Sri Lanka. It is the centre of a long-established industry of precious stone mining. Apart from gem mining, the town is known for rice and fruit cultivations. Large plantations of tea and rubber surround the town. The town of Ratnapura had a population of 110,000 in 2005 and population of the Ratnapura district was 1,767,000 in 2005. Ratnapura District has an area of 3,275.4SqKm and Ratnapura MC area covers an extent of 2,184 hectares.

Study area

Ratnapura city is the name of the provincial capital of Sabaragamuwa Province of Sri Lanka and the Ratnapura District in which the town is situated. It is the centre of a long-established industry of precious stone mining. Apart from gem mining, the town is known for rice and fruit cultivations. Large plantations of tea and rubber surround the town. The town of Ratnapura had a population of 110,000 in 2005 and population of the Ratnapura district was 1,767,000 in 2005. Ratnapura District has an area of 3,275.4SqKm and Ratnapura MC area covers an extent of 2,184 hectares.

Objectives

To develop the land use map for Ratnapura city by applying GIS as a tool.
To show the critical facilities which are vulnerable to flooding.
To create a GIS database for flood prone area in Ratnapura city.
To delineate classified hazard map.

Results

- Insufficient data may be affected to final result of this research.
- Some of data are not available in up to data and is severe a problem when making the very precise flood hazard risk map.

Key words

Geographical Information System, Remote Sensing, Flood risk assessment, Vulnerability, Hazard mapping

Hazard: The probable of occurrence of potentially damaging phenomenon.
Vulnerability: The degree loss resulting from the occurrence of the phenomenon

Purpose of this study

Aims to investigate the methodology to deliver the optimal land use map to save the people from flood natural disaster.

Methodology used creation of Hazard Risk Map

- Primary data collection
- Remote sensing data
- Field data
- Hazard Map
- Vulnerability Map
- Combined going forward
- Weighted Hazard Map
- Hazard Risk Map

Climate data for Ratnapura

- Yearly average temperature is about 25-28°C
- Monthly average temperature is about 25-28°C
- Monthly average rainfall is about 100-150 mm
- Monthly average humidity is about 60-70%