

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 terms of both property damage and human casualties in Sri Lanka. Heavy rainfall in the Eastern and South-Western slopes is a principal cause of the flood risk. In addition, the drainage and topography of certain districts and land use patterns are also significant factors. For example, the Districts of Kegalle and Ratnapura have people settled in flood plains and steep hill-slopes. Flooding has now become an annual occurrence.

As other less developed countries, Sri Lanka is in the initial stage of the adoption geo-information for in disaster management although new world trends to Web GIS, real time warning system, satellite earth observation for rapid damage assessment, data standard and highly advanced Technologies that could be used for disaster management activities.

Key words

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

Hazard : The probability of occurrence of potentially damaging phenomenon.

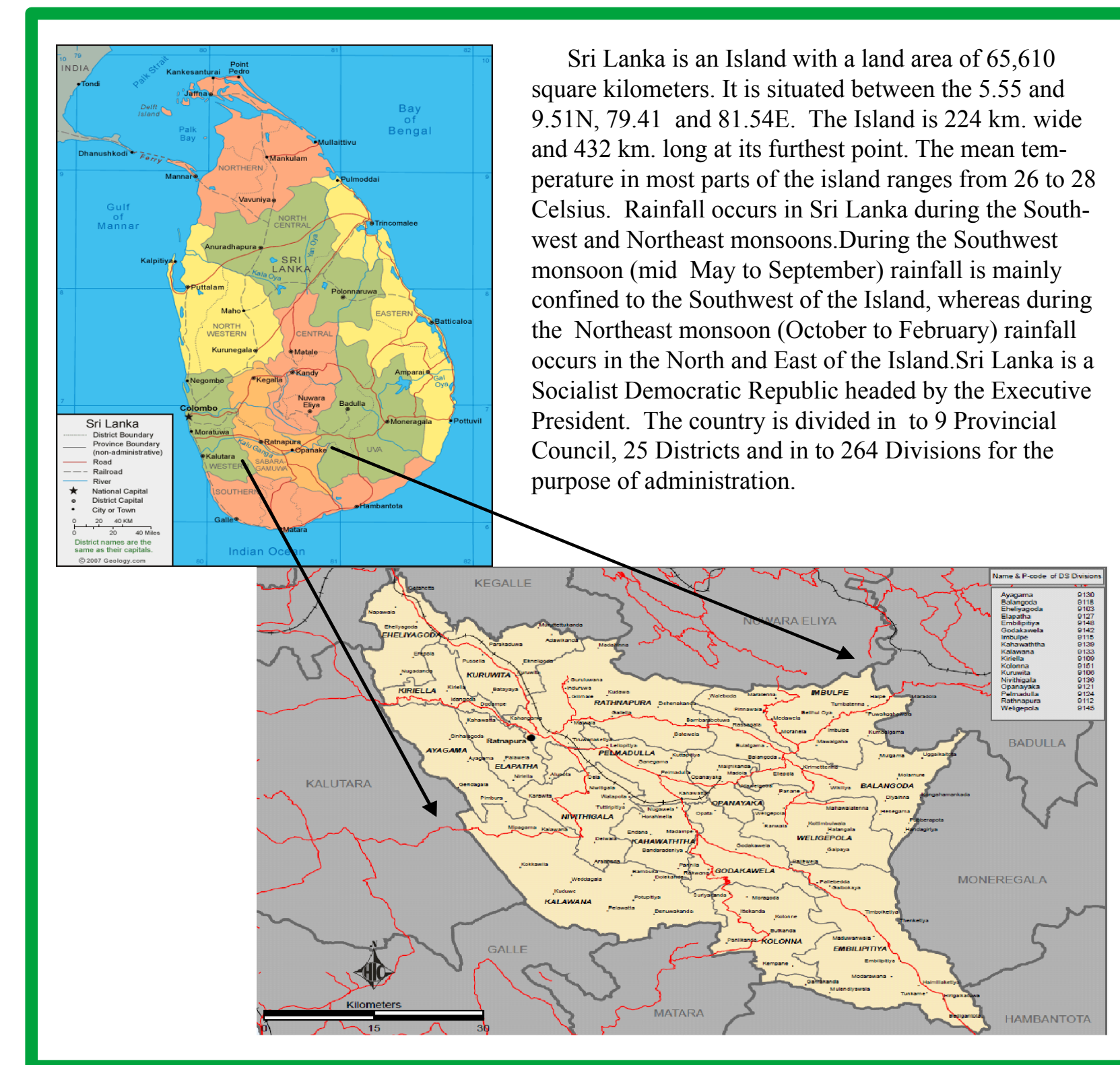
Vulnerability : The degree loss resulting from the occurrence of the phenomenon

Purpose of this study

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

Study area

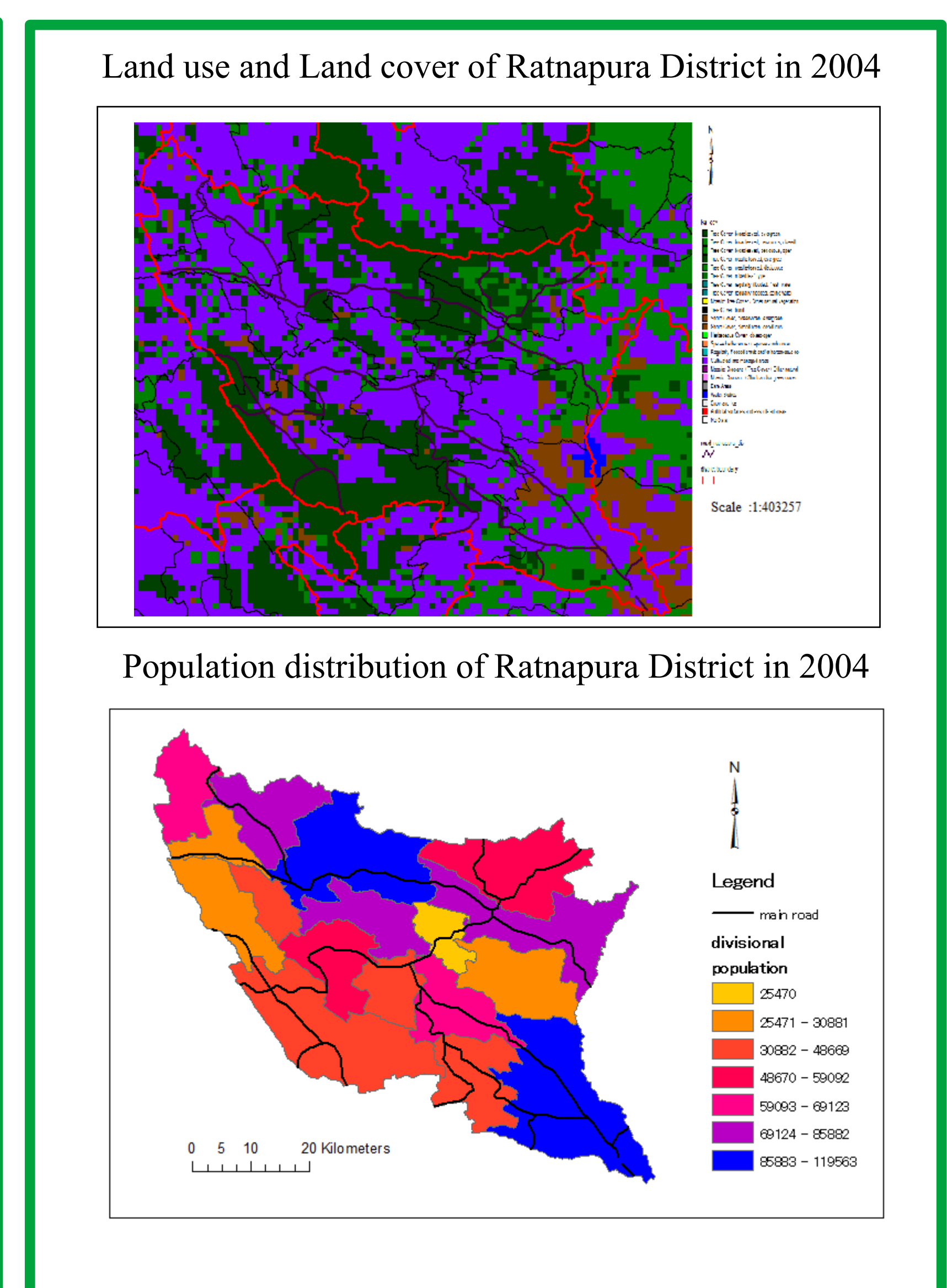
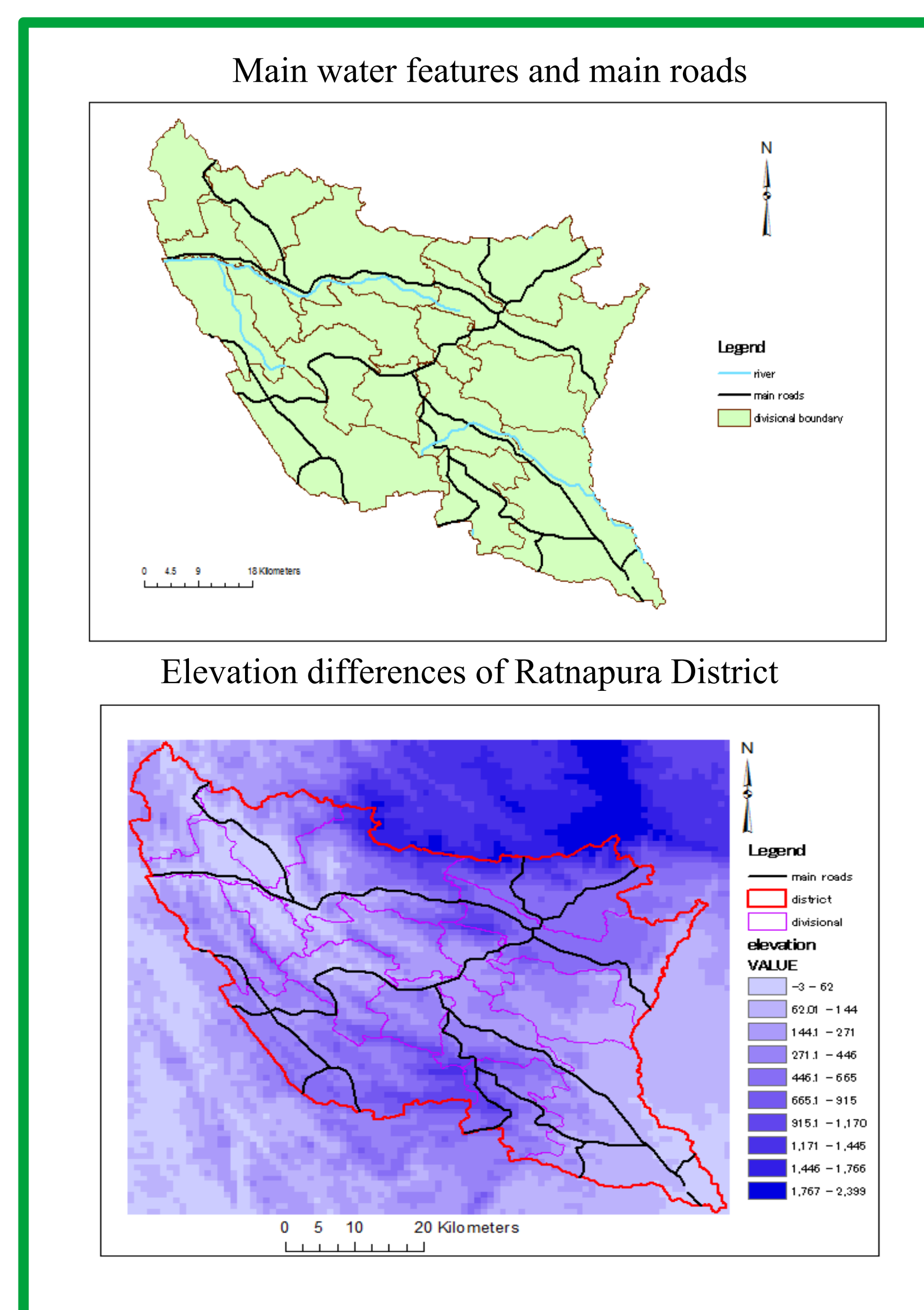
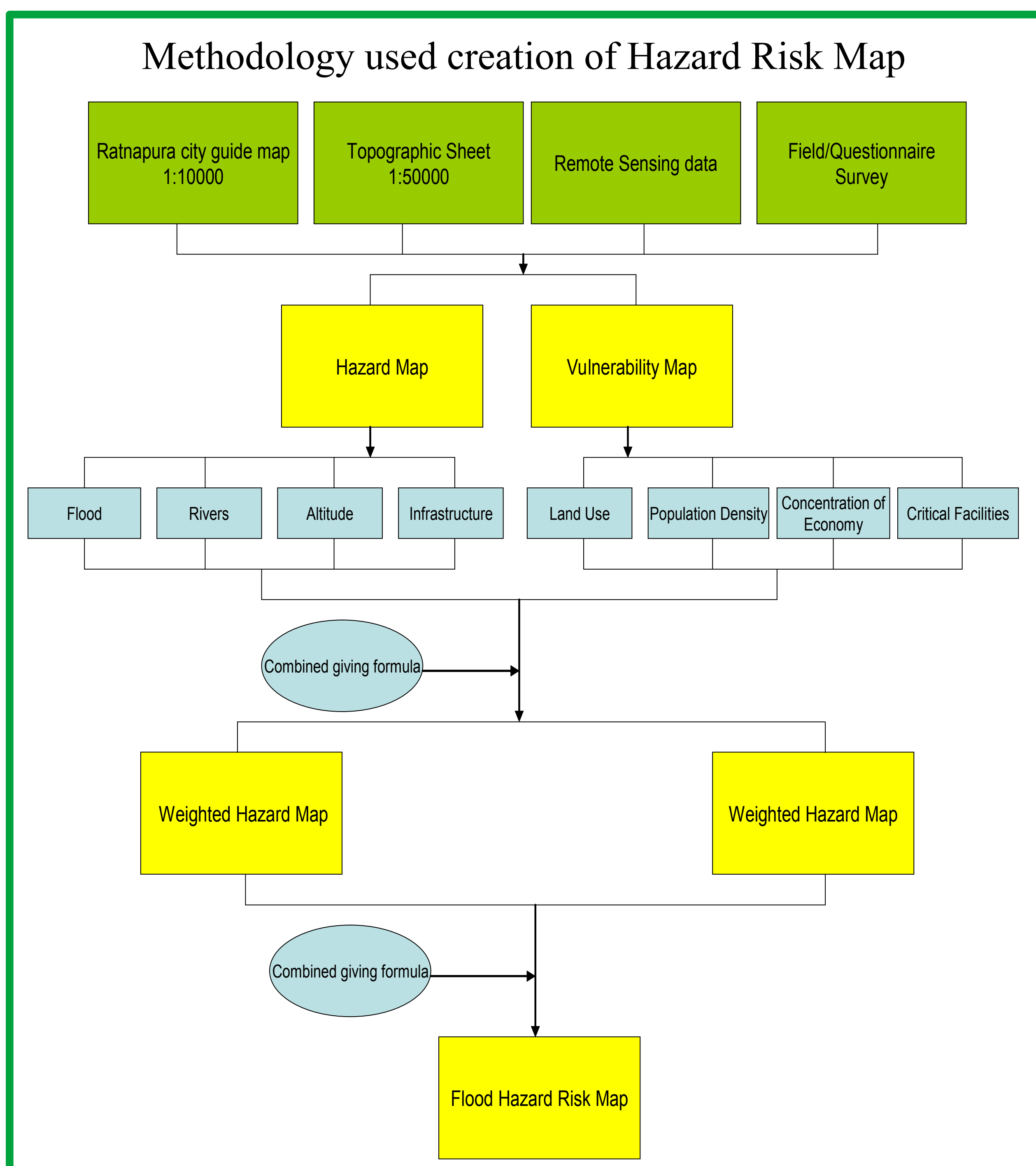
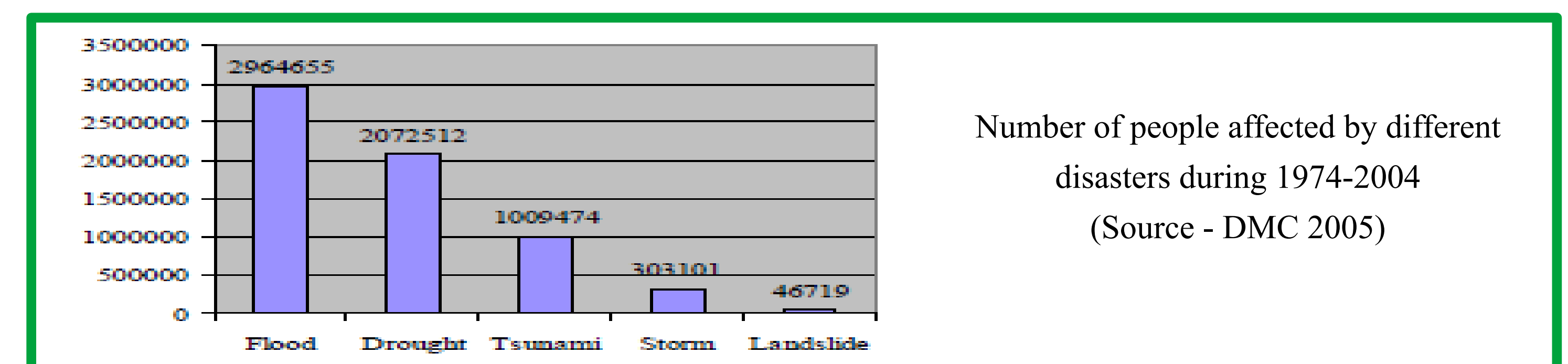
Ratnapura city is the name of the provincial capital of Sabaragamuwa Province of Sri Lanka and the Ratnapura District in which the town is situated. It is the centre of a long-established industry of precious stone mining. Apart from gem mining, the town is known for rice and fruit cultivations. Large 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 2,218.4 hectares.



Climate data for Ratnapura

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily mean °C (°F)	27 (81)	28 (82)	29 (84)	29 (84)	29 (84)	27 (81)	27 (81)	27 (81)	27 (81)	27 (81)	27 (81)	27 (81)	27 (81)
Rainfall cm (inches)	13 (0.5)	12 (0.5)	23 (0.9)	38 (1.5)	45 (1.8)	54 (2.1)	30 (1.2)	22 (0.9)	25 (1.0)	50 (2.0)	38 (1.5)	21 (0.8)	339 (13.3)

Ratnapura is located in the south-western part of Sri Lanka, the so-called wet zone. The town receives rainfall mainly from south-western monsoons from May to September. During the remaining months of the year, there is also considerable precipitation due to convective rains. The average annual precipitation is about 4,000 to 5,000 mm. The average temperature varies from 24 to 35°C, and there are high humidity levels. The city is above 21m from sea level.



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 that is severe a problem when making the very precise flood hazard risk map.

* This research is a part of Master theses which is being conducted by me as requirement for completion Master course in Geosciences of University of Tsukuba.