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UNIVERSITY OF PERADENIYA
SRI LANKA

MITIGATION OF LANDSLIDE HAZARDS ON
SRI LANKAN HIGHWAYS

A dissertation submitted in partial fulfillment of degree of Master of Philosophy

by

NEDAGAMUWAGE INDIKA PADMA KUMARA

Department of Civil Engineering

University of Peradeniya

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A B S T R A C T

Several large-scale disasters occurred in Sri Lanka. Rainfall is the main triggering factor for such disasters. Traffic flow on roads is often interrupted due to natural disasters like landslides and floods. This causes severe adverse effects on transportation and thereby to the economic growth of the country. Natural disasters also cause adverse social, economical and psychological impacts to community.

This research was on usage of GIS application for the management of natural disasters located along selected Sri Lankan national highway sections and mainly focuses on landslides. The main objectives of this application was to develop a landslide database along the selected Sri Lankan highway sections, identify landslide hazard zones and de-routes for hazards sections, locate relocation places to affected people from such disasters, determine the influence of rainfall on activation of landslides, and prepare guidelines to use in a public awareness system.

Details of side slopes, drainage patterns, and land use were fed into a GIS database along with previous landslide occurrences. Rainfall data for last thirty years were collected from the meteorological department of Sri Lanka and entered in the database. Locations of closest hospitals de-route information and places of evacuation are also collected to store in the data base.

For given slope geometry, soil properties, land use pattern and erosive, the tendency of the slope to fail under a certain cumulative rainfall can be determined by the developed database.

A 15% or higher ratio of 14 days cumulative rainfall to annual average rainfall serves as the triggering rainfall in significant number of landslides in Sri Lanka. However, the short term precipitation of three days cumulative precipitation to annual average precipitation exceeds 7% a high risk to occurrence of landslides is seen.

Comprehensive disaster management program giving due consideration to individual family units and community as a whole is an essential part of public awareness system. The developed guideline focuses on the activities to carryout during three phases i.e. pre disaster phase, disaster phase and post disaster phase.