

Mapping Critical Slopes to Landslide Occurrence in a Tropical Environment Using Geographic Information Science: Examining the Case of Tobago

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Abstract

Due to land space and economic limitations, the effects of natural disasters such as landslides have a significant impact upon the economies of small mountainous tropical islands such as Tobago. This is mainly due to the existing favorable physical conditions for landslides and their triggers, coupled with the increasing demands of development, tourism and population growth.

This paper presents a GIS based methodology to define the factors influencing landslide occurrence as well as mapping critical slopes to landslide occurrence in tropical mountainous environments. In addition, the sources of raw data, including ortho-imagery and field surveys are identified and techniques to capture, validate and convert the required data into usable digital format are described.

A landslide susceptibility approach is presented for Tobago and the results are represented as a landslide critical slope map. This outcome can be useful in guiding future developments, the formulation of disaster response and mitigation plans as well as the formulation of landslide insurance guidelines.

Keywords: Landslides, Tropical, Slope Risk Map, Geographic Information Science, Tobago