

ABSTRACT**Development of a Landslide Susceptibility Map
for Tobago using
Geographical Information Systems****Kamal Junior Sant**

Landslides occur on slopes and are part of the natural geomorphological process of earth forming. The need for the estimation of slope vulnerability to earth movement is underlined by the varied effects landslides have had on human activities and vice versa. In the Caribbean the limited resource base mandates that Regional Governments effectively utilize their available land resources to meet the needs of their inhabitants regardless of the inherent constraints of geological factors. Governments and relief agencies have attempted to assess landslide hazard, risks and spatial distribution through the use of maps. The widespread use and distribution of digital maps and utilization of Geographic Information Systems (GIS) to incorporate varied data sets have assisted in automating the manually cumbersome methods involved in landslide risk/hazard assessment in a cost effective and efficient manner.

* The island of Tobago has a tropical marine climate, is mountainous and frequently prone to landslides that damage infrastructure and disrupt the social fabric. Adverse affects can range from minor slope bulges to major slides resulting in loss of human life, damage to infrastructure and the environment, and disruption of economic activity. Landslides occur within a variety of materials and their causes are diverse and complicated, yet there exists no management plan to deal with landslide occurrences in Tobago. The matter is further complicated by the fact that there is no universal threshold value at which a landslide will occur. Due to the varied causal factors, landslide hazard assessment must be evaluated on an individual basis utilizing the causal factors that affect/influence the landslide process and data availability.

The method for landslide hazard estimation utilized for Tobago in this project was adapted from the Regional Landslide Susceptibility Assessment for Wildland Management (A Matrix Approach) developed by DeGraff and Romesburg in 1980 and implemented regionally in both Jamaica and Montserrat. The core data layers developed were Slope, Aspect and Bedrock and these were combined in an overlay process within a GIS and intersected with an inventoried landslide data layer. Landslide susceptibility was estimated from common layer conditions at the inventoried landslide sites and sorted into four non-hierarchical categories (zero, moderate, high and severe). The categories of susceptibility were then graphically represented in the form of an isometric type map indicating areas of estimated slope vulnerability.

The output from the landslide analysis was expressed in the form of a Landslide Hazard (or Susceptibility) Map and is of great value to developers, engineers, planning departments and local Governmental Agencies charged with landslide management in Tobago. These maps provide a cost effective and efficient means of portraying landslide susceptible areas for developing mitigation measures in both landslide and other Natural Hazard Management.

Keywords: Kamal Junior Sant, Landslide, Natural Hazard, Tobago, Tropical Island Environments, Landslide Susceptibility Map, Remote Sensing and Geographical Information Systems.