



Establishing a qualitative landslide susceptibility approach for a tropical region- Navua Catchment, South Viti Levu, Fiji Islands

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Almost every year, Fiji is subject to high magnitude rainfall events induced by cyclones causing widespread flooding and landslide occurrence. Additionally geologic, geomorphic and land use factors favor the occurrence of landslides. Even though the Fiji Islands are sparsely populated with villages and towns located mainly adjacent to the coast, scattered communities occur in the interiors of the islands as in the Navua Catchment respectively. Because of accelerating development and plantation activity, the Navua Catchment was chosen as study area. This catchment experienced significant landslide occurrence in the past and therefore requires the delineation of susceptible areas.

In this study, aerial photo interpretation was conducted in combination with field surveys to establish landslide inventories for six target areas of the Navua Catchment. A total area of 131 square kilometres was mapped for the landslide inventory. Each inventory map comprises information about the spatial distribution of different landslide types, categorized into young and old failures. The information about landslide type, relative age and dispositional factors were stored within a GIS software (MapInfo) and used for a qualitative heuristic landslide susceptibility analysis.

The susceptibility approach mainly focused on the analysis of the landslide abundance of certain geologic formations. The calculation of landslide densities enabled the direct comparison of landslide susceptibility values within the different geologic formations of the six target areas. Geologic formations with high landslide densities are considered to be more susceptible to landslides than geologic formations with low

values. Furthermore, the role of linear structures for landslide occurrence was investigated.

Results show that the Navua Catchment is highly prone to landslide occurrence. Nearly 13 percent of this area is affected by landslides, including a total number of 809 mapped landslides. Young and old debris flows are the most frequent landslide processes within the study region, affecting high percentages of the area in some target regions. In contrast, old and young rotational and translational slides, old complex landslides and block slides are more seldom. Old complex landslides and old rotational slides generally affect large areas.

Generally, almost all geologic formations are characterized by intermediate to high landslide susceptibility. Tawavatu Tuff, Navua Mudstone and Lokalevu Keratophyre show high susceptibility values concerning total number of landslide/km² as well as for percentage of affected area. However, as susceptibilities varied to a great extent between target areas, it was concluded that other factors, especially linear structures as faults and drainage systems, are also important for landslide occurrences in the Navua Catchment.