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Identification of Erosion Prone Areas in Kukule Watershed Using Geographical Information Systems

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ABSTRACT

Sri Lanka mainly depends on hydro-power for industrial as well as residential activities. Although the physical and environmental factors are conducive of hydro-power generation in the country, the mismanagement of the lands has created a significant constraint to the storage of the rain water to make use in the dry season for hydro-power generation. The capacity of the reservoirs has been reduced due to sediments from the catchment of the watersheds. The main objective of this study is to protect the erosion prone areas rather than conserving the whole catchment. Therefore, it was attempted to develop a new methodology to protect the hydro-catchments by identifying the erosion prone areas and concentrating the management strategies for those areas.

This study was carried out using secondary data available in different government agencies. The main data themes (layers) are soils, land use and land cover, rainfall and slope. Most critical areas for each theme were identified. In some themes the critical area was extracted directly such as the case of chena cultivated areas, the critical area is land use and land cover. However, in some cases, computation and data manipulation techniques were adopted such as the case of rainfall data which was in point features had to be transformed to polygon features using Thiessen (Dirichiet tessellation or Voronoi diagram) polygon techniques to calculate the water volume received by the catchment. The area where the highest water volume indicated was identified as the most critical area for that theme. Using geo-processing techniques available in ArcView, the areas were identified satisfying all set conditions related to four themes.

Finally, the total area was classified into four regions; highly erosion prone, moderate erosion prone, low erosion prone and risk free areas.

INTRODUCTION

Being a developing country and also being a country with an increasing population, the demand for a continuous, steady power supply is a necessity for Sri Lanka. A significant proportion of Sri Lanka's power supply depends on hydro-power and the other power generation sources have not been fully developed. The hydro-power supply is almost three times larger than that of the other power sources. This high dependency on hydro-power was continued until it was challenged at the beginning of the new millennium. In 2002, there was a power crisis in the country,