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**SELECTION OF POTENTIAL SOLID WASTE DISPOSAL SITES  
AROUND GALLE URBAN AREA USING GIS TECHNIQUES**

A PROJECT REPORT PRESENTED BY

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to the Board of Study in Earth Sciences of the  
**POSTGRADUATE INSTITUTE OF SCIENCE**

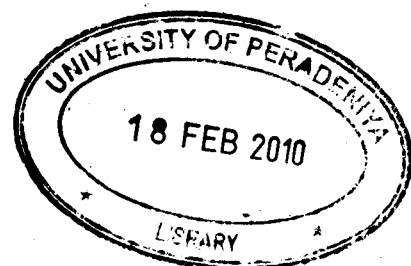
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# **SELECTION OF POTENTIAL SOLID WASTE DISPOSAL SITES AROUND GALLE URBAN AREA USING GIS TECHNIQUES**

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## **ABSTRACT**

Our environment is facing potential threat from un-sustainable waste disposal practices prevailing in almost all the urban centers in the country. A balanced development has always remained the main objective of any developmental strategy. Though the living standards have significantly changed, the method of public health and sanitation still remain primitive. Vast quantities of waste generation by the cities are one of the serious outcomes of unplanned development. Selection of suitable sites for waste disposal has been normally carried out by traditional approaches i.e. throwing it at all types of vacant land in or around the city. For the present study, Galle urban area, which is the capital of southern province, was selected. Population of Galle is increasing day by day due to its position as the administrative nucleus, available resources, and job opportunities. At present, there are no declared waste disposal sites in Galle. Galle Municipality Council (GMC) is disposing municipal wastes in the low-lying areas in general and drainage in particularly causing nuisance. This study aims at demonstrating the utility and assesses the capability of GIS technology for site selection for waste disposal.

Land suitability analysis is a prerequisite for selecting a suitable site for waste disposal. It involves evaluation of a range of criteria such as soil, terrain, socio-economic factors, land use, transport, geology, water table depth, etc. Many of these factors are vaguely

defined and thus characterized by their inherent vagueness. GIS techniques like ranking, rating etc. are employed for suitability analysis. The modeling process of analysis gets enhanced by GIS which can be further combined in meaningful sequences to develop new models. There are number of methods available to tackle problems like selection of waste disposal sites. Such as Boolean logic method, Index overlay with Multi-class Maps, Fuzzy Logic Method, and Spatial Multi-criteria Analysis. Four GIS methodologies were implemented in this research study to analyze the suitability of the site selection for the waste disposal in Galle urban area of Sri Lanka.

The methods described in the study combines the evaluation abilities of MCE method and the other analytical tools of GIS and show the use of GIS as a decision support system (DSS). The first step of the model assesses the availability of land for waste disposal by combining all the criteria (constraint and factors) for landfill. The relative importance weights of factors are estimated using different methods such as direct weighted method, fuzzy values and analytical hierarchy process (AHP). While comparing four methods, that SMCE method offers much more flexibility than the other three approaches. It allows for criteria to be standardized in a continuous fashion, retaining important information about degree of suitability. It also allows the criteria to be differentially weighted and to trade off with each other.

The Methodology is used for the study is after identification of the study area, and research problem, research objectives were formulated and relevant literature on solid waste management were reviewed. Also the type of data available and that would be required were assessed. The different analysis methods for selecting suitable site for the waste disposal were studied and the four methods were applied. The results of all four methods were compared and assessed to select the most suitable method and verified that SMCE was the most suitable method that we can use to select the suitable site for waste disposal. Finally identified suitable sites around the Galle MC area and done the field verification using GPS.