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LANDFILL SITE SELECTION USING ARCGIS AND AHP TECHNIQUES: CASE STUDY OF PROPOSED KILINOCHCHI URBAN DEVELOPMENT AUTHORITY

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Abstract: Kilinochchi is one of the most suitable cities for future industrial development in Northern Sri Lanka. As, it is proposed to develop by Urban Development Authority (UDA) in near future, there should be a proper solid waste management strategy to upcoming Kilincochchi UDA. There is no proper solid waste management hierarchy and solid waste data base to Kilinochchi at the moment. Objective of the study is locating a landfill site to Kilinochchi UDA using GIS technique and validating by Analytical Hierarchy Process (AHP). According to the data collection, solid waste generation is being increased. But there is no proper landfill site in the region. Therefore, the landfill site should be determined. Kilinochchi region was divided into 6 zones and survey was conducted during 30 days to collect necessary data. Solid waste data collected under 3 different categories, such as data from 'municipal council collectors (only for shops, market area and selected houses)', 'waste collected from houses' and 'scattered waste'. The total volume of the waste was calculated by based on collected data. Ponnagar and Umayaalpuram was selected as suitable areas for landfill based on land availability. Several criteria were considered while selecting a most suitable landfill site. Additionally, many significant environmental and geological obstacles have to be overcome for appropriate site selection. Thirteen criteria were identified and considered while selecting a landfill site to Kilinochchi UDA. These includes distance from residential area, distance from water bodies, distance from highway roads, distance from rail roads, distance from access roads, pipe line and electricity lines, depth of water table, slope, height, major aquifer and floodplain etc. ArcGIS model was developed and 'Buffer tool' was mainly used for analysis and each criterion was evaluated with the aid of AHP. Analysis revealed that Umayaalpuram land is most suitable as the landfill for upcoming Kilinochchi UDA.

Keywords: ArcGIS, Analytical hierarchy process, Buffer tool, Landfill, Solid waste data

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