

The Use of Geographic Information System for Selecting Landfill Sites in Osogbo

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Abstract : This study investigated the optimum landfill site in Osogbo so as to identify suitable solid waste dumpsite for proper waste management in the capital city. Despite an increase in alternative techniques for disposing of waste, landfilling remains the primary means of waste disposal. These changes in attitudes in many parts of the world have been supported by changes in laws and policies regarding the environment and waste disposal. Selecting the most suitable site for landfill can avoid any ecological and socio-economic effects. The increase in industrial and economic development, along with the increase of population growth in Osogbo town, generates a tremendous amount of solid waste within the region. Factors such as the scarcity of land, the lifespan of the landfill, and environmental considerations warrant that the scientific and fundamental studies are carried out in determining the suitability of a landfill site. The analysis of spatial data and consideration of regulations and accepted criteria are part of the important elements in the site selection. This paper presents a multi-criteria decision-making method using geographic information system (GIS) with the integration of the fuzzy logic multi-criteria decision making (FMCDM) technique for landfill suitability site evaluation. By using the fuzzy logic method (classification of suitable areas in the range of 0 to 1 scale), the superposing of the information layers related to drainage, soil, land use/land cover, slope, land use, and geology maps were performed in the study. Based on the result obtained in this study, five (5) potential sites are suitable for the construction of a landfill are proposed, two of which belong to the most suitable zone, and the existing waste disposal site belonged to the unsuitable zone.

Keywords : fuzzy logic multi-criteria decision making, geographic information system, landfill, suitable site, waste disposal

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