

Locating the landfill site of urban waste using Fuller's hierarchical analysis method (case study: Bandar Abbas city)

Introduction: This study addresses the critical issue of locating suitable landfill sites for urban waste management in Bandar Abbas, Iran, using Fuller's hierarchical analysis method combined with Geographic Information System (GIS) technology. The improper disposal of municipal solid waste poses significant environmental and public health challenges, particularly in rapidly urbanizing regions. The research aims to identify the most important indicators and criteria for determining optimal landfill sites, ensuring sustainable waste management practices.

Material and Methods: The study employs a multi-criteria decision-making approach, integrating environmental, social, and economic factors to evaluate potential landfill sites. Key criteria include proximity to rivers, distance from water wells, groundwater levels, residential areas, and soil type. Fuller's hierarchical analysis method was used to rank these criteria.

Results and Discussion: The results highlight the importance of environmental considerations, particularly water resource protection, in landfill site selection. The study underscores the need for a balanced approach that minimizes environmental impact while addressing the growing waste management needs of urban areas. The results provide valuable insights for urban planners and waste management officials, offering a framework for informed decision-making in landfill site selection. The research also emphasizes the role of advanced geospatial technologies in enhancing the accuracy and efficiency of spatial analysis. By integrating GIS with multi-criteria decision-making methods, the study demonstrates a robust approach to identifying optimal landfill sites, which can be adapted to other urban areas facing similar challenges.

Conclusion: This study contributes to the field of urban waste management by providing a comprehensive methodology for landfill site selection. It highlights the necessity of incorporating environmental, social, and economic factors into the decision-making process to ensure sustainable and effective waste management practices. The findings advocate for the adoption of integrated waste management strategies, including waste reduction, recycling, and proper disposal, to mitigate the environmental and public health impacts of urban waste.

Keywords: Landfill, urban waste, spatial analysis, Fuller's hierarchical triangle, geographic information system (GIS).