



## Use of GIS in Applying Fuzzy, Boolean and AHP Algorithms in Landfill Location (Municipal Landfill Location Study)

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### Abstract

Sustainable development (SD) can be defined as the right and correct usage of various resources to promote the quality of life. Using productive resources and recycling them properly plays an important and effective role in health and growth of a society. Waste, which because of its large amount and being returnable to the nature considered as a productive resource, is one of the most environmental problems. The present study tries to examine different factors effecting on landfill sites and the value of each while introduces usage of new algorithms to site selection and decision making practices. Optimal areas for burying municipal wastes were selected by Boolean, fuzzy and analytic hierarchy process (AHP) methods using the GIS techniques. Effective factors in landfill were generally classified into 4 main and 15 secondary criteria. Site selection in the area carried out by different algorithms, then final results were extracted and AHP method selected with respect to field inspections, volume evaluation of place, and value of local land rather than Boolean and fuzzy ones. Site selection on the one hand and careful management of landfill operation on the other hand reduce the pollution caused by this natural cycle to the lowest possible level. Thus, minimizing waste disposal and maximizing material recycling must take priority over all other municipal waste management plans.

**Keywords:** Sustainable Development; Site Selection; AHP; Management; Waste Disposal.

## 1. Introduction

Today, a new approach is required in addition to the classic architectural approach to city which according to it not only governments and managers but also the inhabitants of the city have the right to decision; a view that can explain urbanites relations with each other and with urban environment, and make the interaction between inhabitants and components of the environment possible. Planning process, therefore, is an attempt to create a proper setting which allows planner to find the optimal solution to modern management. In the past, human created the villages and his environment according to natural environment and his instinctive selection by reason and experience. Once he recognized that destroying the environment and natural resources would endanger his survival, he always acted in harmony with the nature. He selected his life environment regarding to closeness and accessibility of water, food and the other livelihood and production resources. Since security was the main factor in settlement in the past communities, establishing the placements was for the purpose of meeting needs and basic functions. Land-use planning is the science of spatial division and locating for life's different usages. In fact, land-use planning is reasonable management of space in order to optimize pattern of distribution of human activities. In other words, it is the locating of environmental spaces [1]. Executive organs and organizations should deal with planning and design, implementation, and preservation of environmental sites in simultaneous and comprehensive way. National geographic studies include exploring the natural state of urban and rural areas and their neighbouring regions and the potential impacts that they may have on physical frame of them and on environment in indirect way [2]. Locating environmental sites is greatly impacted by social and legal efforts to reduce and to reconcile the conflictions between public and private interests to extend the concept of the rights of ownership of urban land and using it for public interests of the

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