



Spatial assessment of landfill sites based on remote sensing and GIS techniques in Tagarades, Greece

Mohamed Elhag*, Jarbou A. Bahrawi

Department of Hydrology and Water Resources Management, Faculty of Meteorology, Environment & Arid Land Agriculture, King Abdulaziz University, Jeddah 21589, Saudi Arabia, email: melhag@kau.edu.sa (M. Elhag), jbahrawi@kau.edu.sa (J.A. Bahrawi)

Received 28 November 2016; Accepted 18 February 2017

ABSTRACT

Remote sensing techniques and geographic information system (GIS) are employed in investigation of the environmental criteria for assessing the study area sustainability for hosting a landfill. The designated area is in the municipality of Thermi between the villages Trilofos, Agia Paraskevi, and Tagarades, prefecture of Thessaloniki in North Greece. In Greece, the overall waste management situation at the current time can be fairly characterized as underestimated, as the main constraints being from technical and financial nature. Ten environmental criteria, five factors, and five constraints were applied. 26 GIS map layers were produced using topographic, geological, and CORINE 2006 land cover maps as well as Landsat OLI-8 satellite images. The factors were considered in the weighted overlay analysis tool; then the weights were assigned under GIS environments. Moreover, the constraints were merged in one Boolean layer. Compiling both the factors map and the constraint map resulted in a map of suitable areas classified into three classes according to the suitability –least suitable, suitable, and most suitable. The suitable and most suitable areas represent 414.38 ha or 4.65% of the total study area of 8,895 ha with latitude 40°27'44.78" N and longitude 23°2'30.20" E. This study can be further used for assessing the sustainability cost for optimizing the landfill site by applying social and economic criteria.

Keywords: Fuzzy membership; Landfill; Multi-criteria analysis; Spatial assessment; Suitability analysis; Sustainability

* Corresponding author.

Presented at the 13th IWA Specialized Conference on Small Water and Wastewater Systems & 5th IWA Specialized Conference on Resources-Oriented Sanitation, 14–16 September, 2016, Athens, Greece.

1944-3994/1944-3986 © 2017 Desalination Publications. All rights reserved.