

GEOLOGICAL CRITERIA AND METHODOLOGY FOR LANDFILL SITES SELECTION

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EXTENDED ABSTRACT

The landfill siting problem composes a very complex process due to its multifaceted character. To come up with the best available solution, a series of alternative options has to be assessed based on a variety of criteria, by utilising the methodology of multicriteria analysis. The selection of the most appropriate criteria, based on which the process will be assessed, has to be interdisciplinary hence has to cover the entire landfill siting process holistically, from every perspective (economical, social, environmental, operational, land-planning). This paper focuses on indicating the significance of the geological factor for the landfill siting process, and attempts to categorize the various geological criteria based on their weight factor.

In that multicriteria analysis system, the comparative evaluation of the alternative scenarios, is taking place in 2 steps: (i) criteria groups are defined, each one consisting of a series of individual criteria and the weight factor of each group is defined based on the experience of the working group, and on any potential data from relevant applications. Based on the defined criteria groups and the relative weight factors, the proper cumulative function is extracted based (ii) the Criteria Groups (CG) are getting extracted into their individual evaluation criteria (IC), where by using the appropriate weight factors, their own relative significance is defined, within each criteria group.

The geological criteria, regarding hydro-geological characteristics of the examining areas, should compose the starting point even from the initial selection of the potential landfill sites, aiming at preserving surface and underground water quality in case of any potential malfunction of the whole facility. Slope stability characteristics, seismicity, active faults etc. have to be investigated in order to gain a reliable estimation, as far as natural hazards in the study area are concerned. Thus, once natural hazard is considered highly probable for an area, the site should be automatically excluded from the process.

The advantages of this approach are: (i) it takes into account a large number of criteria, and the effects on each other, utilising tree analysis (ii), it permits more analytical and precise definition of the criteria importance by using a table $N*(N-1)/2$ of comparison for all criteria (iii), it permits the gradation of a landfill site, even if all evidence is given with a degree of uncertainty, and (iv), the final relative evaluation of the landfill sites is trustworthier as sites that haven't any remarkable differentiation are grouped in the same category

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