MUNICIPAL SOLID WASTE DISPOSAL SITE SELECTION OF PANAUTI MUNICIPALITY USING GIS MODEL

Riverside and open dumping are the most common method of solid waste disposal in many developing countries including Nepal. The same practice was observed for municipal solid waste management in Panauti Municipality. Landfilling is now accepted as the most widely used method for environmentally safe disposal of solid waste. However, an appropriate landfill site selection is important to minimize negative impacts associated with open dump sites. Landfill siting is an extremely difficult task to accomplish due to strong public opposition and regulations. Developing countries do not have a systematic process for landfill site selection and hence unsuccessful landfill siting leading to environmental degradation is typically the result especially in the developing world however for the selection of the final landfill site further analyses and protective measures are needed in order to ensure the long term sustainability of the environment. In the first part of the current study, the present and future waste generation quantity was calculated to find out the required size of landfill and it was found to be 0.39 hectares. The volume of municipal solid waste likely to become available within 15 years was found to be 97302.46 m^3. The second part of this study aims to find the best sites for landfills in Panauti Municipality. For this reason, 6 criteria were adopted in this study (river, road, slope, land use, urban center and archaeological sites) using geographic information system (GIS). In addition, the analytical hierarchy process (AHP) method was used to derive the relative weightings for each criterion using pairwise comparison. The analytical technique and model proposed here will help municipal authorities make the right and sustainable choice on the selection and planning of landfill sites without compromising human health, the environment or future uses of natural resources. Weighted Overlay Analysis was done to evaluate the landfill suitability. The results showed that 39.331% of the study area have high suitability for land filling. Finally, five suitable candidate landfill sites from landfill suitability map were chosen based on decision aiding tools (i.e. buffer of 250 m from settlement and size of landfill) and found these area fulfill the scientific and environmental requirements in the municipality. However, the final decision will require further field investigation, a public acceptance survey, and consideration of ownership status, price of the land including additional criteria.

Keywords: *AHP, Landfill siting, Weighted overlay analysis*