عنوان مقاله:

(Geospatial Modeling of Urban Sewage Network Operations Based on DRASTIC Model (A Case Study of Isfahan

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خلاصه مقاله:

In recent years, old urban sewage networks have encountered numerous flaws, leading to several important problems in the environment, such as groundwater pollution, excessive growth of tree roots inside sewer pipes, etc. To tackle such problems, innovative approaches must be practiced in urban sewage networks operations. To this aim, a spatial model based on "predictive analysis" and smart technology in the sewage network operation management is needed. Our proposed model was firstly applied for the city of Isfahan to evaluate and predict possible accidents in the urban sewage network. Our model is based on DRASTIC model and Geographic information system. The sewage accidents were assessed by combining the results of DRASTIC model and Getis-Ord Gi* index. This model could assess the previous sewage accidents and predict the probability of future accidents in cities, as well as their environmental risks. In this study, the intention was to identify the hot spots of accidents in the sewage network using GIS; then by studying the factors affecting the accidents, and geological and environmental parameters, a spatial model was designed. Combination of the Getis-Ord Gi* index and DRASTIC model is the main innovation of this research. In the study area, the following items were determined as the most important factors in the sewage accidents: ۱- soil type, ۲-inappropriate infrastructure, ۳-inappropriate pipes with older age, ۴-lower diameter. Finally, this model showed that there was a significant relationship between spatial and environmental indices in the study area. Also, the significance value obtained from the statistical analysis of the relationship between pipe diameters and sewer network accidents was equal to ۰.۰۰۴ and the significance value obtained from the statistical analysis of the relationship between pipe life and such events based on Kendall and Spearman tests were calculated as ۰.۰۵ and ۰.۳۷, respectively.

کلمات کلیدی:

Sewage network, GIS, Getis-Ord Gi*, DRASTIC, Groundwater, Environment

لینک ثابت مقاله در پایگاه سیویلیکا: