Application of GIS Modeling in Zoning of Land Subsidence Potential Case Study: County of Tabriz

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Extended Abstract

Introduction

Land subsidence is a geological phenomenon that causes the earth's surface to descend slowly and horizontally. Severe damage includes land loss, building cracks, broken underground and transportation lines, and an increased risk of flooding due to landslides. Subsidence causes cracks and fissures in the earth's surface, changes in the pattern of groundwater and surface flows, changes in groundwater quality, deformation of the earth's surface, flooding in the region and some other cases. As these changes and factors cause serious and irreparable damage to urban, industrial and agricultural areas. Land subsidence has a long history in Iran. In the past, only some provinces, including Kerman and Yazd, faced this problem, but now some overuse of groundwater has caused many plains in Iran to face the problem of subsidence. In recent years in Iran with the increase in subsidence due to buildings, runways, bridges, tunnels, streets, rail and road transport lines, agricultural facilities (facilities installed in wells and irrigation network), changes in route and The movement of rivers and canals and the fertility of agricultural lands (by compaction and loss of soil porosity) have been damaged. Due to the importance of the subject, the purpose of this study is to investigate and model the potential for subsidence risk in the county of Tabriz.

Methodology

The present research is applied in terms of purpose and descriptive-analytical research method. In this research, documentary sources, libraries and satellite images have been used. ArcGIS, SAGA GIS and Super decision software have been used to prepare information layers in this research.

Results and Discussion

Multi-criteria decision analysis is one of the most basic decision support operations in GIS. MCDA Capabilities When integrated with GIS, it forms the GIS-based MCDA, which is a useful method for spatial planning and management. After reviewing the research background, eleven factors affecting the occurrence of subsidence risk: rainfall,

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slope, evaporation, geology, land use, runoff height, distance from the fault, drainage network density, distance from the river, vegetation index and depth Groundwater was selected. In order to prepare the final subsidence zoning map, after obtaining the criteria weights through ANP method, the criteria map was called in ArcGIS and standardized with using the fuzzy function of all layers and combined with each other by weighted overlay method. The results show that the center and northern and eastern areas of Tabriz are among the areas prone to subsidence at moderate to very high risk. As the cities in this area have expanded in areas of moderate up to high risk.

Conclusion

The results show that there is a high potential for subsidence in the study area that the occurrence of several subsidence in cities and rural areas in recent years has increased the risk of this phenomenon. The study of evidence and field observations shows the acceptable results of this research and is consistent with previous work done in these areas.

Keywords: Subsidence, Network Analysis Process, Multi-Criteria Decision Making System, GIS, Tabriz.