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Analysis and evaluation of landuse changes trend in Mobarakeh in order to achieve the sustainable development

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Extended Abstract

Objective: In land use planning, justice in spatial distribution of landuses is one of the fundamental components of sustainable development. In the last decade, the increase in population and the development of the physical structure of human communities has caused imbalances in the distribution of landuse in different regions and sustainable development has been endangered. The consequences of land degradation in the form of decreasing ecosystem power due to change in landuse in many countries, including Iran, are the main problem for sustainable development. Therefore, its evaluation and monitoring in the form of identifying the occurrence location, occurrence severity and dangers prediction of the phenomenon are necessary in order to quantitatively and qualitatively estimate the severity and extent of the damages. Land coverings in metropolitan areas are constantly changing as the planners should be able to use timely data to evaluate the distribution of land units and identify their changes. Mobarakeh is one of the important political, industrial, and agricultural place in Isfahan province. There are more than 400 industrial units in this area, among which the most important ones are Mobarakeh Steel Complex, Sepahan Cement Company and Isfahan Polyacryl Company. The launch of large industrial projects and the diversion of various industries to Mobarakeh has led to an increase in the double pressure on its natural environment. Considering that by assessing the land use changes in different periods, the land degradation process can be identified based on the technogenic factors. Therefore, the purpose of this study is to monitor the land use change patterns of Mobarakeh in order to assess the technogenic degradation of the land through remote sensing and satellite imagery techniques. By assessing the degradation of land, it is possible to manage land degradation using management of natural resources.

Methods: The Current study is an applied and developmental research and its methodology is based on the analysis of spatial data and satellite imagery. In this study, Landsat satellite images of MSS and OLI sensors from 1985 and 2015 were used to reveal the land use changes occurring in Mobarakeh. In order to monitor the land use, the preprocessing of the images, including radiometric and atmospheric correction, band stacking, mosaic imaging and clip of the study area, was first performed. After performing preprocessing operations, the aim of the study was to study the land use change in the images in the classification of images. In this study, the method of supervised classification and maximum likelihood were used due to the highest accuracy in separating land use classes with maximum Kappa coefficient. Finally, using the image differentiation method, the numerical value of each pixel in the early history of the time interval is equally divided from the end date, the time and space monitoring of land use changes was made.

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Results: Due to the fact that ecosystem of arid and semi arid regions has lower ecological capability than humid areas, these areas are more vulnerable to destruction. The phenomenon of land degradation in these areas occurs with increasing demand and exploitation of their ecosystems, so changing the use of arid and semi-arid ecosystems causes their equilibrium to deteriorate. Results showed that area of industrial land which was 9.16 km2 in 1985, was increased to 20.33 km2 in 2015. During this period, area of agriculture, range and forest lands have been reduced 38.75, 18 and 1.45 km2 (5.09, 2.37 and 0.19%) respectively, and extent of industrial, urban, degraded and barren lands have been expanded 11.17, 9.46, 16.14 and 7.1 km^2 (1.47, 1.24, 2.12 and 0.93%) respectively. In total, during the 30-year period in Mobarakeh, the extent of rangelands and agricultural lands has been reduced and has expanded to the extent of urban and industrial lands. Although in 2015, the greenery space created around industrial centers, especially the steel complex, has increased, but this increase is not enough to offset the greenness of rangelands and agricultural lands. Therefore, if this increase in the trend of industrialization and the decline of rangelands and agricultural lands continues, then the risk of technogenic degradation of this land would be threatened.

Conclusion: Increased pressure from the industry on the natural lands has led to the destruction of ecosystems in the Mobarakeh region over the course of 30 years, and the pressure from human development has always been integrated into natural resources. Therefore, land use change has caused the greatest degradation and pressure on the range, which is due to the change in the landuse of rangelands to agriculture, and the consequence of such a change is 16.14 km^2 of degraded land abandoned. Human development has also led to the transformation of agricultural lands into urban and residential lands, so that urban lands increased by 9.64 km^2 and in general agricultural land decreased by 38.75 km^2. The other effects of technogenic development is transformation of rangeland into industrial lands and also low-yielding fields that have led to an increase of 13.64 km^2 of industrial land, an increase of 7.1 km^2 of barelands and a decrease of 18 km^2 of rangelands. Increasing abandoned lands (depleted rangelands) and barelands develop erosion, and each year, due to the reduction of water resources, the amount of these lands is expanded, which in turn enlarge the land destruction. Therefore, areas that have decreasing variations in rangelands, agriculture, forest and rivers lead to degradation of the ecosystem, requiring environmental management and planning, and the full attention of ecology restorer authorities.

Keywords: Landuse, Technogenic Factors, Remote Sensing, Sustainable Development, Mobarakeh.

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References:

Alavi Panah, S.K. (2016). *Application of Remote Sensing in Earth Sciences (Soil Science)*. 5th Edition, Tehran: University of Tehran Press, 496 p. ***(In Persian)***

Alavi Panah, S.K., Ehsani, A.H., Omidi, P. (2004). *A study of desertification and changes of Damghan playa lands using multy spectral and multy temporal data*. Journal of Desert, 9(1), 154-143. ***(In Persian)***

Ayhan. A., Metin, T. (2010). *Spatial and temporal analysis of forest cover changes in the Bartin region of northwestern Turkey*. African Journal of Biotechnology, 9(35), 5676-5685. *(in English)*

Barrow, C.J. (1994). *Land degradation: development and breakdown of terrestrial environments*. The Quarterly Review of Biology, 67(3), 395-396. *(in English)*

Chitsaz, V. (1999). *Mapping of soil salinity in eastern Isfahan using digital data of TM*. MSc Thesis, Department of Natural Resources, Isfahan University of Technology. ***(In Persian)***

Duanyang, X., Chunlei, L., Xiao, S., Hongyan, R. (2014). *The dynamics of desertification in the farming-pastoral region of North China over the past 10 years and their relationship to climate change and human activity*. Catena. 23, 11-22. *(in English)*

Fatemi, S.B., Rezaei, Y. (2012). *Principles of remote sensing*. Third edition, Tehran: Azadeh Publication, 288 p. ***(In Persian)***

Feizizadeh, B., Jafari, F., Nazm Far, H. (2008). *Application of Remote Sensing Data in Change Detection of Urban Land Use (Case Study: Green Space in Tabriz City)*. Honar-ha-ye Ziba (Beautiful Arts), 34, 24-17. ***(In Persian)***

Haiying, Y., Joshi, P.K., Daas. K.K., Chaunial, D.D., Melick, R., Xuefei, Jianchu, X.U. (2007). *Land use/cover change and environmental vulnerability analysis in Birahi Ganga sub-watershed of the Garhwal Himalaya, India. Association for Tropical Biology and Conservation annual meeting*. Tropical Ecology, 48(2), 241-250. *(in English)*

Hosseinzadeh Dalir, K., Maleki, H. (2005). *Urban sustainable development and land use in Ilam city*. Journal of Faculty of Literature & Humanities (Shahid Chamran University of Ahvaz), 1, 54-23. ***(In Persian)***

Jabbar, M.R., Chen, X. (2006). *Land degradation assessment with the aid of geo-information techniques*. Earth Surface Processes and Landforms. 31(6), 777-784. *(in English)*

Jafari, M. (2004). *Compilation of service descriptions and methodology for determining criteria and indicators of Desertification Assessment in Iran*. Department of Soil, Faculty of Natural Resources, University of Tehran. ***(In Persian)***

Kachhwaha, T.S. (1985). *Temporal Monitoring of forest land for change detectives and forest cover mapping through satellite remote sensing techniques*. Proceedings of the 6th Asian Conference on Remote Sensing. November 21-26, Hyderabad, India, pp: 276-281. *(in English)*

Moradi, H.R., Fazel Puor, M.R., Sadeghi, S.H.R., Hoseini, S.Z. (2008). *The study of land use change on desertification using remote sensing in Ardakan area*. Iranian journal of Rangeland and Desert Research, 15(1), 1-12. ***(In Persian)***

Mshkouh, M.A. (1998). *A Methodology for Assessment and Mapping of Desertification*. United Nations Environment Programme, Food and Agriculture Organization, Translated in Persian, Tehran, Forest and Rangeland Research Institute. 114 p. ***(In Persian)***

Munkhnasan, L., Jong-Yeol, L., Woo-Kyun, L., Eun-Jung, L., Moonil, K., Chul-Hee, L., Hyun-Ah, C., So-Ra, K. (2015). *Assessment of land cover change and desertification using remote sensing technology in a local region of Mongolia*. Advances in Space Research, 57, 64-77. *(in English)*

Mushtak, T., Jabbar, X.Z. (2011). *Eco-environmental change detection by using remote sensing and GIS techniques: a case study Basrah province, south part of Iraq*. Journal of Environmental Earth Sciences, 64, 1397-1407. *(in English)*

Poorahmad, A., Hataminejad, H., Ziari, K.A., Farajisabokbar, H.A., Vafaii, A. (2014). *The Evaluation and Revising of urban land use from the Point of View of social justice. (Case Study: Kashan)*. Town and Country Planning, 6(2), 179-208. ***(In Persian)***

Pourmohammadi, M.R. (1996). *Need for land for urban development*. Journal of the Faculty of Humanities and Social Sciences, 1(2), 64-43. ***(In Persian)***

Rahimi, M., Damavandi, A.A., Jafarian, V. (2013). *Investigating remote sensing applications in evaluating and monitoring land degradation and desertification*. Scientific - Research Quarterly of Geographical Data (SEPEHR), 22(88), 115-128. ***(In Persian)***

Rasouli, A.A. (2008). *Principles of Applied Remote Sensing, Satellite Image Processing*. First edition, Tabriz: Tabriz University Press, 777 p. ***(In Persian)***

Shieh, E. (2012). *Introduction to urban planning*. Edition 31, Tehran: Iran University of Science & Technology Press, 226 p. ***(In Persian)***

UNEP, (1992). *World Atlas of Desertification*. Edward Arnold, London. *(in English)*

Yuea, Y.M., Wanga, K.L., Zhang, B., Jiao, Q.J., Liu, B., Zhang, M.Y. (2012). *Remote sensing of fractional cover of vegetation and exposed bedrock for karst rocky desertification assessment*. Procedia Environmental Sciences, 13, 847-853. *(in English)*

Zhang, Q., Wang, J., Peng, X., Gong, P., Shi, P. (2002). *Urban built-up land change detection with road density and spectral information from multi-temporal Landsat TM data*. International Journal of Remote Sensing, 23(15), 3057-3078. *(in English)*