Modeling land use patterns using with clue-s model (Case study of Meshkinshahr City)

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Extended Abstract

Introduction

Issue of land use focuses on prospective application pattern of land in every city and covers various types of applications such as residential, commercial, industrial, health, educational, administrative and recreational, which all have been effective on development trend of Meshkinshahr over the past years. Regarding the importance and role of land use system in urban planning, this research attempts to modeling land use pattern for Meshkinshahr using Clue-S in 1402 horizon aiming to develop the city within spatial-physical scale, prepare maps and analyze predictable patterns in various scales.

Research Methodology

In this study, primarily identified the factors which effective on land use changes and then used historical, descriptive methods as well as conducted interview with inhabitants and local authorities, associated organization in Meshkinshahr city such as housing and urban planning organization, municipality and consultant engineers of detailed and descriptive plan. Firstly the framework of Clue-S, its components and application were recognized.
Secondly, model factor was recognized and actually, this study would be meaningless without extracting factors effective on land use changes in Meshkinshahr City. Thirdly, the characteristic data and parameters of Clue-S model were collected. Fourthly, the necessary factors effective on system that dictates the changes of land use in Meshkinshahr were identified using logistic regression model. Then, demand and constraint models were defined within the Clue-S model used in this study and finally, some scenarios for Clue-S Model were offered revealing the potential land use patterns.

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In order to investigate the relations between the variables, the independent and dependent variables have been identified and then used SPSS to determine the regression logistic between them, and finally used the obtained values to prepare an independent model for each of four land uses (unused, residential, public and agricultural).

Results

All the collected data must be converted into a single format to allow modeling in Clue-S model, this model is based on Raster data, which GIS programs are capable of digitalizing these data. First step to do this work is to develop a tabular file for all types of applications and spatial features of each cell. Based on the evidences and previous studies as well as field studies on land use changes, in this study the assumption is based on changeability of unused and agricultural applications into urban applications and non-changeability of urban and public applications to others. The model used in this study, measures the land application changes based on demand scenario and on a yearly basis. The factors effective on land application changes in Meshkinshahr city include litho logy, height, slope and its aspect, population density, land price, land speculation, distance from house corporations, roads, and city centre and from river. In the case study, agricultural lands further divided into croplands and horticultural lands, decrease over the time and as a result of urban development. In order to do statistic analysis as well as simulating the changes in the future, a separate map for each use and two scenarios for change fluctuation were prepared based on the present status of the applications. First scenario predicts a 2% declining rate for unused and agricultural applications during the predicted period, whereas based on the scenario other applications will have an increasing trend with a 2% growth rate.

Conclusion

In this study, processes dictating the urban development of Meshkinshahr city were identified and a spatial model titled Clue-S Model was used to simulate land use pattern and the results were as follow:
- Factors effective on changes of each land uses in Meshkinshahr are varying from each other and each application has its characteristic independent variables.
- The establishment of applications in a specific location is due to optimal spatial index.
- The spatial development rate varies with distance from city center. In other words, agricultural applications increase as so does their distance from city center, whereas public and residential applications have a decreasing trend and unused applications either increase or decrease based on the changing conditions.
- Distance from river is one of the most important factors effective on development of special pattern of land use in Meshkinshahr city. Results from statistic analysis on variables are indicative of positive effect of this factor on all the applications.
- Further studies are required in the future to investigate the spatial balance between the location of unused, residential, public and agricultural applications.

Keywords: modeling, land use changes, Clue-S Model and Meshkinshahr.

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