

URBAN LAND USE SUSTAINABILITY ASSESSMENT THROUGH EVALUATION OF COMPATIBILITY MATRIX CASE STUDY: KARAJ CITY

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Abstract: One of the urban land uses planning purpose is suitable side selection of land uses and segregation of incompatible land uses. Compatibility or incompatibility of land uses is one of the most basic and most complex components in urban planning. This concept is derived from the term "neighborhood" and it requires the matrix and paired comparisons and determining the most appropriate form for the city. Since, getting reliable results implicate intelligent calculation and observations, therefore using the new techniques and spatial analysis elements in comparison are necessary. The main approach of this paper for Karaj, district 4 (near Tehran metropolis) is assessment of urban land uses by consistency matrix method to identifying trouble maker activities and necessities land use and consider the outcome of study for sustainable urban land uses planning in the area. The results of this paper indicate that firstly, incompatible land uses must be moved out of urban environment and placed in other suitable area in order to decreasing urban pollution and restrictions of economy and social .Secondly, sufficient urban land uses should be considered to match citizen's needs such as public facilities. Thirdly, conversion of urban green spaces to other land uses should be prevented. By the way, the subjects of an analytic network process approach for locating undesirable facilities: An example from Istanbul, Turkey in 2008 by Gülfem Tuzkaya, Semih Önüt, Umut R. Tuzkaya, Bahadır Gülsün , Achieving

matrix consistency in AHP through linearization in 2011 by Julio Benítez, Xitlali Delgado-Galván, Joaquín Izquierdo, Rafael Pérez-García and Study and implementation of fire sites planning based on GIS and AHP in 2011 by WEI Lai, LI Han-lun, LIU Qi, CHEN Jing-yi, CUI Yi-jiao are already researched.

Keywords: Karaj city, Land uses consistency matrix, Matrix comparison, Sustainability urban Land uses.

INTRUCTION

Beings and their environment on earth always act like an ecosystem. Therefore, efficiency of each ecosystem depends to the type and quality of land use. Due to evolution of ideas and analytical elements that are used in planning and land uses management in recent century, standards for assessment of urban land use compatibility are developed in order to clarify criteria for site location to provide optimum infrastructure for human activities in all dimension and preparation of their satisfaction. So, regarding this standards are seemed inevitable in site location of some urban land uses especially infrastructure and general facilities such as construction regulations, accessing network, dimension of subdivision land uses, proportionate of numeral & place and identifying consistency and inconsistency of land uses in urban planning.[2]

Nomination of above mentioned parameters are land uses to identify incompetence and assessment of different scenario for conducting optimum decision making to proportionate of land uses properly.

Sample of this study is karaj city- district 4. In order to maintaining optimum different land uses in the area, preparing a comprehensive plan for urban land uses is needed. Consistency matrix for assessment of present diversity activities in region is done by model that is based on neighborhood concept and using spatial analysis elements. This model make possibility that inconsistency activities and necessities land uses for sustainable urban land uses planning in local are identified. Output of this plan will be rising urban functional structure, general fairly access to facilities, decreasing cost of maintaining different proportionate land uses in the area. Consistency assessments of activities are made based on comparing relative parameters with each other by consistency matrix method.

MATERIALS AND METHODS

Karaj city – District 4th presentation

District 4th in Karaj city with an area about 26866938 sq meter and limitation area of 458930294 sq meter, is located in geographical 35°48'16" north wide and 50° 54'5" eastern length and the distance of area from Tehran is about 40 kilometer. This area has been as a sector of Karaj, but regarding to its special situation is managed by independent municipality (Fig. 1&2).

At the present time region are assimilated by residential parish such as Golestan, Mehrshar, Hosseinabad that is now a region of Karaj city metropolis with all relatives facilities such as transport network, electricity and so on. Since during difference circuit these sectors and parishes are developed and linked, therefore the texture of this area is formed irregular. The 4th and 5th Phase 4 of the area have a geometrics and plaid texture with intermediate aggregation, the texture of Mehrshar and Golestan sectors are disjoin and generally is formed by villas and open spaces, Kyanmehre sector have different type of texture such as plaid, apartment, single house and villa. In spite of changes in recent years Hossien Abad sector have been kept its rural texture yet with acrostic and in-numeral network. [6] Regarding of cultural, social and economic diversity that are dominated in the region, organizing unit management is essential to plan suitable method for all sectors.

Survey of land use's changes

Study of satellite and aerial's picture in past thirty years indicate several streams which were emanated from karaj river run in the region and about 90

possible by maintaining consistency matrix of urban percent of its spaces had been formed by trees and green spaces and only 10 percent of its texture had been residential, ministerial and educational .But at the present time, the situation is changed and mentioned percent are overhand. Basically, there is a straight relation between land uses changes and cities extent, as much as the city expand the land use changes are further. Immigration and population growths in this area have caused new land uses which are substituted to garden and green space and irregular development. As a matter of fact there is no optimum relation and between allocation of land use and land. Therefore, decision maker must analyze changes for planning relative option in order to maintain proportionate parity between diversity of land uses. Based on satellite's picture, present situation and detail plan of area the zoning map of the area is prepared to analyzing land uses compatibility and achieving to an optimum activities structure (Figure. 3). Then, hierarchy of land use's segregation in area are shown in logarithm on basic 10.[6]

Above mentioned map indicate that most land uses are residential, streets network and green space and lack of educational, cultural and health facilities land uses are identified.

The concept of compatibility is a reasonable spatial connection between activities and location. This spaces which are derived from planning can be city, rural and so on. In order to maintain consistency in optimum activities and location and changing place of inconsistency land uses, reasonable planning is essential because growth of natural activities always are not matched human needs.

Respect to consistency of land uses, different configuration can be occurs as follow: (1) Quite consistency, mean character of land uses is common and activities of each other are logic. (2) Partly consistency means land uses generally are the same but there are difference in detail. (3) Apathetic land uses, means in spite of special character, they can be placed beside of each other. (4) Partly inconsistency means measure of inconsistency between two land uses are more than consistency of them. (5) Inconsistency means character of two land uses are against of each other.

For denoting the consistency of two land uses, first, different characters and needs of each land use for performing activities regarding to factor of scale, land dimension, communication network, social facilities and relative land uses, sound, air qualification, light and shine must be defined based on standards. While the specification of outcome is equal or near to each other, land uses are consistence otherwise are completely or some deal inconsistency.[4]

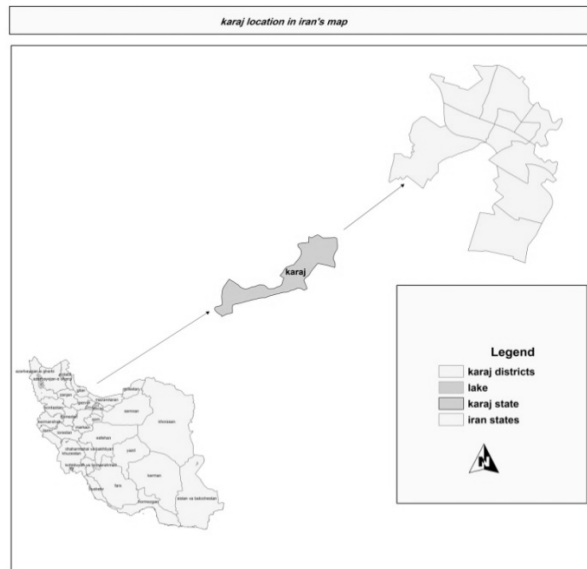


Figure 1: Karaj location in Iran map

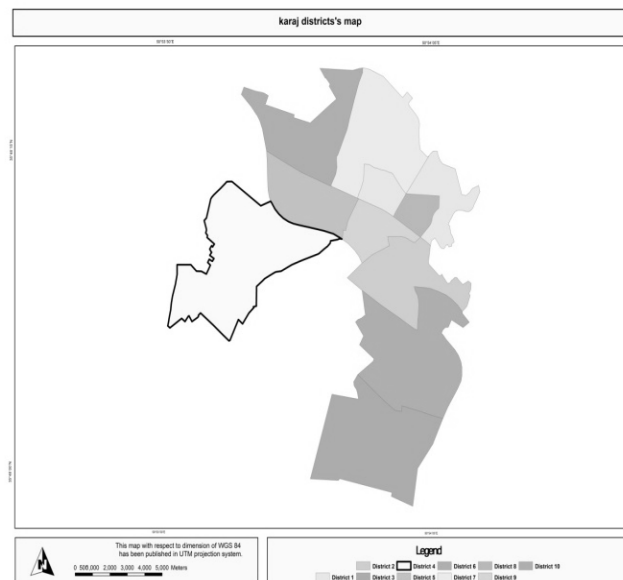


Figure 2: Karaj district's map

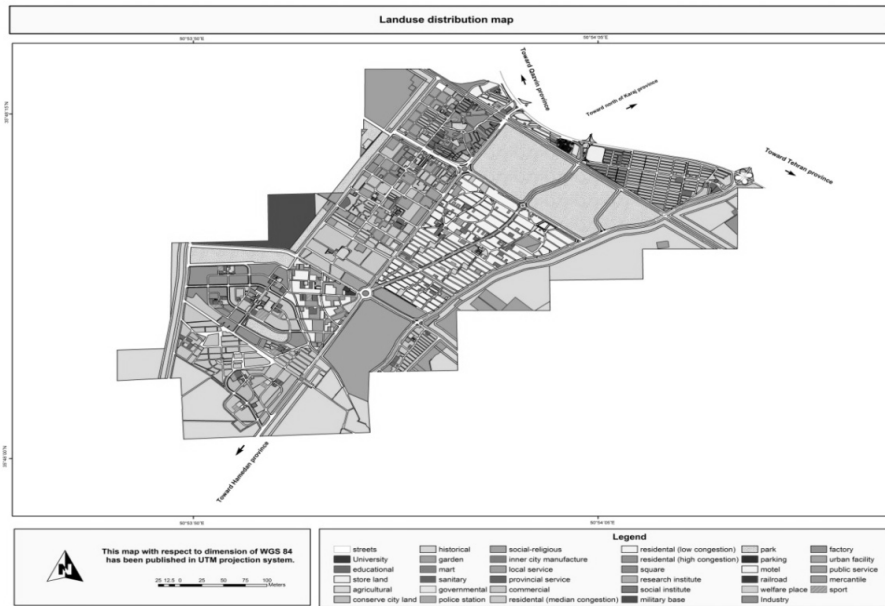


Figure 3: Land use distribution map

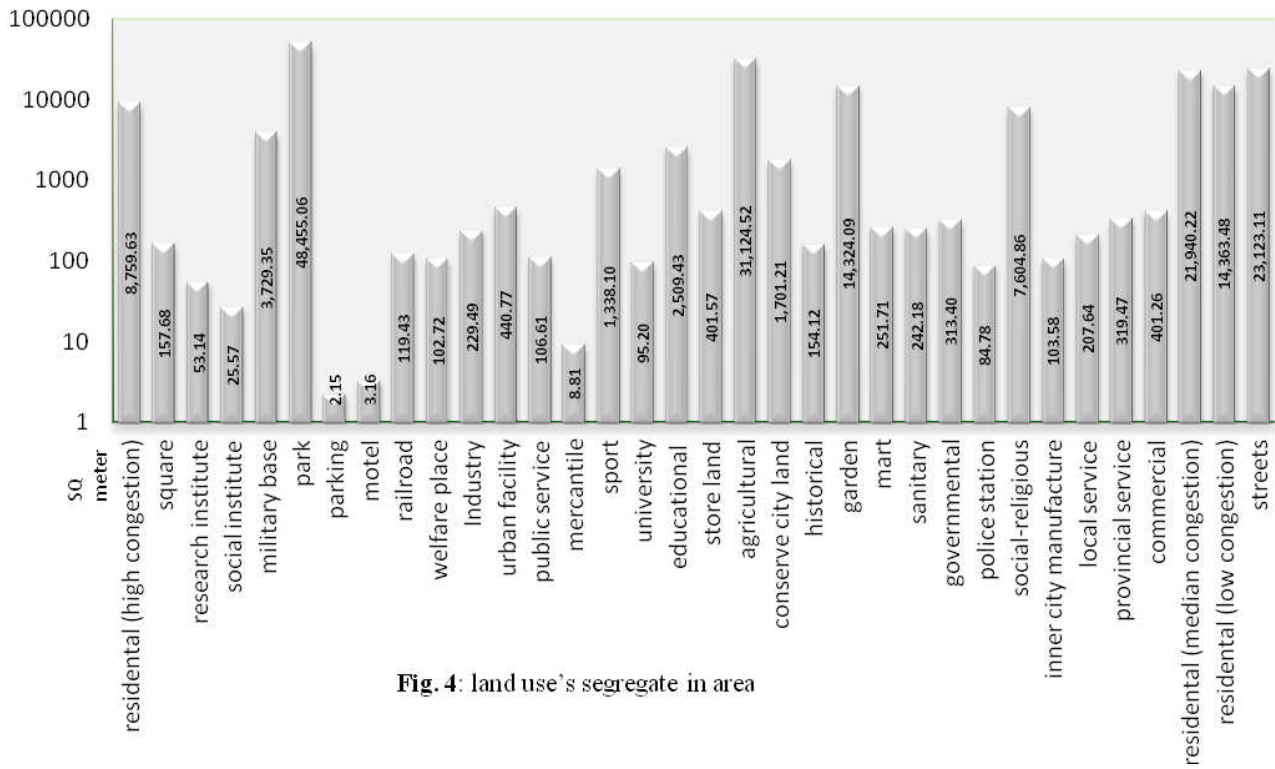


Fig. 4: land use's segregate in area

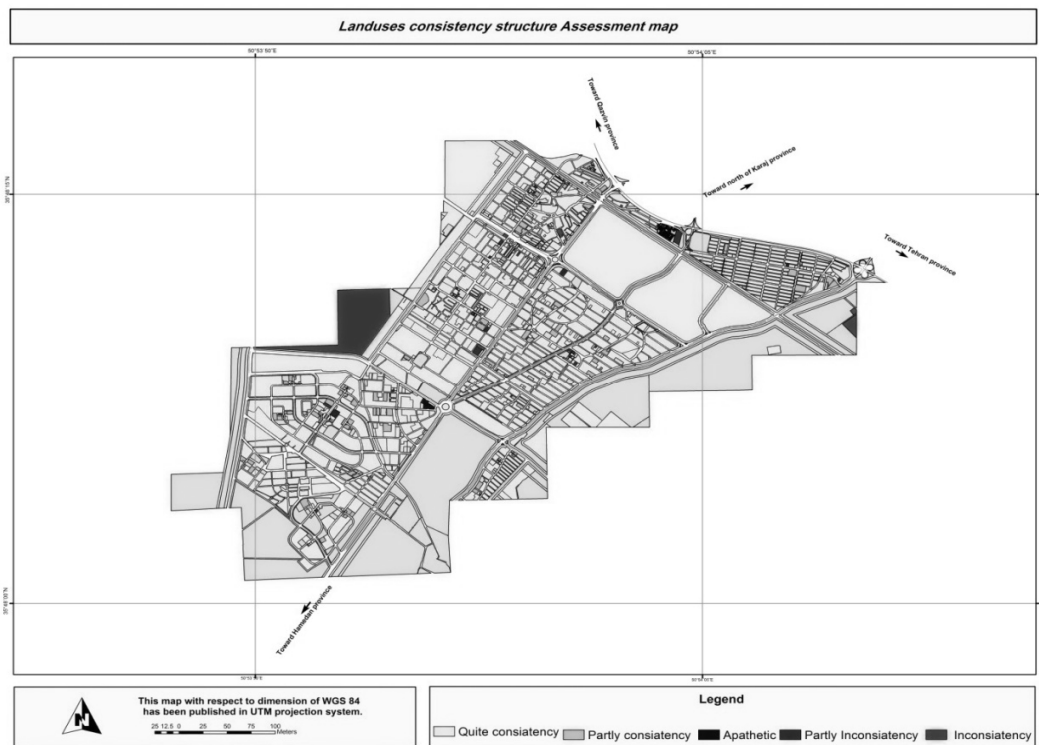


Figure 6: Land use consistency structure assessment map

RESULTS AND DISCUSSION

Since optimum and fairly distribution of services without spatial analysis of land uses and assessment of shortage is not possible; and also giving new option is not effective without land use assessment and finding incompatible points. Therefore, in order to appropriate location of land uses near to each other, urban land uses consistency matrix uses spatial elements to compare activities with each other and place them proportionately.

In implementation of above matrix, reinforcement of residential land uses are considered as a goal then based of consistency or inconsistency of land uses and their score the priority of each land use is identified. The most important distinction of this method is investigation and compilation of different quantity and quality elements such as smell, sound, form in one method and its flexibility which is applied in karaj city- district4. Denoted spaces in land uses consistency structure assessment map provide

opportunity for urban manager and designer to choose optimum places for necessary services and decreasing cost of programs for realization of urban development plan.

As consistency land uses assessment 's map Indicate, the place of trouble maker activities such as factories that make pollution, jail and etc should be changed and shortage of necessary land use like cultural, health and educational facilities must be compensated.

CONCLUSION

Human have provided their needs from land historically. In order to match general benefits by optimum utilization of public source, land uses planning and applying them by experts in Karaj city is essential. Regarding to growth rate of immigration and population which leads to destruction of green spaces, dissonant of land uses distribution, appearance of new sector and trouble maker activities are resulted in region ,Maintain and illustrating of consistency land use matrix based on different

conditions of social, economic and ecology factors in order to clarify criteria and location standards in planning must be considered which outcome will provide optimum infrastructure for activities and increasing output of urban function and more satisfaction. Finally following points are suggested to consider in urban land use planning: (1) Optimum use of land for public benefit should be considered and trade of land must be restricted. (2) Destruction of land and green spaces should be prevented. (3) Fairly distribution of land uses in order to match public needs. (4) Increasing public facilities. (5) Changing place of trouble maker activities in other suitable place.

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