Evaluation of Sustainability and the Optimal Population based on Water Resources in Mashhad

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Extended abstract

Introduction

By 2050, 70% of all population is expected to live in urban areas. Rapid urbanization will lead to the serious water scarcity and contradiction between water demand and supply as well. Also, increase in urban water demand due to population growth has turned to a major concern. Planning and water resource management must be supported by national executives since water resources are facing with the serious issues as a result of the threats of the population growth and climate change.

With the increase of size and density of population, required water resources must be supplied from the out-of-city resources and this raises the question that: "Is there a real capacity for the urban development based on water resources?" Thus, it is inevitable that we must move towards urban planning, sustainable development and optimal population depending on the water resources.

Following the presentation of sustainable development concept, the sustainable city models were presented. In the models, the planners should focus on creation of the cities with less input of energy, materials and less output of pollution. The studies of Haughton on sustainable city models were very helpful and each model presents different strategies for the water and sewage network. Some of the models are including the models of redesigning cities and independent cities. Proposing suitable patterns for the form and shape of cities, also specifying the optimal population size can be considered as steps towards protection of natural resources and reaching sustainable development.

Mashhad, as the center of Razavi Khorasan Province, is located in the Mashhad plain with an arid climate. This is considered as the second most populated metropolitan of Iran and, also, is twelve times as long as the second city of the province. Thus, this province has a mono-central structure and it is also the second greatest religious metropolitan of the world. In addition to the population dwelling there, it annually welcomes about 20 million of pilgrims. One of the most important facilities is drinking water which faces innumerable problems specifically in the summer when the hot weather and the large number of pilgrims increase the need for water. Thus, water shortage becomes more and more obvious. All this is happening while in 1966 in Mashhad plain to provide water was forbidden.

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Therefore, addition to keeping the use of this plain to provide the needed water depends on the neighboring realms and to achieve a sustainable management of water resources, Mashhad should be directed toward a sustainable form.

Hence, the ultimate purposes of this study are at first evaluation of the sustainability of Mashhad in terms of water resources by employing the sustainable urban development models proposed by Haughton and the second determination of the optimal population of the city in 2016 according to the two options of the Water and Sewage Organization of Mashhad to provide the needed water and consumption capitation in 2016.

Methodology

Due to its purposeful nature, this study has used mixed hybrid methodology to consider supportive qualitative data for quantitative analyses. Thus, in order to assess Mashhad's sustainability in connection with water resources, the forms were scrutinized through library research. Then, Haughton's studies on urban water and sewage network were identified. In the studies, reduction of permeation basin, sewage treatment, reduction of city size, and supply management were investigated. Also, using qualitative approach, province's water resources condition, Mashhad plain, and Mashhad itself were calculated through analysis of related documents. Finally, Mashhad's water condition was analyzed based on current documents and the necessity of application of procedures to gain sustainable development.

At this point, we analyzed the most significant plans for supplying Mashhad's water resources studied and applied in recent years. These studies are including substitution of backwater of the sewage refinery, and building Dousti and Ardak dams. The research attempts to specify the optimal population using quantitative approach, the average need of water for the resident population, for consumption per capita, for pilgrim per capita, and the average usual urban need of water in 2016. The data have been obtained from the minutes of the Water and Sewage Organization of Iran.

Results and Discussion

The results indicate that Mashhad plain is among the critical plains in water resources. From total underground water resources, only 2% is remained while 65.97% of urban population of the province living in Mashhad plain. Mashhad City is the biggest urban spot on the plain. In the first 5 months of 2014, from total provided water of the city, 42% were related to surface resources, so that about 92.7% from was Dousi dam, 3.1% from Karde dam, and 4% from Toroq dam. This matter shows the dependence of Mashhad on outside of permeation basin. Dousti dam is located in 220 km of Mashhad and until the end of 2012; nearly 14217 billion Rials were spent. Evident show that Dousti dam supply is about to end and it cannot be dependent on for long. The results also show that approximately one third of produced sewage has been recycled and great effort should be made in this regard. Plan of water transfer from Ardak dam is under implementation but due to delays it won't be utilized yet and hence Mashhad would face water shortage in 2016 even with Ardak dam supply.

Conclusion

Therefore, based on the water supply resources, the condition of recycling sewage and comparison with the guidelines of Haughton's sustainable city models, it can be said that Mashhad's model totally depends on outside resources and Mashhad City is not a sustainable urban center in regard to water resources. According to two options of Water and Sewage Organization of Mashhad for providing the required water in 2016, the city has surplus population. With the number of pilgrims, based on independence from permeation basin (without Ardak and Dousti dams) and on the dependence on permeation basin, the city has surplus population of 1,192,660 and 550,459 people, respectively. The optimal population is 1,933,340 for the first option and 2,575,541 people for the second option with surplus population even with dependence on outside the permeation basin. Proposed solution for

moving towards the sustainability and sustainable management of water resources is to decentralize the population of the city and to convert the mono-central structure of the city into multi-central structure through Haughton‘s models.

Keywords: Mashhad, optimal population, sustainability, water resources.

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Analysis of the Impacts of Urban Sprawl on Land Use Changes in Sari City

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Introduction

The process of land use change in urban areas has gone through an increasing trend since 1960s in Iran. This process has caused a type of unbalanced and unpredictable condition amongst the sustainable use of urban and environmental lands in urban areas of Iran. According to this procedure and its consequences, the land use patterns in the central parts of of Mazandaran (the northern province of Iran located on the coast of Caspian Sea and plays a key role in tourism and agricultural productions of Iran) including Sari City have experienced huge impacts and have gone through a massive fluctuations based on these changes (i.e., the process of urbanization as well as the increasing rate of population expansion and the increasing rate of migration both within and from the city). These changes have expanded and have identified new issues for urban management of Sari. All these impacts have left inspiring effects on Sari. These can be attributed to agricultural land use changes (it should be noted that agriculture is very important in Mazandaran and plays a very important role in the economy of Mazandaran and to some extent in the economy of Iran) in urban areas and also in peripheral areas of the city as a big change in the spatial condition. Based upon the observation and researches in this field, it seems that the continuance of this trend has instigated a discrete and decentralized pattern of growth. Finally, this procedure has caused urban sprawl, a condition in which city expansion develop to go toward peripheral parts of the city in the areas out of city borders while abandoning central parts of the city. According to what it was mentioned above, this paper is aimed at analyzing the interactive effects and impacts of suburban area's land use changes on urban sprawl and we want to see if there is any correlation between the two factors. In the next step, the prognostication of the process of land development and land changes until 2031 (1410) would be afforded. In other words, we would try to predict the probable changes in land use and the way the land would be manipulated by the highlighted time (the year 1410).

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Methodology

The methodology of this paper is descriptive-analytical and we have done our best to use different methods and tools to justify expected assumptions in this research. In the first step, using GEOMOD methodology, we tried to prognosticate the condition of constructed lands in Sari and then on the basis of Markov chain model, we tried to predict the probable trends of land use changes in peripheral areas of Sari in 2031 (1410). In the final step, we used the Geographical Information System (GIS) to join and relate different layers of data produced by previous models (Markov chain model and GEOMOD). We would analyze the interaction between different factors such as constructed areas and land use until 1410 in order to justify the expansion and spatial distribution of land uses.

Results and Discussion

The results of the research show that what we have gained through the research declare that agricultural land use and garden land use changes in 1410 would be decreased with a negative rate of 1.43%. In line with this trend, the constructed areas and regions will be increased with a positive rate of 4.85%. The spatial distribution of the constructed areas in northern parts of the region is concentrated. Same as this trend, in western areas and eastern regions, an increasing trend might be observed.

Conclusion

As we said before this paper is aimed at analyzing the interactive effects and impacts of suburban area's land use changes on urban sprawl and we would try to predict the probable changes in land use and the way the land would be manipulated by the highlighted time (the year 1410). It can be concluded that land use changes have formed the kind of sprawl in pre-urban areas of the Sari region. One of the main reasons of the pre-urban sprawl, amongst other probable reasons to this issue, is formation of the spatial inclination by the people toward residence in suburban areas of city in single house pattern (single household and second- based home pattern are a type of inhabitation in northern parts of Iran; in the pattern the house has a yard and is featured with just one floor). These types of houses are mostly located in peripheral areas of the city because these areas have a bigger potential for expansion and construction due to available vacant lands, these houses can be constructed there and we should note that these houses have other features to attract citizens to inhabit in there. For example, they are cheap and affordable for virtually all the citizens with different social and financial backgrounds. Yet, this is not the end of the story and other criteria can be found that affect the process. For example, this trend is also based upon the intensifying emerging of urban sprawl in urban regions of Sari and it needs to be directed in an appropriate way to lessen its damages toward the spatial condition of the city and save the environment by future planning and development schemes either in regional scale or urban scale.

Keywords: GEOMOD, land use change, Markov Chain, Sari urban region, sprawl.

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Analysis of the Spatial Structure of Urban and Rural Population (Case Study: Zanjan Province)

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Introduction

City as a set of human activities, natural environment, economy, and population is one of the important elements of the space. The population is distributed on the earth's surface to form urban and rural settlements. Populations of settlements have been distributed in various forms. Population distribution and the distribution of settlements in the habitable surface of the earth is not the same. A large part of the population is distributed in some certain areas of land. In the modern times, it is possible that space and spatial organization can solve the problems resulting from lack of proper distribution of population. One of the latest views in planning in the world is spatial and spatial structure.

In this framework, we need to survey the needs, spatial specifications and spatial structure elements. One of the important elements of spatial structure is population. Population is one of the basic elements in economic, social and cultural plans. Therefore, knowing the population, its structure and spatial expansion is a tool to make decisions and planning.

In fact, spatial structure of population expansion is a guide key for long term economic projects. The expansion and mobility of population is very applicable in planning for geographical region. Many problems resulted from false planning is resolved. One of the programs to analyze space and spatial organization is spatial planning. The purpose of this type of programming is to achieve proper distribution of population and activities on the earth surface, and accept population equivalent with its natural and economic power. This form of planning is the best complement to useful planning in the country. In fact, the spatial planning has a macro and global vision. Spatial planning considers all regions together.

Hence, in this research we tried to determine a spatial structure for population in Zanjan province. This paper explores the spatial distribution of population in urban and rural settlements in the zanjan province by space tools to emphasize on system and analysis of the elements influencing the spatial organization of the region, (the three elements of space, activity and population), particular emphasis was also on population element.

Methodology

The research method is descriptive-analytical. The resources used are mainly documents and secondary data sources, such as census data, maps, etc. They were obtained through library

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studies and documents. Study area, the Zanjan Province and has been collected from library documentation. It involves collecting all documents, reports and related data related to spatial organization of area and population, especially in the province. To analyze the spatial organization, we used spatial organization models in this paper. These models include the rank-size model, levels distance limit model, urban settlements classification scheme based on the classification of land, and average nearest neighborhood model. This is to survey the current population expansion status in Zanjan province.

Results and Discussion

The results of this study showed that one of the main problems of the current is disparities and imbalances in the spatial distribution of population in urban and rural settlements. As one of the most important characteristics of spatial pattern of population settlement in population of Zanjan Province is population density in cities and the rest of the province.

About 90 percent of the urban population of the province is living only in 4 settlements and only 10 percent in 12 cities. Thus, the concentration of population in 4 first cities of the province and small share of population in other urban and rural areas caused by the distribution pattern of population in the province is imbalanced.

The problem related to the distribution of population in the province includes dissociation in the urban hierarchy and insufficiency of settlement hierarchy, imbalance between the city and large proportion series (zanjan city) and end city (halab city), the rapid growth of the urban population relative to rural population, and increase in rural-urban migration.

Conclusion

All of the problems lead to concentration of population in small areas of the province. Spatial patterns of population settlement in the province have been disparate and unbalanced. It can be said that the effort to create balance in the pattern of population distribution and reform of the settlement of hierarchy is necessary today. The continuation of current trends will increase the problems resulted from these issues and will cause misuse of natural and human resources for development of the province. It can also create prosperity for the residents of the province.

Keywords: population, settlement, spatial structure, Zanjan Province.

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Identification and Analysis of the Barriers to Private Investment in Urban Development Projects (Case Study: District 10 of Tehran Municipality)

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Expanded Abstract

Introduction

Management of municipalities is based on the income and expenditure. The main sources of income are from the collection of duties and the cost of municipal services. Dependence of municipal and city revenues highly influenced by the periods of boom and recession has led municipalities to targeting, planning and implementation measures in different fields. Decision-making power is strongly influenced by the market and its agents act work; in some circumstances, not even able to pay its current expenses so that staff salaries are paid with a long delay. Economic problems arising from the lack of income in recent years as the recession in the price of land and reduced construction in urban areas as well as reduced liquidity is one of the hard periods for municipalities of Iran.

Methodology

District 10 of Tehran is a center not attractive for private sector investment. This is due to some reasons such as shortage of land, capital return, lack of extra performance and density. In this study, we tried to rely on a field survey to identify potentials of the area using some of the most important indices. The most important financing instruments are also provided. This study with the current state of private investment in the Municipality of Tehran is trying to determine the strengths and weaknesses to attract investment in the region through which it can be improved.

The questions of this study are that:

1. Which obstacles are the most important in the way of private sector investment in region 10?
2. What are the effective strategies to eliminate these obstacles?

The study was a qualitative approach based on questionnaires and in-depth interviews of the investors and officials associated with the investment in selected areas of Tehran. The problems investors are faced with in the private sector were investigated from the perspective of public participation organization experts. Questionnaires and interviews were completed by three groups of the organization, financial, administrative, and technical and project management assistances in the municipalities. The questionnaire has open questions to gain the unknown

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problems and obstacles the investment is faced with from both inside and outside the organization. The 4 interviews of the vice-investment, technical assistance and project control and management is carried out.

Several methods are used to fund and some of which are as follows. It should be noted that these methods is considered more than other forms of investment in municipal projects.

- foreign direct investment (FDI)
- foreign indirect investment (FPI)
- Build, Operate, Transfer (BOT) (Build Operate Transfer)
- Construction, operation, ownership, transfer (BOOT)
- Build, operate, ownership (BOO)
- Buy, build, operate (BBO)
- build, lease, transfer (B.L.T)
- Buyback (Buyback)
- Civil partnership
- combined methods and other methods of participation.

The questions in the interview with deputy public partnerships sample municipalities are as follows:

1. What are the assistance measures in the investment?
2. What are the causes of success / failure in attracting investment in the region?
3. What do you think about the most important obstacles in the way of private sector participation in Tehran?
4. What are the suggestions for providing ground proposed private sector participation?
5. What is the role of public participation organization in preparing the environment for private sector participationinvestment?
6. How you guess the future for investment in the region?

As well as the questions on the interviews with the following investors are:

1. To what extent you are satisfied from municipal as a law partner in this investment?
2. What is your most important concern in the process of signing a contract until the end?
3. Tell us the problems the investors were faced with, so far?
4. Tell us the problems you forecast in work process?
5. What suggestions do you have for improving the process works from beginning to end?
6. How do you see the role of partnership in providing the conditions of this contract?

Results and Discussion

In general, the problems the investment is faced with in the Tehran municipality are divided into two groups inside and outside the organization. Price stability and type of contracts is among the most important problems of the investors. The problems related to the organizational structure are divided into two categories; first the municipal issues related to the definition of packages and the lack of follow-up property rights problems. The second category of problems is related to the type of contracts, a long process of investment, and lack of transport before the construction as the most important problems related to the organization. The most important proposals from investors to improve the investment conditions require more and more constructive engagement between the parties to reduce the amount of investment. This could be brought complications absorbed by the ground, the easing of regulations, ensuring back profits, investment committee and the proposed closure of the investment.

Conclusion

In accordance with the priorities, the most important financial instruments are given. Some of the important barriers to investment of private sector in district 10 of Tehran municipality are including the tendency to sell rather than participate, change of positions and their problems, movement and carefulness, time-consuming contract formation, contract terms, project expertise problems, ownership problems after termination of project, transfer of ownership, technical

expertise and vision to the venture capital, further enhancing the role of public participation organization, investment packages, management in operation of the projects, no floating of contracts, no guarantee, and inconsistency of conditions with the terms of the contract are most.

Keywords: barriers to investment, district 10 of Tehran Municipality, urban development projects

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Analysis of Land Use Changes and Urban Sprawl Simulation in Mid-Sized Cities (Case Study: Khoy City)

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Extended Abstract

Introduction

One of the characteristics of spatial organization in developing countries is unplanned and irregular changes in physical evolution. Most of the problems in planning systems and political– decision flows are emerging from unplanned irregular, spatial– physical approaches in human settlements. The land control is one of the important issues in the recent world that has accelerated rapid growth of urbanization. The factors such as urbanism and village aversion began in Europe in the half of 18th century following the industrial revolution. The factors have resulted in urbanization growth and extension of periphery areas. While this problem has partly been controlled in the European states, it is yet expanding in developing countries. In Iran, the urban limits was adequate for traditional urban land control and there have being existed a balance between environment and city. It was happened until the spatial growth and development pattern was organic and domain factor of urban growth was indigenous. However, since the development and expansion is faced with a natural exogenous, it is also affected by social, economical and political changes. The incomes of oil were injected in the economic growth of cities followed by urban industrialization. It has forced our cities to be affect by world economy system. Consequently, the development patterns of most of Iranian cities are influenced by an improper and rapid process.

Methodology

This research is an applied study conducted by an analytical– description strategy. Data from multi-temporal Land Sat Tm5 for 1989, 2000 and 2011 were used to assess and model the changes in urban land use in Khoy City. To this end, satellite images for 1989, 2000, and2011 of Landsat Tm5 were gathered and then the process of image processing and change detection of land uses were done using Erdas software. Following the image processing, the results of data analysis were inserted to Idrisi software to obtain the process of modeling for Khoy urban growth. Accordingly, the modeling was developed using Markov chain and Autocells Markov chain.

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Results and Discussion

Khoy City has experienced extended physical development from spatial dimension in study period. This resulted in urbanization policies and consistent with political, economical and social changes in Iran. The results of changes in land use assessment indicated that most of the changes are related to urban land uses due to urban construction. Under this condition, urban land use has increased from 995.13 hectares in the beginning of the period to 2084.22 hectares in 1989 and 2557.12 hectares in 2000, respectively. The greatest growth with 27 was experienced between 1989- 2000. The land uses of gardens, green spaces and agriculture section have respectively experienced the decline of 13% and 8% in favor of construction uses in the period under study. As a result, the land uses has reached from 717.03 hectares to 623, 25 hectares in 1989 and 165.06, 288.54 hectares in 2011.The results of Markov chain modeling indicated that, the sections with the maximum changes are related to gardens and green spaces with 70.92% and agriculture lands with 55.80% based on a prespective for 2032. The results of forecasting changes by using Auto cells Markov chain also implied that the most recent changes will happen in urban built land use. It is predicted that land use area of 2557.62 hectares (62.6%) in 2011 to 2872.620 hectares (70.47%) will be reached in 1400. The greatest reduction in the area will be gardens and agricultural land uses. As the land use area will be reduced from 165.06 and 288.54 hectares in 2011 to 44.91 and 140.76 hectares in 1400, respectively.

Conclusion

Unorganized and unplanned urbanization is viewed as one of the major factors of changes in land use throughout the world. This is accounted as one of the main characteristic of cities in developing countries formed under the influence of exogenous factors and consumer economic conditions. The transition from agriculture based economy to industry based economy has caused the breakdown of the sources of rural production which in turn has increased the inorganic and uncontrolled urbanization expansion and immigration. This has resulted in demolition of spatial dimension of gardens and green spaces. Comparison between the results of changes in Khoy's land use with previous studies indicates that physical development of Iran's countries is due to the unsustainable patterns of urban development. It is consistent with the results of a study by Ahadnejad et al. (2011). They have analyzed the changes in land use in Ardabil during 1989– 2011. Their analysis has indicated that most of the changes with 68.6% are related to changes in agriculture land use with regard to urban construction lands. It is also consistent with the results of Roostaei et al. (2014) that have assessed the changes of land use in Urmia. Based on the results of their study, the area of this city has become more than quintuple during the 1989 -2011. It has also reported that, most of the change with 2998.89 hectares is related to agriculture use. It is concluded that the pattern of physical development of Iran cities is unsustainable and anti-environmental for the lack of appropriate policies in local, regional and national levels.

Keywords: Automated Cell Markov Model, Khoy, land use changes, simulation.

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An Analysis on the Differences of Mental- Perception Readiness of Families to Earthquake, Shiraz City

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Extended Abstract

Each year, there are many losses and damages as a result of natural disasters all over the world. Earthquake is one of the most sudden and unpredictable of these events. According to experts view, although we cannot prevent the occurrence of natural disasters, especially earthquakes, but we are able to take measures to reduce vulnerability and rapid relief and reconstruction. In fact, crisis is a sudden and unusual condition happening as a result of natural and unnatural in fortuity. Community readiness toward crisis is a cost effective method can decrease the damages. Shiraz City is located in Zagros folds with high tendency to earthquake. Thus, we did the analysis of different readiness in attitudinal – mental states of Shiraz communities in order to plan effectively for future crisis. Therefore, in relation to Shiraz city risk degree to earthquake hazard, research hypotheses of this article are offered as follows: (1) the mental - attitudes readiness toward earthquake locations in Shiraz is located in the lower level. (2) It seems there is a significant correlation between neighborhoods readiness and socio-economic situation.

For the reduction of urban vulnerability to earthquake and making appropriate policies and strategies, we first should know why and how vulnerability in is more concentrated in specific urban spaces and among specific groups and people. In this relation, we focus only on physical-technical aspects, and ignore the socio- economical aspects of vulnerability. Thus, we have no idea about which groups of people and why are more vulnerable. In fact, it is inequal distribution of social and spatial resources, properties and chances in society that forms these socio-spatial differences of vulnerability. Therefore, analysis and vulnerability reduction of natural hazards at society scale needs systematic and integrated consideration in a holistic view. Ignoring socio-economical vulnerability aspects and status, and mere concentration on hazards and their effects can ruin vulnerability reduction policies due to ignoring half of the reality.

However, the conducted researches in Iran were merely focused on either physical-technical aspects or on different influences and consequences of hazard happenings. In fact, concentration on "hazard intensity and resulted disaster" and also prevalence of "loss ideas and physical solution" is the feature of most vulnerability measurements and analysis of earthquakes in Iran. But, to reduction of cities vulnerability to earthquake, it is essential to evaluate the social dimensions of vulnerability and its spatial distribution.

Therefore, development and disaster reduction are not two agendas, but a single agenda. Disaster planning should be part of developmental planning. The “vulnerability... must be integrated as a part of ongoing policies and programs” and don’t ignore socio-economical vulnerability aspects and status.

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Methodology

Based on the theoretical bases and previous studies, the operational definition of concept readiness offered at one dimension, three indices and eighteen indicators. For measurement of readiness in terms of mental- perception and combining indexes, we used the multivariate decisions methods: AHP and SAW. Relative weights of the indices and dimensions were gotten by experts and Group AHP and Expert Choice software.

For testing hypotheses, at framework of quantitative-survey research method, we used causal-comparative and correlation methods. Sample size of households was calculated by Cochran's method up to 322 individuals. For sampling, we first classified Shiraz city regions in three groups: high, middle and low in relation to socio-economic status. Then, we randomly selected one neighbor from each class, totally three neighbors (high, middle and low). Household questionnaires were organized by both the general and specific questions about the quality of reconstruction. The household questionnaires validity was investigated through content, formal and its reliability through Cronbach's alpha test. Then, the needed data were also gathered by 350 household questionnaires and 20 expert questionnaires. The gathered data were analyzed by statistic test, included: One-way ANOVA and Tukey-test for the hypotheses; and correlation methods for second hypotheses.

In the descriptive analysis in a comparative approach we determined the variables in the sample population (families of neighbourhoods) and the differences between them using descriptive statistics (frequencies, measures of centralization and fragmentation). Inferential statistics were used to analyze the differences between the level of preparedness, as well as indicators of socio-economic status and its components. In this regard, according to analysis of difference between the groups, the Fisher F (One-way Analysis Of Variance) and Tukey test were used to test the difference between dependent and independent variables among the three groups.

Results and Discussion

The results of this research showed that sample neighbors are different in relation to variables such as: literacy, household dimension, income and occupation. For mentally readiness for-a view class averages are 36, 35 and 35. The scale is set between 1 and 100; the values less than 40 indicate low or low levels of readiness. The scale defined as the amount of mental readiness show the attitude of households in the city is low. Thus, the first hypothesis was confirmed. Attitudinal – mental readiness did not have any significantly difference in the three neighbors (high, middle and low) and this was located at the low level.

The results of correlation test showed that there are significant relations between the readiness and age, income, occupation at 95% and education, socio-economic status variables at 99 percent of confidence. Thus, the second hypothesis is also confirmed.

Conclusion

According to the findings of the research, readiness Mental- Perception at society scale, including urban society, has socio-economical aspect. Thus, analysis and promote of readiness to natural hazards at society scale needs systematic and integrated consideration in a holistic view. These results strengthen this theorem that: "the degree of people readiness to natural hazards is related to their social conditions and position in the society". In other words, disaster mitigation is a complicated process and most of its components can't be considered as disaster only, since they are also related to development. Thus, failure in management of the key roots of poverty and underdevelopment means more vulnerability and failure in disaster management. Therefore, socio-economic factors such as poverty reduction and socio-economic empowerment of households and individuals must be considered seriously in hazard mitigation.

Keywords: community, earthquake, mental- preception readiness, Shiraz, social and economical status.

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Environmental Impact Assessment and Improvement of Ecological Performance of Nature Bridge Sidewalk Construction in the District 3 of Tehran

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Expanded Abstract

Introduction

With an increase in urban population, urban environmental pollution, change of lifestyle, urbanization, getting away from nature and environment, we can observe the increase in the need for comforting and attractive social spaces such as sidewalks in cities day by day.

Urban areas are amongst the zones that generate ecological and environmental impacts at several different scales. These zones include special ecosystems that have an important role in creation of problems and solutions to challenges for sustainable development. Sidewalks and urban green spaces are important components of urban life. With the importance of sidewalks in cities, it seems essential to pay attention to them.

Methodology

Nature Bridge in district 3 of Tehran, with an area of 7000 square meters is the first bridge in Iran that is merely sidewalk and connects the Water and Fire Park and the Taleghani Forest Park to each other. The Nature Bridge, apart from its economic and social importance is also important in ecological aspects and in need for more research and study.

The methodology of this paper is ecological evaluation of building the Nature Bridge Sidewalk. The ecologic structure of the region is studied first by using the DPSIR Model and then for the evaluation of the influences of the building of the Nature Bridge, the Iranian Matrix Method is applied using landscape ecology approach.

Results and Discussion

The results of this research show that construction of the Nature Bridge is ecologically thoroughly approved. Besides, among all the impacts, the improvement of ecologic performance of the region is the most important effect with 2 points. The consequences of the improvement of micro-impacts and the quality of air and plant habitats, jointly with 1.6 points, are considered as the most important consequences.

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The results also show that rehabilitation around the Nature Bridge to improve the ecological performance of the bridge is based on the landscape ecology principle, expanding the green patch of Water and Fire Park and Taleghani Forest Park.

Table 1. Tehran ecological structure analysis using DPSIR model in district number 3

Model Components	Driving Force	Pressure	State	Impact	Response
Result	Good condition of natural elements to plant development in the region. There is a large piece of land in the region, Tehran major communication axes through the area and etc.	Increase of population density, The high relative share of construction in the area, misuse of natural elements in the region and etc.	Good condition of green space area in the region, There are vast areas of Abbas Abad in the region, good condition of air corridor in the region and etc.	The destruction of the ecological quality through ill-considered projects, Cut the green corridors, Scattered patches of green space, and etc.	Connection of green corridors with green patch, connection of green patch together, increase of green space per capita in the region, and etc.

Table 2. Ecological assessment of nature sidewalk construction using Iranian Matrix

Impact Consequence	Change of bridge to sidewalk	Connection of Water and Fire park to Taleghani park	Modern architecture and green design of the Nature bridge	Creation of ecological tourism region	Improvement of ecological performance of the region	Means of consequence of score point
Microclimate and air quality	2	1	1	1	3	**1.6**
Animal habitats	1	1	1	1	1	**1**
Plant habitats	2	2	1	1	2	**1.6**
Sense of place and social acceptance	1	1	2	1	2	**1.4**
Means of impact score point	**1.5**	**1**	**1.2**	**1**	**2**	

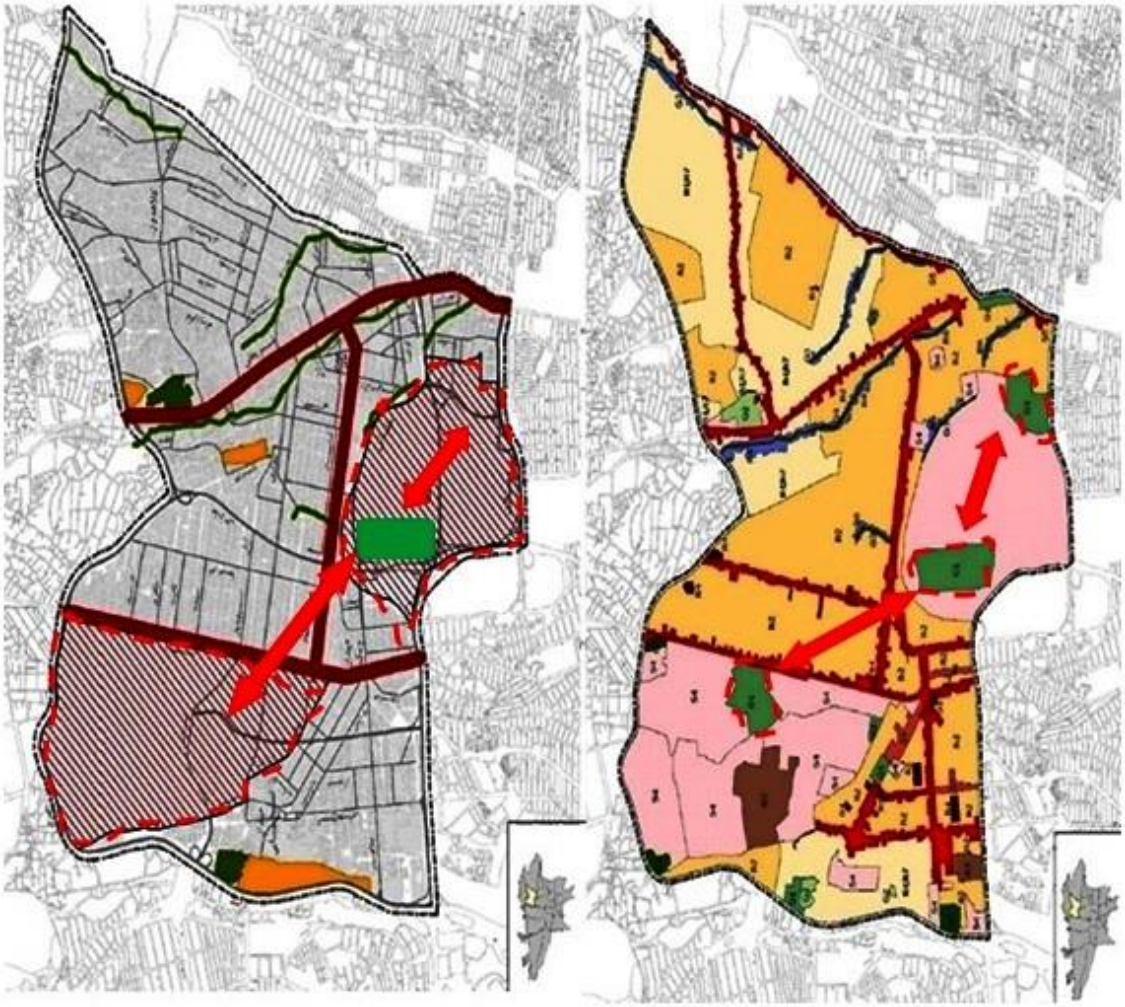

Fig. 1. Ecological connection of Water and Fire Park, Nature Bridge, Taleghani Forest Park patch with surrounding area; Connection with green spots around (right figure), Connection with areas in need of protection and rehabilitation (left figure)

Conclusion

Construction of the nature bridge without taking side events into account will cause the bridge to lose its attraction and turn into a simple place. Because of this, it seems essential to use the ecologic principles of building ecological attraction in the regions around the Nature Bridge. One of the basic rules is the connection and expansion of the green patches. The ecological urban development is followed in many developing cities of the world. One way to achieve this goal is to develop basic concepts of landscape ecology. Water and Fire Park, Nature Bridge, Taleghani Forest Park patch is the tourism area in Tehran. To improve this patch, it is connected to the other green areas and land uses.

Keywords: ecological impact assessment, Iranian Matrix, Nature Bridge, sidewalk, urban ecology.

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