Spatial- Temporal Analysis of Urban Heat- Island of Mashhad City due to Land Use/ Cover Change and Expansion

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Extended abstract

1. Introduction

Increase in the land surface temperature and the formation of heat islands in the metropolis areas has become one of the environmental problems emerged by unplanned expansion of cities. Many factors are involved in the creation of urban heat islands. These factors can generally be divided into two groups of controlled and uncontrolled. In addition, the controllable and uncontrollable factors can be classified as another. The factors with temporary impact such as wind speed and cloud cover, the variables with constant and stable impact such as green space, building materials and sky view and, finally, the factors with periodic or cyclical impact such as solar radiation and heat sources are caused by human activities. Generally, the heat generated in the surface is resulted from the sun in the form of solar radiation, large industries and factories, cars, air ventilation systems and other sources related to the human activities (Rizwan et al., 2008: 122). Nowadays, use of satellite imagery in urban environment studies has been growing rapidly due to integrated vision and reduction in the cost and time of the studies. Land surface temperature is one of the most important variables measured using these images. Thermal images are widely used to evaluate the urban heat island. More research is focused on the earth surface temperature patterns and their relation to biophysical characteristics of urban areas, especially with vegetation index (Sobrino & Raissouni, 2000: 353; Weng et al., 2004: 467) and changes in land use/cover (Xiao & Moddy, 2005: 237; Amiri et al., 2009: 2006; Weng et al., 2009: 467).

Expansion of the city of Mashhad in the past two decades had augmented numerous environmental problems such as air pollution and urban heat island. These problems led to a decline in air quality and the health of urban life and the risk of diseases such as asthma, insomnia and other respiratory diseases. Hence, the need for environmental research and urban planning in the city has been doubled. Therefore, this research using multi-temporal Landsat images (TM, ETM+ and OLI) investigate spatial-temporal distribution of the urban heat-island

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variations due to changes in the urban development of Mashhad, vegetation, land use/ cover, simultaneously.

Methodology

In this study, Landsat images of TM (1/5/1987), ETM + (28/5/2000) and sensor OLI (11/5/2014) was used. The Mashhad topographic map at scale 1:25,000 was used for Geometric correction with RMSE error less than 0.5 pixels. We also used FLASH algorithm for the atmospheric correction on the images. To extract Land Surface Temperature from Landsat images, the raw values (DN) were converted into Spectral Radiance image. Spectral Radiance of thermal bands then was converted into brightness temperature. This is by assuming the fact that the brightness temperature of the black body (emissivity= 1) is calculated and contains the effects of the atmosphere (absorption and emission). Brightness temperature using sensor's calibration coefficients is obtained from the following equation:

$$T = \frac{K2}{\ln\left(\frac{K1}{L_\lambda}+1\right)}$$

where T is effective at-sensor brightness temperature [K], $K2$ Calibration constant 2 [K], $K1$ Calibration constant 1 [W/(m2 sr μm)], L_λ Spectral radiance at the sensor's aperture [W/(m^2 sr μm)]. Obtaining land surface temperature is required to know about land surface emissivity (LSE). To obtain the emissivity, hybrid threshold NDVI and image classification method was used. With obtaining the values of the emissivity, the temperature of the surface for TM and ETM+ images can be calculated from the following equation (Artis & Carnahan, 1982):

$$Ts = \frac{T}{[1+\left(\frac{\lambda T}{\alpha}\right)ln\varepsilon}$$

where T_s land surface temperature, T brightness temperature, ε emissivity power, λ wavelength of radiance, α=hc/k (h=Planck's constant; c=Velocity of light) (k=Boltzmann constant). To obtain the land surface temperature from Landsat 8 thermal data (TIRS), we also used split windows algorithms. Finally, thermal image didn't take simultaneous and heterogeneous classes of images due to changes in urban land use.

Results and Discussion

The results showed that urban sprawl into agricultural areas can reduce green space and that this was the main factor in the surface temperature rise and expansion of urban heat islands in the city of Mashhad. However, global warming, industrial development of the city, and urban traffic (due to the expansion of the city) are increasing the temperature of the thermal expansion of the islands. Thus, the results indicated that about 2,500 hectares of agricultural land and green spaces are changed into built-up land use. This shows that the decrease in vegetation cover is the most important factor in development of the heat islands in Mashhad. With the loss of vegetation cover in and around the city, very cool temperature class (25-29°C) has been replaced by normal temperature class (33-37°C). Furthermore, by manipulating the surrounding areas of the city, their temperature is increased and transformed into the hot and very hot temperature classes.

Conclusion

The results of surface temperature distribution changes indicated that several temperature clusters in the North West, South and South West of Mashhad have been developed. In the north west this development is because of manipulation of the land connected to the city and in the south the development is mainly because of airport's development. The sunny slopes in the

West and South West are because of manipulation of these domains. In addition, the conversion of agricultural lands into urban land uses in the east and north east can alter the very cool and cool temperature classes into normal and hot temperatures classes. The results also showed that the use of multi-temporal satellite data and conventional methods can represent the combined heat islands (assessment of spatial – temporal changes of the distribution of urban heat islands into changes in the development of urban, heat islands relationship with vegetation and land use/cover). These changes in the urban surface areas can reveal all aspects of the formation and expansion of urban heat islands.

Keywords: land surface temperature, land use/ cover changes, Mashhad, split-window algorithm, urban heat islands.

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Statistical Analysis of Sustainable Development in Urmia City

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Extended Abstract

Introduction

According to the increasing rate of urban challenges in various areas, it is required to adopt a strategic and comprehensive approach to sustainable urban development in dealing with the challenging and vulnerable aspects of cities. Adopting a future-oriented and sublime approach has been considered in the agenda of urban planning and management policies for development. This is to provide an impartial and justice-centered insight into the axes of the development. For this purpose, seven sustainable urban development patterns, namely sustainable urban economy, sustainable urban community, sustainable urban housing, sustainable urban environment, sustainable urban access, sustainable urban living, and sustainable urban democracy, with 35 variables were selected and classified.

Harlem Brantdlnd (1987) introduced the concept of sustainable development for the first time in a report entitled "Our Common Future". This report offered the following definition of sustainable development: “Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs and enjoy the resources”. This report has introduced seven strategic imperatives, namely “Reviving Growth, Changing the Quality of Growth, Meeting Essential Human Needs, Ensuring a Sustainable Level of Population, Conserving & Enhancing the Resource Base, Reorienting Technology & Managing Risk, and Merging Environmental & Economic Components in Decision Making”. In fact, adopting a human-oriented approach over and above paying attention to the environment has been the first impression perceived from the principles and fundamentals of the development at a sustainable level. Social justice and fairness in allocation of development resources without undermining other areas of development is the exact inference drawn from the sustainability of urban development. Urban planning and even urban design policies are nowadays faced with this issue.

Methodology

The purpose of this research is to analyze the aspects of sustainable urban development in Urmia through adopting an applied goal-setting strategy and conducting both analytical and

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descriptive survey. Subject-related library documents have been chosen as a basis for conducting the research and getting access to the descriptive data required for the study. The survey method was used as an instrument for collecting the necessary analytical data. Linear, logistic, and logarithmic regression analyses and tree analysis have been used as research tools to elaborate the survey method output.

Results and Discussion

At this stage of the research, a tree analysis has been carried out in order to evaluate the priorities of sustainable urban development in Urmia from the perspective of its citizens. The results of the tree analysis contribute to evaluation of the priorities of indicators based on the aforementioned statistical measures from the perspective of the citizens through classification of overall average. This, in return, was gained by each aspect of the sustainability, calculation of the closely-related standard deviation, and making an overall prediction from synthesizing the low, medium and high averages. In this analysis, it was required to classify and evaluate the data in order to provide the dependent variable. For this purpose, the data below the average level was classified with the value of "zero" and those above the average level with the value of "one". These data were regarded as the variables required for the evaluation. According to the results of the study, the tree analysis aiming at identifying the perspective of urban sustainability aspects denotes that sustainable urban democracy (identified in two branches with an overall average of 22.32) has an inappropriate condition for the perspective of the citizens compared with the other aspects of sustainability in Urmia. Linear, logistic, and logarithmic regression analyses of the aspects denote that the two aspects of sustainable urban settlement and sustainable urban democracy have the weakest impact on the urban sustainability of Urmia. Overall combination of the results obtained from the regression models represents the impact of sustainability aspects on sustainable urban development in Urmia (with a value of 0.101).

Conclusions

Nowadays, the concept of sustainability in development process has become the cornerstone of all policies related to growth and development of human societies. It is necessary to consider this concept to achieve social balance and justice and human-centered development. In this study, the sustainability aspect of urban development in Urmia has been assessed and evaluated using the sustainability for urban development discussed at the conference on "Future of the Twentieth-Century Cities" held in Munich, Germany. For this purpose, the seven aspects of sustainable urban economy, sustainable urban community, sustainable urban housing, sustainable urban environment, sustainable urban access, sustainable urban living, and sustainable urban democracy with 35 variables were brought into questions in the form of questionnaire and survey from the viewpoint of Urmia citizens. The citizen feedbacks were collected subsequently. The purpose of this survey was to identify the priority levels of the seven aspects in the process of sustainable urban development of Urmia from the perspective of its citizens and identifying the impact significance of the aspects considered in the process of sustainable urban development in Urmia. The first stage of the research has been performed with the target group based on a tree analysis. The results of this stage represent low average of sustainable urban democracy compared with dependent variable in the employed conceptual model. The results showed that this aspect of the public perspective needs to be improved and that this aspect has the highest priority at this stage. At the second stage, impact of the aspects proposed in the sustainable urban development process in Urmia has been measured using linear, logarithmic, and logistic regression models. At this stage, the aspects of sustainable urban democracy, sustainable urban environment and sustainable urban economy (from the selected aspects of sustainable urban development) have represented the lowest and the weakest impact compared with other indicators. These are based on the way of explaining the data effectiveness variance in the three regression models. Although, explaining the data resulted from the regression models may not be a satisfactory measure to describe the effect of the

aspects on reliability of the research, the existing significance denotes that the two aspects of sustainable urban living and sustainable urban community have the greatest impact on realization of sustainable urban development in Urmia.

Keywords: sustainable development, sustainability aspects, Urmia.

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The Effect of Physical Capacities on the Place Attachment from the View of Teenagers in Tehran

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Extended Abstract

Introduction

This essay embarks on a research about the effects of community capacities on certain selected districts in the city of Tehran. The urban space can be created based on different patterns of people in the various places and neighborhoods. Another option would be an urban space as seen from the perspective of those who understand different cities based on their mental capacity. In this way, the same number of people and different understanding of urban space was seen. The method of this research has been an analytical and dialectic process.

Methodology

This study has been concluded with distribution of 475 application forms, field and district observation, and oral interviews with teenagers between 12 and 16 years old, from certain districts such as Elahieh in district 1, Narmak in district 8, Hashemi in district 10 and Yaftabad in district 17. It is necessary to mentioned that all these districts were chosen in an analytical and systematic way. The major goal of this research has been the dialectic evaluation of the factors existing or could be created between community capacities and the place attachment for the certain sample districts. To creat pyscial capacity, 16 questions were asked. To investigate the effects of the independent variable component (Physical capacity) on independet variable (place attachment), we used Stepwise multiple regression analysis.

Results and Discussion

Just 11.2 percent of teenagers have positive evalution of the pyscial capacity of their local area. About 79.8 percent have medium evaluation and 9.1 percent have negative assessment. Average evaluation of the respondents is ranged from 0 to 100 and equal to 50.2, i.e., approximately equal to the midpoint of the range. The greatest average from the questions of the pysical capacity is related to neighborhood crowding and the lowest average is related to harmful

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insects and vermin and refer to Game-net and coffee-net. In this paper, place attachment index and pysical capacity of the four districts were studied separately. To that end the Parametric F test (One-way analysis of variance) and also Tukey test (significant differnece) were utilized to cluster the selected neighborhoods and to ansewer the question that; which of the neighborhoods from the index review are either similar to each other or different from each other. In all the variables of the community capacity index (the residential properties, environment recognition, annoying use and activities, environmental features and local features) there was a significant difference between the studied neighborhoods. Tukey test results show that from the component of residential properties, Hashemi District is located in one cluster and other districts are located in other clusters. Therefore, the teenagers of three districts such as Narmak, Elahiye and Yaftabad compared with those of Hashemi District have significantly better living conditions from the point of residential properties. from the point of environment recognition, Hashemi and Yaftabad districts are in one clutser and, narmak and Elahyieh districts are in the other different clusters. Hence, the teenagers of Elayieh compared with those of Narmak have the better recogniton of the environment. From the point of annoying use and activities, Hashemi and Yaftabad districts is located in one clutser and Narmak and Elahyieh district in another cluster. Thus, the teenagers of Elayieh and Narmak districts in comparison with those of Hashemi and Yaftabad have the lowest annoying use and activities. From the point of environmental features, Hashemi and Yaftabad districts are located in one clutser. On the other side, Yaftabad and Narmak distritcs are formed in other cluster and finally the Narmak and Elahiye districts can be placed in one cluster. From the point of local features, Hashemi district along with Elayihe and Narmak districts are located in one clutster and Narmak and Yaftabad districts are formed in other clutster. In general, the results of Tukey test indicates that Hashemi district is located in one cluster, Yaftabad and Narmak districts in other cluster and from the other side, Narmak and Elayieh district can also be formed one cluster. Therefore, Hashemi district has the lowest capacity for community capacities among all other districts and at the same time the Elahye District has the highest level of potential for community capacities. In order to evaluate the variables; the Pierson associative parameter is utilized. This factor for the correlation between physical capacity variable and attachment index is equal to 0.514. This value suggests a strong correlation between the two variables. In other words, if the physical capacity is high, the attachment of teenagers to place will be increased. Among the components of pysical capacity, environment recognition factor has the highest correlation with the place attachment variable. Pierson associative parameter is 0.564 that shows the strong correlation between the two variables. Except the variable of annoying use and activities, other factors are positively correlated with the place attachment variable. Given that a significant amount of all components is less than 0.05, the correlations observed in the sample with 5% maximum error can be generalized to the target population.

Conclusion

The regressive analytic process indicates that all three components of pysical capacities (environment cognition, local possibilities and environmental characteristics) with the place attachment variable has strong multiple correlation. All three components of the analysis for physical capacities are clarifying the place attachment variable. This is in association with F test, all the affiliation variables and clarification variables are decipherable and could be generalized based on the statistics.

Keywords: community capacity, physical investment, place attachment, teenagers, Tehran City.

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Prediction of the Areas Vulnerable to Earthquake in Mashhad City

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Expanded Abstract

Introduction

The map of earthquake-vulnerable areas around our country shows that more than two third of all the land is on high risk zones on which most of populated cities are located. These areas are more influenced by activities of faults and they have shallow quakes near the surface. This is to the extent that 90 percent of all the cities in the country are vulnerable to a 5.5 Richter's earthquake. Two existing powerful and active faults in two sides of Mashhad City, with short distance to the city, show a high risk zone. The city is located in a distance of 20 km to a fault 100 km long in east and southeast of the city and also in a distance just 2 km to a fault of 90 km long in south and southwest part of Mashhad. Up to 275 microseisms and earthquakes took place in Mashhad in 2006; 3 of them were more than 4.5 Richter and one with 6.6 Richter, as the most important in Mashhad. During the period 1891-2011, the City had population 60 times and 40 times the area. Given that, the city is a hub of religious tourism. More than 20 million pilgrims and tourists are allowed to enter the city each year. The population density in the area can convert an earthquake into a harmful humanitarian disaster.

Methodology

Fuzzy logic in GIS software was used for zonation of Mashhad vulnerability during possible earthquakes. In this software, small functions were used for fuzzification and fuzzy multiplication operator was used to overlap the data.

Results and Discussion

Overall results show that the west parts of the city have the highest risk of earthquake, while central and eastern parts are experiencing the lowest levels of relative earthquake risk. District 9 has the highest risk and following that the districts 12, 2, 11, and 10 have most risks, in order. District Samen has the lowest level of earthquake risk and districts 5, 3, and 4 are relatively low risk zones. Among three of the most populated districts of Mashhad, i.e. 2, 3, and 9, the districts 9 and 2 have high risk and district 3 is the only one with low risk of earthquake. But district number 9 which is the third one in the order of population in this city has also a high rank in the

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view of earthquake risk. It is the most risky district in the city. Thus, it seems that special attention should be paid to the earthquake dangers in this region. It is obvious that the old buildings in Mashhad must be more considered, those with relatively high risks of earthquake damages based on findings. Some other results of this study are as follows:

- 51 percent of the city's area with 1.45 million residents is located in high risk region.
- After 1980s more than two third of the city has spread into high and very high risk region.
- 63 percent of old buildings and 55 percent of the areas with more than 120 people density are placed in high and very high risk regions.
- 81 percent of residential buildings and 86 percent of commercial/ administrative/ accommodations buildings are located in relatively high and very high risk regions.
- 76 percent of 4 floor and higher buildings are located in relatively high and very high risk regions.

Finally, it is suggested that if more extension of this city is required, more attention should be paid to the faults around the city and more growth towards the west, specially extending in district number 9, should be avoided. Therefore, to avoid spreading of the city into high risk regions, it is suggested to let it be extended towards the north east. It should be noted that all the results and suggestions given in this study are merely based on the researches related to earthquake risks on the basis of corresponding indices. It is obvious that a vast number of studies and researches from a variety of viewpoints are necessary to set programs to make development in a metropolis like Mashhad.

Conclusion

Imbalance and unprincipled growth of the city especially in the last decades, construction near the faults and places with geologic instability, lack of practical abilities to manage a disaster, existing vulnerable buildings and lots of more factors show that in case of a severe earthquake in Mashhad lots of irreparable damages and casualties would occur. Thus, according to the above agents and investigation about how vulnerable is this city to an earthquake, we can say that disaster management is consistent with behavioral and structural schools. Because we see unprincipled behaviors based on behavioral school like non-standard constructions, use of improper materials, establishment of slums, improper foundation, construction in the canals and watercourses, and etc., Based on structural thought, management problems and the absence of a united management in case of a disaster can also play a role in intensification of a disaster. Finally, to reduce Mashhad's vulnerability to possible earthquakes following suggestions are presented:

1. Providing a database from close or effective faults, which can make trouble;
2. Managing secondary risks like fire, gas leakage, flood and ...;
3. Reinforcing existing buildings as far as possible;
4. Preventing any construction without obeying seismic codes;
5. Cooperation and interaction among all related organizations;

Keywords: city vulnerability, earthquake, Fuzzy logic method, Geographical Information System (GIS), Mashhad City.

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Evaluation of Community Identity in Jahrom City

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Extended Abstract

Introduction

Identity comes from essential attributes of any object, person, or city that finds character through concepts such as differentiation and similarity, continuity and change, unity and diversity, and character. Identity crisis or a sense of no identification is seen as one of the crises of human life in the recent years in many territories and most communities. Therefore, the identity of neighborhood as an introduction to physical division of city and quality of its dimension and hierarchy has turned into a major necessity in discussion of urban planning. However, the identity of the neighborhood can strengthen the sense of belonging to a place and as result, citizen's identity; that is why the concept of neighborhood has a special place in urban planning and design. However, lack of attention to human identity in cities can bring great consequences. Some of the consequences, according to Anthony Giddens, are insecurity, fear, and anxiety existed in modern times. They stem from the fact that modernization destroys the traditional framework of protecting society and have replaced them with a larger and non-specific organization. The solution lies in revival of a less theorized and more human urban, where the environment is planned and designed for man and not dominant him. Identity and social participation in community is considered important as one of the structural– physical infrastructure. Urban survival shows the importance of neighborhood in social– mental development of urbanization. The neighborhood, therefore, is the physical embodiment of community and the boundaries are the embodiment of privacy and territories. With regard to the issues, this paper tries to measure the amount of neighborhood identity of the citizens of Jahrom. Then, the questions arise here as follows:

How is the sense of belonging to a place of the residents of neighborhoods? In addition, what is its status?

What is the link between local resident's participation and their sense of belonging to a place?

Methodology

This article is an applied – developmental research based on the objective; and the theoretical foundations are collected using library method; and the field observations using a questionnaire

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are used to collect the required information. After compiling questionnaire the questionnaires were completed using random sampling. The population in present study is consisted of the residents of all distressed areas in Jahrom, means 22375. The sample size was calculated using the Cochran formula up to 260 people. The questionnaire was analyzed via SPSS; finally, each criterion was calculated using statistical (Pearson and T) tests and standardized coefficients. Factor– heuristic analysis is used in order to analyze the factors affecting the identity of the neighborhood. It means that the result obtained in this study is reduction of 43 primary endpoints to 6 top factors through Varimax Rotation.

Results and Discussion

Using factor analysis in the study, it must first ensure whether the number of data required for analysis is appropriate or not? For this purpose, KMO index and Bartlett's test was used. According to the study, the index result obtained is 0.928; then, it indicates that the number of data is appropriate for factor analysis. Indicators loaded in the factors higher than 0.5form a factor and the indicators that do not have the possibility of accumulation form another factor. In addition, the total variance of six mentioned factors is 91.523 percent that the first factor is that most of it is 35.569 percent. Variance of 99.523 represent that the factor analysis was satisfactory. The results indicate that in this analysis, the first factor alone explains 35.569% of the variance. The second, third, fourth, fifth, and sixth factors explain 34.518, 14.802, 6.633, 3.357 and 1.498 percent of the variance. The factors have been named as the quality of service, physical identity of the neighborhood, security, participation level and solidarity within the neighborhood, aesthetic stakes of neighborhood, and commitment in maintaining the fabric of the neighborhood, respectively.

The sudden and growing gap between the expectations of citizens and their benefits from the services of the city, regardless of whether they are true or false, is causing dissatisfaction and satisfaction. In this research, the citizens have noted that the satisfaction of quality of service considered as the most important factor among the important factors for improvement of the city. Furthermore, we should know that the development approach of entering people into decision-making and control process requires attention to defaults of "public participation" including overcoming obstacles for people's participation in development. This prefers strategy of partnerships with other development strategies and the possibility of finding people to know their purposes. We can say that the cities have the desire for visual environments to broaden the aesthetic experience of citizens in order to improve the image of community of its own and strengthen the civic pride; and to improve the national and international prestige to strengthen the competitive ability of the city in order to attract more capital and creative classes. In today society, the human needs to coexistence are considered at a high level and the co-existence becomes more fulfilling in the form of citizen participation in community. There are factors among the various factors that cause satisfaction or dissatisfaction of organizational performance that are associated with feelings of citizens towards their home. These factors may have a positive effect on satisfaction. According to the results, the real average (2.82) is less than the given mean value (3). Therefore, the average sense of belonging to a place in the neighborhoods of Jahrom was assumed less than the theoretical average. It, then, can be said that the research hypothesis is confirmed. In addition, the Pearson correlation coefficient was used to evaluate the participation and the level of belonging to a place. According to the correlation coefficient (0.925) with reliability of 0.99 and error smaller than 0.01, the results show that there is a significant statistical relationship between the two variables of level of participation and sense of belonging to a place. This means that the higher the level of participation in neighborhood, the greater the sense of belonging to a place and vice versa; the participation rate can also be reduced with the reduction of place.

Conclusion

Based on the results of factor analysis, the most important factor in factor analysis means the first factor with eigenvalues 23.120 and variance 35.569. This shows that the importance of factor "service quality in the neighborhood identity" is of utmost importance. The second important factor is the variable of "knowing the physical identity of neighborhood" that has little distance with the variable "quality of service". The variables of "security", "level of cooperation and solidarity within the neighborhood", "aesthetic risks of neighborhood" and "commitment in preserving the fabric of the neighborhood" are placed in the next levels. With respect to the Pearson correlation coefficient (0.925) with reliability of 0.99 and the error less than 0.01, the results show that there is statistically significant relationship between the two variables of the level of participation and sense of belonging to a place. This means that whatever the level of participation in the neighborhood increased the sense of belonging to a place will also be increased and vice versa. The participation rate reduces with the reduction in the level of sense of belongings to a place. However, despite the significant activities carried out, there is a gap between people and urban management. It is likely that the lack of citizens' participation in solving urban problems is resulted from the loss of residents' sense of belonging to them.

Keywords: community, community identity, Jahrom City, participation, sense of belonging to a place.

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The Effects of Green Space Expansion on the Patterns of Urban Heat Island (Case Study: Velayat Urban Park)

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Extended Abstract

Introduction

The megalopolis of Tehran is the most populated city of Iran with an irregular and unplanned pattern of urbanism. The situation of green spaces is far less than the standards and the distribution of green spaces in the urban area is unequal and heterogeneous. As a result, Tehran has a highly intensified and multi-core heat island located above the various industrially and residentially active regions. The heat island, by the definition, is the increase in temperature of urban area in comparison with that of the suburbs and rural regions. This phenomenon was first measured and defined by Luke Howard. It is nominated due to its spatial appearance. If temperature contours of a city are drawn, it will look like an island surrounded by water. Due to former studies, the heat island appears more in minimum temperatures.

In Tehran, because of numerous factories located in west part of the city and the effects of heat island in the country, the existence of heat island could transfer the pollutants into the urban area and henceforth, this phenomenon is of high importance in health related issues. The intensity of heat island imitates the synoptic weather patterns very much, but its spatial pattern is mainly affected by local conditions and land cover. According to the studies the intensity of Tehran's heat island is a function of synoptic conditions but never reaches zero. Also, many other researches confirm the connection of the land use, especially from natural land use to urban cover, to the heat island. Therefore, one of the best methods to reduce the heat island intensity is to increase the green spaces. However, it may be evident that increase in the green spaces will reduce the heat island intensity, but the rate of the effects may be different. This research was carried out to model and measure the effects of green space expansion on the heat island pattern in Velayat urban park.

Methodology

To measure the green space expansion in the Velayat Park, in the first step, the images for year 2006 and 2013 were obtained using Universal Map Downloader. The images were obtained to extract the pre and post conditions of the green space. Then, the images of the Thematic Mapper sensor (TM), landsat 5, and Operational Land Imager (OLI) and Thermal Infrared Sensor

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(TIRS), Landsat 8, were obtained and each image was processed using ENVI 4.7. The images were divided into four specific land use classes (Asphalt, Soil, Vegetation, and Concrete-representing buildings).The field observation was also inspected for four times to increase the precision. The outputs of this step were entered the Envi-met, a Microscale non-hydrostatic simulation model, with spatial resolution of 20 meters for an area of 3.4 kilometers long and 2.6 kilometers wide.

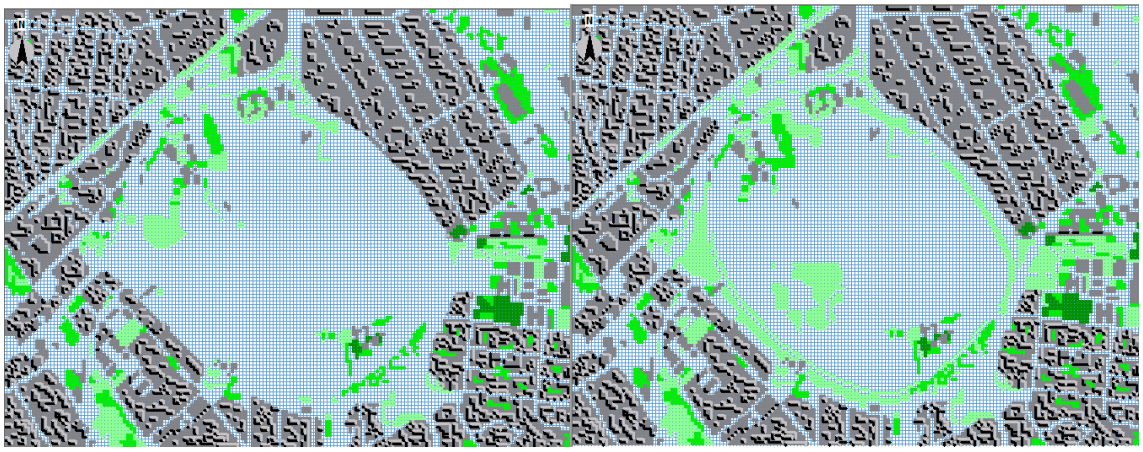
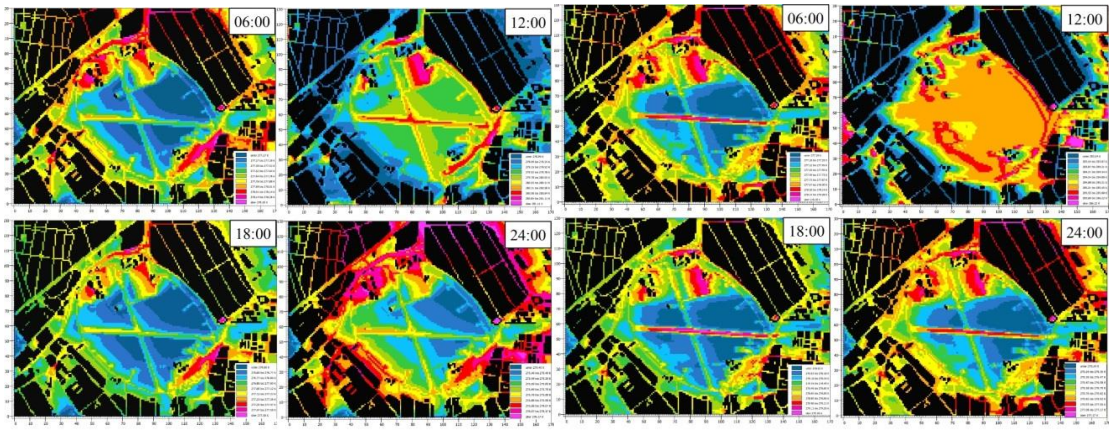


Fig.1. The land uses entered to the model (Envi-met) before and after the green space expansion (right and left, respectively). Green, grey, and blue represent vegetation, buildings, and asphalt and soil surfaces (bare surfaces), respectively

Results and Discussion

After the steps were taken, the simulations were carried out. The results were produced for a 24 hours pattern, but since the patterns were somehow alike and the descriptions would take a larger article to be shown, the results were limited to 6 hours intervals with maximum like-hood. The results are shown in Figure 2.



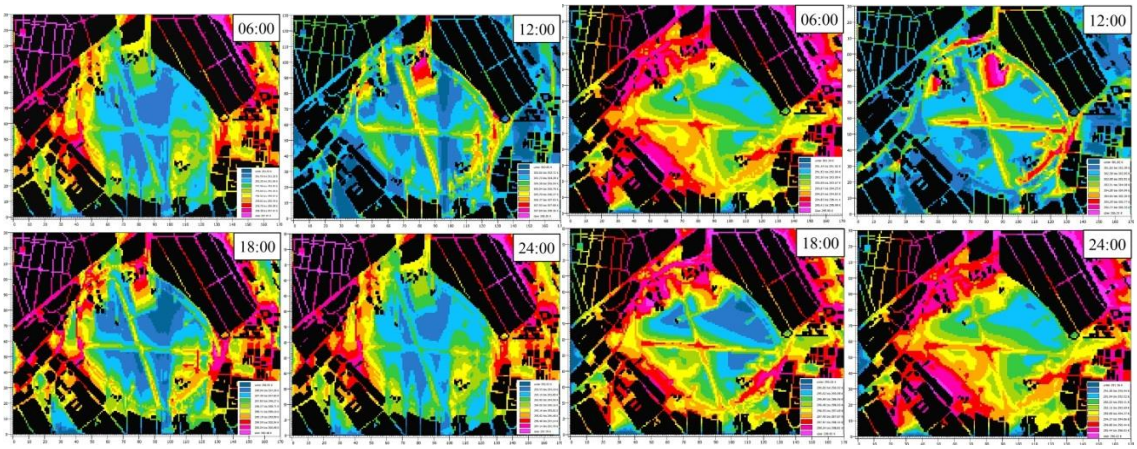


Fig. 2. Simulation results for 4 Jan 2006 (upper left), 17 Jan 2013 (upper right), 2 Aug 2006 (down left), and 15 Jul 2013 (down right) at hours 06:00, 12:00, 16:00, and 24:00 for each day

Conclusion

One of the methods used to study the heat island, nowadays, is modeling of the remotely sensed images. In this research, a microclimatic model (Envi-met) was employed to simulate the effects of green spaces expansion on the spatial pattern of the heat island in the Velayat Park. The results have indicated that the central area of the Velayat Park with soil cover makes a cool island core in most hours. This core is sometimes coherent and sometimes divided into parts. Anyway, the coldest part of the core is located in the northeastern quarter. The thermal gradient is the highest in the western part of the park. The effects of green spaces expansion in this part of the park have intensified this gradient. Furthermore, it seems that in some hours, the air temperature is increased in the edge of the expanded green space. For the heat transfer, since the park is surrounded by relatively tall buildings, the heat transfer is hardly possible. It is clearly evident that around the Bahman Farhangsara (which has almost no construction), the heat and cold tongues penetrate out of Velayat Park boundaries. Hence, it could be concluded that if the height of the buildings around the park is changed, the cooling effect of the park will expand more efficiently.

It was also discovered that the effects of green space expansion are most evident at 12:00 in winter when (after the expansion) temperature differences in the central zone of the park show a reduction in comparison with those of the pre-expansion pattern. It could also be seen that the effects of the asphalt road passing through the park is almost vanished at daytime while its effects could be easily witnessed before the expansions. In summer, two points should be notified: first, in August 2nd 2006 in which the wind is southward, all temperatures are moved southward unexceptionably. The second can be seen in all times when the effects of green space expansion appear with the increase in temperature differences. It is clearly evident that in summer when the sun shine is more, the more homogenous the surfaces are the less the temperature differences will be and vice versa. In warm seasons, the rate of cooling is also different due to the variant thermal characteristics of the surfaces. Hence, in summer pattern, in both diurnal and nocturnal hours, the expansion of green spaces is equivalent to increased temperature differences. Therefore, two different thermal patterns may be seen in warm and cold seasons.

Keywords: green space, thermal pattern, Velayat Urban Park, urban heat island.

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Analysis of Participatory Management of Neighborhoods with Emphasis on the Role of Social Capital (Case Study: Region 15 of Tehran Municipality)

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Expanded Abstract

Introduction

In this research, we can say that local communities and participatory planning at the community level in urban management has a special place in Iran in the recent years. Citizen participation in municipal affairs has become one of the basic concerns of municipal managers and always was highlighted at scientific, political and administrative meetings. Thus, assessment of the participation of citizens in urban areas and evaluation of the influencing factors can be the first step towards real participation. Various factors are effective on citizen participation but it seems that social capital is one of the most important of them. The present study is analysis of participatory management of neighborhoods with emphasis on the role of social capital in region 15 of Tehran Municipality.

Methodology

The present study has a descriptive –analytic method based on library and field studies. Hence, the first neighborhoods of Shush, North Kianshahr and South Afsarieh are selected as the sample and then estimated volume of samples were 384 people using Cochran sampling formula and the samples were randomly selected proportional to the population of each district. In the field studies, a questionnaire was used to collect data. In this regard, the questionnaire was designed in two parts in the form of Likert The first part was to evaluate the citizen participation in community management and the second part to evaluate the factors affecting the participation of citizens in the management of their neighborhoods. Cronbach's alpha coefficient was used to measure reliability. The coefficient obtained for the first part of the questionnaire was 0.844 and for the second part it is 0.735 that represent the good reliability of the questionnaire. The validity of both the appearance and content of the questionnaire was approved by a group of professionals and experts. Then, they were analyzed by KMO coefficient to assess the validity of both the questionnaires. The coefficient obtained was 0.765

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for the first part of the questionnaire and 0.71 for the second part. The research data were analyzed using the SPSS software.

Results and Discussion

The findings indicate that the citizens have a positive attitude towards collaborative management. This trend is not uniform among the sites studied and in neighborhood of Shush it is more than other ones. Hence, analysis of variance and Tukey's test results show a statistically significant difference. In addition, these assessments indicate that the level of social capital in the community is satisfactory. Thus, there is a significant difference statistically between the sites. However, the Shush neighborhood has higher levels of social capital. The combined results of multiple regression analysis show significant positive correlation between social capital and the willingness of the citizens to manage collaborative and the components of social capital influence the willingness of citizens in participatory management. Accordingly, present study suggests that the further the social capital in urban neighborhoods the more is the tendency of citizens in participatory management. The effectiveness of constructive elements of social capital on tendency of citizens in participatory management and influencing factors of membership in social networks is greater than the other components.

The results of this analysis also indicate that whether the people in the organization of formal and informal social networks and the nature and collective consciousness find better capability to participate in community management. Social networks can also define the goals and social needs to makes it possible for consultation, cooperation and contribution of the citizens to the intellectual, financial, and physical situations of the neighborhoods. This is to identify problems and offer logical and rational and sustainable solutions. The trust is a requirement for the formation of social ties and interactions. Social trust help create cooperation and collaboration among the individuals, groups and social networks. However, there are differences and even aspirations to solve problems and manage their social obligations. It is noteworthy that the more emphasis on the importance social networking and social trust does not mean that other components are not important. In fact, these components are interdependent and complementary and social capital finds real terms and can be considered as the source to manage community.

Conclusion

This study demonstrates that one of the factors that could contribute to citizens' participation in the management of urban neighborhoods is social capital to which less attention has been paid. The importance of social capital as a factor for local development is to the extent that scholars believe that community development without social capital is impossible. The study offers the following suggestions for the promotion of social capital as well as increased tendency of citizens to the participatory management:

- Education and promotion of citizen participation in the process of community management of the lowest levels of learning, such as family, kindergarten and elementary school;
- Transparency of municipal management measures and informing the citizens to participate in community management;
- Support and strengthening of the formal and informal social networks as the formation of social capital accumulation;
- Efforts to improve institutional confidence between the people and the municipal authorities With actions such as tracking and responding to the demands of the people, respect for citizens, providing citizens with the honest report on a regular basis;
- Involving people in defining and analyzing problems and decision making to solve them using participatory approaches for evaluation;
- Development of public spaces in the neighborhood as a platform for social interaction and the formation of social capital and civic participation.

Keywords: neighborhood management, participatory management, Region 15 of Tehran Municipality, social capital.

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