Ecological Design of Urban Landscape

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Abstract

Paying attention to the spatial placement of the elements (man-made or natural) based on the landscape pattern and ecological processes in urban design would have a considerable impact on both human and the nature. In a way that the discords in the placement of patchs in respect to each other, or in respect to visual corridors and urban matrixes lead to the unwanted results in the cities. The effect of such discords can be seen in continental changes, loss of energy (increase in the consumption of fossil energies), etc. Aim of this study is to design a city based on the recognition of relationships between the patches and corridors and natural/ artificial matrixes; also, introduction and the design method based on the fundamental urban landscape guidelines which is done with a qualitative approach in the form of library research and identification of the situation, size and other elements of patches, corridors and matrixes by using aerial-photos and GIS maps. Based on this, the research compilation process is in a way that first discusses the importance of this subject and the design methods in this study and different suggested methods in the field of ecological urban landscape design and explores Iranian and worldwide experimentations on the subject by presenting new solutions like the placement of the artificial and natural patch and corridors, matrixes, e.g, designing beach parks across the rivers to protect and maintain the natural corridor, preservation of green patches as the urban-parks, etc. The author hopes that presented solutions of this research in the field of design, would help to solve the mentioned issues and problems regardless of its minor delineation.

Keywords: Urban ecology, Urban landscape, Ecological urban landscape

1. Introduction

Tendency to have a life that is coordinated with the nature is not a recent topic in the history of human being (Wang ,et al: 1392, 26), but after the advancements in technology, human being have destructed, manipulated, or demolished the nature partially or totally to reach for his/her own goals. In a way that even after the passing of years and years, human being is tangibly perceiving this destruction inside. Changes in the continental conditions, increase of pollutants (resulting from factories, and the overuse of fossil fuels in households and cars), loss of plant and animal species, etc. are among the factors that are contributed by the unawareness of human being of natural environment and the destruction of it.To create a desirable condition and reach a new coordination between the nature and the inhabitants of the earth a close inspection of social, biological, skeletal is needed to help for reaching an ideal condition. Landscape ecology is an interdisciplinary subject that surveys the different structures in the works of urban designs to be able to construct the ideal biological-environmental conditions in other cities. One of the methods to design based on the landscape ecology is to design based on the spatial arrangement of the elements in which analyses the correlation of zones and surfaces with corridors and the intertexture pathways in addition to exploration of the structure and operations and the placement of elements and its formation based on the present qualities in each texture to both avoid the rupture between existing zone in a texture and the textures from each other so that it would be a factor to act as connection between the citizens of a locality with the existing artificial or natural objects in it. To get acquainted with the recited concepts and subjects, this paper analyses the landscape ecology in design based on spatial arrangement of elements and the doctrine of ecological urbanization.

2. Research Methodology

There are various different methods for programming and designing ecological-landscapes. The suggested methods in this research includes the employment of aerial photos and GIS maps and putting different layers together to find a recognition of type, size of the zones, identification of corridors and adjacency of the textures plus getting interests from the principles of urbanization to design ecologic urban landscape in locating the placement,

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whereabouts of urban landscape elements in order to reach the desirable ecological urban landscape design.
We can refer to some other studies in Iran which are done on the similar topics with the subjects of this research, including (Parivar.et al, 1387); in their analytical studies they elaborate on the temporal changes and spatial distribution of the green spaces of Tehran city which offer definitions and quantitative parable of formal/ geometrical qualities and the nature of transmittance by employing the metrics of territorial countenance and executional distribution of territorial countenance. In a separate study,(Parivar.et alm 1388) have composed series of solutions to elevate the state of human nature by following an analysis of ecological structures of Tehran's territorial countenance. All of the suggested ideas in the mentioned research are delineated in order to confront with this conditions in preserving the river-valley corridors, creating a boundary with vegetation and consolidation of patches, expansion of vegetation across the artificial corridors like roads and spatial distribution of free patches in the mosaics of territorial countenance. Aminzadeh And KhanSefid's paper (2009) have analysed the ecological network of Tehran through an aerial catalysis and processing of satellite images; They have presented a number of solutions for enhancing the functional and structural aspects of Tehran acropolis based on the models of patch, corridors and matrices. Among the other employed methods to design an ecological landscape of the urban landscape we can also refer to Moeinifar and Aminzadeh's paper (1390) in which they survey a new method in designing of an ecological urban landscape that is a more efficient and complete method in respect with other mentioned methods. In this method, localization of urban green spaces was done by GIS, and AHP softwares which is called the ecological landscape suitability analysis (ELSA) method. The mentioned method is based on these following stages:

1. Contrasting the pivotal elements in localization of green spaces and prioritizing them: in this stage, all of the impacting elements in the formation of green spaces are identified and listed in order of their significance for localization which is defined and prioritized according on the appointed case study.
2. Specifying the importance of the standards: In this stage, reaching for an order for the significance of the standards in three step process: First, specifying the weight of each standard according to the AHP method. Second, forming comparison matrices of binary correlation of standards, and third to calculate the CR
3. Preparation of spatial layers of the standards and meaningful of spatial layers in regard to the goals of the research.
4. Applying AHP weights in the attributive table of layers and determining the final weight of the layers with the aid of AHP weight and the quantitative values of the strata.
5. 6. Change in the mode of spatial layer model structure, from vectors to rasters.
6. Layering the spatial layers with a index overlapping approach.
7. Providing map of propriety and compatibility of the land based on the goals of the study or localization of urban green spaces.
8. Extracting all the zero values from all the spatial layers, providing layer of unallowed boundaries for the research goals, elimination of unallowed ranges from the final propriety layer and compatibility with earth in order to develop urban green spaces in line with the research goals.
9. Categorization of final layer and evaluation of different outputs (Moeinifar et al, 2010).

3. Domestic and international experiences in the field of ecological landscape plan

During the few past decades, a large number of efforts have been made by various countries in the world to elevate the quality of the ecological landscapes and they figured out that planning based on the fundamental presenting maxisms are not only having a positive impact on preserving the environment, it also causes an increase in the economical power and decrease in the fuel consumption for each city. In this text we will be analysing the types and conditions of the planning methods located inside and outside of the country will be presented.

3.1. The Extracted Maxims of Sustainability in Traditional Cities in Iran

Mehdizadeh (et al, 1386) research analyses two cities of Tabriz (Bazar) and Yazd (Meidan Khan) from the point of view of sustainability, a description and analysis of the research is as follow:

3.1.1. Tabriz

In this city, the *Bazaar* would be the case study and the pinnacles of affective[impactful] factors in reaching for a sustainability will be presented. *Bazar* of Tabriz is socially, economically and environmentally stable place, there are various different activities and functions in its architecture and urban context that holds inside. Accumulations and open spaces are mixed in an appropriate way and the central garden of the mosque helps the circulation of air for the interior space. The presence of water and vegetation (green spaces) helps the stability of the chambers and the whole set, shops are arranged to be located around these spaces. The presence of water and vegetation (green spaces) helps the stability of the chambers and the whole set, shops are arranged to be located around these spaces. Use of renewable and

recyclable resources which are used in the construction of Bazar have created a healthy environment, the air pollution, contamination of soil and water is minimized by using the native material and accommodations. In the *Bazar,* the access priority is given to the pedestrians, and not the transport vehicles. A specific sense of collective identity and cultural diversity is present which is in coordination with the culture of local sphere. This subject protects the health of humans, and elevates it. Synthesis of different land uses in *Bazar* collection improves the social stability of it. Spaces are used for a wide variety of goals and reasons, Bazar has a good sub-structure because of its appropriate density (Nassabi & Moradi, 2007).

3.1.2. Yazd

In this city, *Meidan Khan* was analysed as a public space and the vertices of impactful elements in reaching the stability will be described and explained. Yazd's *Meidan Khan* is an instance of a stable social, cultural, economical space. This collection puts forward a setting that brings together different functions and helps the social stability of the assortment by developing a contexture of functions. Square, reflects and presents the culture of a society and also links the form to the social, economical activities. Native building materials are used in the buildings and the local human resources helped the construction of the building, which is in case one of the instances of social stability (Bonnie, 2000) creates a collection of spaces for living, connecting and social interactions. Regarding human scales and focus on the public spaces is another points in keeping the stability of the set. Regarding the notions of physical stability and welfare, the space is a resource to blow the fresh air into the surrounding environment. Using the healthy, non-toxic, material is another advantages of it (Wulff, 1966; Beazley & Harverson, 1982).Thermal comfort is considered in the spaces, which develops an appropriate space for social interactions altogether with trees, and their sunshades on the square. Visual comfort is also included in the collection since the whole set was designed/planned for the human needs and the human body parts are the scales to such collections - the same thing is true about stability. The collection is designed and constructed by native people which is another possibility when they can participate in planning/design based on their demands. The specification of the square and extracted tenets from it would be desirable for the future urbanization plans (Nasabi, Al-e Hesabi and Hosseini. 2007:5)

Based on the analysed points in the traditional planning of Tabriz and Yazd city, it can be perceived that the wide-open design of Tabriz Bazar have been done based on the type of climate with these qualities:

1. Use of the native material,
2. Focus on pedestrian transportation, and the priorship of pedestrians,
3. Presence of different guilds along with others,
4. Attention to the vegetative spaces.

These are some of the points that are executed in accordance with the ecological/climatic properties; in Yazd, too the employed maxims in *Meidan Khan* includes these points:

1. Mingled land uses;
2. Use of native resources;
3. Planting trees;

Are some of the points which help to achieve an ecological stability.

3.2. Case studies on responsive tourism and stable during development (East Asia)

3.2.1. Suzhou

In Suzhou, planning of green outskirts with an expanse of 251 kilometers around the Jinji River have gifted a new and modern face to the city. Such chain-projects in *Suzhou* are the supplements to the famous and old gardens of the city and the city's first sustainable park. 10 Years ago, this lake was surrounded with agricultural fields and fishing space of the village. The city is trying to change itself into a brand and become a suitable place for attracting foreign assets, just like the park in the environments of *Jinji* river that enhanced/relieved its own ecosystems. The area around the lake is expanded by commercial and trade zones, the residential zones and neatly designed parks and a 9mile road of the entrance to the lake. Based on the *New York time*'s critique: "Moving inside of this park, is considered as a excursion", the open spaces around the lake is in a way an attraction for the visitors. Eight unique sectors with different landscapes surrounds the Jinji lake. The areas that are located on the western and northern coasts which are also close to Suzhou with a high potential in tourism, attracts the native inhabitants and the workers to the waterside. Water Parks are located near to shopping and recreational centers and are situated near international cultural spots. By enhancing the lake's water system, there exist a variety of activities based on water which results in the attraction of thousands of visitors. Observations proves that the river's water as one of the main elements of this region, was unusable during the past 10 years - due to the contamination. Increasing the economical growth through attracting foreign assets by growth in the number of tourists in Suzhou and interferences of land uses was some of the maxims that was employed for a stability in Suzhou (Wang .et al, 2012).

3.2.2. Busan, South Korea

Gadeokdo Modaloplis island project presents unique views in the new tenets of integrated development. Gadeokdo is situation around Busan, in the southern korea at the end of Baekdu du' daegan (Baekdu mountain ranges) and has a great deal of potentials for turning into a tourist resort. As an island across the coast of south korea and in a junction between the outputs of sub-siberian railways, four rivers in the water transportation route, an open commerce are with a big port and a proposed

international airport. As a communication center, master plan of Gadeokdo Modaloplis introduces it as a concept that fuses the human inhabitant, nature, environment and development, commerce and tourism on a local and national level. The master plan is an approach to connect people with different places so that it would adopt a new international method of tourism. The center of new goals is to develop an integrated tourism, to absorb and store those which show the unique factors of ocean, earth and weather.Different layers of the tourist programs and their attractions in Gadeokdo, brings touristic opportunities for the visitors. The central space station, connects north-asia to the other major areas which provides sets of opportunities for increasing the efficiency of consumption in the oversea flights, by which the time and expenses of the trips will be diminuated. There is no need for having visas in this island and foreign visitors and air transit passengers can access this island and various activities or cultural experiences of it. Tourist attractions of this island have been designed in a way that are compatible with the rise of the sea levels in the future (Wang .et al, 2012).
So here is a list of mentioned maxims in reviving the Busan: 1.Using water transportation in the river 2. Placement of international airport's next to the island (putting all means of transportation together 3. Signifying the true idea of human correspondence with the *menage*, environment and nature 4. Developing tourism opportunities by eliminating the limits for the passengers (No need for taking Visas).

4. Urban Landscape

4.1. A number of descriptions in the field of Urban Landscape

Landscape is the crystallization of the concept of the existing interactivity between the natural environment and the human activities aiming to enhance and appropriate the environment for living and one's needs (Antrop, 1998: pp.155-161). Landscape is our instinctual language. The landscape used to be the first and foremost inhabitants. Human evolution happened while it was in between of plants and animals under the sky on the land and near to water, all of the human race carry such legacy in their body and soul (Spirn, 1387:19). Urban planning, studies the urban landscape in three skeletal, non-skeletal and human activity surveys (Behzadfar, 2009), Lynch have also considered the three administrative, physical and functional factors in planning urban landscape (Rezazadeh, 2008).
Concept of the landscape is the same explanation that is inducted to the environment from the beginning. Landscape brings up different perceptions of the environment in the viewer, a mutual connection exist between the landscape and social behaviours of the inhabitants, in a way that any variation in the schema of the land would contribute to the change in the landscape.
In urban spaces, landscapes are highly impacted by the human activities. The urban landscapes have considerable links with economical, social or cultural functions (Wu;2006,2010,2014).

4.2. Emergence of Landscape Studies

During the renaissance in the 15th-century, first images from the westworld sceneries was illustrated (2002,Olwig؛ 2004؛ Lörzing& Simon,2001), Collen And Lumer (1995) considers this as a starting point for the emergence of an awareness of the landscape.
Alexander Von Humboldt have provided an accurate description of the landscape: "Landscape includes the collective qualities of a place on earth" (Zonneveld,1995).
A German geologist called *Opel* made of used the landscape sciences (Troll, 1950). The German phrase 'Landschafts Kunde' had a specific significance which Yohans Gabriel Grano defines it as: 'The duty of the landscape studies is to analyse the generality of the landscapes, those which are integrated with them, and associated areas, a vista that is linked with the spectator in the environment, (Granö,1929 :57). Accordingly, landscape is taken as "Observable circumference, or the Landscape" but it develops and includes the meaning of "All the special, sensually perceivable phenomena" (Granö,1929 :56). Inspired by the new method of observing the landscape through aerial photos. Carl Troll added a new method based on the holistic, ecological and integrated approaches (Troll,1968,1966,1959,1950,1939). He believed that "Research/ Study the aerial imaging, includes landscape ecology" (Troll,1939).
Nowadays, the landscape studies refer to all the involving disciplines in the landscape studies, e.g. landscape ecology, landscape regional geography, state geology, Landscape architecture and environmental psychology (cognitive) (Antrop, 200b), but the contemporary use of the word - landscape sciences - is not used synonymously with the German term «Landschafts Kunde» which is the word by word translation of 'Landscape Science'. The word 'Landscape' has different meanings, there are narrow differences between their use in different language, and its significance. Simplistic, accurate interpretations have caused a sense of confusion and a number of meaningless debates to start. The accurate use of language while speaking about landscapes have been numerously underscored by the researchers (Lowenthal 1961; Brandt 1998; 1999; Moss and Milne 1999; Naveh, 2000; Zonneveld, 1995; 2000; Antrop; Claval, 2004; 2001; Olwig, 2002; 2004).

4.3. Urban Landscape Design

Urban growth, increase of the land use, saving results of the community sharing and other social processes are structural elements that lead to the formation of spatial, temporal patterns in the landscapes. These patterns, are too becoming important factors for the urban conditions, on the scales of landscape or sector in the terms of weather quality, local continental conditions or the irrigation processes so that they can a basis for marking and analysing the relations between the urban landscape structure and their functions (Forman and Gordon,1986).

The definition of landscape services is suitable for analyzing the bonds between structures and functions in the urban environment since it has a focus on spatial pattern, in the man-made sceneries, they describe a combinatory system (which is the indicator of the urban environments) in which there exist a relation between nature, the society and technology (Bastian et al, 2014, pp 1463; 1479).

The structural elements for the urban landscape impact the terms of the ecosystem and in result it can also impact the biophysical functions. The interaction of urban landscape with the functions of ecosystem happens through resources (e.g, the impacts of the pattern of sunlight coverage on the earth), warehouses (e.g, absorption of pollutant by the the grains of soil), systems for advocation (e.g, haltering the flood by using quagmires, and human welfare (e.g, reducing the level of stress through natural sceneries) (alberti, 1999). In addition to the sheer presence of the urban landscape elements, the configuration of these elements (e.g, density of the skyscrapers or open spaces of the use of green elements in the constructed structures) is also adds to the environmental functionality (Ratti and Richens, 2004; Ratti .et al, 2003) and the living quality (Voigt .et al ,2014) of the urban dwellers. The importance of the different elements of urban landscape depends on the subject that what are the desirable outcomes? And in which spatial scale would they be more significant ? (Cadenasso .et al, 2007). Connectivity is another properties of the landscape which indicates the relation between the structure and function of the landscape. Connectivity, refers to the fact that 'to what extend a landscape have cause facilities or blocks the flow of energy, substances, sustenance, biological diversity and humans in that location. The quality of connectivity forms in the landscapes in which they are the results of the interaction of structures with functions, e.g: water lines, food cycles and preservation of biological diversity (Leitao. Et al, 2006). In landscapes with major variations, alterations, esp, in the urban environments, connectivity is reduced to a considerable level which contributes to fragmentation; this breakdown, the separation and isolation of the landscape elements altogether with deep impacts on the ecological processes, need connectivity. Disorder in the water connectivity is a critical concern in planning for stability. Since the human culture is to a large extend relying on the water, development and maintaining a healthy water-system would have a lot of fundamental functions, in urban and artificial spaces, roads are the biggest obstacles to connectivity and the major reason of fragmentation (Forman .et al,2003).

Urban landscape analysis is usually considered based on the land coverage and its use, some scientists point out to the undoubted impact of the structure and the function in a landscape. Difference between the structure and the order to develop a number of cities with green belts. In his book "Cities Cultures" 1938, Mumford considers the cities as the outcomes of earth together with natural disasters. To him, urban culture is harmful for the local society culture in the time of crisis. The horizontal, and function would cause a number of changes in the landscape in a way that the method and composition of the urban landscape elements has a huge impact on the human and the natural environment. Sometimes, the changes in the structure and the function causes the loss or fragmentation of biological elements, which sometimes lead to the loss of natural environment.

5. Urban Ecology

The word Ecology is consisting of two Latin words *Icus* meaning habitation, life shelter or living place, and *Logos* which means recognition, science or complex wisdom, and its literal meaning of it signifies the analysis/ survey of the living organisms in the field of biology (Pourjafar, et al, 2010).

The word of ecology science was first (1866) used by the German biologist *Ernst Haeckel* (1834-1919), to identify the existing mutual relationship between the living creatures and its environment. He defined his innovated ecological science as the science of analyzing the direct relations of the organism with its circumference, which in a broader sense includes all of the terms of environmental spaces (Leser, 1976).

The term *Ecological City* was first borrowed from Richard Register's book "Building cities for a healthy future" (1987). His viewpoint on ecological cities is a suggestion about building a city that is like a system of life would support the healthy body of the city, increases the biological diversity with the land use, and creates a diversity in the city by using the patterns of evolution and stability (Wang. et al, 2011).

5.1. First Studies on Urban Ecology

Reading the western civilization after the industrial revolution - in infact a career review of pioneers of planning of 19th century like Frederick Law Olmsted (1822-1903), Patrick Geddes (1854-1932), Ebenezer Howard (1850-1928) who mentioned a number of their viewpoints on the existence of life, the significance of protecting beauties of the nature and ecological functions along which planning; for instance he offered the bioregional theory in which he focused on paying enough attention to the mutual relations between the city and the ecology of its surrounding area. He has a focus on research, analysis and planning especially the fact that regional studies for ecological environment and human relations should be considered before and planning and development of the project. Howard, has the similar argument about the importance of returning the nature to the cities in his theory of *Garden Cities*, he also had a focus on decentralization and limitation of the city growth. In the 20th century, these types of viewpoints became prevalent by Mumford and Clarence Stein in

scattered development of city causes an increase in the rate of suburbanism and a number of social problems; Ian McHarg (1920-2001) then published a book with the title of "Designing With Nature" in 1968 (Wang et al, 2011).

5.2. Ecological Urban Design

Human activities in the nature and increased use of human domination caused fragmentation between the natural environments. In result, focus of the ecological concepts shifted from contact to isolation, and from safekeeping of lots to protection of ecological networks of the cities is under the attention more than any other time in the past (Jongman and Pungetti, 2004). Such approaches, causes a systematic rendering for the ecological structures of the cities, and considers it as an interwoven ecological network made up of both natural/ artificial substances with ecological functions. Nowaday, attention to the ecological network of the city is considered as an approach to increase the ecological values of open urban environments (Cook, 2002). The ecological network structure includes its own way of spatial distribution of zones, and the configuration, contact and connectivity of the basic landscape elements and they manifest the quality of the landscape function, esp, functions like transportation of species, foods and water lines (Turner, 1989; Forman, 1995). Structure of the ecological network should be considered as a mixture of patches, corridors and the network which have their parts in urban environments as a connected system of natural layers (covering shades of the vegetative fields, lakes, rivers and other streams of natural water) and artificial (parks, gardens, ponds and artificial water canals, transport corridors (Khansefid, 2009). Due to the high level of human interventions, this connection is becoming more weak in the urban spaces; this leads to the fragmentation, separation and isolation of the landscape elements and it finally brings disorders to the connectivity- oriented ecological processes (Ahern, 2007).

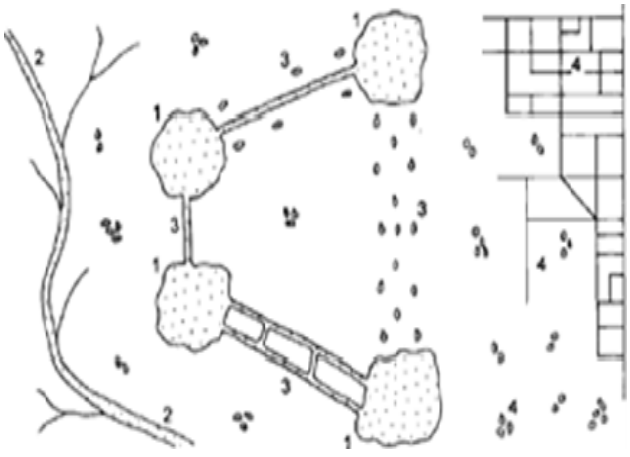

Fig.1.Forman's "Essential Patterns" in landscape planning: 1. Big patches of vegetative field 2. River corridors 3. Connectivity between patches and smaller adjacent patches 4. Small natural land (Forman ,1995, p.452)

In urban ecological planning and designing, the separation based on the ecological functions of the patches, corridors is as follow:

1. Natural patches: Including abundant lands in the city like heights and the existing hills in the city which must be connected to each other and the city texture in an appropriate way.
2. Artificial patches: Including planting of jungles, parks, gardens, green spaces of squares and other vegetative spaces which their connection and connectivity to each other and to the natural context should be maintained, the amount of impact by these spaces depends on their expanse, form and their type.
3. Natural Corridors: Valleys and river valleys, it also includes the natural streams and their circumference boundaries. Their capacities should be exploited to connect the city with the outside city nature and the river and the infiltration of nature into the urban texture and linkage, connectivity of the natural/ artificial green zones.
4. Artificial corridors: Linear parks, greenroads, access roads, fences and the green spaces on the curb of the streets and highways, woody routes, artificial canals and streams which their connections and linkage with each other and natural corridors plus the most significant in their group is the their communicative nature of them between between the natural/ artificial zones (Khansefid, 2009).

Ecological design should match the stability theories, based on this fact, Jeffrey Kenworthy recounts 9 properties for the ecological cities:

1. City condensed forms and complex uses, it gets an optimum uses of the land and protects the natural environment, biological diversity and the zones of food production.
2. Natural environment infiltrates in the urban spaces and includes it, city and its circumference provides its alimental demands.
3. The infrastructure related to the highway and streets are getting a lower priority in respect to the infrastructures related to the pedestrians and cyclists' routes and the focus on the network of rail transportation, vehicular and motorcycles would decrease.
4. The widespread use of bioenvironmental technologies in the development of water, energy and waste management; in other words, city life supports the close cycle systems.
5. The central part of the city and its subsets are civic centers which focus on the transportation . and travel by public transit more than personal vehicles and has a big share of residence and work.
6. City includes public spaces with high qualities which reflects the public culture, sense of society, equality and proper supervision. Public spaces included the transportation systems and all of the involving spaces around it.
7. The physical structure and urban design, specially in the case of public spaces, are highly

readable, infiltratable, bearable, diverse, rich and -visually- proportional.

8. The economical function of the city and providing more jobs through innovation and exceptionality of the local, cultural and historical environment along with high level of social quality and living environment of the public spaces of the city would be provided.
9. Planning for the future of a city depends on the "argument and decision" rather than on "anticipation and preparation" which is a computer-game driven process.(Kenworthy, 2006).

5.3. Ecological Urban Landscape Design

Wu considers landscape ecology as a totally interdisciplinary and transdisciplinary science of the environmental multiplicity which "he aims to analyse the relation between the spatial pattern and ecological processes in different scales with the goal of reaching the landscape stability and to develop it" (Wu, 2013). He comments on the reportage of the Alerton Workshop (Risser et al,1984) - workshop as the master plan of the landscape ecology in the north America : considering the landscape ecology as a branch of ecology,... motivates a disregard for the ostensible analysis of the cultural human processes which fabricates the landscapes."

Ecological planning can be observed in the fields related to the human applications of ecology (Berger and Sinton,1985), applied ecology of ecosystems (Meffe et al,2002) and the applied ecology of the landscape. Applied ecology of the landscape uses the fundamental theory of landscape (set of all of the landscape theories) for planning, it is dubs it as "Ecological Landscape Planning" (Ahern, 1999).

In the applied ecological landscape, a multi-scale approach (in regard to spatial patterns and ecological processes) is an accepted approach (Leitao and Ahern, 2002; Ndubisi, 2002). In a multi-scale approach, major attention is being payed to the analysis and planning of spatial configurations of the landscape patterns and ecological processes in different scales and their method interaction and processes.This kind of analysis are usually indicators of important points for developing a physical connection, existence of important links and spaces for establishing such links. This kind of analysis are usually indicators of important points for developing a physical connection, existence of important links and spaces for establishing such links. In the urban spaces, appropriate scales are: The central region of the city, regions or sectors, the singular spaces (Ahern, 2007). In fact, the spatial arrangement of the landscape elements (local ecosystems or land uses) in a heterogeneous environment has great impacts on the landscape processes and biological arrangements (Risser et al,1984; Forman,1995; Wiens,1995). Because spatial configuration and composition of the landscape elements directly determine the function of landscapes, especially in regard to the movement of biological species, alimentary substances and the streams of water (Turner,1989).

To realize the ecological processes, the relation between patterns and processes and also the significance of connectivity, spatial configuration of a spot is a shared point. In applied ecological landscape design, a mosaic model is employed to describe and perceive the spatial configuration of landscapes, which is globally accepted, This model uses three fundamental elements of the landscape to reach for the structure of the landscape: patches, corridors and matrixes. A patch is a nonlinear terrain which is distinctable from its peripheral surroundings. patches have different functions, e.g, habitat for the wildlife, a region for renewal of groundwater aquifers or as the resource of edible nutritious and biological species. Corridor is an area with a specific overlays which has skeletal, content differences with its surrounding area (Forman, 1995). Corridors, too have different functions in the landscape, e.g, wildlife inhabitat, the pathway for transporting plants, animals, aliments, wind or as an obstacle for such relocations. matrixes are the types of the earth overlays regarding the area, the amount of connectivity and integrity, and the control which is applied on the terms of a landscape (Forman,1995;Forman and Gordon,1986). The following table marks a number of examples of urban landscape elements in the framework of patch/ corridor/ matix.

Table 1
Instances of urban landscape elements that are categorized into patch/ corridor/ matrix. Source:(Ahern,2007)

Urban patches	Urban Corridors	Urban matrix
Parks	River	Residential
Sport Gymnasiums	Canal	Industrial
Quagmires	Drainage	Business
Public Gardens	River bed	Landfill
Cemeteries	Streets	Zone with different land
University	Power-transit	
Unoccupied Land		

In designing based on the fundamentals of ecological urban landscape, a precise attention should be payed to identify the type of pathes, textures and corridors. For the same reasons, sometimes it is possible to develop a condensed form for the cities, sectors and all-inclusive spaces and to decrease the private transportation costs by creating or changing the type of land use. And to provide the alimental demands of the cities by developing the green zones like agricultural lands, to avoid the transit of artificial corridors like highways and streets on the margin of natural corridors like rivers and green patches, in fact it can help the correct localization of patches and the corridors. In the ecological urban landscape design, the whole city should be analysed through the aerial photos, the only way to reach connectivity and connection in ecological networks is to have the full view to the whole research area.

6. Fundamentals of urbanization in the context of ecological urban landscape design:

A scattered set of principles are formulated for the structure and role of urban ecosystems that are gradually extending (Alberti, 2008). These principles are proposed singularly in different context and more quantitative data are provided to approve them (Cadenasso et al,2006b). Since the ecological science of urban systems is still in the formation stages of it, the suggested tenets would be certainly changed and developed in the course of the advancement of science, these ideas may be changed or even be refuted in the future; to create the integrated science of urban systems based on ecological ideas, these are the governing doctrines of the ecosystemic functions which are emanated while serving the urban landscapes, these doctrines are:

1. Cities and their boundaries are ecosystems,
2. They are heterogenous,
3. Dynamic,
4. Human/ biophysical factors have interactions in within,
5. Biophysical processes are always considered important (Cadenasso et al,2008).

In this research, the first three doctrines:

-The concept of "Urban areas being synonymous to ecosystems" is the fundamental presumption of contemporary urban ecology. Our definition of ecosystem is similar to its traditional application in the science of ecology. If we consider ecosystem a naturally closed, homeostatic and self-regulating, this doctrine may sound strange. This definition is an abstract of the original definition of Tansley (1935) on ecosystem which is the motive factor in today research and applications (Jax et al ,1998; Pickett and Cadenasso, 2002; Jax ,2006). We consider cities as ecosystems since they include biophysical bundles which are interacting with each other. There exist a number of organisms in the city, e.g, the people, air, soil, light and physical regulators like temperature or the duration of the daytime. Of course the living bundles in the cities have a complex social structures (Grove et al, 2005, 2006 a, b) that includes institutions (Steiner, 2002). The social structure is perceived through population density, descriptions of the age, ethnical and racial structure, social classes and lifestyle. This complex network of structures and social interactions forms a general meaning kernel called the framework of human ecosystem (Machlis et al,1997). The same way, the physical collection of each city does not only include the living context, soil and any native/ or raising from the plans and wild animals, but it rather includes roofed and mutated soil, nurtured or imported plants, buildings, roads and the infrastructure of facilities and also the layers of cobblestones. This is why urban ecosystem is more complex in respect to agricultural or wildlife ecosystems (Cadenasso .et al, 2006a). In brief, city is an ecosystem of humans who has biological, physical, artificial factors which are all interacting with each other (Machlis et al, 1997 ;Pickett et al,1997; Grimm et al, 2000; Alberti et al, 2003).

-Cities are dynamic: Dynamic quality of the cities refers to their reception of changes (Plunz, 2007). Natural harms, sever continental events, change in the economical fundings, increase in the age of families, wearing or reparation of infrastructures are just a number of dynamisms of the city which landscape design and management should pay attention to. A constant balance in the city is impossible (Pulliam and Johnson, 2001). Plans which consider changes in the vegetative fields, have more alternative choices when facing harms, and they are used by people in different ages, they have a more chance in the ever changing cities. Also, plannings for the landscapes that can be compatible with the continental conditions (Carreiro and Tripler, 2005; Grimm et al, 2008) is an opportunity to adopt with a universal dynamic process on a massive scale (Cadenasso .et al, 2008).

- Human/ biophysical factors have interactions in within: These two important subjects should be considered as the goals of landscape design. A plan which is designed solely to comply the obvious social criteria like recreations or simplifying the business, does not have the essential capability to help those demands of the ecosystem which will cause to the high social values in the end. The judgement basis of all ecosystem management plans and landscape design should be the fact that to which extent they are capable of upgrading commodities and social, ecological services and reduce the dangers and social/ ecological vulnerabilities (Steiner, 2002; Grove .et al, 2007).

- Biophysical processes are always considered important: Managing and designing landscapes provides this opportunity to preserve and develop fundamental biological processes that shapes the health and human well being. Since it is important to consider such functions, even on the big green colors on the city map that usually have such advantages. Routing the streams of water, harnessing aliments with the toxic liability of CO2 preservation,

neutralizing the toxic substances, facilitate the soil respiration, production of biomasses, enhancing the bad continental conditions, reduction of natural harms and retaining the biological diversity (Cadenasso .et al, 2008) are all the instances of processes that can be utilized in different designed systems (Palmer .et al, 2004).Landscapes managerial and planning methods can be designed purposefully to retain and revive such natural processes in the urban texture. This way, by using management and landscape we can invent new creative ways to include ecological processes in the cities (Felson and Pickett, 2005).
Among the suggested tenets, this topic should be considered that all of the designs should made based on the fact that they should serve the people and to supply humane social needs, also preventing the ruin of environment. And as a deliberation of this concept that we consider cities as ecosystems it is true that we refer to the issue of relationship of human with his/ her surrounding based on the national, age-related, continental and ecological specifications of it which has a direct impact on the living and the environment quality which motives the heterogeneity in the cities and sectors, too and we can observe its impact in the course of time along with variations in the different urban spaces; and this exact process of changes enables us to call cities as living creatures which is called the dynamism doctrine. Using the mentioned subjects in design, enables us to consider all of properties of the city, esp. The human life during the design process because in many of the designs, the concepts of designing for the occupant of the city and the variations which people create during the course of time would be forgotten.

7. Conclusions

In planning based on ecology of the urban landscape using the mentioned methods and approaches of the study, it first employs the use of aerial photos and GIS maps to identify and analyse the borders of the study in the terms of : 1. The transmittal course of the patches, corridors and matrixes. 2. Neighbouring of matrixes, corridors, patches adjoining next to each other. 3. Heterogeneous and opulence nature of the patch (Doing an analysis about the existing uses in the boundary. 4. The percentage of the patch ratio (Ratio for the frequency of each type of use) 5. The number of each patches (Number of the patches which cover special uses) (Bargh Jelveh, 2010). 6. Level and percentage of the highways expansion in the area. 7. Separation of artificial and natural corridors, and patches. 8. In the case of segmentation of patches and corridors, attention would be paid to the causes of such fragments of the elements to reach a planning by using the results and overlapping the different layers of the maps along with social structures, morphology, climate with these qualities: A. The preservation of the substance and energy cycle among the patches, corridors. B. Maintaining the connection the minor patches. C. Keeping a balance between the major manmade patches (Bargh Jelveh, 2010). D. Prevention from the disjointment of the patches. E. Preserving the green patches and natural corridors, etc.
Based on the presented topics, here a number of planning solutions in this field are provided in the following lines:

1. Preserving the major scale green patches like jungles and to interest from them as urban parks - the breathing lungs of the city.
2. Separating of the industrial matrixes from residential or historical sites by changing their uses.
3. Interfering of the uses in the planning area (in order to supply the demanding functionalities of the citizens).
4. Developing pathways to offer public transportation in order to decrease the use of fossil fuels - without defecting the environment.
5. Developing beach parks across the rivers to manage the natural corridors.
6. Elimination of the highways that are constructed along the river boundaries and prevention of the highways paths in natural green patches.
7. Development of commercial-recreational uses in the unoccupied patches and ruins in order to bring in opportunities in line to attract tourists.
8. Development of cycling roads and pedestrian pathways across the rivers and vegetation fields.
9. Connecting natural green patches together using the green-roads and linear parks.
10. Development of flooring and planting trees according to the existing pieces in the area.

The few number of topics that were mentioned in this research can contribute to resolve the planning based on ecological urban landscape, along with various other cases. This way, the destruction of environment and avoiding the development of asymmetrical and unfamiliar sceneries with natural environment; also it can reach a stability regarding the ecological terms in which subordinated to other aspects of stability like, economical stability.

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