



## Some approaches in design of urban furniture with emphasis on green space use and sustainable urban landscape

Leila BADEİY<sup>1,\*</sup>, Mahdieh NAKHAEI<sup>1</sup>, Fereshteh BABAOGHLY<sup>1</sup>, Nikoo ABHARI<sup>2</sup>

<sup>1</sup>Young Researchers and Elite Club, Marand Branch, Islamic Azad University, Marand, Iran

<sup>2</sup>Young Researchers and Elite Club Jahrom Branch, Islamic Azad University, Jahrom, Iran

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**Abstract.** Rapid growth of urbanization has created over crowdedness, traffic and pollution in urban spaces. Thus, the design of urban green spaces and furniture design is consistent with the emotional needs of citizens and can make a considerable change in comfort and safety of body and soul of human being and gives a good identity to the city. Despite rural life, urban life is without natural beauties and urban spaces don't have visual beauty and human being is in urgent need to order and beauty in living environment. We can put together the dull space of city and beauty morale of human being to consider the significance of creating green spaces and design of good urban furniture as preventing visual confusion in city. This space with the title of some approaches in urban furniture design with emphasis on green space use and sustainable urban landscape in Jolfa city is evaluated and it also attempts to show that green space and beautiful urban furniture can give specific identity to the city. By beautification of visual environment of city, a pretty view is caused and urban views are improved and also the city can be become vital, dynamic and sustainable. The results of reality show that innovation of a developed set of urban furniture with common similar connections is the goal of integrated furniture systems. The features of such system besides coordination in city components can reduce consumption of materials, reduction of construction costs and dimensions reduction. Integration and common aspects in such items not only lead to visual coordination but also help the regional and urban identity.

**Keywords:** Urban spaces, Urban furniture, Aesthetics, Green space

### 1. INTRODUCTION

Urban equipment is a set of mobile and semi-mobile, applied or decorative tools as presented to the residents with the permission of state authorities as permanently or seasonally in public space of city. Urban equipment is an inseparable component of environment of a city and enables the identity and full recognition of city (More et al., 1994:2).

Urban furniture includes all elements as located first in open urban spaces and has general function and second, their presence in urban space fulfills the general needs of citizens. Elimination of urban furniture from urban organ or their unsuitable nature can provide inefficiency and disturbance in urban system performance and various needs are left unfulfilled (Agashte, 2000, 79). Indeed, major part of constituent elements of view of each city is the furniture of the city and besides specific applications organizes the beauty and order of city. Formation of visual elements creating the image of each city provides memory for each audience. Kevin Lynch in the book "city view" in this case and regarding the memory about a city in the mind of audience (mental image) has discussed in details. The designer attempts to fulfill the needs of citizens beside the arrangement of these tools and components as each citizen feels comfortable regarding them. Bench, light posts, mail box, telephone booth, panels, green spaces, foundation and other components form this order (Mortezayi, 2002, 47). The change of urban furniture is mixed with the history of city and street. This history is inseparable and makes a review on city and urbanization as unavoidable. From the formation of first civilizations to the emergence of advanced contemporary cities, this case is true. Based on the

\* Corresponding author. Email address: Leila Badeiy

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mentioned items and emphasis on the reality, this evaluation is presented in two parts as called urban furniture history and urban green spaces in Jolfa city.

## 2. THE STUDY PURPOSE

- 1- The evaluation of current urban furniture in Jolfa city
- 2- Using scientific methods in creation and development of green space and urban furniture in Jolfa city
- 3- The comparative investigation of common standards and regulations with the existing condition in Jolfa city.
- 4- Recommendation and presenting scientific and practical model for city managers in furniture and green space in Jolfa city.

### Study question

- 1- Are urban furniture and green space of Jolfa city consistent with the needs of urban people?
- 2- Do urban furniture and green space of Jolfa city fulfill the requests of people in city?
- 3- Are standards observed in the design of furniture and urban green space?

### Study method

The present study is document and field study design in terms of significance of study. Thus, data collection techniques are different.

- In document study method, documents and maps of film, photos are used for data collection.
- In field study method, the governor office, municipality, etc. are referred and by interview and objective observations in the city, the photos are provided and the data collection is performed.

## 3. LOCATION OF STUDY AREA (JOLFA CITY)

Jolfa town with the area of 1607.31km<sup>2</sup> is one of the towns in Azarbayijan Sharghi province as located in northwest of this province. Jolfa town was one of the areas of Marand town and due to commercial nature was turned into an independent town. General climate of Jolfa town is semi-arid and cold. Annual raining is 225 to 400mL. The average annual temperature is 15°C as varied in the margin of Aras River to 5 degrees in highland. Jolfa is a new town established in 70s and it was turned into an independent town in 1996 in housing and census statistics. The historical works of this town are Jolfa bathroom, Saint Stepanus church, Zialmolk Nakhjavani bridge, Asiab Kharabe waterfall, Shoaib Dozal shrine, Seyed Mohammad Noje Mehr shrine and Kordasht complex.



Figure 1. The map of Jolfa town.

### **The common regulations, standards in design and construction of urban furniture**

The criteria and standards in each city are different based on natural and climatic conditions. City is not an imaginary creature and it is a body the quality of its relations is evaluated. In our country, definite standards and criteria are not presented to formulate regulations of urban furniture. Using other standards of other countries due to the conflict of their conditions in terms of climate, cultural, social, political and economic features are not without problems (Qanbari, 2010:60). Urban furniture is one of the main communication tools of city with the citizens. Bench is not only a board for sitting, trash bin is not for throwing trash and lamps are not only for lighting. Today, urban furniture is the main communication relation of citizen with the city. It is a tool as besides fulfilling the needs can form the memory and satisfaction is created. Need assessment, selection and furnishing urban furniture is a specific science with specific standards. A part of these rules is based on culture and tradition of each city. The city should be as the citizens feel secure and comfortable. This issue requires that besides defined standards for each city, specific criteria based on its specific conditions of the city are considered and this discussion starts with the general definition of standard and then the criteria and standards regarding furniture and urban green spaces are introduced. As besides familiarity with these criteria, a good model of them is considered.

### **Different types of urban furniture elements**

Agashte divides urban equipment into two following groups:

- a. Aesthetic elements as vase, statue, ornamental tree and plants, fountain, flag, the like.
- b. Functional elements as lamp, traffic light, trash bin, bench, shade, bus station, phone booth, press booth, mail box, kerb, etc (Agashte, 2000, 79).

### **The common regulations, criteria and standards in design of green spaces**

#### **Urban green spaces:**

Many researchers believe that the term standard is not logical for green space as standard has a static concept and green space due to its dynamic nature negates any statistic nature. In this relation, we can not present a standardized extension for green space for a country as green space quantity depends upon climatic conditions and bioclimatic features of each region (Atak consulting engineers, 1990). Based on the importance of green space and its effect on improving quality of urban spaces, improvement of environmental aspects, urban life and increase of health and urban health, the study of condition of urban green spaces with the review of methods, standards and per capita in recent years were taken into attention of urban planners, geography experts and environment experts.

#### **Per capita and standard of green space in Iran**

Standard indicates optimal condition in which various theories and taste are involved. Green space standard has economic, social, cultural dimensions, above all social values. We can not expect that standard volume has definite unit in the entire Iran. Besides the above items, climatic conditions, selection of various plant varieties and bioclimatic features of region are different. At this standard value, it is different among the countries. The information of green space standards is a guiding level in projects, plans and policies. Determining the level of green space in Iran is mostly based on applied standards in other countries. Based on studies of housing and urbanization ministry, common per capita of urban green spaces in Iranian cities is ranging 7 to 12m<sup>2</sup> for each person. The determined index from UN environment (20 to 25) m<sup>2</sup> is stated. According to the report of studies and planning center of interior ministry, healthy life is possible where the share of per capita of each person regarding green space in residential region

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is not less than 30 to 50m and to arrive park, 15 to 20m is required. Some of urban planners propose that (0.1 to 0.06) of total city ignoring the population density is associated to green space. Determining the level and per capita of green space use in Iran is mostly based on applied standards in other countries. Determining the per capita of green space mostly depends upon the bioclimatic features of the region and city. It should be said that green space per capita in a desert city or a big city like Tehran can not be similar to a coastal city like Mazandaran province. The knowledge of green space standards can be considered as guiding the activities and policies (<http://mghoraninia.blogfa.com>). According to the global standards in metropolises, green space per capita for each person is 35 to 50m<sup>2</sup>. For example, green space per capita in a metropolis like Tehran is only 10 to 12m for each person.

Therefore, we are encountered with serious air pollution, noise pollution, high dust in urban space, etc. If the urban green belt was complete and we had adequate green space, these trees can absorb toxic gases, dust and noise and make the air clean. Therefore, the adverse effects of the pollution are reduced considerably. Each hectare of green space can absorb 48 ton dust in space. If 500 Ton pollutant is eliminated in Tehran, how is it effective on the climate of this metropolis? Unfortunately, valuable and old gardens are destroyed and towers are constructed instead. It means that steel and concrete are used instead of green space. Green space can help the air coolness in Tehran arid climate. Concrete and steel by absorbing heat in summers increase temperature to 5 to 6 degrees and living is problematic for the residents. Thus, we are encountered with respiratory, skin allergies, Asthma, heart and brain attacks, cancer, digestion diseases and high pressure and people die out of these diseases (<http://mellatonline.net>). The proposed levels of green space per capita presented by organizations and domestic organizations of Iran are as followings:

Housing and urbanization ministry.....	7 to 12m
Park protection studies (master plan of Sorkhe Hesar parks)...	15 to 50m
Russian consulting engineers of Poladshahr.....	25m
Management and planning organization.....	12 to 40m
Dr. Majid Makhdum.....	15 to 50m
Dr. Bahram Soltani.....	30 to 40m
Tehran municipality.....	15 to 50m (management and planning organization, 1996, 194).

In the land dedicated to green space and its utilities, at most 30% should be dedicated to building and asphalt, etc. and 70% to plants, trees and green space. According to the extracted results of some of questionnaires, it is shown that urban dwellers expect the following items of green space and experts fulfilled estimations based on the following Table. The following Table shows the expectation of urban dwellers of green space and minimum required level to fulfill the requirements.

Some regulations should be considered in creation or organizing green spaces:

- 1- Spatial coherence in organizing and balanced design of environment
- 2- Space construction of open and close spaces
- 3- Order and variety of similarities and differences beside each other
- 4- Repetition in design and giving meaning to order and variety element
- 5- Consistency with climatic and geography conditions
- 6- Sociability and functionalism in design
- 7- Least interference to natural conditions
- 8- Easy access and movement by presenting freedom feeling
- 9- Aesthetic principles of line, form, tissue, color, etc.

10- Tradition and people culture (Ruhani, 1986:80).

To calculate intracity green space for Iran cities, four parameters are applied:

- 1- Average area for healthy growth of a tree
- 2- Local climate features
- 3- Environment quality
- 4- Density of a person or room in residential units

According to Behbahani (1994), the acceptable standards of urban green space in Iran are at least 6m<sup>2</sup> and at most 20m<sup>2</sup> for each person as a combination of garden, sport fields. To determine the per capita of urban green space, there are various factors as followings:

- The extension and volume of built space
- Green space can be manifested in physical structure
- Ecological need of environment to green space
- The need of social environment to green space (Bahram Soltani, 1992, 76).

The study of furniture condition and urban equipment and comparative comparison with standards in Jolfa city.

One of the obvious features of spatial organization of Jolfa city is extreme distributions in city physical aspect. The main physical structure of city is as checked form located in linear border between Aras river and Railway fields and dual northern limitations from Aras river and boundary areas and southern limitation from Railway and the fields cause that urban tissue is formed as linear and as Jolfa is a small city, the urban furniture and equipment are investigated generally and are compared with standards and with a comparative state, this is followed to define the existing condition in city.

**The comparative investigation of the standards of urban furniture elements with the existing condition in Jolfa city**

Establishment of urban furniture elements in current cities is unavoidable and Jolfa city always has accepted local tourists and passengers from neighboring countries and these elements are necessary. This section deals with the ergonomic adaptation, visual and physical considerations and layout and evaluation criteria and selection of some elements as bench, chair, trash bin, vase, urban board, tree fence, kiosk, beam, bridge on pond, lighting of street, cobblestone, shade in Jolfa city with common standards. Table 1 analyzes the standards of urban furniture elements with existing condition in Jolfa city.

**Table 1.** Common standards of urban furniture with existing condition in Jolfa city.

Evaluation criteria	Layout	Visual and physical considerations	Ergonomic	Urban elements of Jolfa
Simplicity in design is observed and it is wooden or iron and it has high durability.	In parks with distance 30m and close and in pavements behind the wall are installed and it has pretty view.	It has curve form consistent with environment and is selected in suitable sizes.	Are common for men and women with the width 400mm and for some people.	Observations of existing condition 1-Bench and chair
It has pretty form and is viewed from far distance and any tired pedestrian is invited. The standards are observed well.				Evaluation
It is metal and is not stolen and it is also durable.	It is not very close to shades to make any disturbance but it is observed from far distance.	The color is consistent with environment and in most cases in green space is turned into a common element for identification.	It is comfortable and safe in body sizes of users and it is emptied easily.	Observations of existing condition 2-Trash bin

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It resists against vandalism and is available for pedestrians and standards are observed well in parks, green spaces	Evaluation
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It is selected based on the location and is a	In distances as 3 to 4 times more than	Hidden lights with new forms prevent	Light is adequate and is good in terms of	Observations of existing 4-Street
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This element is not observed in the studied city.				Observations of existing 3-Vase
To create pretty view in city , it is better to use permanent or seasonal vases based on type of climate.				Evaluation
IN terms of boards, there is an interesting confusion in city.	Some boards have wide view and are observed from far distance but stores boards are installed based on taste.	White background with black writing is observed in urban boards.	The boards installed by municipality are installed at height 2m but stores boards are based on taste.	Existing condition observations 5-Urban boards
Due to the lack of observing standards and coping up of personal tastes, adaptability and readability with environment are forgotten.				Evaluation
This element is not seen in Jolfa city.				Observations of existing Fencing around 8 tree

This element is observed in the city in some cases and it is located with the aim of informing. The standards were also observed well.				Evaluation
	Colors are different and taste-based.	Iron pipe	They are observed in different forms and sizes.	Observations of existing 6-Beam
Sometimes, size is not suitable with the type of use and it is risky and doesn't resist against vandalism. Different colors create non-coordination and existing standards are not good.				Evaluation
It has consistent length and width.	There are observed in front of educational centers and beginning and end of lanes.	Iron	Without level difference with pedestrian and is used in the surface on bridge with distance form iron.	Observations of existing 7-Bridge on pond
Standards are observed and specific coordination in terms of form is seen in city and is not consistent in terms of color. By good coloring, it can be turned into an attractive element in city and create specific coordination in city.				Evaluation
To create visual comfort for pedestrians by observing aesthetic principles, this element is necessary.				Evaluation
It is metal and highly durable and is installed with the informing aim.	It is installed in passengers' path and has specific consistency with surrounding environment.	It has pretty for m and the color is observed from far distance.	It has consistent size, safe and comfort of the expert is provided.	Observations of existing 9-Kiosk

safe place for passengers in dark areas.	installed height and is as one or two-way	light dazzling.	frequency distribution and lighting is good in boulevards.	lighting
The standards are observed as well and most of crowded parts in city have adequate lighting. This city accepts many passengers and this element at standard level increases reliability and safety in public areas and shopping centers.				Evaluation
Foundation with slope 1cm and thickness 5cm can be observed.	1cm holes are observed between the cobble stones.	Concrete or cobble stone.	At cold climate, gray is used.	Observations of existing 10-Pavement covering
As flooring can indicate the importance of pedestrian movement and it can create many attractions for pedestrian, the standards are observed and are acceptable.				Evaluation
Beautiful forms as consistent with environment, easy maintenance and metal with easy construction	Metal and concrete	In green spaces, inside forest park with good view can be installed	Height 200cm Dimensions 200*200 and two-way slope	Observations of existing 11- Shade
The size is based on standards. By pretty view, each tired passenger is invited to rest With metal and concrete skeleton has high durability. The form and color are consistent with environment and beauty of environment is increased.				Evaluation

Source: Author studies

### Comparative evaluation of common standards in urban green spaces of Jolfa

Based on the previous issues, existing per capita of urban green spaces of Jolfa before guiding plan was 19.6m<sup>2</sup> per person. The horizon of guiding plan of per capita was 9m<sup>2</sup>. Due to the lack of fulfillment of predicted population, its change is little and according to the report of Municipality in 2005, it was equal to 18.20m<sup>2</sup>. The main point is that in standards, the per capita and values are used by all people and minimum expectations of people are fulfilled regarding beauty, oxygen, prevention of noise, dust and recreation and leisure time. Thus, green space per capita of Jolfa is lower than standard of UN organization (20 to 25m<sup>2</sup>) and is equal to the proposed per capita for developing countries (16m<sup>2</sup>) and Tehran Municipality with per capita (15 to 20m<sup>2</sup>) and is higher than proposed standard of housing and urbanization ministry (7 to 12m<sup>2</sup>). Also, per capita of Jolfa city with 18.20m<sup>2</sup> is higher than minimum proposed level of experts of management and planning organization. Thus, Per capita of urban green space is a good figure.

Table 2. Levels, percent and per capita of fulfilled green spaces in guide plan period and in 2005.

2005	Second five years 1999	First five years of 1994 plan	Existing condition 1989	Explanation
128700	168700	95700	81725	Area in m <sup>2</sup>
18.20	27.62	17.57	19.06	Per capita m <sup>2</sup>
1.51	1.98	1.12	1.27	Percentage of total proposed use of plan

Source (Edalatdust, 2005)

Table 3. The area and percentage of urban green spaces of Jolfa based on its types in 2005.

Percentage to total	Area in m <sup>2</sup>	Different types of urban green spaces	No.
42.28	122000	Public green spaces and park	1
37.45	108000	Semi-public green spaces	2
20.27	58500	Street green spaces	3
100	288500	Sum	

Source (Edalatdoost,2005)

#### **4. CONCLUSION**

Discussion about furniture and urban green spaces requires different fields as urban planning, green space engineering, urban design, urbanization, environmental graphic, etc. and each has specific claim and the important thing is recognition of different furniture and urban equipment among green spaces and using different scientific fields for analysis of issues. The common regulations and standards in design, construction and layout of urban furniture and urban green spaces show that by more details about ergonomic, layout of urban furniture and per capita and common standards of urban green spaces in design of furniture and urban green spaces, we should consider the global standards and adapt with the conditions of society and city. Thus, besides observing the general standards, city beauty and comfort and security of citizens are fulfilled.

#### **5. RECOMMENDATIONS**

- 1- Good urban furniture can lead to better access and security of citizens.
- 2- Considering the visual and physical features in design of urban furniture as size, color, form and tissue, beauty and specific consistency to urban spaces can be created.
- 3- Access to urban equipment at minimum time-place distance is of great importance.
- 4- In urban furniture design, considering vandalism, safety and stability can lead to reduction of cost and economic saving.
- 5- Urban equipment should be consistent with natural-climatic conditions of region.
- 6- Ergonomic factor is an important feature that should be considered in design, construction and urban layout.
- 7- In the design of urban furniture, important factors as adaptability of fulfilling the environment need, environmental factors and executive and performance factors are considered.
- 8- Flooring of streets, pedestrians and squares in forming urban spaces has considerable share and creates high attraction for movement.
- 9- In selection, locating and installation of urban furniture, considering the personal views leads to confusion in city.

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