



Analyzing Urban Green Space Function Emphasizing Green Space Features in District 2 of Tabriz metropolis in Iran

Analisando a Função do Espaço Verde Urbano no Distrito 2 da Metrópolis de Tabriz, Irã

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Abstract

Urban green spaces can be a comprehensive tool for long term protection of environmental sustainability through improving the quality of life. With urban areas development, population growth and activities increase, urban planners prioritized green spaces and breathing issues in the top of their studies; time lapse and outbreak of respiratory illnesses, resulting from pollution and population density, necessitated deep studies of these phenomena. By the appearance of sustainable development theory the plan of developing green spaces achieved a great importance. Nowadays, developing green spaces, especially parks, is a substantial element of urban development plans which reveals the importance of such spaces in human centers. Land price increase and owners' attempts for converting gardens and farms into inhabitable areas have decreased green spaces. From the other hand, the concept of city without green spaces in their different forms is not imaginable. Urban development repercussions and environmental complexities have necessitated the existence of green spaces. Cities have to accept the structure and functions resulting from natural systems to guaranty their own survival. Referring to green spaces as the lungs of the city seems reasonable; thus, this study aims to examine the status of green spaces, focusing on District 2 of Tabriz and its strengths and weaknesses.

Keywords: environment; green space; Tabriz city; urban planning; Iran

Resumo

Os espaços urbanos verdes podem ser uma importante estratégia para a proteção ambiental sustentável de longo prazo, possibilitando um incremento na qualidade de vida. Com o desenvolvimento das áreas urbanas, crescimento da população e aumento das atividades urbanas, os gestores urbanos priorizaram os espaços verdes e temas relacionados à qualidade do ar, como de relevância para análise; as doenças respiratórias resultantes da poluição e do adensamento populacional, demandam assim estudos aprofundados. A partir do surgimento da teoria do desenvolvimento sustentável, a planificação de espaços verdes tornou-se de grande importância. Atualmente, a implantação de espaços verdes, especialmente parques, é um elemento substancial dos planos de desenvolvimento urbano, os quais revelam a importância de tais áreas nos centros urbanos. O aumento do preço da terra e a transformação de jardins e fazendas em áreas habitadas conduziu à diminuição dos espaços verdes. Por outro lado, o conceito de cidade sem os espaços verdes nas suas múltiplas formas é inimaginável. As repercussões do desenvolvimento urbano e das complexidades ambientais conduzem obrigatoriamente à existência de tais áreas. As cidades têm de aceitar a estrutura e as funções resultantes dos sistemas naturais para garantir sua própria sobrevivência. Os espaços verdes, como pulmões da cidade, é um conceito adequado. Assim, este estudo objetiva reexaminar o status de espaços verdes, avaliando os aspectos positivos e negativos, com ênfase no Distrito 2 de Tabriz.

Palavras-chave: meio-ambiente; espaço verde; cidade de Tabriz; planejamento urbano; Irã

1 Introduction

From the environmental view, green spaces make the living segments of the cities and balance live sections with inanimate parts. Examining in present status of the cities shows that urban areas should be optimized. They should balance the ecologic structures against constructed areas. Owing a population of 1.4 million people (in 2006), Tabriz is regarded as one of the metropolises of northwest of Iran. Based on different business, organizational, educational, and service functions of this city, its population is growing fast. The lack of enough green spaces, air pollution, and various environmental crisis demand new approaches in urban planning for Tabriz city.

Urban green spaces include some benefits for people, Environmental benefits of urban green spaces can be include Ecological Benefits, Pollution Control, Biodiversity and Nature Conservation. Also Economic and Aesthetic Benefits are Energy Savings and property Value; Final benefits will be in Social and Psychological aspects such as Recreation and Wellbeing and Human Health (Shah & Haq, 2011)

Urban green spaces as an important contributor can be a significant part of sustainable development. Developments of urban green spaces need to consider interdisciplinary and integrative approaches such as economic, political, social, and cultural, management and planning aspects to improve existing urban green spaces' facilities and services, and to optimize urban green space policies (Shah, 2011)

The definition of urban green spaces which is agreed on by ecologists, economists, social scientists and planners is public and private open spaces in urban areas, primarily covered by vegetation, which are directly (e.g. active or passive recreation) or indirectly (e.g. positive influence on the urban environment) available for the users (Tuzin, 2002).

2 The Importance of Investigating Green Spaces

Construction and population growth, pollution increase, and problems resulting from traffic, cultural and social problems, scarcity of recreational and green spaces (like amusement parks) are the problems with which Tabriz confronts. Green spaces - the lungs of the city- help beautifying the view of it; so, regarding them with scrutiny is of great importance. Identifying per capita of the city

should follow some criteria like land price, people income, development facilities, land location, social issues, rituals, population need to recreational centers, life style and building technology. So, first a criterion should be appointed for all population and applications; then, a per capita should be identified for both of them. The total per capita of the city results from the sum of all applications' per capita like (green space applications, residential, recreational, medical, educational, etc.) which finally yields the necessary area for urban development. In urban studies, a standard refers to the level of segments identified by measurement criteria regarded for a definite number of populations. (Chehrzad, 1992).

Space per capita recommended by UN is 20-25 m². It is 18 m² in France, 15 m² in Latin America, and 10 m² in England. Based on the recommendation of *First Comprehensive Plan of Tehran* (legislated in 1970), park per capita should be 9.13 m². Recreational area (park, club, cinema, theater, etc) per capita is also different. UN per capita is 30m². In Tehran Plan it is 17.71m² whose 9.13 m² is park, 3.2 m² is recreational area, and 6.55 m² is open space (Urban Planning Group of Housing Ministry, 1943).

Green Space Research Department in France suggests the per capita of 10m² for green space.

National Institute of America introduces the per capita of 14m² for green spaces. Northland suggests the per capita of 48 m² for green spaces. However, the standards of developing countries are much lower than Europe and America. For example in Calcutta, it is 1.2m² and in Baghdad it is 1.4m², while suggested standard is 16m² for developing countries (Dallalpoor, 1995). Based on experts' ideas, international green space standard per capita of populated cities should be 15-50 m² (Hoseinzadeh, 1998). Studies of Housing Ministry identify the per capita of 7-12 m² while UN suggests the per capita of 20-25 m². Table 1 shows the suggested area for green spaces by different organizations. Various geographic, social, economic, political, and environmental features may change these standards. According to Behbahani (1994), acceptable green space standard of Iran is the minimum of 6m² and the maximum of 20m

2.1 Environmental Effects of Green Spaces

Parks and green spaces have strategic importance for improving biologic conditions of urban areas for cleaning the weather, filtering

wind, reducing sound pollution, and improving microclimatic conditions. Beside social, psychological, and environmental considerations, parks are also economically important. Since, they add recreational, aesthetic, and touristic attractions to the city which create employment. Natural elements adjacency to the green spaces optimizes urban spaces. Based on a study in Tokyo, linear parks are good for the neighborhoods with smaller areas while square parks are proper for larger places (Geo & Asami, 2001). The studies of Coley *et al* (1997) show that the people living in the areas with qualitative green spaces have better social behaviors and crime statistics is low there (Chiesura, 2004). The most significant green space effect in the cities is its environmental function which contrasts misuses of technology and overbuilding (Majnoonian, 1995). Green space effect is maximized when it is located correctly and uses many trees and bushes (Soltani, 1992).

2.2 Main Functions of Green Spaces

Main functions of green spaces are as follows:

1. *Green space function in city structure.* Green space is regarded as the live urban section which balances inanimate structure of the city and gives a better perspective to the sights. In that case, it can play the role of city edge, discriminate urban sections, and embellish path ways. Creating green borders among crossing constraints helps their safety, decreasing pollution extent.
2. *Environmental function.* This function improves ecologic conditions and pollution reduction. It also enhances the quality of urban life. This quality maximizes when green space is located correctly and many trees are used in its design.
3. *Social- psychological function.* The main goal of green spaces is creating closeness between human and nature. Everyone needs some hours in silence and peace. This need increases by population density and apartment life in the future. So, a place where one can get away from urban noises or concerns acquires necessity in the cities (Soltani, 1992).

2.3 The Patterns of Green Spaces Inside the City

This system is defined in the form of green pieces with various sizes and functions in

urban structure in which green space starts from neighborhood parks with limited applications and extends to a suburban park with wider functions (Turner, 1992). This model is regarded in developed countries with older urban planning history.

Urban parks offer recreational services to different urban areas. Their main function is creating peace, refreshment, and joy in the citizens; so, ideally, they should be comfortable, safe, and relaxing (Hultsman, *et al.*, 1987). Those parks are divided into neighborhood, alley, local, regional, and suburban parks that will be described below.

1. *Neighborhood parks.* Neighborhood parks refer to the places located in a neighborhood with less than half hectare in a way that a 9 year old child is less than 200 m distant from the furthest point of the neighborhood. The child also doesn't need to cross the street fast.
2. *Alley parks.* Alley parks are located in an alley with an area twice as big as the neighborhood park (1-2 hectare). A 9 year old child is less than 400 m distant from the furthest point of the neighborhood. The child can cross the street slowly.
3. *Local parks.* Local parks are in an area twice as big as the alley parks. Every resident is less than 2 km far from the furthest point of the area and can cross any paths.
4. *Regional parks.* Regional parks are in an area twice as big as the local parks. Every resident is far twice as much as local parks from the park (about 5-6 km) and can reach it in 30 min or more by driving.
5. *Suburbanpark.* It refers to the park covering the whole city with the area over 10 hectares including all necessary equipments of the citizens. Such parks are built in the suburb and rough areas.

Park Type	Function Range	Area
Neighbourhood	200 m	Less than 0.5 hectare
Alley	400 m - 600 m	1-2hectare
Local	800 m – 1200 m	2-4hectares
Regional	1500 m – 2500 m	4-10 hectare
Suburban	25-30 mind riving	Over 10 hectares

Table 1 Park classifications based on their function range (adapted from Majnoonian, 1995).

Since one of urban development elements is increasing green spaces and pollutant reduction, regarding this point in urban plan is of great importance. Developing green space as city lungs is for enhancing the health of the citizens. But from capitalism view, green space is in the range of luxuries whose development needs much capital. Also, creating refinery and filtering units for chemicals needs more investment and less benefit, unless they can compensate for the expenses. All chemical pollutions in industrial cities are because of the shortage of green space or its inefficiency for the lack of capability, limited or improper spread. Then, the outbreak of many diseases becomes probable. The role of green space in filtering air pollution in the squares, streets, parks, and suburbs is a necessity of urban life. Definitely, creating green belts is regarded as favorable if it coordinates with a holistic system which concerns the interrelation of humans and the environment. Based on international standards, every person should have 15-25 m² green spaces. Vegetative types should be selected based on their ability in absorbing harmful combinations of the atmosphere. Generally, people are aware of the impact of green spaces and look at it as the health symbol, although the relationship between trees, their different mechanisms and health is not completely transparent for them. Cities are either suffering from insufficient green space or their improper distribution. Social class also is a determinant here; in a way that well-paid people have more favorable status than badly-paid classes from green space view. Although per capita of green space has had a significant growth in previous years, it has a considerable difference with acceptable global criteria yet (Majnoonian, 1995).

2.4 Examining Green Space Status of Tabriz

Tabriz is one of 7 metropolises in northwest of Iran. It has been a trading center from ancient times. Most houses used to have gardens for family gatherings and refreshment. There were famous gardens in different sections of Tabriz (e.g. Ghareaghaj) that now have just left their name on the neighborhood. Capitalism penetration after 1920 in Iran caused land use differences from green spaces to residential areas. Thus, the lack of proper planning for green space development has led to green space inadequacy. Tabriz has always been the center of economic activities in Iran northwest for its geographic, communicative, political, and

economic position. Cities are distinguished by their various functions. Awareness about employment and income of a city is necessary in planning for different levels of land uses and house-building policies. Generally, income and employment depend on economic activities of every city which attract more population. It can also be the most important factor in identifying citizens' residential areas, since middle-class families select more hygienic areas with better views.

Industry is another distinctive feature of social-economic life in Tabriz. Tabriz is an industrial pole in the country, owning 20,000 industrial workshops (based on the statistics of 1996). There are 277 large industrial units in Tabriz, revealing its industrial density. This number includes 71% of the industry in the province. Total green space of Tabriz was 2,604,636 m² for 1,300,000 people in 2005; so, green space per capita for every citizen was 2 m² which is insignificant for this metropolis. It must be notified that some parks like Grand Park of Tabriz with the area of 800,000m² haven't been completed and utilized but are counted in green space statistics. Then, real per capita of green space is less than mentioned number. Table 2 summarizes these areas based on the municipalities of different districts of Tabriz.

Row	District	Area (m ²)
1	District 1 Municipality	207820
2	District 2 Municipality	1024515
3	District 3 Municipality	415732
4	District 4 Municipality	375225
5	District 5 Municipality	199870
6	District 6 Municipality	355117
7	District 7 Municipality	88596
8	District 8 Municipality	28400
9	VadiRahmat District	9371
Total		2604636

Table 2 Green space areas of different districts in Tabriz in 2005.

Needed green space of Tabriz is 1800 hectares. Then, if the existing area is distracted from this number, 1540 hectares results that shows the green space shortage in Tabriz. In green space planning for the cities, green space area in boulevards, squares, and street sides is calculated separately and is studied from environmental view.

Tables 3 and 4 show the area of those spaces of Tabriz.

District	Total Park Area	Percentage to Total	Region Total Area (hectare)	Population (per 60 people)	Area Density (Person/ hectare)	Park Space Per Capita (m2/person)
1	207820	8	1720	313304	182/15	0/66
2	1024515	39/3	3500	224443	64/13	4/56
3	415732	16	2120	264377	124/71	1/57
4	375225	14/4	3100	296015	95/49	1/27
5	199870	7/7	26000	16033	0/62	12/47
6	255117	9/8	42200	8063	0/19	31/64
7	88596	3/4	24600	27279	1/11	3/25
8	28400	1/1	260	18349	70/57	1/55
Vadi	9371	0/4	-	-	-	-
Total	2604646	100	103500	1167863	11/28	2/23

Table 3 The status of Tabriz parks based on areas.

District	Neighbourhood	Alley	Local	Regional	Suburban
1	7820	-	140000	60000	-
2	13600	129695	201220	70000	610000
3	28941	131470	115321	-	140000
4	53317	144816	127092	-	50000
5	5270	23600	68000	103000	-
6	1911	-	64185	49021	140000
7	4500	63396	20700	-	-
8	3000	245400	-	-	-
Vadi rahmat	9371	-	-	-	-
Total	127730	518377	736518	282021	940000

Table 4 City parks functions from green spaces.

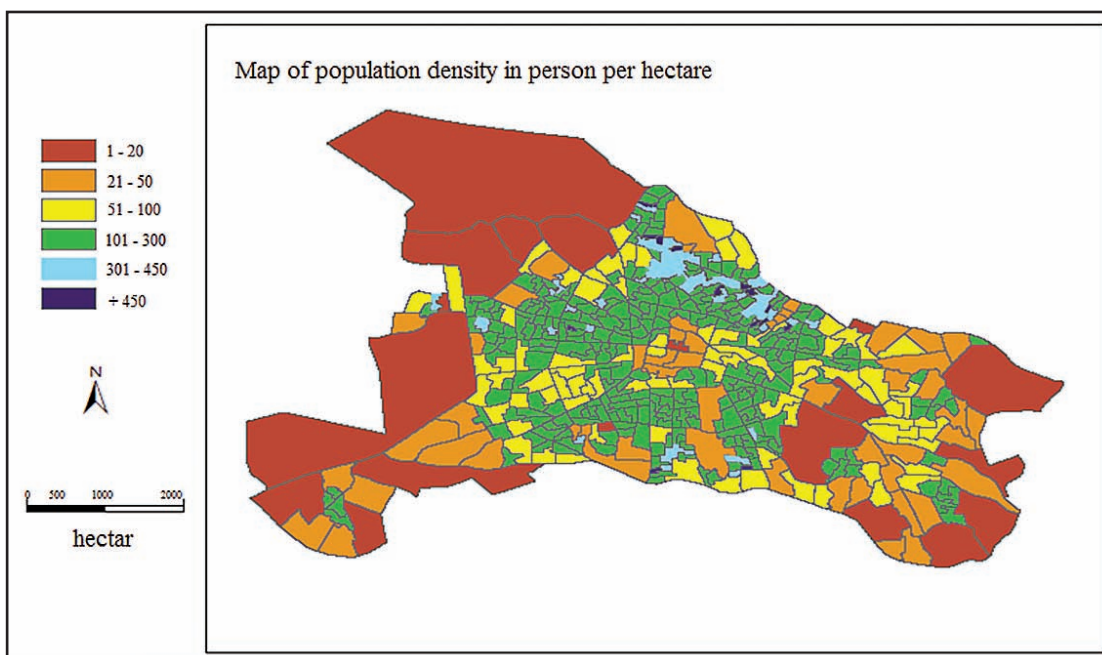


Figure 1 Population density (person/ hectare) in Tabriz.

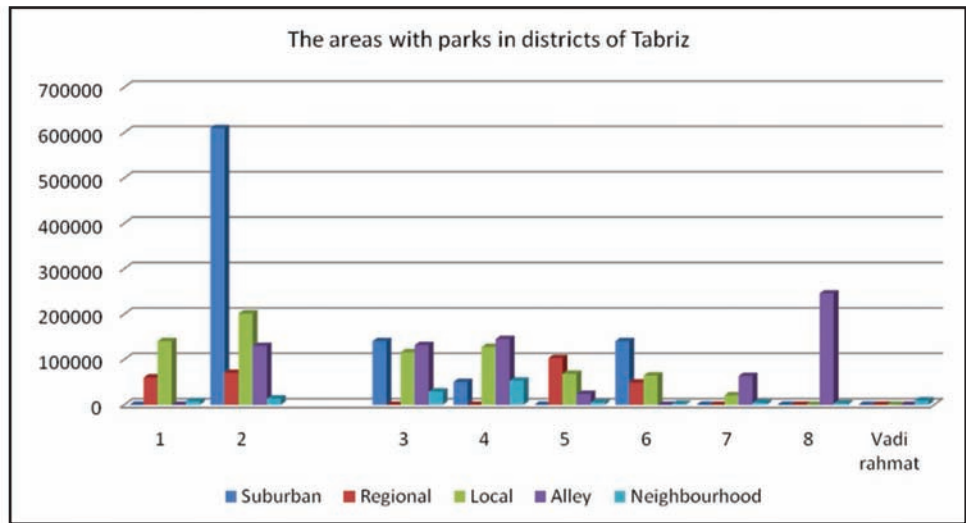


Figure 2
 The areas with parks in districts of Tabriz.

Along with population growth in Tabriz, physical development of this city has increased. In 1911, 1956, 1976, and 1996, it had 700, 1770, 4580, 14000 hectares of areas. Parallel with population growth, green space applications have also decreased. In the Comprehensive Plan of Tabriz, provided by Consultant Engineers, green space area has been identified as 1266070 m². From this amount, 647070 m² (0.61 m² per capita and 49%) of urban land uses belong to the parks. Forest areas contain 619000 m² (0.58 m² per capita and 47%) of urban land uses. This amount is insignificant compared with other uses. Residential, bare land, and farms per capita is 43.5, 28.84, 12.76 m².

2.5 Green Space of District 2 of Tabriz

Based on the statistics of Tabriz (statistics

of 2006), Tabriz has 2.6 million m² green space whose 2.6 m² is located in District 2(16%). Considering Elgoli Park with area of 610,000m², the area of district parks raises to 1,024,515m². Mirdamad, Baharan, and Shahriar parks are the biggest green spaces of this district. Totally, 28 parks are identified in this area. Sidewalk areas of these parks are 207,480m² and grass areas are 294,847 m². From aesthetic views, planting flowers was done in 29,450m² whose 20,320m² is seasonal and 9,130m² is permanent. There are also 889 bushes whose 322,366m² is in bulk vegetation form. There are 66,246 trees with wide leaves and 29,535 trees with needle leaves in Elgoli Park. Totally, there are 125,073 trees in this area.

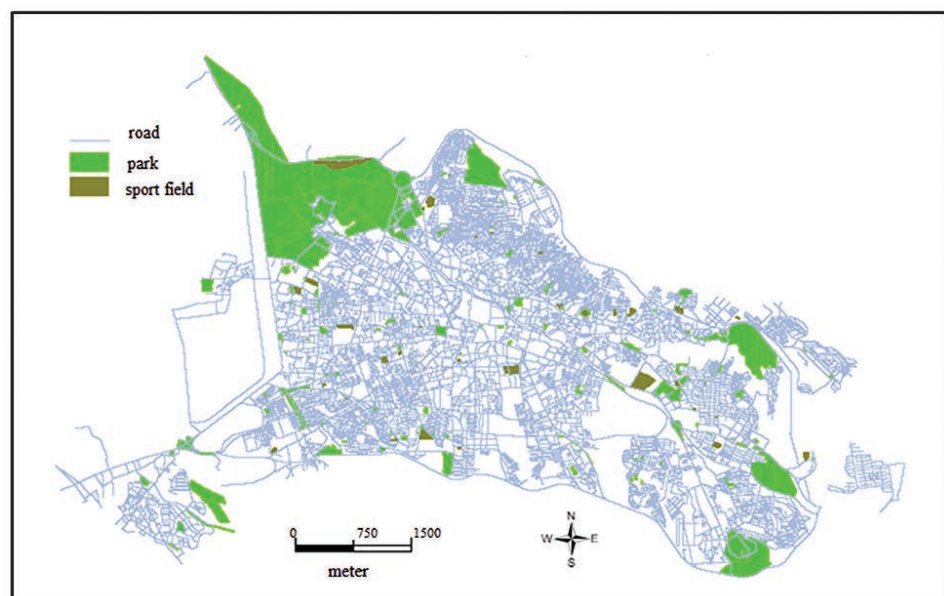


Figure 3 Park distribution and sport lands of Tabriz till 2006.

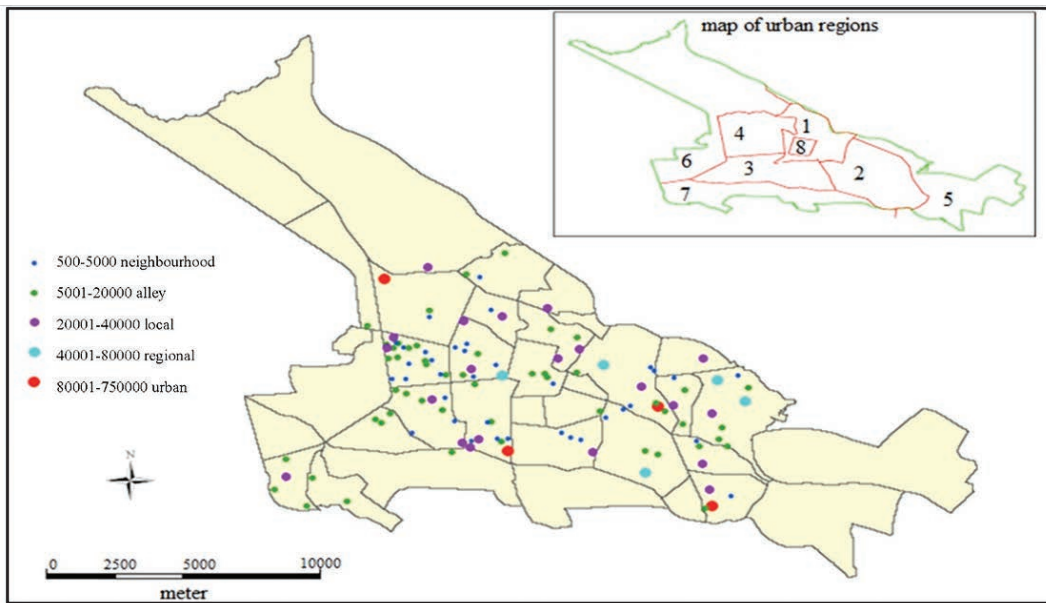


Figure 4 Park distribution in different districts of Tabriz in 2006.

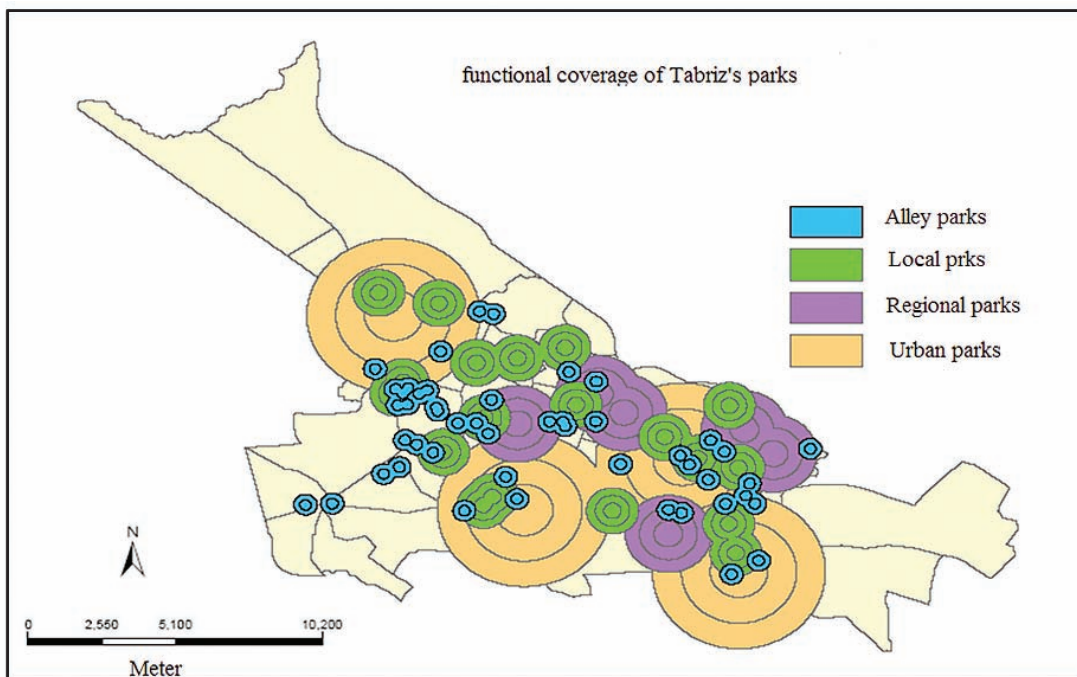


Figure 5 Function level of urban parks in Tabriz.

Park Type	Percent	Total Area(m ²)
Suburban	59	610000
Regional	6/8	70000
Local	19/64	201220
Alley	12/65	129695
Neighbourhood	1/32	13600
Total	100	1024515

Table 5 District 2 park areas based on their functions.

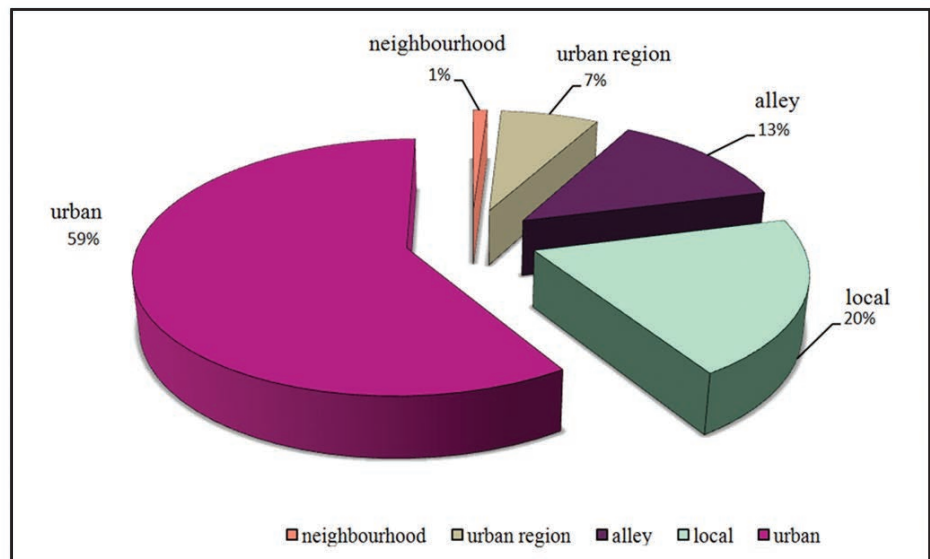


Figure 6 The percent of green space division based on their function type.

Based on the statistics of 2006, 11 green spaces in the area of 33,770m² - length of 14,210m² and width of 54m² - are created in District 2, shown in tables of appendix. They have grass area of 33,770m² and flower plant area of 1,850, 80 bushes, 13,330 row flowers and 2,718 trees. There is 7,070m² irrigation system whose water is provided from underground wells. There are 10 grass fields in District 2 with the area of 28,570m². In these fields, 2,010m² have seasonal flowers and 752 m² contain permanent flowers, 8 bushes, and 725 trees. 617 trees have wide leaves and 108 trees have needle leaves. There are also 103 side road paths with green space in the area of 17,612m². The important point to consider in this respect is regarding the effects of each tree type (wide or needle leaf) on the environment to yield an optimum vegetation for the area.

Except for 35 m of west-east Zafarani which has irrigation network, watering green space of side streets is by tanks. Based on the latest statistics, 72 areas have dense vegetation in the area of 466,828m². There are also 48,243 trees whose 38,273 of them have wide leaves and 9,970 of them have needle leaves.

3 Conclusion

The quality of cities depends on how the urban green spaces are designed, managed and protected. The management, planning, design, policy implementation of urban green spaces as the key discussion issues of sustainable environment are highly integrated and incorporated into the sustainable development at local and global level (Tuzin, *et al.*, 2002). Urban green spaces not only play role to environment but also it contributes to

social, economic, recreation, cultural, visual aspects and commercial developments in cities.

Having regional look at green space, per capita and standards of it are not scientifically correct, since they are better regarded at local or national level. For example, Elgoli and Golestan parks may be located in District 2 or 5 but their function should be examined in metric space. Table 4 shows total park area, density, and per capita in 9 districts of Tabriz. It reveals that Tabriz has 2,353,341 m² parks with park per capita of 2.23m² which shows considerable growth compared with previous years. Among Tabriz districts, District 6 has the best per capita of 31.64m², District 5 has the per capita of 12.47m² in the second rank; District 2 has the per capita of 4.52 m² in the third rank; the lowest rank among districts belong to District 8 with the per capita of 0.66m². Areas of the districts have also been different. For example, District 6 has the largest area with one suburban park, 7 regional parks, and 12 local parks. Also, except Elgoli, in District 2 there are 16.9% of regional parks, 48.5 % of local parks, 31.3% of alley parks, and 3.3 % of neighborhood parks.

Tabriz has 940,000 m² parks with suburban function, 282,021m²with regional function, 736,518m² with local function, 518377 with alley function and 127730 with neighbourhood function.

Urban parks have been created in districts 2, 3, 4, and 6 and regional parks are located in districts 1, 2, 3, 5, and 6. In District 8, there is no park with local and regional functions and in District 6 there are no local parks that show improper distribution of the parks in Tabriz.

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