



Investigation of Urban Green Spaces in the Case of Bursa Province

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Abstract

Rapid population growth, irregular urbanization due to population growth, pollution is just some of the biggest problems affecting the quality of cities and has great impacts on livable cities. Quality of life is quantified by physical, social and economic characteristics of the urban environment and urban inhabitants. This research focused on green spaces in Bursa province. It is aimed to investigate the existing assets of the green spaces in Bursa province and to determine the green space requirements at the district level. The historical city core and neighborhoods with uninterrupted connection with this region in Bursa province (Osmangazi, Nilüfer, Yıldırım, Gürsu and Kestel districts) were studied as a research area. As first step, In this study, firstly, green space presence in Bursa was determined by data taken from municipalities, aerial photographs and field study. In the second step, green space values per person are calculated. Finally, district-level suggestions regarding the green spaces of the research area have been developed. In the research area, the ratio of active green spaces to urban areas is 0.066%, passive green spaces 0.072% and other green spaces 0.04%. All of the green spaces cover 0,177% of the urban area. The maximum amount of green spaces is in Osmangazi district and the least amount of green spaces is in Gürsu. Green space values per person by districts from low to high are respectively Yıldırım (1.71), Gürsu (1.90), Osmangazi (5.10), Nilüfer (9,59), and Kestel (25.06). The highest green space value per person is in Kestel district and the reason why Kestel has high value is the cemetery area (1.050.505m²) in the district. Efforts should also be made to increase active green spaces in Kestel district. Green space values per person should increase for a livable city.

Keywords: Bursa, green spaces, green space values per person.

Bursa Kenti Örneğinde Kentsel Yeşil Alanların İrdelenmesi

Öz

Hızlı nüfus artışı, nüfus artışına bağlı düzensiz kentleşme, kirlilik kentlerde yaşam kalitesini etkileyen en büyük sorunlardan sadece bazıları olup, yaşanabilir kentler üzerinde büyük etkileri vardır. Yaşam kalitesi, kentsel çevrenin ve kent sakinlerinin fiziksel, sosyal ve ekonomik özellikleri ile nicelleştirilebilir. Bu araştırma, Bursa kentindeki yeşil alan varlığı üzerine odaklanmıştır. Bursa kentinde bulunan yeşil alanların mevcut durumlarının araştırılması ve ilçe düzeyinde yeşil alan gereksinimlerinin belirlenmesi amaçlanmıştır. Araştırma alanı, Bursa kent dokusunu (tarihi kent çekirdeği ve bu çevreyle kesintisiz bağlantılı gelişme alanları) oluşturan Osmangazi, Nilüfer, Yıldırım, Gürsu ve Kestel ilçelerinin mahalleleri ile sınırlandırılmıştır. Bu çalışmada öncelikle Bursa'da yeşil alan varlığı, belediyelerden alınan veriler, hava fotoğrafları ve arazi çalışmasıyla tespit edilmiştir. İkinci aşamada kişi başına düşen yeşil alan değerleri hesaplanmıştır. Son olarak, Bursa kenti yeşil alanları için ilçe düzeyinde öneriler geliştirilmiştir. Bursa kentinde, aktif yeşil alanların kentsel alana oranı %0.066, pasif yeşil alanların oranı %0.072, diğer yeşil alanların oranı ise 0.04' tür. Yeşil alanların tümü ise kentsel alanın %0.177'sini kaplamaktadır. En fazla yeşil alan miktarı Osmangazi ilçesinde, en az yeşil alan miktarı ise Gürsu ilçesindedir. Kişi başına düşen yeşil alan miktarı düşükten yükseğe doğru sırasıyla Yıldırım (1.71), Gürsu (1.90), Osmangazi (5.10), Nilüfer (9,59) ve Kestel (25.06)'dir. Kişi başına düşen yeşil alan miktarı en fazla Kestel ilçesindedir. Ancak bu miktarın fazlalığı ilçede bulunan mezarlıktan kaynaklanmaktadır. Kestel ilçesindeki aktif yeşil alanların artırılması için çaba harcanmalıdır. Yaşanabilir şehirler için kişi başına düşen yeşil alan miktarları artırılmalıdır.

Anahtar Kelimeler: Bursa, kişi başına düşen yeşil alan miktarı, yeşil alanlar.

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1. Introduction

Today's world, in the process of rapid urbanization, urban green spaces have become the indispensable elements of ecological, aesthetic, social and recreational value (Bilgili and Gökyer, 2012: 108-109). Urban green spaces have vital importance in enhancing the urban environment and the quality of city (Dunnet et al., 2002: 20).

In order to increase the quality of the city, green spaces should be protected and prevented from decreasing. These spaces have an importance for urban aesthetics, culture, and recreation as well as, urban structure, and urban ecosystems. The diversity and richness of green spaces, most importantly with the presence of the plants and with their functions, contribute to the physical and mental health of urban inhabitants. Additionally, it improves social networks, solidarity and spatial identity by enabling various social activities of urban inhabitants (Cohen 1996: 95-101; Gangloff 1996: 30-36; Bolund and Hunhammar 1999: 293-301; Kotler et al. 2000: 451; Willis et al. 2001: 544; Jim 2004: 311-320; Gómez et al. 2011: 311-328; Zencirkiran 2013: 7).

Urban green spaces have important meanings for:

- Urban climate, noise moderation, air cleaning,
- Biodiversity; to save valuable urban species,
- Social and cultural values,
- Health and ecology,
- Leisure and recreation,
- Connect different scales and parts of the urban landscape (Alm, 2007: 13; Leeuwen et al.: 20).

Urban green spaces also provide the connection between urban and nature. In this context, green spaces are a reflection of the natural spaces to cities (Bilgili and Gökyer 2012, 108-109). There are different ways to classify urban open and green spaces, such as its size, purposes of use, its equipment status, its functions, its location etc. (Byrne and Sipe, 2010: 10-12). Green spaces are generally classified into three main groups which are "passive green spaces", "active green spaces" and "other green spaces" in the relevant literature and legal regulations. (Emür and Onsekiz, 2007: 82; Aksoy and Akpınar, 2011: 82). Active green spaces are urban parks, regional parks, neighborhood parks, children's playgrounds and sports areas. Passive green spaces are refuges and cemeteries and other green spaces are picnic areas, zoo, and city forests.

When we take the longer view, urban green spaces should be considered and improved for creating healthy places for people, creating a healthier city, providing quality places in the city and sustaining the green systems. Within this scope; the existence of green spaces in the Bursa province has been determined specifically for the green space types. The green space values per person were determined. In this paper, the current situation of the presence of green space in urban area of Bursa province has been evaluated and green space existing assets and per person values has been calculated. Comparing the current situation with the standards and creating the proposals constitutes the study. The types of green spaces deficiency at the district level have been identified. However, the standards regarding the green spaces in our country are deficient. In our country, the standard for active green spaces (per person value) is defined as 10m² in the regulation. There is no other standard for green spaces other, This situation restricts the search for competence comparisons.

In this study, it is aimed to investigate the existing assets of the green spaces in Bursa province and to determine the green space requirements at the district level. In this study, the existence of green spaces was tried to be examined against the growth of Bursa province as physical and population. The presence of green spaces in the districts and quantities per person were determined and the shortcomings in the districts were revealed. It is aimed to be a guide for the physical development for Bursa province to given priority for establishing green spaces according to the types in the districts where have insufficient green spaces.

In this scope, the historical city core and neighborhoods having uninterrupted connection with this region In Bursa province (Osmanlı, Nilüfer, Yıldırım, Gürsu and Kestel districts) were studied as a research area. In this context, the present existence of green spaces in the research area were determined by green space types and the importance of increasing these areas was emphasized.

2. Material and Method

2.1. Material

The main material of the research is Bursa province which is located to the south of Marmara Region. The

research area is limited to the neighborhoods of the Osmangazi, Nilüfer, Yıldırım, Gürsu and Kestel districts forming the Bursa urban fabric (the historical city core and the development areas connected by this uninterrupted connection) (Figure 1). Bursa province is surrounded by Bilecik, Sakarya in the east, Kocaeli in the north, Yalova, Istanbul and the Marmara Sea, Kütahya in the south, Balıkesir in the west. According to data obtained from Turkish statistical institute (TÜİK, 2017), the total population of the research area is 2.046.449.

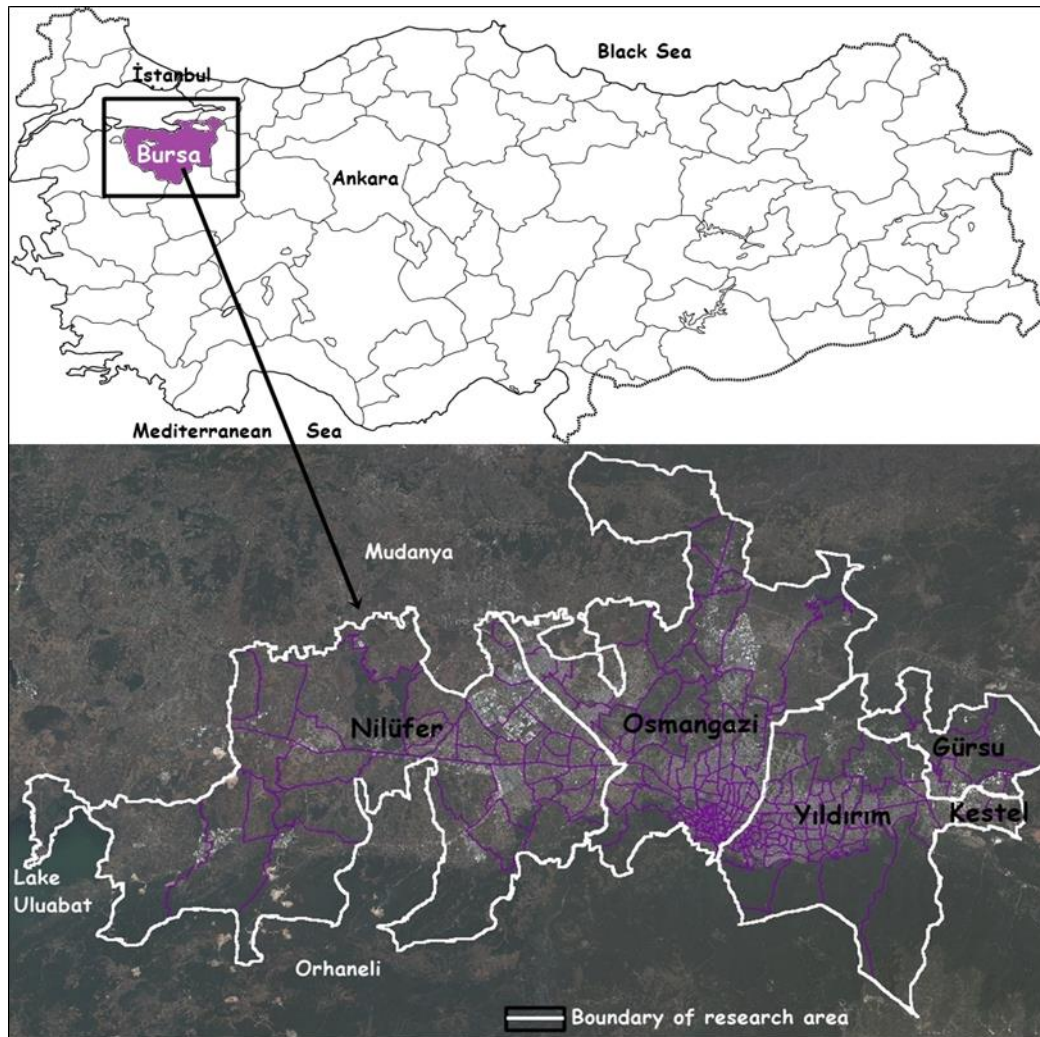


Figure 1. The location of the research area

2.2. Method

The method of the study was applied in three stages listed below;

- Determination of the presence and the characteristics of the green spaces (active green spaces: urban park, regional park, neighborhood park, children's playground and sports area, passive green spaces: refuge, cemetery, other green spaces: picnic area, zoo and city forest) with values obtained from the municipalities, data obtained from aerial photographs, and on-site calculations in the research area.
- Determination of the green space value per person of the Bursa province at the district level, (Space size/population)
- The development of proposals at the district level regarding the green spaces of Bursa province.

3. Results and Discussion

According to the types of green spaces in Bursa province, their quantities in the districts are determined with values obtained from the municipalities, data obtained from aerial photographs, and on-site calculations in field study and given in Table 1.

Table 1. Green space quantities in Bursa

Green Space Type	Quantity	DISTRICTS					Total
		Nilüfer	Osmangazi	Yıldırım	Kestel	Gürsu	
Urban Park	m ²	-	1.499.000,00	-	-	-	1.499.000,00
	%	-	100,00	-	-	-	100,00
Regional Park	m ²	92.000,00	280.000,00	231.800,00	-	25.080,00	628.880,00
	%	14,63	44,52	36,86	-	3,99	100,00
Neighborhood park	m ²	552.790,00	288.967,00	388.524,00	73.750,00	44.276,00	1.348.307,00
	%	41,00	21,43	28,82	5,47	3,28	100,00
Children's playground	m ²	36.045,00	192.085,00	56.262,00	-	-	284.392,00
	%	12,67	67,54	19,78	-	-	100,00
Sports Area	m ²	105.573,00	138.095,00	57.740,00	35.000,00	-	336.408,00
	%	31,38	41,05	17,16	10,40	-	100,00
Active green spaces	m ²	786.408,00	2.398.147,00	734.326,00	108.750,00	69.356,00	4.096.987,00
	%	19,20	58,53	17,92	2,65	1,70	100,00
Refuge	m ²	594.165,00	506.660,00	198.740,00	89.703,00	51.473,00	1.440.741,00
	%	41,24	35,17	13,79	6,23	3,57	100,00
Cemetery	m ²	1.016.844,00	826.601,00	77.374,00	1.050.505,00	33.458,00	3.004.782,00
	%	33,84	27,51	2,58	34,96	1,11	100,00
Passive green spaces	m ²	1.611.009,00	1.333.261,00	276.114,00	1.140.208,00	84.931,00	4.445.523,00
	%	36,24	30,00	6,21	25,65	1,91	100,00
Picnic area	m ²	-	357.750,00	11.650,00	200.000,00	5.600,00	575.000,00
	%	-	62,22	2,03	34,78	0,97	100,00
Zoo	m ²	-	205.000,00	-	-	-	205.000,00
	%	-	100,00	-	-	-	100,00
City forest	m ²	1.562.801,00	6.585,00	91707,00	-	-	1.661.093,00
	%	94,08	0,40	5,52	-	-	100,00
Other green spaces	m ²	1.562.801,00	569.335,00	103.357,00	200.000,00	5.600,00	2.441.093,00
	%	64,02	23,32	4,23	8,19	0,24	100,00
The amount of green spaces	m ²	3.960.218,00	4.300.743,00	1.113.797,00	1.448.958,00	159.887,00	10.983.603,00
	%	36,06	39,16	10,14	13,18	1,46	100,00
Population	Person	412.818,00	841.756,00	649.731,00	57.818,00	84.326,00	2.046.449,00
Per person value	m ² /person	9,59	5,10	1,71	25,06	1,90	5,37

According to Table 1, the amount of active green spaces is 4.096.987m², the amount of passive green spaces is 4.445.523m², the amount of other green spaces is 2.441.093m². With 4.300.743 m², the largest green spaces are in Osmangazi district and the least green spaces are in Gürsu. When the per person values are examined, the highest value is in Kestel district. Most of the amount of green space in this district is cemeteries. The lowest value is 1.71 in Yıldırım. The amount of green space according to population is the least in this district. Urban parks and zoo are located only in the Osmangazi district. This finding reduces the values of other districts. The distributions of the green spaces (active green spaces: urban park, regional park, neighborhood park, children's playground and sports area, passive green spaces: refuge, cemetery, other green spaces: picnic area, zoo and city forest) according to the Table 1 are shown in Figure 2, the green space per person values are shown in Figure 3, and the green space graph with the respective spaces is shown in Figure 4.

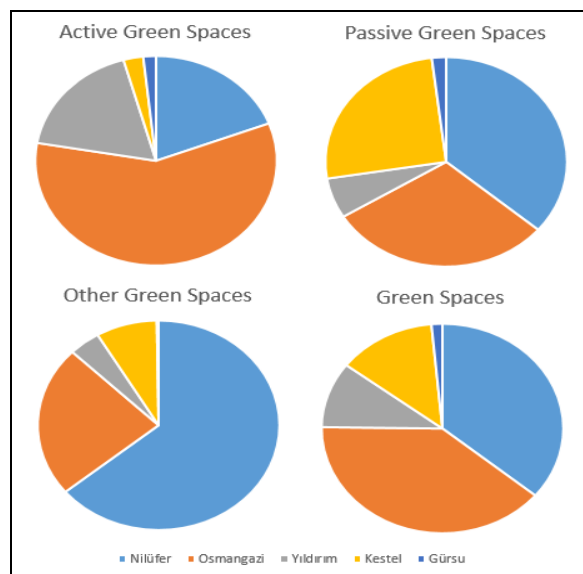


Figure 2. The distributions of the green spaces.

According to Figure 2,

- The most active green spaces (urban park, regional park, neighborhood park, children's playground and sports area) are in the Osmangazi district, and from high to low respectively Nilüfer, Yıldırım, Kestel, and Gürsu.
- The most passive green spaces (refuge, cemetery) are in the Nilüfer district, and from high to low respectively Osmangazi, Kestel, Yıldırım, and Gürsu.
- The most other green spaces (picnic area, zoo, and city forest) are by a long way in the Nilüfer district, and from high to low respectively Osmangazi, Kestel and Yıldırım. There is no picnic area, zoo and city forest in Gürsu district.

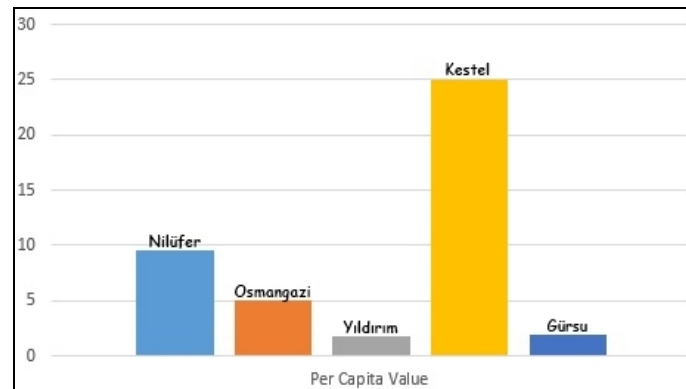


Figure 2. The green space values per person

According to Figure 3, green space values per person from high to low respectively Kestel (25.06), Nilüfer (9.59), Osmangazi (5.10), Gürsu (1.90) and Yıldırım (1.71).

According to the results of the research, as seen in table and figures, Gürsu district has the least amount of green space and Osmangazi district has the most amount of green space. However, the areal quantity of green spaces do not mean that they are sufficient. It has been researched according to the standards whether the data obtained in the performed study is sufficient. In this case, the international standards and the values in the findings are compared (Table 2 (Altunkasa, et al., 2011: 11-12)). In our country, the standard for active green spaces (per person value) is defined as 10m² in the appendix-1 of the Regulation on Principles of Planning promulgated in the official journal no 23804 on September 02, 1999.

Table 2. Standards Developed For Green Spaces According to Countries.

Green space type	Per person value of Turkish Standards	Per person value of Bursa
Active green spaces	10 m ² /person	2 m ² /person
Green space type	Per person value of US National Recreation and Park Association's Proposal	Per person value of Bursa
Active green spaces	42-88 m ² /person	2 m ² /person
Green space type	Per person value of French standards	Per person value of Bursa
Parks	25 m ² /person	2 m ² /person
Other green spaces	25-50 m ² /person	1.19 m ² /person
Total	50-75 m ² /person	3.19 m ² /person
Green space type	Per person value of UK National Playgrounds Association Standards	Per person value of Bursa
Active green spaces	40-48 m ² /person	2 m ² /person
Green space type	Per person value of Holland Standards	Per person value of Bursa
Neighborhood park	18 m ² /person	0.658 m ² /person
Urban park	32 m ² /person	0.732 m ² /person
Total (Active green spaces)	50 m ² /person	1.39 m ² /person
Green space type	Per person value of Canadian standards	Per person value of Bursa
Green spaces	40 m ² /person	5.37 m ² /person
Green space type	Per person value of Vienna	Per person value of Bursa
Green spaces	120 m ² /person	5.37 m ² /person
Green space type	Per person value of Stockholm ²	Per person value of Bursa
Green spaces	87.5 m ² /person	5.37 m ² /person
Green space type	Per person value of Curitiba	Per person value of Bursa
Green spaces	45.5 m ² /person	5.37 m ² /person
Green space type	Per person value of London ²	Per person value of Bursa
Green spaces	27 m ² /person	5.37 m ² /person

According to Table 2, per person value standards are significantly higher than the values in Bursa province. Together with this standards, The World Health Organization (WHO) has suggested that every city should have a minimum of 9 square meters of green space per person. Green space values in research area are also lower than this value.

4. Conclusion

Green space has long been one of the key components of a livable city. In this study, the existence of green spaces in Bursa province was evaluated and per person values were calculated. Since there is no regulation defining quantitative and qualitative standards for green spaces in our country except for the one defining the active green space per person, different interpretations both in planning and in practice and consequently various decisions might occur. When compared to international per person value standards, these standards are significantly higher than the values in Bursa province. These green space per person values in Bursa should increase for a livable city.

Green space findings of the research area are evaluated, priority should be given inefficient areas while green spaces are being constructed. These can be listed as follows:

- For the neighborhood parks there are neighborhoods in the districts of Nilüfer, Yıldırım and Gürsu where the neighborhood park is not exist. These neighborhoods should be given priority in planning the neighborhood park.
- Kestel and Gürsu districts are the priority districts for the planning of children's playgrounds.
- The priority area for sports areas is Gürsu district.
- The planning of neighborhood parks, which can serve many neighborhoods from green spaces, in places where they can border several neighborhoods will increase their accessibility
- The botanical garden that does not yet exist in the city needs to be planned in suitable sizes in the appropriate areas.

From low to high green space values per person by districts are respectively Yıldırım, Gürsu, Osmangazi, Nilüfer, and Kestel. Kestel has the highest value and the reason why Kestel has high value is the cemetery (1.050.505m²) in the district. Efforts should also be made to increase active green spaces in Kestel district. Nilüfer, Kestel, and Gürsu districts are new developing districts, so these districts are more advantageous than Osmangazi and Yıldırım districts for creating new green spaces.

It is difficult to increase the size of the green space in the cities. If there is no field for a green space facility, the size of the green space can be increased by taking a sample from some innovative solutions in some countries. These samples should literally build parks in the sky, such as multilayered parks, green roofs, and rooftop parks. There are some examples of these parks; Namba parks in Osaka, Japan, Rooftop park in San Francisco, USA, Hofbogen in Rotterdam, Netherlands, MFO-Park in Zurich, Switzerland. It takes a holistic approach to create a livable city, but bringing people closer to nature is one of the most important step in this process.

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