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Urban Inequalities

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Analysis of urban green space inequalities in Isparta, Turkey

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Abstract
Cities defined by population size, heterogeneity, and dynamic change face historical and contemporary inequalities. The United Development Goals underline the urgency of addressing urban inequality, which has been exacerbated by the COVID-19 pandemic. Urban open and green spaces emerge as important elements for social well-being and affect social, cultural, and psychological aspects. Despite their importance, inequalities in the distribution, quantity, and function of these areas persist. Standards advocating a minimum of 9 m^2 of green area per person and accessibility become an important component. However, global data reveals that distribution is inadequate. Only 37.8% of neighborhoods in the city are conveniently located near open public spaces.
This study examines the distribution, size, and accessibility of urban green spaces, focusing on Isparta. Unequal distributions were detected in terms of the area covered by green spaces in the neighborhoods, their accessibility, and green spaces per capita. The findings reveal the need for measures to correct urban inequality in planning, design, and management policies, which will contribute to the creation of sustainable and livable cities.

Keywords
Urban green spaces; Inequality; Neighborhood; Distribution of the services; Sustainable cities.

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1. Introduction

Cities are generally defined as spaces with a certain degree of population size, heterogeneity, and levels of integration, possessing unique social, cultural, economic, and political dynamics. Differences between the first cities that emerged and contemporary cities can be traced and interpreted based on the conditions in the course of human history. Accordingly, data related to inequality in cities exists in every period of history, and this inequality remains noteworthy in today's cities. However, the ability of urban dwellers to benefit from all the opportunities their city offers is considered a fundamental right. The United Nations' Sustainable Development Goals Report for 2022 focuses on one of the 17 key objectives: reducing urban inequality. The report highlights the need for governments to address various issues exacerbated by the COVID-19 pandemic, such as income inequality, gender inequality, and unequal access to urban services. It emphasizes the importance of data-driven efforts by states to tackle these challenges (United Nations, 2022). In this regard, all services offered to society should be distributed equally and fairly.

The adverse effects of climate change, food crises, environmental pollution, the destruction of natural systems, inequalities arising from the COVID-19 pandemic, and other crises have further emphasized the importance of sustainable urban development and policies. Strengthening the preparedness and resilience of cities in terms of universal access to high-quality infrastructure and essential services is crucial for cities to respond effectively to recovery processes and future crises (United Nations, 2022). In general, the character of cities emerges as a result of the location, densities, distribution, interrelations, and interactions of three fundamental spatial character types: areas for buildings or structures, transportation zones, and open green spaces. (Gül et al., 2020). The accurate planning of these factors has become the foundation of sustainable cities, bringing along various benefits such as smart mobility, adaptation to climate change, and energy conservation (Gargiulo & Zucaro, 2015; Gargiulo et al., 2017; Gargiulo & Zucaro, 2023).

The increasing trend of urbanization and construction has led urban green spaces to become a priority in urban policies and governance. Open green spaces are public places that positively influence the social, cultural, physical, and psychological well-being of the community. Parks, boulevards, and playgrounds not only enhance the quality of urban life but also play a vital role in social life. Therefore, there is a growing need to optimize land use with a focus on urban open green spaces (European Commission, 2019). Resolving the inequalities arising from the distribution, quantity, and functional characteristics of open green spaces is an important, yet often overlooked, aspect of addressing this need. If green spaces in the city are not accessible to people, the abundance of green space per capita becomes less significant. Therefore, ease of access to public spaces is considered a component of social justice (Fol & Gallez, 2014). The planning and design of public open green spaces, which are utilized by all urban residents, should embody an approach that is equal and fair for city dwellers. The selection of locations for these spaces, their accessibility, size, function, amenities, safety, and management policies should be formulated within this framework. Therefore, public green spaces should be easily accessible to all individuals and distributed equally (WHO, 2017). In this way, proposals have emerged that focus on the importance of ensuring both space and proximity (Martins, 2022). The World Health Organization has set a target of a minimum of 9 m^2 per person and an ideal value of 50 m^2 of urban green space (WHO, 2010). Public spaces typically constitute 2% to 15% of the land area in city centers in Europe. On average, approximately 40% of the surface area of European cities consists of urban green infrastructure. While there are contradictions in how cities define green space, many cities strive to reach the suggested minimum level, while others aim to incorporate significantly more (European Commission, 2019). For example, in Germany, the targets for green space per person range from 6 to 15 m^2 per capita (Badiu et al., 2016; für Landespflege, 2006).

In Turkey, the amount of green space per person was set at 10 m^2 according to the Spatial Plans Construction Regulation (Regulation No. 29030) in 2014. Handley et al. (2003) stated that all citizens should have access to at least 2 hectares of green space within 300 meters of their homes. Van Herzele & Wiedemann (2003)

suggested residential green space in an area of 150 m (not necessarily of minimum size) and at least 1 hectare of neighborhood green space within 400 m (Martins, 2022). However, it is observed that the function of green spaces in urban centers has decreased both qualitatively and quantitatively in recent times (Aksoy, 2014; Doğan & Küçük, 2019; Gül et al., 2020; Öztürk & Özdemir, 2013). United Nations data from 2020 indicates insufficient distribution of such areas. Only about 37.8% of neighborhoods in cities are conveniently located within a 400-meter walking distance to an open public space. This corresponds to approximately 45.2% of the urban population (United Nations, 2022). In this context, approaches that consider scientific studies on the subject in both legislation and practice are needed. It is of great importance to integrate the existing inventory of urban open and green spaces into planning, urban design, and management processes and analyze these areas considering standards.

In this study, the locations, and spatial sizes of open and green areas in Isparta were examined concerning population data. The area covered by green spaces within neighborhoods, the accessibility of green spaces, and the amount of green space per capita were calculated. Based on these calculations, the distribution, and inequalities in urban open green spaces among neighborhoods were evaluated and interpreted, and recommendations were made. The study revealed an uneven distribution in terms of the area covered by urban open green spaces, accessibility, and the amount of green space per capita among neighborhoods.

In this context, it is anticipated that by proposing measures to prevent urban inequality in the planning, design, and management policies of urban green spaces, the study will contribute to the creation of sustainable and livable cities.

2. Methodology and study area

In this study, the distribution and quantity of green spaces in the city of Isparta in Turkey were examined within the framework of the concept of urban inequality. Isparta province is in the northern part of the Western Mediterranean region of Turkey, between the latitudes of 30º 20' and 31º 33' east, and 37º 18' and 38º 30' north (Fig.1).

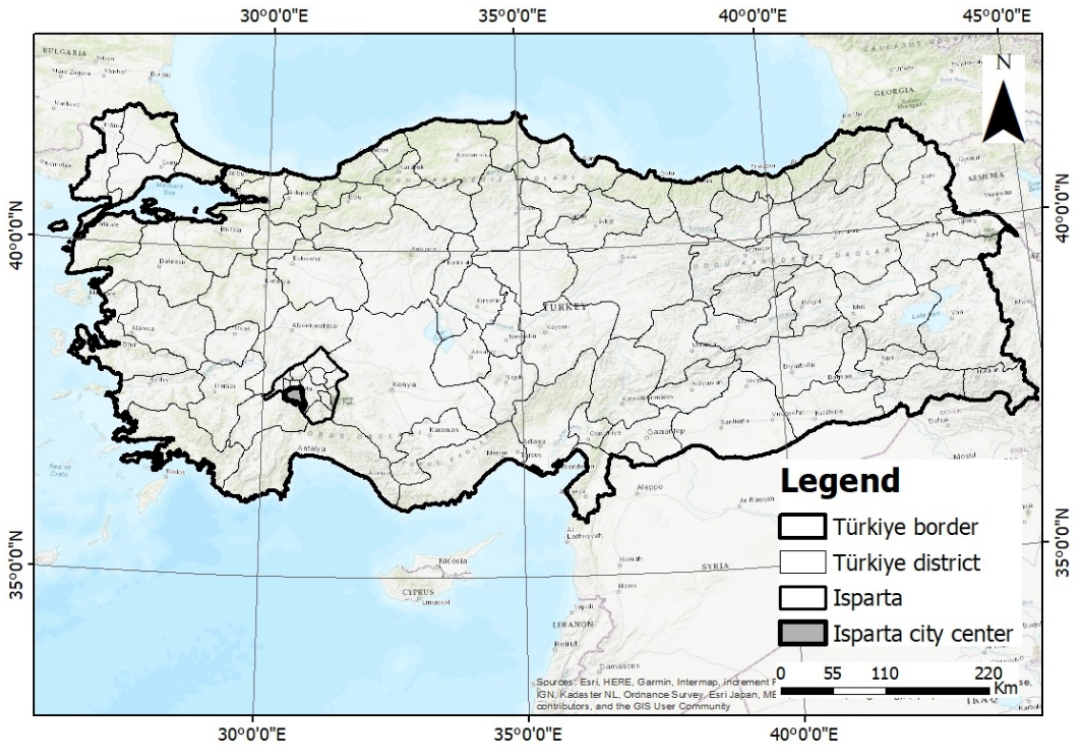

Fig.1 Isparta, Turkey

Isparta province is bordered by Burdur to the west, Konya to the east, Afyon to the north, and Antalya to the south. The average elevation of Isparta is 1035 m, and its approximate area is 8933 km² (RTMCT, 2022). The primary focus of the study is the city center of Isparta (Fig.2).

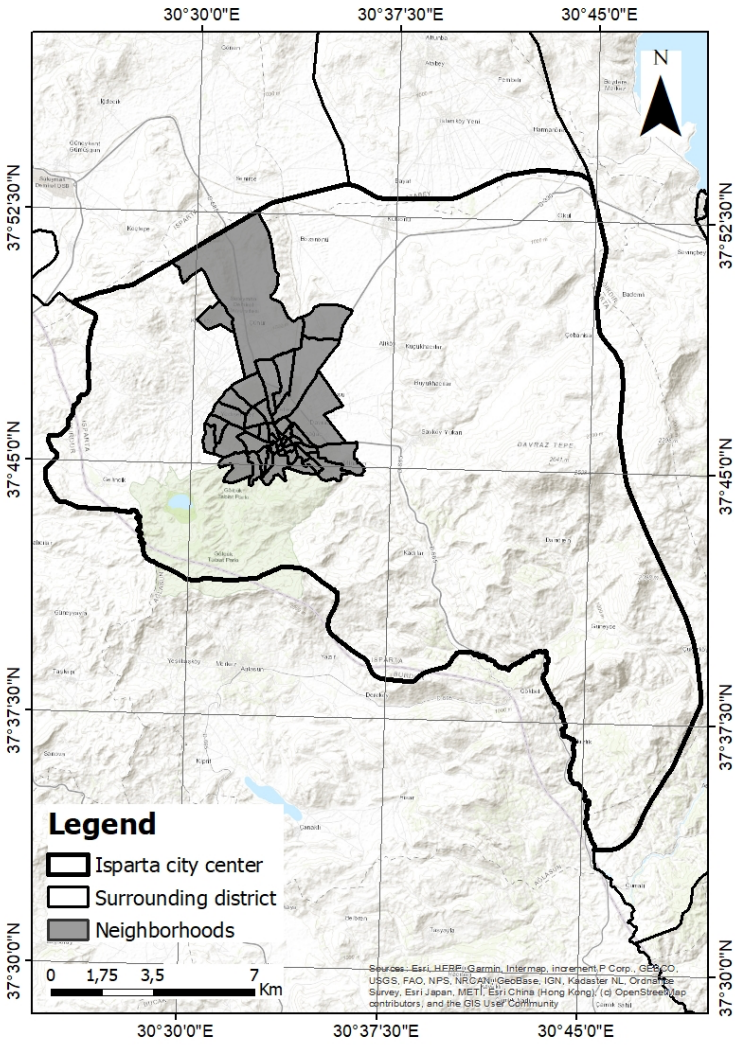

Fig.2 Study area

The area of the city center of Isparta is approximately 79 km², with an average elevation of 997 m. The city center has a topography characterized by a low slope from south to north and is surrounded by high mountains to the south. The city center of Isparta, with its cultural civil architecture hosting many civilizations throughout history and its natural values, stands out as a prominent urban center. There are a total of 44 neighborhoods in the city center of Isparta, with a total population of 247,580. There are a total of 325 green spaces in the city center, covering a total area of 2km². The city center also features 4 recreational areas and 1 nature park. In this study, a quantitative analysis of the existing open green spaces in the 44 neighborhoods located in the city center of Isparta was conducted. Public open green spaces were categorized under four typologies (children's playgrounds, parks, recreation areas, and urban parks). The research consists of four stages: (1) literature review; (2) creation of the urban green space inventory; (3) quantitative analysis of green spaces in neighborhoods; and (4) synthesis (evaluation of the relationship between green space and urban inequality and the development of recommendations).

In the first step, a literature review was conducted on the concepts of urban open green spaces and urban inequality. In the second step, information on public green spaces (children's playgrounds, parks, recreation

areas, urban parks) was obtained from the Isparta Municipality Parks and Gardens Directorate to create the urban open-green space inventory. This information, along with Open Street Map open-access data and Isparta Zoning Implementation Plan data, was digitized using ArcGIS software (Fig.3).

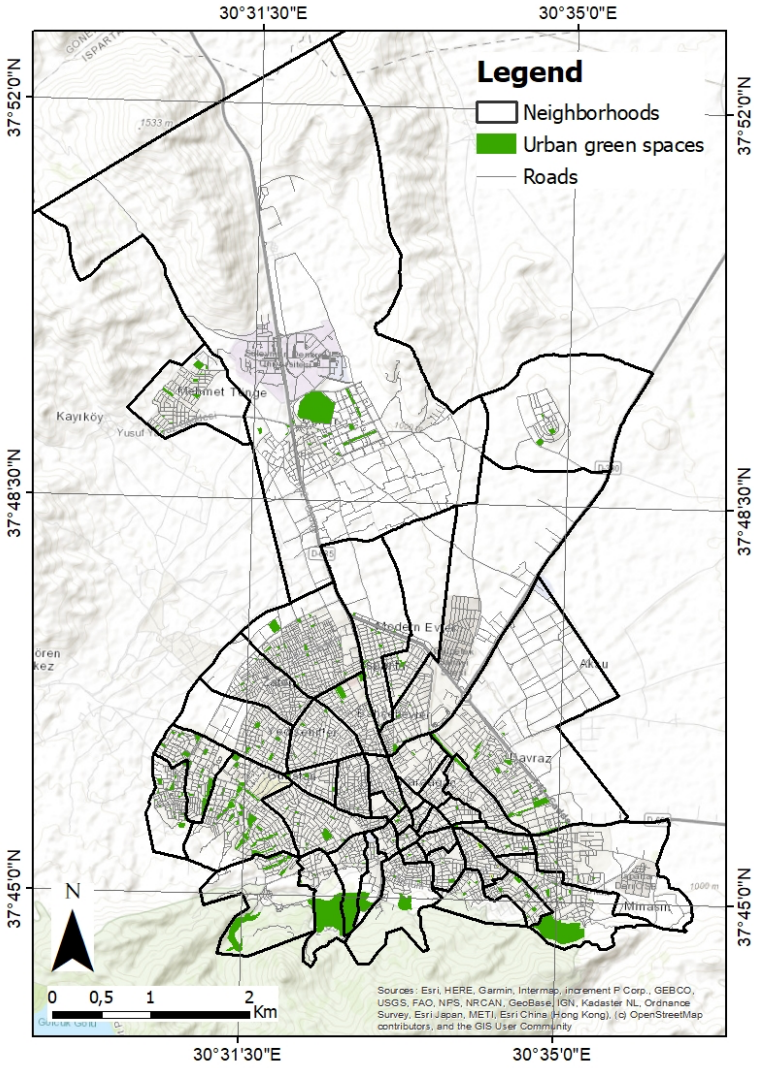

Fig.3 Public open green spaces in Isparta

In the third stage, a quantitative analysis of the distribution and quantity of green spaces in neighborhoods was conducted. This quantitative analysis includes ratio calculations related to neighborhoods and green spaces. These ratio calculations were performed considering three fundamental criteria defined by the authors: (1) The green space ratio of neighborhoods (%); (2) The ratio of green spaces to neighborhood population (per capita green area); (3) The accessibility ratio of green spaces to neighborhoods (within 500m). As a result of these calculations, inequalities in the distribution and quantity of green spaces in neighborhoods were identified. In the fourth synthesis stage, comparisons between neighborhoods were made using these calculations to assess the relationship between green spaces and urban inequality. The findings and results obtained are presented in the article.

3. Equality and green spaces

Equality implies justice in access to services and is primarily concerned with who gets what (Wicks & Crompton, 1986). Researchers have proposed three fundamental principles regarding the fairness of location selection

decisions for services (Wicks & Crompton, 1986): establishing equal opportunity as the starting point, supporting deviations from this starting point when serving the least advantaged, and determining a minimum threshold that should not fall below in terms of quality or quantity. While the term "equality" describes a situation where settlements have the same rights and advantages, the term "equity" describes a situation where all settlements are treated equally, and no one has an unfair advantage (Hao, 2013).

While accessibility is measured by the spatial relationship between places, equity is defined by the equal distribution of opportunities in service distribution. Accessibility is concerned with efficiency and strives to distribute public facilities as equally as possible for maximum access, while equity is more concerned with the impact of the distribution of public facilities or resources on those who can use them (Hao, 2013; Nicholls & Shafer, 1999). Equity doesn't always align with efficiency, as it derives its meaning solely from the demographic or socio-economic characteristics of the user. Numerous studies have brought to light issues concerning the fairness and accessibility of services (Lindsey et al., 2001; Nicholls & Shafer, 1999; Ottsmann, 1994; Talen, 1998; Talen & Anselin, 1998). Accessibility, used as a social indicator to assess whether there is equality in service distribution, may not be effectively measured by a simple distance. Proximity to a public resource doesn't necessarily guarantee accessibility, as the cost of utilizing the facility may exceed an individual's financial means or social standing (Cho, 2003).

Growth in the urban centers has resulted in spatio-temporal inequalities between travel needs and requirements and transport infrastructures, leading to significant consequences for cities such as traffic congestion, road accidents, air and noise pollution, inefficient energy consumption, and, most importantly, impacts on people's general standard of living (Gaglione & Ayiine-Etigo, 2022; Kiba-Janiak & Witkowski, 2019). The challenges related to improved access to public spaces and various services are often examined as a policy tool guiding contemporary cities toward socially sustainable urbanism, emphasizing principles of non-discrimination, justice, and overall satisfaction for all urban residents (Stauskis, 2018).

Proximity to public services contributes to residents' well-being by increasing opportunities, raising the value of residences, and saving on travel expenses that could be spent on other consumptions (Pacione, 1982). Reducing travel costs to reach facilities and services can significantly redistribute income among city residents (Pahl, 1971). Urban accessibility studies have often analyzed the performance of transportation networks using economic models designed to assess access infrastructure efficiency. However, it is argued that for sustainable urban development, the concept of urban access should not only be related to distances but should also develop thinking to measure social access inequalities and their impacts on public policy (Fol & Gallez, 2014; SEU, 2003). Curtis & Scheurer (2010) state that accessibility is a complex and multifaceted concept. Accessibility is associated with the spatial dimension of social exclusion, and its impact is assessed in terms of the location and position of poverty (Farrington, 2007). An important point regarding accessibility is that even when it is appropriate, it does not necessarily mean that people can benefit from it (Church et al., 2000).

According to Hine & Grieco (2003), individuals with low levels of direct accessibility can still achieve real access through social networks. Therefore, it is essential to consider interpersonal interactions and involvement with the local community because of exclusion from local networks (Stanley & Vella-Broderick, 2009). Moreover, the social isolation of specific individuals is likely to worsen their accessibility situations (Hine & Grieco, 2003). Thus, as emphasized by Cass et al. (2005), social interactions constitute a significant dimension of access.

Today, the scientific discussion has strongly focused on the examination of 'soft' mobility networks at the urban and neighborhood scales, to the form of built environments and urban structures (Gaglione & Ayiine-Etigo, 2022; Gaglione et al., 2022). The physical structure of a city is formed through the multifaceted interaction of fundamental components such as architectural structures, open and green spaces, and transportation. In the developmental process of cities, land use distributions and locations have always been key points for the sustainability of the city. Particularly, urban green spaces constitute a fundamental element that provides organic connections, integration, and balance with all land uses in the city (Gül & Küçük, 2001).

Green spaces are physical areas covered with plants that provide diverse services and contributions to the city's ecosystem and its residents. They constitute spaces for active and passive recreational activities, social interactions among people, and contribute to the formation of the city's identity (Gül et al., 2020). Urban open and green spaces undertake the task of carbon sequestration, integrate nature with humans, provide opportunities for active and passive recreation, enhance urban quality of life, contribute to the identity and aesthetics of the city, and offer natural solutions to various technical issues (such as purification, reduction of the urban heat island effect, etc.) (Aksoy, 2014; Eraslan et al., 2014; Gezer & Gül, 2009; Gül & Küçük, 2001; Sandström, 2002; Öztürk, 2004).

However, to ensure that everyone can benefit equally from the advantages provided by urban open green spaces, these spaces in cities need to be created with the right planning approach. The community must have comfortable utilization of these spaces, coupled with convenient accessibility. The benefits of these areas remain inaccessible to individuals unless they are in proximity. In this perspective, the significance of urban open green spaces lies not only in their quantity but also in their accessibility. This dual aspect is crucial for fostering urban equality and establishing sustainable cities.

4. Quantitative Analysis of Green Spaces

4.1 The green space ratio of neighborhoods

In Isparta city center, the total size of public green spaces in the 44 neighborhoods is 2 km^2. The total area of the neighborhoods is 79 km^2. The proportion of urban open green space is approximately 2.5%. The neighborhood with the highest green space ratio in terms of area coverage is Yenice neighborhood, with a percentage of 30.2%. Following closely is Doğancı neighborhood with a green space ratio of 27%. The neighborhood with the lowest green space ratio is Gazikemal, accounting for only 0.1%. Fourteen neighborhoods have a green space ratio below 1%.

There is an unequal distribution among neighborhoods concerning the ratio of public green spaces (Tab. 1).

ID	Neighborhood name	Green space (m^2)	Neighborhood area (m^2)	Green space ratio (%)
1	Akkent	16,619	4,011,356	0.4
2	Anadolu	10,142	2,095,688	0.5
3	Ayazmana	261,167	1,556,430	16.8
4	Bağlar	1,027	493,195	0.2
5	Bahçelievler	33,786	680,335	5.0
6	Batıkent	64,769	920,318	7.0
7	Binbirevler	35,793	906,893	3.9
8	Çelebiler	4,198	96,714	4.3
9	Çünür	295,423	28,802,245	1.0
10	Davraz	111,276	6,813,987	1.6
11	Dere	141,279	2,064,162	6.8
12	Doğancı	149,247	551,840	27.0
13	Emre	48,974	1,364,394	3.6
14	Fatih	57,284	2,190,394	2.6
15	Gazikemal	129	97,201	0.1
16	Gülcü	6,098	326,558	1.9
17	Gülevler	13,865	388,664	3.6
18	Gülistan	9,411	362,670	2.6

19	Halıkent	19,662	421,533	4.7
20	Halifesultan	9,351	377,289	2.5
21	Hızırbey	31,890	1,109,787	2.9
22	Hisar	7,094	190,541	3.7
23	Işıkkent	173,101	2,167,010	8.0
24	İskender	702	133,400	0.5
25	İstiklal	1,795	549,418	0.3
26	Karaağaç	12,936	595,070	2.2
27	Keçeci	61,001	388,070	15.7
28	Kepeci	506	218,360	0.2
29	Kurtuluş	8,766	90,197	9.7
30	Kutlubey	16,878	105,815	16.0
31	Mehmet Tönge	37,090	1,862,553	2.0
32	Modernevler	23,969	2,244,486	1.1
33	Muzaffer Türkeş	25,845	1,525,207	1.7
34	Pirimehmet	5,308	337,766	1.6
35	Sanayi	12,441	623,6923	0.2
36	Sermet	1,651	197,806	0.8
37	Sidre	5,242	711,015	0.7
38	Sülübey	1,567	102,634	1.5
39	Turan	5,875	166,610	3.5
40	Vatan	7,260	2,728,626	0.3
41	Yayla	330	148,317	0.2
42	Yedişehitler	8,463	893,943	0.9
43	Yenice	256,178	847,633	30.2
44	Zafer	5,635	1,259,304	0.4
	Total	2,001,023	7,9332,357	2.5

Tab.1 Ratio of green space to neighborhood area

4.2 Green space per capita

The amount of green space per capita in Isparta City is 8.08 m² (Tab. 2). The neighborhood with the highest green space per capita is Yenice neighborhood, with 149.03 m² per person. Other neighborhoods with a high amount of green space per capita are respectively Doğancı neighborhood (74.22 m²), the Keçeci neighborhood (47.14 m²), and the Kutlubey neighborhood (39.81 m²). Gazikemal neighborhood has the lowest amount of green space per capita, with 0.09 m². It is followed by the Bağlar neighborhood with 0.14 m². Yayla neighborhood has 0.15 m² of green space per capita.

There is an unequal distribution of green space per capita among the residents of Isparta City. The difference between the highest and lowest green space per capita is 148.94 m².

ID	Neighborhood name	Green space (m^2)	Neighborhood population	Green space per capita (m^2)
1	Akkent	16,619	2,610	6.37
2	Anadolu	10,142	7,619	1.33
3	Ayazmana	261,167	9,109	28.67
4	Bağlar	1,027	7,406	0.14
5	Bahçelievler	33,786	7,213	4.68

6	Batıkent	64,769	6,411	10.10
7	Binbirevler	35,793	2,526	14.17
8	Çelebiler	4,198	893	4.70
9	Çünür	295,423	23,842	12.39
10	Davraz	111,276	23,002	4.84
11	Dere	141,279	1,627	86.83
12	Doğancı	149,247	2,011	74.22
13	Emre	48,974	5,079	9.64
14	Fatih	57,284	14,784	3.87
15	Gazikemal	129	1,456	0.09
16	Gülcü	6,098	2,934	2.08
17	Gülevler	13,865	2,921	4.75
18	Gülistan	9,411	4,900	1.92
19	Halıkent	19,662	6,683	2.94
20	Halifesultan	9,351	5,433	1.72
21	Hızırbey	31,890	11,426	2.79
22	Hisar	7,094	2,026	3.50
23	Işıkkent	173,101	8,408	20.59
24	İskender	702	1,786	0.39
25	İstiklal	1,795	8,170	0.22
26	Karaağaç	12,936	7,402	1.75
27	Keçeci	61,001	1,294	47.14
28	Kepeci	506	3,249	0.16
29	Kurtuluş	8,766	1,147	7.64
30	Kutlubey	16,878	424	39.81
31	Mehmet Tönge	37,090	2,940	12.62
32	Modernevler	23,969	8,208	2.92
33	Muzaffer Türkeş	25,845	4,674	5.53
34	Pirimehmet	5,308	4,978	1.07
35	Sanayi	12,441	4,082	3.05
36	Sermet	1,651	2,353	0.70
37	Sidre	5,242	2,300	2.28
38	Sülübey	1,567	1,181	1.33
39	Turan	5,875	1,681	3.49
40	Vatan	7,260	6,492	1.12
41	Yayla	330	2,216	0.15
42	Yedişehitler	8,463	12,531	0.68
43	Yenice	25,6178	1,719	149.03
44	Zafer	5,635	8,434	0.67
	Total	2,001,023	247,580	8.08

Tab.2 Green space per capita

4.3 The accessibility rate of green spaces

The accessibility rate to their own green spaces of neighborhoods in the city of Isparta is expressed as the percentage ratio of the 500m buffer zone around open green spaces to the neighborhood area (Fig. 4, Tab. 3).

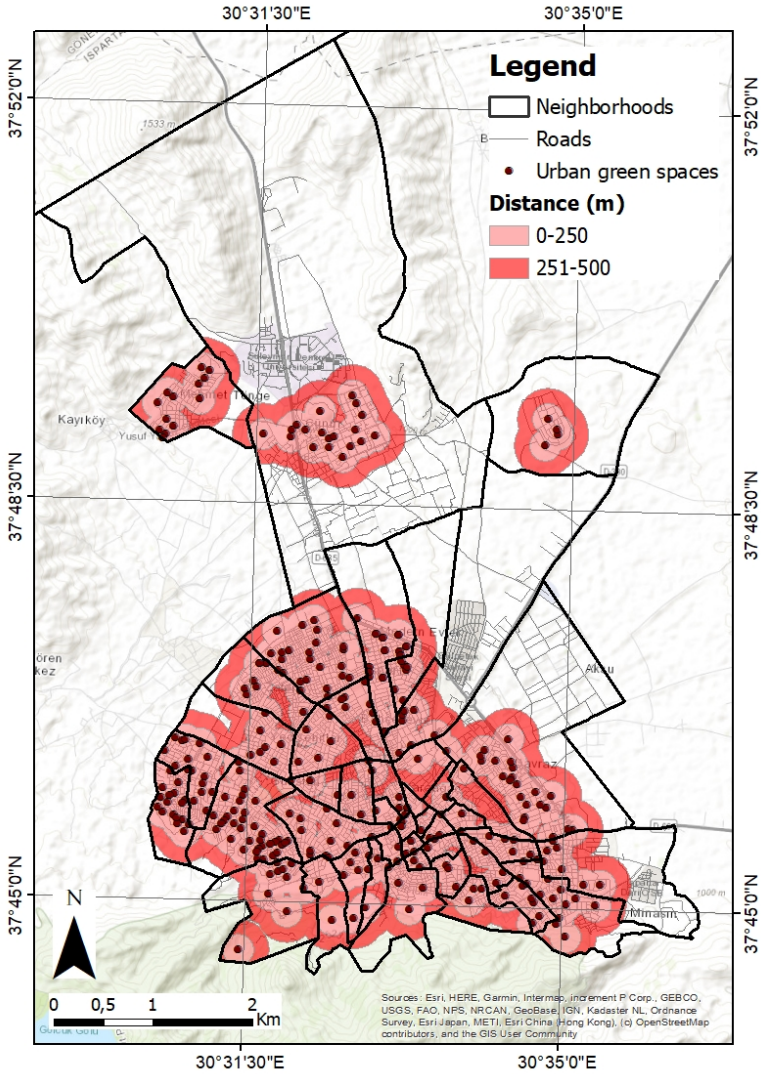

Fig.4 Buffer map of urban green spaces

Accordingly, both Gülistan and Gazi neighborhoods have a green space that all residents can access within a 500m distance. In Batıkent, Çelebilier, Doğancı, Gülcü, Gülevler, Halıkent, Halifesultan, Hızırbey, Hisar, İskender, Kutlubey, Kurtuluş, Pirimehmet, Sermet, Sülübey, Turan, and Yayla neighborhoods, the accessibility ratio of open green spaces is very high. However, in the Sanayi neighborhood, this ratio is 13.13%.
The overall accessibility ratio of the city's open green spaces is 43.81%.

ID	Neighborhood name	The buffer zone (500m) around green spaces (m^2)	Neighborhood area (m^2)	The accessibility rate of green spaces %
1	Akkent	1,470,000	4,011,356	36.65
2	Anadolu	499,310	2,095,688	23.83
3	Ayazmana	1,473,027	1,556,430	94.64
4	Bağlar	470,064	493,195	95.31
5	Bahçelievler	643,464	680,335	94.58
6	Batıkent	919,916	920,318	99.96
7	Binbirevler	895,876	906,893	98.79
8	Çelebiler	96,680	96,714	99.96

9	Çünür	3,970,857	28,802,245	13.79
10	Davraz	2,986,136	6,813,987	43.82
11	Dere	1,794,222	2,064,162	86.92
12	Doğancı	551,721	551,840	99.98
13	Emre	1,015,998	1,364,394	74.47
14	Fatih	2,155,267	2,190,394	98.40
15	Gazikemal	97,201	97,201	100.00
16	Gülcü	326,448	326,558	99.97
17	Gülevler	388,560	388,664	99.97
18	Gülistan	362,670	362,670	100.00
19	Halıkent	421,396	421,533	99.97
20	Halifesultan	377,165	377,289	99.97
21	Hızırbey	1,109,324	1,109,787	99.96
22	Hisar	190,476	190,541	99.97
23	Işıkkent	2,061,128	2,167,010	95.11
24	İskender	133,370	133,400	99.98
25	İstiklal	525,699	549,418	95.68
26	Karaağaç	312,272	595,070	52.48
27	Keçeci	387,935	388,070	99.97
28	Kepeci	210,270	218,360	96.30
29	Kurtuluş	90,165	90,197	99.96
30	Kutlubey	105,815	105,815	100
31	Mehmet Tönge	105,778	1,862,553	5.68
32	Modernevler	1,369,111	2,244,486	61.00
33	Muzaffer Türkeş	970,508	1,525,207	63.63
34	Pirimehmet	337,648	337,766	99.97
35	Sanayi	818,884	6,236,923	13.13
36	Sermet	197,739	197,806	99.97
37	Sidre	505,529	711,015	71.10
38	Sülübey	102,465	102,634	99.84
39	Turan	166,552	166,610	99.97
40	Vatan	1,078,194	2,728,626	39.51
41	Yayla	148,265	148,317	99.96
42	Yedişehitler	875,443	893,943	97.93
43	Yenice	838,695	847,633	98.95
44	Zafer	1,200,238	1,259,304	95.31
	Total	34,757,481	79,332,357	43.81

Tab.3 The accessibility rate of green spaces

5. Assessment of the relationship between open green spaces and urban inequality

The types, amenities, functions, service areas, and features of open green spaces play a significant role in enhancing urban quality of life (Emür & Onsekiz, 2007). Throughout the pandemic, there has been a noticeable trend where individuals tend to steer clear of public transportation, opting instead for personal transportation

options (Mouratidis, 2021). This circumstance has underscored, once again, the necessity for readily accessible urban service areas within cities (Barbarossa, 2020; Ender Altay & Şenay, 2023; Özdede et al., 2021).

A high-quality living environment within a city result from a balanced relationship between the city's transportation facilities and open green spaces. Accordingly, urban land use, accessibility, and quantity of open green spaces have always been subjects of research.

Some European cities have set threshold values per person for minimum accessibility to green spaces. For instance, in the United Kingdom, it is recommended that urban residents have access to at least 2 hectares of natural green space within 300 meters of their homes (Handley et al., 2003). In Berlin, the goal is for every resident to have access to at least 0.5 hectares of urban green space within 500 meters of their homes. Similarly, Hutter et al. (2004) have proposed 1.0-10 hectares of green space within 500 meters for each resident.

In Turkey, in the year 2014, with the revision of the Spatial Plans Making Regulation numbered 29030, spatial standards were updated, and the green space amount was determined to be 10 m² per person. Under the title of social infrastructure areas, children's playgrounds, parks, botanical parks, zoos, recreational areas, and recreation are listed. For populations ranging from 0 to 501 thousand, the allocation per person for children's playgrounds, parks, botanical parks, zoos, recreational areas, and recreational areas is 10 m². In provincial planning, for settlements with populations ranging from 0 to 501 thousand, the allocation per person is 5m² for the zoo, urban forest, afforestation area, fairgrounds, fairs, festivals, and racecourse.

However, 500 m walking distance is envisaged for children's playgrounds, play areas, and the service area of green spaces. Although the green space standard per person is determined as a minimum of 10 m² in the Zoning Regulation, in line with environmental protection policy decisions, in newly developing areas in cities, the green space standard has been increased from 10 m² per person to 15 m². Within the framework of these standards, urban areas are being developed both in Turkey and worldwide. However, it is observed that these standards cannot be achieved in every city. Examples from studies conducted in Turkey illustrate this. According to Türker & Gül (2022), the amount of active green space per person in Uşak city, based on the city's population, is determined to be 8.5 m².

There are differences and imbalances in the quantity and accessibility of green spaces in the 29 neighborhoods of Uşak. Green spaces are only more than 10 m² in 4 neighborhoods (Çevre, Karaağaç, Dikilitaş, and Kemal Öz), while in other neighborhoods, the values are quite low. Additionally, there are no park areas in a total of 8 neighborhoods. The ratio of neighborhood areas to the amount of active green space is an average of 1.1%. In a study by Bilgili et al. (2011), it is stated that the urban green spaces in Van are insufficient within the framework of accessibility standards. In a study by Öztürk & Özdemir (2013), it was found that the open and green spaces in the city center of Kastamonu are insufficient, and the distribution of open and green spaces on a neighborhood basis is not proportional. Aklıbaşında (2019) expressed in their study that there is 3.3 m² of active green space per person in Nevşehir, which is quantitatively insufficient. Olgun & Tahsin (2019) found in their research that the amount of active green space per person in Niğde is 6.29 m². In a study by Koçan (2021), the amount of green space per person in Bayburt city is determined to be 10.9 m². Köşe & Kara (2021) noted that in Söke (Aydın) city, there is 13.41 m² per person of active green space, but there is not an equal distribution among neighborhoods.

In Isparta city, public urban open green spaces constitute 2.52% of the neighborhoods. The amount of green space per person in the city is 8.08 m². About 43.8% of the city's population can access green spaces within 500 meters. However, it has been observed that there is an unequal distribution among neighborhoods in terms of the area covered by urban open green spaces, accessibility, and the amount of green space per person.

In European cities, on average, about 40% of the surface area consists of urban green infrastructure, and there is approximately 18.2 m² of publicly accessible green space per person. About 44% of the urban

population in Europe lives within 300 meters of a public park (European Commission, 2019). In the city of Isparta, Turkey, it has been observed that equal opportunities for urban open green spaces are not provided to people living in different neighborhoods. Additionally, compared to standards and examples from around the world, it becomes evident that decision-makers and implementers in many cities in Turkey, including Isparta, need to take various measures to enhance the quality of life and provide a more sustainable urban environment. The primary goals of these measures should focus on bringing green spaces to an adequate level both in terms of quantity and spatial distribution. Those most affected by these inequalities in cities are generally the lower-income groups, women, the elderly, people with disabilities, and (more broadly) individuals without cars (Hine & Grieco, 2003; Hine & Mitchell, 2001; Social Exclusion Unit, 2003). Lack of access to public spaces and opportunity inequality is considered a component of social exclusion, especially for disadvantaged groups (Caubel, 2006; Fol & Gallez, 2014). In the last forty years, the policy discourse on social issues has gradually shifted from combating social inequalities to addressing the problem of social exclusion (Jones & Smyth, 1999; Levitas, 2000). As a result, transportation policies increasingly focus on specific regions by targeting the needs of the most deprived neighborhoods, seen as particularly vulnerable to social exclusion, rather than aiming for comprehensive access.

Urban green spaces require more than just an increase in quantity; the development of a comprehensive and systematic planning approach suitable for urban land use, a topic often overlooked in planning studies, is of greater importance. According to Gül et al. (2020), it is crucial not only to increase the m² per person of urban open and green spaces but also to ensure comprehensive and equitable spatial distributions.

Simultaneously, factors such as the quantity, form, type, features, qualities, standards, accessibility levels, recreational services, and contributions of green spaces need to be considered. It is emphasized that green space inventories, analyses, and appropriate site selections should be carried out, and the results should be reflected in urban planning and design decisions.

6. Conclusion

Urban public green spaces are physical areas that provide ecological, economic, socio-cultural, psychological, and aesthetic benefits. It is a consensus among researchers that urban open green spaces enhance the quality of life in cities. In this context, the level of development of a city is directly proportional to the capacity, balanced spatial distribution, and accessibility of green spaces, both qualitatively and quantitatively. In this context, studies are being conducted on the usage and accessibility of urban services, particularly by disadvantaged groups such as the elderly, and simultaneously reveal inequalities stemming from the distribution of open green spaces across neighborhoods (Ender Altay & Şenay, 2023; Gaglione et al., 2022; Giannakidou & Latinopoulos, 2023). These investigations have gained even more significance, especially with the emergence of the need for green spaces during the pandemic. In such disaster situations, the resilience of disadvantaged groups in urban areas or neighborhoods with limited services is often at the lowest level.

Open green spaces are service areas that significantly impact the overall quality of life in a society and are a crucial consideration in creating an equitable city. Conducting further research to highlight inequalities and facilitating developments in existing laws and practices can play a crucial role in reducing urban inequalities.

In Turkey, researchers emphasize that green spaces are not distributed equally in urban areas, there is a lack of connections between green spaces, and accessibility is insufficient. The reasons for this include the inadequate analysis of existing open-green spaces in the planning process, failure to identify deficiencies, neglect of standards, and poorly organized management and decision-making processes, among other factors (Bilgili et al., 2011; Eminağaoğlu & Yavuz, 2010; Gül et al., 2020). Specifically, there is a requirement for strategic planning aimed at enhancing the layout of urban areas through the proactive implementation of networks for open and green spaces.

Researchers seem to be aware of the importance of the functionality, accessibility, and maximization of these areas. However, it is observed that these qualities are not prominently featured in planning documents and the approaches of policymakers. Although recent strategies indicate a clear increase in interest in augmenting urban open and green spaces at various levels, challenges persist regarding socio-cultural and sociopolitical trends (Scheiber & Zucaro, 2023).

It is necessary to develop an approach that will break this resistance to enhance public open and green spaces in cities and neighborhoods. Firstly, the identification of a national policy focusing on creating green cities that can respond to the needs of society is necessary. Sustainable land-use policies and the adoption of soft mobility are crucial components of this approach, preventing the relaxation of this strategy due to resistance factors such as rapid and intense urbanization. Secondly, it is crucial to establish the minimum per capita allocation of open and green space, ensuring the definition of criteria and thresholds for the selection of suitable locations. Addressing the deficiencies identified in areas that do not meet these criteria is essential for creating an equal environment for everyone.

For urban open-green spaces to effectively serve the city ecosystem and its residents, the goal should be to achieve an equitable spatial distribution throughout the entire city. The organization of green spaces should be perceived as a public investment for equal social life and should align with a long-term vision for a green city. This is crucial for the city to provide a sustainable, equitable, and accessible environment. Those involved in urban planning, including managers, policymakers, decision-makers, planners, and designers, should work towards developing the urban open-green space system in a way that benefits society, especially as they prepare for a resilient future in the face of challenges such as climate change, natural disasters, and pandemics.

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Image Sources

Fig.1: Authors' elaboration;

Fig.2: Authors' elaboration;

Fig.3: Authors' elaboration;

Fig.4: Authors' elaboration.

Table Sources

Tab.1: Authors' elaboration;

Tab.2: Authors' elaboration;

Tab.3: Authors' elaboration.

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