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Many public urban parks, but who profits from them? The example of Tabriz, Iran

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Abstract

Introduction: Public urban parks are accessible to everyone in a city. The time people need to reach a public park influences the accessibility of the park. Parks far away from home are less accessible because of time to spend to reach them than those in the neighborhood. Good green urban infrastructure aims to provide different types of parks (by size and structure) to all urban dwellers. The network of parks should allow all inhabitants to have access to parks within close proximity to their residences.

Methods: This paper aims to investigate the accessibility of parks as related to the social status of the inhabitants. This was investigated using the example of a clearly socially stratified city (Tabriz, Iran), in which a part of the urban society (by total number and social status) has better or worse access to urban parks. The example of urban parks shows which services are supplied on site and who the potential users are within an accessible distance. The services are qualified by structural park indicators and quantified by the quantity of these indicators. The distances are calculated on the basis of the size of the parks. Different distance circles around the parks indicate from where most of the users are coming, depending on park category. A quantification of population as related to potential users by social status in different distances to the parks shows the accessibility of parks for different quantities of inhabitants and different social strata. The classification of social status (high, middle, and low) was carried out by General Census of statistical center in 2005, informal settlement project data, statistical blocks data, land price in Tabriz municipality, and master and detailed plan reports.

Results: Many households do not enjoy government recommended levels of access to public green spaces in Tabriz, and the results highlight the social segregation in park distribution and their accessibility.

Conclusions: The best parks are located in the high social status areas, and the accessibility is the best among all societal levels.

Keywords: Ecological services; Urban parks; Social status; Park accessibility

Introduction

A clear focus of urban ecological research is on biodiversity and ecosystem services, energy consumption and sustainability, multifunctional landscapes (design and planning), and carbon footprint for climate change studies (Breuste and Qureshi 2011). Urban ecosystems cover a large proportion of the land surface, or those in which people live at high densities (Pickett et al. 2001). This include also 'green and blue spaces' in urban areas, including parks, cemeteries, yards and gardens, urban allotments, urban forests, wetlands, rivers, lakes, and

ponds which provide services for urban dwellers (Breuste 2003; Breuste et al. 2008; Gómez-Baggethun and Barton 2012). These ecosystem services provided in urban areas were addressed by major initiatives like the Millennium Ecosystem Assessment and the Economics of Ecosystems and Biodiversity (2011) and have received increasing attention as part of the policy debate on green infrastructure (European Environmental Agency 2011; DG Environment 2012). In particular, public parks play an important role in supporting biodiversity and providing important ecosystem services in urban areas (Bolund and Hunhammar 1999; Crane and Kinzig 2005; Gaston et al. 2005; Smith et al. 2005). In addition,

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urban parks are often the only alternative green spaces, especially to those covered by trees, that were lost as a consequence of urbanization (Pauleit et al. 2005), and they play important roles in providing regulation, provisioning and cultural ecosystem services, such as air and water purification, wind and noise filtering (Chiesura 2004), preventing soil erosion (Binford and Buchenau 1993), accommodation of social interactions (Peters et al. 2010; Iamtrakul et al. 2005; Cranz 1983), providing hygiene and aesthetics (Ignatieva et al. 2011), reducing work-related stress (Kaplan and Kaplan 1989; Gobster and Westphal 2004), leisure, sport and recreational activities (Salazar and Menéndez 2007), biodiversity, urban cooling (Cao et al. 2010; Imai and Nakashizuka 2010; Kordowski and Kuttler 2010), selling price of nearby houses (Benson et al. 1998; Tyrväinen 1997), and increasing property values (Geoghegan et al. 1997; Tyrväinen 1997; Morancho 2003).

Access to nearby parks and natural settings is associated with improved mental health (Sugiyama et al. 2008; Payne et al. 2005), positive effects and reduced anxiety (More and Payne 1978), physical health (Payne et al. 2005), and healthy weight among children (Potwarka et al. 2008). Moreover, park users are more likely to achieve recommended levels of physical activity compared with non-users (Giles-Corti et al. 2005; Deshpande et al. 2005). There is also evidence that distance from parks and open space is inversely associated with use and physical activity behavior (Kaczynski and Henderson 2007), which might suggest that creating more neighborhood parks within walking distance to more residents could encourage physical activity participation in the population. Distance is often mentioned as the main environmental factor influencing the use of a green space (e.g., Coles and Bussey 2000; Van Herzele and Wiedemann 2003; Giles-Corti et al. 2005), and a distance of 300 to 400 m is seen as a typical threshold value after which the use frequency starts to decline (Grahn and Stigsdotter 2003; Nielsen and Hansen 2007). Other environmental factors such as the size of the green space, presence of facilities, and availability for activities are also thought to have an influence on the use of an urban green space (Van Herzele and Wiedemann 2003; Bedimo-Rung et al. 2005; Giles-Corti et al. 2005).

Accessibility is not easy to quantify, and there is no single best approach for measuring it (Gutiérrez 2001). Accessibility refers to an individual's ability to take part in a particular activity or set of activities (Lau and Chiu 2003). The choice of indicator affects the spatial pattern of accessibility (Talen and Anselin 1998). Some researchers have examined patterns of accessibility to certain services and the geographic relationship between service deprivation and area deprivation (Lindsey et al. 2001; Tsou et al. 2005).

There are relatively few studies that map the distance people have to travel to their nearest green space

(Barbosa et al. 2007; Comber et al. 2008; Kessel et al. 2009; Oh and Jeong 2007; Van Herzele and Wiedemann 2003). The results of these studies, all based on data from one or more cities, show that the majority of the population in these cities does not have access to a green space within 300 m of their homes; however, at least 90% of the population does have access to a green space within a 900- to 1,000-m radius. The European Environment Agency (EEA) reports similar findings for access to a green space within a 15-min walk in their 1995 assessment of a range of European cities (Stanners and Bourdeau 1995). The city of Copenhagen, Denmark, has recently adopted a new planning strategy that includes the aim of providing a green space within a 400-m radius for at least 90% of its population by 2015 (Public Health Office Copenhagen 2006).

The Accessible Natural Green space Standards (ANGSt) in England model specifies guidelines for green space access provision:

- No person should live more than 300 m from their nearest area of a natural green space of at least 2 ha in size;
- There should be at least one accessible 20-ha site within 2 km from home;
- There should be one accessible 100-ha site within 5 km;
- There should be one accessible 500-ha site within 10 km (Comber et al. 2008).

The reasons for higher demand for urban public parks in Near East and Middle East cities are cultural demands, higher urban population density, and lack of private open spaces for the majority of the urban residents. Urban parks in Iranian cities play an important role in providing ecological services, and access to them improve mental health and social communication. The public use and requirements of parks may also become different with the planners' viewpoints (Hayward and Wehitzer 1984). Public spaces in Iran can be considered multipurpose areas (Hami 2009). Urban parks are defined as public green spaces which provide opportunities for camping, recreation, and family gathering (Majnonian 1996). Parks in Iran are regarded as an important venue to fulfill residents' leisure times, and they are known as important destinations for residents in big cities such as Tabriz to spend even their holidays (Nohorly 1999). During the summer season in Iran, schools and universities are closed and also, due to rising temperature, park usage in Iran especially in Tabriz city based on Hami's (2009) research is during summer.

Several studies have examined the relationship between distance to green spaces and participation in physical activity. Giles-Corti et al. (2005) found that proximity to public open space was associated with higher levels of walking amongst residents in Perth, Australia. Hillsdon

et al. (2006) found no relationship between distance to green spaces and self-reported leisure time physical activity amongst a cohort of adults in a British city. Studies that have measured the availability of a green space within the neighborhoods of participants have drawn similarly equivocal conclusions; in the Netherlands, Maas et al. (2008) found no association between a green space area and physical activity levels of adults. Conflicting findings have also emerged from studies that have examined the correlation between green space availability and bodyweight. For example, Potwarka et al. (2008) found no relationship between proximity to parks and overweight tendencies of Canadian children, while Nielsen and Hansen (2007) identified a significant association for Danish adults. These conflicting findings might reflect the diverse and complex influences on bodyweight, which include dietary behaviors as well as physical activity.

This paper aims to investigate the accessibility of parks in relation to social status of the inhabitants. This was investigated using the example of a clearly socially stratified city (Tabriz, Iran), which part of the urban society (by total number and social status) has better or worse access to urban parks.

Methods

Description of the study area (Tabriz)

The study was carried out in the city of Tabriz in the northwest area of Iran (Figure 1).

The city is increasingly faced with development and population growth. In the past half-century, industrial centers have developed on the periphery of Tabriz. The development of industry and its need for workers caused a great immigration from villages and small cities. With the increasing population in recent decades, Tabriz has also experienced extreme growth (Panahi 2000). In the last century, Tabriz was surrounded by gardens, had good climate, and was valued by most of the Iranian kings. In different points in history, Tabriz was chosen to be the capital of Iran. The recent expansion of Tabriz destroyed these gardens and has already affected the climate of the city.

Tabriz has been selected as a case study because it develops very rapidly which causes increasing demand for ecosystem services like recreation and is clearly structured by social status. It is easy to identify different categories of urban parks - Tabriz is located in overall semi-desert surroundings without recreational attractiveness for urban dwellers who are therefore limited to the ecosystem services of the urban parks.

Data collection instrument

Data were collected for Tabriz parks analyzing from Tabriz Parks and Green Spaces Organization (TPGSO) and completed on-site survey. For analyzing of urban land use, land uses map are collected from Tabriz municipality, Urban Planning Organization in Tabriz, and Consultant engineering maps. The classification of social status (high,

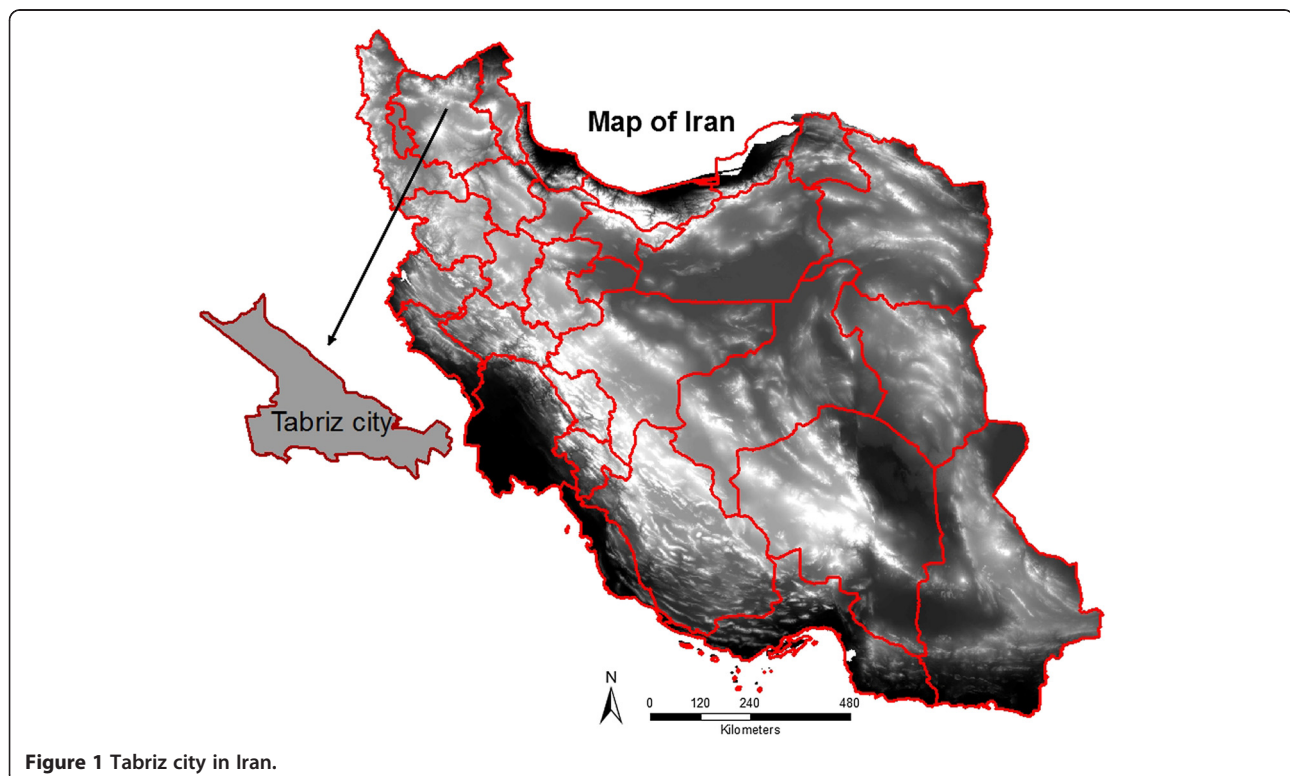


Figure 1 Tabriz city in Iran.

middle, and low) was carried out by statistical blocks data. For the completion of all data, we used AutoCAD, ArcGIS, and excel software, and the final maps produced in shape file format for analyzing.

Accessibility and categorization of urban parks

The Iranian urban park types are as follows (Majnonian 1996; Ghorbani 2009) (see Table 1):

- **Pocket parks:** pocket parks are small spaces that serve community members within an immediate vicinity. Pocket parks generally average 0.5 ha or less in size. They are available where opportunities for neighborhood parks are unavailable but offer some of the same characteristics as neighborhood parks; however, they offer limited amenities due to their small size and accessibility radius is 200 m.
- **Neighborhood parks:** neighborhood parks are in scale between pocket and community parks but provide similar amenities within walking distance of residential areas. Neighborhood parks are more than 0.5 and lesser than 2 ha in size and the accessibility radius is 600 m.
- **Community parks:** each community park should be available to the entire community. The parks should be easily accessible by all residents and accessibility radius is 1,200 m. Typically, community parks are 2 to 4 ha in size.
- **Regional parks:** regional parks are generally much bigger than a community park in size, and its accessibility radius is 2,500 m.
- **City parks:** city parks are established for all urban dwellers and are more than 10 ha in size with several recreation facilities. The accessibility is a 30-min drive or more.

Social structure of Tabriz

Spatial expansion of Tabriz has caused spatial changes in social structure. Migration from small towns and villages surrounding the city of Tabriz in East Azerbaijan province comprised mainly of workers and unskilled people. This migration process has led to a growth of informal settlements in Tabriz and caused tremendous changes in social structure (Asgharizamani 2000, and social polarization in the neighborhoods (Panahi 2000) (Table 2).

To identify socially segregated areas according to socio-economic groups, we used the results of studies by Adimark (2004) and Romero et al. (2012) and census data (Iranian Statistical organization 2005) and municipal plans (Municipality of Tabriz 2012). The data used for the social classification are education, occupation, household dimension, income (Iran statistical center 2005), land value (land price map, Babaiaghdam 2007), building type and property sizes (GIS-based map, Municipality of Tabriz 2012, and informal settlement map (Zista Consulting Engineers 2005). Using these data, the socio-economic groups have been broken down into three categories: high, middle, and low. Figure 2 shows the classification of social status (high, middle, and low) and indicates that the west, northwest, and southwest areas of Tabriz are occupied by the lower social groups, and the east, northeast, and southeast by middle and part of southeast, and northeast areas of Tabriz are occupied by inhabitants of high social status.

Definition of potential user areas

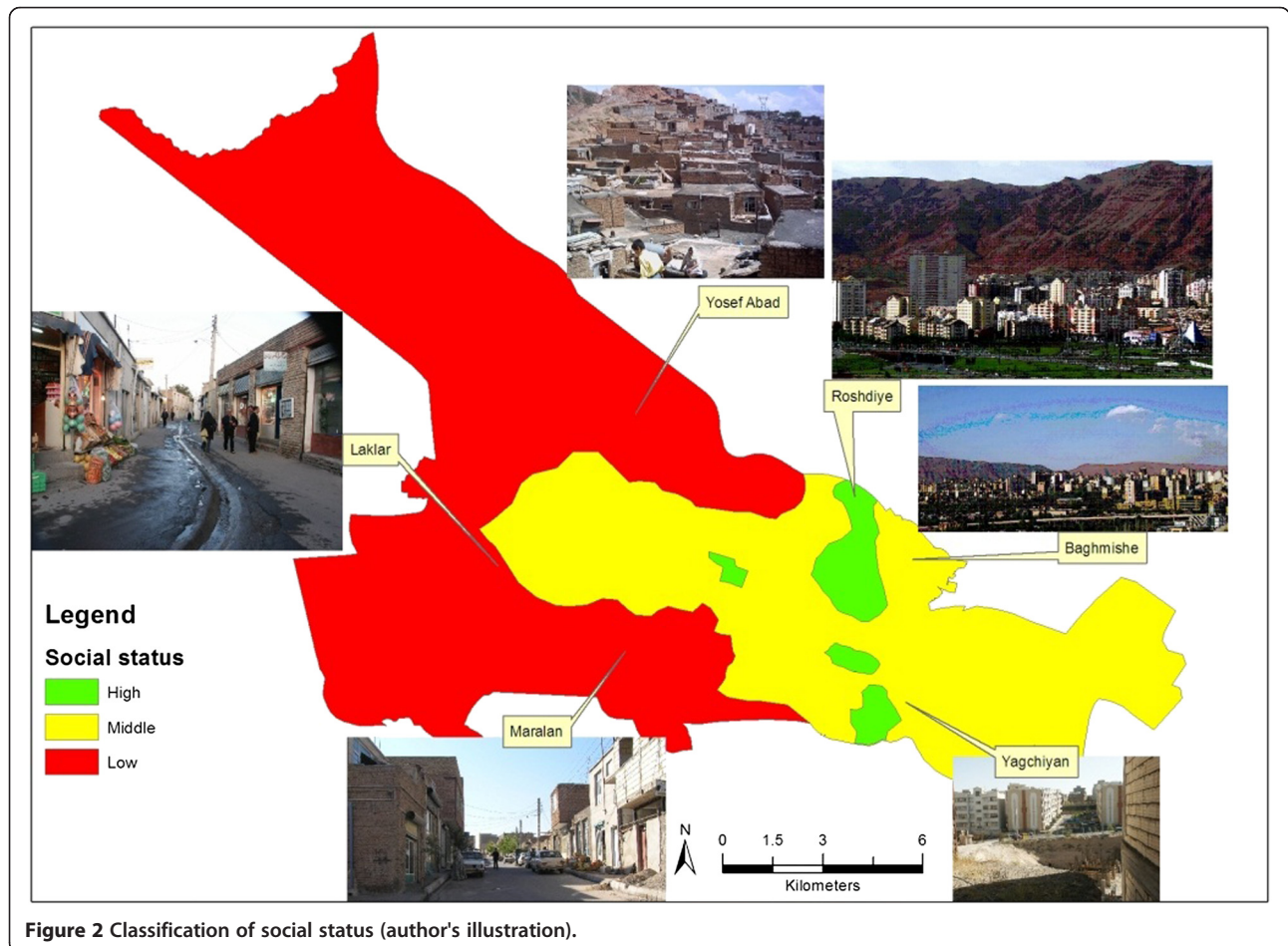
Distance is often mentioned as the main environmental factor influencing the use of a green space (e.g., Coles and Bussey 2000; Van Herzele and Wiedemann 2003; Giles-Corti et al. 2005), and a distance of 300 to 400 m is seen as a typical threshold value after which the use

Table 1 Urban park area and accessibility in Iran and Tabriz

Parks	Description	Area (ha)	Access	Number of parks in Tabriz
Pocket park	A mini park or vest-pocket parks are an urban open space at the very small scale. Pocket parks scattered throughout the urban areas where they serve the immediately local population.	0.5	200 m	47
Neighborhood park	A neighborhood park is typically a small park, usually between 0.5 and 2 ha. They typically have playground facilities and are located within a 600-m distance of residential areas. Parents with young children are the main users.	0.5 to 2	200 to 600 m	53
Community park	Community parks serve more than one neighborhood but are not intended to serve the city as a whole. Community parks have more intensive recreational facilities such as sports fields and recreational facilities.	2 to 4	600 to 1,200 m	16
Regional park	A regional park is a mid-sized park providing a range of facilities and activity space for recreation or sport. These parks cater for large groups and are appealing to a range of users or groups. They serve several communities or suburbs and are a fairly well-known destination for those people living within their catchment. In fact, these parks are the major parks in urban regions.	4 to 10	1,200 to 2,500 m	11
City park	A city park is a major recreation or sports park that offers a wide variety of opportunities to a broad cross section of residents of a planning scheme area. These parks are large in size and well known amongst residents; these parks are major destinations within a planning scheme area.	More than 10	30-min drive	6

Table 2 Social structure problems in Tabriz

Problems	Causes	Consequences
Uncontrolled migration of population to Tabriz	<ul style="list-style-type: none"> - Concentrating facilities and activities in the Tabriz urban area - Industrial development from 1955 	<ul style="list-style-type: none"> - Evacuation of rural areas
High percentage of rural migrants with lack of expertise	<ul style="list-style-type: none"> - Lack of employment opportunities and services in rural areas 	<ul style="list-style-type: none"> - Establishment of an informal sector in the urban economy - Employment of migrants in an informal sector - Formation of marginalized and low-income neighborhoods
High sex ratio, especially in the older age group	<ul style="list-style-type: none"> - Permanent migration of unmarried young men 	<ul style="list-style-type: none"> - Population imbalance between males and females
Young people	<ul style="list-style-type: none"> - High rates of fertility - High proportion of young migrants in Tabriz 	<ul style="list-style-type: none"> - Lack of facilities and services to active group
Social stratification in neighborhood areas especially in recent years	<ul style="list-style-type: none"> - Unequal distribution of income between social groups. - Employment of unskilled rural migrants in the informal economy - Assessment and appraisal of land and housing using land quality and neighborhoods facilities 	<ul style="list-style-type: none"> - Significant differences in neighborhoods based on the level of services and quality of facilities, residential units, and street network



frequency starts to decline (Grahn and Stigsdotter 2003; Nielsen and Hansen 2007). Other environmental factors such as size of the green space, presence of facilities, and possibility for activities are also mentioned to have an influence on the use of an urban green space (Van Herzele and Wiedemann 2003; Bedimo-Rung et al. 2005; Giles-Corti et al. 2005).

Table 3 is based on the minimum target in which each urban resident should be able to enter at least one green space on each functional level of the indicated maximum distance and minimum surface based on a research by Van Herzele and Wiedemann (2003).

Data analysis

In this paper, the parks' accessibility with social group factor is analyzed using the buffer method. The potential user areas were defined differently depending on type of park following the results of Ghorbani (2009):

- Pocket parks: 2 rings, 100 m, and second 200 m;
- Neighborhood parks: 3 rings, 200, 400, and 600 m;
- Community parks: 3 rings, 300, 600, and 1,200 m;
- Regional parks: 3 rings, 1,200, 2,000, and 2,500 m;
- City parks: 3 rings, 1,000, 2,000, and 3,000 m.

All data on parks and land use maps were compiled using a GIS system (ArcGIS 10). All 132 parks in Tabriz were investigated.

Results

Urban land use distribution and social groups' accessibility

For the evaluation of urban land use in this paper, land use categories of Tabriz are classified in six clusters. The result in Table 4 shows that 33.6% of the area of Tabriz is undeveloped land (semi-desert), followed by residential area at 22.8%, but recreational area composes only 7.2% of urban area. Table 4 shows that 6%, 8.2%, and 21.3% of land in low, middle, and high social status areas are covered by recreational land use. The development of recreational areas is also related to social segregation.

The distribution of land use shows, in the central area of Tabriz with mostly residential districts, fewer recreational

areas. The most recreational areas are located in the east and northeast (Figure 3).

Quantitative accessibility of different park categories (number of potential visitors)

Because of no recreational alternatives in the surroundings of Tabriz (semi-desert), urban parks are potentially important places for recreation of the population of Tabriz. In total, the 132 parks consist of different park categories (Figures 4 and 5).

The analysis shows that the number and distribution of parks does not explain accessibility. The park space per capita in Tabriz is 2.6 m² while the standard target, based on urban planning ministry proposals, is 7 to 12 m² and was not met. The park distribution shows that several areas of the city have poor accessibility to parks (see Figure 3). Only 32.3% of urban households in Tabriz have access to parks (all park categories included) 300 m from their homes to parks. This accessibility is clearly connected with social status. Table 5 illustrates that 84% of high social status population have urban parks within 300 m, but the accessibility for low and middle social status groups is only 27% and 29%, respectively.

This differs for different park categories but always demonstrates the same connection of social status and park accessibility (see Figures 6, 7, 8, 9 and 10; Tables 6).

Accessibility of different park categories by social groups

Valuation of a social group's accessibility to pocket parks for all socio-economic groups was unsuitable, and approximately 90% of dwellers in Tabriz do not have access to pocket parks. The equipment with neighborhood parks for low social status groups do not have good accessibility for most of the neighborhood parks, which are mostly located in high and middle social status group areas. In community park assessment, low and middle social status groups have poor accessibility, but for regional parks, they had the best accessibility for all social status groups and the most of the social status group's profit. Therefore, regional parks are most accessible for mostly all social status levels compared to other park categories. City parks again show a difference in accessibility by social status groups. Only 51.8% of low social status groups have accessibility, meanwhile, 97% of high social status groups profit from city parks (Table 7 and Figure 11).

The results show that only the distribution of regional parks was suitable for all social status groups and the lowest accessibility to parks is to pocket parks. The distribution of parks in other types, however, was based on social segregation. As the results indicate, the best access to parks was for high social status groups and the worst access was for low social status groups.

Most parks are best accessible for high social status groups, and low social groups suffer by reduced access.

Table 3 Minimum standards for urban green spaces (MIRA-S 2000)

Functional level	Maximum distance from home (m)	Minimum surface (ha)
Residential green	150	-
Neighborhood green	400	1
Quarter green	800	10 (park: 5 ha)
District green	1,600	30 (park: 10 ha)
City green	3,200	60

Table 4 Land use distribution and social status access

Land use	Characteristics	Area (ha)	Social status					
			Low		Middle		High	
			Area (ha)	Percent	Area (ha)	Percent	Area (ha)	Percent
Agricultural	-	3,460.6	3,203.03	20.88	329.77	3.87	0.8	0.1
Industrial	-	1,107.835	847.48	5.52	260.83	3.06	2.1	0.2
Not used land	-	7,914.799	4,453.63	29.03	3,935.51	46.17	333.2	35.9
Recreation	Green spaces, gardens, and tourism area	1,687.268	918.11	5.98	698.43	8.19	197.6	21.3
Residential	-	5,365.516	2,791.99	18.20	2,323.52	27.26	323.2	34.9
Service	Education, clinics and hospitals, commercial and business centers, offices, cultural, religious, infrastructure facilities, airports, terminals, military, and parking	4,046.758	3,126.51	20.38	975.75	11.45	70.5	7.6
Sum	-	23,582.78	15,340.74	100.00	8,523.81	100.00	927.49	100.00

Urban park areas per capita for social groups (low, middle, and high) are 1.3 m² for low, 2.1 m² for middle, and 6.1 m² for high (average 5.6 m²).

Discussion

Why are urban parks so important?

Today, the number of built-up areas is growing to population rate and has increased in most Iranian cities by fast urbanization and industrialization over recent years. Urban parks have a strategic importance for the quality of life in Iranian urban society and play a significant role in increasing the livability of cities (Biddulph 1999).

Urban green spaces and their social function and usage

Urban green spaces and recreational land uses are perceived to have effects on social cohesion, as all groups of people are related to nature regardless of their social status (Schetke et al. 2010). Contact with nature influences people's health (Gidlof-Gunnarsson and Ohrstrom 2007; Qureshi et al. 2010) and has psychological benefits by reducing stress (Ulrich 1984; Ulrich et al. 1991), restoring attention (Kaplan and Kaplan 1989), reducing criminal and antisocial behavior (Kuo and Sullivan 2001), and positively affecting self-regulation and restorative experiences (Korpela et al. 2001; Hartig et al. 2003; Korpela and Yle'n 2007; van den Berg et al. 2007). In addition to the

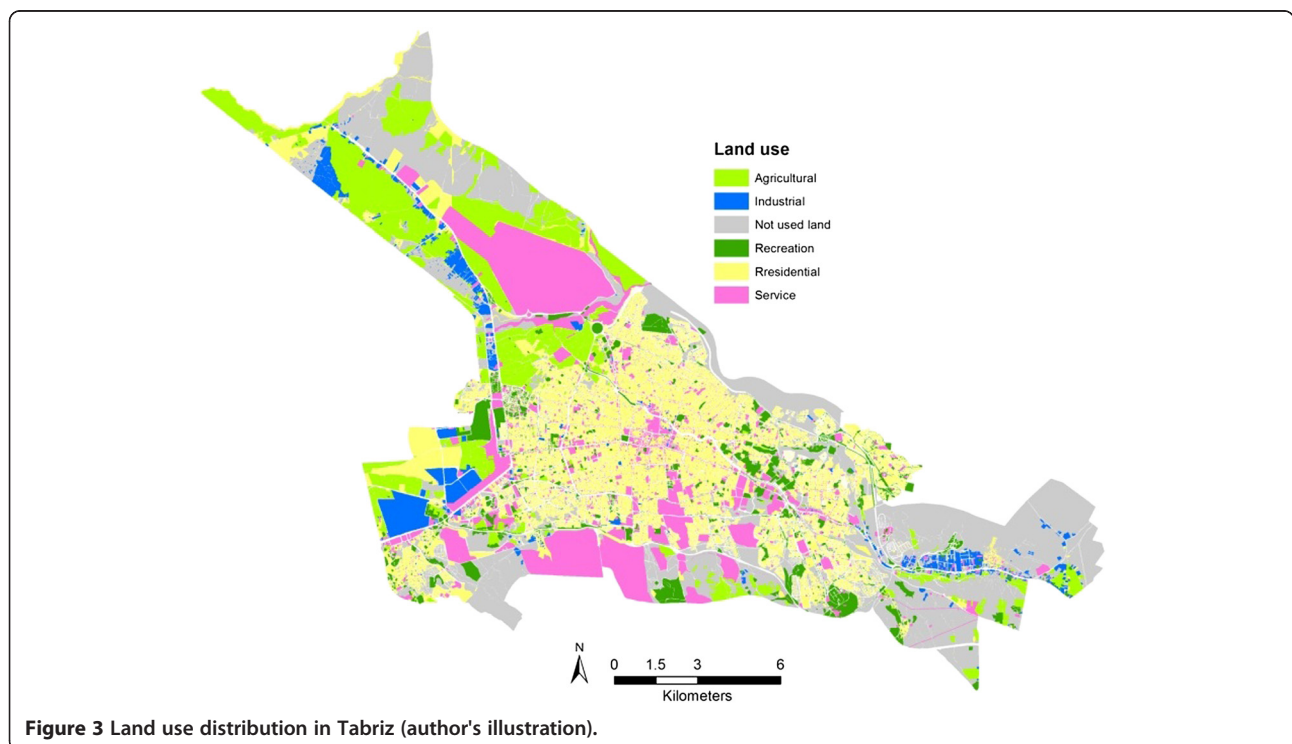
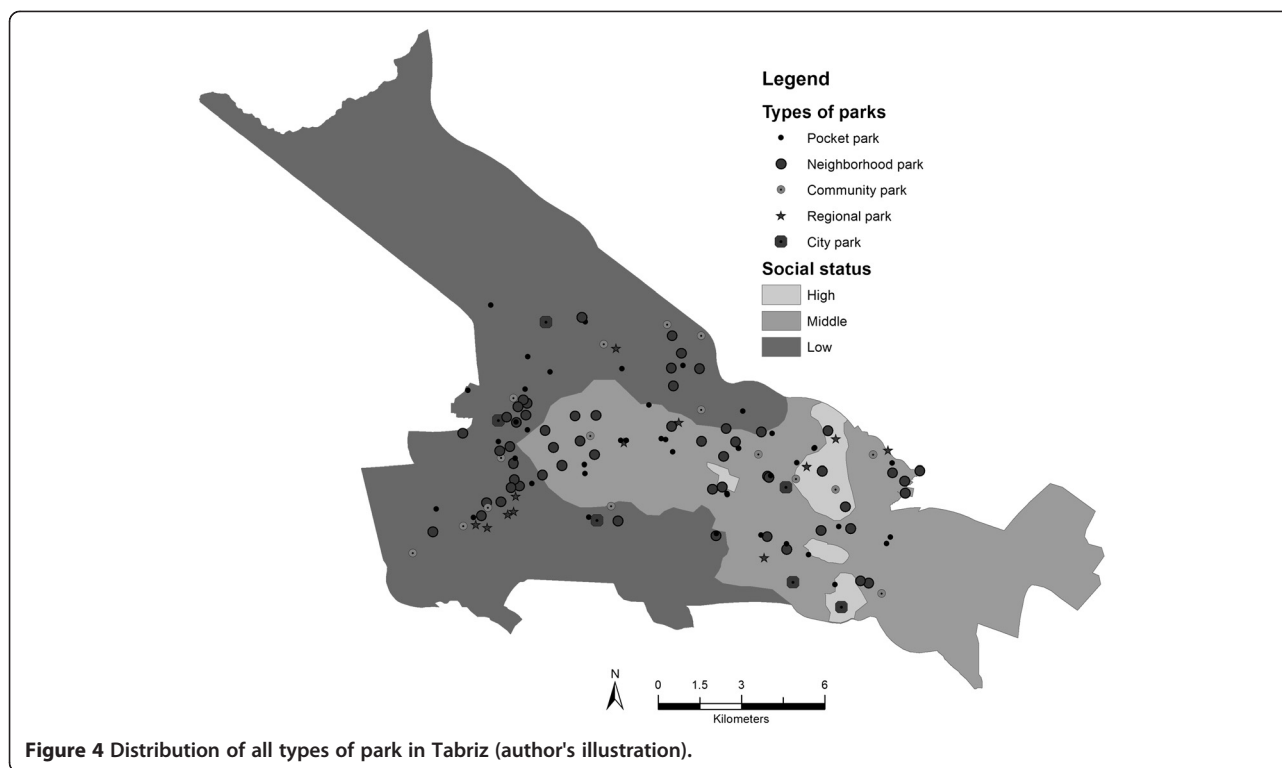


Figure 3 Land use distribution in Tabriz (author's illustration).



psychological benefits from contact with nature, there are also direct physical health benefits, such as addressing issues associated with obesity, increased longevity, and self-reported health (Pretty et al. 2006).

According to Khosravaninezhad et al.'s (2011) research on urban parks in Tehran, the result is that all people, at all times and in all age groups, notice and appreciate the role of nature and the benefits of it for their improved mental, psychological, and social well-being. Most people feel joyous and happy when they are close to nature, and they identify parks as a place to revitalize and refresh themselves. It shows that parks directly and indirectly raise the quality of life. Also, according to the survey of urban park visitors about the attraction and deterrent factors of urban parks, it was found that most people prefer to spend their spare time outside of their residences in the parks and enjoy being in other people's company. Results show that, firstly, people satisfy a part of their psychological and social needs in parks, and secondly, development and expansion of urban parks and green spaces falls in line with the development of Tehran, leading to an increase in the quality of urban life. Findings also include the need for upgrading park facilities considering that the citizens of Tehran spend 2 to 4 h a day for recreation and leisure in the large urban parks. At the same time, because of the importance of the accessibility factor for the usage of urban parks by the citizens of Tehran, creation and expansion of parks in neighborhoods could increase the availability of parks for the

people and raise their quality of life (Khosravaninezhad et al. 2011).

Does planning of parks support social segregation, or does social segregation support development of public parks?

Residential segregation is a form of physical and functional separation of spaces inhabited by different social groups living in the city. As a consequence, segregation might imply different residential distributions with different densities of population, different types of houses, and also different public and private green spaces (Weiland et al. 2011; Romero et al. 2012). There is a concern that access to the countryside and urban green spaces by different ethnic and religious groups is limited. Green spaces provide important environmental facilities, and they are a highly valued point of contact with nature (Kahn 1999) and offer health benefits (Frumkin 2001).

Heynen et al. (2006) analyzed the spatial distribution of urban green spaces with income. They found a strong positive correlation between the amount of residential canopy cover and median household income and implied that any investment in green spaces that was not carefully targeted would benefit the wealthy rather than the socio-economically deprived residential areas.

In Iranian cities, the biggest and best equipped parks are located in high social status group areas. Social segregation supports the building of public parks in Iranian cities and spatially in big cities (Tehran, Esfahan, Tabriz and Shiraz)

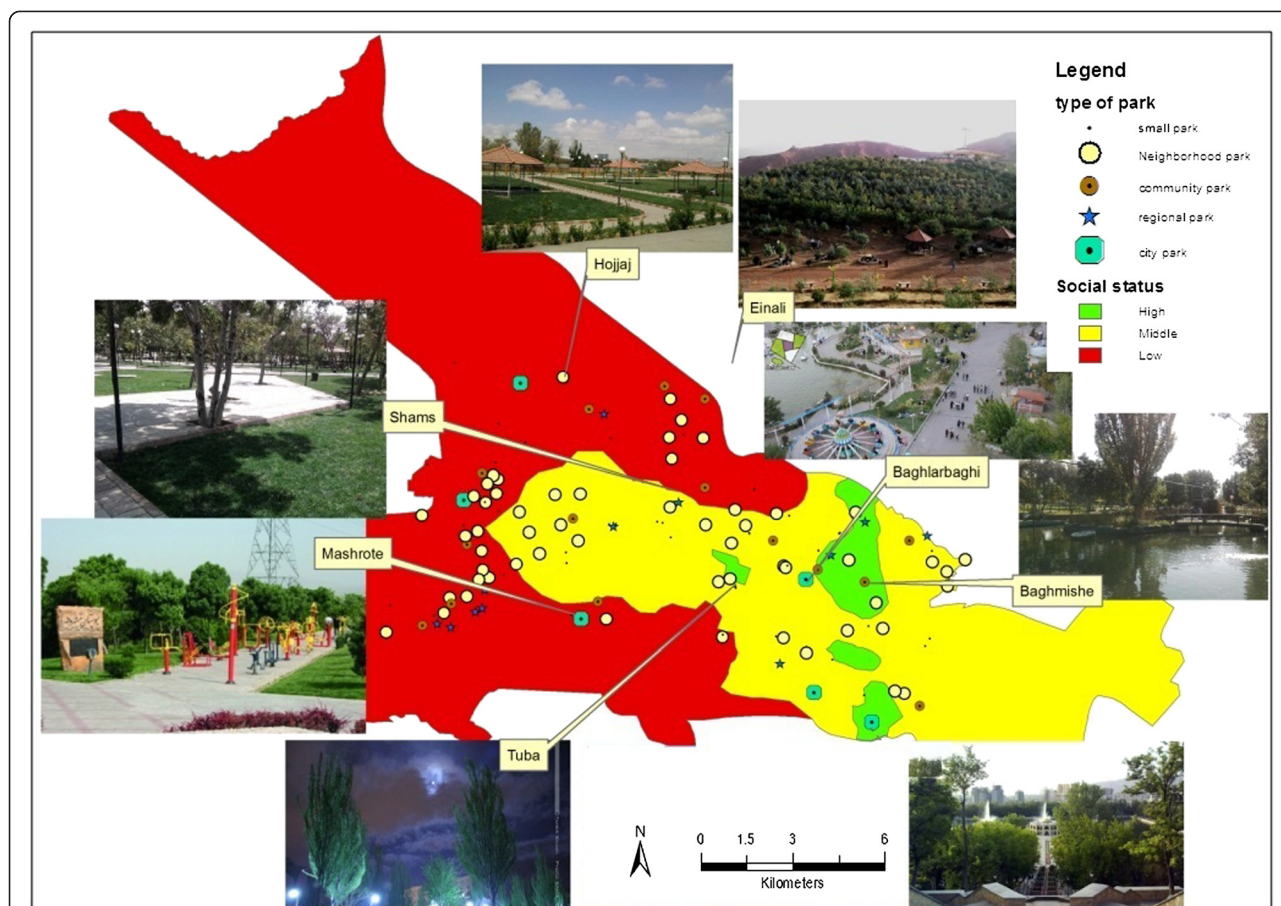


Figure 5 Distribution of all types parks facilities (author's illustration).

(Daneshpour and Mahmoodpour 2009; Khosravaninezhad et al. 2011; Hami et al. 2001).

Do all people have access to the parks?

Not all people in cities have access to parks and green spaces, and several studies have examined green space access in European cities. The Dutch government requires that sufficient opportunities exist for access to outdoor recreation, and a recent analysis of green space availability in the Netherlands found that 67% and 83% of neighborhoods had ready access to recreational opportunities for walking and cycling, respectively (De Vries and Van Zoest 2004). Depending on which definition of green space one

uses, 64% or 72% of Sheffield's households in the UK fail to meet this target (Barbosa et al. 2007).

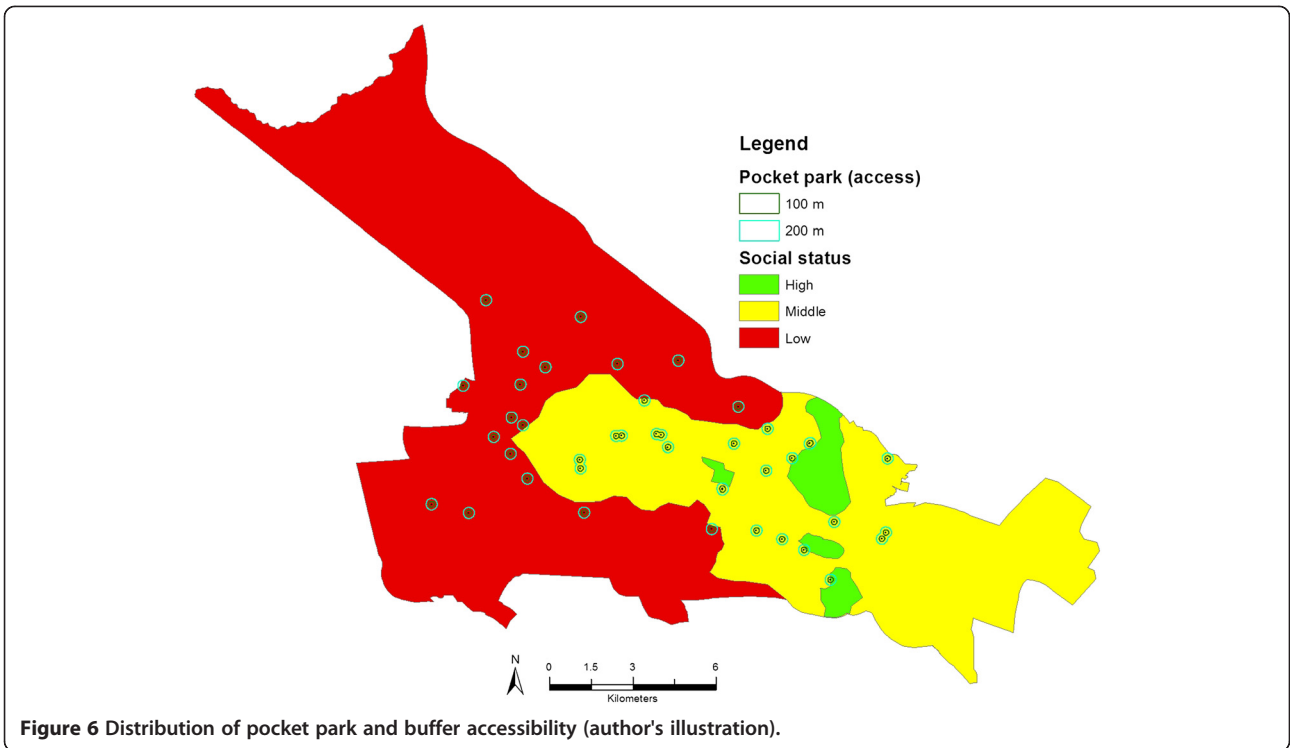
Therefore, as well as being concerned with the overall number of households having green space within a specified distance, policymakers need to consider the problems of these distributions and the very large distances of some households from any public green space. For example, the distance to the nearest municipal park from some households in Sheffield is more than 20 times the English Nature recommendation (Barbosa et al. 2007). Also, the distance-based measures of access could be refined to include travel constraints, such as physical and psychological barriers to pedestrian movement (Brown et al. 2007).

Social status and accessibility of parks in Iran

In Iranian cities, the social status of users of urban parks has been important in their perception. It has been deduced that the use of public parks has become a major source of leisure and recreational activity for lower income groups and a major refuge for lower income groups from the burden of their routine life in Iranian cities. As there is an evident socio-spatial dichotomy in Tehran, the capital of Iran, the non-local lower income

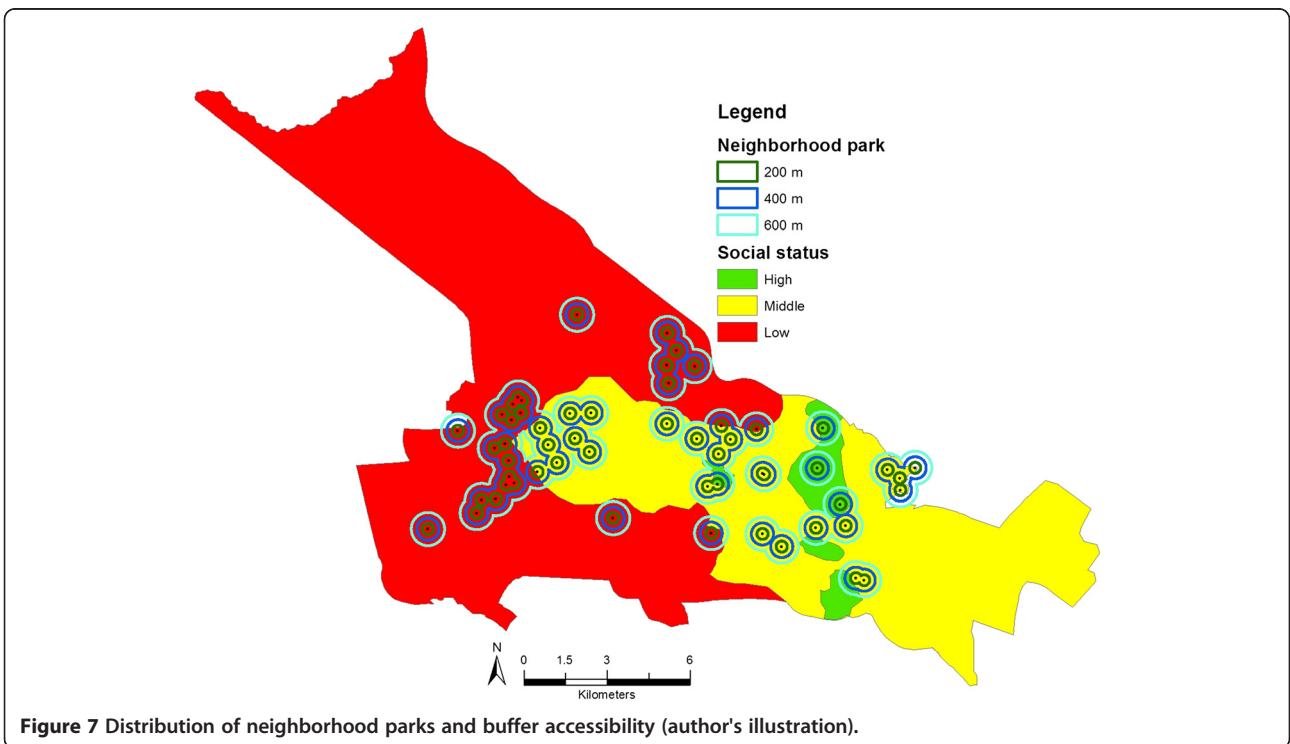
Table 5 Accessibility in 300 m

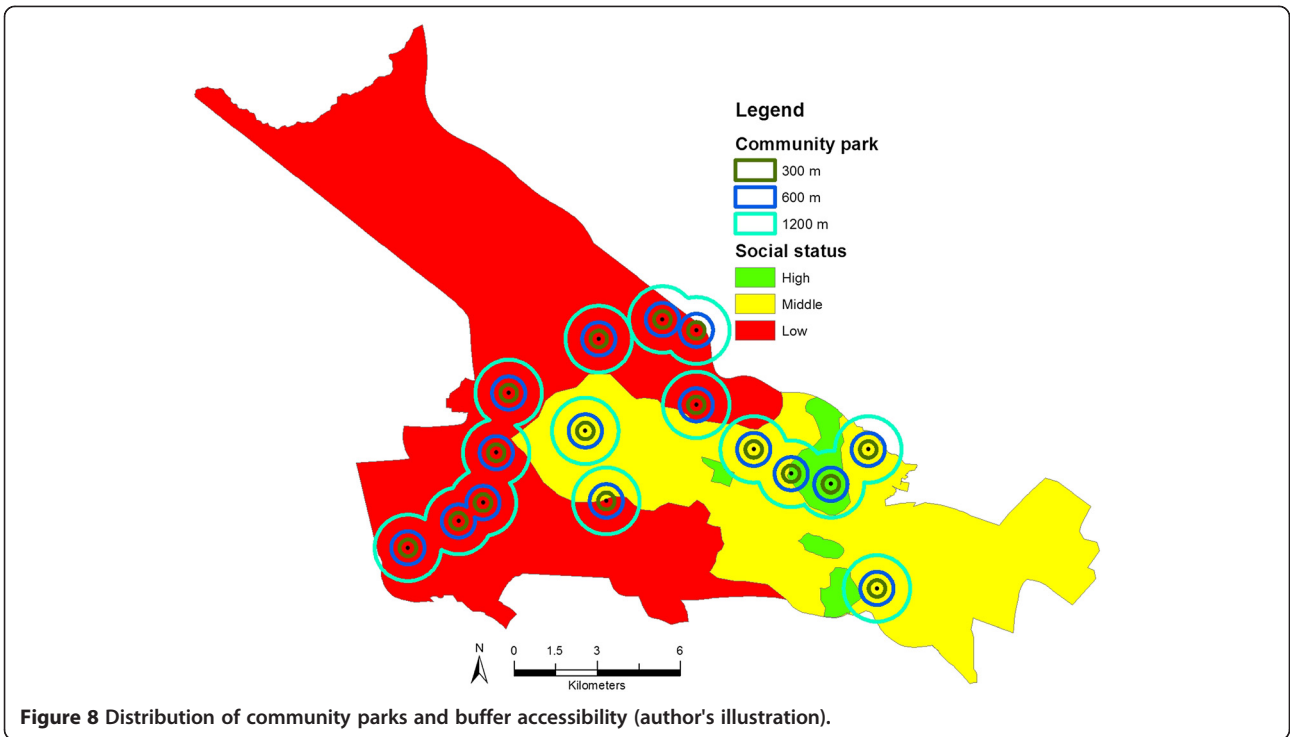
Social status	Population	Population in 300 m	Percent of population in 300 m
Low	732,455	197,763	27.0
Middle	555,929	161,219	29.0
High	109,676	92,127	84.0
Sum	1,398,060	451,109	32.3



groups living in dense residential areas of the southern parts of Tehran use the urban parks in the northern parts of the city. This has become one of the major barriers of using these parks - especially during the weekends and public holidays - by the more well-off

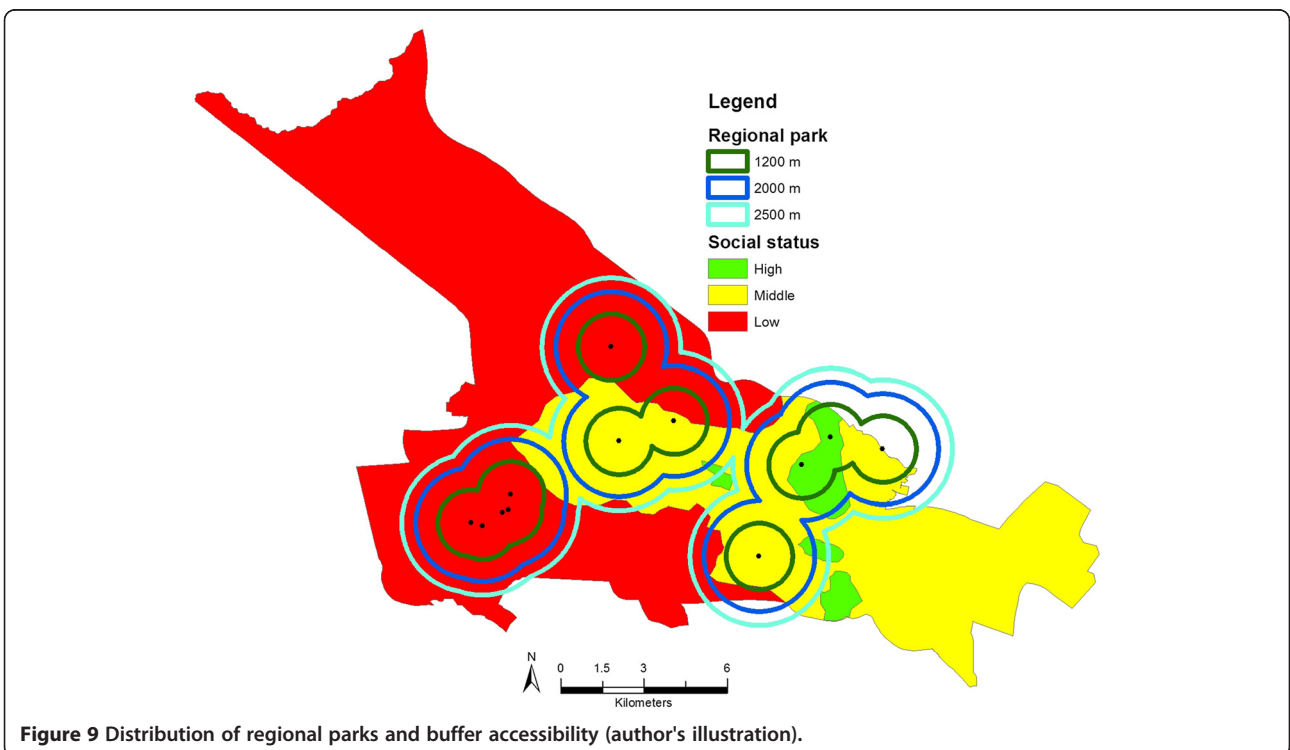
residents of the northern parts of the city. Another major factor of low usage of public parks in Tehran - as was deduced from the survey - is the physically inactive lifestyle of many of the better-off and educated sections of this city's residents. This has become a major barrier





of increasing their use of public parks as opposed to their personal or gated private open spaces, whether in Tehran, in the holiday resorts surrounding Tehran, or in the coastal areas to the north of the country (Daneshpour and Mahmoodpour 2009).

The situation in Tehran seems to be contrary to the situation in some countries in which there is an increasing shift towards privatization of urban parks. The use of urban public parks has been enhanced especially for the lower income groups, which do not own or have



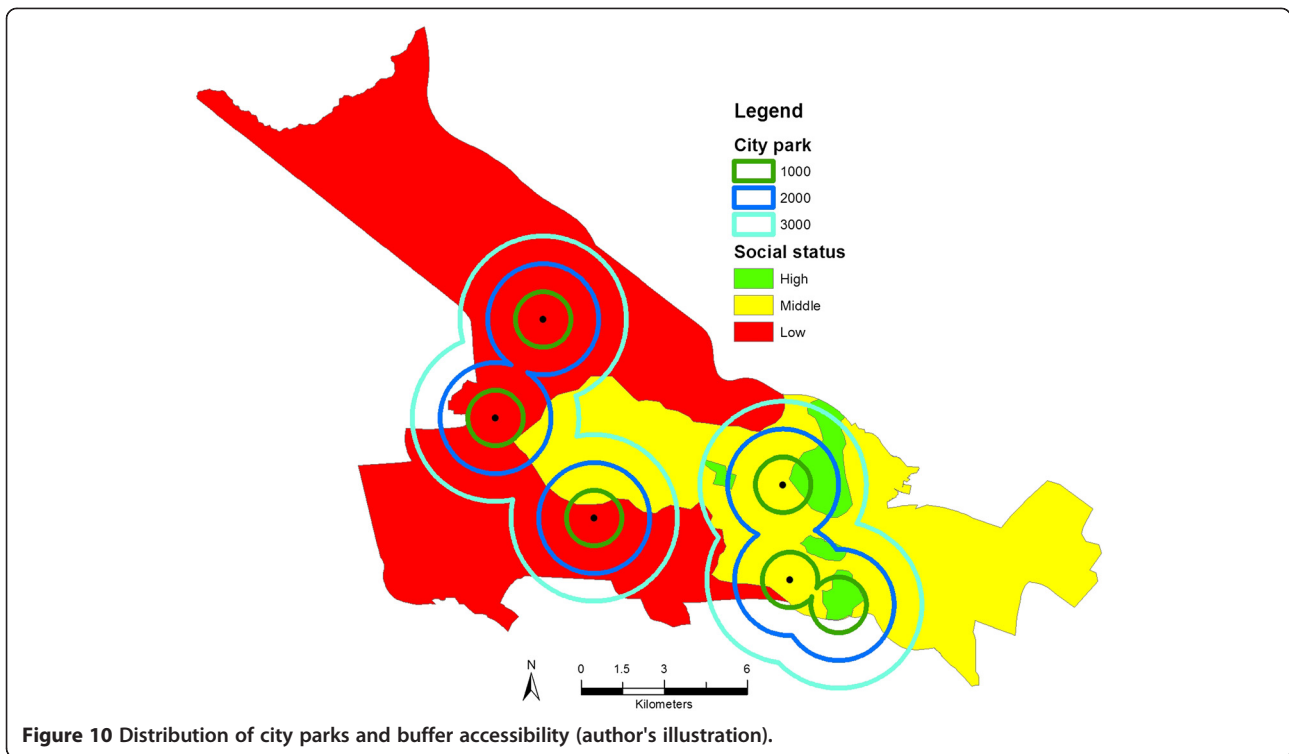


Figure 10 Distribution of city parks and buffer accessibility (author's illustration).

access to property suitable for spending their leisure time (Daneshpour and Mahmoodpour 2009).

Developing a green space strategy is a good opportunity for improving the quality of life in the Iranian cities, and appropriate accessibility to green space is one basic strategy in a master plan (Rahimi 2013). The parks and green space department in large cities in Iran supplies green space and park strategies and propose the accessibility of type of parks (pocket, neighborhood, community, regional, and city parks) as well as their amenities and outdoor furnishings. Also, in the master and detail

plans in Iranian cities, distribution of green spaces, strategies for the development of parks, management, and planning is too less based on people's demand (Saidnia 2004).

Many studies have examined access to green spaces and participation in physical activities. But a little research has been done about accessibility and social status. In this work, accesses to all kinds of parks are investigated by different social groups and poor areas to access are specified, and social segregation for park accessibility in this research is analyzed. In the others works, percent of accessibility (De Vries and

Table 6 Accessibility in buffer rings

Type of park	Name of parks	Number of population in buffer ring			Sum population in three rings	Percent of population for park access in Tabriz
		First ring	Second ring	Third ring		
City parks	Elgoli	12,055	31,812	13,577	57,444	4.1
	Saeb	25,342	39,602	22,886	87,830	6.3
	Baglarbaghi	2,022	72,566	100,560	175,148	12.5
	Big park	9,563	20,926	66,708	97,197	7.0
	Sanat	23,925	80,059	104,337	208,321	14.9
	Mashrote	43,153	126,521	109,858	279,532	20.0
	Sum	116,060	371,486	417,926	905,472	64.8
Regional parks	Sum	403,078	548,832	321,725	1,273,635	91.1
Community parks	Sum	80,243	233,382	549,735	863,360	61.8
Neighborhood parks	Sum	180,953	384,676	422,874	988,503	70.7
Pocket parks	Sum	47,728	100,786	0	148,514	10.6

Table 7 Type of parks and social status profits

Type of park	Social status	First ring		Second ring		Third ring		Sum of population in three rings	Percent of population to park access (three rings)
		Number of population	Percent of population to park access	Number of population	Percent of population to park access	Number of population	Percent of population to park access		
City park	Low	62,695	8.6	142,260	19.4	174,414	23.8	379,369	51.8
	Middle	37,484	6.7	183,353	33.0	197,888	35.6	418,725	75.3
	High	15,881	14.5	45,873	41.8	45,624	41.6	107,378	97.9
Regional park	Low	186,693	25.5	306,931	41.9	143,933	19.7	637,557	87.0
	Middle	186,448	33.5	209,189	37.6	145,093	26.1	540,730	97.3
	High	29,937	27.3	32,712	29.8	32,699	29.8	95,348	86.9
Community park	Low	34,413	4.7	124,254	17.0	281,794	38.5	440,461	60.1
	Middle	32,865	5.9	81,244	14.6	224,958	40.5	339,067	61.0
	High	12,965	11.8	27,884	25.4	42,983	39.2	83,832	76.4
Neighborhood park	Low	84,808	11.6	158,298	21.6	168,938	23.1	412,044	56.3
	Middle	83,329	15.0	197,694	35.6	209,074	37.6	490,097	88.2
	High	12,816	11.7	28,684	26.2	44,862	40.9	86,362	78.7
Pocket park	Low	21,558	2.9	50,632	6.9	0	0.0	72,190	9.9
	Middle	22,160	4.0	44,842	8.1	0	0.0	67,002	12.1
	High	4,010	3.7	5,312	4.8	0	0.0	9,322	8.5

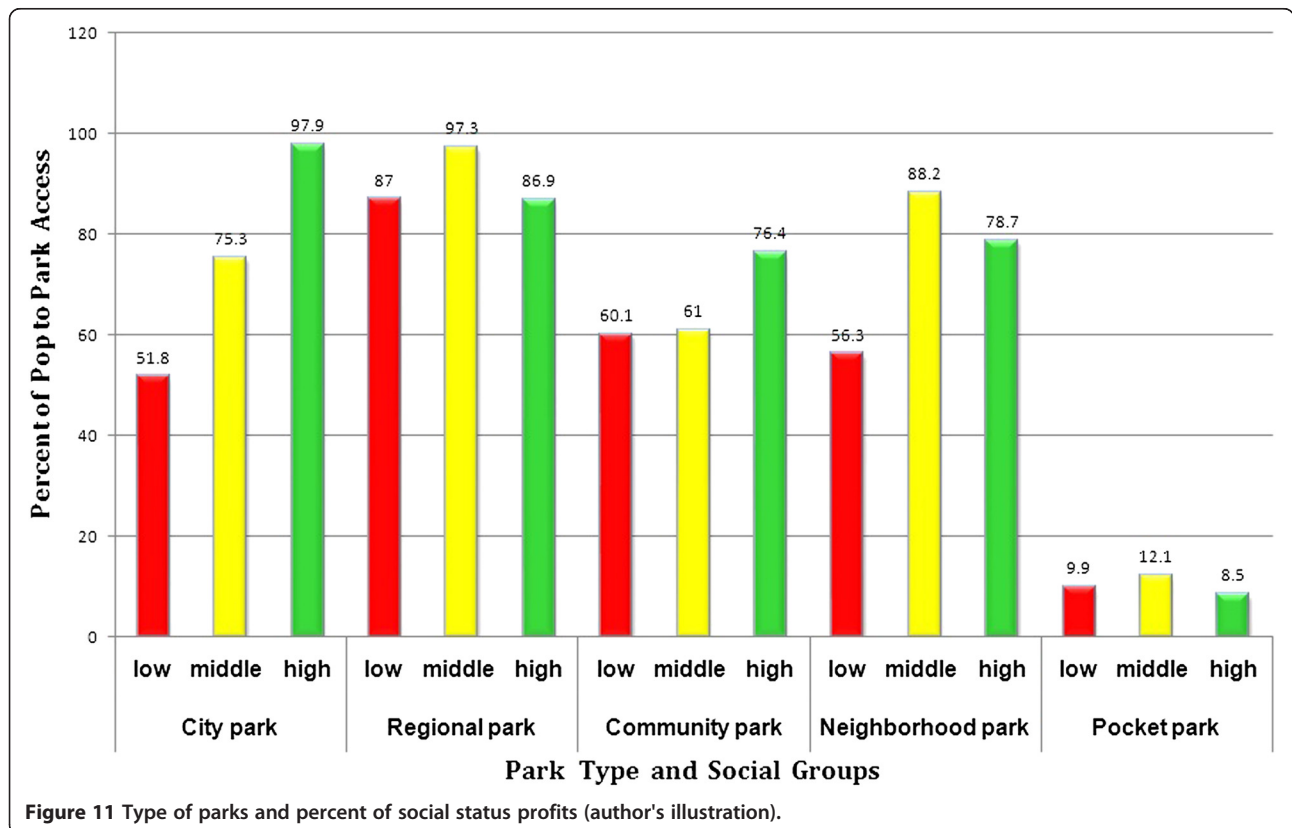


Figure 11 Type of parks and percent of social status profits (author's illustration).

Van Zoest 2004) or accessibility of ethnic and religious groups (Comber et al. 2008) were studied.

Also, we used suitable data (The data used for the social classification are education, occupation, household dimension, income, land value, building type and property sizes, and informal settlement map) for social groups classification and in the first social-economic map for Tabriz produced in this research.

Conclusions

Green spaces play an important role in supporting urban communities both ecologically and socially. In Tabriz, their importance has been recognized in public policy commitments aiming to ensure ready access to green space for all. We assessed the accessibility of parks for residents and their distribution in Tabriz's city limits. We also examined how green supply services compare between different levels of social status. Many households do not enjoy government recommended levels of access to public green space. The results highlight the social segregation in park distribution and their accessibility in Tabriz. The best parks are located in the high social status areas, and the accessibility is the best among all societal levels. The low social status groups do not have good access to urban parks. The distribution of public parks in Tabriz does not reflect the greater need these groups have due to the lack of their own private urban green-like social groups of high social status have.

Protecting, planning, and building parks in Tabriz with appropriate ecosystem services, amenities, and furnishings, based on established guidelines for green space planning, can resolve the green space shortage and poor accessibility for low social groups.

Competing interests

The authors declare that they have no competing interests.

Authors' contribution

All authors read and approved the final manuscript.

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