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Full Length Research Paper

The evaluation of existing and proposed active green spaces in Konya Selçuklu District, Turkey

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Urban green spaces have social, planning, economic and ecological functions. To benefit functions of green spaces, it is important to make sufficient provision of quality and quantity green space within urban areas. In this study, the adequacy of the active green spaces in Selçuklu district were investigated in terms of spatial quantity and access by walking in urban development plans and existing applications using GIS. The results displayed that existing active urban green spaces covered 57 632 75 m^2 area, and the per capita ratio is 12.53 m^2 according to actual urban population. The size of the active green spaces except city parks is below in force standards. 66% of the total district area is not within ideal distance walk to the city parks, 71% to neighbourhood park, 55% to the children playgrounds, and 43% to the sports areas alike. In development plans it has been stated that green spaces are in multipartite and are not defined according to a plan. 21 569 790 m^2 urban area was planned as active green spaces, and 38.38 m^2 per capita was anticipated according to population projection. However, 36.34 % of urban park and 9.68% of other active green spaces was applied until 2010. These results showed that existing active green spaces do not make a sufficient contribution to urban life due to their small areas and disproportionate distributions across the urban. At the end of our research suggestions have been made in terms of planning and designing to have positive contributions to the life of urban dwellers.

Key words: Active green spaces plannig, adequarcy of active green spaces, Selçuklu district, Turkey.

INTRODUCTION

The world is becoming an increasingly urban place. Some 65% of the world's population is expected to be urban by the year 2025 (Schell and Ulijaszek, 1999). As a result of urbanization, the world's population has become increasingly concentrated in cities. Due to fast urbanization, natural ecosystems are increasingly replaced by urban development. Urbanization increases the distance between people and natural space. Most obviously, the natural environment has been exploited to support economic growth. However green spaces are a part of nature and play a key role in improving the environmental quality, liveability, and sustainability of our towns and cities. They provide a range of benefits at both the national and the local levels and offer many useful opportunities to people in different ways.

The benefits of urban green space can be grouped in four classes including social, planning, economic and ecological functions. There are project studies and reports have been in Europe related to development and benefits of green spaces (DTRL, 2006; BUGS, 2010; URGE, 2010). Many previous studies cite these projects and report (Leeuven et al., 2006; De Ridder et al., 2004; Baycan-Levent and Nijkamp, 2009). Gilbert (1989) said that factors such as the size, shape, accessibility, diversity, history, and distribution of green spaces within a city as well as the design and management of the green spaces individually, play a decisive role in defining the functions of them. Therefore, identifying suitable sites for conserving and developing green spaces is the first important step to ensure their roles and functions.

Many studies have been done in Turkey show that the information on the provision and quality of green space is very limited. This situation is the same in many European

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countries (Pauleit, 2003; Szulczewska and Kaliszuk, 2003). There is often a serious lack of information about the quantity and quality of urban green in most cities. The available information is usually incomplete and fragmented and needs to be improved. Information on private green space usually does not exist at all, although its extent can be larger than that of public green space. In fact, in order to be effectively useful and sustain their function it is required that amount and distribution in construction plans be enough and provide information on the issue.

Site information about green spaces can be gained by using land suitability analysis based on Geographical Information Systems (GIS). One of the most useful applications of GIS for planning and management is the land use suitability mapping and analysis (McHarg, 1969; Hopkins, 197; Collins et al., 2001). GIS are designed to store, retrieve, manipulate, analyze, and map geographical data. GIS, which is a strong, efficient and effective application within land-use planning, landscape evaluation and planning, environmental impact assessment, regional planning, selecting the best site for the public and private sector facilities, habitat analysis, can support a wide range of spatial queries that can be used to support location studies. GIS will play a significant role in future location model development and application (Miller et al., 1998; Church, 2002; Kalogirou, 2002; Malczewshi, 2004).

Konya has experienced a dramatic change in industry, education and construction sectors for the last 30 years. The population of the city was about 329 139 in 1980, which increased excessively to 742 600 in 2000 and finally showed a high rate of increase and reached 980 973 in 2009. The density of the population is 57 people/km^2. Konya is the 2nd most crowded city in the Interior Anatolian Region and 7th overall in Turkey (TSI, 2009). The rapid development seen since 1980 has influenced governors in Konya, and as the result of this influence with a legal regulation Konya became a metropolitan municipality in 1989. Since then, Konya has been governed as Konya Metropolitan municipality and three municipalities (Selçuklu, Meram, and Karatay).

In this research the improvement of green spaces in Selcuklu district, the rates of active green spaces per capita according to construction plans, the possibilities to reach these green spaces on foot and their efficiencies have been discussed. It has been aimed that this research would be a source to lead the authorities and local governors in their studies on construction plans in terms of planning decisions and application.

MATERIALS AND METHODS

Description of the research area

The city of Konya is located between 36° 41' and 39° 16' east meridians and between 31° 14' and 34° 26' north parallels. Konya is the largest province in Turkey (38257 km^2). The average height of the city from the sea level is 1024 m. The highest point of the city is "Alaeddin Tepesi" with the height of 1080 m. "Aslim Batakligi", which is located in the northeast part, is the lowest point of the city with the height of 975 m (Figure 1). During the History of the city, Konya maintained its importance as one of biggest stops of the legendary Silk Road, where the convoys stop for trading and resting. Today, the center role of the city did not change, it still is an important intersection of the two main highways of Turkey: one lies in the east-west direction and the other one lies is in the north-south direction (Anonymous, 2010).

Materials

The study materials consist of graphic and nongraphic dates. Graphic datas comprise of Selçuklu District's 1/1000 scale development plans, air flight photos belong to 2006 of Konya City, graphical and Cad-based maps showing spatial distributions of Selçuklu district neighbourhood. Nongraphic datas comprise of datum regarding to distributions, features, types and amounts of green spaces obtained from Konya Metropolitan and Selçuklu Municipality Director of Park and Gardens, Turkish Statistical Institute population dates, Konya city's 1/1000 scale development plans and reports, photographs of the research area, visual inspection, update and visual obtained from field work, the previously done related to topics and areas.

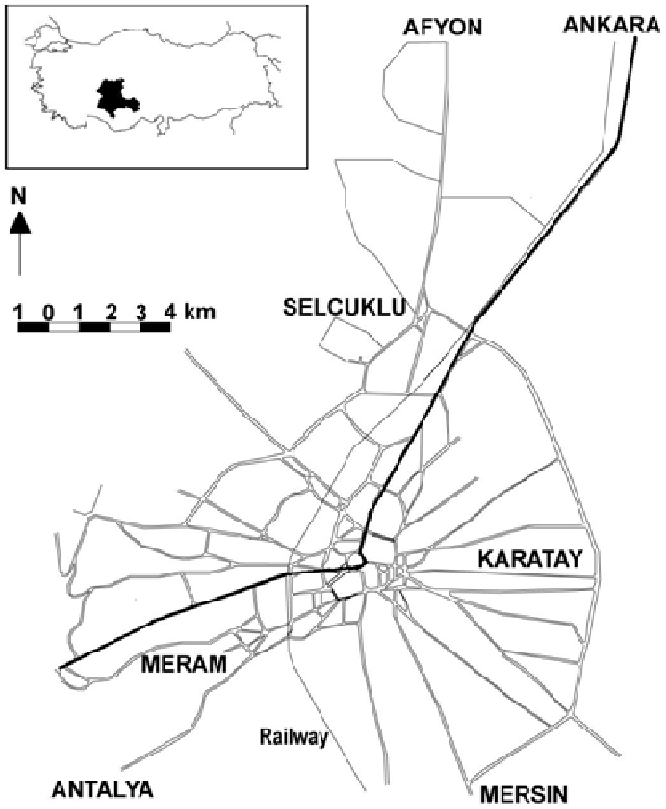

Figure 1. Location of Selçuklu District.

Methods

Active green spaces of Selçuklu district were divided into two groups in this study where quantitative and accessibility of these green spaces were defined:

Existing situation

To define the efficiency of green spaces, predicted realization rate in the construction plans and to define the quantitative and accessibility proficiency of green spaces,

Situation in construction plan

It has been carried out to define quantitative and accessibility proficiencies of green spaces.

Previous studies on the issue were used to define the method of this research (Van Herzele and Wiedemann, 2003; Manlun, 2003; Doygun and İlter, 2007; Oh and Jeong, 2007; Uy and Nakagoshi, 2008). The flow chart of the study is consisted of data collection, data record, data control, inquiry and analysis. In the research, GIS was used for data record, digitization, accessibility, field calculation and in inquiry processes and Mapınfo Professional 8 and also Netcad 4, 0 softwares were used. The data making up data bank of the research, the name of the green field that is defined as open green spaces in the construction plan, its size, location, function, construction year are non-graphical information existed due to application. The data is collected from Construction Planning and Park-Gardens Directorate in Konya metropolitan and Selçuklu municipality and from field confirmation.

In the first step of the study numerical data related on the usage of existing green spaces was collected by observation and through data obtained from the municipality and their efficacy areas and proficiencies were defined. In the next step, the distribution, areas and amounts of the green spaces suggested in 1/1000 scaled development plans approved by Construction Planning Directorate were determined. The active green spaces in the application are gathered in two groups as parks and recreation areas. The data on population of the districts and the amount of green spaces is grouped and shown on the maps as entity property that shows the numerical distributions of the districts. In order to visualize the analysis questions were asked, efficiencies and influence fields were analyzed.

The classification and quantitative proficiency of the active green spaces were done according to Turkish Republic the Ministry of Public Works and Settlement (MPWS) standards. In evaluation of accessing buffer zones were allocated that symbolizes ideal walking distance to the green spaces, so influence areas of active green spaces were defined. In defining service semi diameters of green spaces, their distance to children playground was accepted as to children playground 400 m (10 min), sport areas and neighbourhood park 800 m (20 min), and city parks 1200 m (30 min), walking distances were taken into consideration (Manlun, 2003; Altunkasa, 2004; Aydemir, 2004). General evaluation and sugges-tions on green spaces in Selcuklu District were given in result section.

RESULTS

Theoretical Background

Classification of open green spaces in urban areas

There is not a uniform method to classify open green space in the world till now. Different countries have proposed different classifications based on the function, size and physical characteristics of green space (Manlun, 2003). Based on the activities and the variety of activities and MPWS standards, urban open green spaces are classified as:

Home-oriented open green spaces

They aim at providing aesthetic quality and informal activities in home outdoor places such as roof gardens, terraces and balconies. It involves natural passive and active recreational activities such as sitting, reading, sunbath, and doing garden work.

Open green spaces in a neighbourhood

This group involves housing gardens, playground and children garden. They allow for various recreational facilities (resting, playing, and socializing) such as game play and small sport activities (basketball, volleyball etc.) for 0 to 14 years children. These can serve average 10 min on foot in neighbourhood.

Open green spaces in district

This group involves sport spaces and Neighbourhood Park. These are used for social, cultural, physical and educational activities, and involve activities in community parks or in school yards such as play grounds, recreational centres, making new friends and reading. These can serve several neighbourhood.

Open green spaces in towns

These are created in cultural and natural areas, and involve City Park and natural reserve areas, sea shores, river banks, picnic areas, special sport areas or play grounds for groups (Yıldızcı, 1982).

The size of active green spaces in urban areas

One of the conditions of being able to create a qualified home outdoor environment around a residence is the presence of norm and standards of land use and their careful applications (Birch, 1974). Norm and standards of open green spaces (City Park, Community Park, children playground etc.) have an important role in making municipal plan and helping with urban design. It is very difficult to decide to design how much active green space is required for the neighbourhood without standards and norms (Richman, 1979). Active green spaces can be grouped in four classes including city park, children playground, neighbourhood park, sport place, have to 10 m^2/person in urban areas according to MPWS standards. Distributions of active green spaces in settlement are given in Table 1.

The distance of active green spaces in urban areas

Other environmental factor has an important role in making municipal plan is distance is often mentioned as the

Table 1. Distributions of 10 m^2/person per person standards according to MPWS standards.

The size of populations	5000 person (in neighbourhood level)	15000 person (in district level)	More than 15000 person (in city level)
Green spaces 10 m^2/person	Playground and children garden 1.5 m^2	Play sport area 2 m^2 Neighbourhood park 3 m^2	City park 3.5 m^2

Table 2. Average walking distance and time to urban green spaces.

Green spaces	Playground and children garden	Play sport area and neighbourhood park	City park
Walking distance	400 m	800 m	1200 m
Walking time	10 min	20 min	30 min

Table 3. Quantitative development of children playground.

Year	Population	Standard of MPWS m^2	Children Playground			Requirement	
			District/Number	Area m^2	m^2/Person	m^2/Person	Area m^2
1990	188224	1.5	16/21	15315	0.08	1.42	267278
2000	327627	1.5	34/62	36700	0.11	1.39	455402
2009	459921	1.5	51/229	104512	0.28	1.22	561104

main environmental factor influencing the use of green space (Coles and Bussey, 2000; Van Herzele and Wiedemann, 2003). 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). According to the literature research, average walking distance and walking time to urban green spaces are given in Table 2 (Manlun, 2003; Altunkasa, 2004; Aydemir, 2004).

The historical development and current status of active green spaces in Selçuklu district

Selcuklu district became a central municipality in 1989. Since then, the population of the district, that had a rapid improvement, reached to 327627 in 2000 and to 459921 in 2009. There are 60 districts in development plan of Selcuklu. In this section, historical development of green spaces that were foreseen in development plans and their proficiency was evaluated according to MPWS standards. This purpose Selçuklu district's 1/1000 scale development plans were inspected to examine the green spaces implementation in the region.

Children playground

The population of Selcuklu was 188 224 in 1990. There were 21 children playgrounds at this period and that means 0.08 sq m green field per capita. The population was 139 403 between 1990 and 2000 and there was 21 385 sq m increase in the amount of playground. There are children playgrounds in 34 districts and the amount of playground per capita is 0.11sq m. We have seen that there was increase in the numbers and distributions of playgrounds in 2009. There are 229 children playgrounds in 51 districts and the amount if 0.28 sq m per capita (Table 3). There is an increase both in the number and amount of the children playgrounds. However, it has not reached to 1.5 sq m for per capita standard.

Today, according to MPWS standards 1.22 sq m field need for per capita, there is 561103 sq m deficit. When the distribution of children playgrounds and accessibility within 400 m semi diameter circle are evaluated, we have 116614.1 da influence area (Figure 2). When the accessibility to children playgrounds is evaluated, while 45% of the dwellers are in ideal walking distance to these parks, 55% are beyond this distance.

Neighbourhood park

While there were 4 district parks with 52200 sq m in 1990, this increased to 98625 sq m in 2000, and 415304 sq m in 2009. The amount of area per capita was 0.28, 0.30, 1.11 sq m respectively. There is 409330 sq m park deficit as of 2009 (Table 4). When the distribution of neighbourhood parks and accessibility within 800 m semi diameter circle are evaluated, we have a 76142.6 ha influence area (Figure 3). When the accessibility to neigh-

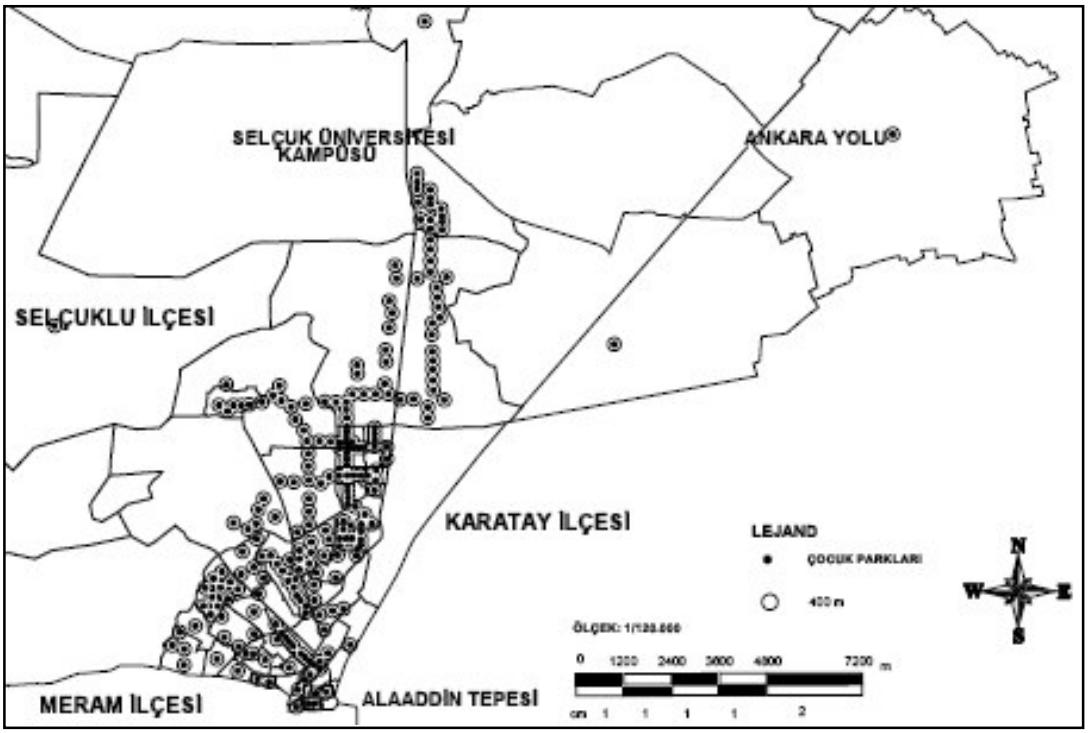

Figure 2. Distribution and accessibility of children playground.

Table 4. Quantitative development of neighborhood park.

Year	Population	Standard of MPWS m^2	Neighbourhood Park			Requirement	
			District/Number	Area m^2	m^2/Person	m^2/Person	Area m^2
1990	188224	3	2/4	52200	0.28	2.72	511969
2000	327627	3	8/15	98625	0.30	2.70	884593
2009	459921	3	20/34	415304	1.11	0.89	409330

Table 5. Quantitative development of sport area

Year	Population	Standard of MPWS m^2	Sport Area			Requirement	
			District/Number	Area m^2	m^2/Person	m^2/Person	Area m^2
1990	188224	2	3/7	75799	0.40	1.60	301158
2000	327627	2	6/14	150599	0.46	1.54	504546
2009	459921	2	25/72	248499	1.85	0.15	68988

bourhood park is evaluated, while 29% of the dwellers are in ideal walking distance to these parks, 71% are beyond this distance.

Sport area

While there were 7 district parks with 75799 sq m in 1990, this increased to 150599 sq m in 2000, and 248499 sq m in 2009. The amount of area per capita was 0.40, 0.46, 1.85 sq m respectively. There is 68988 sq m park deficit as of 2009 (Table 5). When the distribution of sport areas and accessibility within 800 m semi diameter circle are evaluated, we have a 150240 ha influence area (Figure 4). When the accessibility to sport areas is evaluated, while 57% of the dwellers are in ideal walking distance to these parks, 43% are beyond this distance.

City park

While there were 4 district parks with 235026 sq m in 1990, this increased to 3466456 sq m in 2000, and 4994960 sq m in 2009. The area of city parks in the dis-

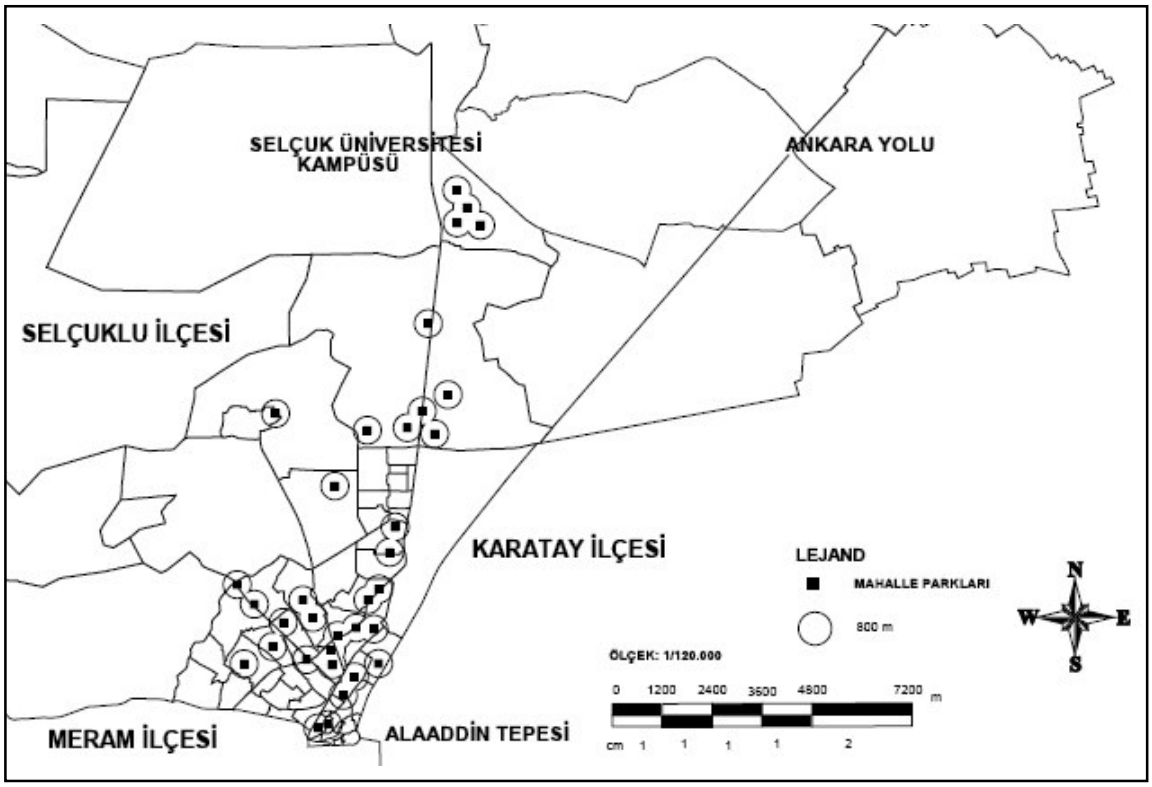

Figure 3. Distribution and accessibility of neighbourhood park.

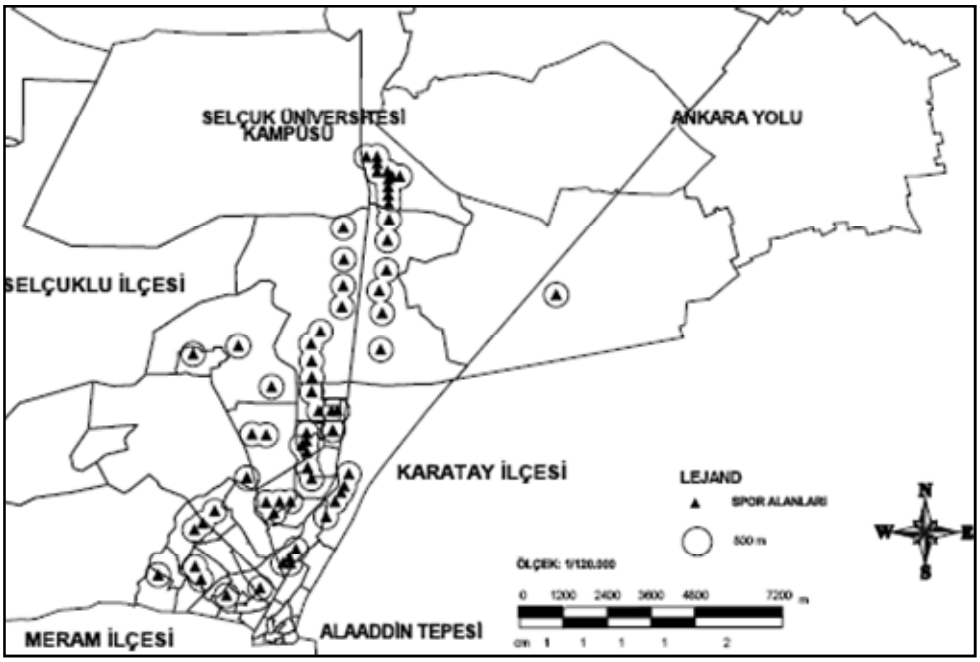

Figure 4. Distribution and accessibility of sport area.

trict is above standards (Table 6). However, when the distribution and accessibility of the parks within 1200 m semi diameter circle are evaluated, we come across a 89754 ha influence area (Figure 5). When the accessibility to city park is evaluated, while 34% of the dwellers are in ideal walking distance to these parks, 66% are

Table 6. Quantitative development of city park.

Year	Population	Standard of MPWS m^2	City Park			Requirement	
			District/Number	Area m^2	m^2/Person	m^2/Person	Area m^2
1990	188224	3.5	3/4	235026	1.25	2.25	423504
2000	327627	3.5	7/8	3466456	10.58	7.08 +	-
2009	459921	3.5	9/14	4994960	10.86	7.36 +	-

Table 7. The status of active green spaces in development plan.

Year	Population projection	City Park			Recreation Area		
		District/Number	Area	m^2/Person	District/Number	Area	m^2/Person
2020	561946	13/19	13 634 212	24.26	70/5274	7 935 578	14.12

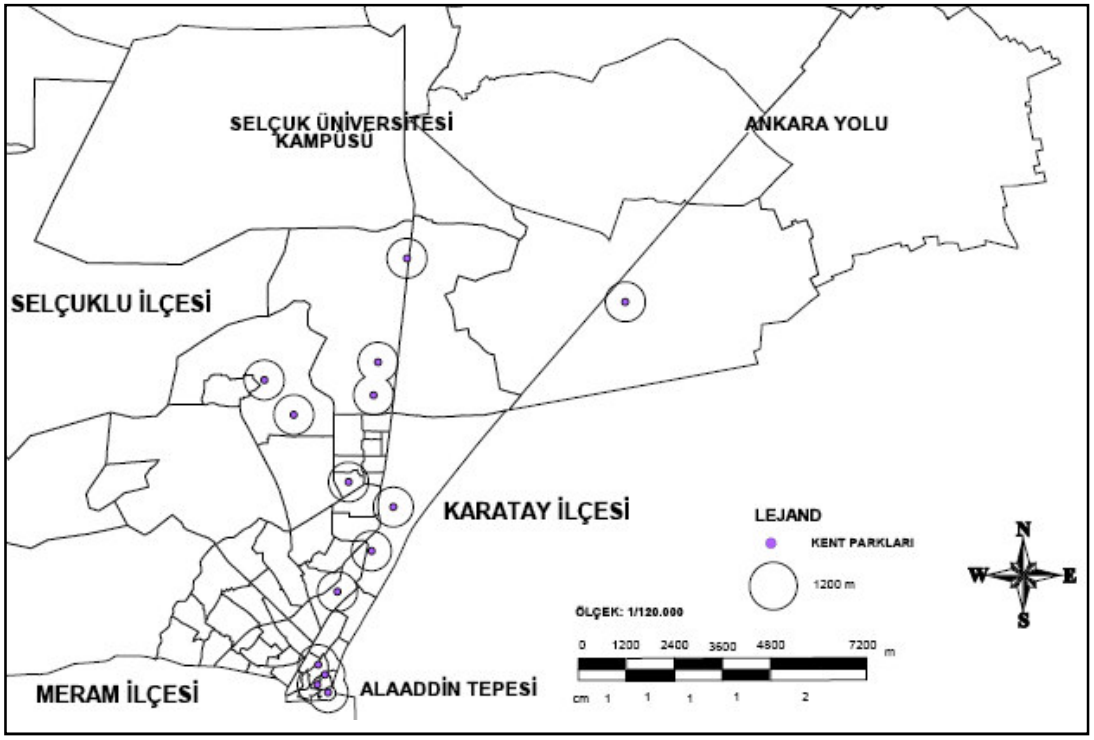

Figure 5. Distribution and accessibility of city park.

beyond this distance.

The status of development plan of active green spaces

When the position of active green field on construction plan was evaluated, it is seen that the green spaces are divided into two groups as city parks and recreation areas. The green areas known as recreation areas are designed as sport areas, children playgrounds and neighbourhood parks during the implementation. When development plans are evaluated, it was defined that there are 13 634 212 sq m city park and 7 935 578 sq m recreation area (Table 7). It was defined that 4 994 212 sq m of active green spaces in Selcuklu district was city park, 768 315 sq m was district park, sport areas, children playgrounds (Figure 6). The amount of active green spaces that has not been realized yet, though it is on the plan, is 8 639 252 sq m city park, 7 167 263 sq m recreation area, 15 806 515 sq m in total.

According to population projections, the population of district will be 561 946 in 2020. If the active green spaces stated in development plan are realized, there will be

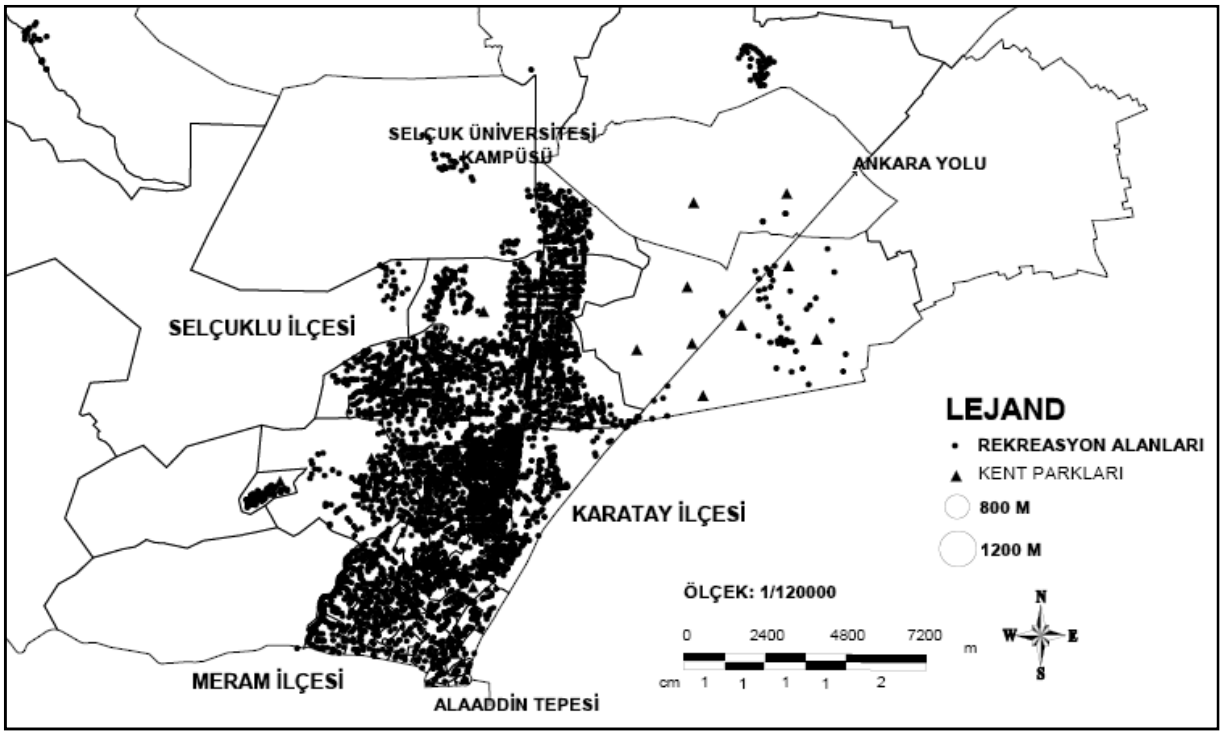

Figure 6. Distribution and accessibility of development plan of active green spaces.

24.26 sq m city park and 14.12 sq m recreation area per capita. However, % 36.34 of urban park and 9.68% of other active green spaces was applied until 2010.

DISCUSSION AND CONCLUSION

Urban green spaces provide many environmental and social services that contribute to the quality of life in cities. Their benefits are primarily determined by the quantity and quality of these areas as well as their accessibility (Tyrvainen et al., 2005). Previous studies have shown that city dwellers want to live closer to the green spaces. Burgess et al. (1988); Coles ve Bussey (2000) and Grahn and Stigsdotter (2003) stated that green spaces will be more often visited if they are closer to the dwellings. Bolitzer and Netuzil (2000), Marancho (2003) and Kong et al. (2007) confirmed the positive amenity impact of proximate urban green spaces such as public parks, natural areas and golf courses on house prices, and highlighted the preferences of homeowners.

In this study according to present codes;

i) Historical development, fields proficiencies in application and in the future,
ii) Accessibility opportunities of green spaces in Selcuklu district were evaluated.

The result of this study stated that the existing green spaces in Selçuklu district are far from satisfactory according to the quantity, and the spatial dispersion of urban green usages on the urban form is unbalanced and urban active green spaces have not been evaluated effectively according to the potentials and dynamics of sustainable urban development. It will be possible that Konya has a modern and green urban by means of a process to be put into planning, designing and management by taking into consideration the ecological, scientific, and technical criteria for raising the quality and quantity of the green spaces of the urban.

At the end of the evaluation of active green spaces in Selçuklu district, some suggestions were cited:

i) In Selcuklu district, when the active green spaces per capita were evaluated, it was determined that the city parks 9.61 sq m, neighbourhood park 0.83 sq m, children playgrounds 0.20 sq m, sports areas 1.45 sq m were increased, respectively in last 20 years. Although this increase is positive, still is not enough. Today the amount of green spaces per capita is 12.53 sq m (1.85 m^2 sport area, 1.11 m^2 neighbourhood Park, 0.28 m^2 children playground, 10.86 m^2 city park). In terms of fields, children playgrounds, neighbourhood parks and sports areas are below MPWS standards. City parks, on the other hand, are above standards. It should be priority to improve balanced distribution of green fields in the district that have important function. The studies on the issue should start from the existing fields by increasing the numbers of usages of these areas (such as hiking trails, play equipment, sport areas etc.) and their functions should be diver-

sified so that more people can benefit from them. While allocation new green spaces, the district that do not have green spaces should be given privilege.

ii) In the district, existing and foreseen green spaces are small and multipartite. The cost of maintenance of small and multipartite green spaces is quite high and they cannot shelter wildlife due to inadequate vegetation (Eşbah, 2006). The fact that the green spaces are small and multipartite will cause less people use them and will create a number of drawbacks in terms of the operation and contributions to the city ecology. While opening small active green fields to usage, foreseen in the plan, enough attention should be given to ideal form and size of these fields and they should be designed so as to serve large dwelling structure and a lot of people.

iii) In European Commission Urban Transformation Report there is a 15 min walking distance criteria for urban green spaces and the rate of people living at this distance to total population is given as 64.8% (Anonymous, 2006). In this study, since we did not have any opportunity to obtain the mentioned data, information on ideal walking distance to green spaces around dwellings and total influence area of the fields is given. In order to make the same evaluation in Konya, there is a need for urban data system in which dwelling and population information updated regularly. It is only with the help of this system that we can have information on how many people live on a certain distance to these green fields. Urban Information System (UIS) is an effective tool for municipalities in order to manage all physical, social, cultural and economical activities and offer well-qualified service. UIS is based on a computer and information technologies and their systematic usage and easy access. Serving, deciding and using city resources efficiently will be easier via UIS (Tecim and Tarhan, 2004).

It is necessary to set up city knowledge system unit within local authorities to provide accessibility to data about application and maintenance and planning of green fields, association, updating, and questioning. City knowledge system center was set up within Konya municipality in 2005. However, due to lack of knowledge, equipment and staff, the center can not work efficiently. Konya metropolitan and Selcuklu municipality should work together to activate the system.

iv) Individual factors such as age, education, gender, expectations, actual needs, attitudes and preferences and demand are likely to have an impact on use of green space (Roovers et al., 2002; Balram and Dragicevic, 2005; Jim and Chen, 2006; Sanesi and Chiarello, 2006; Tyrvainen et al., 2007). For that reason, in planning and application of green spaces, the needs of dwellers, the features of social structure (such as age, gender, profession, cultural level) their requirement, trends, and expectations should certainly be taken into consideration.

v) The need for green spaces should not only be considered as numerical increase but also it should be considered as spatial quality and decreasing of inequalities. Other environmental factors such as presence of facilities and possibility for activities in the green space are also thought to have an influence on the use of urban green space (Van Herzele and Wiedemann, 2003; Bedimo-Rung et al., 2005; Giles-Corti et al., 2005). Therefore, after green spaces are opened, the adequacy of equipment, quality and maintenance should be followed.

vi) The first construction plan on Konya was made in 1936. When the development plans made after this date are evaluated, it is seen that none of them had green field system prediction. This can be regarded as an important planning defect that leads to other types of problems. In fact, urban green field systems such as green belt, garden cities, greenway (Elson, 1986; Flink and Searns, 1993; Howard 1997) are systems that were developed in the 19th century and was applied in many European countries and in the USA in the 20th. It is understood that during construction planning process Konya, like many other Turkish cities, followed a wrong policy in defining green fields. This approach is based on defining informal, small fields that are not appropriate for buildings or place as green fields that belong to foundation or treasury lands. It is impossible for these fields to meet the expectations that are isolated from each other and are not distributed equally within city structure. In developing plans to be done from now on, it is important to be careful on planning open green fields systematically.

All factors influencing the use of green space can, and will, interact with each other and a solution that might work in one situation might not work in another situation; each city has its own structure, each green space its own characteristics and each neighbourhood its own inhabitants (Schipperijn et al., 2010). For that reason, in the studies of green spaces planning and applications which will realize in Konya in the future, the planners and managers green space need to be aware of possible site-specific solutions in addition to general recommendations

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