

The Effects of Urban Green Spaces on House Prices in the Upper Northwest Urban Development Area of Adana (Turkey)

M. Faruk ALTUNKASA*, Cengiz USLU

University of Çukurova, Faculty of Agriculture, Department of Landscape Architecture, 01330 Balcalı-Adana - TURKEY

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Abstract: Green spaces have very important functions in the creation of a sustainable city. However, in cities, which grow in terms of their population and physical environment, the primary aim of city planning is to meet the housing deficit. For this reason, areas having natural characteristics within an urban area are destroyed and existing green spaces are turned into housing areas. The most important reason why green spaces are not prioritized in city planning is that there is no market representing the green spaces. The market value of green spaces is hard to quantify. The higher price paid by customers for houses that have green spaces compared with those without green spaces directly reflects the market value of the green spaces. This article explores the feasibility of representing green spaces in the housing market by a monetary evaluation approach in order to obtain systematic data that can affect the physical planning decisions in new urban development areas.

Key Words: Green spaces, Economic value, Adana

Adana Kuzeybatı Üst Kentsel Gelişme Alanında Kentsel Yeşil Alanların Konut Fiyatları Üzerine Etkisi

Özet: Yeşil alanlar, sürdürülebilir kent yaratılmasında çok önemli işlevlere sahiptir. Buna karşın, nüfus ve fiziksel çevre bakımından büyüyen kentlerde kent planlamasının öncelikli amacı, konut açığının giderilmesidir. Bu nedenle, kentsel alanlardaki doğal unsurlar tahrip edilmekte, mevcut yeşil alanlar konut alanlarına dönüştürülmektedir. Kent planlamasında yeşil alanların öncelik taşıyamalarının en önemli nedeni, temsil edildikleri bir piyasanın bulunmamasıdır. Yeşil alanların piyasa değerini hesaplayabilmek kolay değildir. Bununla birlikte, yeşil alansız konutlarla karşılaştırıldığında, yeşil alanlara sahip olan konutlara alıcılara tarafından ödenen daha yüksek fiyat, yeşil alanların piyasa değerini doğrudan yansıtmaktadır. Bu makale; yeni kentsel gelişme alanlarının fiziksel planlama kararlarına yön verebilecek sistematik verilere ulaşabilmek için, parasal bir değerlendirme yöntemi kullanarak yeşil alanların konut piyasasında temsil edilebilirliğini incelemektedir.

Anahtar Sözcükler: Yeşil alanlar, Ekonomik değer, Adana

Introduction

In order to improve the environmental quality in cities and ensure its sustainability, the view of price determination for environmental issues and the reflection of this price to the inhabitants was formed 50 years ago. However, this view did not become clear until 1987, when the report of the World Commission on Environment and Development (WCED) was published (WCED, 1987; Pearce et al., 1989; Tisdell, 1991; Turner et al., 1994; Shechter, 1995; Callan and Thomas, 2000; Field and Field, 2001).

Green spaces with their various functions are essential for improving the quality of rural life and

creating a sustainable urban life (Gold, 1980; Simonds, 1983; Garrod et al., 1991; Bernstein, 1994; Cohen, 1996; Gangloff, 1996; The World Resources Institute, 1996; Thompson et al., 2001). However, in cities growing in terms of their population and physical environment, the primary aim of city planning is to meet the housing deficit. For this reason, areas having natural characteristics within an urban area are destroyed and existing green spaces are turned into housing areas (Cernea, 1993; Cohen, 1996; The World Resources Institute, 1996). Considering the current market conditions, the prices of ground lots are greatly increasing and thus cities are shaped accordingly. The most important reason why green spaces are not

* Correspondence to: faltun@mail.cu.edu.tr

prioritized in city planning is that there is no market to represent green spaces, in other words no representation of the green spaces within the market prices of houses (Hanley and Spash, 1993; Shechter, 1995; Callan and Thomas, 2000; Lange and Schaeffer, 2001; Willis et al., 2001).

Adana, where this study was carried out, is a city that encounters the aforementioned problems intensively. Located in the south of Turkey, Adana is the center of the Çukurova region, and the sixth largest city in the country. According to reports published in 2000, the urban population is 1,180,000. Projections indicate that by 2010 the urban population will be between 1,400,000 and 1,800,000. The reason for this large range is the high level of uncontrolled migration from the rural areas of the eastern and southeastern parts of Turkey.

Until the 1990s, urban development basically took place on the agricultural land formed by the Seyhan River. The master plan accepted by the city council in 1969 that would direct the urban development, could not meet the demands of this rapidly growing population. Accordingly, a rapid increase in the construction of illegal buildings and squatter houses around the city center made it even more difficult to implement the master plan. In order to overcome these problems and to direct the development towards the north of the city (which is less valuable for agriculture and has more stable ground than the alluvial regions) some additional plans were prepared with revisions and put into practice in 1991-92. These master plans divided the city into 4 regions, namely Northeast, Northwest, Southeast and Southwest, which surround the city center. Upper Northwest Urban Development Area (UNWUDA) is now the most important developmental area of Adana (PBMI, 1991).

UNWUDA provides an area of 1,625 ha. While the population in this area was only 4,500 in 1980, this number is now estimated to have reached 300,000 by 2002. In these revision plans and programs prepared in 1991-1992, while the population for 2010 in UNWUDA was estimated to be 470,000 in an area of 1,625 ha, the expected population has increased to 1,000,000 in the revision plans of subsequent years (PBMI, 1991). This means that 60% of the total city population will live in an urban area comprising only 10% of the whole urban area of Adana. In the 2 decades following 1980, the population increased 67 fold and accordingly in the last decade many high buildings have been constructed. These

have brought about serious drawbacks. For example, in order to create residential areas many vegetable and fruit plantations including vineyards have been destroyed. The natural plant cover has also been damaged and the natural topographic structure has been greatly spoiled due to the digging and filling in. Both in the 1969 master plan and in the 1991-1992 revision plans, green spaces were used for housing areas as in all continuing master plan revisions. Multi-storey buildings (10-15 storeys) located very close to each other in most parts of the development areas have become the primary reason for the quality of urban life declining. As a result, under the effect of the housing market, the prices of building land, which are a few times higher than the average, can turn the master plan revisions into a means of unearned income for policy-makers.

Inevitable growth in UNWUDA causes some inconveniences for its inhabitants. The main sources of these inconveniences can be summarized as follows:

* Quality of urban life decreases due to house construction exceeding demand. For instance, while the aim is to construct houses for 2.5 million people by 2010, the estimated population by the end of the same period is only 1.8 million maximum. The decrease in population growth was attributed to the decrease in migration from southeastern Turkey after the implementation of the Southeast Anatolian Project.

* Growth of the development areas being faster than expected, makes already inefficient drainage and sewage systems even more insufficient.

* While green spaces are desperately needed because of the hot and humid weather pattern of the city, the amount of urban green spaces (parks, public gardens, play lots, and playgrounds), which is currently 0.75 m² per capita, is decreasing fast (according to the constitutions and regulations for physical development and planning in Turkey, the amount of urban green spaces per capita is 10 m²).

Preliminary studies to determine the user demands on this issue have found that people living in UNWUDA want both public and private green spaces to be increased in order to meet their demands. In addition, it has been found that the inhabitants of the area can afford the expenses of creating green spaces. This study aims to investigate the feasibility of representing green spaces in the housing market and to obtain systematic can affecting

the physical planning decisions in new urban development areas.

Materials and Methods

In this study, a monetary evaluation method based on individuals' demands was used. These values were measured by examining individuals' expressed preferences for environmental quality (elicited via questionnaires) (Willis and Garrod, 1991; Hanley and Spash, 1993; Turner et al., 1994; Shechter, 1995; Bateman and Willis, 1999; Callan and Thomas, 2000; Kolstad, 2000; Field and Field, 2001; Hanley et al., 2001; Ready et al., 2001). The aim of using the monetary evaluation method in this study was to evaluate the social costs and social benefits of urban green spaces allotted for houses from the economic point of view. Related to this, studies to determine the housing market and user demand tried to find answers to 3 main questions that can contribute to the creation of a market price for green spaces in general:

* To what extent do environmental differences, particularly green spaces, around houses affect house prices?

* How many of the house owners are willing to pay for the green spaces of various sizes belonging to their housing estates?

* What can be the social benefits gained from the green spaces created to improve urban environmental quality?

In this study, first of all prices were obtained from 7 different real estators for housing areas located in different parts of the research area regarding environmental issues. The investigations revealed the fact that houses with the same qualities and in the same area have different prices, and it was indicated that the positions of the houses (whether the house is on an avenue or street) might cause this difference. Thus, the prices of houses were evaluated in 2 groups; the first group of houses sited on an avenue or street, and the second group sited on by-streets and in districts. Houses on avenues were represented by 4 avenues (Turgut Özal, Kenan Evren, Süleyman Demirel and Mavi Boulevards), where the housing demand is more intensive. Houses on streets and in districts were represented by four districts (Belediye Evleri, Güzelyalı, Toros and 100. Yıl) (Figure 1). The average market prices for flats with various

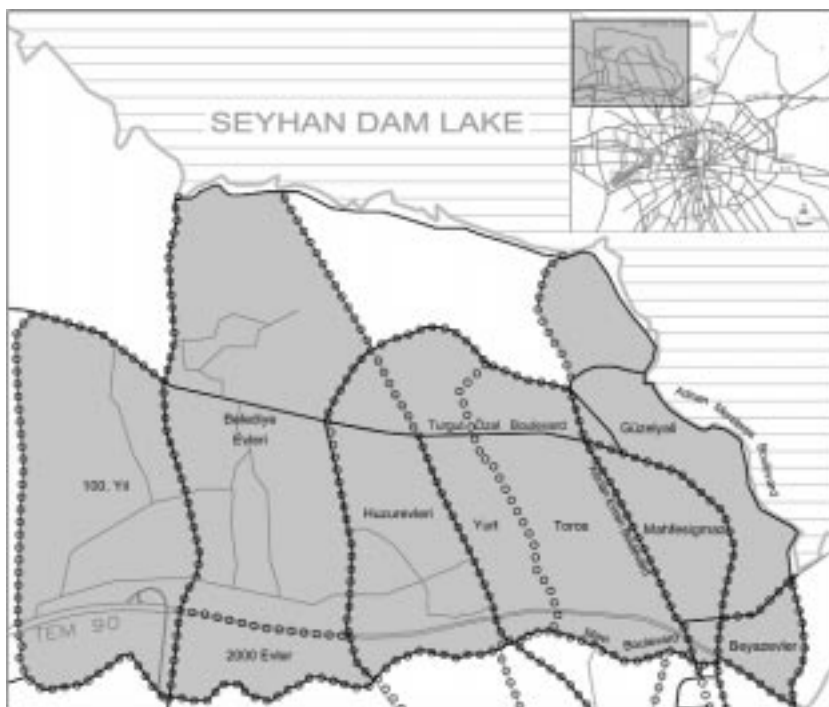


Figure 1. A simplified map of the research area.

qualifications but without any green space properties were used in calculations. In parallel to these studies, standard forms were prepared in order to determine the price increases that the customers would accept in the event of houses with green spaces of different sizes being on sale. These forms were filled in by people who came to real estate agencies to buy a house or who wanted to buy a house in person from the research area. Apart from these people, forms were also filled in on the basis of mutual negotiations. The questionnaires were answered by 450 people (considering that the individual answers the questionnaire on behalf of his family consisting of about 4 people, we can say that the results reflect 1800 people's opinions). The data obtained were prepared for statistical analysis by grouping the houses according to their position, whether they are located on an avenue or within a district.

Correlation and regression analyses were used to determine the correlation between the amount of private green spaces (belonging to housing estates) and house prices and also to determine the significance of this correlation. In the analysis, the MSTADC program was used. Linear regression equations explain the effect of the amount of green spaces as an independent variable on house prices as a dependent variable according to the location of the houses and the size of the green spaces they have were obtained. The results of analysis created a basis to determine the social benefits provided by a balance between the housing sites and green spaces.

Results

The study attempted to determine the socio-economic background of the people who were given a questionnaire, the results of which are shown in Table 1. Interpreting the data related to socio-economic characteristics of the people given the questionnaire, the following results can be obtained:

* Most of the population in the research area are young, middle-aged and working people who have a good educational background. Considering that university graduates comprise 7% and high school graduates 22% of the urban population of Adana according to the data in 2000, it can be concluded that most of the people with a higher educational and cultural background live in the area.

* Small families consisting of 2-4 people are dominant. Although in the majority of the families only one of the spouses has a job, the ratio of families in which both spouses have a job is also high.

* Total monthly income of 55% of the people given the questionnaire ranges between US\$ 501 and 700 (average US\$ 600). The families whose income ranges between US\$ 701 and 1000 comprise 22% of the sampling population, which seems quite high. This means that the majority of families in the research area are of middle or upper middle class. However, the level of average income in the research area might have a slight increase because of the possibility that the families who

Table 1. Proportional distribution of socio-economic characteristics of people given the questionnaire to value the green spaces belonging to housing estates in the Upper Northwest Urban Development Area of Adana.

Age groups	:	24-30	31-40	41-50	51-60	61-70	
%		14	43	28	11	4	
Gender	:	Female	Male				
%		42	58				
Marital status	:	Married	Single				
%		94	6				
Educational background	:	Primary school	Secondary school	High school	University		
%		6	11	39	44		
Number of people in the household	:	1 person	2-4 people	5-7 people			
%		2	66	32			
Number of people in the household who have a job	:	1 person	2 people	3 people			
%		57	39	4			
Total monthly income of the household (US\$)	:	400-500	501-600	601-700	701-800	801-1000	1001-1500
%		18	29	26	15	7	5

have above average income ranges used real estate agencies more than the others.

To determine the preferences of the family members regarding the location of the housing estates in which they would buy, 9 districts and 12 avenues in the research area were included in the study. The members were asked to rank the first 3 options according to their preferences. Table 2 illustrates the data obtained as proportional values. The results indicate that 64% of the family members prefer houses on the side of an avenue and 36% prefer houses located within a district.

The following are the primary reasons why houses on avenues are preferred: having better building quality, being better with regard to comfort and aesthetics, having partly completed drainage and sewage systems, and being close to shopping centers and public places, besides the common opinion among the users that these houses are more appropriate for the people of high social status.

As for preferences pertaining to houses within districts, the following reasons can be listed: lower prices, existence of green spaces although below standard, fewer traffic problems and better traditional neighborhood relationships.

Table 2 shows the price increases submitted by individuals who want to buy a house in the research area if the housing they preferred has green spaces of various sizes. According to these, the price of a house without any green space was increased by 20.7%, 29.9% and 33.7% for a green space of 7 m², 10 m² and 14 m² per capita, respectively. The striking point in Table 2 is that the higher the prices for a house without green space, the higher the price increased. Thus it can be concluded that individuals with higher income are more willing to increase the prices and that as their income decreases their willingness to increase the prices decreases as well, which can be considered quite natural. Another striking point is that while the rate of increase is only 9.2% between 7 m² and 10 m², the rate decreases to 3.8% for green spaces ranging between 10 m² and 14 m². This may indicate that when the amount of green spaces expands, the owners avoid paying additional costs. At this point, it is also possible to see the effects of the law of diminishing marginal utility (Smith, 1990; Taylor, 1995; Bateman and Willis, 1999).

Correlation and regression analysis were applied to the data shown in Table 2, and following are the results in summary:

Table 2. Price increases submitted by the people who want to buy a house in the research area if the housing they preferred has green spaces of various sizes and the result of correlation and regression analysis for these increases.

Place of the house in the urban area	Average price of houses without green space US\$	Rate of preference %	Increased prices by the buyers providing houses having green spaces of different sizes						The result of correlation and regression analysis	
			7 m ² per capita		10m ² per capita		14 m ² per capita		Significance level	Regression equation [Y= a + bX]
			US\$	%	US\$	%	US\$	%		
Avenues										
Turgut Özal	32,110	23	39,750	23.8	42,250	31.6	43,540	35.6	* P < 0.05	Y=32.730+0.864X
Kenan Evren	24,710	19	30,050	21.6	32,420	31.2	33,290	34.7	* P < 0.05	Y=25.090+0.644X
Süleyman Demirel	36,000	12	44,640	24	48,170	33.8	49,540	37.6	* P < 0.05	Y=36.767+1.016X
Mavi Bulvar	15,180	9	17,670	16.4	19,160	26.2	19,830	30.6	* P < 0.05	Y=15.387+0.346X
Within districts										
Belediye Evleri	14,190	11	16,210	14.2	17,710	24.8	18,270	28.7	** P < 0.01	Y=14.370+0.301X
Güzelyalı	25,760	9	31,400	21.9	33,610	30.5	34,380	33.5	* P < 0.05	Y=26.230+0.650X
Toros	16,250	8	19,270	18.6	20,780	27.9	21,500	32.3	** P < 0.01	Y=16.480+0.390X
100. Yıl	10,750	6	12,230	13.8	13,070	21.6	13,520	25.8	** P < 0.01	Y=10.733+0.216X
Mean	21,870		26,400	20.7	28,400	29.9	29,320	33.7		

Note: 4% of the research population (sampling population) preferred 8 avenues and 5 districts apart from those illustrated in Table 2. However these have not been represented in the table since they account for less than 1% of the total research population.

* In the research area there is a statistically significant correlation between the green spaces (parks, public gardens, play lots, and playgrounds) belonging to the houses and the prices of the houses. This is shown by a correlation coefficient very close to 1 (the mean is 0.985). This correlation is positive since the price of the houses increases in parallel to the amount of green spaces.

* In addition, the correlation is real between house prices and the amount of green spaces. This is because in the significance tests conducted the correlation is at the level of 1% for the Belediye Evleri, Toros and 100.Yıl districts, and for the other options the correlation was at the level of 5%.

* When the amount of green spaces as an independent variable [X] takes certain values, the value of the house (price of house) as a dependent variable [Y] can be calculated by the formula $[Y = a + bX]$, a simple regression equation (in the equation a stands for the price of the house without any green space, b stands for additional costs created by the green spaces) (Table 2).

Discussion

In the present work we studied whether there is a correlation between the amount of green space of houses and the price. The economic value of green spaces in a hypothetical market was estimated. The results obtained showed that there is a positive correlation between house prices and the existence of green spaces. In a similar work, Lange and Schaeffer (2001) examined the effects of the view from rooms on room prices between 2 hotels within the same category but in different locations in Zurich. It was indicated that the prices of the rooms with visual variety and an outside green space view were 20% higher than those of other regular rooms. Garrod et al. (1991) determined the economic value of 4 botanical gardens on the basis of travel costs within a city's borders, and they pointed out that it is possible to benefit from a hypothetical market for the monetary evaluation of non-market goods and services, and mentioned that individuals' preferences are an indicator in this. Cohen (1996), Bateman and Willis (1999), Thompson et al. (2001) and Willis et al. (2001) highlighted the fact that green spaces have been overexploited in order to meet housing needs as a result of fast urban population growth. They also emphasized that the inclusion of the

green spaces within the housing market would be of great support in combatting this.

According to the aims of the plan applied in UNWUDA, the population will reach up to 1,000,000 by the year 2010. This means that the total number of houses will be around 200,000 by that time. On the other hand, the amount of urban development is increasing every year via revisions to existing plans. However, considering a further regulating revision plan and the 1991 program, the estimated population for this area was approximately 470,000 and the houses around were 105,000 units. Even though we might accept the fact that the population will be higher than expected, the number of new houses for the research area will be higher than the demand for them. For this reason, a reasonable solution for the area would be to reduce the number of houses and accordingly use these vacant areas as green spaces. Considering the economic aspects of the issue, the possible decrease in business volume can be compensated for by the inhabitants on the condition that they agree to create more green spaces.

The willingness to pay for these areas has been proved by the questionnaire results of this study. If 200,000 houses are built as planned for the research area, the market volume will be US\$ 4,374,000,000 taking the average price (US\$ 21,870) as the basis. If houses are planned so that 7 m² of green space per capita will be owned, the customers will increase the prices by 20.7%. Thus, US\$ 4,374,000,000 of market volume will be accomplished with 165,682 houses. This number has been estimated as 10 m² of green space per capita for approximately 154,014 houses and 14 m² of green space per capita for approximately 149,641 houses. According to the calculations, if the number of houses in the research area reaches 150,000 by 2010, there will be no loss in the total market volume. Furthermore, the number of houses targeted in the 1991 plan decisions will be accomplished by approximately 50% more than planned and the amount of green spaces will increase at an acceptable level.

Despite these findings, due to high rents the conditions needed to decrease the number of houses in the research area have not yet been established. Having reached saturation point in terms of housing demand, not only the number of houses but also the prices will decrease. Today, it might be acceptable that the current dynamic and high market volume of the housing market

will continue to exert its effects for some time. However, we should not neglect the fact that it could be too late. Urban life may be ruined to such an extent that it cannot be compensated for in the future. If the responsible authorities take the requests of habitants into consideration and from now on reflect them within their planning decisions, the following can be achieved:

* According to demand, houses with suitable density and structure can be built.

* Applying contemporary norms while planning urban areas will increase opportunity and possibilities.

* The number and quality of areas with social facilities and especially green spaces can be developed according to the needs of the people.

* Developments in building technology and equipment can be reflected in houses constructed in time according to demands.

* The necessary conditions will be created so that resources for housing production will be used in balance and a sustainable market volume is developed.

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