Resident's Views and Perceptions of Urban Green Infrastructure in the Municipality of Paphos, in Cyprus Island

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Abstract. The primary goal of urban parks and green spaces is to provide ecosystem services not only for the people that use them but also for the entire urban population. So far, few studies have recorded the views of residents about parks and urban green spaces in Cyprus island. The present paper uses a structured questionnaire to record the views of Paphos residents, concerning the urban parks and green spaces in their municipality. More specifically, the residents were asked to evaluate the local parks and green spaces as regards their number and size, suitable design, safety for children, the variety and care of plants, and the facilities for people with disabilities. They were also asked to record problems such as noise pollution, mess from companion animals and unpleasant odors. The residents' satisfaction regarding the local authorities and their contribution towards improving parks and green spaces was also evaluated to some extent. The residents' answers led to useful proposals that could be adopted by the local authorities to manage the green infrastructure of the city and in order to meet the daily and future needs of the people who visit parks and urban green spaces

Keywords: urban parks; green spaces; residents' views; questionnaire; Municipality of Paphos; Cyprus island.

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1 Introduction

The "urban green infrastructure" as a concept emerged the last two decades including not only urban green spaces, parks, gardens, woodlands, nature areas, green streets and avenues [1], but also as the strategically planned networks of high quality designed, natural and semi-natural areas, including, other environmental features such as waterbodies, planned and managed to deliver a wide range of ecosystem services to their users and to protect biodiversity in urban settings [2, 3].

The urban green areas constitute indicators of sustainability, which need to be considered in city development and policy [4]. Developing more sustainable cities is not just about improving the abiotic and biotic aspects of urban life, it is also about the social aspects of city life, such as people's satisfaction, experiences, and perceptions of their everyday environments [5]. Attention to green spaces of the urban structure is still poor. Low appreciation of green spaces is also reflected in the cuts of budget of many towns [6]. However, it is argued that urban green infrastructure is a topic of strategic importance for the quality of life particularly in areas that have become importantly urbanized [7].

For people living in large and dense areas a good quality of life depends largely on the quality of the urban environment. The influence of urban green areas in environmental quality is recognized in most developed countries [8].

Parks also constitute a space for socialization and collaboration between residents. Another important role of green infrastructure is to strengthen communities and make cities and neighborhoods more attractive places to live and work in [9].

It is important, however, to understand the preferences of residents and their satisfaction in relation to green infrastructure in their neighborhood [10]. The amount of green spaces in close distance to places where people live, has a significant relation to their perceived quality of wellbeing. Thus, this relation might be explained by the fact that the increased presence of urban green spaces is likely to increase their use by the public [11].

Some previous studies carried out in various European countries underline the influence of urban parks and green spaces on local residents [12]. Whereas, Cypriot cities do not have the green areas they should have [13]. Therefore, there is a lack of knowledge concerning this subject.

The aim of the present study was to investigate the residents' perceptions, preferences and satisfaction about the urban green infrastructure of the municipality of Paphos in Cyprus island, evaluate the importance of green areas for the residents' wellbeing and suggest management improvements.

2 Materials and methods

2.1 Study area

Paphos, is a coastal city in the southwest of Cyprus (34°46′N 32°25′E) and lies on the Mediterranean coast, about 50 km (30 min) west of Limassol (the biggest port on

the island). The city of Paphos, with more than 35,961 inhabitants, has a limited number of parks and green spaces.

The lack of urban planning when developing the town of Paphos, coupled with severe degradation of public spaces, as it took place in the past decades, dictates the creation of a unified system of green spaces able to improve the micro-climate of the town, and result in achieving biodiversity preservation goals [14].

2.2 Methodology

Simple random sampling was used due to its simplicity, since it requires the least possible knowledge of the population compared to other methods [15]. The estimation of the proportion of the population and the estimation of the standard error of the proportion of the population s_p, were given by the formulas of simple random sampling [16]. Separate pre-sampling of 50 individuals was carried out ~~in the two researches~~ in order to calculate the size of the sample, which was estimated for every quantitate and qualitative variable according to the formulas of simple random sampling, where t = 1.96 and e = 5% [17]. The sample was estimated to 400 inhabitants for possibility (1-α)100=95%, e=0,049.

Hierarchical Log-linear Analysis was used to examine the four groups of variables. Prior to the application of Hierarchical Log-linear analysis, the expected frequencies in the contingency table, were examined [18]. Classes were grouped together in order to satisfy the criteria mentioned by Tabachick and Fidell [19]. For the data analysis the Statistical Package for Social Sciences was used (SPSS 16).

3 Results

3.1 Demographic profile of the respondents

During the interviews, the residents were initially asked about their demographic profile. As shown in Table 1, they are mainly men, public servants with upper secondary education.

3.2 The residents' well-being is related with the use of parks and green spaces

People living in dense urban areas perceive benefits and enhance their well-being by visiting green spaces [20]. According to the first question of the survey, the residents of Paphos evaluated rigorously the parks and urban green spaces of their municipality. Half of them (43.5%) found them as mediocre, and about one to four (26.3%) evaluated them as good and (6.8%) very good or very bad (6.5%).

According to the results most of the residents (34%) visited urban green spaces rarely and 26.5%, sometimes per month, 21% visit the green spaces sometimes per week and 18.5% more than once per year.

Most of the residents (66%) of Paphos considered that the best season for visiting green spaces is mainly in spring. Less residents visit parks in summer (19.5%), autumn (8.8%) and winter (5.8%).

Their visits were usually short and lasted between 15 and 30 min (32.3%) or 30 and 60 min (32.8%). Less visitors (16.5%) stayed in the park for more than an hour having leisure time with their children. Some visitors (15%) stop at the park for less than thirty minutes of isolation and walking, while 3.5% did not answer the question.

Table 1. Demographic features of the respondents

Gender	male	Female		
	65.3%	34.8%		
Age	18-30	31-40	41-50	> 50
	49.3%	25.8%	15.0%	10.0%
Marital	unmarried	Married	divorced or widowed	
Status	47.8%	45.3%	7.0%	
Childhood				
without children	one child	two children	three children	more than three
49.8%	15.8%	17.5%	12.0%	5.0%
Educational	primary school	lower secondary	technical school	
Level	3.3%	1.8%	10.8%	
	upper secondary	technological ed.	university	
	45.3%	7.3%	31.8%	
Profession				farmers or live-
	private employee	public servants	self-employed	stock farmers
	24.5%	33.0%	7.5%	3.0%
	students	pensioners	housewives	unemployed
	17.3%	3.3%	1.0%	10.5%
Annual	≤ 5.000 €	5.001-10.000 €	10.001-20.000 €	
Income	14.3%	12.5%	21.3%	
	20.001-30.000 €	> 30.000 €	No answer	
	12.3%	8.0%	31.8%	

The residents of Paphos were then asked about their satisfaction with their perceived wellbeing in their municipality and 54.3% stated that they were satisfied, 18.8% very satisfied and 5% absolutely satisfied. Only one to six (15.3%) of the respondents were less satisfied or 6.8% not at all satisfied with their wellbeing in the Municipality of Paphos.

Through the application of Hierarchical Log-linear analysis, in four cases after the removal of the third-class degree of correlation, was established that the most appropriate model was the one which included the impact and the interaction of the variables divided by two.

To the variables 'evaluation of green spaces', 'duration of visit' and 'satisfaction with the wellbeing' Hierarchical Log-linear analysis was applied where we have no interaction per 3 criteria, because the X^2 for Pearson's test is 0.164 with probability (p)= 0.921 and because the X^2 likelihood ratio is 0.166 with probability (p)= 0.920. With the application of Hierarchical Log-linear analysis to the data for the municipality of Paphos the relations are:

The residents evaluated the parks and urban green spaces as very good or good, they visit them sometimes per week or per month and they are absolutely or very satisfied with their quality of life. On the contrary the residents found the park and green spaces in their municipality as mediocre to very bad, they visit them rarely or sometimes per year and they are less or not at all satisfied with their wellbeing.

Additionally, residents were asked to identify their perceived sense of crowding and the possible disturbance caused by other visitors in the park. Most of them (62.8%) noted that they enjoyed the presence of other visitors; while, 22% of them were indifferent about the crowd. Eventually, only 10.5% of the residents specified that they were disturbed by the presence of other people and a few of them (2.8%) responded that they were disturbed by "something else".

Moreover, parks and green spaces were evaluated as bad places to spend time "alone", "with your family", "your friends" or "your mate" (Table 2).

Table 2. Evaluation of the parks in the Municipality of Paphos according to the type of companionship at the moment of the visit

	Very good	Good	Bad	Very bad	No answer
Alone	9.0%	32.3%	40.0%	15.3%	3.3%
With your mate	10.3%	28.5%	38.3%	18.8%	4.3%
With your friends	10.0%	34.5%	44.5%	9.0%	2.0%
With your family	12.5%	32.8%	35.5%	13.0%	6.3%

3.3 Satisfaction with the existing infrastructures in the parks and green spaces

The residents were also asked to rate the level of importance and satisfaction with the existing conditions in the parks and green spaces via a 5-points Likert scale (1 being the most negative value and 5 being the most positive value). Results are reported in Table 3. Most residents were of the opinion that the number of urban green spaces in their municipality were either mediocre or insufficient (41.3% και 30% respectively). The total area of existing green spaces was also assessed as mediocre or insufficient (38.5% and 42.3% respectively) and also the same assessment took place concerning their architectural design (42.5% και 28.3%). With more positive view the residents evaluate the distribution of green spaces in their municipality (41% mediocre, and 21.5% good), their accessibility (good 39.8% and mediocre 38%), and their satisfaction with the activities performed by municipality (44% very satisfied and 24.5% mediocre).

Regarding the variables 'number of parks', 'distribution of parks', 'number of visitors' and 'satisfaction with activities performed by the municipality' Hierarchical Log-linear analysis was applied, showing that there is no interaction per 3 or 4 criteria, because the X^2 for Pearson's test is 0.164 with probability (p)= 0.921 and because the X^2 likelihood ratio is 0.166 with probability (p)= 0.920. With the application of Hierarchical Log-linear analysis to the data for the municipality of Paphos the relations are:

- The residents who were absolutely or very satisfied with activities performed by the municipality, stated that the number of the parks and green spaces were absolutely or very sufficient, their distribution very good or good and that there were very big or big numbers of visitors in them.
- On the contrary the residents who were mediocre or not at all satisfied with activities performed by the municipality', claim that the numbers in the parks and green spaces were mediocre to absolutely insufficient, their distribution is mediocre to very bad within the municipality and they accept mediocre to little number of visitors.

Table 3. Evaluation of the characteristics of the parks and green spaces in the municipality of Paphos.

Number of green spaces				
absolutely sufficient	sufficient	mediocre	insufficient	absolutely insufficient
5.0%	16.8%	41.3%	30.0%	7.0%
Total area of existing green spaces				
absolutely sufficient	sufficient	mediocre	insufficient	absolutely insufficient
2.5%	16.0%	50.3%	25.3%	6.0%
Distribution of green spaces in the municipality				
very good	good	mediocre	bad	very bad
3.8%	21.5%	41.0%	28.5%	5.3%
Accessibility of green spaces				
very good	good	mediocre	bad	very bad
6.3%	39.8%	39.0%	11.3%	3.8%
Number of visitors				
very big	big	mediocre	small	very small
3.0%	14.5%	37.8%	30.0%	14.8%
Architectural design				
absolutely satisfied	very satisfied	mediocre	a little satisfied	not at all satisfied
2.5%	17.3%	42.5%	28.3%	9.5%
Infrastructure available				
very good	good	mediocre	bad	very bad
2.5%	17.5%	47.3%	26.0%	6.8%
Cleanliness				
very good	good	mediocre	bad	very bad
4.8%	21.8%	44.3%	23.3%	6.0%
Plant care				
very good	good	mediocre	bad	very bad
4.0%	25.0%	45.0%	19.3%	6.8%
Children's playgrounds				
very good	good	mediocre	bad	very bad
3.3%	20.5%	48.5%	19.3%	8.5%
Sports facilities				
very good	good	mediocre	bad	very bad
3.5%	11.8%	40.5%	28.3%	16.0%
Safety for children				
very good	good	mediocre	bad	very bad
2.8%	19.8%	40.8%	23.3%	13.5%
Facilities for people with disabilities				
very good	good	mediocre	bad	very bad
2.8%	12.0%	36.5%	28.3%	20.5%

Presence of pets				
no problem	little problem	mediocre	big problem	very big problem
15.8%	22.5%	32.3%	23.5%	5.8%
Noise pollution				
no problem	little problem	mediocre	big problem	very big problem
5.5%	26.0%	38.5%	22.3%	7.8%
Unpleasant odors				
no problem	little problem	mediocre	big problem	very big problem
6.3%	21.3%	36.8%	26.5%	9.3%
Satisfaction with activities performed by the municipality				
absolutely satisfied	very satisfied	mediocre	a little satisfied	not at all satisfied
9.5%	24.5%	44.0%	19.8%	2.3%

The parks of the municipality did not receive good evaluation from the residents addressing their infrastructure facilities. More specifically, the available infrastructures in the parks (sits, kiosks etc.) were rated as mediocre (47.3%) and bad (26%), the cleanliness as mediocre (44.3%) and good (25%), plant care as mediocre (45%) and good (25%), the children's playground (48.5%) mediocre (40.5%) and bad, (28.3%) Sports facilities as mediocre (40.5%) and bad (28.3%), safety for children were also evaluated as mediocre (40.8%) and bad (28.3%) and the facilities for people for disabilities were assessed as mediocre 36.5% and bad 28.3% (Table 3).

To the variables 'cleanliness', 'plant care', 'Safety for children' and 'Sports facilities' Hierarchical Log-linear analysis was applied and showed that there were no interaction per 3 or 4 criteria, because the X^2 for Pearson's test is 2.741 with probability (p)= 0.740 and because the X^2 likelihood ratio is 2.862 with probability (p)= 0.721. the relations are:

- The residents stated as very good and good the safety for children; while, they found that the cleanliness, the plant care and the sport facilities are very good and good.
- On the contrary the residents who stated that the safety for children was mediocre to very bad, evaluated the plant care, cleanliness and sports facilities as mediocre to very bad.

According to the evaluation of the problems in the parks the residents regard unpleasant odors, the presence of animals and noise pollution were mainly mediocre (Table 3).

For the variables 'their perceived sense of crowding', 'the presence of animals', 'noise pollution', and unpleasant odours' Hierarchical Log-linear analysis was applied representing no interaction per 3 or 4 criteria. There is no interaction per 4or 3 criteria, because the X^2 for Pearson's test is 3.995 with probability (p)= 0.780 and due to the fact that the X^2 likelihood ratio is 4.049 with probability (p)= 0.774. the relations are:

The residents who stated that the people around amused them, found that problems like noise pollution, the presence of companion animals and the unpleasant odors are mediocre to not regarded as problems.

On the contrary the residents who consider that the people around disturbed or are indifferent found the problems like noise pollution, the presence of companion animals and the unpleasant odours, as very big or big.

4 Conclusions

The city of Paphos has a limited number of parks and green spaces because of the absent of proper urban planning when the city Paphos was under development [14].

This study offers a general understanding of public perceptions regarding urban green spaces and parks from the residents' point of view. The fact that most of the residents evaluated the green infrastructure of their city as mediocre, bad or very bad is an indicator that there is a problem encountered also in other European countries like Italy [12].

Half of the residents stated that were satisfied or little satisfied with their life in the city. Furthermore, the findings revealed that the residents' well-being is related to their satisfaction with urban green infrastructures. The residents that considered themselves satisfied with their life, visited parks more frequently and for longer periods than the residents that were not satisfied with their life. Therefore, encouraging people to visit green spaces and parks can make them feel more satisfied with their lives.

Through the Hierarchical Log-linear analysis, it became evident that the existing green spaces were mediocre to insufficient in number, size, design, and distribution for about the half of the study population.

The results of the present study can be used as a valid tool in the planning, design and management of urban green spaces, thus promoting the adoption of participatory processes in decision making by the local authorities [21].

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