



The role of urban parks for the sustainable city

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Abstract

International efforts to preserve the natural environment are mainly concerned with large, bio-diverse and relatively untouched ecosystems or with individual animal or vegetal species, either endangered or threatened with extinction. Much less attention is being paid to that type of nature close to where people live and work, to small-scale green areas in cities and to their benefits to people. Increasing empirical evidence, however, indicates that the presence of natural areas contributes to the quality of life in many ways. Besides many environmental and ecological services, urban nature provides important social and psychological benefits to human societies, which enrich human life with meanings and emotions. The main concern of this paper is to address the importance of urban nature for citizens' well being and for the sustainability of the city they inhabit. Some results of a survey conducted among visitors of an urban park in Amsterdam (The Netherlands) are presented and discussed. The issues investigated concern people's motives for urban nature, the emotional dimension involved in the experience of nature and its importance for people's general well being. Results confirm that the experience of nature in urban environment is source of positive feelings and beneficial services, which fulfill important immaterial and non-consumptive human needs. Implications for the sustainability of the city will be analyzed and discussed.

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1. Introduction

International efforts to preserve the natural environment are mainly concerned either with large, bio-diverse and relatively untouched ecosystems or with individual animal or vegetal species, endangered or threatened with extinction. Less scientific—and political—attention is being paid, on the other hand, to that type of nature close to where people live and work, to small-scale green areas in cities, and to their benefits to urban dwellers. Cities' sustainability and

regeneration strategies mainly focus on man-made and built components of the urban environment. In comparison, attention to the natural components and the green spaces of the urban structure is still poor. Low appreciation of green spaces is also reflected in the recent cuts in the maintenance of budget of many towns (Tyrvaïnen and Vaananen, 1998).

It is argued, however, that urban parks and open green spaces are of a strategic importance for the quality of life of our increasingly urbanized society.¹ Increasing empirical evidence, in fact, indicates that the presence of natural assets (i.e. urban parks and forests,

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¹ Two-third of all Europeans now reside in towns or cities (e.g. Girardet, 1992; EEA, 1995, 1998).

green belts) and components (i.e. trees, water) in urban contexts contributes to the quality of life in many ways. Besides important environmental services such as air and water purification, wind and noise filtering, or microclimate stabilization, natural areas provide social and psychological services, which are of crucial significance for the livability of modern cities and the well being of urban dwellers. A park experience may reduce stress (Ulrich, 1981), enhance contemplativeness, rejuvenate the city dweller, and provide a sense of peacefulness and tranquility (Kaplan, 1983). The hypothesis about the restorative function of natural environments has been tested in many empirical studies. Ulrich (1984), for example, founded that hospital patients who could look out on trees and nature from their windows recovered more quickly than those whose views were restricted to buildings. Later studies have lead to similar results, strengthening the assumption that natural environments have a positive influence on psychological and mental health. Contemporary research on the use of urban parks and forests, for example, verifies beliefs about stress-reduction benefits and mental health (Hartig et al., 1991; Conway, 2000). In a survey among park's visitors a significant relation was found between use of the parks and perceived state of health: those who used local parks frequently were more likely to report good health than those who did not (Godbey et al., 1992). Schroeder (1991) has shown that natural environments with vegetation and water induce relaxed and less stressful states in observers compared with urban scenes with no vegetation. This ability of natural elements to function as "natural tranquillizers" may be particularly beneficial in urban areas where stress is an all too common aspect of daily living (van den Berg et al., 1998). Beside aesthetic, psychological and health benefits, natural features in cities can have other social benefits. Nature can encourage the use of outdoor spaces, increases social integration and interaction among neighbors (Coley et al., 1997). The presence of trees and grass in outdoors common spaces may promote the development of social ties (Kuo et al., 1998). Kuo et al. (1998) also found out that greenery helps people to relax and renew, reducing aggression. Natural environments can also be seen as a domain of active experience providing a sense of challenge, privacy and intimacy, aesthetic and historical continuity. Beside the social and psychological benefits mentioned above, the functions

of urban nature can provide economic benefits for both municipalities and citizens. Air purification by trees, for example, can lead to reduced costs of pollution reduction and prevention measures. Furthermore, aesthetic, historical and recreational values of urban parks increase the attractiveness of the city and promote it as tourist destination, thus generating employment and revenues. Furthermore, natural elements such as trees or water increase property values, and therefore tax revenues as well (Tagtow, 1990; Luttik, 2000).

Beside positive effects, parks may play a negative role on people's perceptions. Some surveys have reported residents' feelings of insecurity associated with vandalism, and fear of crime in deserted places (Melbourne Parks, 1983; Grahn, 1985; Bixler and Floyd, 1997). However, far larger is the empirical evidence of the positive functions of green areas; a study by Kuo and Sullivan (2001) even shows that residents living in "greener" surroundings report lower level of fear, fewer incivilities, and less aggressive and violent behavior.

This paper addresses the importance of urban nature for the well being of the citizens and for the sustainability of the city they live in.

At this point, a brief explanation of what a sustainable city is supposed to be seems necessary.

1.1. The sustainable city

There is no accepted definition of a sustainable city, and as it happened with the concept of sustainable development, many interpretations exist of which characteristics a city should present to be considered sustainable, and many are the criteria and indicators developed to assess them. They often include aspects of urban planning and community development (see www.rec.org).

Some cities have been developing their own sustainability indicators, to try and measure quality of life issues in a meaningful way. This has usually been done as a result of Local Agenda 21 consultations or in response to national government guidelines.² Beside environmental criteria (water and energy saving, waste

² Local Agenda 21 is a document adopted by more than 178 Governments at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, 3–14 June 1992.

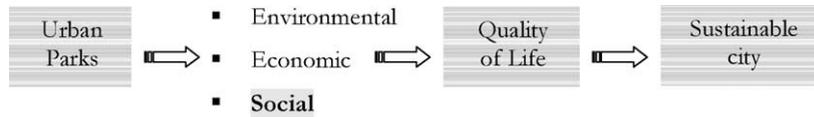


Fig. 1. Urban parks and city sustainability.

recycling, transportation, etc.), quality of life issues are central to all the various definitions of a sustainable city. Aspects such as “amount of public green spaces per inhabitant”, “public parks” and “recreation areas” are often mentioned as important factors to make the city liveable, pleasant and attractive for its citizens.

It is strongly believed that 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, that is—among others—about people’s satisfaction, experiences and perceptions of the quality of their everyday environments (see also Beer, 1994). In the context of this study, the relation between urban parks and city sustainability is addressed through the investigation of the value of urban nature as provider of social services essential to the quality of human life, which in turn is a key component of sustainable development (see also Prescott-Allen, 1991). Fig. 1 illustrates the conceptual links and relationship assumed between urban park and city sustainability.

Why do people need urban parks? Which benefits do they get from visiting them? And, do these benefits really affect their quality of life? These are the main research questions addressed by this study. Issues investigated concern the social demands for parks among urbanities, the emotional component involved in their experience of nature and the benefits perceived. Results from a survey study conducted in The Netherlands, in the summer 2001, will be presented and their implications for city sustainability discussed.

2. Materials and methods

Both secondary (literature review and desk research) and primary data have been gathered. Primary data have been collected through a survey conducted among visitors of the Vondelpark, the most popular park of Amsterdam (The Netherlands). Created in 1865, the park attracts about 10 millions visitors each

year. It extends over 48 ha surface and hosts 4400 trees of 127 different species. Since 1996 it benefices the status of monumental park to be preserved for future generations.

The survey was set up after a small pilot study. Respondents were randomly selected among the visitors of the park,³ regardless of their social extraction or professional background. People approached in the park, were first informed about survey’s objective and answering procedure. Those willing to participate were given the questionnaire with a pre-paid envelope to return the questionnaire, and invited to fill it in during their stay at the area, so that the answers would reflect their immediate experiences. Questionnaires have been distributed on both weekdays and weekends, in different hours of the day, and in different parts of the parks. Responses formats were either closed (dichotomous, multiple choices), in ranking scale or open. The questionnaire addressed a broad range of issues, ranging from motives for nature, nature’s images, perception of environmental functions, environmental attitudes and willingness-to-pay questions. For the purpose of this paper, however, the analysis will be limited to the following issues:

- (i) Motives for nature: Why do people visit the park? In what sort of activities do they engage, and which needs do these activities fulfill?
- (ii) Emotional dimension and perceived benefits: Which feelings do people experience in the park, how important are for people’s general well being, and why?
- (iii) Public satisfaction with the amount of green areas in cities: Are people satisfied with the amount of green in their city?

The study has mainly an exploratory character, and no confirmatory nor predictory aims were set. The

³ The only selection criteria was that they had to live in Amsterdam.

main interest driving the data analysis was to unfold people's thoughts and perceptions in a qualitative way, rather than to establish quantitative relations or identify group-dependent variables. While basic descriptive statistics has been applied, more attention has been paid to the qualitative analysis and interpretation of the richness of the data obtained. Nonetheless, results provide interesting information to city-planners and urban developers about the role and importance of public green space for the citizens' daily well being and quality of life.

3. Results

In total, 750 questionnaires were distributed. A relatively high percentage of questionnaires (62.3%) was returned, often accompanied by enthusiastic comments and encouraging words (i.e. a postcard, or a poem). The sample size is $N = 467$, prevalently constituted by female (52.7%). Age classes ranged from 15 to 65 and the mean age of the total sample is about 42 years (S.D. = 15.19).

Both quantitative and qualitative analytical techniques have been used to analyze and interpret the

data collected. Closed questions have been subjected to basic descriptive statistics, analysis of variance and factor analysis, while the open question has been content analyzed.

In the following paragraphs results obtained will be presented and discussed.

3.1. Motives for nature

People's motives to visit natural areas and the various activities they carry out reflect the demands people place on natural areas, and the needs they expect to be fulfilled. This information can help decision makers to formulate strategies in tune with public needs and expectations. To collect data about people's motives to visit the park, the respondent was asked: "Why do you come here?". The following alternative options were given. To sport, to meet others, to play with children, to walk the dog, to listen and observe nature, to contemplate and meditate, to get artistic inspiration, and other. A frequency analysis of people's motives to visit nature shows that "To relax" is the motive most frequently mentioned by the visitors, accounting for the 73% of the answers (Fig. 2). This result should not come with surprise: in urban contexts the need to

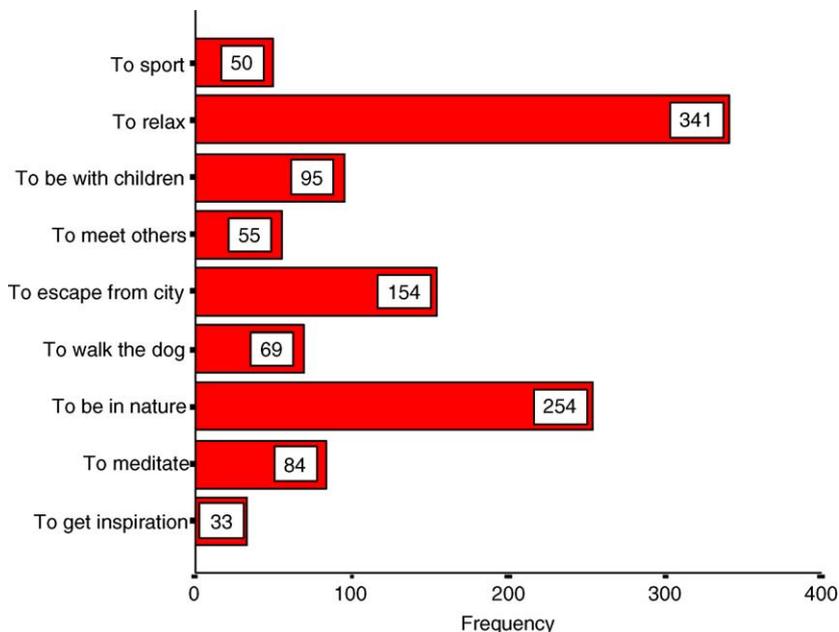


Fig. 2. Motives for nature: frequency distribution.

relax and step away from the hectic rhythm of the city is particularly strong. As many of us have surely experienced, in the silent and timeless atmosphere of natural environments one can forget the daily worries, breathe fresh air and relax, both mentally and physically.

“To listen and observe nature” (shortened as “To be in nature” in Fig. 2 for editorial convenience) constitutes another important motive to visit the park (54.4%). This motive reflects a pure and disinterested need to feel nature around, to observe its elements, and experience them through the senses (i.e. smell, hearing, and sight). The motive “To escape from the city” is mentioned in 32.2% of the answers returned. This motive indicates that the park constitutes a sort of “oasis”, a refuge far from the traffic, the noise and the pollution of the city. Many respondents also mentioned the need to see other things than cars, buildings and concrete. In these terms, urban nature offers the possibility to escape not only from the

worries and the routine of everyday life, but also from the physical contours of the city. Findings also indicate that almost 20% of the respondents visit the park “To be with the children”. In this respect, nature fulfils important social functions, strengthening family ties and providing safe places for children to play, which are increasingly scarce in modern cities. The benefits deriving from these functions accrue to both parents and children. It has been suggested that the senses of challenge and adventure children experience in nature contribute positively to their development (Cornell and Hadley, 2001). The reasons “To contemplate and meditate”, “To meet others”, “To walk the dog”, “To sport” and “To get artistic inspiration” follow in decreasing frequency. These motives reflect needs to experience solitude and to be on your own, as well as to meet other people and engage in social relations.

No significant gender-related differences were found with regards to the motives of the visit. On

Table 1
Motives: age-related differences (ANOVA)

	Sum of squares	d.f.	Mean square	F	Significance
To sport					
Between groups	1.472	5	0.294	3.144	0.008*
Within groups	43.174	461	0.094		
Total	44.647	466			
To relax					
Between groups	4.079	5	0.816	4.277	0.001**
Within groups	87.925	461	0.191		
Total	92.004	466			
To be with children					
Between groups	6.985	5	1.397	9.376	0.000**
Within groups	68.689	461	0.149		
Total	75.675	466			
To meet others					
Between groups	1.351	5	0.270	2.642	0.023*
Within groups	47.171	461	0.102		
Total	48.522	466			
To listen and watch nature					
Between groups	7.865	5	1.571	6.707	0.000**
Within groups	1–7.994	461	0.234		
Total	115.850	466			

* Significant at $P < 0.05$.

** Significant at $P \leq 0.001$.

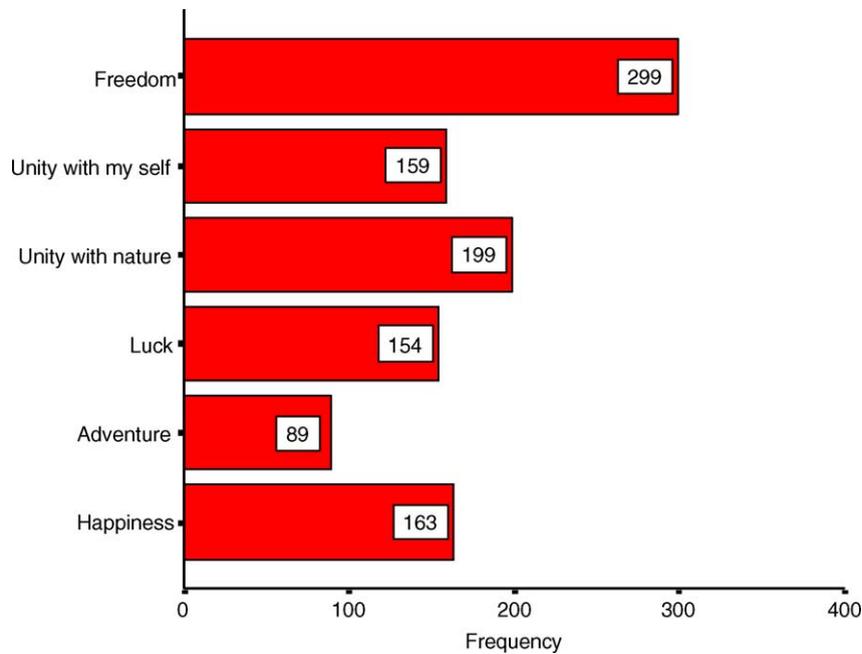


Fig. 3. Emotions experienced: frequency analysis.

the other hand, various age-related differences were found (see Table 1).

While sporting and meeting other people apply more to the youngest age-categories, the other motives and activities—relax, stay with children and contemplating nature—seem preferred by adult and elderly visitors.

3.2. The emotional dimension of the park's experience

Another important research interest of this study was to explore the emotional dimension of nature-based experiences, the benefits people perceive and the relation with their well being in general. It is assumed, in fact, that the feelings and the emotions we perceive in the natural environment form a relevant part of our experience in it. Respondents were asked to answer the following questions:

- “Which feeling does nature evokes you?”. This question had a multiple response format. The following options were given: Freedom, Luck, Adventure, Happiness, Unity with my self, Unity with nature, and Other—where the respondent

could add other feelings not included in the given list.

- “How important are these feelings for your daily well being?”. Responses are rated along a 1–5 points measurement scale (1, not important at all; 5, essential); and Why? This was an open question where the respondent could motivate his/her answer.

Frequency analysis of the answers obtained about the feelings experienced (Fig. 3) shows that “Freedom” is by far the feeling most frequently mentioned, accounting for 64% of the answers.

The feeling of “Unity with nature” accounts for almost 43% of the data obtained. The feeling of being one unity with nature implies harmony with it, and the ability to live with extra-physical reality as one belonged to it. The condition of feeling part of nature, forming a unity with it implies a sort of transcendence from the ego and the self (see Maslow, 1971). “Happiness”, “Unity with my self” and “Luck” follows, and “Adventure” is the less mentioned feelings people experience in the park. Other feelings often added by the respondents were silence, beauty and tranquility. Only one respondent mentioned the feeling of fear for wild animals, while no feelings of insecurity

Table 2
Feelings in nature: factor resolution

Feeling	Component	
	Recreation	Spirituality
Freedom	0.61	
Happiness	0.61	
Adventure	0.59	
Luck	0.69	
Unity with my self		0.79
Unity with nature		75
Total variance explained (%)	28.8	18.6

Note: Extraction method: principal component analysis. Rotation methods: varimax with Kaiser normalization. No factor restriction. All factors loading >0.40 are included.

were mentioned. Performance of ANOVA showed no significant differences among male and female with regard to the emotional experiences. On the other hand, adventure was found highly significantly related ($P < 0.001$) to age: $F(5, 461) = 8.012$, $P = 0.000$.

Performance of factor analysis showed the presence of two principal components: recreation and spirituality (Table 2).

The items loading under this first factor are “Freedom”, “Happiness”, “Adventure” and “Luck”. The recreational dimension is identified in virtue of the fact that the experience of nature is source of positive feelings, which re-create the spirit. With the term “recreation” we do not refer to the particular activities people engage in during their stay in nature, but rather to the sense of relaxation and re-generative enjoyment that the very experience of nature promotes. The second dimension emerged has been called *Spirituality* and “Unity of my self” and “Unity with nature” are the feelings related to it. This dimension is believed reflect the need to reach higher states of mind, to elevate the soul and the mind beyond the daily thoughts, to feel part of a bigger whole and in harmony with it. The tranquil atmosphere of the park inspires reflection, meditation, and a general feeling of harmony between one self and the surrounding.

Respondents were then asked to rank the importance of these feelings and emotions for the general well being along a 1–5 points measurement scale (1, not important at all; 2, not important; 3, important; 4, very important; 5, essential). A frequency analysis shows that 94% of the responses range from important to essential, with an average scored value of 3.74

(S.D. = 89). The finding indicates that the emotional experience is perceived as a very important contribution to people’s well being. In the following paragraph, more will be said about why is that so. No statistically significant group differences were found.

3.2.1. Open answers

Another important aim of the research was to explore the reasons why the experience of nature was—or not—perceived as important for people’s general well being. Respondents were asked to articulate their personal thoughts and valuations in an open question. In the questionnaire a blank space was left to leave the respondents the freedom to express their thoughts with their own words. Answers returned were often articulated in long sentences, with many enthusiastic and deep thoughts. Analysis of the open responses consisted on a case-by-case reporting of the answers given by respondents, and on their detailed content analysis. Answers containing similar words or meaning were considered as addressing the same underlying motive, and thus grouped under the same representative theme. Table 3 summarizes the main themes found and the related representative arguments.

The restorative component reflects the perception that being in the natural environment is compensates the stress of daily life, and re-creates people’s psychophysical equilibrium. Evidences from experimental research show that natural environments are a powerful source of restorative experiences (Hartig et al., 1987, 1991). Among the key components of the restorative experience Kaplan and Kaplan (1989) mention escape, fascination, extent, action and compatibility. The amenity component represents the

Table 3
Open question: underlying dimensions

People’ answer	Dimension
I can recharge my batteries	Restorative
My psycho-physical equilibrium is restored	
I need nature to function good	
I can forget my daily worries	Amenity
I take a break from the stress of the city To step out from the routine of everyday	
It gives value and essence to life Nature is the basis of life We belong to nature	Spiritual

experience of nature as diversion from the everyday life, as a break from worries and responsibilities, as a visual diversion from cars and houses, as place to listen to other sounds than those of traffic and human voices. This component reflects the need to divagate from the routine of everyday life, to amuse and to engage in activities outside the psychical barriers of the city. Kaplan and Kaplan (1989) describe the sense of “Being away” as a state involving distancing oneself from negative distractions, or from one day to day work. Driver et al. (1991) mention the concept of “Temporary escape”, understood as passive or mental only, such as through meditation or gazing out a window at a pleasant natural view. The last component emerged from the content analysis of the open answers has been called spiritual. The arguments related to this spiritual component (see Table 2) depict nature as the primary source of energy, the original driving force, the basis and the very essence of human existence. Nature is perceived as a mystic energy giving sense to life, which enriches it and makes it fully worthy to be lived. As Thompson (2002, p. 65) also noted, “for many people in cities, the park is a place where nature may have a metaphysical or spiritual dimension”.

The last question the respondent was asked to answer was “Are there enough green areas in your city?”. The majority (almost 59%) of the responses indicated dissatisfaction with the amount of urban green currently present in the city.

4. Discussion and recommendations

The information emerged from the survey indicates that urban nature fulfils important immaterial and non-consumptive human needs. Results obtained accord with previous observations regarding people’s need to experience nature (Kaplan and Kaplan, 1989). People visit the park primarily because they want to relax. Renema et al. (1999) also found relaxation as an important need fulfilled in nature, along with fascination, beauty, peace and freedom. The needs to experience nature and to escape from the stressful rhythm of the city also constitute important reasons for people’s visits to the park. In a study about stakeholders’ perception of a city park respondents mentioned, among others, the value of “isolation from the din of the city” (Gobster, 2001). As Bishop et al.

(2001, p. 119) also recognises “green spaces in a city play an important role in helping residents and visitors to escape temporarily from the crowded streets and buildings: it provides a place to relax”. The sense of “escape from the city” has also been found among the most important benefits of wildlife experiences (Rossman and Ulehla, 1977). Furthermore, findings show that the experience of nature in the city is source of a large array of positive feelings to people. Freedom, Unity with nature, and Happiness are among the most frequently mentioned, along with beauty and silence. In Klijn et al. (2000), freedom and silence also appear as central values in people’s appreciation of nature. Coeterier et al. (1997) found that the feeling of being one with nature was specially evoked by landscapes with water.

But what is the relation between people’s emotional experiences and their well being? How does being in the park affect people’s sense of well being? Findings show that the feelings and the emotions evoked in the park are perceived by people as very important contributions to their well being. Direct benefits are perceived in terms of regeneration of psychophysical equilibrium, relaxation, break from the daily routine, and the stimulation of a spiritual connection with the natural world. All these emotional and psychological benefits contribute critically to the quality of human life, which in turn is a key component of sustainable development (see Prescott-Allen, 1991).

Despite their intangible and immaterial nature, these services provide clear benefits to people, whose loss can have serious socio-economic consequences. Failure to provide the restorative and psychological benefits of access to nature in the city, for example, could have substantial health costs in the long run (Thompson, 2002).

Therefore, valuation of the various amenities, social and psychological services of urban areas should be integrated into project assessments’ procedure and be properly accounted for in policy decisions and urban planning strategies. Alternative valuation exercises should be directed towards public debate, discursive and deliberative processes, able to articulate discussion of aesthetic, spiritual and moral values and to accommodate post-materialistic needs and value orientation (see Jamieson, 1998; Brown and Cameron, 2000; Chiesura and de Groot, 2003). Public valuation about user’s satisfactions and needs is important to

urban management (see also Burgess et al., 1988; Millward and Mostyn, 1988; Costa, 1993). In this respect, representation and participation of citizens in all aspects of urban life are critical, as a sustainable city has to be created by people themselves (Camagni et al., 1998). How can in fact a city be sustainable if it does not meet the needs of its citizens?

It is suggested that sustainability indicators for urban development should include more parameters about public spaces and green open areas, as well as indexes reflecting citizens' satisfaction and perception of their living environments. Results obtained also show that some differences in the reasons, activities and feelings experienced in the park are significantly related to people's age. City planners and urban designers should therefore take into account this variability, by managing green spaces in a diversified way, so as to fulfil the needs and expectations of all the segments of the population (children, families, elderly people, etc.).

5. Conclusions

In the context of this study, the role of urban parks as provider of social services and their importance for city sustainability has been addressed. Some results have been presented of a survey aimed at exploring the motives and perceptions of visitors of a Dutch urban park. Due to the small size of the sample analysed and the limited statistics performed, no universal conclusions can be consistently made about the role of urban parks in general. However, some conclusive remarks can be made.

First of all, urban nature fulfils many social functions and psychological needs of citizens, which make urban nature a valuable municipal resource, and a key ingredient for city sustainability. Secondly, different age-groups have different motives to visit the park and different activities they are going to undertake. Park's design and management, therefore, should take into account recreational requirements of all target groups (see also Roovers et al., 2002).

Valuation and assessment of these intangible services and benefits is of crucial importance in order to justify and legitimise strategies for urban sustainability. It is argued that valuation of their worth to society must start from the appraisal of the needs, wants and

beliefs of the individuals composing that very society. Public involvement, citizens' participation and a qualitative appraisal of their needs and interests are believed to help urban communities to articulate commonly shared values which, in turn, can serve as reference criteria for local planners to envision more sustainable city strategies.

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References

- Beer, A.R., 1994. Urban greenspace and sustainability. In: van der Vegt, et al. (Eds.), *Proceedings of a PRO/ECE-Workshop on Sustainable Urban Development: Research and Experiments*, November 1993. Dordrecht, The Netherlands.
- Berg, A., van den Top, I.M., Kranendonk, R.B., 1998. *Natuur wensen van stadsmensen (The Demands on Nature of Urban Citizens)* (in Dutch). IBN-DLO Rapport, Wageningen, The Netherlands.
- Bishop, I.D., Ye, W.S., Karadaglis, C., 2001. Experiential approach to perception response in virtual worlds. *Landsc. Plan.* 54, 115–123.
- Bixler, R.D., Floyd, M.F., 1997. Nature is scary, disgusting and uncomfortable. *Environ. Behav.* 29, 443–467.
- Brown, P.M., Cameron, L.D., 2000. What can we do to reduce over-consumption. *Ecol. Econ.* 1 (32), 27–42.
- Burgess, J., Harrison, C.M., Limb, M., 1988. People, parks and the urban green: a study of popular meanings and values for open spaces in the city. *Urban Stud.* 25, 455–473.
- Chiesura, A., de Groot, R.S., 2003. Critical natural capital: a socio-cultural perspective. *Ecol. Econ.* 44, 219–231.
- Coeterier, F., Ploeger, B., Schone, M.B., Buijs, A., 1997. *Beleving van de Wadden. Onderzoek naar waarden van bezoekers en bewoners (Perception of the Waddensea Area. Investigating the Values of Visitors and Inhabitants)* (in Dutch). Wageningen, DLO-Staring Centrum.
- Coley, R., Kuo, F., Sullivan, W., 1997. Where does community grow? The social context created by nature in urban public housing. *Environ. Behav.* 29, 468–494.
- Conway, H., 2000. Parks and people: the social functions. In: Woudstra, J., Fieldhouse, K. (Eds.), *The Regeneration of Public Parks*.
- Cornell, E.H., Hadley, D.C., 2001. Adventure as stimulus for cognitive development. *J. Environ. Psychol.* 21, 3.

- Costa, L., 1993. Popular Values of Urban Parks: A Case Study of the Changing Meaning of the Parque Do Flamengo in Rio de Janeiro. Ph.D. Thesis, University of Central London, London.
- Driver, B.L., Brown, P.J., Peterson, G.L., 1991. Benefits of Leisure. Venture Publishing.
- European Environment Agency (EEA), 1995. Europe's Environment: The Dobbris Assessment. Stanners, D., Bourdeau, P. (Eds.), Copenhagen.
- European Environment Agency (EEA), 1998. State of the European Environment. Copenhagen.
- Girardet, H., 1992. The GAIA Atlas of Cities: New Directions for Sustainable Urban Living. Anchor Books, New York.
- Gobster, P.H., 2001. Visions of nature; conflict and compatibility in urban park restoration. *Landsc. Urban Plan.* 56, 35–51.
- Godbey, G., Grafe, A., James, W., 1992. The Benefits of Local Recreation and Park Services. A Nationwide Study of the Perceptions of the American Public. College of Health and Human development, Pennsylvania State University, Pennsylvania.
- Grahn, P., 1985. Man's Needs for Urban Parks, Greenery and Recreation. Institute for Landscape Planning, Swedish Agricultural University, Alnarp.
- Hartig, T., Mang, M., Evans, G.W., 1987. Perspectives on wilderness: testing the theory of restorative environments. In: Easley, Passineau (Eds.), *The Use of Wilderness for Personal Growth, Therapy, and Education*. Estes Park, CO.
- Hartig, T., Mang, M., Evans, G., 1991. Restorative effects of natural environments experiences. *Environ. Behav.* 23, 3–26.
- Jamieson, D., 1998. Sustainability and beyond. *Ecol. Econ.* 2–3 (24), 183–192.
- Kaplan, R., 1983. The analysis of perception via preference: a strategy for studying how the environment is experienced. *Landsc. Urban Plan.* 12, 161–176.
- Kaplan, S., Kaplan, R., 1989. *The Experience of Nature. A Psychological Perspective*. Cambridge University Press, Cambridge, 340 pp.
- Klijin, J.A., Buij, A.E., Dijkstra, H., Luttk, J., Veeneklaas, F.R., 2000. The Forgotten Values of Nature and Landscape. Use and Appreciation Measured in Money and Emotional Value. Alterra Green World Research, Wageningen.
- Kuo, F.E., Sullivan, W.C., 2001. Environment and crime in the inner city. Does vegetation reduce crime. *Environ. Behav.* 3 (33), 343–367.
- Kuo, F.E., Bacaioaca, M., Sullivan, W.C., 1998. Transforming inner city landscapes: trees, sense of safety, and preferences. *Environ. Behav.* 1 (30), 28–59.
- Luttk, J., 2000. The value of trees, water and open spaces as reflected by house prices in the Netherlands. *Landsc. Urban Plan.* 48 (3–4), 161–167.
- Maslow, A.H., 1971. *The Farther Reaches of Human Nature*. The Viking Press, New York.
- Melbourne Parks. A Survey of the Use of Selected Sites, 1983. Melbourne and Metropolitan Board of Works, Ministry of Planning and Environment, Melbourne.
- Millward, A., Mostyn, B., 1988. *People and Nature in Cities: The Social Aspects of Planning and Managing Natural Parks in Urban Areas*. Urban Wildlife, Nature Conservancy Council, Peterborough.
- Prescott-Allen, R., 1991. *Caring for the Earth: A Strategy for Sustainable Living*. IUCN, The World Conservation Union, United Nation Environmental Program, Worldwide Fund for Nature, Gland, Switzerland.
- Renema, D., Visser, M., Edelmann, E., Mors, B., 1999. De wensen van Nederlanders ten aanzien van natuur en groen in de leefomgeving (The Wants of the Dutch for Nature and Green in the Living Environment) (in Dutch). Wageningen, DLO-Staring Centrum.
- Roovers, P., Hermy, M., Gulinck, H., 2002. Visitor profile, perceptions and expectations in forest from a gradient of increasing urbanization in central Belgium. *Landsc. Urban Plan.* 59, 129–145.
- Rossmann, B.B., Ulehla, Z.J., 1977. Psychological reward values associated with wilderness use. *Environ. Behav.* 9 (1), 41–65.
- Schroeder, H.W., 1991. Preferences and meaning of arboretum landscapes: combining quantitative and qualitative data. *J. Environ. Psychol.* 11, 231–248.
- Tagtow, R., 1990. The need for urban forests. *Am. City County* 105, 74–75.
- Thompson, C.W., 2002. Urban open space in the 21st century. *Landsc. Urban Plan.* 60, 59–72.
- Tyrvaainen, L., Vaananen, H., 1998. The economic value of urban forest amenities: an application of the contingent valuation methods. *Landsc. Urban Plan.* 43, 105–118.
- Ulrich, R.S., 1981. Natural versus urban sciences: some psycho-physiological effects. *Environ. Behav.* 13, 523–556.
- Ulrich, R.S., 1984. View through a window may influence recovery from surgery. *Science* 224, 420–421.

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