

# Development and Management of Green Spaces in European Cities: A Comparative Analysis\*

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## Abstract

This paper aims to compare the present state and availability of urban green spaces in various European cities. The results of a factor analysis applied on the information gathered in extensive survey questionnaires show that the availability of “urban green” is high in metropolises and big cities, whereas availability of “natural green”, such as forests and agricultural areas, is high in medium sized and small cities.

## 1. Introduction

This paper is part of the project “Development of Urban Green Spaces to Improve the Quality of Life in Cities and Urban Regions” (URGE\*\*\*) and considers urban green spaces as an important contribution to a sustainable development of cities. It aims to develop interdisciplinary tools for scientists as well as for planners all over Europe concerning the planning of urban green spaces. The main question of the project is how urban green spaces (both qualitative and quantitative) can be developed from ecological, economic,

social and planning perspectives, and which tools and instruments are helpful in this respect. The project includes the elaboration and testing of an interdisciplinary catalogue of methods and measures, based on experience from various European cities. This catalogue of methods will be validated by comparing case studies in four European “partner cities” and twelve European “reference cities”. The knowledge gained will be used to improve existing green spaces and to optimise urban green policies in Europe (URGE, 2002).

This study is complementary to the URGE project. We analyze several European cities, including reference cities to obtain additional information on their features of urban green. We will compare the present state and availability of urban green spaces in these European cities by means of factor analytic methods. In the next section, we will describe “urban green” and discuss the importance of urban green for the quality of life. In Section 3 we will give a description of our study and the data obtained from the extensive survey questionnaires and we will

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compare and evaluate the present state and availability of urban green spaces based on the application of a factor analytic method. In the final section, we will discuss the policy relevance for the development and management of urban green spaces.

## 2. Urban Green Spaces and its Importance for Quality of Life

Since this paper is related to the URGE project, the definition of urban green space that is used here is almost similar to the one that is used within the URGE project, and has been formulated by ecologists, economists, social scientists and planners. They agreed on the following definition:

*By urban green spaces we understand public and private open spaces in urban areas, primarily covered by vegetation, which are directly (e.g. active or passive recreation) or indirectly (e.g. positive influence on the urban environment) available for the users.*

The provision, design, management and protection of urban green spaces are at the top of the agenda of sustainability and liveability. Urban green spaces play a key role in improving the liveability of our towns and cities. The quality and viability of cities largely depend on the design, management and maintenance of green as well as open and public spaces in order to fulfil their role as an important social and visual focus. Urban green spaces are not only an important component in housing areas, but also in business, leisure, retail and other commercial developments.

The quality of green spaces helps to define the identity of towns and cities, which can enhance their attraction for living, working, investment and tourism. Therefore, they can contribute positively to the competitiveness of cities. From the **social perspective**, particular types of green space can offer a bigger diversity of land uses and opportunities for a wide range of activities, help to foster active lifestyles, and can be of real benefit to health. Well-managed and maintained green spaces contribute to social justice by creating opportunities for people of all ages to interact (Scottish Executive, 2001). Urban

green spaces emphasize the diversity of urban areas by reflecting the different communities they serve and meeting their varying needs. They enhance cultural life by providing venues for local festivals, civic celebrations and theatrical performances. Urban green spaces provide safe play space for children (Jacobs, 1961), contribute to children's physical, mental and social development (Hart, 1997) and play an important role in the basic education of schoolchildren with regard to the environment and nature. From the **planning perspective**, a network of high quality green spaces linking residential areas with business, retail and leisure developments can help to improve the accessibility and attractiveness of local facilities and employment centres. Well-designed networks of green spaces help to encourage people to travel safely by foot or by bicycle for recreation or commuting (Scottish Executive, 2001). Furthermore, well-designed urban green spaces provide a barrier to noise and can function as a visual screen (Dole, 1989). From the **economic perspective**, a green space might deliver products such as wood or fruits and also compost and energy as a result of urban green production. Their presence can create an increase in the economic value of an area and provides new jobs. From the **ecological perspective**, urban green spaces moderate the impact of human activities by, for example, absorbing pollutants and releasing oxygen (Hough, 1984), contribute to the maintenance of a healthy urban environment by providing clean air, water and soil (De Groot, 1994), improve the urban climate and maintain the balance of the city's natural urban environment (Stanners et al., 1995). They preserve the local natural and cultural heritage by providing habitats for a diversity of urban wildlife and conserve a diversity of urban resources. Despite the enormous benefits that urban green spaces provide there is a serious lack of information about the quantity and quality of urban green spaces. However, with the new integrated approaches to combine strategic planning for green spaces with innovative design and delivery and the active involvement of the community at all stages, urban green

spaces can be part of an 'urban renaissance' (DTLR, 2001).

### 3. A Comparative Framework for Urban Green Spaces: A Case Study on European Cities

This paper aims to compare the present state and availability of urban green spaces in various European cities. The sample contains 26 cities from 15 countries that aim to share their experience in innovative green space policies and strategies. The data and information used for comparison and evaluation are based on extensive survey questionnaires filled out by experts of relevant city departments. For the data concerning land use and population, factor analytic methods are applied to show interesting links and patterns in European cities.

Factor analysis is a statistical approach that can be used to analyze interrelationships between a large number of variables and to explain these variables in terms of their common underlying dimensions (Hair et al. 1998). For this factor analysis, two groups of data were used. One group contains data concerning general land use such as residential areas or industrial areas, whereas the second group contains data concerning green land use such as urban green areas or forests. For the evaluation of the results of the factor analysis, 26 cities were divided into four groups: Metropoles (5), Big Cities (6), Medium-Sized Cities (12) and Small Cities (3) according to their population size.

To perform the factor analysis, seven types of land use were distinguished. The factor analysis concerning general land use identified three factors: (1) mixed land use, such as residential areas, industrial areas, forest and agricultural areas; (2) "man-made environment", such as built-up area and urban green areas; and (3) water.

Several factor analyses have been performed, showing that the variables "urban green" and "built-up areas" were often grouped together. This may sound contradictory, but they are related to each other since both of them describe "man-made environment". The city scores show that especially metropolises have a high score on man-made environment. The other city groups show high scores for mixed land use or water.

The second factor analysis concerning green land use was performed for four groups of variables: Urban Green Areas, Forests, Agricultural Areas and Water. Because of the lack of detailed data on green areas and in order to evaluate the green image of the cities, not only green land use such as forest and urban green have been used, but also the other non built-up areas, such as agricultural areas and water surfaces. The analysis identified two factors: "Natural Green Areas" (**N**), containing forest and agricultural areas, and "Urban Green Areas" (**U**), containing urban green and water. Several factor analyses that have been performed with variables describing green land use showed that the variables urban green and water were clearly related to each other. This can be explained by the recreational facilities that both types of land use offer. When the factors are compared with the scores per city some conclusions can be drawn about the cities and the availability of green areas (see Table 1). The metropolises and the big cities have a high score on the urban green factor. This may be explained by the fact that they are older cities with high population densities or by the loss of natural areas. Therefore, these cities have to invest in urban green spaces. On the other hand, medium-sized cities have a relatively high score on the natural green factor. Because of the availability of natural green areas, medium-sized cities might invest less in urban green areas.

Table 1 Availability of natural and urban green in European cities

Metropolises Pop:1.000.000 +		Big Cities Pop:500.000-1.000.000		Medium-Sized Cities Pop:100.000-500.000			Small Cities Pop:-100.000		
Berlin	U	Birmingham	U	Antwerp	-	Leipzig	N	Alphen aan de Rijn	-
Budapest	U	Cracovia	N	Bern	-	Montpellier	-	Freiberg	-
Istanbul	N	Genoa	-	Chemnitz	N	Salzburg	-	Gorlitz	-
Vienna	U	Helsinki	U	Dresden	N	Sarajevo	-		
Warsaw	U	Lodz	N	Edinburgh	U	Tallinn	-		

		Turin	-	Espoo	U	Zurich	-		
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U: Urban Green, N: Natural Green

The results of the factor analysis for the availability of urban green spaces in European cities show many similarities with the results of a case study research on Dutch cities (van Leeuwen et al. 2002). This study shows that big Dutch cities have a high score in terms of the urban recreation factor, whereas new cities have higher scores on the daily leisure factor, and peripheral cities show high scores on the structural, longer stay recreation areas. The (similar) results of these two studies draw the attention towards big cities. Although the availability of urban green spaces is higher in big cities than in medium-sized and small cities, it doesn't mean that this amount of green space is enough to facilitate inhabitants and a high urban quality of life. For a clearer picture of the availability of urban green spaces further information and empirical testing are required, especially for metropolises and big cities.

#### 4. Policy Relevance for the Development and Management of Urban Green Spaces

Urban green spaces play an important role in improving the liveability of towns and cities. They provide a range of benefits at both national and local level and offer many opportunities to people in different ways. However, this potential of green spaces is not always being realised, as current management practices are sometimes sub-optimal. Despite the benefits that urban green spaces provide there is a serious lack of information about the quantity and quality of urban green spaces. More information and more integrated approaches for the development and management of urban green spaces are needed. Providing attractive and accessible green spaces creates benefits to the competitiveness of the urban location in a broader perspective.

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