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Research Paper

Green justice or just green? Provision of urban green spaces in Berlin, Germany

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HIGHLIGHTS

- Most areas in Berlin are supplied with more UGS compared to the per capita target value.
- Dissimilarity in UGS provision by demographics, such as immigrant status and age exists.
- The UGS Berlin-Tempelhof can provide more than 180,000 inhabitants with 300 ha UGS in a catchment area of 1500 m.
- An underuse of Tempelhof by immigrants and older age groups was identified.
- Efficient UGS planning requires an increased understanding on preferences of UGS that includes cultural contexts and individual perspectives.

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ABSTRACT

Urban green spaces (UGS) have been shown to provide a number of environmental and social benefits relevant for a higher quality of life of residents. However, population growth in cities combined with urban planning policies of (re)densification can drive the conversion of UGS into residential land. This development might result in an unequal distribution of UGS in a city. We present an analysis of UGS provisioning in Berlin, Germany in order to identify distributional inequities between UGS and population which are further discussed in light of variations in user preferences associated with demographics and immigrant status. Publicly available land use and sociodemographic data at sub-district level are applied in a GIS, dissimilarity index and cluster analysis approach. Results show that although most areas are supplied with more UGS compared to the per capita target value of 6 m^2, there is considerable dissimilarity by immigrant status and age. To address rising concerns about socio-environmental justice in cities and to evaluate the (dis)advantages of applying UGS threshold values for urban planning, visitor profiles and preferences of a site-specific case, the park and former city airport Berlin-Tempelhof are analyzed. Results from questionnaire surveys indicate that the identified dissimilarities on sub-district level are not the same as socio-environmental injustice in Tempelhof, but point to a mismatch of UGS and user preferences. In addition to evaluating UGS distribution, the match between quality of a park and specific cultural and age dependent user needs should be considered for successful green infrastructure planning rather than focusing on target values.

1. Introduction

It is now a well-known issue that more than a half of world's population lives in cities and that urban population numbers will continue to increase (United Nations, 2012). The United Nations project nearly 5 billion urban inhabitants by 2030, an increase of 40%. While urban populations continue to increase, global urban land area is expected to grow at a faster rate. Seto, Fragkias, Güneralp, and Reilly (2011) estimated that urban land will increase by 1.5 Mio. km^2 by 2030, triple their baseline estimate of 0.7 Mio. km^2 (based on MODIS 2001). As urbanization is dominated by both population and urban land area expansion, the need to provide new housing developments for more city residents presents a challenge to urban planning (Haase, Kabisch, & Haase, 2013). This challenge, however, might also present great opportunities for sustainable urban management if development practices incorporate quality of life improvements through equitable provision of urban green spaces (UGS).

1.1. Environmental and social benefits of UGS

A number of scientific studies have demonstrated the environmental and social benefits provided by UGS. In these studies,

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UGS were mostly defined as a range of parks, street trees, urban agriculture, residential lawns and roof gardens (Breuste, Haase, & Elmqvist, 2013). Environmental benefits include the process of local climate stabilization via air filtration (Jim & Chen, 2008) or cooling through shade provision (Bowler, Buyung-Ali, Knight, & Pullin, 2010; Gill, Handley, Ennos, & Pauleit, 2007) which is particularly important for mitigation strategies of urban heat island effects. Further, the specific location of street trees and resulting shade was found to reduce overall energy consumption (Simpson, 2002). UGS also reduce noise (Bolund & Hunhammar, 1999), increase carbon storage (Strohbach & Haase, 2012), have positive effects on rainwater infiltration and, thus, lead to water purification (Bolund & Hunhammar, 1999). Social benefits for urban residents include mental and physical health improvements such as stress reduction and relaxation associated with exposure to UGS (see a comprehensive review by Konijnendijk et al., 2013; Kuo, Bacaicoa, & Sullivan, 1998; Maas, Verheij, Groenewegen, de Vries, & Spreeuwenberg, 2006). Particularly during periods of hot weather, UGS reduce local temperatures and can, thus, alleviate the effects of heat on residents (Breuste et al., 2013; Lafortezza, Carrus, Sanesi, & Davies, 2009). Further, UGS may more directly increase the quality of life through the provision of recreational benefits which include active and passive activities. Active exercises are linked to the opportunity to do physical activities such as sports, playing with kids or walk the dog. Passive recreational activities include relaxing, painting, sunbathing, meeting other people, playing with children or simply to experiencing nature (for an overview see Byrne & Wolch, 2009). In addition, UGS provide the potential to increase the perception of safety (Kuo et al., 1998) and act as meeting places for local residents, thereby supporting social interaction (Martin, Warren, & Kinzig, 2004). However, negative effects of UGS on the perception of urban residents have also been observed. For instance, surveys have reported that residents feel insecure and fearful of crime when they are in rather dense, unmanaged wildlife areas with short view distances (Bixler & Floyd, 1997; Schroeder & Anderson, 1983). In a comparative study on social safety in rural and urban areas, Maas et al. (2009) found that in strongly urban areas, notably enclosed UGS are associated with reduced feelings of social safety while the opposite is the case in rather rural areas.

1.2. Socio-environmental justice and distribution of UGS

Within a city, UGS are mostly unevenly distributed over space and, are therefore disproportionately available to a subset of the urban population (Ernstson, 2013). Case study research in European and US cities has shown that different immigrant communities have less access to UGS in their vicinity (Germann-Chiari & Seeland, 2004; Pham, Apparicio, Séguin, Landry, & Gagnon, 2012). Comber, Brunsdon, and Green (2008) showed that Hindu and Sikh groups have limited acces to UGS in the city of Leicester. Dai (2011) found that in the city of Atlanta, mainly Afro Americans have significantly lower acces to UGS in their neighborhoods. This disproportionate provision of UGS to specific social groups raises concerns about environmental justice (Davis et al., 2012). Traditionally, environmental justice focuses on the health implications of low-income and minority individuals who reside in neighborhoods with increased concentration of pollutants or unwanted land uses (for a literature review see Downey & Hawkins, 2009). According to a report on Environmental Justice and Race Equity in the EU, environmental justice is described as "...equal access to a clean environment and equal protection from possible environmental harm irrespective of race, income, class or any other differentiating feature of socio-economic status" (Schwarte & Adebowale, 2007). Apart from this report, environmental justice and the importance of health-promoting environmental factors such as UGS in relation to social factors are still a marginal issue on research and policy agendas of the EU (member states, Schwarte & Adebowale, 2007). Some relevant research and policies are discussed in the UK and to some extent in Germany (for UK see e.g. Comber et al., 2008; Walker, Mitchell, Fairburn, & Smith, 2003; for Germany see e.g. UMID: Environment and Human Health – Information Service, 2011). In Germany, the issue of environmental justice is still a new topic, only recently gaining awareness with the 2011 project "Environmental Justice in Berlin" which represents a first step for integrated reporting on environment, health, social issues and urban planning by researchers, urban planners and local stakeholders (Flasbarth, 2011). The report refers to noise, air quality, bio-climatic conditions and UGS provision. The results, however, remain rather descriptive and on a city-wide level.

In this paper, we propose an expanded framework of socio-environmental justice combining the presented definition of environmental justice with the social justice concept developed by the anthropologist Low (2013). According to Low's argumentation, three different dimensions need to be discussed to address injustice in the case of public spaces such as urban parks. While *distributive justice* focusses on the fair allocation of public spaces and related resources for all social groups, *procedural justice* relates to fair integration of all affected groups into the planning and decision process of a public space. Finally, *interactional justice* is about the quality of interpersonal relations in a specific place and if people interact safely without, e.g. discriminant behavior. Low emphasized this expanded concept of social justice because major transformations that occurred in the urban society in the U.S. within the last 20 years would necessitate employing a broader framework of justice (Low, 2013). These transformations include increased immigration, greater heterogeneity, more local segregation, economic restructuring and globalization or less public money, e.g. for park maintenance (Low, 2013). Although these changes reflect specific developments in the (U.S.) American context, similar changes have been observed in Western Europe (Low, 1999). Thus, it is reasonable to relate the concept of socio-environmental justice to our case of UGS in Europe.

1.3. UGS threshold values and preferences by different social groups

Although distributive aspects of availability and access to UGS as health promoting factors are not yet discussed in a sufficient way, many European cities provide threshold values for per capita UGS or for minimum accessibility for a defined area of UGS. For instance, the city of Berlin, Germany, aims at 6 m^2 of UGS per person (Senatsverwaltung für Stadtentwicklung und Umwelt, 2013a), while Leipzig in Eastern Germany aims at 10 m^2 per capita (City of Leipzig, 2003). In the UK, it is recommended that city residents should have access to a natural green space of minimum 2 ha within a distance of 300 m from home (Handley et al., 2003).

The pure application of per capita UGS and UGS accessibility threshold values can provide a broad assessment of UGS provision for a total city (Larondelle & Haase, 2013) but does not indicate how UGS are distributed across different groups of the society. Moreover, within a city there exist a range of different demographic and cultural structures, which in turn, implies a diversity of purposes that UGS needs to serve. For instance, a city-wide survey in Berlin showed that older individuals want to relax, get fresh air and enjoy nature while younger and middle aged people also prefer doing sports (Senatsverwaltung für Stadtentwicklung Berlin, 2004). Older individuals, appreciate large trees, a clean and well maintained site and seating while individuals of younger age groups also prefer grassy areas for sitting, sunbathing and playing in rather natural structures. The issue that different age groups have different motives to visit an UGS, participate in different activities and