

Who benefits from nature in cities? Social inequalities in access to urban green and blue space across Europe

Who benefits from nature in cities? Social inequalities in access to urban green and blue spaces across Europe



Parks, urban forests, tree-lined streets and riverbanks support urban well-being by providing space for rest, relaxation and exercise, and by keeping temperatures down. However, not everyone across Europe enjoys equal access to green space in cities. This briefing reviews the evidence of socio-economic and demographic inequalities in access to the health benefits derived from urban green and blue spaces across Europe. It showcases examples of green spaces that were designed to meet the needs of vulnerable and disadvantaged social groups.

Key messages:

The health benefits of urban green space are well recognised for children, whose physical and mental development is enhanced by living, playing and learning in green environments. The elderly also benefit significantly from visiting green and blue spaces, through improved physical health and social well-being.

Access to green and blue spaces differs across Europe. Overall, cities in the north and west of Europe have more total green space within their area than cities in southern and eastern Europe. Green areas that are publicly accessible form a relatively low share of the total green space, but the provision of publicly accessible green space is location specific and varies between cities.

Within cities, the degree of greening varies across neighbourhoods, with less and lower quality green space typically found in communities of lower socio-economic status.

The World Health Organization recommends that all people reside within 300m of green space. In contrast, national and local recommendations vary across Europe. Guidance on access for specific vulnerable groups is rare.

Targeted action to reduce inequalities in access to high-quality green space can maximise the health and well-being benefits of nature in cities.

Involving local communities in the design and management of green space has been found to foster a sense of ownership and promote use.

Publications

Case studies:

- [Greening of built-up neighbourhood in Malmö, Sweden](#)
- [Oasis school grounds programme in Paris, France](#)
- [Urban community gardens in Berlin, Germany](#)
- [Green schoolyards in Flemish Brabant, Belgium](#)
- [Therapeutic garden and urban regeneration in Zagreb, Croatia](#)
- [Garden streets project 'Tuinstraten' in Antwerp, Belgium](#)
- [Garden for the senses in Tallinn Botanic Garden, Estonia](#)
- [Diverse collective garden project — 'Orto Collettivo' — in Genova, Italy](#)
- [Opening an urban park to the public in Getxo, Spain — 'Thinking Fadura'](#)

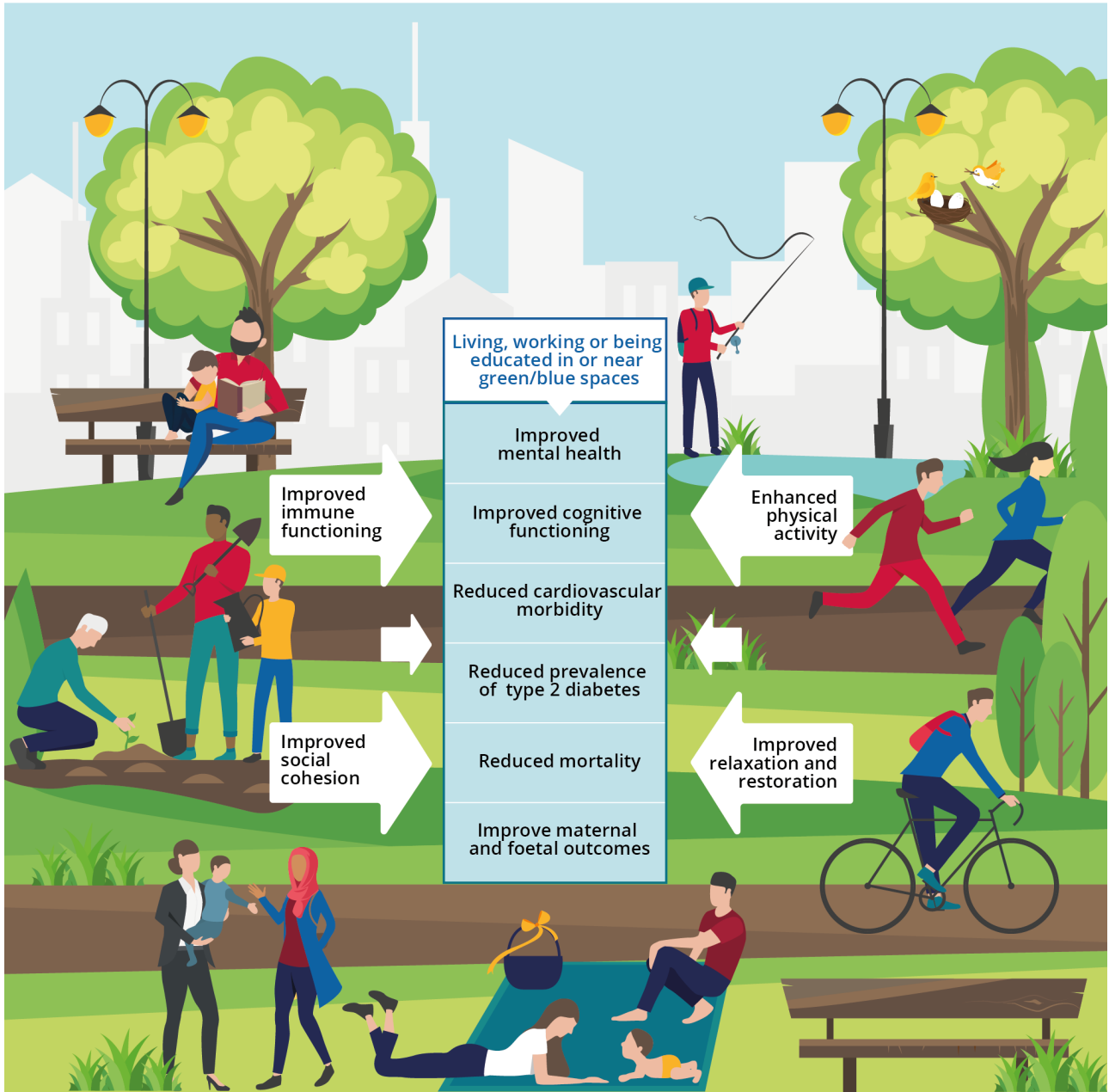
Publications

Urban green space: benefits to health

Accessible and high-quality urban green and blue spaces, such as parks, urban forests, tree-lined streets, allotments, river banks and coastlines, provide significant health benefits to local communities (EEA, 2020). Green spaces improve air quality, reduce noise and enhance biodiversity (Maes et al., 2019). Green spaces also moderate temperatures during hot periods and provide cool and shaded areas (Romanello et al., 2021). Local communities use green space for physical exercise and social interactions, and for relaxation and mental restoration (see Figure 1). Exposure to green space benefits health by reducing mortality and morbidity from chronic diseases, improving mental health and pregnancy outcomes, and reducing obesity (EEA, 2020).

Publications

Figure 1. Health and well-being benefits of urban green space



Source: EEA (2020).

Urban greening: an emerging priority in EU policy?

Urban green spaces are becoming recognised as contributors to sustainability in international frameworks and European policies. Global United Nations Sustainable Development Goal 11.7 explicitly aims to provide ‘universal access to safe, inclusive and accessible, green and public spaces’ ([UN, 2015](#)). The EU’s 2030 biodiversity strategy encourages bringing nature back into cities by creating biodiverse and accessible green infrastructure ([EC, 2020](#)). The strategy also emphasises the importance of developing urban greening plans in larger cities and towns ([EC, 2020](#)). The role of nature-based solutions for climate resilience is recognised by the EU strategy on adaptation to climate change ([EC, 2021a](#)). The earlier EU green infrastructure strategy ([EC, 2013](#)) emphasises the benefits of green spaces in fighting social isolation and strengthening communities. Signatories to the [Green City Accord](#), a European Commission initiative for cities striving towards sustainability, pledge to conserve and enhance urban biodiversity by increasing the extent and quality of green areas in cities ([EC, 2021b](#)).

Who benefits most from urban green space?

Green and blue spaces are particularly beneficial for the health and well-being of certain socio-economic and demographic groups. Overall, people of lower socio-economic status reap greater benefit from urban green space than more privileged groups, especially in terms of reducing stress and improving mental health ([Ward Thompson et al., 2016](#); [Marselle et al., 2020](#)).

In Barcelona, Norway and the Netherlands, urban gardens and allotments were found to provide opportunities for social integration, access to healthy food and environmental learning for lower income groups ([Camps-Calvet et al., 2016](#); [Veen and Eiter, 2018](#)). The COVID-19 pandemic has also demonstrated the societal importance of green space for recreation, especially for those who lack access to private green areas ([Korpilo et al., 2021](#); [Reinwald et al., 2021](#); [Ugolini et al., 2020](#)).

Publications

For **children and young people**, greener environments are linked to better physical and mental health, including improvements in memory, attentiveness and learning ability, and a reduction in stress (Dadvand et al., 2015; Vujcic and Tomicevic-Dubljevic, 2018; Andrusaityte et al., 2020). Parks and playgrounds encourage participation in social activities, thus contributing to social well-being and social cohesion (Nordbø et al., 2019). Nature-based education and play can help children develop their motor skills (Kabisch et al., 2016; see also the example from Flanders). In contrast, studies suggest that young people and children with relatively low exposure to green space are more likely to have poorer eyesight, suffer from obesity and be exposed to oxidative stress (Dadvand et al., 2017; Petraviciene et al., 2018; De Petris et al., 2021).

The **elderly** also derive physical and mental health benefits from the use of green space (Enssle and Kabisch, 2020). These benefits include increased levels of physical activity (Machón et al., 2020), which is associated with better cardiovascular health (Kabisch et al., 2021), and a lower risk of heat-related mortality (Burkart et al., 2016). Even just being able to see blue space, such as the coast, has been linked to a lower risk of depression (Dempsey et al., 2018). Accessible green space offers a place for social interactions, which can counter the risks of social isolation among the elderly (Camps-Calvet et al., 2016; Artmann et al., 2017).

In Berlin, London and Sheffield, urban green areas have been found to support the social inclusion of disadvantaged groups, functioning as spaces where **migrants and asylum seekers** can connect with other people (Rishbeth et al., 2019).

How green are European cities?

In 2018, green infrastructure made up on average 42% of the area of cities in the 38 EEA member countries (EEA-38)^[1], excluding Liechtenstein. However, this area varied both between countries and within individual countries. The European city with the lowest total green space provision, at 6.8% of the total city area, is Trnava, Slovakia. The city with the highest proportion of green space (95.8%) is Cáceres in Spain (EEA, 2021a); in some cases, the high proportion of green space is driven by the large extent of the city's administrative area, e.g. incorporating forest areas around the city core. In addition, the area of publicly available green space is much lower than the total area of green space in cities and is estimated to be on average only 3% of the total city area. Yet, in cities such as Geneva (Switzerland), The Hague (Netherlands) and Pamplona/Iruña (Spain), accessible green space accounts for more than 15% of the city area (EEA, 2021a). Figure 2 compares the green space provision among the EEA-38 capital cities.

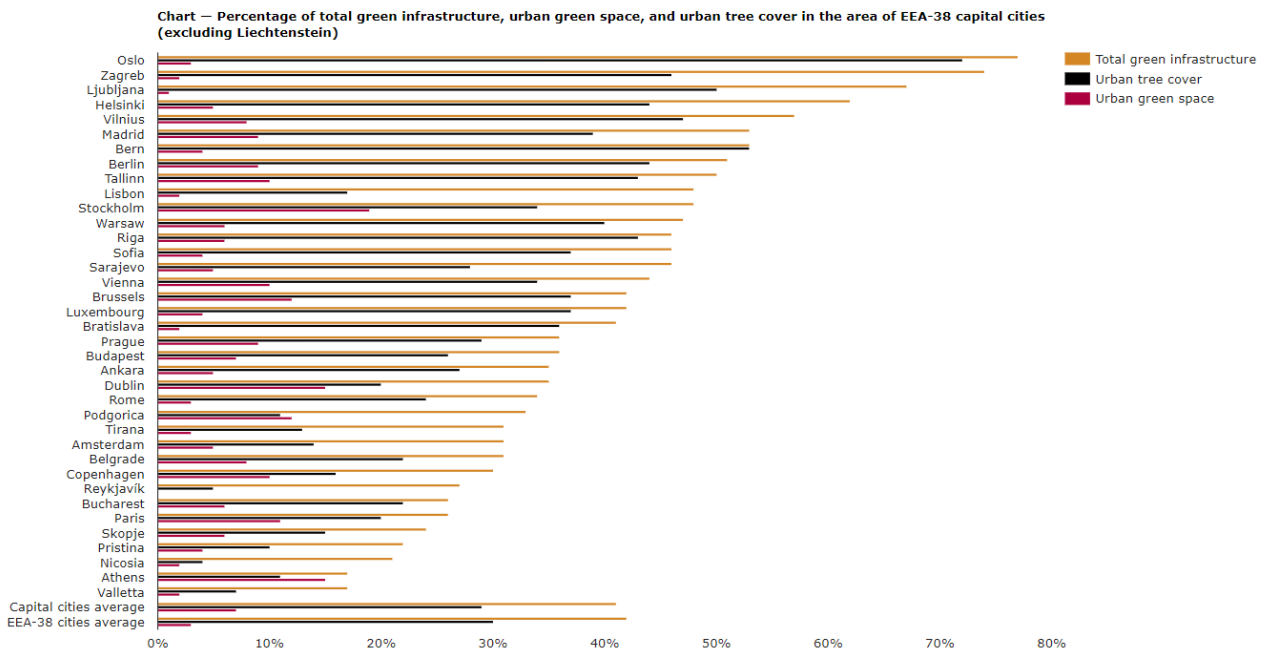
The EEA urban tree cover viewer (EEA, 2021b) presents the area of land in cities covered by the crowns of trees viewed from above in 2018. The average urban tree cover for cities in the EEA-38 is 30%, but also varies widely. Cities in Finland and Norway have the highest proportion of tree cover, at over half the city areas, while cities in Cyprus, Iceland and Malta have the lowest, at below 10%. Comparing the capitals alone, tree cover ranges from 4% in Nicosia to 72% in Oslo (Figure 2).

Publications

In general, based on the 2012 data, the area of publicly accessible green space per inhabitant tends to be higher in cities in northern European countries than in cities in southern and eastern European countries, with the exception of Poland, where public green space per inhabitant is also higher (Maes et al., 2019). Looking at capital cities in Europe (Figure 2), the data from the Urban Atlas 2018 suggests that the proportions of urban green space (i.e. accessible vegetated areas such as public gardens, parks, urban forests and cemeteries) are relatively low overall; nonetheless, some capitals (for example Stockholm, Dublin or Athens) tend to have higher proportions of such publicly available green space. An assessment based on 2012 data (Maes et al., 2019) suggests that less than half of Europe's urban population lives within 300m of a park, with large differences across Europe. For example, while more than 80% of the population of Stockholm has access to a public park a short walk (300m) away, in Heraklion, Greece, under 20% enjoys such access.

Publications

Figure 2. Percentage of total green infrastructure, urban green space, and urban tree cover in the area of EEA-38 capital cities (excluding Liechtenstein)



Note: Liechtenstein is not included because of the unavailability of data from the Urban Atlas. Urban green space corresponds with the Urban Atlas 2018 class “green urban areas”, which includes accessible, vegetated areas such as urban and suburban parks, public gardens or cemeteries, as well as forests or other green spaces that are used for recreation (Copernicus, 2016). Total green infrastructure consists of all vegetated green surfaces, irrespective of their accessibility to the public. Total green infrastructure includes, alongside “green urban areas”, water and wetlands, high nature value farmland, allotments, private gardens, sport and leisure areas, natural and semi-natural green spaces, street trees and isolated tree patches (EEA, 2021a). Urban tree cover is the area of land in cities covered by the crowns of trees viewed from above (EEA, 2021b).

Sources: EEA 2021a; 2021b.

Unequal access to urban green space

Evidence from across Europe shows that green space is available less in lower income urban neighbourhoods than in higher income ones. In German cities, neighbourhoods characterised by a low average income, low levels of educational attainment and high unemployment rates tend to have

Publications

access to smaller areas of green space than those with high income, educational attainment and employment rates (Wüstemann and Kalisch, 2016; Schüle et al., 2017). This pattern is repeated in the Netherlands (de Vries et al., 2020) and Portugal (Hoffmann et al., 2017). Children from lower socio-economic backgrounds in Germany were found to be disadvantaged in terms of access to urban green space compared with children from wealthier families (Rehling et al., 2021).

In cities in central and eastern Europe, these differences were found to be driven by the housing market. Properties in areas with more green space tend to be more expensive, often resulting in neighbourhood gentrification (Kronenberg et al., 2020). This trend has been seen in Poland (Trojanek et al., 2018) and in Debrecen, Hungary, where new upmarket neighbourhoods have more green space than older housing estates inhabited by lower income residents (Csomós et al., 2020).

Communities with a high proportion of immigrants and ethnic minorities have also been found to have less access to high-quality green and blue spaces than those with lower proportions of immigrants and ethnic minorities (WHO, 2017a; De Sousa Silva et al., 2018). For example, immigrants in Oslo have less access to green areas for outdoor recreation (Suárez et al., 2020) and in Helsinki they live further away from blue space than non-immigrant inhabitants (Viinikka et al., 2018). In Berlin, immigrants tend to live in higher density neighbourhoods and they thus have limited access to green space (Kabisch and Haase, 2014). Fewer benefits from nature are also found in areas in Turin, Italy, that have a high housing density (Battisti et al., 2019). An example from Košice and Trnava, Slovakia, shows how green space can be improved in areas of high-density housing to keep temperatures down, benefiting the elderly and children in particular (Climate-ADAPT, 2018).

However, differences in the availability of green space among socio-economic groups are highly location specific. For example, in Oslo, no substantial differences in green space provision were found among neighbourhoods of varying socio-economic status (Mouratidis, 2020). In many locations, a more equal provision of green space is driven by urban planning and housing policies. For example, the City of Berlin uses the environmental justice principle in its planning to avoid the accumulation of multiple environmental and social problems in specific neighbourhoods (Berlin Senate Department for the Environment, Transport and Climate Protection, 2021). Furthermore, Vienna integrates considerations of green space into social housing planning (Oscilowicz et al., 2021). The examples from Antwerp, Augustenborg (see Climate-ADAPT, 2020) and Lindängen show how social housing can become greener.

Quality of urban green space as a condition for use

The design of green space, including the provision of various facilities, the density of planting, and the width of paths and their maintenance, determines its use by different groups. Green space in neighbourhoods of lower socio-economic status is often of lower quality than that in wealthier neighbourhoods, reducing people's motivation to use it (Csomós et al., 2020; de Vries et al., 2020; Vierikko et al., 2020). In socio-economically disadvantaged neighbourhoods of Helsinki, Berlin,

Publications

Bucharest and Lisbon, urban parks have less diverse facilities and vegetation than those in wealthier city areas (Vierikko et al., 2020). In the Netherlands, green areas in poorer neighbourhoods are less aesthetically pleasing than those in wealthier neighbourhoods (de Vries et al., 2020). In Porto, Portugal, in addition to offering fewer amenities, green space accessible to populations of lower socio-economic status has more signs of damage and gives rise to more safety concerns than green space in neighbourhoods of higher socio-economic status (Hoffmann et al., 2017). Therefore, people living in such neighbourhoods may derive fewer benefits from the locally available green spaces.

Furthermore, vulnerable groups, such as children with disabilities (Lynch et al., 2019) and the elderly, especially those with reduced mobility (Artmann et al., 2017; Onose et al., 2020), may not use urban green space because of a lack of seating, toilets or drinking fountains. The therapeutic gardens in Tallinn and Zagreb illustrate how to facilitate the inclusion of people with disabilities.

Perceived safety is another important factor influencing the use of green space. This is affected by quality, maintenance and interactions with other user groups (Błaszczyk et al., 2020; Onose et al., 2020). Gender also seems to influence the use of green space, with studies from Sweden suggesting that, while women seem to attach more value to green areas than men, they feel less safe in some green spaces and this prevents them from using them (Fredman et al., 2019; Ode Sang et al., 2020).

Ensuring the provision and high quality of green space for the groups that need it

The World Health Organization (WHO) recommends that urban residents have access to at least 0.5-1ha of public green space within 300m of their home (WHO, 2017b). The city of Berlin uses a guideline of 500m, or a walk of 5 to 10 minutes, to green space of at least 0.5ha, and 1km to 1.5km to larger areas of green space, of at least 10ha (Berlin Senate Department for Urban Development and Housing, 2020). Furthermore, Berlin residents should have access to at least 6m² of smaller and 7m² of larger green areas per person. The Italian urban planning regulations require that 9m² of parks and public areas are available for recreation per person. The Accessible Natural Greenspace Standard set by Natural England (2010) recommends that people should be able to access at least 2ha of green space within 300m of their home.

Guidelines and tools for the provision of urban green space produced by European research projects include guidance on spatial analysis for green infrastructure (ProGReg, undated) and the BlueHealth toolbox (2020). At the national level, Nature Value Explorer (undated), from Belgium (Flanders specifically), suggests methods to estimate the socio-economic value of nature's benefits. However, there is little guidance on ensuring access to and the usability of green and blue spaces for specific socio-economic and demographic groups. Recently, the so-called '3-30-300 rule' has been introduced, whereby everyone should be able to see at least three trees from their home; every neighbourhood should have at least 30% tree cover; and people should reach a green area of 1ha within 300 metres, as per the WHO's recommendation above (Konijnendijk, forthcoming).

Publications

The specific objective of creating inclusive green spaces should be integrated into urban planning and housing development (RFSC, undated; Oscilowicz et al., 2021). Enabling public access to existing green spaces is one way of increasing availability to lower socio-economic status groups. This is illustrated by the **Barcelona green infrastructure and biodiversity strategy 2020** (City Council of Barcelona, 2013) and the 'Thinking Fadura' initiative of Getxo, Spain.

In relation to children and young people, the United Nations Children's Fund (UNICEF, undated) recommends safe public access and provisions for various groups to use green space simultaneously. For instance, the greening of school grounds is strongly recommended, as this can lead to more active play, as shown by the example from Flanders. The example from Paris shows how greening school grounds benefits not only children, but also the wider community when school grounds are open to the public during heatwaves.

Practical considerations for the design of green spaces for the elderly and people with reduced mobility and other disabilities include the width and layout of paths, lighting and how to provide multi-sensory information and experiences. Benches for rest, toilets and cafes make green spaces more accessible for the elderly and people with disabilities (PHE, 2020).

Community gardens, or urban farms, provide direct contact with nature, physical activity and a source of fresh food for disadvantaged and vulnerable groups. In addition, they offer opportunities for social integration, education, and even professional development and small-scale entrepreneurship (Interreg Europe, 2020; Oscilowicz et al., 2021). This is demonstrated by urban gardens in Berlin and an initiative in Italy offering certified permaculture courses to asylum seekers (Orto Collettivo, Genova).

The participation of vulnerable groups in the planning of green space can support their social inclusion, ensuring that specific needs are taken into consideration, and foster their trust in and identification with the project. This participation is likely to increase future usage of the space (Hansen et al., 2017; Wilk et al., 2020). For example, in Ireland, the research project **Mapping Green Dublin** followed a community-led approach to develop a neighbourhood greening strategy that addresses the concerns and desires of people living in the area (**Mapping Green Dublin, 2021**). Also the initiatives from Belgium (**Green school yards in Flanders** and **Tuinstraten in Antwerp**), Italy (**Orto Collettivo in Genova**) and Croatia (**therapeutic garden in Zagreb**) involved users in the construction and maintenance of the spaces, to further increase the sense of ownership.

Notes

[1] The EEA currently has **32** member countries and six cooperating countries. The 32 member countries are the 27 European Union Member States, together with Iceland, Liechtenstein, Norway,

Publications

Switzerland and Turkey. The six cooperating countries are Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia.

References

- Andrusaityte, S., et al., 2020, 'The effect of residential greenness and city park visiting habits on preschool children's mental and general health in Lithuania: a cross-sectional study', *International Journal of Hygiene and Environmental Health*223, pp. 142-150.
- Artmann, M., et al., 2017, 'The role of urban green spaces in care facilities for elderly people across European cities', *Urban Forestry & Urban Greening*27, pp. 203-213.
- Battisti, L., et al., 2019, 'Assessment and mapping green areas ecosystem services and socio-demographic characteristics in Turin neighborhoods (Italy)', *Forests*11, p. 25.
- Berlin Senate Department for Urban Development and Housing, 2020, '06.05 Versorgung mit öffentlichen, wohnungsnahen Grünanlagen', accessed 17 December 2021.
- Berlin Senate Department for the Environment, Transport and Climate Protection, 2021, 'Environmental justice', accessed 13 December 2021.
- Błaszczuk, M., et al., 2020, 'Quality of urban parks in the perception of city residents with mobility difficulties', *PeerJ*8, p. e10570.
- BlueHealth, 2020, 'BlueHealth toolbox', accessed 13 December 2021.
- Burkart, K., et al., 2016, 'Modification of heat-related mortality in an elderly urban population by vegetation (urban green) and proximity to water (urban blue): evidence from Lisbon, Portugal', *Environmental Health Perspectives* 124, pp. 927-934.
- Camps-Calvet, M., et al., 2016. 'Ecosystem services provided by urban gardens in Barcelona, Spain: insights for policy and planning', *Environmental Science & Policy*62, pp. 14-23.
- City Council of Barcelona, 2013, *Barcelona green infrastructure and biodiversity plan 2020*, City Council of Barcelona, Barcelona, Spain, accessed 04 January, 2022.
- Copernicus – The European Earth Observation Programme, 2016, *Mapping Guide for a European Urban Atlas*. European Commission, accessed 11 January 2022.
- Climate-ADAPT, 2018, 'Social vulnerability to heatwaves — from assessment to implementation of adaptation measures in Košice and Trnava, Slovakia', *European Climate Adaptation Platform*, European Environment Agency, accessed 13 December 2021.
- Climate-ADAPT, 2020, 'Urban stormwater management in Augustenborg, Malmö', *European Climate Adaptation Platform*, European Environment Agency, accessed 21 December 2021.

Publications

- Csomós, G., et al., 2020, 'Access to urban green spaces and environmental inequality in post-socialist cities', *Hungarian Geographical Bulletin*69, pp. 191-207.
- Dadvand, P., et al., 2015, 'Green spaces and cognitive development in primary schoolchildren', *Proceedings of the National Academy of Sciences of the United States of America*112, pp. 7937-7942.
- Dadvand, P., et al., 2017, 'Green spaces and spectacles use in schoolchildren in Barcelona', *Environmental Research*152, pp. 256-262.
- De Petris, S., et al., 2021, 'Geomatics and epidemiology: associating oxidative stress and greenness in urban areas', *Environmental Research*197, 110999.
- de Sousa Silva, C., et al., 2018, 'Environmental justice in accessibility to green infrastructure in two European cities', *Land*7, 134.
- de Vries, S., et al., 2020, 'Environmental justice in the Netherlands: presence and quality of greenspace differ by socioeconomic status of neighbourhoods', *Sustainability*12, 5889.
- Dempsey, S., et al., 2018, 'Coastal blue space and depression in older adults', *Health & Place*54, pp. 110-117.
- EC, 2013, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Green infrastructure (GI) — enhancing Europe's natural capital' (COM(2013) 249 final of 6 May 2013).
- EC, 2020, Communication from the Commission to the European Parliament, the European Council, the Council and the European Economic and Social Committee and the Committee of the Regions 'EU biodiversity strategy for 2030 — bringing nature back into our lives' (COM(2020) 380 final of 20 May 2020).
- EC, 2021a, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions 'Forging a climate-resilient Europe — the new EU strategy on adaptation to climate change' (COM(2021) 82 final of 24 February 2021).
- EC, 2021b, 'Green City Accord: a European Commission initiative to make cities greener, cleaner and healthier', European Commission, accessed 17 December 2021.
- EEA, 2020, *Healthy environment, healthy lives: how the environment influences health and well being in Europe*, EEA Report No 21/2019, European Environment Agency.
- EEA, 2021a, 'Urban Green Infrastructure, 2018', European Environment Agency, accessed 04 January 2022.
- EEA, 2021b, 'Urban tree cover in Europe (2018)', European Environment Agency, accessed 21 December 2021.
- Enssle, F. and Kabisch, N., 2020, 'Urban green spaces for the social interaction, health and well-

Publications

being of older people — an integrated view of urban ecosystem services and socio-environmental justice', *Environmental Science & Policy*109, pp. 36-44.

Fredman, P., et al., 2019. 'Friluftsliv 2018: Nationell undersökning av svenska folkets friluftsvanor (Rapport No. 6887)', Naturvårdsverket (Swedish Environmental Protection Agency), accessed 17 December 2021.

Hansen, R., et al., 2017, *Urban green infrastructure planning: a guide for practitioners*, Green Surge, accessed 17 December 2021.

Hoffmann, E., et al., 2017, 'Socioeconomic inequalities in green space quality and accessibility — evidence from a southern European city', *International Journal of Environmental Research and Public Health*14, 916.

Interreg Europe, 2020, *Urban ecosystems: the importance of green infrastructure and nature-based solutions for the development of sustainable cities — A policy brief from the Policy Learning Platform on environment and resource efficiency*, European Regional Development Fund, 17 December 2021.

Kabisch, N. and Haase, D., 2014, 'Green justice or just green? Provision of urban green spaces in Berlin, Germany', *Landscape and Urban Planning*122, pp. 129-139.

Kabisch, N., et al., 2016, 'Adding natural areas to social indicators of intra-urban health inequalities among children: a case study from Berlin, Germany', *International Journal of Environmental Research and Public Health*13, 783.

Kabisch, N., et al., 2021, 'Physiological and psychological effects of visits to different urban green and street environments in older people: a field experiment in a dense inner-city area', *Landscape and Urban Planning*207, 103998.

Konijnendijk, C., forthcoming, 'The 3-30-300 Rule for urban forestry and greener cities', *Biophilic Cities Journal*, Vol. 4, No. 2.

Korpilo, S., et al., 2021, 'Coping with crisis: green space use in Helsinki before and during the COVID-19 pandemic', *Frontiers in Sustainable Cities*3, 713977.

Kronenberg, J., et al., 2020, 'Environmental justice in the context of urban green space availability, accessibility, and attractiveness in postsocialist cities', *Cities*106, 102862.

Lynch, H., et al., 2020, 'Advancing play participation for all: the challenge of addressing play diversity and inclusion in community parks and playgrounds', *British Journal of Occupational Therapy*83, pp. 107-117.

Machón, M., et al., 2020. 'Proximity to facilities and its association with the health-related habits of functionally independent older adults', *International Journal of Environmental Research and Public Health*17, 8677.

Maes, J., et al., 2019, *Enhancing resilience of urban ecosystems through green infrastructure (EnRoute): final report*, Publications Office of the European Union, Luxembourg, accessed 11

Publications

January, 2022.

Mapping Green Dublin, 2021, Strategic pathways to community-led greening: A collaborative research project across Dublin 8. Dublin: University College Dublin, accessed 11 January 2022.

Marselle, M. R., et al., 2020, 'Urban street tree biodiversity and antidepressant prescriptions', *Scientific Reports*10, 22445.

Ministry of Public Works for Italy, 1968, Decreto Ministeriale (D.M.) 2 aprile 1968, n. 1444, accessed 17 December 2021.

Mouratidis, K., 2020, 'Neighborhood characteristics, neighborhood satisfaction, and well-being: the links with neighborhood deprivation', *Land Use Policy*99, 104886.

Natural England, 2010, 'Nature nearby': accessible natural greenspace guidance, accessed 17 December 2021.

Nature Value Explorer, undated, 'English summary', accessed 13 December 2021.

Nordbø, E. C. A., et al., 2019, 'Neighborhood green spaces, facilities and population density as predictors of activity participation among 8-year-olds: a cross-sectional GIS study based on the Norwegian mother and child cohort study', *BMC Public Health*19, 1426.

Ode Sang, Å., et al., 2020, 'Are path choices of people moving through urban green spaces explained by gender and age? Implications for planning and management', *Urban Forestry & Urban Greening* 49, 126628.

Onose, D. A., et al., 2020, 'Too old for recreation? How friendly are urban parks for elderly people?' *Sustainability*12, 790.

Oscilowicz, E., et al., 2021, Policy and planning tools for urban green justice: fighting displacement and gentrification and improving accessibility and inclusiveness to green amenities, Barcelona Lab for Urban Environmental Justice and Sustainability, Barcelona, accessed 17 December 2021.

Petraviciene, I., et al., 2018, 'Impact of the social and natural environment on preschool-age children weight', *International Journal of Environmental Research and Public Health*15, 449.

proGInreg, undated, 'Planning and implementing nature-based solutions', Productive Green Infrastructure for Post-Industrial Urban Regeneration, accessed 13 December 2021.

PHE, 2020, Improving access to greenspace: a new review for 2020, Public Health England, London, accessed 17 December 2021.

Rehling, J., et al., 2021. 'Socioeconomic differences in walking time of children and adolescents to public green spaces in urban areas — results of the German environmental survey (2014-2017)', *International Journal of Environmental Research and Public Health*18, 2326.

Reinwald, F., et al., 2021, 'Urban green infrastructure and green open spaces: an issue of social fairness in times of COVID-19 crisis', *Sustainability*13, p. 10606.

Publications

- RFSC, undated, The Reference Framework for Sustainable Cities: 5 Dimensions and 30 Objectives for a European Vision of tomorrow's cities, Reference Framework for Sustainable Cities, accessed 17 December 2021.
- Rishbeth, C., et al., 2019, 'Participation and wellbeing in urban greenspace: "curating sociability" for refugees and asylum seekers', *Geoforum*106, pp. 125-134.
- Romanello, M., et al., 2021, 'The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future', *The Lancet*398, pp. 1619-1662.
- Schüle, S. A., et al., 2017, 'Relationship between neighbourhood socioeconomic position and neighbourhood public green space availability: an environmental inequality analysis in a large German city applying generalized linear models', *International Journal of Hygiene and Environmental Health* 220, pp. 711-718.
- Suárez, M., et al., 2020, 'Environmental justice and outdoor recreation opportunities: a spatially explicit assessment in Oslo metropolitan area, Norway', *Environmental Science & Policy*108, pp. 133-143.
- Trojanek, R., et al., 2018, 'The effect of urban green spaces on house prices in Warsaw', *International Journal of Strategic Property Management*22, pp. 358-371.
- Ugolini, F. et al., 2020, 'Effects of the COVID-19 pandemic on the use and perceptions of urban green space: An international exploratory study', *Urban Forestry & Urban Greening*, Volume 56, December 2020, 126888
- UN, 2015, Transforming our world: the 2030 agenda for sustainable development — A/RES/70/1, United Nations, accessed 21 December 2021.
- UNICEF, undated, Discussion paper: the necessity of urban green space for children's optimal development, United Nations Children's Fund, accessed 17 December 2021.
- Veen, E. J. and Eiter, S., 2018, 'Vegetables and social relations in Norway and the Netherlands', *Nature and Culture*13, pp. 135-160.
- Viinikka, A., et al., 2018. 'Mapping the distributive environmental justice of urban waters', *Fennia*196, pp. 9-23.
- Vujcic, M. and Tomicevic-Dubljevic, J., 2018, 'Urban forest benefits to the younger population: The case study of the city of Belgrade, Serbia', *Forest Policy and Economics*96, pp. 54-62.
- Ward Thompson, C., et al., 2016, 'Mitigating stress and supporting health in deprived urban communities: the importance of green space and the social environment', *International Journal of Hygiene and Environmental Health* 13, 440.
- Wilk, B., et al., 2020, 'Guidelines for co-designing and co-implementing green infrastructure in urban regeneration processes', accessed 17 December 2021.
- WHO, 2017a, Urban green space interventions and health: a review of impacts and effectiveness,

Publications

World Health Organization Regional Office for Europe, Copenhagen, accessed 17 December 2021.

WHO, 2017b, Urban green spaces: a brief for action, World Health Organization Regional Office for Europe, Copenhagen, accessed 17 December 2021.

Wüstemann, H. and Kalisch, D., 2016, Towards a national indicator for urban green space provision and environmental inequalities in Germany: method and findings, Working Paper, SFB 649 Discussion Paper No 2016-022, Humboldt University of Berlin, Collaborative Research Center 649 — Economic Risk, Berlin, accessed 17 December 2021.

Identifiers

Briefing no. 15/2021

Title: **Who benefits from nature in cities? Social inequalities in access to urban green and blue spaces across Europe**

HTML: TH-AM-21-015-EN-N - ISBN: 978-92-9480-413-6 - ISSN: 2467-3196 - doi: 10.2800/160976

PDF: TH-AM-21-015-EN-Q - ISBN: 978-92-9480-412-9 - ISSN: 2467-3196 - doi: 10.2800/041176

Published on 01 Feb 2022