



The Importance of Urban Green Spaces around the World and their Strength in Contributing to our Environment

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ABSTRACT

Worldwide, urbanization is rapidly taking place with most people living in urban areas. This trend emphasizes the importance of green spaces within the urban environment to keep it healthy. Urban green spaces serve as a crucial habitat for biodiversity, offering a range of habitats for various species of plants and animals. This paper explores the multifaceted effects of urban greenery on sustainability, well-being and ecological balance. These areas are crucial for maintaining ecological balance in highly populated areas and for the health of urban ecosystems. Deciduous plants and animals enhance air quality. The plants filter pollutants and provide oxygen from photosynthesis naturally. Trees, in particular, filter airborne particles and contamination, and they are excellent air purifiers. This process helps reduce the impact of urban pollution, increases biodiversity and helps create a more sustainable urban environment. Urban green spaces bring valuable advantages to mental well-being. Urban green spaces are also important in regulating the temperature and in reducing the urban heat island phenomenon. When vegetation is present, it reduces the surface temperature, which will help to create a cooler and more comfortable urban environment. Due to the importance of effective temperature regulation, residents' well-being is promoted and the issues associated with increasing temperatures in the metropolitan area are solved. Besides the environmental effects, urban green spaces have a positive impact on the emotional and physical health of urban residents. Opportunities for recreation, exercise and relaxation are associated with stress reduction and mental health. In addition, urban green spaces promote social interaction and participation in the community, thereby helping to build social cohesion. Overall, this review highlights the importance of urban green spaces for environmental health and wellbeing, biodiversity conservation, air quality and temperature regulation. Understanding these benefits is vital in promoting sustainable urban development globally.

Introduction

In the context of the increasing urbanization, the importance of urban green spaces is growing. Parks, gardens, community gardens, and street trees are integral parts of these areas, crucial to fostering healthy and sustainable urban living (Turner-Skoff and Cavender, 2019). The growing demand for resources and infrastructure in cities, driven by an increasing global population, poses a significant challenge to environmental and human health (Dodman et al., 2023). Urban green spaces are often referred to as "green lungs" or "urban oases" as they constitute natural areas that can help counteract the proliferation of built-out areas. Rural to urban migration has led to urbanization, or an increase in the number of people living in urban areas. While this trend fosters growth and innovation, it also gives rise to a few challenges. Rapid urbanization is associated with more construction, less green space, and more pollution, which reduces environmental quality and harms citizens' health (Edeigba et al., 2024).

The impacts on this urban transition are wide-ranging. Loss of green areas means decrease in biodiversity, also the streets are heated due to the absorption and retention of heat in the built surfaces, which leads to higher temperatures in cities, consequently contributing to urban heat island effect. Pollution and a sedentary lifestyle are also contributing factors to poor public health, highlighting the close relationship between environmental and human health (Cerin et al., 2021). This paper examines the effects of urban green spaces on the environment's health. The importance of this research is that urban green spaces can act as mitigators between human development and environmental conservation.

The importance of urban green spaces in the context of climate change, biodiversity and public health is a key issue. This review examines the diverse benefits of these green areas, including biodiversity preservation, temperature regulation, promotion of social cohesion, and improvement of mental well-being. In addition, it seeks commonalities, good practices and innovative approaches to the use of urban green space throughout different regions and cultures. The results are designed to guide urban planning, policy making and community engagement, and to promote a healthy and sustainable urban future worldwide.

Urban Heat Island Mitigation

The urbanisation is a serious environmental issue with regard to the growth of urban heat islands (UHIs). Heat absorbed and re-radiated by concrete and asphalt surfaces in urban areas cause increased temperatures and the formation of "local hot spots" within the urban heat island. Urban green spaces produce a shading and cooling effect which plays a critical role in its cooling effect to regulate the temperature and mitigate UHIs in urban areas (Pfautsch et al., 2024). The UHIs can be understood as increased temperature in the city as compared to the rural areas, primarily driven by some features of the built environment, including impermeable surfaces, high population density, and lack of greenery. They all lead to heat absorption, curtailment of the natural cooling system and creation of microclimates that cause more heat to accumulate (Bagheri, 2025).

Urban landscapes with concrete and asphalt surfaces have more heat and surface temperature captured than green surfaces. In tall buildings and high-density urban arrangements, it is hard to achieve natural air circulation, causing heat trapping and more ambient temperatures. Urban areas lacking vegetation have less cooling potential from vegetation and increase the urban heat

island (UHI) effect. In addition, human activity, industrial activity and emissions from vehicles add to the heat output, increasing temperatures even further (Imran et al., 2021). Shade and evapotranspiration are main contributions of green spaces to reducing UHIs. Exposure to solar radiation is reduced by vegetation on impermeable surfaces, providing shade. This shading effect reduces the temperature of surfaces and generates cooler microclimates within and around green spaces. Trees and plants provide shade over surfaces which will decrease the heat absorption (Cheela et al., 2021). As a result, shaded areas have cooler temperatures and provide relief from urban heat.

When plants release water vapor, it is called evapotranspiration as it acts as a natural cooling mechanism which reduces the air temperature and ambient temperature (Yang et al., 2023). Green spaces help to cool down by allowing the evapotranspiration rate. The temperatures of urban green zones with permeable surfaces and vegetation can be significantly reduced. The permeable surfaces also have improved heat dissipating and soil moisture retaining properties than impervious surfaces such as concrete or asphalt. Photosynthesis also allows plants to use the sun's energy and produce oxygen to help maintain the environment (Irfeey et al., 2023). Conclusively, green spaces play a key role in the reduction of the heat from the surrounding environment by active processes.

Urban areas with the greenery will feel comfortable outside by providing cooling. The coolness of shaded areas makes them optimal for outdoor use and enjoyment including recreational and social events. In urban settings, greenery can improve the environment, making it more pleasant and comfortable by providing relief from the heat (Dover, 2015). Parks and green spaces can provide citizens with recreational spaces to relax, and to engage in outdoor activities in a more favorable climate. Green spaces are cool and inviting, and promote social activities, they are active and colorful spaces capturing the attention of the community and thus enriching the quality of life. If these urban green spaces are made part of urban development, then it is in line with the Sustainable Urban Planning principles. Cities could counteract the negative effects of UHI through the use of green infrastructure and considering ecological issues for urban development (Jenning and Bamkole, 2019).

Urban green spaces support biodiversity, habitats for plants and animal species and enhance ecosystem. They let the storm water flow through them and lessen the chance of urban flooding and better water management. Green spaces help to clean and purify air and pollutants as a result of plant activity (Bai et al., 2018). For example, trees help to lower air-borne pollutants.

Global assessment emphasizes the role of urban green spaces in urban thermal control and helps mitigate the urban heat island (UHI) effect. The concept of urban heat island needs to be understood to realize the importance of the necessity of green space in the urban area. Green areas can play a role in creating a more comfortable and sustainable environment for living in the city, by providing shade, promoting evapotranspiration and reducing surface temperatures (Gunawardena et al., 2017). Green spaces also help to regulate temperature, increase outdoor comfort, promote community interactions, and promote sustainable urban design principles. Investment and maintenance in urban green space is essential as urbanization and climate change are core issues for cities, and these spaces are vital to addressing them. Infrastructure investment in the green infrastructure is not only a method to mitigate adverse impacts of urban heat island but also a sustainable and healthy approach to enhance cities and urban areas in terms of resiliency, vitality and livability, for both present and future urban citizens (Kumar et al., 2024).

Improving Air Quality

As urban areas deal with the impacts of industrial activities and vehicle emissions, it is essential to find sustainable methods to enhance air quality. Green areas within cities can contribute to better air quality. The international survey explores the way in which plants and nature can absorb pollutants, green spaces as natural filters with trees purifying the air, creating healthy environment (Edeigba et al., 2024). One critical aspect of the pollutant uptake and pollutant abatement that can be achieved by urban green space vegetation is called botanical remediation. The process is natural, where pollutants are absorbed, metabolized and neutralized by plants and its impact on the environment is lessened. Phytoremediation can be accomplished by various plant species, such as trees, shrubs, and grass. Gaseous pollutants like O₃, SO₂ and NO₂ are absorbed by plants through a small opening on the leaves called stomata (Joshi et al., 2023). These can be metabolically changed in the plant following ingestion. Plants are good filters for particulate matter because they capture the dust, pollen and other airborne particles on their leaves. This physical filtering helps to lessen the amount of particle contaminants in the air. The roots of plants also play a role in soil restoration as well as improving air quality. Some pollutants may be taken up and stored by roots of a plant and not released to the air or groundwater (Rostami & Azhdarpoor, 2019). Through their air and soil purifying capacity, urban green areas are an integral part to reducing the negative effects of pollutants on the environment. Plants use photosynthesis to make their own food; carbon dioxide (CO₂) is taken in, and oxygen (O₂) is produced (Maeng & Gonczi, 2019). Urban green spaces, which have a rich plant life, serve as oxygen sources and produce a considerable amount of oxygen in the air surrounding them. Plant cells have chloroplasts to use sunlight to make glucose and oxygen from carbon dioxide and water. This oxygen release contributes to rise in oxygen concentration in the atmosphere. The high plants present in urban green areas increase oxygen production and consequently the amount of oxygen in some places (Edeigba et al., 2024). Apart from creating oxygen, the complex structure of plants forms a natural filtering system of air. This filtration is physical, chemical and biological. Leaf surfaces have a microscopic feature that can capture and remove airborne pollutants. The physical filter will have the effect of removing particulate matter in the air. Under certain circumstances, plant tissues metabolically change certain contaminants that are taken up by the plants. The changes can make the pollutants less damaging or into less toxic forms. Root influence on the soil produces a diverse mix of microorganisms in the area adjacent to the roots called rhizosphere. Pollutants can be broken down by soil microorganisms, aiding natural filtering. The large surface area of the canopy and the ability of trees to efficiently clean the pollutants in the air make them a superb air purifier (Molina & Segura, 2021). Tree canopy is an intricate structure and the huge surface area of leaves will play a satisfactory role in filtering and absorbing harmful substance. Dust and pollen are carried by air and settle on leaves and branches of trees. This physical removal decreases the amount of particulate matter in the atmosphere (Wróblewska & Jeong, 2021).

Gaseous pollutants like carbon monoxide (CO), sulfur dioxide (SO₂) and ozone (O₃) are taken up by the stomata. These pollutants are then carried to other parts of the plant where they can be metabolized or sequestered. Volatile Organic Compounds (VOCs) from various sources such as industrial processes and transportation can affect air quality. Some VOC's can be ingested and metabolized by trees, especially broadleaf. VOCs are taken up by the waxy surfaces of leaves. Some VOCs may enter the plant tissues following deposition on leaves. When VOCs are taken in by the plant, they may be metabolically modified in plant cells. In this way VOCs can be either

broken down or converted into less harmful substances. Trees are also known to filter pollutants and provide a cooling effect that improves air quality. Tree canopies provide shade and lower surface temperatures that decrease ground-level ozone formation, thereby enhancing air quality (Knight et al., 2021). Shaded areas will be cooler, and so will reduce the formation of ground-level ozone.

Safeguarding Biodiversity

The conservation of biodiversity in cities faces increasing difficulties as urban areas grow. Urban green areas provide a haven for many species of flora and fauna and thus contribute significantly to the protection of biodiversity. The present study aims to understand the significance of urban green spaces as habitats, the role played by urban greening in biodiversity conservation in urban areas and the fundamental value of maintaining ecological balance in urban areas. Tree-lined streets, parks and gardens create a range of urban green spaces that are vital habitats for many plant species (Miller et al., 2015). These areas act as refuges for both native and non-native plants, enhancing the greenery in cities. Urban biodiversity can be preserved with the existence of native plant species in green spaces. Over time, these plants have evolved to suit the environmental conditions, climate and soil of the area. Green spaces offer unique microhabitats and are hot spots for biodiversity within the urban fabric. Urban green spaces provide habitats for many species of wildlife as well as places for people to live and grow plants. These areas contribute to the biodiversity of the city by offering habitat, food, and breeding space for a variety of animals. Birds and other species find shelter in the trees and shrubs within a green space. The birds' sounds add to the soundscape of urban living, and the variety of birds heard adds to the quality of diversity. The diverse flora and fauna that can be found in green spaces, creating a vibrant ecosystem. Insects in turn can be an important food source for birds and other urban wildlife (Douglas & James 2014). In highly populated urban areas, fragmentation of nature ecosystems constitutes a major challenge for the preservation of biodiversity. Urban green spaces perform the role of a corridor to ease the impact of habitat fragmentation by providing migration pathways for species. Movement of wildlife species between fragmented habitats is enabled in these green spaces. This allows gene flow, which is a vital component for maintaining genetic diversity and therefore strength in populations. Green areas can also provide opportunities for gene flow between isolated sub-populations and minimize inbreeding and genetic bottlenecks by facilitating gene flow between isolated populations. Urban green areas serve as refuge for the protection and conservation of rare and endangered species which could find space in such natural areas. Green spaces contribute to vulnerable species by offering a proper habitat and reducing its isolation. Green space in urban areas can provide a sanctuary for rarely occurring and vulnerable plant species that allows conservation efforts to be directed at saving their lives (Lambert & Donihue, 2020). The different ecosystem services that urban green spaces provide help maintaining ecological balance in cities. These benefits cover not only issues of biodiversity conservation, but also broader issues of environment and human well-being.

Plants in green space help to clean the air by producing oxygen and absorbing pollutants. Green spaces also help to purify water by filtering pollutants from rainfall and reducing runoff. Tree biomass and vegetation in green spaces are of great importance for carbon storage, greenhouse gas reduction and resilience to climate change in urban areas. Urban heat island (UHI) effect is a peril for biodiversity and human health as its hallmark is the higher temperature in urban areas. As natural coolants, urban green spaces can help to reduce the UHI effect and improve the

overall urban environment by creating a more balanced and sustainable urban ecosystem. In urban green spaces, the tree canopy and other greenery provide areas with shade and cooler surface levels are able to create microclimates. The green spaces provide opportunities for the residents to rest, relax and to cool down during heatwaves (Lin & Li, 2025). These areas can be used as living learning spaces, promoting awareness of the environment. Green spaces offer opportunities to develop an understanding about the local flora and fauna and foster a community that cares for and engages in biodiversity conservation.

Parks and nature reserve also create educational activities and guided tours to help communities to understand the value of their local biodiversity. These green spaces, which are protected by their status, serve as educational tools and help to spread awareness about the importance of plant diversity in the urban setting. Citizen engagement can help to monitor and protect biodiversity. Community participation can be achieved through citizen science programs that involve green spaces in the city for data collection and observation. Birdwatching groups and initiatives such as Citizen Science collect data around birds in green spaces, aiding in monitoring of bird populations and behavior. Community-driven projects in urban green space can carry out a plant assessment and inventory, which can help to document native plant species and identify possible conservation needs (Taddeo et al., 2025). Teamwork makes the dream work: Combining community science and expert-led surveys to study urban plant richness and composition. Amidst increasing urban development, urban green spaces play a crucial role in preserving biodiversity. Green spaces are very important for the conservation of biodiversity, providing space for various species of flora and fauna, and providing routes of migration for wildlife. The urban green areas play an important role in maintaining environmental health and sustainability, promoting ecological balance, mitigating the urban heat island effect, and engaging the community (Wang et al., 2024). It is important to have green spaces in urban areas and preserve and extend these spaces to provide a balance between urban growth and the safeguarding of Earth's ecosystems.

Human Comfort

Green spaces provide much more than a break from the surrounding concrete. Parks, gardens and greenways promote good health and wellbeing. This global study investigates how green spaces in cities can encourage recreation, physical activity and relaxation, all of which have a positive impact on mental health and stress reduction. The study explores how green spaces are linked to reduced mental health problems and looks at how green spaces can make a difference in improving mental health. Urban green spaces offer unique opportunities for recreation and leisure activities, featuring well-designed facilities and beautiful green areas. Playgrounds, sports equipment, and wide-open spaces are located on parks and are places for people and families to play and exercise. These areas provide a lively and vibrant environment for various recreational activities, promoting a healthy and active lifestyle among urban residents (El-Kholy et al., 2022). Usually, urban green spaces provide walking, jogging tracks and exercise areas. These amenities promote physical activity through convenient spaces for exercise and fitness activities. The implementation of exercise opportunities in natural environments can benefit both physical health and provide opportunities for outdoor fitness centers for many different types of fitness.

Urban green areas offer quiet places for leisure and tranquility, apart from active recreation. Carefully maintained plants, water features and shaded areas provide for quiet and contemplative

spaces. Green areas are a place to escape from the city noise and have a positive impact on mental health. Landscaping protects metropolitan living conditions (Roe & McCay, 2021). Being outdoors, whether for working around insects or enjoying the hue of colors, has been shown to have a profound impact on reducing stress. Green spaces may be helpful in reducing stress and cortisol levels by producing positive physical responses. Nature provides a peaceful and serene environment, that can help to reduce stress and promote a calmer and more balanced state of mind. It has been shown that engaging with urban greenery can improve emotional and mood betterment. Natural light, air and plants boost your body's release of endorphins, and your body's natural mood boosters. People who use green space for leisure or relaxation can often feel happier, content and less worried or sad. Urban green spaces have also a positive effect on cognitive functions. Research shows that exposure to nature can improve brain function, concentration, and memory. People in urban environments enjoy cognitive renewal, with increased clarity and concentration when they engage in activities such as reading, reflection or taking a casual walk-through green space (Bornioli et al., 2018). The literature has also been expanding on the link between decreased mental health problems and greenness in urban areas. More green space often means more healthy communities in terms of their residents' psychological and emotional well-being. Proximity to green space is a strong influence on mental health: people who lived near these spaces reported increased well-being rates than those with restricted access. There is a positive relationship between community health and individual well-being (Wood et al., (2017).

Urban green spaces provide opportunities for socialization, interaction and participation within communities by providing meeting places. Providing common areas where people can come together and engage in social interaction contributes to the sense of community and connection, reducing feelings of isolation and alienation that may be associated with mental health problems. To fill the gaps in mental health, fair access to green spaces should be ensured. The distribution of green spaces in a variety of districts in urban design contributes to mental health. Creating a common space for people to engage with each other can help in creating a sense of belonging and connection. Equality of opportunities to green spaces is required to tackle mental health inequalities. Investing in green space distribution within neighborhoods, as a priority in urban planning, contributes to the improvement of mental health (Ma et al., 2019). When green spaces are accessible to all, such as children, seniors and people with physical and/or sensory impairments, the benefits to mental health are available to everyone. The global evaluation highlights the significant impact urban green spaces can have on mental and physical health, thereby promoting overall health. International assessment and appraisal of the value of urban green spaces for health and wellbeing reveals that urban green spaces have a significant positive effect on physical and mental wellbeing. The recreation, physical activity and leisure opportunities found in urban areas help residents to enjoy more active, balanced lifestyles. Having green spaces in urban areas is highly significant for mental benefit because of their multiple positive effects on mental health and stress reduction. There's a need to promote green spaces in the urban planning process because they've been linked to reduced rates of mental health problems (Jackson, 2011). As well as having an impact on personal health, the positive effects of green spaces on the well-being and equity of mental health in societies are very significant for creating resilient and healthy communities in cities. In an urbanizing world, it is vital to recognize the value urban green spaces provide in improving the quality of life. By prioritizing the provision, maintenance and fair distribution of such facilities, everyone can enjoy the positive impact on their mental and physical health that these green spaces can have and help

to build cities that are not only healthier and happier, but also more environmentally friendly (Douglas et al., 2017).

Community Involvement and Socialisation

Increasing global urbanization brings with it several challenges, such as health issues and a possible breakdown in relationships within communities. Not only do green spaces in the cities improve environmental health but they also promote social togetherness and participation in the city (Jennings & Bamkole 2019). This detailed study examines the role of green spaces in the city as places of meeting, interactions and bonding to foster a sense of belonging of cities' various populations. One of the most basic functions of urban green spaces for their attractiveness is that they are natural meeting places. Outdoor spaces, including gardens, parks and other public spaces provide safety as a focus point, overcoming the barriers that often separate city dwellers. These places become hubs – whether they are specifically designed for shared activities or embraced by the community – where people meet and interact for many reasons (Wolch et al., 2014). Accessibility is an important feature of urban green spaces. These sites have been planned to be accessible in the city, with the proviso that people of different economic and social status can easily access them(Rahman & Zhang 2018).Due to their inclusive atmosphere, individuals from various backgrounds can engage with each other, enhancing the connections within diverse urban communities. Shared activities, cultural and recreational events bring people together in green spaces of urban areas, to have a food festival or an art show, or something to do outdoors. Celebrating cultural diversity in green spaces helps in creating a rich mosaic of community life, by overcoming cultural boundaries and establishing a shared identity between the residents (Neal et al.,2015).

The combination of public spaces for events and work in green areas is a new tendency. They serve as meeting places for community, workshops, learning events, as well as places for professionals to meet. The relation between working and community life in the urban area is time and space, both of which are taking different forms in urban green spaces. These areas are not just places for social interaction but serve as hubs for building a sense of belonging and community among urban residents. Taking part in activities within urban green space can foster an overall sense of responsibility to maintain or improve the urban green space. The use of these spaces by residents will foster increased civic engagement and a sense of place. This is a shared duty – and it can spark work to solve other community problems and work together to improve the neighborhood (Ellery & Ellery 2019).

Green spaces provide platforms for integration and sharing of diversity. These spaces serve as a bridging point and collaborate several cultural expressions by means of initiatives such as the community garden, cultural events and art installations. One key area where urban green spaces are playing a significant role in fostering wellbeing is their impact on mental health. Good ecological scenery is beneficial to reducing stress levels and providing recreational and enjoyment spaces, leading to enhanced mental wellbeing among urban citizens. Natural places assist to reduce stress and provide recreation and pleasure, leading to better mental health for city residents (Feng et al., 2025).

In the global evaluation, the importance of urban green space to foster social cohesion, community engagement and a sense of belongingness are stressed. These spaces are beneficial for the environment as well as hubs for various urban communities to meet and develop

meaningful connections. They offer cultural and recreational activities that enhance the quality of community life and foster a sense of community identity among its members. Urban green spaces are not just passive landscapes; they foster social connections and a sense of belonging within the community. These areas are shown to promote connections in communities and foster a sense of belonging, communal responsibility, civic engagement and cultural assimilation (Edeigba et al., 2024). Prominence should be given to the development and maintenance of urban green spaces in the development of harmonious and resilient, connected communities all over the world. Spending resources in these areas will ensure that they remain lively, available, and are a major part of the social fabric of our cities.

Conclusion

The global evaluation focuses on the role of green urban areas in improving environmental health and on the co-dependency of urban growth and ecological well-being. Urban green spaces have diverse impacts, which can be manifested in a number of ways. These areas are vital components of urban fabric as they also serve to provide habitats to conserve biodiversity, purify air, help control temperature and provide mental and physical benefits. With the growing process of urbanization that cities around the world are facing, the need for green spaces in the urban planning process can be emphasized. These are sustainability examples that provide solutions to the environmental and health problems associated with urban areas with high population density. Their role in ecological balance in urban settings is a crucial issue for the development of resilient, adaptable and healthier urban areas. This report highlights the need for global strategies for sustainable urban development. Urban Green Spaces combine urban development and the environment, infrastructure and people. A healthy environment for current and future generations is critical, and investing in urban green areas is essential to achieve this goal. The investment will be for improving the quality of life, resilience and wellbeing in cities rather than simply creating attractive spaces. The trend towards maintaining and promoting green spaces in all forms is likely to continue as cities develop, and the benefits they provide will be available to everyone, and help to build up the city, not only economically prosperous, but also alive, sustainable and natural.

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