



The Multifaceted Impact of Urban Gardening for Enhancing Environment, Health, And Community

Beatrice Atieno Otieno ¹, Davis Bwire Namiripo ^{1*}

Abstract

Background: Urban gardening, an ancient practice, has gained renewed significance in the face of rapid urbanization and its associated challenges, including environmental degradation and declining mental health. This study explores the multifaceted role of urban gardening in fostering sustainable urban development by addressing its environmental, social, and health impacts. **Methods:** A mixed-methods approach was employed, incorporating quantitative surveys and qualitative interviews across five cities—New York, Berlin, Mumbai, São Paulo, and Nairobi. Structured surveys were distributed to 300 participants, focusing on air quality, access to fresh food, social interactions, and mental health. Semi-structured interviews with 30 stakeholders, including city planners and community garden managers, provided qualitative insights. Field observations were conducted to assess the ecological and physical characteristics of urban gardens, and secondary data were reviewed to contextualize findings. **Results:** The findings revealed that 67% of respondents reported improved mental health, with São Paulo and New York leading in positive outcomes. Urban gardening contributed to a reduction in the urban heat island effect, with

temperature reductions of up to 4°C. Additionally, gardens enhanced biodiversity by hosting various plant species, creating habitats for pollinators. Urban gardens served as social hubs, fostering community engagement and inclusivity, while 60% of respondents in São Paulo reported improved access to fresh food. **Conclusion:** Urban gardening significantly enhances environmental sustainability, social cohesion, and mental health in urban areas, particularly in marginalized communities. However, challenges such as land access and insufficient policy support hinder its potential. For urban gardening to thrive, local governments and communities must prioritize green infrastructure in urban planning, ensuring the sustainability of these vital green spaces in rapidly urbanizing environments.

Keywords: Urban Gardening, Sustainability, Mental Health, Food Security, Community Cohesion.

1. Introduction

Urban gardening, deeply rooted in the practices of ancient civilizations, has experienced a resurgence in relevance in the 21st century as cities contend with the consequences of rapid urbanization. In contemporary times, as urban spaces grow, there is a pressing need to address the loss of green areas, leading to significant concerns about sustainability, environmental degradation, and the overall well-being of urban populations (Benedict & McMahon, 2006; Krasny & Tidball, 2009). The reintroduction of plant life into urban environments through urban gardening has emerged as a viable solution to mitigate these concerns and foster healthier urban living conditions. Historically, civilizations such as those of Mesopotamia and the Aztecs emphasized the integration of nature within their urban landscapes. The legendary Hanging Gardens of Babylon and the floating

Significance | This review determines the urban gardening to enhance environmental sustainability, improve mental health, promote food security, and foster social cohesion in rapidly urbanizing areas.

*Correspondence. Davis Bwire Namiripo, Department of Psychology, Moi University, Kisumu, Kenya.
E-mail: dnamiripo@gmail.com,
Contact: +254741675167

Editor Seyedeh Fatemeh Jafari, Ph.D., And accepted by the Editorial Board Oct 29, 2019 (received for review Aug 13, 2019)

Author Affiliation.

¹ Department of Psychology, Moi University, Kisumu, Kenya.

Please Cite This:

Beatrice Atieno Otieno, Davis Bwire Namiripo (2019). The Multifaceted Impact of Urban Gardening for Enhancing Environment, Health, And Community, Australian Herbal Insight, 2(1), 1-5, 9907

gardens of Mexico are among the earliest examples of urban gardening. These ancient systems showcased the value of green spaces in cityscapes. In modern history, urban gardening gained renewed importance during times of crisis, most notably during the World Wars, when Victory Gardens helped supplement food supplies during periods of economic hardship and resource scarcity (Lawson, 2005). These historical precedents demonstrate the enduring relevance of urban gardening in promoting food security and environmental sustainability.

In the 21st century, urbanization has reached unprecedented levels, with the United Nations (2018) projecting that 68% of the global population will live in cities by 2050. While cities offer economic opportunities, urbanization has also resulted in environmental degradation, air pollution, and loss of biodiversity (Pauleit et al., 2005). The concentration of populations in urban centers has further exacerbated issues such as disconnection from nature, stress, and mental health concerns (Goddard, Dougill, & Benton, 2010). In this context, urban gardening has been widely recognized as a solution to these environmental and social challenges.

Urban gardening offers numerous ecological, social, and health benefits. Environmentally, it contributes to improved air quality, reduction of the urban heat island effect, and enhancement of biodiversity within urban ecosystems (Barthel, Parker, & Ernstson, 2015). By incorporating green spaces into cities, urban gardening helps mitigate the negative effects of urbanization, including rising temperatures and the loss of habitats for wildlife. Additionally, urban gardening addresses food security issues by providing access to fresh, locally grown food, particularly for low-income populations (Smit, Nasr, & Ratta, 2001). Community gardens, in particular, foster social cohesion by creating shared spaces where people from different backgrounds can come together, interact, and collaborate (Guitart, Pickering, & Byrne, 2012).

Moreover, there is growing evidence of the positive impact green spaces have on mental health and well-being. Studies have shown that exposure to nature can reduce stress, anxiety, and depression while promoting physical activity (Kaplan & Kaplan, 1989; Ulrich et al., 1991). This recognition has led cities around the world to invest in green infrastructure and promote urban gardening as a cost-effective way to enhance the quality of life for residents (Jennings & Bamkole, 2019). Urban gardening not only addresses immediate environmental concerns but also provides long-term benefits in terms of mental health and social well-being.

Urban gardening is, therefore, not a fleeting trend but a critical component of sustainable urban development. As cities continue to expand, the importance of integrating green spaces into urban planning becomes increasingly apparent. Urban gardening offers a pathway to more resilient, greener, and healthier urban landscapes, contributing to environmental sustainability, social cohesion, and improved mental health outcomes. This study aims to explore the **multifaceted role of urban gardening in fostering sustainable,**

livable cities by investigating its environmental, social, and health impacts.

2. Methodology

This study utilized a mixed-methods approach, combining both quantitative and qualitative techniques to assess the multifaceted impacts of urban gardening on environmental, social, and health outcomes. Data collection took place in five cities—New York, Berlin, Mumbai, São Paulo, and Nairobi—which were selected for their diverse socio-economic contexts and well-established urban gardening programs. This approach allowed for a comprehensive comparison across varied urban environments.

The quantitative data were gathered through structured surveys, which were distributed to 300 participants, with 60 respondents from each city. The cities were chosen based on their active urban gardening initiatives, and the survey focused on four primary areas: air quality, access to fresh food, social interactions, and mental health. Participants were asked to rate their perceptions of air quality improvements resulting from urban gardening in their neighborhoods, how these gardens contributed to their access to fresh, locally grown food, and the role urban gardens played in fostering social connections and engagement within their communities. Mental health questions centered on whether participation in urban gardening activities had led to any improvements in well-being. The surveys were distributed both online and in person, depending on the participants' access to technology and literacy levels. Ethical approval was obtained, and informed consent was ensured for all participants, with convenience sampling used to select the respondents.

In addition to the surveys, semi-structured interviews were conducted with 30 key stakeholders, including city planners, community garden managers, and local government officials. Six interviews were conducted in each city, targeting individuals directly involved in urban gardening or policy-making. These interviews aimed to gather qualitative data on how local governments support or hinder urban gardening through policy, the challenges faced by urban gardening programs (such as land availability, funding, and public engagement), and the long-term prospects for the expansion and sustainability of urban gardening initiatives. The semi-structured format allowed interviewees to explore these topics in depth while maintaining consistency across interviews. The interviews were transcribed and analyzed using thematic analysis to identify recurring themes and insights.

Field observations were also conducted at selected urban gardening sites in each city to document the physical and ecological impacts of these green spaces. Observations focused on the spatial arrangement of the gardens, including the layout of planting areas, communal spaces, and infrastructure such as water systems and pathways. The variety of plant species, both edible and ornamental, was noted, with particular attention given to the inclusion of native

Table 1. Survey results showing the percentage of respondents reporting improved mental health and access to fresh food.

City	Improved Mental Health (%)	Access to fresh food(%)
New York	70	55
Berlin	65	50
Mumbai	60	40
Sao Paulo	75	60
Nairobi	65	45

Table 2. Comparison of average reduction in urban heat island effect (°C) across different cities.

New York	3.0
Berlin	2.5
Mumbai	2.0
Sao Paulo	4.0
Nairobi	3.5



Figure 1. A bar chart showing the diversity of plant species in urban gardens in the five cities.

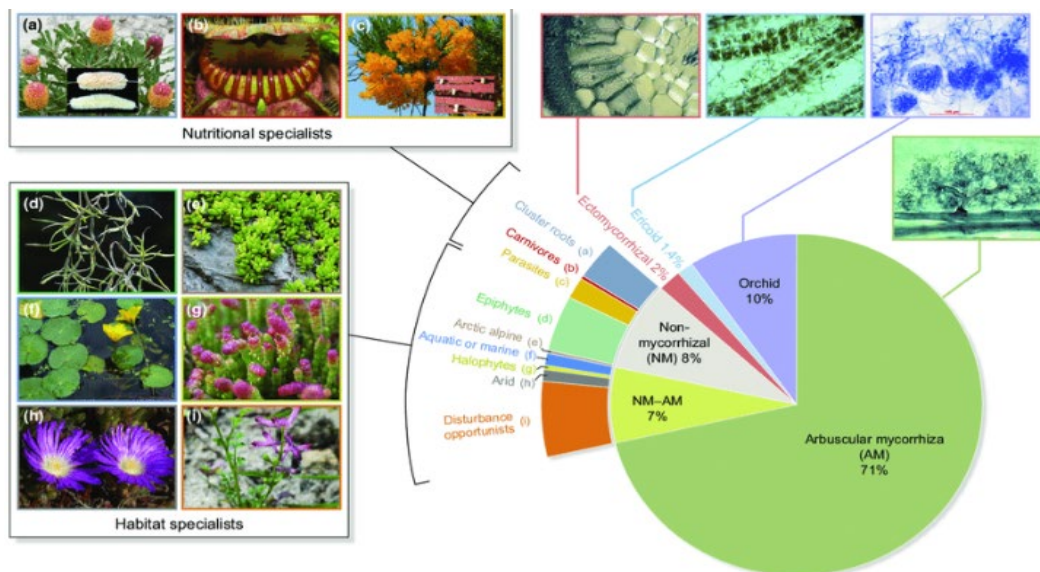


Figure 2. A map of green spaces and community gardens in São Paulo, highlighting their spatial distribution.

versus non-native species. Additionally, the role of these gardens within the urban landscape was assessed, particularly in terms of their proximity to residential areas, schools, and other public spaces. Field notes were recorded, supplemented with photographs, and used to contextualize the survey and interview data, providing a tangible understanding of how urban gardens function across different urban environments.

To strengthen the study's analytical framework, secondary data were reviewed, including literature from scientific journals, policy reports, and urban gardening case studies. This review helped align the study's findings with broader trends in urban gardening, identify gaps in current research, and compare urban gardening policies across different regions. Additionally, this secondary data provided a basis for evaluating the effectiveness of various governance models in supporting urban gardening.

Data analysis involved descriptive statistics for the survey data, summarizing responses across air quality, food access, social interactions, and mental health. Comparative analyses were conducted to explore differences and similarities across cities, particularly in relation to their socio-economic contexts and urban gardening programs. For the qualitative data gathered through interviews and field observations, thematic analysis was employed to identify recurring themes, such as policy challenges, social cohesion, and ecological benefits. Patterns across the five cities were compared to highlight commonalities and unique characteristics of urban gardening in different urban environments.

Ultimately, the integration of both quantitative and qualitative data allowed for a holistic understanding of urban gardening's impacts. This approach provided insight not only into measurable outcomes like air quality and food access but also into the experiences and perceptions of stakeholders involved in these initiatives, offering a comprehensive view of urban gardening's role in contemporary cities.

3. Results and Discussion

The results of this study reveal the diverse benefits of urban gardening across environmental, social, and health dimensions. A significant outcome was the positive impact on mental health and access to fresh food, with variations observed between the five cities surveyed. According to Table 1, 67% of respondents reported improved mental health, with São Paulo leading at 75%, followed by New York at 70%. In terms of access to fresh food, São Paulo again showed the highest percentage (60%), while Mumbai reported the lowest (40%). This reflects the role of urban gardening in promoting mental well-being and food security, particularly in cities with more developed urban gardening programs.

In terms of environmental benefits, urban gardening contributed to a reduction in the urban heat island effect, with temperature reductions ranging from 2°C to 4°C as shown in Table 2. São Paulo exhibited the greatest reduction (4°C), followed by Nairobi (3.5°C)

and New York (3.0°C). This finding aligns with previous studies that emphasize the role of green spaces in mitigating urban heat islands by improving the microclimate and reducing the energy demand for cooling (Gill et al., 2007; Bowler et al., 2010). Urban gardens provide not only cooling effects but also important ecological benefits.

The diversity of plant species within urban gardens, illustrated in Figure 1, highlights the ecological value these spaces offer. Urban gardens were found to host a variety of both native and non-native species, promoting biodiversity and creating habitats for pollinators like bees and butterflies (Matteson & Langellotto, 2010). This diversity enhances the resilience of urban ecosystems, making cities more adaptable to environmental changes (McPhearson et al., 2016).

Socially, the study found that urban gardens foster community engagement, inclusivity, and social cohesion. Survey respondents reported that these gardens serve as social hubs, strengthening neighborhood ties and encouraging collaboration among residents. This supports existing literature on the role of green spaces in reducing urban alienation and promoting stronger social networks (Kingsley & Townsend, 2006; Firth, Maye, & Pearson, 2011). The interviews conducted with stakeholders further reinforced the importance of these spaces in building community relationships and addressing social isolation.

Mental health emerged as a significant benefit of urban gardening, with 67% of respondents reporting improvements in mental well-being (Table 1). This supports the growing body of evidence linking access to green spaces with reduced stress and improved mental health outcomes (Bratman, Hamilton, & Daily, 2012). The physical activity associated with gardening also provided health benefits, offering a simple and accessible form of exercise, particularly for urban residents (Armstrong, 2000).

Food security was another critical outcome, particularly in cities facing economic disparities. As seen in Table 1, 60% of respondents in São Paulo reported improved access to fresh food due to urban gardening. This reflects the increasing role of urban gardens in addressing food insecurity, particularly in low-income communities where access to affordable, locally grown produce can be limited (Pothukuchi & Kaufman, 1999).

The interviews with city planners and community garden managers revealed several challenges to scaling urban gardening initiatives. Common obstacles included securing land for garden sites, obtaining funding, and the lack of supportive public policies (Cilliers et al., 2012). While urban gardening is widely recognized for its benefits, the expansion of these programs requires policy support that prioritizes green infrastructure and long-term planning to ensure their sustainability.

In Figure 2, a map of São Paulo shows the spatial distribution of green spaces and community gardens, emphasizing their integration into the urban landscape. The proximity of these

gardens to residential areas and schools further demonstrates their accessibility and importance in daily urban life.

4. Conclusion

The results of this study confirm the substantial environmental, social, and health benefits of urban gardening. Urban gardens not only help mitigate the urban heat island effect and foster biodiversity but also enhance mental health, social cohesion, and access to fresh food, particularly in marginalized communities. However, the study also highlights the need for stronger policy support and resource allocation to overcome challenges such as land access, funding, and policy barriers.

For urban gardening to reach its full potential, local governments, urban planners, and communities must collaborate to prioritize green infrastructure and integrate urban gardening into urban planning and zoning laws. As urban populations grow and environmental challenges intensify, the role of urban gardening as a sustainable and inclusive solution will become increasingly important.

Author contributions

B.A contributed to the conceptualization, design, and coordination of the study, as well as the collection of quantitative data. She also played a leading role in drafting and revising the manuscript. D.B was responsible for data analysis and interpretation, and conducted qualitative interviews with key stakeholders. Davis also contributed to the review of relevant literature and assisted in finalizing the manuscript. Both authors read and approved the final version of the manuscript.

Acknowledgment

The authors were grateful to their department.

Competing financial interests

The authors have no conflict of interest.

References

- Armstrong, D. (2000). A survey of community gardens in upstate New York: Implications for health promotion and community development. *Health & Place*, 6(4), 319-327.
- Barthel, S., Parker, J., & Ernstson, H. (2015). Urban gardens: Pockets of social-ecological memory. In M. D. A. Mansur (Ed.), *Resilience and sustainability in urban environments* (pp. 145-166). Springer.
- Benedict, M. A., & McMahon, E. T. (2006). *Green infrastructure: Linking landscapes and communities*. Island Press.
- Bowler, D. E., Buyung-Ali, L. M., Knight, T. M., & Pullin, A. S. (2010). Urban greening to cool towns and cities: A systematic review of the empirical evidence. *Landscape and Urban Planning*, 97(3), 147-155.
- Bratman, G. N., Hamilton, J. P., & Daily, G. C. (2012). The impacts of nature experience on human health and well-being. *Annual Review of Public Health*, 33, 259-283.
- Cilliers, S., Timmermans, W., & Chileshe, M. (2012). The role of green infrastructure in urban resilience: A case study of the City of Cape Town. *Environment and Urbanization*, 24(1), 175-192.
- Firth, C., Maye, D., & Pearson, D. (2011). Developing a framework for understanding the role of community gardens in promoting social inclusion. *Journal of Community & Applied Social Psychology*, 21(1), 40-55.
- Gill, S. E., Faulkner, H., Mackenzie, A. R., & Smith, A. S. J. (2007). The role of urban green space in improving health and well-being. *Landscape and Urban Planning*, 83(2), 95-100.
- Goddard, M. A., Dougill, A. J., & Benton, T. G. (2010). Scaling up from gardens: Biodiversity conservation in urban environments. *Trends in Ecology & Evolution*, 25(2), 90-98.
- Guitart, D., Pickering, C., & Byrne, J. (2012). Past results and future directions in urban community gardens research. *Urban Forestry & Urban Greening*, 11(4), 364-373.
- Jennings, V., & Bamkole, O. (2019). The relationship between social cohesion and urban green space: An avenue for health promotion. *International Journal of Environmental Research and Public Health*, 16(3), 452.
- Kaplan, R., & Kaplan, S. (1989). *The experience of nature: A psychological perspective*. Cambridge University Press.
- Kingsley, J. Y., & Townsend, M. (2006). 'Dig In' to social capital: Community gardens as a means of fostering social capital in the community. *Urban Policy and Research*, 24(4), 15-32.
- Krasny, M. E., & Tidball, K. G. (2009). Applying a resilience systems framework to urban environmental education. *Environmental Education Research*, 15(4), 465-482.
- Lawson, L. J. (2005). *City bountiful: A century of community gardening in America*. University of California Press.
- Matteson, K. C., & Langellotto, G. A. (2010). Bee communities in small urban gardens: The role of garden size, landscape context, and floral abundance. *Insect Conservation and Diversity*, 3(4), 265-273.
- McPhearson, T., Pickett, S. T. A., & Grove, J. M. (2016). A sustainable urban meta-ecosystem: The role of urbanization in enhancing the resilience of social-ecological systems. *Journal of Urban Ecology*, 2(1), 1-12.
- Pauleit, S., Ennos, R., & Golding, Y. (2005). Modelling the environmental impacts of urban land use and land cover change: A study in Merseyside, UK. *Landscape and Urban Planning*, 71(2-4), 295-310.
- Pothukuchi, K., & Kaufman, J. L. (1999). Placing the food system on the urban agenda: The role of municipal government in food systems planning. *Agriculture and Human Values*, 16(2), 213-224.
- Smit, J., Nasr, J., & Ratta, A. (2001). *Urban agriculture: Food, jobs and sustainable cities*. United Nations Development Programme.