Green Gentrification: A Literature Review of Trends, Challenges, and Research Opportunities

Marta Dell'Ovo[1,2(✉)], Giulia Datola[1], Daniela Maiullari[3], Alessandra Oppio[1], and Martina Schretzenmayr[4]

[1] Department of Architecture and Urban Studies (DAStU), Politecnico di Milano, via Bonardi 3, 20133 Milan, (MI), Italy
marta.dellovo@polimi.it
[2] NBFC-National Biodiversity Future Center, 90133 Palermo, Italy
[3] Faculty of Architecture and the Built Environment, Delft University of Technology, Julianalaan 134, 2628 BL Delft, The Netherlands
[4] Institute for Spatial and Landscape Development, ETH Zurich, Stefano- Franscini-Platz 5, 8093 Zurich, Switzerland

Abstract. Green infrastructure projects, while enhancing environmental quality, often unintentionally exacerbate socioeconomic inequalities through "green gentrification." This phenomenon leads to rising property values, demographic shifts, and the displacement of vulnerable populations, raising critical concerns about social justice in urban greening. This study systematically reviews the literature to examine how the distribution of and access to green spaces contribute to green gentrification and explores strategies to mitigate its effects. Based on the analysis of peer-reviewed studies in urban planning, green infrastructure, and social dynamics, four key themes emerge: (i) the spatial and health outcomes of greening interventions, (ii) the socioeconomic impacts of green spaces on property values and resident demographics, (iii) the social justice challenges faced by marginalized communities, (iv) the role of urban policies in moderating gentrification.

The findings reveal that while urban greening initiatives provide significant environmental and health benefits, these are often inequitably distributed, disproportionately benefiting wealthier populations and displacing vulnerable groups. Studies highlight the importance of integrating affordable housing policies with green infrastructure projects. This approach aims to prevent the displacement of low-income residents while enhancing urban sustainability and inclusivity. Methodologies employed in the reviewed studies—such as spatial analysis, community surveys, and economic assessments—highlight the complex interactions between green infrastructure, housing markets, and social equity.

By outlining implications for policy and future research, this study provides a foundation for shaping urban greening strategies that balance environmental goals with social equity, ensuring sustainable and inclusive urban development.

Keywords: Green gentrification · Spatial analysis · Socioeconomic studies

Marta Dell'Ovo: The author belong to NBFC—National Biodiversity Future Center, 90133 Palermo, Italy

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1 Introduction

In contemporary urban studies, green gentrification is a critical phenomenon that highlights the intersection of environmental improvements and socioeconomic displacement [1, 2]. Investments in urban green spaces—such as parks, green roofs, and tree-lined streets—have become integral to urban planning as cities increasingly prioritize sustainability and climate resilience. Despite their beneficial environmental and public health impacts, these interventions often lead to unexpected consequences such as rising property values, exacerbating social inequalities, and the displacement of low-income residents [3].

Anguelovski et al. [4] provide an interesting overview about the conceptualization of "green gentrification", "ecological gentrification", and "environmental gentrification", explaining how the most relevant literature is situated in the US and Canada, and is defined as the output of the "restoration of an environmental amenity" [5]. Moreover, the concept of urban sustainability is central to promoting a holistic vision and approach.

Environmental Justice is central to understanding green gentrification [6, 7]. It emphasizes the fair distribution of environmental benefits across all social groups, particularly marginalized and disadvantaged communities [8]. Green gentrification could be considered a paradox since these initiatives aim to promote sustainability and livability but unintentionally contribute to social exclusion if not managed carefully [9]. Improving the attractiveness of a neighborhood could result in increasing property values, housing prices, and the consequent displacement of residents, especially the working class [9, 10]. SocioEconomic Equity is vital within green urbanism [3, 11], and to understand the leading factors that influence gentrification, it is important to look at the overall picture by analyzing positive and negative impacts as well as relationships among several variables.

The tangible and intangible values provided by the natural capital are well-known as Ecosystem Services (ESs) and are categorized with the support of the Millennium Ecosystem Assessment [12–14]. They improve air quality, reduce Urban Heat Island Effects (UHI), and enhance well-being, but since green areas are not equally distributed, wealthier populations can disproportionately benefit [15]. Disservice could be generated if not correctly designed and managed [16]. The rising demand for green neighborhoods often increases housing costs, making it difficult for lower-income residents to remain in their communities and access these environmental benefits. Moreover, the framework of Ecosystem Services is crucial in contemporary urban cities affected by climate change and non-communicable diseases [17–20]. Their provisions are related to Regulating Services such as climate regulation, Provisioning also related to medicinal resources, and Cultural, consisting of cultural, spiritual, and aesthetic values aimed to promote mental and physical health [14, 21, 22]. Integrating ESs and disservices in urban decision-making processes could raise awareness, communication, and support community participation, thus contributing to a more equitable greening planning decisions on the side of the process and of the outcome [23]. Urban policies would be strategic in this context in mitigating the negative impact of new green interventions and developing inclusive strategies that interplay climate adaptation, social need, and economic value [24]. The criticisms detected could underpin the request for an equity-based climate

action and sustainable strategies while exploiting existing gaps and competing political values [9].

Given these premises, this paper examines the multidimensional impacts of green gentrification by comprehensively reviewing recent literature and comparing key findings on environmental justice and socioeconomic dimensions. After an introduction of the main topics related to the issue investigated by the paper (Sect. 1), the methodology developed to analyze the literature review is presented (Sect. 2), and contributions selected are compared and main findings and gaps discussed (Sects. 3 and 4). The conclusions (Sect. 5) aim to provide some possible new lines of research.

2 Research Methodology

An analysis of the literature review has been developed from September to October 2024 to understand how other studies have faced the concept of green gentrification, and from which perspective. Using the Scopus database, the search started by using the keywords "green gentrification" and "urban" to limit the context of the analysis. 165 papers were found initially, written between 2014 and 2024, and then, by filtering to European studies, the number decreased to 88 articles. It has been decided to limit the analysis to the European context because non-EU urban contexts, such as the US, have very different social dynamics that are not comparable with those under study in this research. As discussed by [4], most of the contributions on this topic come from American and Canadian scholars, who have primarily focused on experiences within their own national contexts. This paper, however, aims to explore whether the dynamics identified in those studies remain consistent or take on different forms when examined in a different geographical and socio-political setting.

The 88 papers have been further filtered considering the coherence of the title and the topics discussed within the abstract. At the end of these phases, 24 articles were analyzed (Fig. 1).

Fig. 1. Literature review's phases

Papers have been analyzed by considering the year, the country, the objectives, the primary methodologies applied, the results obtained from the case study, if present, how the concept of green gentrification has been discussed, if the research applies Geographic Information System (GIS) software to provide spatial analysis and which criteria have been defined how useful and with an impact for the topic. Table 1 shows an extract of the more extensive literature review developed for the 24 papers.

Table 1. Example of the structure of the literature review [1, 2, 8, 25–29].

Author(s)	Title	Year	Nation	Objective	Methodology	Results	Case Study	Green Gentrification	GIS Analysis	Criteria Analyzed
Cole et al.	Are green cities healthy and equitable? Unpacking the relationship between health, green space and gentrification	2017	Multiple (Global)	Analyze the relationship between urban health, green spaces, and gentrification	Comparative qualitative analysis of health and green space data across different global cities	Green spaces promote health but also increase the risk of displacement and inequality	Various cities	Green gentrification leads to better health outcomes for some while excluding or displacing lower-income residents.	No	Health outcomes, green spaces, equity, gentrification.
Ali et al.	Gentrification through green regeneration? Analyzing the interaction between inner-city green space development and neighborhood change	2020	Germany	Investigate the interaction between green regeneration and neighborhood change in Leipzig	Case study method using qualitative analysis of urban planning and demographic data	Green regeneration led to significant demographic shifts and increased property prices	Leipzig, Germany	Green regeneration attracted wealthier residents, resulting in gentrification and displacement of lower-income groups.	Yes	Neighborhood change, green regeneration, property prices, demographic shifts.
Goossens et al.	Livable streets? Green gentrification and the displacement of longtime residents in Ghent, Belgium	2020	Belgium	Investigate the impacts of street greening on displacement of long-time residents	Qualitative interviews, spatial analysis using GIS tools	Green street projects in Ghent led to displacement of vulnerable populations	Ghent, Belgium	Street greening projects were linked to gentrification and displacement of longtime residents.	Yes	Displacement, long-time residents, street greening projects.
Maia et al.	Hidden drivers of social injustice: uncovering unequal cultural ecosystem services behind green gentrification	2020	Multiple (Global)	Explore how cultural ecosystem services (CES) relate to social justice in green gentrification	Mixed methods: qualitative interviews, quantitative CES assessments	Unequal access to cultural ecosystem services drives social injustice in urban greening	Various cities	Hidden dynamics behind CES exacerbate green gentrification and social inequities.	Yes	Cultural ecosystem services, social justice, access inequality.
Bockarjova et al.	Property price effects of green interventions in cities: A meta-analysis and implications for gentrification	2020	Multiple (Global)	Analyze the effect of green interventions on property prices and potential for gentrification	Meta-analysis of previous studies examining property price effects	Green interventions systematically increase property prices, with high potential for gentrification	Multiple global cities	Green interventions drive up property prices, contributing to gentrification trends.	No	Property prices, green interventions, meta-analysis, gentrification risk.
Blok	Urban green gentrification in an unequal world of climate change	2020	Global	Examine how urban greening and climate change are interconnected with gentrification	Qualitative theoretical framework exploring climate change, urbanization, and green gentrification	Urban greening projects in the context of climate change exacerbate existing inequalities	Global	Urban green projects aimed at climate resilience often lead to gentrification, especially in unequal urban settings.	No	Climate change, urban greening, inequality.
Alexandrescu et al.	Green gentrification as strategic action: Exploring the emerging discursive and social support for the Green Tree Strategy in Porto Marghera, Italy	2021	Italy	Analyze the discursive strategies and social support for a green gentrification project in Porto	Discourse analysis, social network analysis	The Green Tree Strategy garnered strategic discursive support despite risks of gentrification	Porto Marghera, Italy	Social and discursive support for green gentrification emerged in the context of broader environmental strategies.	No	Discourse analysis, green gentrification strategies, social support.
Triguero-Mas et al.	Exploring green gentrification in 28 global North cities: the role of urban parks and other types of greenspaces	2022	Multiple (Global)	Explore the relationship between urban parks, other greenspaces, and green gentrification	Comparative analysis using GIS tools and demographic data	Urban parks and greenspaces were closely linked to gentrification trends across several cities	28 cities, Global North	Parks and other greenspaces are significant contributors to green gentrification, particularly in the Global North.	Yes	Urban parks, greenspaces, gentrification, demographic shifts.

3 Comparative Analysis

The selected studies approach green gentrification from multiple perspectives, focusing on the interplay between urban greening and socioeconomic dynamics. A key objective of many articles is to examine how the introduction or revitalization of green spaces contributes to gentrification. Research by [3, 26, 29] explores how green infrastructure projects drive up property values, often making neighborhoods unaffordable for long-term, lower-income residents. These studies analyze the tension between environmental benefits and rising living costs, highlighting the displacement risks marginalized populations face.

Another crucial focus is the social inequalities and environmental justice concerns tied to green gentrification. Studies such as those by [8, 30, 31] emphasize the uneven distribution of green spaces and how marginalized communities are often excluded from their benefits. Historically, it has been determined by zoning laws [32] and uneven distributions of public infrastructure funding [33]. It started to be recognized as a racial phenomenon, and the effect is contemporarily defined as racial residential segregation [34]. More recently, the concept that the new regeneration project brings to the mechanism of unaffordable living costs and higher rents has raised concerns. By investigating how green interventions reinforce these consolidated racial and economic inequalities, the studies underscore the importance of equitable access to natural capital through specific practices such as land recognition and more equitable access to housing.

Policy and governance are also central themes in the literature. Research by [35, 36] assesses the role of urban planning in shaping green development outcomes. These studies examine whether policies mitigate or exacerbate green gentrification, focusing on the effectiveness of affordable housing initiatives and collaborative governance models in ensuring that the advantages of urban greening are distributed more fairly.

Some studies take a socio-spatial and health-oriented approach, analyzing how green spaces reshape urban demographics and influence public health. Articles by [1, 37] employ spatial analysis to track neighborhood transformations following green interventions while also considering both the positive effects, such as improved air quality and well-being, and the negative consequences, particularly for displaced communities.

Finally, a few studies adopt a long-term and cross-city perspective to assess the broader impacts of urban greening. Research like [38] examines historical patterns of green infrastructure development, providing insights into how past urban planning decisions continue to shape contemporary gentrification dynamics. This longitudinal approach offers a deeper understanding of how cities evolve and how green gentrification unfolds over extended periods.

Figure 2 shows the central cluster of topics discussed within the literature analysis carried out with the support of the VOSviewer software tool.

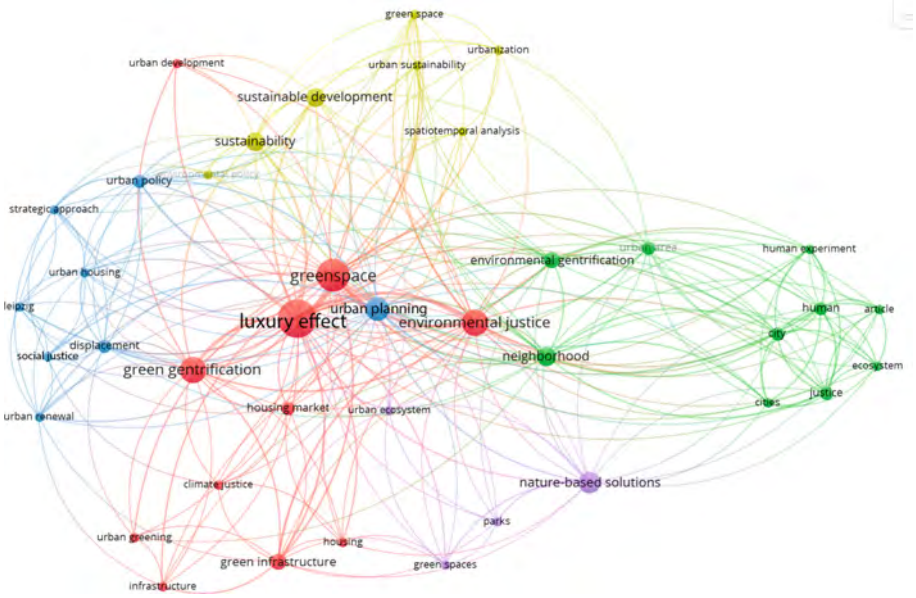

Fig. 2. Keywords analysis (VOSviewer software).

3.1 Methodologies Applied

The studies on green gentrification employ a range of methodologies to capture its complexities. Qualitative approaches, such as interviews and focus groups, are frequently

used to explore residents' lived experiences affected by urban greening. Research by [25, 28] highlights displacement's social and emotional impacts, providing valuable insights into how communities perceive and respond to these changes. Qualitative analysis supports catching the perception of the community involved, its subjective experiences, and investigating the intangible values in play.

In contrast, quantitative methods and spatial analysis, mainly through Geographical Information Systems (GIS), offer a broader, data-driven perspective. Studies like those by [3, 37] examine shifts in property values and demographic patterns, illustrating how proximity to new green spaces often correlates with rising housing costs and the displacement of lower-income residents. These techniques enable researchers to visualize and statistically analyze the spatial dimensions of green gentrification. Distributing and visually representing the output of the analysis could support policymakers in urban decision-making processes and in engaging non-expert actors.

Meta-analysis also plays a crucial role in synthesizing findings across different contexts. For example, [8, 26] provide a comparative perspective on the economic impacts of urban greening, revealing overarching trends in housing market fluctuations following green infrastructure projects. Comparing previous analyses and case studies supports reading possible future dynamics.

Some studies adopt a mixed-methods approach, integrating qualitative and quantitative techniques to provide a more comprehensive analysis. Amorim Maia et al. [8] exemplify this strategy by combining resident interviews with statistical data, allowing for cross-validation of findings and a deeper understanding of the socioeconomic dynamics at play. By utilizing this diverse array of methodologies, researchers can capture green gentrification's structural and personal dimensions, offering a more holistic view of its impacts.

3.2 Analysis of the Results

The studies collectively highlight the environmental benefits, and the social inequalities associated with urban greening. Green infrastructure projects have been shown to contribute to healthier urban environments, e.g., improving air quality and mitigating urban heat islands [3, 29]. However, these benefits are not socio-spatially equitably distributed. Low-income residents, who could benefit most from such improvements, are often displaced before they can experience them. This phenomenon, known as green gentrification, underscores the unintended social consequences of urban greening when policies fail to protect vulnerable populations. Gentrification and displacement emerge as recurrent themes in the literature. Rising property values following the introduction of green spaces often lead to the relocation of long-term, lower-income residents. This process has been documented in cities such as Ghent [25], Lyon, Amsterdam, and Wien [30], where demographic shifts favor wealthier newcomers at the expense of pre-existing communities. These changes disrupt social cohesion and alter the socio-cultural fabric of neighborhoods, reinforcing socioeconomic divides. Green spaces are frequently introduced in previously underserved areas, yet their benefits often remain out of reach for the communities that once lived there [8, 30]. This reveals a deeper structural problem in urban planning, where environmental justice is not merely about creating green spaces

but ensuring equitable access to them and protecting marginalized populations from displacement.

Governance and policy failures further complicate the issue, and research shows that urban greening can exacerbate socioeconomic disparities when affordable housing and inclusive planning are not prioritized [35, 36]. At the same time, some cases demonstrate that collaborative governance and community-led planning can help mitigate these effects by ensuring that environmental improvements do not come at the cost of social equity.

A key paradox in the discussion of green gentrification concerns public health. While green spaces are widely recognized for their positive impacts on mental and physical well-being, these benefits are often inaccessible to displaced communities [1]. As a result, marginalized and vulnerable communities that would most benefit from urban greening are frequently excluded from its advantages, highlighting the urgent need for policies that integrate environmental improvements with social protections.

This body of research collectively underscores the dual nature of urban greening. While it offers crucial environmental and health benefits, it also reinforces socioeconomic inequalities when implemented without safeguards for vulnerable populations. Addressing these challenges requires a more holistic approach to urban planning that balances ecological sustainability with social justice.

4 Critical Challenges and Research Opportunities

The studies propose various strategies to counteract green gentrification and promote more equitable urban development. A key approach is integrating affordable housing policies with green infrastructure projects to ensure that low-income residents are not displaced. Research by [36] emphasizes the need for proactive planning measures, such as mixed-income housing initiatives, rent control, and subsidies, to maintain affordability in neighborhoods undergoing greening efforts.

Fostering community participation and collaborative governance could be another strategy to understand the community's needs and avoid unexpected impacts. [35] highlight the importance of engaging residents in decision-making to ensure that green projects reflect the community's needs. Cities can create more inclusive planning models prioritizing social equity and environmental improvements by bringing residents, policymakers, and developers together to promote different ways of living for the various needs of the communities in the area.

Monitoring and regulation also play a crucial role in preventing displacement. Studies like [3] suggest that tracking property values, demographic trends, and green space accessibility through tools such as GIS mapping can help policymakers identify early signs of green gentrification. This data-driven approach allows for timely interventions to protect vulnerable populations from being priced out of their neighborhoods.

Finally, targeted investments in public housing and equity-focused green initiatives within the same neighborhood can help ensure marginalized communities benefit from urban greening. Research by [8] underscores the importance of designing green spaces for all. The paper highlights the importance of providing public amenities and infrastructures to offer the opportunity for social cohesion. Communities should appropriate

and live in those spaces, moving from the aesthetic vision of a green space to a usable vision to improve livability, promoting their active involvement in the design phase.

By prioritizing inclusive development [8], cities can balance the environmental and social benefits of urban greening while mitigating its unintended consequences.

A step forward within the existing literature, to advance research on green gentrification and offer valuable insights for urban planning, future studies should focus on several key areas. First, conducting longitudinal research is crucial for tracking the long-term effects of green gentrification; by observing how property values, demographics, and health outcomes change, researchers can better understand its lasting impacts. Additionally, comparing different cities, as shown in the work of [29], can reveal how green gentrification manifests differently in various urban contexts.

A highly innovative and impactful approach involves integrating socioeconomic, spatial, and health data, paving the way for more comprehensive and equitable urban planning strategies. Combining data on socioeconomic factors, spatial analysis (such as GIS), and public health can help researchers understand how proximity to green spaces influences community health and social well-being. For example, correlating housing data with health metrics, such as asthma rates or mental health issues [39, 40], could provide a clearer picture of both the benefits and challenges of urban greening.

Understanding community perceptions and willingness to engage is also key. Future research should investigate how residents perceive and engage with green infrastructure projects. Studies like those by [8, 25] highlight the importance of exploring local perspectives on the changes brought by greening efforts.

Moreover, evaluating existing urban policies aimed at mitigating green gentrification is key. Researchers should examine case studies of cities successfully implementing inclusive green development policies. This can provide valuable empirical data to assess the effectiveness of these policies and help develop new solutions.

Finally, with climate resilience becoming a critical concern in urban planning, future research should explore how greening initiatives, such as flood defenses, green roofs, and sustainable infrastructure, might contribute to climate gentrification. Understanding the interplay between climate adaptation efforts and socioeconomic displacement, as noted in studies by [3, 27], is crucial for addressing the equity challenges in green urban development.

5 Conclusions

The literature analyzed shows that green gentrification can be understood as a complex process where environmental improvements in urban areas, such as creating or enhancing green spaces, unintentionally lead to the displacement of low-income residents and exacerbate social inequalities. The following elements characterize the process: i) environmental benefits and economic costs: greening projects bring tangible ecological benefits, such as reduced pollution, lower temperatures, and improved public health. However, these benefits often have economic impacts that disproportionately affect vulnerable populations, leading to increased property prices, rental fees, and demographic shifts. ii) social and racial inequities: green gentrification compounds existing inequalities, especially in marginalized communities. Wealthier residents benefit from the new

amenities, while lower-income populations are either displaced or excluded from the benefits.

Based on the literature, different gaps emerge, which consist in the i) geographical distribution of these studies, mainly located in North American and Western European contexts; the ii) analysis of the effects of green infrastructure on socio-spatial transformations over time; the iii) lack of public health outcomes; iv) the tendency to have top-down assessment; the v) lack of evaluation framework for planning tools; vi) understanding how to replicate policies.

In conclusion, several key approaches should be considered to address the complex dynamics of green gentrification in future research. First, collecting socioeconomic and spatial data through GIS tools can offer valuable insights by mapping changes in neighborhood demographics, housing prices, and proximity to newly developed green spaces over time. This will help identify patterns of gentrification that may be linked to greening efforts, providing a clearer understanding of how these projects impact urban areas. Despite the importance of integrating and georeferencing information, data availability is a topic to consider while developing consistent methodologies.

Additionally, analyzing health and well-being indicators is crucial for assessing the broader effects of green gentrification on public health. Researchers can gain a more holistic view of green spaces' impacts on urban populations by collecting data on respiratory health, mental well-being, and other relevant outcomes alongside greening interventions.

Engaging directly with local communities through interviews, focus groups, and surveys is another vital aspect of the research process. This will allow a deeper understanding of residents' perceptions of green spaces, displacement, and accessibility. Including marginalized groups is significant, as their voices can shed light on the social justice implications of green gentrification, ensuring that all community members are considered in the process.

Finally, evaluating the effectiveness of existing urban policies to prevent green gentrification is essential. This combination of qualitative and quantitative analysis will offer valuable insights into what works and what needs improvement in policy development.

Incorporating these research methods will provide a comprehensive, multidimensional analysis of green gentrification, helping to develop actionable and replicable policy recommendations that can guide more equitable and inclusive urban greening efforts moving forward.

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