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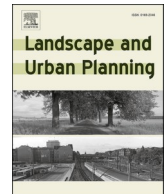
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Greening the city: An analysis of socio-spatial disparities through urban gardening practices in Lille and Lyon (France)

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HIGHLIGHTS

- Participatory greening initiatives are becoming increasingly prevalent to green cities.
- Community gardens and greening licenses are two forms of participatory initiatives.
- Participatory greening programmes fail to mitigate environmental injustices.
- Greening licenses tend to concentrate in neighbourhoods with higher average incomes.
- Community gardens appear to occur more frequently in more disadvantaged neighbourhoods.

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ABSTRACT

Over the past three decades, urban gardening initiatives have proliferated in cities. The community garden has emerged as a global model for participatory urban greening. To date, few studies have engaged on greening licenses. These schemes have emerged in French cities along community gardens to green the interstices of urban space, such as the feet of trees or holes in pavements. The role of urban gardening in reducing urban environmental injustice is debated in the literature. The cities of Lille and Lyon (France) were selected for study to investigate the geographical distribution of participatory greening initiatives according to the socio-economic profile of neighbourhoods. By comparing the location of community gardens and greening licenses, the role of institutional and associative frameworks in making these schemes accessible to the population was highlighted. A mixed methodology combining statistical and cartographic analysis with qualitative fieldwork was employed. The findings suggest an uneven distribution of greening initiatives in the two cities. The concentration of greening licenses in neighbourhoods with higher average incomes than those hosting community gardens highlights the barriers to participation faced by the most disadvantaged sections of the population. However, the concentration of community gardens managed by charities in these neighbourhoods emphasises the fact that one of the conditions for environmental justice is to support initiatives in working-class neighbourhoods with specific policies. Our results provide useful insights for policymakers on the types of support that should be implemented to ensure that participatory greening initiatives benefit as many people as possible and do not perpetuate urban social and environmental injustice.

1. Introduction: Expanding urban participatory greening

In recent years, urban planners and citizens have increasingly promoted greening strategies to effectively strengthen urban resilience (Meerow, Newell, & Stults, 2016). Green infrastructure provides a range of environmental, social and health benefits to urban neighbourhoods (Bourdeau-Lepage, 2018). Urban vegetation produces ecosystem services (e.g. supporting biodiversity, reducing local temperatures, improving urban air quality or managing stormwater) (Bolund &

Hunhammar, 1999; Dearborn & Kark, 2010). Proximity to natural elements also helps to improve physical and mental health (Kaplan & Kaplan, 1989), increases social cohesion (Coley, Sullivan, & Kuo, 1997), reduces crime (Kuo & Sullivan, 2001) and speeds recovery from surgery (Ulrich, 1984).

Faced with the challenge of global climate change, cities are trying to develop their green infrastructure by implementing planting programmes. Planting initiatives cover a vast panel of actions, some led by municipalities as parks and street trees, others by companies as urban

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farms and finally others by residents as community gardens and guerrilla gardening (Adams & Hardman, 2014; Campbell, 2015). The benefits of urban agriculture include access to food, maintenance of green spaces in areas dominated by the built environment, citizen's empowerment and a new kind of experience of nature (Reynolds, 2015). Participatory greening initiatives have become increasingly active since the end of the 20th century, responding to the need for participation in building a sustainable city, as it had been raised since the Rio Summit (1992). The economic crisis of the 1960 s and 1970 s led to the emergence of grassroots communities in US cities (Lawson, 2005). The first community gardens appeared in the late 1970 s in the United States (Berkeley, California) with the mobilisation of citizens around the People's Park (Basset, Baudalet, & Roy, 2008). In 1973, Liz Christy established the Green Guerrillas in New York with the objective of increasing the number of urban greening operations. This was achieved by the use of seed bombs, which were dropped on unoccupied urban land (Reynolds, 2015). The appropriation of urban wasteland for greening purposes, as it appeared in North America, was widely interpreted as the expression of a right to the city, the demand for an alternative way of making the city (McClintock, 2014). However, cities were swift to endorse these initiatives. As early as 1978, the City of New York created the "Green Thumb" urban gardening programme, offering residents plots at a rental fee of \$1 a year (Reynolds, 2015). These models served as a catalyst for the development of collective gardening in France from the late 1990 s onwards. In 1996, a French private foundation, the *Fondation de France*, became interested in innovative gardening initiatives and funded meetings between gardening organisations at its headquarters in Paris, between 1996 and 2003. Additionally, the *Fondation de France* funded two study trips for French non-profit organisations to Montreal (Canada) in 1996 and New York City (United States of America) in 1997. Then, it co-financed meetings in Lille (1997) and Nantes (1999) which were attended by representatives of Canadian and American organisations, including Guerrilla Gardening from New York City (*Le jardin dans tous ses états*, 1997). In 2002, French representatives of community garden organisations were invited by the *American Community Gardening Association* to New York City to present their emerging network. In 2003, the City of Paris extended an invitation to representatives of New York's community gardens to participate in the launch of "Main verte", the City of Paris' programme dedicated to community gardens (Basset et al., 2008; Baudalet-Stelmacher, 2023). This event marked the beginning of a period of rapid expansion of greening initiatives throughout France supported by the creation of a national network for community garden organisations called *Le jardin dans tous ses états*. Other participatory greening models have also emerged, especially when large enough plots were unavailable to initiate a community garden. In 2003 a municipal gardener in Lyon (France) initiated an experiment to plant pavement cracks with residents (Denis, 2010). With the assistance of municipal authorities, the experiment was extended, and incisions were made

voluntarily in the pavements to be planted by residents. The authorisation granted to residents to plant pavements is gradually being extended to the foot of trees and to flower boxes in public lands (Bally, 2018, 2023; Deschamps, 2019). This novel model of participatory urban greening spread in other French cities due to its capacity to develop vegetation more extensively in urban settings, circumventing the limitations of available land in contrast to community gardens (Deschamps, 2024; Ramos, 2018). Their development has also benefited from the media coverage of the Incredible Edible movement in Great Britain (Giacchè & Porto, 2018). For a decade, these pavement initiatives were known by different names, depending on the city (e.g. *jardin de rue* or *micro-implantation florale*), despite operating in very similar ways. In 2015, the city of Paris chose the name "greening license" for its programme. The phrase was a resounding success, with numerous French cities adopting it, including those that already had a similar programme but renamed it. In the present day, community gardens and greening licenses represent the two principal forms of participatory greening programmes in French cities (Fig. 1). Both initiatives operate in a similar manner, with residents undertaking initiatives on public lands which are subject to authorisation and control by the local council. The development of participatory greening programmes in France is a response to the need to green public spaces in an era of austerity (Rosol, 2010), but also to the hope that residents' participation will lead to a fair and equitable greening of urban spaces.

Our work builds upon existing research in the fields of urban political ecology, environmental justice, and citizen participation. The objective of this study is to identify the contextual economic, social and political factors that impede or facilitate participation in municipal-led greening programmes. The study focused on Lille and Lyon, two French cities that were at the vanguard of the development of participatory greening programme at the state level. The goal of this study was to (1) ascertain the distribution of residents' greening initiatives inside cities, (2) uncover the differences between community gardens and greening licenses in terms of socio-economic context, and (3) identify the economic, social and structural barriers and facilitators that explain the unequal distribution of greening initiatives. Finally, we discuss how greening programmes can better address the concerns of a just and resilient city by understanding the needs of inhabitants in terms of resources for a public land-based gardening project.

2. Spatial inequalities and urban gardening

2.1. Social inequalities and urban segregation

Since the 1970 s, radical geography has sought to deconstruct social relations of domination and to take account of the spatial dimension of inequalities (Castells, 1970; Harvey, 1973; Smith, 1984). Space is conceived not simply as a medium for studying the location of



Photographs by the author, 2020.

Fig. 1. Community garden and greening licenses in France.

inequalities, but as an element whose characteristics and design play an active role in the reproduction of social inequalities. The study of inequalities focuses not only on the created configurations, but also on the ways in which inequalities are reproduced or constrained by social, spatial or political dynamics (Soja, 2010). The work of Pierre Bourdieu is an important step in understanding the processes through which inequalities are reproduced. For Bourdieu (1979, 1980, 1994), inequalities are the result of the unequal distribution of different capitals, i.e. different resources, different material and immaterial advantages, between populations. These resources are the result of individuals' previous social affiliations and play a crucial role in the mechanisms for reproducing individual and collective social positions. This concept of capital has made it possible to go beyond a strictly economic study of inequalities and to consider the role of other types of immaterial resources in the reproduction of social inequalities.

The spatial dimension of inequalities is reflected at the urban level through the phenomenon of segregation, which refers to the social division of the city (Burgess, 1924; Roncayolo, 1972; Lefebvre, 1974). Segregation is not limited to a deliberate form of discrimination. It is defined as the result of inequalities in the resources and social position of residents (Préteceille, 1995). For Harvey (1973), segregation is a structural element of the capitalist production of space. Social division is inscribed in urban space, while the division of urban space guarantees the reproduction of social classes. Urban social segregation affects people's living conditions. Spatial mismatch (Kain, 1968), for example, highlights the impact of segregation on the employment opportunities of the most disadvantaged groups. Segregation is thus a source of spatial injustice (Lehman-Frisch, 2009).

2.2. Environmental injustice: Can greening initiatives solve the problem?

The environmental justice theory emerged as a specific dimension of social justice applied to natural amenities. Initially, research works on environmental justice focused on the exposure of the most vulnerable sections of the population to risks and pollution (Agyeman, 2005; Schlosberg, 2013) before taking into account access to green amenities, especially in urban contexts (Anguelovski, 2016).

The unequal distribution of green amenities prevents just transition and the implementation of just and resilient cities (Agyeman, 2005) despite being part of the UN Sustainable Development Goals (SDG 10, 11 & 16). It has been demonstrated that urban green infrastructures are concentrated on wealthier neighbourhoods (Heynen, Kaika, & Swyngedouw, 2006; Sister, Wolch, & Wilson, 2010). Furthermore, they have been found to increase nearby property values (Garcia-Lamarca et al., 2021) and to spur gentrification in some contexts (Anguelovski et al., 2022; Dooling, 2009; Gould & Lewis, 2016; Wolch, Byrne, & Newell, 2014). Historical drivers such as redlining in the North American context (Locke et al., 2021; Nowak, Ellis, & Greenfield, 2022) or urban renewal (Roman et al., 2018) as well as structural differences in urban form (Heynen, 2003) and a lack of municipal plans (Kolosna & Spurlock, 2019) have contributed to persistent disparities. The "green space paradox" has been identified as the social limit encountered by numerous urban greening initiatives of disadvantaged neighbourhoods, the initiative being the start to a social displacement rather than being able to mitigate it (Pearsall & Eller, 2020).

The unequal distribution of green infrastructures has been described as the "tip of the iceberg" of environmental injustice (Zuniga-Teran, Gerlak, Elder & Tam, 2021), participation and recognition being the two others levers for justice (Schlosberg, 2004). More recently, studies on urban gardening as part of the green infrastructures have demonstrated how this practice can be employed as a mean of challenging injustice (Certomà & Martellozzo, 2019; Milbourne, 2012; Reynolds, 2015). This resistance to neoliberal urbanism (Certomà & Tornaghi, 2019; Rosol, 2012) can be understood as a form of everyday environmentalism (Loftus, 2012). Thus, urban agriculture has been linked to social inclusion. It offers opportunities for recent immigrants to maintain elements

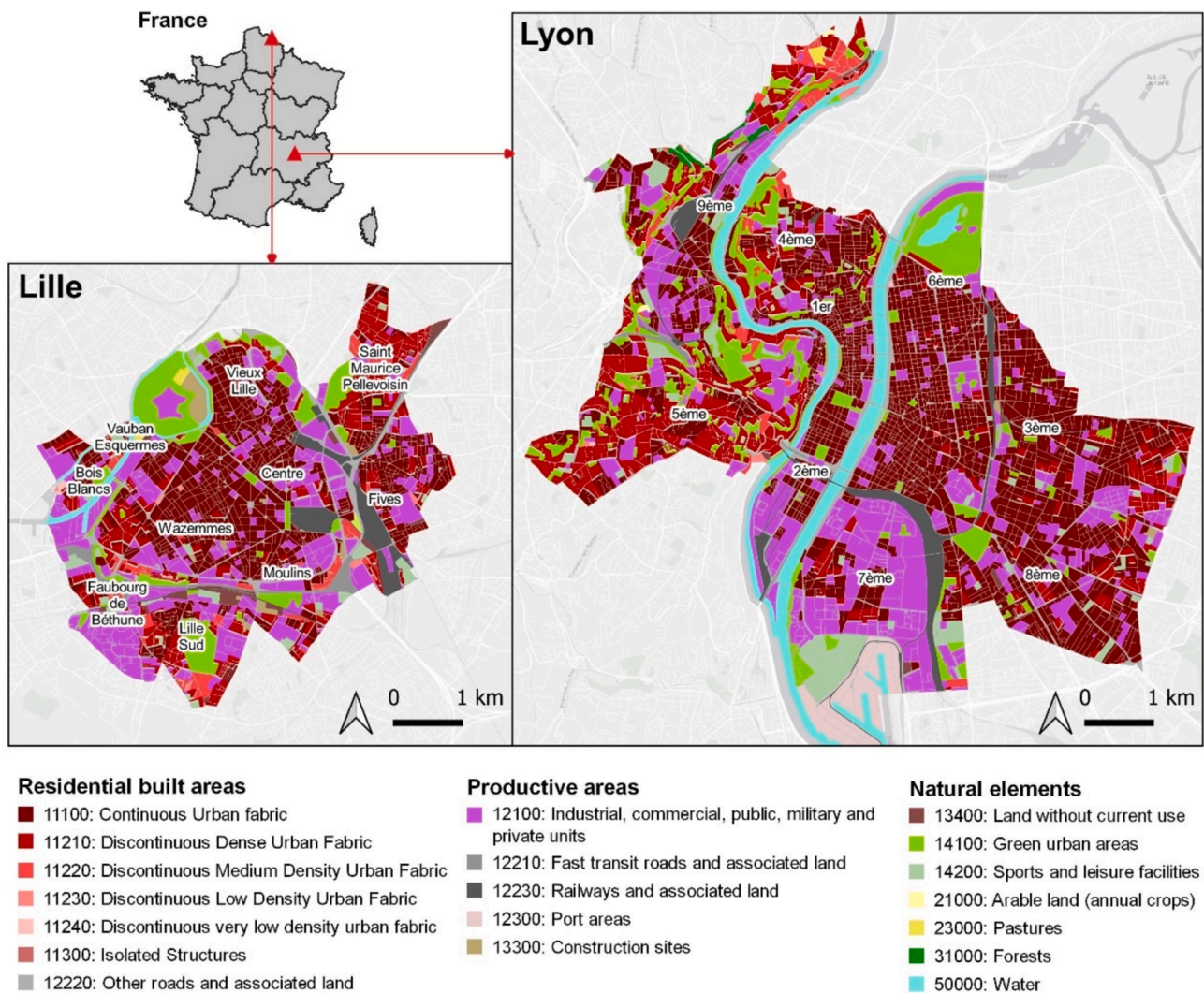
of their cultural heritage by growing foods from home that are not easily accessible in their new environment (Gerodetti & Foster, 2016; Hynes, 1996). It can also be an access to fresh food for disadvantaged communities (Tornaghi, 2017). More broadly, it has been interpreted as a demand for a right to the city (Apostolopoulou & Kotsila, 2021). At the same time, urban agriculture has been characterised by the prevalence of white gardeners and the reproduction of racial and socioeconomic disparities among practitioners (Cohen & Reynolds, 2014; Paddeu, 2012; Reynolds, 2015). A study on the social composition of participants in some Parisian community gardens has shown how they form a "entre-soi" (Mestdagh, 2017) representing the desire to live with one's own socio-economic group. Analyses of the residents involved in these programmes have yielded contrasting conclusions regarding the role of greening initiatives in combating or reproducing environmental injustices (McClintock, 2014). Still, few studies have sought to examine participatory gardening practices through the lens of the areas in which they take place, attempting to adopt both a sociological and a geographical perspective. Certomà & Martellozzo (2019) observed that less urban gardening initiatives can be found in the wealthier residential areas in the West and North of Roma (Italy). However, they did not examine the social and political processes that help to explain resident (non-)participation. Furthermore, there is a lack of knowledge regarding the following: (a) the impact of new forms of urban greening initiatives, such as greening licenses, on the unequal distribution of green amenities in cities, (b) the factors that motivate or prevent residents from participating in such initiatives, and (c) the extent to which municipal actions through greening programmes mitigate or exacerbate social inequity.

3. Methods

3.1. Study areas

We have chosen two French cities as case studies because they have been involved in urban greening programmes for a long time and have many initiatives that could be observed. Lille and Lyon are also trying to position themselves as showcases for urban greening in France. Although almost all French metropolises and medium-sized cities have participatory greening programmes, these two cities are pioneers at the national level: Lille is the first French city to host a community garden and Lyon experimented very early institutionalised street gardening. The choice of these two cities was also driven by the fact that they both articulate greenery to a very different socio-economic context and different urban and architectural past.

Lille, situated in the north of France, is considered as one of the most economically disadvantaged metropolitan area in the country, a consequence of its industrial heritage. The city covers an area of 22 sq. km with 16 % of natural areas, 55 % of residential built areas and 29 % of productive areas (Urban Atlas, 2018, Fig. 2). The disentanglement of industries in the 20th century resulted in a significant number of residents falling into poverty. In 2020, the city had a population of 236,234 people, with a poverty rate of 27 % and a median annual income of € 20,520 per consumption unit (INSEE, 2024a). Since the 1950 s, the city has consistently been governed by a socialist mayor. The decline of industrial activity has resulted in the proliferation of vacant sites within the city limits. This led to the emergence of community initiatives to reengage these spaces. Indeed, the city's industrial past has given rise to very vivid communities and to a plethora of social experiences. This context of great vitality led to the establishment of the very first community garden in France, in Lille in 1997, in the Moulins neighbourhood with the help of a non-profit organisation, *Les Amis des Jardins Ouverts mais Néanmoins Clôturés* (AJONC). This was the culmination of the inaugural gathering on this subject in France (*Le jardin dans tous ses états*, 1997). The oceanic climate, with no dry season, that characterises Lille, partly explains why the municipality did not feel concerned by the urban challenges of global warming until quite late in the day. In 2019,



Data: European Union's Copernicus Land Monitoring Service information, Urban Atlas Land Use 2018.
DOI: <https://doi.org/10.2909/1b4dffa1-6ceb-4cc0-8372-1ed354c285e6>

Fig. 2. Localisation and land uses of case studies.

the municipality initiated a greening licenses programme, which followed the example of French cities, including Lyon.

Lyon, located in the centre-east of France, is the third most populated city of the country with a population of 522,228 people in 2020. The poverty rate was 16 % and the median annual income of € 25,430 per consumption unit (INSEE, 2024b). The city covers an area of 48 sq.km with 18.8 % of natural areas, 57.6 % residential built areas (including the city centre which is covered by a UNESCO World Heritage site) and 23.6 % of productive areas (Urban Atlas, 2018, Fig. 2). Due to its geographical location, the city is characterised by a warm temperate climate and is particularly vulnerable to averaged temperatures increasing and urban heat island (Alonso & Renard, 2020). Since the 1990 s, the city has developed an important policy towards urban ecology, leading to numerous experiences in urban greenery. The city is known in France for its innovative urban trees' politics since then. In the early 2000 s, the city experimented a pioneering participatory planting programme in the streets which subsequently evolved into greening licenses. The inaugural community garden appeared not long after the first one in Lille (Asaad, 2016) in 2000, supported by the non-profit organisation *Passe-Jardins*. Following nearly three decades of a centre-left municipal majority, an ecologist mayor was elected in 2020 in Lyon, providing a new impetus to the city's environmental policy.

These two cities have developed several programmes aimed at greening public spaces with the help of residents (Fig. 3). Participation is a broad term that includes consultation operations, self-organisation by residents and workshops run by the municipality. An overview of the different programmes implemented by these two cities reveals at first a standardisation of the greening tools available to cities. Lille and Lyon deploy almost the same programmes on a similar timeline. However, they have a slightly different positioning. Lyon tends to develop the theme of nature in the city through the prism of the climate issues facing the city, while Lille is more concerned with developing its green infrastructure by relying on the help of residents, including in public spaces, through the organisation of workshops where residents can help the city's gardeners maintain public parks. These different approaches are understandable given the history of these two cities.

This article focuses on community gardens and greening licences because of the proximity of these two programmes. They are the only two schemes that directly involve residents in the greening of public spaces after signing a charter. Allotments differ in that they are private spaces (owned by the city or other) and have a very specific social history (Consalès, 2018). Consultations and orchards are not the same form of participation, as they do not involve residents in the greening of public spaces. School playgrounds, on the other hand, involve a very

	Lille	Lyon
Allotment gardens	X <i>19th century</i>	X <i>19th century</i>
Community gardens	X <i>1997</i>	X <i>2000</i>
Greening licences	X <i>2019</i>	X <i>2003</i>
Marauding orchards	X <i>(n.d.)</i>	X <i>2020</i>
Public-owned educational farm	X <i>(n.d.)</i>	X <i>2020</i>
Participatory planting: planting workshop open to the public	X <i>(n.d.)</i>	
Schoolyards planted with the participation of pupils	X <i>2020</i>	X <i>2020</i>
Consultation on urban planning to promote nature in the city	X <i>2017 (revision of town planning schemes)</i>	X <i>2018 (consultation on climate in the city)</i>
Participatory budgeting with urban nature identified as a priority)	X <i>2018</i>	X <i>2023</i>
French Capital of Biodiversity	X <i>2012 (elected with a project entitled "biodiversity and citizenship")</i>	X <i>2019 (elected with a project entitled "climate: nature as a source of solutions")</i>
European Green Capital	X <i>2021 (shortlisted for the final)</i>	X <i>2022 (application)</i>

Fig. 3. Participatory greening programmes in Lille and Lyon, with their starting dates.

specific public: children.

3.2. Methodology

We relied on a three-step methodology that combined quantitative and qualitative methods. The first step involved mapping the locations of residents' greening initiatives in Lille and Lyon through field inventory and the creation of a GIS database. The second step was a spatial analysis crossing green initiatives data with a socio-economic variable. Our final step was the interpretation of our spatial analysis results with qualitative fieldwork. Qualitative and quantitative studies are usually developed separately. However, we believe that they are truly complementary to understand social practices within a spatially explicit context. Quantitative analysis was performed to determine the spatial pattern of greening initiatives in our two cities, thereby going beyond the common idea of a "green city" evenly invested by residents' initiatives. Then, qualitative survey enabled us to explicate our first results by determining the reasons for the spatial pattern, according to inhabitants' and municipalities' discourses.

3.2.1. Mapping inhabitants greening initiatives

We constructed our own georeferenced database about inhabitants' initiatives in Lyon and Lille. All available data were either fully missing (in the case of greening licenses) or incomplete (in the case of community gardens). The non-profit organisations in Lille (AJONC) and Lyon (*Passe-Jardins*) had a map of community gardens on their website. However, these maps refer to a very broad definition of collective gardening (e.g. including urban farms, gardens on private land) and were not being regularly updated. We therefore decided to complete and verify these databases with our own inventory.

We inventoried initiatives through a walking method. A systematic exploration of each street in each city was conducted, with the initiatives being categorised according to their type (e.g. community garden or greening license), some characteristics and their location (with a GPS). The inventory was conducted in Lyon between February 2019 and December 2019, and in Lille between June 2019 and October 2020. The

time constraints imposed by the necessity to complete the inventory in a limited timeframe precluded the possibility of conducting simultaneous explorations of both cities. Moreover, the Covid-19 pandemic significantly reduced mobility in France during the year 2020, necessitating an extended fieldwork period in Lille. Field visits were carried out during all four seasons. Greening licences were therefore identified either by the presence of a plant, even a bare one, or by the layout of the pavement (hole, flower box or panel).

Then, the inventory was imported into a GIS, thereby enabling the exhaustive mapping of initiatives in each city.

3.2.2. Exploring the spatial pattern of greening initiatives: Socio-demographic variable

Our analysis focuses on income-inequity. The median annual income of individuals is a census variable made available by the French Institute of Statistics and Economic Studies (INSEE) on a grid of 200-metre square. This grid was particularly well-suited to our research as it provided statistics at a very fine level, which is particularly interesting in urban dense contexts. The geometric grid also allowed to get rid of potential biases, such as those resulting from administrative divisions, and ensured to be as close as possible to our data which were highly precise. Indeed, during our qualitative fieldwork we were able to corroborate our hypothesis that those involved in greening initiatives reside in near to their respective initiatives. All the interviewees we met with did live on the same street as their greening initiative. A fine spatial resolution grid seemed then appropriate for the study of the effects of income on the distribution of initiatives.

To combine these data with our georeferenced base, we attributed to each point referring to an initiative the annual median income corresponding to its cell. Thus, we constructed a database linking each initiative to its surrounding median income. To enable a comparison between Lyon and Lille which are subject to differing socio-economic conditions, a control database was created comprising all cells in each city. This allowed the distribution of initiatives to be examined according to annual mean income compared to the distribution of income in each city.

To investigate the existence of socio-spatial inequity in the distribution of inhabitants' initiatives, univariate statistics were calculated for each indicator in comparison to the statistics at the city scale.

3.2.3. Qualitative fieldwork

The final stage of the research process involved a return to fieldwork but this time through qualitative methods. A total of 59 interviews were conducted during fieldwork in each city with actors involved in urban greening, whether it was greening licenses or community gardens, at any level. The objective of the qualitative fieldwork was to confront our quantitative findings to local politics and practices. This would enable us to ascertain how disparities are born and if they are acknowledged by actors involved. Beyond the mere observation of the spatial and social distribution of greening initiatives, we intended to unpack the motivations that prompt residents to become involved in such initiatives, or to the opposite, the barriers that prevent some from participating. We also aimed to present the measures and interventions implemented by municipalities to develop urban greening initiatives and to assess their impact on the actual participation of residents.

For that purpose, two distinct categories of interviewees were targeted. The first category consisted of municipal actors, including elected officials and municipal employees. The second category comprised residents engaged in greening initiatives through community gardening or greening licenses. Interviews followed a semi-structured interview guide, which was adapted to each category of actors. Six municipal actors were interviewed in Lyon and five in Lille. The questions were about the municipal greening politics, its history and actors, their spatial strategy and the difficulties encountered. A total of 33 residents were interviewed in Lyon and 15 in Lille. The questions were about their motives in greening public land, the history of their initiatives, their social networks, and their relationship to municipal actors. Interviews were in French, translation in this article was made by the author.

4. Results

4.1. The distribution of greening initiatives through the city

4.1.1. An uneven geography of participatory greening programmes

Residents' greening initiatives are less developed in Lyon than in Lille (Fig. 3). We inventoried 1,070 initiatives in Lyon and 1,444 in Lille which, related to the total area of the city, means 22.7 initiatives per square kilometre in Lyon and 65.6 initiatives per square kilometre in Lille.

The map in Fig. 4 illustrates that inhabitants' initiatives to green their city are not evenly distributed in Lyon and Lille. While some neighbourhoods have no initiatives at all, others seem to have many. In Lyon, three main neighbourhoods appear to gather most initiatives: Croix-Rousse, Guillotière and Montchat. Secondary locations also gathered numerous initiatives, although they are less dispersed and exhibit a greater degree of restraint as in Grand Trou. Similarly in Lille, three main areas for initiatives can be identified: Fives, Wazemmes and Esquermes. In contrast to Lyon, these centres are far more extended in the city. Then the city of Lille seems more invested by inhabitants' initiatives than Lyon. Secondary locations, which are less extensive, can be identified in the Vieux-Lille, Porte de Douai and Saint Maurice – Pellevoisin.

However, community gardens and greening licenses do not exhibit the same pattern of growth. Firstly, the number of greening licenses is far more important than community gardens. Small green patches can be easily multiplied and distributed throughout the city's interstices whereas community gardens depend on the availability of vacant land. Suitable plots are scarce in densely built-up metropolises such as Lille and Lyon. A total of 43 community gardens were inventoried in Lyon, while 17 were inventoried in Lille. In contrast, 1,027 greening licenses were counted in Lyon, and 1,427 in Lille. Fig. 4 shows that community gardens are not always situated in the same neighbourhood as greening licenses. Furthermore, greening licenses tend to be very concentrated

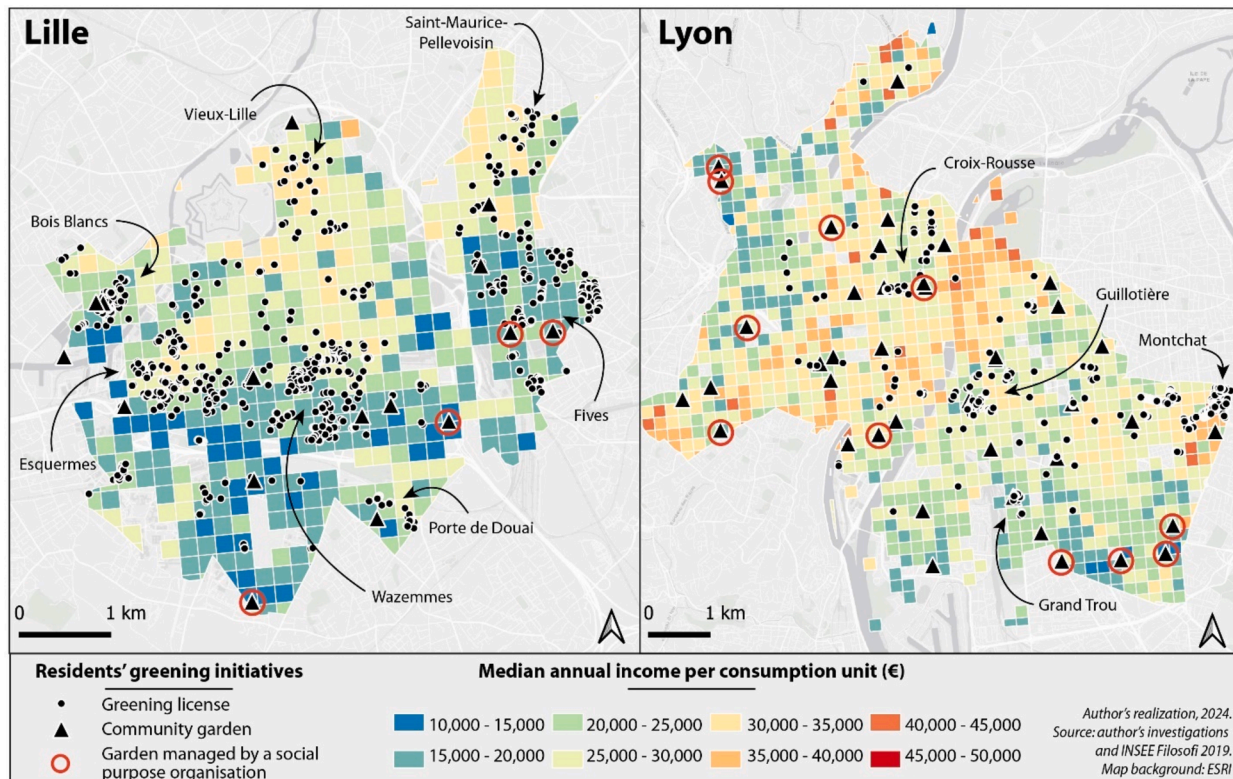


Fig. 4. Distribution of community gardens and greening licenses in Lille and Lyon.

whereas community gardens tend to be isolated in the city, hence a greater dispersion of community gardens.

These differences in the spatial distribution of greening licenses and community gardens in our case studies prompted us to examine a socio-economic criterion to characterize the planted neighbourhood.

4.1.2. Community gardens and greening licenses' differentiated geography

As shown in Fig. 5, the mean annual median income per consumption unit for cells welcoming greening licenses in Lyon is € 29,551.04, while for cells welcoming community gardens it is € 27,445.9. In contrast, the city mean is € 27,445.9. In Lille, the mean annual median income for cells with greening licenses is € 23,116.22 and with community gardens it is € 19,282.51 whereas the city mean is € 22,641.36. The difference in wealth between Lyon and Lille is significant and this is reflected in the economic distribution of initiatives. In fact, the distribution of initiatives observed in our two case studies is similar. Greening licenses are more prevalent in slightly above-average neighbourhoods, whereas community gardens are more common in poorer areas. In both cases, initiatives appear to be lacking in the wealthiest neighbourhoods. Greening licenses are also rare in the poorest neighbourhoods of both cities.

The results of the statistical and cartographic analysis indicate that greening initiatives are unevenly distributed in the two cities studied, depending on the median income of the neighbourhoods. The analysis also sheds lights on a distinction between the neighbourhoods where community gardens are situated and those where greening licenses are

granted. We now try to understand the reasons for these disparities, both at the urban level and within the greening programmes.

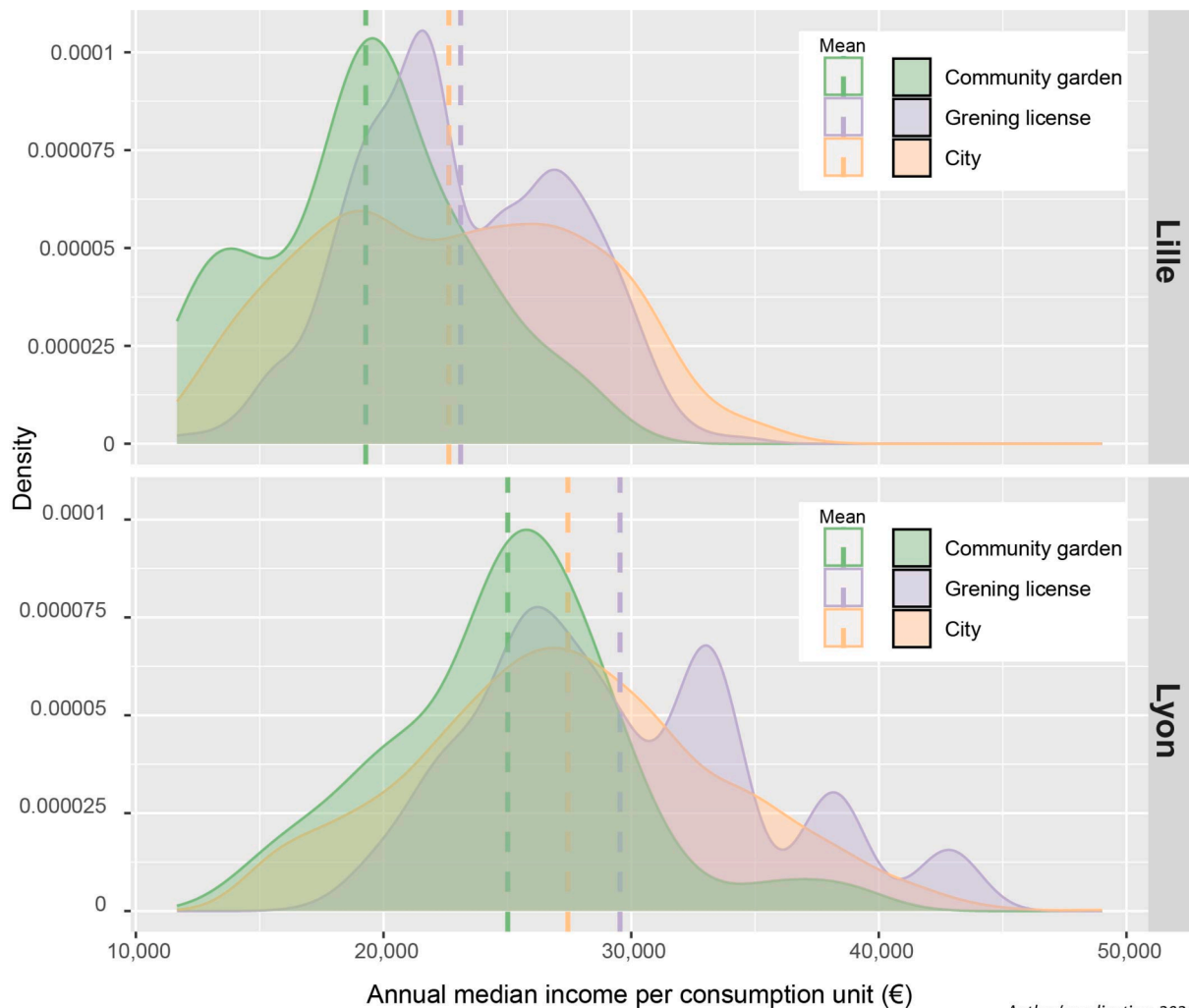
4.2. The inhabitants' ability to participate: A factor of the uneven distribution of greening initiatives

4.2.1. The municipality support as a tool to develop greening initiatives

The participatory greening programmes in Lille and Lyon were launched in the 2000 s. From the outset, these programmes were supported by the municipalities:

"It was never really wild, they [the residents] had always had the agreement of someone. It could be an oral agreement, there was an elected official who said yes yes, go ahead [...]. It's never unauthorized because there's always someone from the townhall who knew about it or who initiated things". City community garden project manager, Lyon, April 2019.

The initiatives are overseen by greening charters drafted by municipal authorities and signed by residents. These charters typically include commitments such as "to garden in an ecological manner" (nature and garden life officer, Lille, October 2020) and "not to do just anything" (environment officer, Lyon, April 2019). However, the initiative is ultimately at the discretion of the residents, who are the primary actors in requesting municipal approval to cultivate a designated area. The procedure is analogous for both community gardens and greening licenses. The residents identify an area of public land that they would like to



Author's realization, 2024.

Data : Author's investigation, INSEE Filosofi 2019.

Fig. 5. Income distribution considering the presence of greening initiatives in the neighbourhood.

plant. In most cases, they contact their local town hall, which then refers them to the administrative procedure set up by the central town hall. This procedure requires the residents to submit a file describing their project, its location, the area it covers and the names of the residents who will be involved. Based on this file, the municipality grants or refuses permission to the residents to take over the public domain. Should authorization be granted, the municipal authority may proceed with some preliminary work (e.g. fencing off a plot for a community garden, adding topsoil, removing the gate at the foot of a tree, cutting a hole in the pavement) and provide an official sign to be displayed near the garden area:

“And sometimes that’s important because some residents don’t understand why some people go to community gardens and others don’t. They see it as privatization. So, the fact that there’s a town sign legitimizes the action. It’s true that we’ve had some feedback on that”. City community garden project manager, Lyon, April 2019.

The process of institutionalisation has been identified as a factor that contributes to the development of greening initiatives. The involvement of residents is facilitated by the knowledge that they are supported by the municipality and that their actions are conducted within an official framework. Thus, these initiatives are more likely to be sustained over time, as one resident notes: “when you’ve gone through a lot of troubles to build planters, fill them with soil and decorate them, you’d rather they stayed! The best way for ensuring the project’s acceptance and preventing its withdrawal is to reach an agreement with the green space department” (Lyon, April 2019). City support is an important driver for the spread of local initiatives. However, the role of the city can be even more upstream. For instance, Lille has chosen to target certain streets based on known requests from residents and the potential for greening that is has identified (in terms of technical feasibility or climate resilience opportunity):

“In some neighbourhoods, we are working more closely with the neighbourhood councils to put out calls for projects in micro-sectors of about 2–3 streets, where we will take a more proactive approach. The local council will go door-to-door, offering people the possibility to get a greening licence, and then we will offer a climbing plant so that people are interested in getting involved at that particular time”. Nature and garden life officer, Lille, October 2020.

This proactive approach tends to favour the planting of climbing plants, rather than ground plants, as the supposed visual and ecological effect is greater. It also targets neighbourhoods with very similar characteristics: the city of Lille prefers to deal with owners of individual dwellings to simplify the administrative process. While tenants can sign the charters and plant ground flowers in the hole in the pavement, they need their landlords’ permission to grow plants on their facades. The city of Lyon, on the other hand, does not seek to initiate projects and confines itself to its role of support and guidance and does not aim to develop climbing plants in particular.

The residents we interviewed feel that support from the municipality is necessary for them to engage in greening public spaces. Some even hope for support that is not only administrative but also material, such as the supply of plants for their initiatives each season, and not at the beginning only. However, cities want to make residents more “autonomous” (City community garden project manager, Lyon, April 2019), for example by limiting plant donations and encouraging the development of residents’ self-help networks. Municipalities’ main motivation is to ensure that residents’ initiatives do not increase the workload of council staff, who have limited human and financial resources, once the project is up and running. They support intermediary actors to pursue these objectives.

4.2.2. A programme without municipal planification but with some help from non-profit organisations

Until 2020, Lyon was not promoting greening licences and knowledge of the programme is mainly spread by word of mouth. This lack of publicity is deliberate on the part of the city, which is afraid of receiving

more requests than it can deal with and is relying solely on an “oil slick” diffusion (city community garden project manager, Lyon, April 2019). Residents become aware of the programme through observing the activities of their neighbours, or by virtue of their involvement in local groups close to the municipal authority, such as neighbourhood councils, where they can interact with elected representatives. However, since the introduction of a public and more transparent process, the geography of greening licence applications has not changed. New applications continue to be located in neighbourhoods that already have greening licences. On the contrary, Lille has set itself targets for the number of new greening licences since their beginning, even if this means stimulating demand through door-to-door campaigns: the city is counting on a “snowball effect” (nature and garden life officer, Lille, October 2020). Today, both Lille and Lyon promote greening licences on their websites and through their local newspaper and the application for greening licences is entirely paperless.

The community garden model is based on a less individualistic approach. There are two levels of involvement of non-profit organisations. The first is at city level, the second at garden level. Lille and Lyon each have a non-profit organisation that is the local branch of the national network *Jardin dans tous ses états*. These are *Passe-Jardins* in Lyon (founded in 1999) and *Amis des Jardins Ouverts mais Néanmoins Clôturés* (AJONC) in Lille (1997). In both cities, the non-profit organisations are funded by the city council to provide support to community gardens that have signed a charter. They offer training courses for gardeners (about organic gardening techniques or the management of a community garden for instance) and maintain the network of local gardeners by distributing small advertisements for bartering (e.g. seeds, straw, tools). They also help to raise awareness of the city’s community gardens by organising events open to the public, such as garden festivals, activities for heritage days, urban walks, etc. The role of the AJONC in managing the gardens is more important than the *Passe-Jardins*. They are funded under Lille’s social urban policy and must place more emphasis on the social aspect of their activity than the *Passe-Jardin*, which focuses on the environmental aspect of gardening. For municipalities, the role of these organisations is to complement the work of the city in supporting the gardens, as the action of the city should cease once the gardens have been inaugurated.

At the garden level, two types of organisations can be identified: organisations established specifically with the purpose of overseeing the garden and pre-existing organisations. Most of these associations are social purpose organisations, including reintegration associations, youth centres and neighbourhood committees. 4 community gardens in Lille and 11 in Lyon are overseen by pre-existing organisations (Fig. 3). These specific kind of community gardens tend to be set in the lowest-income neighbourhoods of both Lille and Lyon. The average mean income of neighbourhood hosting pre-existing associations’ community garden is € 17,556.47 in Lille and € 22,590.29 in Lyon.

There is a clear distinction between community gardens situated in neighbourhoods with the lowest standard of living and operated by charities, and community gardens operated by non-profit organisations whose sole objective is to provide a garden, which are then situated in neighbourhoods with an average standard of living that is comparable to that of the neighbourhoods where greening licenses are granted.

4.2.3. Residents’ capital: A barrier to participation?

The challenges encountered by residents who have initiated greening projects independently appear to contribute to the uneven distribution of initiatives. First and foremost, the completion of the application form requires a good understanding of the French language and an access to digital technology, two possible barriers. The form requires skills in putting together an application and some knowledge of the French administrative system. It is essential to demonstrate the feasibility of the project and its value to the local authority. It is necessary to convince the municipality that the project is beneficial and to propose a project that is located solely on public land and complies with town planning

regulations (e.g. pedestrian accessibility, plants toxicity). What's more, municipal officials who process applications are particularly interested in files that include maps, drawings, or photomontages of the project. In the case of a community garden project, it is necessary for residents to establish a non-profit organisation by registering it with the prefecture (in France, prefectures are the administrative centre that register non-profit organisation). These are all skills that must be mobilized, which is why the people behind these projects tend to be highly qualified and have jobs that require them to have these kinds of skills, such as architects, managers, etc. On the other hand, existing organisation use the community garden as a mean of offering new activities to their members, employing the skills they already possess within their association, which typically comprises a few employees. For instance, community garden permits the pursuit of more advanced gardening activities, which necessitates greater investment of time, tools and effort. An organisation in Lille, situated in the most impoverished area of the city, asserts that "the population has other priorities than looking after nature here [...] and that things need to be presented differently" (Lille, July 2020). The success of the garden is contingent upon the recruitment of young residents by getting them involved in the structural work through the utilisation of jackhammers to cut through the asphalt of the future garden area. Young children and mothers from the neighbourhood are more likely to take part in the gardening activities that follow. However, these pre-existing organisations do not apply for a greening license because they are seeking to develop activities that can gather groups of people. Therefore, the location of greening licenses on the restricted space of the pavement is unsuitable.

Greening licenses make it possible to carry out an activity that requires minimal time, because of their concentration on very small areas. However, without the support of an organisation, the financial cost of greening is borne exclusively by the residents who are spearheading the initiative. Income inequalities can play an important role here. While some residents are "happy to spend ten euros every three months" (resident interview, Lyon, April 2021), for others the upkeep cost becomes too unaffordable on a regular basis. This is due to the necessity of replacing damaged plants, paying for water for watering and acquiring the necessary tools and topsoil. Individuals are not eligible to any public grants as, according to the French law, only non-profit organisation can apply for grants from local authorities.

In one hand, procedural capital seems to be a predictable barrier to local participation. On the other hand, gardening skills do not seem to form such an obstacle. Several residents claim to be amateurs during our interviews, with one woman from Lille confiding that she "doesn't know anything about gardening, it's another member of the garden who tells me what to do as she goes along" (Lille, September 2020). This amateurism can also prove counterproductive, with gardeners in Lille stressing how much it costs them not to maintain the plants they have bought. Learning to garden involves both experimentation and training. This can involve gardeners sharing their skills, with the latter referring to someone in the group who knows a little more than the others, like the woman from Lille above. Residents also turn to organisations funded by local councils and the leaflets they produce. At first sight, not knowing how to garden does not seem to be a barrier to participation. However, in certain situations, the relationship between gardening knowledge and participation can prove to be conflictual and a real barrier to participation. Training courses run by organisations and advice from town halls are promoting ecological gardening based on the principles of permaculture. This gardening technique is becoming the norm in community gardens and greening licences, promoted by the charters. However, there is no consensus among residents.

In a charity garden in Lyon, the employee in charge of the garden clearly recognised that the ecological approach she was implementing was putting off some residents, who saw her garden as an "unkempt jungle" (May 2019). In Lille, a resident confided that the permaculture mounds put him off because they reminded him of graves (April 2019). Similarly in Lyon, the leader of a youth organization in charge of a

community garden is unable to recruit local people because, while he wants to develop flowers and natural gardening, residents want a vegetable garden. Similar difficulties in recruiting gardeners have been observed in some poor neighbourhoods in Lille. Apparently, the difficulty is not a sign of disinterest in gardening itself: at the same time, residents of these neighbourhoods are on the waiting list for a private plot in an allotment garden.

5. Discussion

5.1. Greening initiatives exacerbates social division of the city

The distribution of greening initiatives in Lille and Lyon is heterogeneous but their development has exceeded municipalities' expectations as they had to reorganise their departments to deal with the number or applications received. While the greening programmes are considered a success in both cities by municipal authorities, the number of residents involved remains minimal in each city. It represents 0.002 initiatives per inhabitant in Lyon and 0.006 initiatives per inhabitant in Lille. In this case, it is difficult to consider the participation of residents to be significant. Urban gardening thus remains an epiphenomenon on the scale of large cities.

Contrary to previous work in France (Consalès, 2018; Vandembroucke et al., 2017), greening initiatives do not follow a gradient from the centre to the urban periphery – urban periphery having more land available for initiatives. Community gardens seem to be spread randomly across the urban space, while greening licenses are highly concentrated around a few urban cores. The low level of resident involvement means that the urban space concerned by participatory greening is very uneven. However, participatory greening of public spaces seems to present a paradox: while only a small number of streets and neighbourhoods are involved, the greened areas are highly visible and have a major impact on the urban landscape. On a neighbourhood scale, they are becoming important living and meeting places for the few residents invested.

By studying median income of the neighbourhoods that host participatory greening initiatives, we demonstrate that urban gardening initiatives are not randomly distributed in space and benefit some more than others. By doing so, they produce and reinforce existing social disparities (Haughton, 1999; Reynolds, 2015). The participatory framework of those greening programmes does not impeach them to reproduce phenomenon observed on municipality-led urban nature (Heynen et al., 2006). However, our study shows that the types of greening initiative considered largely nuances these results. Greening licenses tend to exacerbate the uneven distribution of environmental amenities in the city whereas community gardens seem to be more distributed in the city. This is quite different from what Consalès (2018) observed in Marseille where the very poor city-centre concentrate community gardens. In Lille and Lyon, community gardens can be divided into two categories: those created by non-profit organisations and those by charities. Community gardens with a social purpose thus appear to be an opportunity to develop participatory greening in neighbourhoods with the lowest median income. The part played by charities seem essential for its capacity to give access to these amenities to disadvantaged groups. Cooperation between different stakeholders, including inhabitants, social centres, job-seekers associations and parks management offices, enables the improvement of residents' perceived quality of life (Certomà & Martellozzo, 2019). Community gardens run by organisation whose it is the sole aim tend to avoid the poorest neighbourhoods and by doing so, increase the unequal distribution of urban environmental amenities. The main factor explaining the distribution of initiatives in the city thus seems to be the residents or organisation behind the initiative. Understanding the barriers and levers to participation appears fundamental.

5.2. Greening initiatives and procedural justice

The difference in the socio-spatial distribution of community gardens and greening licenses sheds light on the barriers and levers to residents' participation in urban greening. Our findings here are in line with those of the literature on the unequal effects of participation. More important resources are linked with a greater participation in civic and social life (Lancee & Van de Werfhorst, 2012). Participatory projects have difficulty in mobilising the most disadvantaged parts of the population when they are not directly aiming at them, as in some experience of participatory budget with an aim of inclusion (Hernández-Medina, 2010). Out of consequence, participatory programmes tend to over-represent the most affluent and highly educated. The very strong institutionalisation of programmes in France tends to leave out populations that are unable to follow the procedure to take advantage of these programmes. Similar trends have been observed in American cities, as Detroit (Michigan, USA), where urban agriculture first developed informally in marginalised and abandoned neighbourhood, led by African American organisations. Progressively, young, educated and affluent white stakeholders stepped on original organisations, supported by the municipal authority through the legalization of urban agriculture (Guthman, 2008; LaCroix, 2010; Paddeu, 2017). The institutionalisation of urban gardening appears to be an obstacle to procedural justice. The concept of procedural justice (Miller, 1999; Schlosberg, 2013) is interesting to invoke to understand the unequal access people have to these schemes. It adds complexity to the issue of environmental injustices by highlighting the fact that, in addition to the distribution of amenities, participatory greening initiatives also reproduce disparities in the participation processes. Procedural injustice insists on the fact that the accessibility of the procedure is often a blind spot in studies of environmental justice. The procedure we described for gaining authorisation to garden in public spaces is complex and calls on skills that are not universal. Participants with a higher-education background tend to be promoted over others less acculturated to the functioning by projects enhanced by neoliberal administrations (Ernwein, 2017). Participatory greening contributes to urban environmental injustices, but more broadly it contributes to unequal access to the right to the city (Lefebvre, 1974) by offering the possibility of greening public space to only a small portion of the population. Our results shed new light on the ambiguity often evoked in the scientific literature concerning the 'two faces' of urban gardening. Gardening can be both considered as apolitical and co-opted by neoliberal institutions (Allen & Guthman, 2006; McClintock, 2014; Pudup, 2008), and as a "leftist struggles for spatial justice against the dynamics of accumulation and exclusion in the city" (Certomà and Martellozzo, 2019). Without specific consideration of justice issues, greening initiatives tend to replicate broader social disparities and reinforce unjust systems (Reynolds, 2015).

5.3. The purpose of urban gardening is a vector of inequality

Even though urban gardening has historically been associated with working-class populations in France (Dubost, 1997; Weber, 1998), participatory planting without the help of charities tend to favour middle-class. We hypothesise that the social change in urban gardening is the result of a change in its purpose. Urban gardening as a means of providing fresh food remains an objective associated with the working-class. However, urban gardening as it is now promoted by local councils is more focused on greening issues. The institutionalisation of greening programmes has changed their meaning compared to their emergence as community gardens. While these were initially implemented to expand food production in cities (Cohen & Reynolds, 2014), their development by French municipalities now emphasises their part in the urban ecological transition. This is directly reflected in the choice of words used: the greening licence is not a gardening licence for instance. Another example is the attention paid to ecological gardening techniques. The emphasis appears to be more on the greening of urban space

and its contribution to reducing heat islands, soil impermeability and supporting biodiversity, rather than its role in food production.

This vision of urban gardening seems to be more in line with the expectations of the middle-class, who are looking to improve their daily living environment, than with those of the poorest residents, who are still struggling to secure fresh food. This involvement of middle-classes in the greening of their neighbourhoods can also be seen as a physical appropriation of their neighbourhoods, in the same way as the renovation projects carried out in neighbourhoods undergoing gentrification. Greening becomes a tool to make residents and their way of life visible and for shaping their neighbourhoods according to their aesthetic expectations. It could be hypothesised that this is also part of a strategy to increase the financial value of their living space, particularly in the case of homeowners.

Urban greening reveals the role of space in the reproduction of social inequalities by reflecting the unequal capacity of individuals to make use of space. It distinguishes those who settle for spaces produced for them on the basis of the image that others have of their needs (in the case of certain community gardens run by charities for instance) from those who control their own living space. The great similarity between the programmes developed in Lille and Lyon indicates the spread of a model of urban nature that is intended to be universal and reflects the construction of an image of a modern and resilient city. This image does not consider the different ways in which urban nature can be used, nor does it recognise the different values attached to urban gardening (Heynen et al., 2006).

6. Conclusion

Using a mixed methodology, this article advances the literature on the socio-economic aspect of the movement of greening cities, which is greatly studied in the North American context but less in European ones. The article retraces the spatial and social distribution of residents greening initiatives in public lands in Lyon and Lille (France). In this study, we analyse the extent to which participatory urban greening exacerbates already existing socio-economic inequalities. The uneven distribution of greening initiatives demonstrates that inhabitants' participation does not allow greening to mitigate urban environmental injustice. The administrative procedure which must be followed to be given permission to green public spaces, but also the financial cost, which then falls exclusively on the residents, exclude the poorest neighbourhoods in the cities studied.

The comparison between community gardens and greening licenses is instructive. The reproduction of socio-economic disparities appears to be even greater in the case of greening licenses, which are concentrated in neighbourhoods that are richer than average. Conversely, community gardens managed by charities are developing in poorer neighbourhoods. This difference between initiatives run by individuals and initiatives that can be supported by organisations helps us to understand the main obstacles to residents' participation. What's more, the shift from urban gardening to participatory greening tends to exacerbate inequalities in participation, favouring people looking for leisure and to improve their living environment to the detriment of those who want to access fresh food.

Over and above the aim of distributional justice, this article shows that the challenges of procedural justice are major in the case of urban greening. While municipalities are increasingly turning to residents to green public spaces, this cannot be fair if it does not directly address the issues of justice. The risk of a participatory programme with no overall planning and relying solely on the social, cultural and financial capital of residents is that it will reinforce urban environmental injustices.

CRedit authorship contribution statement

Amélie DESCHAMPS: Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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The procedures involving human participants in this research are in accordance with the French GDPR (General Data Protection Regulation) and with European regulations relating to the protection of individuals and their personal data and its circulation.

Data availability

Data will be made available on request.

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