

# HOW TO BUILD FOOD-SUSTAINABLE CITIES AND GIVE HEALTH TO THE AGEING URBAN RESIDENTS: A TALE OF TWO COMMUNITY GARDENS IN LISBON, PORTUGAL

ISABEL MARIA MADALENO

Institute of Geography and Spatial Planning (IGOT), Universidade de Lisboa, Portugal

## ABSTRACT

Following comparative historical analyses undergone over 20 years of research, both in developed and developing countries from Europe, Africa, Asia and Latin America, the question is: Can you afford to continue building unsustainable cities, under the current climate change challenges? Green corridors were implemented within the municipality of Lisbon, over the last decade, permitting residents and visitors to stroll, ride a bike, and grow their own food in several parks or community gardens approved by the Municipal Council and Assembly. The paper presents two case studies of community gardens established in the capital city of Portugal where food crops, spices and medicines are produced using organic waste from the gardeners' kitchens, making their households more resilient to climate change and less vulnerable to supply chains, thus reducing the carbon footprint for Lisbon residents. Hope is to contribute to urban sustainability science with good examples of environmental practices within cities and towns, towards a better future for us all.

*Keywords: urban sustainability, Lisbon, urban agriculture.*

## 1 INTRODUCTION

Community cultivation utilizes a combination of close spacing, intercropping and organic fertilization practices. According to Wade [1] this biodynamic intensive method of gardening begun in Europe in the 1800s, particularly in France. However, the Industrial Revolution in England led to the increase in urban food gardens, in order to address survival needs of incoming households [2], as rural migrants possessed agricultural skills and easily took care of vacant urban land, whenever and wherever they were allowed to. This is what happens in the 21st century Lisbon municipality, a global and cosmopolitan European metropolis, where the municipal legislation permits interested urbanites to grow food crops in the vicinity of their home, under a 80 to 146 euros annual fee, for plots of 50 to 120 m<sup>2</sup>, thus providing access to land, compost tanks, and water, under the pre-condition that gardeners don't plant trees or raise poultry inside the community garden.

In fact, food gardening was always widely practiced in Lisbon and in its metropolitan region as stated in registers [3], usually in private front and backyards, in public schools and in museum parks, as it is intrinsically a Portuguese cultural approach to poverty, unemployment, underemployment and it is praised as educational to all generations [4]. However, Lisbon lacked the legislation and the municipal organizational background to make the activity possible and socially acceptable, until the 2000s, because farming activities are usually regarded as oxymoron in urban areas. From 2007 onwards, green corridors were implemented within the municipality, permitting residents and visitors to stroll, ride a bike, and grow their own food, spices and medicines in several food parks or community gardens approved by the Municipal Council and Assembly [5].

Around this time, Ruchelman was publishing the second edition of his book about American cities, entitled *Cities in the Third Wave* [6]. He argued that ideal compact cities could be efficient to keep, but they consumed large amounts of resources. Therefore,



demands for clean air, open and green spaces, contact with nature and birds, were completely lost in agony with high levels of energy consumption, pollution driven transportation networks that generated lung diseases. Global cities were increasingly disconnected from the rural realm and urbanites had to travel long distances to look for calm and peaceful unpolluted environments. In the next decade, the housing crisis deepened socio-territorial inequalities in the United States but also in Europe, where Airbnb short-term rental market overheated the economy of cities such as Barcelona, Berlin, Amsterdam and Lisbon [7]. Despite the evictions of poor and elderly residents from Central Lisbon neighbourhoods, the municipal planning for greenways continued, as it was a strategy to uncompact the capital city of Portugal, as well as a movement intended to beautify boulevards and avenues, making the city a less polluted realm.

According to the Spanish geographer Hernández [8], both the serious social effects of fiscal consolidation, due to the sovereign debt crisis in Europe, and the appearance of extremist political parties, most of them green parties, gave way to the resurgence of climate change movements. These obliged the traditional conservative political parties to review their positions related to the design of cities, in order to mitigate the effects of a wave of extreme climate events. Other inorganic social movements forced this urban sustainability actions, such as the millennial environmental activist Greta Thunberg, who challenged world leaders, in the European Union and all the United Nations members, to change their policies related to the urban realm.

The objective of this work is to research ways to produce local food and decrease our carbon footprint. The idea is to look for sustainable management of soil, water and vegetable production within cities and metropolitan areas, under the label of urban agriculture. This is a long quest initiated in Latin America, continued in Africa and Asia, and improved in Europe, as part of “The Urban and Regional Change and Policies Research Group” (ZOE), from the University of Lisbon. Europe has wide environmental concerns, growing together with cultural and social cohesion policies, whose implementation marks the current European Commission agenda, the New Circular Economy Action Plan [9]. Under this plan, urban gardening contributes to reduce waste and ensure the implementation of the United Nations 2030 Sustainable Development Goals, particularly goal 11: Sustainable Cities and Communities [10].

The research question is: Can you afford to continue building unsustainable cities, under the current climate change challenges? Instead of continuing building compact cities that lack a sense of community, and neighbourhoods usually taken over by festival and culturally hungry tourists that have no other concerns but have a good time abroad, the hypothesis formulated is that we can envisage more environmentally sustainable cities if we accommodate rural activities in the urban realm, such as community gardens, integrated or not in greenways or green corridors (see Fig. 1). Another ambitious question is: are we building cities for its residents or as a business opportunity for future guests? Hope is to contribute for a better urban sustainability science.

## 2 MATERIAL AND METHODS

As the geologist Allègre stated [11], the study of the past is the key that permits us to predict the future. There is an ecological system in rural areas in contradiction with the ecology of the cities. A heat island covers metropolitan regions because the greenhouse gases capture temperatures that can be higher by 2–5° of the surrounding rural realm [12]. Natural balances can be gradually re-established, though, if instead of small greenery pockets, like parks and public gardens, planners introduce greenways and trails, nature conservation areas and



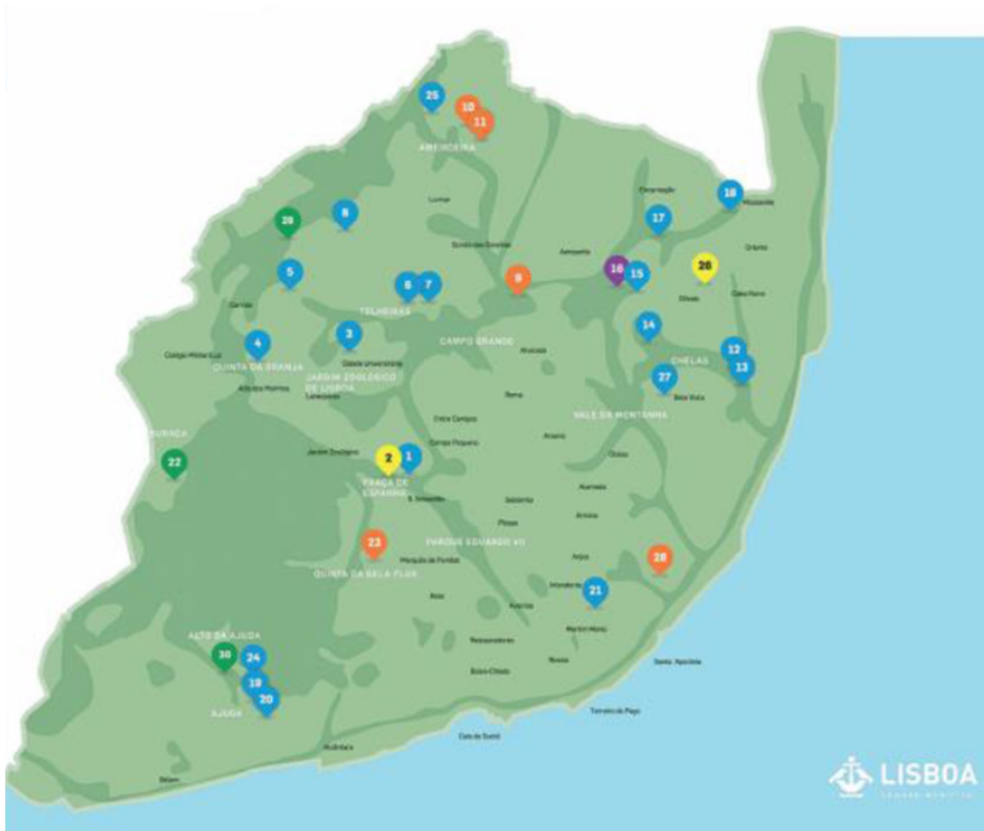


Figure 1: The municipality of Lisbon with the location of city parks and green corridors. The Bensaúde Horticulture Park, number 3 (in blue, as it has municipal management) and Padre Cruz community gardens, numbered 29 (in green, part of a greenway). The map reproduces current Lisbon municipality urban agriculture spots, 30 in total, and includes five parks and food gardens under non-municipal management (in orange) [15].

community gardens [13]. The possibility to lease public land for horticulture (cabbage, lettuce, tomatoes and carrots), for kitchen spices growth (rosemary and thyme), gives citizens access to affordable and fresh nutritious food that supplement market and supermarket purchases, whilst providing work to the urban poor and therapeutically driven activities for the elderly, enhancing environmental awareness and appreciation [14].

The current study was part of the Institute of Geography and Spatial Planning (IGOT) curricula, developed in urban geography classes of Honours degree students, and integrated in fieldwork techniques for geography learning of the Institute of Education (IE), and a Master's degree seminar also from the University of Lisbon. The students conducted surveys involving urban cultivators and gardeners, all around the metropolis, even though this contribution only focused on community gardens from the municipality of Lisbon, a total of thirty. Semi-structured interviews used the same questionnaire, intended to gather data about the age, sex (see Table 1), educational background, and profession of the urban gardeners, as

well as their place of residence, type of transportation used to travel to the cultivated plot, number of hours spent weekly in farming activities, and the inputs to and outputs of the community garden cultivation.

Table 1: Surveys of Lisbon municipality community gardens. (Source: *Students 2019–2021.*)

Bensaúde	Horticulture	Park	Father Cruz	Neighborhood	Total
Age group	Male	Female	Male	Female	–
40–44	3	1	–	–	4
45–49	1	1	–	–	2
50–54	4	–	1	–	5
55–59	–	–	1	–	1
60–64	3	–	2	–	5
65–69	–	–	3	–	3
70–74	2	1	–	–	3
75–79	2	–	2	–	4
Over 80	2	–	1	–	3
Total	17	3	10	0	30

Previous research conducted in Latin America, Southern Asia and in Africa followed the procedural sequence listed: 1. Archival examination of manuscripts from the early years of Spanish or Portuguese colonization; 2. Fieldwork with random surveys to flora consumption and trade conducted in Metropolitan Regions and in Cities, under the form of in-depth interviews to three categories of informants: (i) urban gardeners responsible for food, spice and medicinal herbs growth and care; (ii) formal and informal traders of fruits, spices, tubers, roots and herbal preparations, pharmacists and medicinal flora traders; (iii) traditional healers and herb doctors that cure diseases and mild affections with potions of herbs or simples. Table 2 presents the number of testimonies conducted, mostly in tropical environments, and the proportion of urban agriculture gardeners and farmers interviews collected for two decades [16].

### 3 RESULTS

Urban agriculture (UA) is an activity that contributes to the production, processing and trade of food inside city limits, practiced using recycled organic wastes in compost tanks, an intensive ecological system that provides oxygen and biodiversity [18]. UA improves household's food security and quality within cities and metropolitan areas, giving income to the unemployed and underemployed urbanites, physical and mental health to ageing citizens, whilst improving family inclusion and integration in urban neighbourhoods, and in peri-urban towns [19]. The first survey focusing on urban gardening was conducted in the African city of Pointe-Noire (Congo), by the geographer Vennetier [20]. The 54,000-inhabitant city had about 3,000 households devoted to food production, ranging from cassava, corn, peanuts and potatoes to a diversity of horticulture crops. During the 1990s, another research conducted in six Kenyan cities concluded that 62% of the 1,576 urban households interviewed by the Mazingira Institute cultivated the food they consumed [21]. Most of the gardeners (56%) were women.

In 1998, the Portuguese Tropical Research Institute concluded a survey in Belém, Brazil, that accounted for 69.7% of female gardeners [22]. This is not the case with Lisbon, Portugal,



Table 2: Urban agriculture across the globe and across history [17].

Cities and Metropolis	Interviews (No.)	% Urban gardeners	Research mission years	Country
Belém, Pará	570	97.3	1998, 2005	Brazil
Presidente Prudente	280	100	1999	Brazil
Santarém, Pará	50	64.0	2006, 2007	Brazil
S. Luís, Maranhão	100	90.0	2010	Brazil
Recife, Pernambuco	50	6.0	2019, 2020	Brazil
Santiago Metropolis	132	84.1	2002, 2003, 2005	Chile
Iquique	75	64,0	2012	Chile
Metro Central Mexican	100	42,0	2004, 2006	Mexico
Lima Metropolis	34	0,0	2004, 2016	Peru
Piura	40	0,0	2016	Peru
Havana	50	94.0	2009	Cuba
San José	43	69.7	2010	Costa Rica
Rio Cuarto	100	80.0	2011	Argentina
Colonia del Sacramento	50	48.0	2011	Uruguay
Panama City	50	6.0	2017	Panama
Maputo Metro Area	20	100	2000	Mozambique
Accra	50	4.0	2017, 2018	Ghana
S. Tomé	50	20.0	2019	S. Tomé
Kochi	50	80.0	2013	India
Goa	50	52.0	2014	India
Malacca	20	20,0	2013	Malaysia
Manila	50	2.0	2015	Philippines
Total or average	2,014	51.0	–	–

where only 10% of the 30 community gardeners interviewed in 2019 and 2021, were female (Table 1). About 60% of the Lisbon community gardeners are over 60 years old, also in opposition with urban farmers interviewed in another Latin American city, Santiago, Chile, where 40.2% of the 111 La Pintana municipality residents questioned in 2002 and 2003 (Table 2) were in the same age group [23]. However, the sample of the tiny Colonia de Sacramento, Uruguay (15,934 inhabitants, in 2011) registered a proportion of 58% urban gardeners above 60 years old.

Again, a noticeable difference signalled between the first and the last sample conducted on the issue of urban agriculture and developed across time is the much smaller proportion of part-time gardeners: about 54.3% were registered in late 1990s in Brazil against 40% in 2019–2021 in Lisbon, Portugal. Across time, research conducted in three continents revealed that UA doesn't provide self-sufficiency in grains (wheat, corn), tubers (potatoes) or rhizomes (cassava) but feeds families with fresh vegetables and fruits, as fruit trees and horticulture are part of green belt municipal programs in countries such as Argentina, Brazil, Chile, Cuba and Mexico, in Latin America; Horticulture integrates basic school curricula in Manila, the Philippines, Asia [24]; Peri-urban horticulture and poultry was technically and financially sponsored in Maputo, Mozambique, in the year 2000 [4].

The 22 case studies numbered in Table 2 also gave evidence of the importance of aromatic and curative herb production in front and backyards, as well as in peri-urban farming plots,

whose growth contributes to improve the health of the most vulnerable citizens, mostly using native flora already mentioned in early colonization year manuscripts [17]. The cities that registered a higher number of species applied externally or taken in teas and potions were: S. Luís, Brazil (109 different taxa); Río Cuarto, Argentina (125 species); and Kochi, India (136 plant species, either grown or traded in Ayurvedic pharmacies). The number of plants grown in Lisbon community gardens was quite small, as the 2019–2021 survey found only seven species used for medicinal purposes: Peppermint (7); Rosemary (four occurrences); Melissa (4); Lemongrass (six occurrences); Lavender (2); Sage (2); and *Lippia citriodora* (3).

### 3.1 Characterisation of Padre Cruz community gardens

The Carnide neighbourhood plots are 50–100 m<sup>2</sup> sized (5/20 m), close fenced and possess water for irrigation and horse manure, as well as compost tanks, for fertilization purposes (see Fig. 2). Only one community gardener was a part-time construction worker that travelled from another municipality (Amadora), on weekends, to water and tend his 100 m<sup>2</sup> plot, but the remaining nine were retired males, resident in two closely located social housing blocks, named Padre Cruz and Horta Nova. The gardeners travelled daily, walking or by public transportation, except for 40% of the 10 interviewed tenders that brought their car three times a week (Table 1). As to the educational background of Padre Cruz gardeners: 30% were illiterate; 40% had only basic schooling (4 years of studies); one had completed secondary school (12 years of studies); and one had completed an honours degree.



Figure 2: Detailed aerial photo of Padre Cruz community gardens, with a clear image of the plots or food gardens [25].

The survey was conducted by an IGOT Geography student resident in Carnide neighbourhood (see Fig. 1), during his 2019 urban geography schoolyear. Figs 2, 3 and 4 were part of his essay. Padre Cruz community gardens main productions were corn (20%)

and potatoes (30%), whilst the majority produced bush beans (90% of the plots), cabbage (30%), lettuce and onions (20% each), hot and sweet pepper (10%). Rosemary was also gardened, used as spice and as medicine. These community gardens are part of a green corridor located in the north-west of Lisbon municipality, connected to Monsanto City Park.



Figure 3: Horticulture community garden plot [25].

Figure 4: Beans tended in Padre Cruz gardens [25].

### 3.2 Characterisation of Bensaúde horticulture park community gardens

In contrast with Padre Cruz gardens, Bensaúde Park, located in the neighbourhood of Benfica, (south to Carnide area), constitutes the so-called doctors' food gardens, as about 60% of the tenants completed an honours degree, their professions varying from engineer, architect, lawyer, agronomy professor and accountant. Nowadays, about 40% are retired, and one gardener interviewed was unemployed, with food production having a vital role in his food security. It is interesting to emphasize that two municipal technicians, resident in the neighbourhood of Benfica, also tended their plot, as a part-time job and intended to supplement their household's diet. Bensaúde Park plots have an area that goes from 80, 100 to 120 m<sup>2</sup> and the rent paid is of 100, 125 to 146 euros per annum, respectively.

Bensaúde Park covers 3.5 hectares of Greenland, formerly farmed and part of the Lisbon greenbelt. The community gardens total 21, but one is empty. They are fenced, and have small shacks used to keep the utensils used, but not farming machines, as they aren't allowed in these municipal food plots. The gardens have compost tanks and water, small nurseries and some remaining trees, like almonds, shading some food gardened areas. The interviews were conducted by Master's degree students, during the Fieldwork in Geography Seminar, in the schoolyear of 2021. Table 3 shows the diversity of horticulture crops tended in this second example. Besides these, Bensaúde gardeners also grow potatoes and sweet potatoes, a diversity of herbs and spices (coriander, oregano, parsley, garlic, thyme, laurel, cumin, and savoury), medicines (peppermint, rosemary, lavender, sage, and mint) and fruits (passion fruits, strawberries, raspberries, and melons).

## 4 DISCUSSION

A total of 45 different plant species was recorded in both food gardens, in 2019 and 2021. Change in dietary habits all over Europe, where veganism is growing as environmental awareness increases, have brought back vegetable gardens from peri-urban to urban areas [26]. The sustainability of urban ecosystems, and the western romanticized picture of

Table 3: Horticulture crops from Bensaúde Park community gardens. (Source: Master's students essays, 2021.)

Common name	Botanic name	Use	Occurrences
Kale	<i>Brassica oleracea</i> var. <i>acephala</i>	Green leaf	1
Pumpkin	<i>Cucurbita pepo</i>	Cucurbit	2
Lettuce	<i>Lactuca sativa</i>	Green leaf	14
Leek	<i>Allium ampeloprasum</i> var. <i>porrum</i>	Bulb	5
Beetroot	<i>Beta vulgaris</i>	Green leaf, root	1
Onion	<i>Allium cepa</i>	Bulb	14
Eggplant	<i>Solanum melongena</i>	Fruit vegetable	1
String bean	<i>Phaseolus vulgaris</i>	Legume	1
Cucumber	<i>Cucumis sativus</i>	Fruit vegetable	1
Pepper	<i>Capsicum annum</i>	Fruit vegetable	1
Broccoli	<i>Brassica oleracea</i>	Brassica	2
Carrot	<i>Daucus carota</i>	Root	3
Cabbage	<i>Brassica oleracea</i> var. <i>capitata</i>	Brassica	16
Pea	<i>Pisum sativum</i>	Legume	6
Spinach	<i>Spinacia oleracea</i>	Green leaf	1
Turnip	<i>Brassica rapa</i>	Green leaf, root	4
Tomatoes	<i>Lycopersicon esculentum</i>	Fruit vegetable	4
Fava bean	<i>Vicia faba</i>	Legume	11
Okra	<i>Abelmoschus esculentus</i>	Fruit	1
Celery	<i>Apium graveolens</i>	Whole plant	2
White lupine	<i>Lupinus albus</i>	Grain pulse	1

individuals feeding the city, explain the diversity in horticulture production in Bensaúde Park community gardens (see Table 3), tended by highly educated residents of Benfca neighbourhood, but not entirely. In fact, a total of 21 different vegetable species are found in 80 to 120 m<sup>2</sup> plots, showing how local food supply can be enriched in quality and quantity, inside a European capital city.

Turner et al. [27] wrote that community gardens are quite diverse elsewhere around the world, including: “city farms, therapeutic gardens, school kitchen gardens, or a more individual allotment system” [27]. These authors have analysed the European History of UA, and they stated that in times of crisis citizens always felt encouraged to play an active role in their own food production, as registered during the two World Wars, the 1970s oil crisis, and the collapse of the Soviet Union. So, it is quite unsurprising that, during the current pandemic CORONA virus outbreak, the Bensaúde Horticulture Park allotments registered intensive cultivation, even amid more wealthy urbanites.

The Padre Cruz community gardens, researched just before this pandemic outbreak (2019), are food-based social-allotment gardens, associated to less-wealthy Lisbon residents, long concerned about their household food-security. This case study constitutes a good example of economic and environmental inclusion, as it is in a green corridor also sought after by neighbouring illegal settlement residents, like Cova da Moura builders, as found during the survey. Morgan [28] argues that food security has long become a national security issue, hurried by catastrophic climate change effects that are giving way to mass migrations and escalating land conflicts. Food planning can no longer afford to leave urban areas out of the equation of how to get essentials for human life existence on planet earth. Empowering



urban residents to produce their own food, either by creating individual allotment gardens or by allowing them to grow food in terraces and walls is a challenge for national and municipal governments. “Locally produced food is the most ecologically sustainable because it has lower food miles”, therefore reducing our “carbon footprint” [28].

## 5 CONCLUSIONS

Following the comparative historical analyses undergone over twenty years of research, the hypothesis formulated for the current study project was that we can envisage more environmentally sustainable cities if we accommodate rural activities in the urban realm, such as community gardens, integrated or not in greenways, instead of continuing to build compact cities that lack a sense of community. Lisbon community gardens were found to have a good potential to promote social inclusion, particularly Padre Cruz allotments, tended by social housing residents from two nearby built areas (Padre Cruz and Horta Nova) and sought after neighbouring Amadora municipality residents, from illegal migrant areas such as Cova da Moura. Community-building potential was also found in both community gardens, the less-wealthy Carnide greenway and the wealthier Benfica neighbouring horticulture park.

The integration of allotment gardens in green corridors was a beneficial innovation from Lisbon municipal government, as in the year 2020 the city received the prize for European Green Capital, attributed by the European Commission. With a population of over 500,000 inhabitants, the municipal government was recognized to have a cohesive city-wide vision for sustainable mobility and to have achieved that through measures to restrict car use and prioritize walking, cycling and public transport. Lisbon also connected its green areas with the Alcântara valley green corridor and linked up Monsanto Park and the Tagus Riverine paths, with cycling and walkways, giving its citizens greater access to green spaces. The tale of two community gardens, one of them integrated in Monsanto Park green corridor is a sound contribution to improve micro-climatic conditions and reduce the heat island effects, as well as of improving waste recycling management and reducing food miles, by localizing food production and giving access to soil prepared for gardening purposes.

## REFERENCES

- [1] Wade, I., *City Food: Crop Selection in Third World Cities*, Urban Resources System: San Francisco, 1986.
- [2] Mateus, M.L.P.F.R., Campos de Coimbra. Do Rural ao Urbano. Unpublished PhD thesis, Universidade de Coimbra: Coimbra, 2009.
- [3] Cavaco, C., A pequena horticultura doméstica de não agricultores das periferias urbanas: O caso de Lisboa. *Economia*, VIII(2), pp. 395–423, 1984.
- [4] Madaleno, I.M., Urban agriculture, an environmentally sustainable land use: Case studies from Europe, Latin America and Africa. *WIT Transactions on Ecology and the Environment*, vol. 129, WIT Press: Southampton and Boston, pp. 961–969, 2002. DOI: 10.2495/URS020921.
- [5] Castro-Henriques, J., Urban agriculture and resilience in Lisbon: The role of the municipal government. *Urban Agriculture Magazine*, 22, pp. 49–50, 2009.
- [6] Ruchelman, L.I., *Cities in the Third Wave: The Technological Transformation of Urban America*, Rowman and Littlefield: New York, 2007.
- [7] Mendes, L., Transnational gentrification and the housing market during pandemic times, Lisbon style. *Urban Geography online*, 2021. DOI: 10.1080/02723638.2021.1949832.



- [8] Hernández, J.L.S., Los mecanismos organizativos de las prácticas económicas alternativas en las ciudades españolas. *Documents d'Anàlisi Geogràfica*, **67**(3), pp. 417–440, 2021. DOI: 10.5565/rev/dag.658.
- [9] European Commission, Circular Economy Action Plan: For a cleaner and more competitive Europe. Interreg Europe: Brussels, 2020.  
[https://ec.europa.eu/environment/pdf/circulareconomy/new\\_circular\\_economy\\_action\\_plan.pdf](https://ec.europa.eu/environment/pdf/circulareconomy/new_circular_economy_action_plan.pdf). Accessed on: 5 Jul. 2021.
- [10] United Nations, The SDGs in action. United Nations Development Programme: New York, 2021. <https://www.undp.org/sustainable-development-goals>. Accessed on: 5 Jul. 2021.
- [11] Allègre, C., *Ecologia das Cidades, Ecologia dos Campos*, Instituto Piaget: Lisbon, 1996.
- [12] Spiegelhalter, T. & Arch, R.A., Biomimicry and circular metabolism for the cities of the future. *WIT Transactions on Ecology and the Environment*, vol. 129, WIT Press: Southampton and Boston, pp. 215–226, 2010. DOI: 10.2495/SC100191.
- [13] Wolch, J.R., Byrne, J. & Newell, J.P., Urban green space, public health, and environmental justice: The challenge of making cities “just green enough”. *Landscape and Urban Planning*, **125**, pp. 234–244, 2014.
- [14] Lautenschlager, L. & Smith, C., Beliefs, knowledge, and values held by inner-city youth about gardening, nutrition, and cooking. *Agriculture and Human Values*, **24**, pp. 245–258, 2007. DOI: 10.1007/s10460-006-9051-z.
- [15] CML, Mapas do Município de Lisboa. Câmara Municipal: Lisboa, 2021.  
<https://www.google.com/search?source=univ&tbm=isch&q=Mapas+do+munic%C3%ADpio+de+Lisboa>. Accessed on: 2 Nov. 2021.
- [16] Madaleno, I.M., Spices and medicines cultivated and traded in Panama-City. *La Geografía de las Redes Económicas y la Geografía Económica en Rede*, eds M.P. Alonso Logroño, T.S. Marques & H. Santos, Universidade do Porto and Asociación de Geógrafos Españoles: Porto, pp. 249–257, 2020.  
DOI: 10.21747/9789898969460/geoa24.
- [17] Madaleno, I.M., Etno-Geografía de Flora Útil de Latinoamérica. Un análisis histórico comparativo de los siglos XVI y XXI. Hacia una perspectiva integrada. Aportaciones de las Geografías Económica, Regional y de los Servicios para la cohesión y la competitividad territorial, eds C. Gago, J. Córdoba, M.P. Alonso, R.M. Jordá & J. Ventura, pp. 63–67, 2021.
- [18] UNDP, *Urban Agriculture: Food, Jobs and Sustainable Cities*, United Nations Development Programme: New York, 1996.
- [19] Bakker, N., Dubbeling, M., Gundel, S., Sabel-Koschella, U. & Zeeuw, H., *Growing Cities, Growing Food*, German Foundation for International Development: Feldafing, 2000.
- [20] Vennetier, P., La vie agricole urbaine à Pointe-Noire (Congo). *Cahiers d'Outre Mer*, **14**(53), pp. 60–84, 1961.
- [21] Sawio, C.J., Urban agriculture research in East and Central Africa: Record, capacities and opportunities. *Cities Feeding People*, IDRC: Ottawa, pp. 1–26, 1993.
- [22] Madaleno, I.M., Urban agriculture in Belém, Brazil. *Cities*, **17**(1), pp. 73–77, 2000.
- [23] Madaleno, I.M. & Gurovich, A., “Urban versus rural” no longer matches reality: Endurance of an early public agro-residential development in peri-urban Santiago, Chile. *Cities*, **21**(6), pp. 513–526, 2004.



- [24] Madaleno, I.M., Food and medicinal plants consumed in Manila, The Philippines. *WIT Transactions on the Built Environment*, vol. 170, WIT Press: Southampton and Boston, pp. 203–210, 2017. DOI: 10.2495/CC170201.
- [25] Abreu, A., Hortas Urbanas Carnide. Unpublished Honours degree essay, Universidade de Lisboa: Lisbon, 2019.
- [26] Herchenbach, M., Food and the city. *Journal of Landscape Architecture*, 7(2), p. 89, 2012.
- [27] Turner, B., Henryks, J. & Pearson, D., Community gardens: sustainability, health and inclusion in the city. *Local Environment: The International Journal of Justice and Sustainability*, 16(6), p. 489, 2011. DOI: 10.1080/13549839.2011.595901.
- [28] Morgan, K., Feeding the city: The challenge of urban planning. *International Planning Studies*, 14(4), p. 345, 2009. DOI: 10.1080/13563471003642852.

