“More Than Fruits and Vegetables”

Community garden experiences from the Global North to foster green development of informal areas in Sao Paulo, Brazil

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Abstract

Urban gardening contributes to society in various ways such as by enhancing communities, ensuring food security, improving health, providing places for recreation as well as by raising environmental awareness. Although urban gardening initiatives have been spreading, the challenge remains to include vulnerable communities, especially in developing countries, which face manifold infrastructural, environmental and social pressures, thereby helping achieve the United Nations Sustainable Development Goal (SDG) 11 (Make cities and human settlements inclusive, safe, resilient and sustainable) and foster urban inclusiveness.

The study evaluated the performance of urban community gardens in order to verify their potential for implementation in the slums of Sao Paulo, Brazil. Significant assets and drawbacks were analyzed from existing studies and categorized into social, spatial, economic and environmental factors. Additionally, qualitative interviews on societal and motivational issues were conducted with contributors to a community garden in Dresden, Germany.

The results highlight the potential of urban gardening to counteract spatial pressures in informal areas by creating green spaces, improving food quality, raising environmental awareness and, in general, ensuring a higher quality of life. On the other hand, some obstacles remain to be overcome, such as soil pollution, the high probability of further contamination as well as a lack of basic infrastructure. A top-down implementation of urban gardens within slums is considered feasible if the projects are designed in partnership with the community, and a long-term adaptive management model is applied. Under these conditions, urban gardening will make a significant contribution to 'inclusive urbanism'.

KEYWORDS

urban agriculture, community garden, slum, informal settlement, inclusive urbanism

1. Introduction

The ongoing process of urbanization around the world, especially in developing countries like Brazil, is bringing fresh challenges to urban areas, whether regarding limited infrastructure, food security, environmental damage, the negative impact of climate change or the problem of segregated, non-inclusive urban structures.

Due to a lack of formal and affordable housing options in Brazil, residents are forced into informal housing, leading to the expansion of slum[1] (Lall 2006). The 'favelas' and the 'loteamentos irregulares'[2] are the most common types of slum in the country. Censuses from 2000 to 2010 show that 24% of the absolute increase in the number of houses in Sao Paulo (Brazilian biggest city) were new dwellings in favelas (Pasternak & D'Ottaviano, 2016).

Sao Paulo has a total of 11,253,503 inhabitants (Instituto Brasileiro de Geografia e Estatística 2010). Its 4,116 slums[3] ('loteamentos irregulares' and 'favelas') are mostly located within the city borders. 4,404.63 ha of Sao Paulo area is occupied by favelas, where 11.38% of the urban population resides, resulting in very high densities (Pasternak and D'Ottaviano 2016).

While the population density in Sao Paulo city is 80 inhabitants per hectare, in the favelas, the figure is 300 inhabitants per hectare. These high densities are reflected in a lack of space between the houses (around 84% of the dwellings there is no open space) and the increasing number of families living in the same plot (Pasternak and D'Ottaviano 2016).

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1 "A slum household as one in which the inhabitants suffer one or more of the following 'household deprivations': lack of access to improved water source, lack of access to improved sanitation facilities, lack of sufficient living area, lack of housing durability and lack of security of tenure" (UN-Habitat 2016).

2 "*Favelas* are precarious human settlements resulting from the invasion of both public and private urban areas". "They lack in almost every element of urban infrastructure and collective equipment" (Lall 2006).

Loteamentos irregulares " are in precarious technical conditions, and not registered in the public registry office". "They differ from favelas, since the occupiers have bought their plots from whoever presented themselves as landowners, and in most of the cases paid all due taxes" (Lall 2006).

Infrastructure problems of 'favelas' and the 'loteamentos irregulares' in Sao Paulo are: lack of regular access to water, electricity, waste collection, sewage, drainage and street pavement and lightning. Water and electricity are obtained irregularly by the residents from the formal networks. Sewage and garbage are discarded on streets and streams. Land parcelling does not follow legal regulations, so streets have usually inappropriate dimensions, and there is no space reserved for green and public facilities. Landslides and floods are frequent due to improper soil conditions and settlement implementation. Dwellings usually have smaller dimensions than formal constructions, are mostly made of bricks and have one restroom per dwelling, characteristics that differentiate than from other slums in the world.

Both in 'favelas' and the 'loteamentos irregulares', residents have no formal ownership of the land, but diverse legislation recognizes residents rights (through a long and complicated process of regularization), which also differentiate them from slums in other countries.

3 http://www.habitasampa.inf.br/habitacao/ in 24/05/18.

Considering the general fact that "the proportion of green space per person diminishes as population density increases" (Gasperi et al. 2016), open and green areas are becoming ever rarer in these informal areas. Sufficient open and green space is essential to facilitate social interactions, thereby helping to establish 'inclusive' activities between the local populations (Espino 2015).

The 'loteamentos irregulares' are usually large glebes, irregularly subdivided, sold to low-income people. The land regularization law permits that these areas become regular, designating fewer open areas to public green areas and facilities than the regular parcelling (the goal is to secure ownership of low-income people who bought the land informally). As the designated green areas and the public facilities are usually not established in the short term, many are transformed into 'favelas'.

Sao Paulo is thus suffering from a vicious circle of informal expansion, whereby vacant land is consumed in an unplanned way, leading to a lack of open and green space as well as poorly integrated areas. There is an urgent need for strategies to improve the quality of life in Sao Paulo's periphery, and to establish land uses to encourage the community and create a local sense of ownership to take care of the land.

Urban and peri-urban agriculture (UPA) "has become a key part of strategies for reducing cities ecological footprint, recycling urban wastes, containing urban sprawl, protecting biodiversity, building resilience to climate change, stimulating regional economies, and reducing dependency on the global food market" (Food and Agriculture Organization of the United Nations 2014).

For the Food and Agriculture Organization of the United Nations (FAO), UPA is defined as "the growing of plants and the raising of animals within and around cities". This definition encompasses a range of diverse crops, animals or non-food products such as herbs, ornamental plants and tree products.[4]

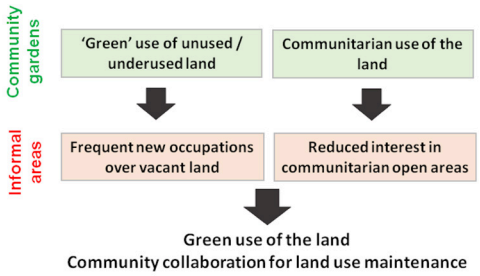

Figure 1. Potential benefits of urban community gardens in preventing the expansion of informal areas and encouraging communitarian and green land use

4 www.fao.org/urban-agriculture/en/, in 27/06/18.

Urban agriculture is aligned with the Sustainable Development Goals (SDGs) and the New Urban Agenda/Habitat III, as it can contribute to reduce poverty (SDG 1[5]) and hunger alleviation (SDG 2[6]) in low-income communities, through "improving urban food security and providing entrepreneurship opportunities"; boosting sustainable food patterns (SDG 12[7]) by reducing "climate change-related greenhouse gas emissions through reducing food production and distribution inputs" and promoting sustainable and environmental measures (SDG 15[8]) in urban development, such as "incorporating waste management, nutrient recycling and energy recycling" (Game & Primus 2015). Considering the most of vulnerable population in Sao Paulo lives in the slums, a contribution for poverty and hunger alleviation (SDGs 1 and 2) are incredibly relevant in these areas. The lack of infrastructure and actions on environment and consumption awareness lead to different sources of pollution in informal areas, which makes contributions on SDGs 12 and 15 very important.

Reducing the proportion of global urban population living in slums and improving quality of life of human settlements are actions to comply with the SDG 11[9] (United Nations, 2016). At the same time, the communitarian use of gardens as green public spaces can be part of a strategy for inclusive management of urban land use. "Cities should experiment with more cohesive cross-sectoral partnerships and civil society networks to support inclusive and pro-poor adaptation plans" (Chu et al. 2017). SDG 11 achievement requires the integration of various policy fields, such as the environment, infrastructure, social housing and urban development.

The contribution to the mentioned SDGs leads to the question of how urban agriculture could contribute to face Sao Paulo slums challenges and which possible problems must be considered in an implementation project, considering these areas characteristics. These answers are relevant to orient a broader policy, able to take the advantages from the benefits of this practice.

5 Goal 1: End poverty in all its forms everywhere (United Nations 2016).

6 Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture (United Nations, 2016).

7 Goal 12: Ensure sustainable consumption and production patterns (United Nations 2016).

8 Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss (United Nations 2016).

9 Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable (United Nations, 2016).

This paper investigates the success of community gardens[10] and their potential for social and urban inclusivity in slums and its surroundings, as one strategy to ensure the green usage of vacant land in the periphery, thereby safeguarding the land from informal expansion and addressing several issues in slums through the creation of communitarian areas (Fig. 1).

We adopt the definition of the community garden as "a land managed by a public or nonprofit organization, or a group of individuals, used to grow plants and harvest food or ornamental crops from them, for donation or for use by those cultivating the land and their households" (Goldstein et al. 2011). Further: "In English *sensu stricto*, community gardens are focused on ideas of community-building, while 'urban garden' designates a garden with an urban location" (Ernwein 2014).

2. Method

This paper is part of a more prominent research that aims to establish the potential of communitarian gardens for informal areas. The goal is to investigate different scales and territories of contribution: Global North, Global South, country (Brazil), and city (Sao Paulo). Literature review from these territories has been investigated, and a case study from each one has been selected. Case studies are related to specific subjects as shown in Fig. 2.

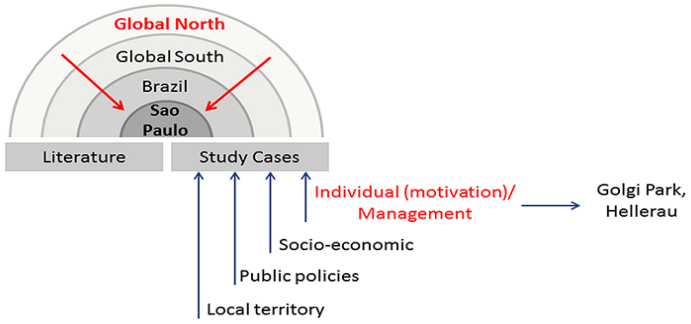

Figure 2. Full research steps: in this paper, the contribution from Global North and the case study on individual and motivational aspects

10UPA can be implemented in vacant lots, community gardens, balconies, rooftops, indoor farms, as well as greenhouses (Game & Primus, 2015). There exist various categories of gardens, namely "community gardens, commercial gardens, community-supported agriculture, farmers' markets, personal gardens, and urban farms" (Goldstein et al. 2011).

This paper presents the results from the Global North. A literature review of publications from the period 2010–2018 (as reported in Artmann and Sartison, 2018) aimed to identify the benefits and problems of urban gardening in the region. Issues affecting Brazilian slums were related to benefits from community gardens found in the literature. The problems in establishing urban gardens from the literature were combined with findings in the interviews conducted at Golgi Park Intercultural Garden in the Hellerau district of Dresden, Germany, allowing us to draw the first recommendations for an initial project implementation in informal areas (Fig. 3).

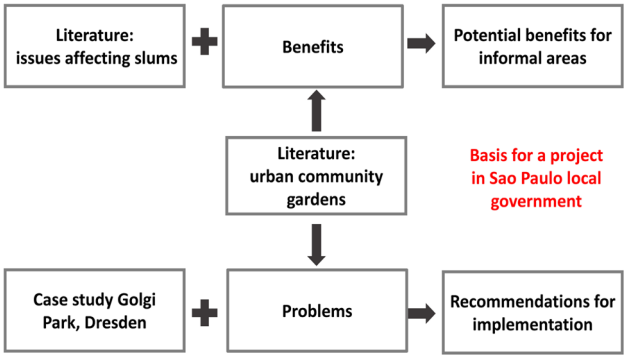

Figure 3. Paper research steps: By combining issues affecting slums and the benefits of urban gardening with the German case study and problems of urban gardening, the aim was to identify potential benefits for informal areas as well as to formulate recommendations for implementation in informal and segregated, non-inclusive areas

Having in mind the different context of most of the cases from Global North literature, compared to Sao Paulo periphery, the focus of the case study in this territory was 'the individuals'. The interviews at the case study focused on motivation aspects, looking for finding what motivates people to join into the community garden and what were the management actions that influenced it. The goal was to select a case study with conditions utterly different from São Paulo periphery. The question was 'if socio-economic and quality of life aspects are available, and other green and communitarian spaces are offered in the city, what really motivates people to join such communitarian gardening initiative?' The idea was to investigate a completely different economic, political, social and even environmental scenario to figure out what makes a top-down community garden initiative succeed. Choosing a case study in a place with similar conditions could lead to results that are consequences of socio-economic difficulties. Dresden was selected on detriment to a metropolis in order to guarantee equity and minor social and economic problems.

The criterium to select the garden in Dresden was finding a top-down initiative with a focus on social inclusion. Golgi Park is a top-down initiative of the HELLERAU – European Centre for the Arts, a theatre. The park's initial goal was to benefit vulnerable social groups, especially refugees.

The interviews, to investigate motivational aspects as well as management and technical issues facing such a top-down project, were conducted as open questions, in a voluntary basis, on detriment to complex qualitative ones, with the goal of given voice to people. This choice, as well as the existence of other case studies in the whole project, made us to opt for a small amount of interviews, which could be reported (Chapter 3.3) with the details presented by the two gardeners and two managers.

The following questions were formulated to gardeners:
-What motivates you to join the garden?
-What could demotivate you?
-Which benefits do you think this project offer you? (Why have you chosen Golgi Park and not another community garden?)
-Which initiative do you think could avoid vandalism and the theft of crops and equipment?

The following questions were formulated to managers:
-What are the critical aspects of making people join the garden?
-How do you invite people?
-Is the Hellerau neighborhood invited? Do they use the garden?
-How do you finance the events in the garden?
-What are the main achievements of the project, in your opinion?
-What is the importance of the funding to the project succeeding?
-Do you have vandalism problems? How to avoid it?

3. Results and Discussion

3.1 Issues affecting Brazilian slums

UN-Habitat estimates that one in eight of the world's population currently lives in slums. Despite many efforts, slums continue to grow in developing countries, thereby "excluding fellow humans and citizens from the benefits of urbanisation and from fair and equal opportunities to attain individual and collective progress and prosperity" (UN-Habitat 2016).

Usually created in violation of land and building regulations, slums often lack public services and infrastructure. In Brazil's largest cities, they are strongly linked to environmental degradation. Informal expansion due to the lack of housing alternatives for a low-income population is threatening a significant proportion of environmentally-protected areas (Maricato 2003). In the country's southeast (including the cities of Sao Paulo and Rio de Janeiro), around

20,000 precarious informal houses are located in environmental conservation areas (Pasternak and D'Ottaviano 2016; data from 2010 census). While the entire urban population is affected by this process of informal expansion, the main burden falls on low-income and segregated groups (Maricato 2003). Dwellings are constructed on unsecured hillsides, around and sometimes over streams as well as in environmentally sensitive areas. Such areas are highly vulnerable to natural disasters (Ferreira and Whitaker 2012).

Generally, slums lack healthcare and educational facilities (Lall 2006). In addition, there are few jobs in or near slums, and transport connections to the central urban areas are poor (Ferreira and Whitaker 2012). "Public transport is insufficient and expensive, and the quality of life in slums is deficient" (Lall 2006).

In 2010, 61% of favela residents were black people, even though blacks made up only 37% of the total urban population (Pasternak and D'Ottaviano 2016). Further, the average income of Brazil's black population is around 57% lower than the white population (Georges and Maia 2017).

Many favela residents drop out of school early. The average of schooling in Brazil is 7.45 years[11]. The causes of this poor attendance can be the need to find paid work, the long commute from the house to school as well as learning difficulties (Silva, Pelissari, and Steimbach 2013).

Low incomes and a reduced educational level have a direct impact on patterns of food consumption. Qualitative research on the eating habits of obese women in one favela of Rio de Janeiro showed the price to be the most significant factor influencing food purchases. Further, the women ate few vegetables apart from potatoes and pumpkins. Salads and fruits were almost entirely absent from their diet. Lunch usually consisted of rice, beans and chicken (the cheapest meat). There was also a marked preference for fatty meats and sugary desserts. Time for physical and leisure activities was rare due to the many daily work activities as well as housekeeping and childcare tasks (Ferreira and Magalhães 2005).

Another study of a favela in Pernambuco state showed that 13% of the 508 children registered at the local health centre were overweight. The leading causes were found to be an excessive calorie intake, the consumption of artificially sweetened drinks as well as sedentary lifestyles. 61% of the mothers of the overweight children had attended school for eight years or less (Siqueira, Alves, and Figueiroa 2009).

Violence is high in informal areas due to the lack of state and police authority (Ferreira and Whitaker 2012), with drug dealers battling over their respective turfs in the favelas. Some young people become involved in the drug trade as one way of gaining money and respect, yet they often face a life of violence or end up in prison or face punishment from the drug dealers (Meirelles and Gomez 2009).

11 https://www.cuponation.com.br/tempo-de-estudo-outros-paises, in 24/05/18.

3.2 Potential benefits of urban gardening for issues affecting slums

In Sao Paulo, slums usually have a high population density, since the access to land is expensive (even those poorly served by facilities) and usually, more than one family live in the same dwelling. Plots are entirely constructed, and 3 to 5 floors are standard in some areas (Fig. 4 and 5). Generally, there is little space for open, green areas to foster communal activities; also, they lack sufficient public facilities.

Figure 4. High density in a Sao Paulo slum (Cabuçu de Cima): few and green open spaces
Source: Photo from Fabio Knoll

Studies have shown that urban gardening can provide access to collective green areas (Saporito 2017), create opportunities for community recreation (Kremer, Hamstead, and Mcphearson 2013), stimulate social cohesion (Roth et al. 2015), reactivate cooperation and solidarity (Gasperi et al. 2016), promote multicultural integration (Saporito 2017) and, potentially, establish a location to cement social bonds and offer mutual support (Kato, Passidomo, and Harvey 2014). Urban gardening acts as a tool for social transformation (Kato, Passidomo, and Harvey 2014) while stimulating civic engagement (Gasperi et al. 2016). Further, "the collective care of an urban garden means taking care of the community to which the gardeners belong to and generates a symbolic community" (Gasperi et al. 2016). In conclusion, urban gardening provides all the prerequisites for inclusive urbanism.

Figure 5. Cabuçu de Cima slum: power line, a remaining empty space that can be used for gardening
Source: Photo from Fabio Knoll

In informal areas, people face a range of social problems from low educational attainment to violence associated with the drug trade. Urban gardening offers residents a way to acquire new knowledge and skills (Russo, Tomaselli, and Pappalardo 2014), for example, through education in vegetable growing (Yoo 2016). Gardening has been found to reduce crime (Russo, Tomaselli, and Pappalardo 2014) and decrease violence (Kato, Passidomo, and Harvey 2014), thereby remedying some of the problems faced by residents in informal areas.

The low quality of life in these areas can be improved by therapeutic gardening (Saporito 2017) or only by providing contact with nature (Gasperi et al. 2016) and encourage participants to rethink urban space (Kato, Passidomo, and Harvey 2014). Awareness of ecological sustainability can be stimulated by recycling biodegradable waste for compost and the use of wastewater to irrigate urban gardens (Russo, Tomaselli, and Pappalardo 2014). Here, environmental educational activities, especially with children and university students (Saporito 2017), can make a useful contribution.

In regard to improved urban planning, the frequently damaged environment found in the informal areas can be regenerated by creating gardens, green pathway sand park systems. This not only lets cities breathe but can also help reduce building densities (Russo, Tomaselli, and Pappalardo 2014). Another useful measure is to restore local biodiversity, e.g. by growing old cultivars within the city (Roth et al. 2015).

Urban gardening can provide a temporary or permanent use for vacant land. Turning vacant plots into urban gardens can help lower maintenance costs (Morckel 2015), reduce the stock of vacant, unproductive urban land (Defoe et al. 2014) and, most importantly, avoid the expansion of new informal areas over the few remaining vacant plots. Of course, at the same time, it is vital to ensure that sufficient alternative housing is available (Lall 2006). In many countries, spatial planners attempt to steer the development of vacant plots (Kremer, Hamstead, and Mcphearson 2013), (Morckel 2015), (Gasperi et al. 2016). In the ideal case, this should include an analysis of land availability (i.e. the identification of plots and registration of ownership) as well as management of the short and long-term development.

In particular, "public bodies might pay attention to establishing a transparent and participatory planning regulation framework guiding the potential use and the requalification processes of vacant areas" (Gasperi et al. 2016). With forethought and care, urban green spaces can serve many functions, including increasing the level of attractiveness (Morckel 2015), improving the public image of neighbourhoods (Defoe et al. 2014) and creating new functions and values of space within them (Foo et al. 2014).

In areas of slum upgrading, where urban regeneration processes are expected, community gardens can also contribute to maintaining community-building dynamics (Demailly and Darly 2017).

Informal areas suffer from inadequate access to healthy food, which is often unaffordable, as well as a lack of education regarding healthy eating. Together, these result in widespread obesity, which is associated with several chronic diseases. Gardening can provide low-income groups with healthy food that is either free or cheap (Roth et al. 2015). It can contribute to the improved nutrition of residents. In addition to a better diet, individual health is enhanced due to the mental and physical benefits of gardening (Gasperi et al. 2016).

Economic inclusiveness can boost the integration of urban agriculture with urban resilience (Dieleman 2016). Bearing in mind the low incomes of slum residents, urban gardeners can find it financially profitable to cultivate particular crops on small plots (Thomas and Lavkulich 2015). Agricultural products can be used for own consumption or sold at markets to supplement the family budget (Kato, Passidomo, and Harvey 2014).

Figure 6 gives an overview of how urban gardening can contribute to face some common challenges in the slums, showing diverse aspects can be explored through communitarian gardening.

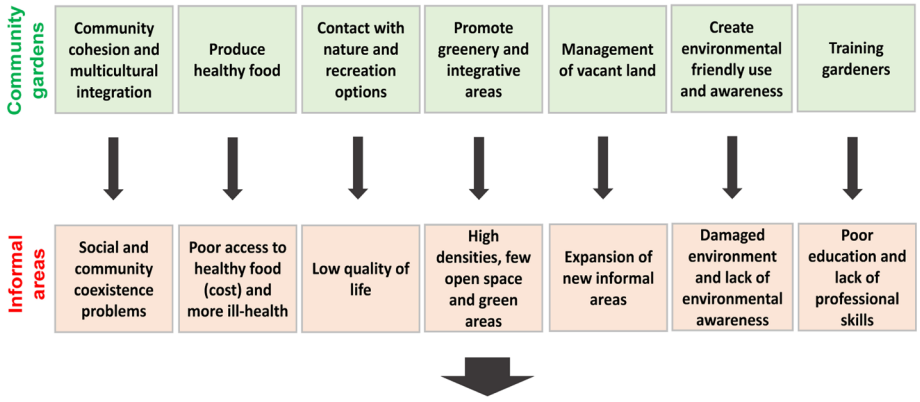

Figure 6. How community gardening can help solve everyday problems in/around slums

3.3 Case study – Golgi Park Intercultural Garden Hellerau

Table 1 provides an overview of Golgi Park Intercultural Garden. It is located behind the 'Festspielhaus Hellerau' (festival theatre) in Hellerau neighbourhood, city of Dresden.

Area	3,200m²
Ownership	Festspielhaus Hellerau
Project start	May 2015
Number of participants	Around 25
Nationality of participants	German, Syrian, Tunisian, Moroccan, Eritrean and others
Number of managers	3
Target group	Refugees, local citizens, employees from the Festspielhaus Hellerau, volunteers from the wider Dresden area, school classes, visitors to the Festspielhaus, interested gardeners and anyone interested in such a joint project
Project funding	Cultural Foundation of the Free State of Saxony, the Heidehof Foundation and the Stiftungsgemeinschaftanstiftung&ertomis
Meetings	From 4 pm on Tuesdays

Table 1. Details of the Golgi Park Garden
Source: Dresden Garden Network (Garten-Netzwerk Dresden)

Figure 7. Features of the Golgi Park garden
Source: Image from Google Maps

Figure 8. Raised beds in Golgi Park garden along with some participants
Source: own photos

In 1911, there was a school of Rhythmic in the site. In the 1930s, the area served as a military camp and between 1945 and 1991 the Soviet army occupied it. From 2009, it is the Festival Theatre[12]. Figure 7 provides details of the garden's structure and its essential features. Considering the history of the site and its high potential of soil contamination, the gardening is made in raised beds, as shown in Figure 8. The interviews results are related as follows.

GARDENERS

The two interviewed gardeners had no previous experience in gardening. They travel to the garden by car accompanied by family members. Their motivations for joining the Golgi Park garden are:

- interest in plant cultivation;
- lack of space for cultivating at home;
- an interest in learning about the plants;
- a desire for their children to play in green space;
- access to open space, with fresh air and green surroundings.

The following factors were mentioned as demotivational:

- having problems with other people;
- having an allergic reaction to plants or getting ill;
- a lack of time;
- "if I am not welcome anymore".

The main benefits of the garden were described as:

- meeting different people;
- have a supply of fresh and tasty vegetables;
- spending time with the family in green surroundings and enjoying the gardening space.

For the first interviewed gardener, the most crucial aspect of Golgi Park was the opportunity to make things together: "what is special here is that you have materials, and if you have ideas, you can construct things." The second gardener highlighted the importance of the requisite infrastructure and administrative aspects: "with the project (funding), we can get everything we need – soil, water, seeds and people with knowledge to bring ideas and make the garden more attractive."

In reducing vandalism and the theft of crops and equipment, both interviewed gardeners suggested some solutions while insisting that the garden should remain open to everyone: "I do not believe in fences – they can always be climbed or destroyed. It is not a solution for the community"; "One solution could be to make the garden visible from the street, so people can see

12 http://www.hellerau.org/golgi-park-info, in 24/05/18.

if something happens" or "Maybe writing something like 'Take part, do not steal' could be one way to reach people."

In regard to implementing an urban garden in the slum surroundings of a city such as Sao Paulo, the Golgi Park gardeners pointed out the necessity of:
- having an expert to help participants with planting;
- finding people in the community interested in gardening;
- making sure that participants feel welcome;
- having sufficient material resources to enable participants to construct the garden; and
- making the garden visible and striving to attract all residents in order to create an inclusive atmosphere and thereby avoid vandalism.

MANAGERS

A team of three managers is responsible for administrating and organizing the Golgi Park garden (one working 20 hours a week and the others 12 hours a week). Two of the managers are current students (of social work and horticulture, respectively).

For the two interviewed managers, the key to getting residents involved is to adapt the garden to their needs; "It is important to know people's needs and wishes, and to discuss with them how the garden (or part of the garden) could fulfil their wishes."; "What you can do is, from the beginning, show them what is possible in the garden."

The managers stated that the garden is no longer actively publicized amongst refugee groups. While some refugees still use the garden for various purposes, the current group of active gardeners is rather diverse. Social media posts and printed material encourage local people to take part in gardening activities and "If people get in touch and start gardening, we noticed that they soon bring other acquaintances to the garden."

The Hellerau neighbourhood is invited to use the garden and take part in events through invitation letters delivered to their homes; however, few locals join in gardening activities, perhaps due to the number of private gardens in this neighbourhood. "People here do not really use the garden for gardening; but some people from Hellerau spend some free time here, bring their kids, come for a walk, look at the beds and ask what happens here or just come to enjoy the sun." This shows the potential to foster inclusivity, i.e. by bringing refugees (non-Germans) into contact with local citizens (mostly Germans).

The events are highly diverse, receiving funding from diverse sources. Partners are invited for workshops or to fund specific activities.

The managers see the integration of different generations in the garden as an achievement. Another positive aspect is that the garden functions as a meeting place for the exchange of ideas and to get to know different realities,

thereby helping to create an inclusive atmosphere amongst the local citizens.

External funding is needed in order not to burden participants with administrative tasks. The salaries of the managers have to be paid (responsible for the garden organization and maintenance) as well as general expenses such as water, soil, materials, etc.

It is not difficult to keep the Golgi Park garden safe from vandalism and theft, "maybe because it is behind the theatre, which provides some sense of security and makes it a respected place".

The managers agree that involving local people is the best way to safeguard the garden from willful damage: "Make the place a people's place, make them care about the plants and the garden". Asked how to do this, the response was "Invite them, even if they do not come. Invite the neighbourhood, because usually who makes this are people living locally".

The closing remark of one manager was "If you have a plan for a garden, talk about it with people; ask what they want and what should be changed" (in the proposal). Regarding the establishment of a community garden in slum surroundings such as in Sao Paulo, the Golgi Park managers point out the necessity of:

- constructing the garden according to people's wishes;
- providing social media posts and printed material to encourage the participation of local people;
- inviting and welcoming the entire neighbourhood;
- establishing partners for the promotion of events;
- welcoming diverse social groups in an inclusive atmosphere;
- encouraging users to bring other people;
- providing funding for materials and a minimal staff so as not to burden participants with administrative tasks;
- locating the garden close to some public facility and inviting people for every activity in order to avoid vandalism.

3.4 Possible problems facing community gardens in slums and its surroundings

Some basic factors that can hinder the implementation of community gardens in informal areas are: a possible lack of interest in gardening; soil contamination; the vulnerability of the gardens to theft; and the short-term support of top-down initiatives.

The possible lack of interest in gardening could be attributed to many factors in informal areas.

First, people generally lack access to essential services and infrastructure and consequently face a range of problems such as disease, landslides, floods, etc. Land tenure is also a concern, i.e. the assurance that they can remain in these areas. Without essential services and land tenure, residents can hardly

be expected to have an awareness of environmental concerns or the importance of healthy diets or to recognize the benefits of more communitarian and green spaces. In this regard, strength the social housing programmes, according to the existing housing plans[13] and legal regulations are a premise. Like the previous governments, the current local government has goals for slum upgrading, land regularization and social housing building, to face the problem.[14] It is a long term action, for what more political priority should be given.

Second, their days are filled with (often informal) work and the long commute to their workplaces – public transport is insufficient (Lall 2006) – which are usually located outside the peripheral slums. Women also have to do household childcare tasks, further reducing their free time. Clearly, it is a challenge under such conditions to get working-age people involved in communitarian work. Of course, unemployed or retired persons should also be encouraged to get involved in urban gardening. However, the community gardens should not place additional pressures on people (interviews with Golgi Park managers); on the contrary, in a top-down initiative, they should offer some socialization and enjoyment.

Various forms of human activity serve to alter soil properties. For example, the demolition of buildings and vehicle emissions pollute the environment with lead (Knight et al. 2013). Soil contamination is a crucial factor to be considered when creating gardens in and around slums, because:

- these areas are often subject to regular flooding (dwellings may be constructed on the banks of watercourses);
- the watercourses are usually polluted by waste flows from residential areas, which are not connected to municipal sewage systems, as well as by solid waste illegally dumped into watercourses;
- waste accumulates in the streets or on unsealed areas due to missing or infrequent waste collection;
- vacant plots are usually associated with waste accumulation;
- waste products from construction sites are often improperly discarded;
- there is usually heavy vehicle traffic.

All of these factors increase the likelihood of soil contamination. Clearly, this topic should be given priority before establishing an urban garden in order to avoid future health risks to local people.

The vulnerability of gardens to theft is undoubtedly high due to the lack of security in such areas. For example, electric cables or maintenance hole

13 For more information about Sao Paulo housing master plans see: http://www.favelasaopaulomedellin.fau.usp.br/wp-content/uploads/2016/09/pmh_2009-2024.pdf,; in 03/09/19. http://www.habitasampa.inf.br/files/CadernoPMH.pdf; in 03/09/19.

14 Goals from 2017-2020: slum upgrading for 27,500 dwellings (in a total estimated in 830,000), land regularization of 210,000 dwellings (in 850,000) and build 25,000 social housing apartments. http://planejasampa.prefeitura.sp.gov.br/assets/Programa-de-Metas_2017-2020_Final.pdf, in 04/09/19.

covers are often stolen. At the same time, the community gardens must strive to remain public spaces, open to the neighbourhood and any interested persons.

The short-term nature of the support given to top-down initiatives can become a problem for such community gardens. After the 4-yearly[15] local government elections, there is always the risk that a new administration will cancel financial support. Long term political willpower and stable policies are needed to ensure inclusive and sustainable practices (Park 2017). Key to this process is adequate policymaking that assures government commitment as well as inclusive governance able to strengthen public participation and avoid undesired outcomes (Buijs et al. 2017).

An extraordinary commitment must be provided to temporary community gardens. When temporary community gardens are transferred into a different land-use, then the availability of another area for gardening is mandatory. This limited time-scale must be made clear to all the participants from the project's inception so that suitable alternatives can be planned in advance.

3.5 Recommendations for implementation of urban gardening

The following recommendations are designed to tackle the key problems faced when implementing community gardens in slums and its surroundings, in the case of a top-down initiative.

Recommendations to generate interest in gardening and to foster inclusivity

-Consult people about their interest in joining the project.
-Advertise the project and invite people to build it together, designing the project in accordance with people's interests (interviews with Golgi Park gardeners and managers).
-Provide materials and qualified people to advice on plant cultivation (interviews with Golgi Park gardeners).
-Identify and attract a group of people in the target community interested in gardening (Mcivor 2016 and interviews with Golgi Park gardeners).
-Welcome the whole neighbourhood, in the sense of a community meeting place; it is vital to gain the support of the local community, even those who do not intend to take part in gardening work (Mcivor 2016 and interviews with Golgi Park gardeners and managers).
-Welcome diverse social groups in an inclusive atmosphere and encourage users to bring along other people (interviews with Golgi Park managers).
-Organize diverse activities in the garden such as special events, festivals, targeted activities (for children, the elderly, women, etc.) and establish dedi-

15 Elections for the local government in São Paulo occur every four years. The current one: 2017 - 2020.

cated partners for this (interviews with Golgi Park managers).
-Involve other social organizations (Saporito 2017), (Roth et al. 2015) such as local churches, schools and NGOs, in order to help diversify the activities.
-Promote the idea of gardening in schools (Roth et al. 2015).
-Create dedicated strategies to attract participants such as a communication plan (Saporito 2017); provide social media posts and printed material to encourage people to get involved (interviews with Golgi Park managers); organize events to promote the project (Gasperi et al. 2016).

Recommendations on how to tackle soil contamination

-Be aware of the sources and risks of soil contamination; investigate the history of the site. If there is potential contamination from the previous land uses, do not plant directly in the soil (use raised beds instead) or promote chemical monitoring and "perform soil remediation activities in case of risk" (Gasperi et al. 2016).
-Locate the garden far from main roads and sources of pollution. Russo et al. (2014) suggest locating gardens at a distance of 250m from roads carrying more than 5,000 cars per day in order to reduce the risk of polluted soil.
-Be aware when choosing crops for planting that some vegetables are more resistant to the effects of contamination than others.
-Analyze the various components of compost before adding it into the soil, as these may increase the levels of contaminants.

Recommendations to safeguard the gardens against theft

-Involve the community in keeping the garden secure (including equipment and crops). "Make the garden a people's place; make them care about the plants and the site" (interviews with Golgi Park managers).
-Chose a highly visible, easily accessible location for the garden so that possible disturbances can be quickly noticed (Mcivor 2016 and interviews with Golgi Park gardeners and managers).
-If possible, locate the garden close to a public facility (interviews with Golgi Park gardeners).

Recommendations for the short-term support of top-down initiatives

-Ensure that the project enjoys high recognition.
-Create a municipal public policy that supports urban agriculture.
-Integrate existing policies (environment, social inclusion and food security) to urban agriculture projects.
-Consider the long-term perspective of programmes and plans in order to foster the participation of residents (Gasperi et al. 2016).
-Get residents involved as market customers, community gardeners or volunteers (Kato, Passidomo, and Harvey 2014).

–"Establish sustainable actor networks" (Roth et al. 2015) in order to support activities as well as to integrate citizens, the private sector and interested professionals.

4. Conclusion

The benefits and problems of community gardens have been explored using state-of-the-art scientific knowledge from Global North and complemented by case study interviews. The case study was oriented to investigate what motivates people and which management strategies can promote the individual interest of participating in such initiative. The collected data from the interviews corroborated with diverse findings from the literature, showing relevant contribution. The primary aim was to collect and transfer the benefits of communitarian gardening for application in the most sensitive territory in Sao Paulo, where informality prevails, as a strategy to promote inclusiveness. The results show that community gardens can be an effective option to help ensure food security and improve the natural, social and business environments as well as to provide healthy food in the slums of Sao Paulo. The residents of such informal areas face different problems ranging from high population densities and lack of green space to poor access to healthy food and low quality of life.

This paper provided a matrix of possible problems with recommendations to avoid them in implementing community gardens in slums and its surroundings. Their top-down implementation can be successful if the initiatives are designed together with the community, and if a long-term adaptive management model is applied. Further, many barriers to implementation must be overcome in partnership with the community, for example, the issues related to participation, soil pollution and garden security. Integration of stakeholders, political will and priority, and population engagement are vital factors to put it into practice in the way to meet the Agenda 2030.

The community gardens can be a strategy for curbing urban sprawl and at the same time improving diverse aspects in the most vulnerable territories in the cities, especially in areas facing significant social and environmental problems. Adopting urban gardens in planning and policies can be a strategy for promoting inclusiveness in cities. The recommendations offered here are intended to encourage local stakeholders to assist in establishing community gardens in informal neighbourhoods, which can happen before or together with slum upgrading projects. Bearing in mind, slums are a dynamic problem, with social, environmental and urban consequences, that tends to be increased in crisis periods, political priority and budget increments are demanded in housing programmes, as well as integrated policies.

It is important to mention this paper is part of a most prominent work that will provide a broader panorama about the topic in different scales and

territories, including Global South and the local contributions, looking for different aspects like socio-economic, political and territorial in other case studies. Further works are demanded on evaluating the quantity, types and needs of existing local initiatives of urban agriculture, to propose a policy able to support and expand them. Examples of inter-sector integration are also welcome, once urban agriculture can involve diverse sectors, usually operating separately with different goals and actions in the city.

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