

O uso de áreas sob torres de transmissão na instalação de hortas urbanas: uma ferramenta voltada à sustentabilidade

The use of transmission line buffer corridor in the installation of urban gardening: a tool aimed at sustainability

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Abstract

Food insecurity is a major concern worldwide. In Brazil, around 8.7 million people face hunger and extreme poverty, especially in urban centers. To tackle this issue, implementing urban gardens has proved to be a useful tool for improving the living conditions of communities and contributing to the sustainable development of the region. This research focused on gardens under electricity towers, aiming to analyze the relevant legislation and identify the direct and indirect recipients of this practice as well as the environmental, social, cultural, and economic impacts, verifying the existence of any potential health risks. We used the methods of literature review and field research in two vegetable gardens in the São Mateus region of São Paulo. The results showed that urban gardens implemented under towers are tools for combating hunger, food education, income generation, and contributing to the development of sustainable cities, acting as agents for the fulfillment of the goals and SDGs of the 2030 Agenda.

Keywords: Community gardens; Food security; SDGs

Resumo

A insegurança alimentar é um problema preocupante em todo o mundo, no Brasil cerca de 8,7 milhões de pessoas enfrentam fome e miséria extrema, especialmente nos centros urbanos. Para combatê-la, o implemento das hortas urbanas mostra-se como ferramenta útil, visando a melhoria nas condições de vida das comunidades e colaborando no desenvolvimento sustentável da região. A presente pesquisa teve por foco as hortas sob torres de energia elétrica, objetivando a análise da legislação pertinente, identificação dos destinatários diretos e indiretos desta prática e os impactos ambientais, sociais, culturais e econômicos, verificando a existência de eventuais riscos à saúde. Foram adotados os métodos de revisão bibliográfica e pesquisa de campo em duas hortas na região de São Mateus, município de São Paulo. Os resultados mostraram que hortas urbanas implementadas sob as torres constituem instrumentos de combate à fome, de educação alimentar, de geração de renda e colaboram para o desenvolvimento de cidades sustentáveis, atuando como agentes de contribuição para o cumprimento de metas e ODS da Agenda 2030.

Palavras-chave: hortas comunitárias; segurança alimentar; ODS.

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1 Introduction

The right to regular, nutritious food is a basic human right, inherent and indispensable to the fulfillment of human dignity and the other rights guaranteed in the Federal Constitution (art. 6). Despite the constitutional safeguard, as well as the provision in international standards, hunger, and food insecurity, abound in different regions of the world. In Brazil, around 8.7 million people face hunger and extreme poverty, especially in urban centers (BRASIL, 2024).

A study published by the Brazilian Agricultural Research Corporation (EMBRAPA) highlights the importance of agribusiness for global food security, claiming that Brazilian agribusiness can feed 800 million people worldwide (Contini & Aragão, 2021). However, this study includes in this calculation the production of food and animal feed but fails to account for the use of grains to produce biofuels, waste in the production chain, inequalities in consumption, and data on hunger and food insecurity. This economic model, focused mainly on the production of commodities, cannot guarantee food security, as well as posing a threat to food sovereignty, and causing the destruction of landscapes and environmental degradation (Ferreira Fo., 2022).

It is worth remarking that access to a healthy environment is a basic human right, formally recognized as such by the United Nations General Assembly on 26 July 2022. Like the right to food, the right to a sustainable environment is indispensable to the fulfillment of other fundamental rights, such as human dignity, health, work, life, well-being, and housing.

Agroecology arises from the need to build new social and production relationships, transcending the concept of sustainable agriculture and proposing new social construction, based on respect between men and women, where both occupy equal spaces of speech, participation, and decision-making, with equal incomes, shared power, fighting any form of gender violence or sexism (Lima & Jesus, 2017). When agroecological practices are linked to urban areas, there is a connection with community gardens, which have proven to be an effective tool for mitigating hunger and seeking sustainability.

Meanwhile, the scarcity of unbuilt areas, especially in large Brazilian cities, especially in the Metropolitan Region of São Paulo – RMSP, with an area of 8,051 km² and a population of over 22 million people (IBGE, 2021), provides an alternative for implementing community gardens in the spaces under power transmission towers.

In many cases, these spaces are used irregularly, without authorization or compliance with safety issues, endangering the community. Other times, the abandonment or poor maintenance of the areas by the concessionaire leads to the growth of scrubland, as well as the use of the site for improper waste disposal, resulting in the proliferation of insects and rodents.

Given this problem, this study aimed to analyze the current legislation that deals with the concession of areas to companies responsible for providing electricity services, to verify the existence of legal restrictions, the competence to allow sharing, and the procedures required to institutionalize projects aimed at agricultural food production and the safety of users. In addition, this study sought to highlight the benefits of the shared use of these spaces as tools for tackling food insecurity and sustainable development, contributing to the achievement of the Sustainable Development Goals (SDGs) of the UN's 2030 Agenda.



2 Theoretical Framework

2.1 Right to Food and Food Security

Food is a basic human right, as recognized in several legal documents. At the international political level, the landmark was the Universal Declaration of Human Rights (1948), whose article 25 establishes that “everyone has the right to a standard of living adequate for the health and well-being of themselves and their families, including food” (...)” (ONU, 1948).

In Brazil, the National Food and Nutrition Security System – SISAN – was created in 2006 by Law No. 11.346, of 15/09/2006 (Organic Law on Food and Nutrition Security – LOSAN), whose article 2 establishes that “adequate food is a basic human right, inherent to the dignity of the human person and indispensable to the fulfillment of the rights guaranteed in the Federal Constitution”. In turn, the right to food was included in the Federal Constitution as a fundamental social right in Constitutional Amendment 64 of February 4, 2010 (Brasil, 2010).

The human right to adequate food is indispensable for the fulfillment of other rights, such as the right to health, well-being, life, and personal dignity. Despite the legal guarantees, hunger and malnutrition still devastate the population in Brazil and around the world, calling for an urgent solution to enforce human rights.

The “State of Food and Nutrition Insecurity in the World” (SOFI) report, published by the United Nations, based on the joint efforts of different international agencies (FAO, WHO, IFAD, UNICEF, and WFP), reveals that, on average, 733 million people in the world could face hunger in 2023, representing around 9% of the population. (SOFI, 2024, p.18).

In Brazil, according to data from the Brazilian Institute of Geography and Statistics (IBGE), 8.9% of households faced moderate or severe food insecurity in urban areas in 2023, of which 50.9% had a per capita household income of less than half a minimum wage.

Furthermore, Brazil is internationally recognized as one of the main producers and exporters of agricultural commodities, such as soybeans, corn, sugar, beef, and poultry (Quintam & Assunção, 2023), with the sector showing a 24.31% growth rate in GDP in 2020 (CEPEA, CNA, 2022). The study published by EMBRAPA highlights the importance of agribusiness for food security in the world, where Brazilian agribusiness would be able to feed around 800 million people in the world (Contini & Aragão, 2021).

When analyzing the figures for hunger and food insecurity in comparison with the growth of agribusiness, the apparent paradox of abundance becomes clear: while on the one hand, Brazil is considered one of the largest food producers in the world, on the other hand, hunger and food insecurity pose a challenge for management and the development of public policies.

The model employed by agribusiness is marked by the “Green Revolution”, a process of modernization and transformation of the world’s agricultural sector, following the Second World War and the resulting efforts to rebuild Europe and Asia, “which consolidates large-scale food production based on the use of agricultural inputs, such as hybrid seeds, synthetic fertilizers, and pesticides” (Ferraz, 2017, p. 131-132).

The agricultural trade assumes the role of modernizing agriculture through large production units, gradually excluding family farming and rural workers in general, whose only alternative is to migrate to the cities (Leonel Jr., 2020). Another hallmark of agribusiness is deforestation for the expansion of monocultures or cattle ranches, thus affecting biodiversity.



According to the Annual Report on Deforestation in Brazil (MapBiomas, 2022), deforestation in Brazil grew by 20% in all biomes in 2021, with 59% of the country's deforested area concentrated in the Amazon.

In addition to deforestation, the use of pesticides, mainly in the form of fertilizers and herbicides, poses severe environmental problems (Altieri, 2012), such as soil and water contamination and the loss of plant and animal species, as well as causing damage to the health of the workers who deal directly with the handling of the products.

In addition, there is concern about food contamination. The study carried out by the National Health Surveillance Agency – ANVISA, Program for Analysis of Pesticide Residues in Food - PARA, for the 2017/2018 Cycle, after analyzing 4,616 samples of 14 foods of plant origin, corresponding to 30% of the Brazilian population's diet, indicated that 23% of the food consumed daily by Brazilians contains some level of contamination by agrochemicals (ANVISA, 2019). However, no information is provided on the exact amount consumed and what it will lead to in the long term.

In turn, the high cost of manure and chemical fertilizers drives small farmers out of the countryside and into urban centers, leading to new and diverse economic, environmental, and social problems (Altieri, 2012, p.82), such as the disorderly growth of cities, unemployment, food insecurity, slum settlements, construction in areas of risk and environmental protection, an increase in violence, the accumulation and irregular disposal of waste, and an upsurge in pollution in all its different forms (water, air, and soil).

These are some of the problems arising from the agribusiness economic model, which does not meet the needs of most of the population, who do not have access to the quantity and quality of food they need to consume, as well as being marked by ignorance and misinformation.

2.2 Human Right to the Environment and Sustainable Development

On July 26, 2022, the United Nations General Assembly declared that access to a healthy environment is a human right (United Nations, 2022). Understanding the environment as a human right means that its realization is a necessary condition for ensuring a dignified and healthy life for every human being” (Lisboa & Barros, 2008, p.12).

Nevertheless, the principle of human dignity, which guarantees the right to health, work, life, well-being, and housing, means that it is essential to recognize the environment as a human right (Lisboa & Barros, 2008).

Boff (2016) reports that the earliest concerns with the environment, more precisely with the rational use of forests, arose in the 16th century in Germany. However, it was only after the First World Conference on Man and the Environment, held in Stockholm in 1972, that the environment was placed on the international agenda (Ferraz, 2017), and “the right to an ecologically balanced environment became a fundamental right of the individual, equaling other rights already enshrined, such as freedom and equality” (Lisboa & Barros, 2008, p.16).

In April 1987, the World Commission on Environment and Development, or Brundtland Commission, published a report entitled “Our Common Future”, defining sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN, CMMAD – World Commission on Environment and Development, 1991, p. 46).

Since 1987, there have been many UN Conferences (Rio – Eco 92; Rio+5 Meeting, 1997; Earth Summit, Johannesburg, 2002; Sustainable Development Summit, New York, 2015.) Although there is still a certain amount of skepticism among people, including scientists,

Boff points to a growth in humanity's social awareness of the environmental issue, with the term "sustainable development" being used in various official documents, encompassing environmental, economic, social, and cultural issues.

Conversely, Boff highlights a certain fad and little commitment to making the planet's sustainability a reality (Boff, 2016). According to the author, "sustainable development is proposed as an ideal to be achieved, within supposed sustainability criteria that do not always match reality". The author also points out that it is not possible to have zero environmental impact, as every generation of energy has an impact, but man must make efforts to protect the environment, not just by not harming it, but by restoring its vitality, giving back more of what has already been taken from it, ensuring, in fact, the well-being of future generations.

2.3 Agroecology and Urban Community Gardens

Agroecology was only referred to as a scientific discipline until the mid-1960s/70s (Wezel et al., 2009). From then on, as part of the environmental movements against industrial agriculture and the Green Revolution, it also became a movement and a critical expression in the search for unconventional models of agriculture. In 1980, agroecology emerged as a practice, often intertwined with social movements. Today, the foundations of agroecology lie in respect for nature, solidarity, respect for cultural diversity, and the ideal of a fairer and more equal society.

Shiva (2013) argues that the agroecology model is the only one that can develop techniques to increase productivity and the production of healthy, poison-free food without destroying biodiversity. Thus, adopting agroecological practices allows for the use of more sustainable agricultural systems, with greater benefit from biodiversity, without the use of pesticides, while supporting small farms, representing the key to food security and environmental, economic, social, and cultural sustainability.

At the same time, urban community gardens have emerged as a response to the need for urban centers to invest in ecological projects in the face of sustainable needs, as well as to produce natural and healthy food for those involved in the projects, their families, and the local community, improving nutritional quality and social interaction (Biazoti & Sorrentino, 2022).

Although they are not the same as agroecology, when analyzing small urban communities and family gardens, there is an intertwining between community agricultural practices and agroecology, based on diversifying production, making maximum use of internal inputs, avoiding the use of pesticides and encouraging collaboration and collectivity. Thus, the use of agroecological practices in urban community gardens appears to be an effective tool for mitigating hunger and seeking sustainability.

2.4 Gardens in Transmission Towers

Implementing community or family gardens to provide access to healthy food and fight poverty faces numerous challenges, especially the lack of land in large urban centers. In this scenario, unbuilt, idle spaces underneath power transmission towers have gained special attention from organizations, associations, communities, and people in search of better living conditions who are interested in developing food-growing activities, whether for their own consumption, for educational or therapeutic purposes, or even to generate income.

Urban gardens provide nutritionally important and healthy food for the people involved, their families, and the local community, as well as generate income through the marketing of products grown by project participants and professional training and job opportunities, since these communities sometimes face different types of social and economic vulnerability (Costa & Sakurai, 2021; Biazoti & Sorrentino, 2022). The quality of management of the strips under the transmission lines is improved, resolving major demands for the concessionaire, irregular occupations, and waste disposal, as well as avoiding the cost and work of clearing the land, which was previously the responsibility of the concessionaire.

3 Methods

This study used two research methods: 1) bibliographical research and 2) field research.

Bibliographic research: the bibliographic research followed a descriptive approach, surveying bibliographies on legal and environmental concepts and considerations on the subject, from the initial problem - hunger and food insecurity – to the possible way of mitigating the problem: implementing vegetable gardens near power towers and lines.

To this end, the first step was to divide the central theme into six axes: food security, agroecology, sustainable development/sustainability, urban agriculture, urban community gardens, and energy towers, creating keywords and establishing literature search terms. That done, an initial literature search was carried out in the Google Scholar, Scielo, and Capes Platform databases, using the terms: “hunger and food security”; ‘human rights and food’; ‘human rights’ and ‘environment’; ‘urban agriculture’ and ‘agroecology’; ‘sustainable development’; ‘sustainability’; ‘urban gardens’ and ‘energy towers’;” energy transmission towers”.

After initially identifying the articles, specific filtering criteria were applied. Firstly, the selection prioritized articles published in the last three years, highlighting that the selection process began in August 2020. This ensured that the content was current. Secondly, the abstracts of the articles were carefully read to ensure that they actually addressed the topic in question. The third criterion involved assessing the Qualis rating of the journals in which the articles were published, with a preference for those rated between A and B, reflecting high academic quality. After this preliminary selection, the articles were read thoroughly and authors who were frequently cited were included in the final selection. In addition, seminal and classic books relevant to the central theme of the study were also incorporated to provide a solid and comprehensive theoretical basis.

Considering that the research also required an analysis of legislation, especially on the concession of public energy services, the supply of electricity, the regulation of services, and the use of transferred areas, a search was first carried out on the “Google” search engine, using the word “legislation” associated with the term of interest. Once mention of legislation was found, a search was conducted on the websites of public bodies, such as “planalto.gov.br”. After reading through the legislation, we selected those that were relevant to the study and, based on the analysis, occasionally further searches were required to connect the subjects, for example: “electric and magnetic fields” associated with “energy towers”.

Field research: aimed at collecting on-site data and information on the socio-environmental phenomena studied in the theoretical field. In addition to observation, data was obtained through semi-structured interviews with the coordinators and partners of the gardens, combined with photographic records. The interviews were based on questions about the history, operation, and management of the garden, as well as the obstacles to production and their

specific needs from an environmental and legal point of view. Once gathered, the information was analyzed qualitatively and quantitatively to gain an understanding of its complexity.

This research focused on the areas around power transmission towers in the municipality of São Paulo/SP. Using the Sampa+Rural platform, we spotted some urban gardens structured around power towers in the district of São Mateus, on the eastern side of the city of São Paulo. After searching online for the addresses and telephone numbers of those responsible, we were able to make contact and schedule visits. Having drawn up a script of non-personal questions, restricted to the implementation and operation of the garden, the interviews were carried out between July and August 2022, on two properties, referred to here as Property 1 and Property 2. The answers were recorded and then transcribed.

4 Results and Discussion

4.1 Theoretical Framework

Throughout the bibliographical research and field research, we found that there is a common understanding in the literature and among horticulture enthusiasts that urban gardens combined with agroecological praxis are effective mechanisms for producing healthy food, generating income, strengthening and developing social relations between the actors involved, boosting self-esteem, and (re)inserting them into the job market, training them for a new role, even if they have no previous knowledge, are old or have little schooling.

The gaps and/or divergences detected, which were the subject of the analysis, basically referred to: i) the possibility of using the areas under the power transmission towers to implement these gardens, analyzing the legal issues relating to authorization, and the potential risks and effects on health; ii) the difficulties faced in implementing the gardens due to a lack of public policies, the influence of the socio-economic profiles of the agents involved, and the impacts on the lives of the people concerned, both directly and indirectly.

4.1.1 Legislation

From a regulatory point of view, according to articles 21, item XII, point “b” and 22, item IV, both of the Federal Constitution, the Union has exclusive competence to operate electricity services and installations, as well as to legislate on the matter (BRASIL, 1988). In turn, according to Law No. 9.427/96, ANEEL was granted the operation of the services and is responsible for administering the electricity concession and permission contracts (BRASIL, 1996). In turn, the concessionaires and permit holders are responsible for the transmission and distribution of energy, as well as for expropriation (Decree-Law No. 3.365/41) or maintenance (Decree No. 24.643/34), through administrative or judicial channels.

Thus, once the transmission line, towers, and distribution lines have been installed, the responsibility for managing the area lies with the concessionaire in charge, even if it is installed in a private area.

To implement vegetable gardens, there is an express legal possibility of using the land for planting crops (item 13.7, NBR 5422/1986), provided that the technical specifications and safety restrictions established by the concessionaire itself, with ANEEL’s approval, are observed.

4.1.2 Health Risks

When dealing with electricity, concern has generally focused on the risk of shocks and their effects on the human body. As a result, precautions are better known and observed. A little over 30 years ago, some studies pointed to a possible link between some diseases, such as cancer, and exposure to electromagnetic fields.

Although inconclusive and not consensual, according to guidelines from the World Health Organization (WHO), some safety guidelines have been regulated (Law No. 11,934.09 and ANEEL Resolution 915/21) and analyzed by the Federal Supreme Court (STF, RE No. 627.189/SP, 2017), aiming to set the limits allowed in transmission activities to ensure that they are not unhealthy or dangerous, conditioning the electricity concessionaire to carry out its activities within acceptable standards for human health.

It is worth noting that the focus of the studies and legal regulations was not specifically on the workers near power towers but on the entire local community.

4.2 Case Studies of Two Urban Gardens in the District of São Mateus, São Paulo/SP

There were two gardens chosen in the district of São Mateus, with different forms of organization, but both with a formal contract with the same energy concessionaire - ENEL (Entidade Nacional de Energia Elétrica). The gardens visited have different characteristics: the first (Property 1), maintained by the NGO Cidades sem Fome, is run as a social business, with many collaborators and sponsoring partners; while the second (Property 2) is family-run, with few people working in the garden and no financial support from third parties, although it does have help from NGOs and associations to establish partnerships for the sale of products.

The two gardens in question are run by people with different ideas and socio-economic profiles. However, both managers see the areas and projects as tools for sustainable development and food security and share common goals: transforming the space and improving people's quality of life, both the gardeners and those who benefit from healthier food.

4.2.1 Characteristics of the Study Area – District of São Mateus

São Mateus is a district in the eastern region of the municipality of São Paulo. It covers 13 km² and is km from central São Paulo. Before 1948, São Mateus was a farm, until the patriarch of the family that owned the place, Mateo Bei, decided to subdivide it. On December 8, 1948, the São Mateus district was founded.

According to the latest census, carried out in 2010, the population is estimated at 115,140 inhabitants, with a demographic density of 10,908 inhabitants/km² (PMSP, 2022). The population of the São Mateus district, in 2010, represented 3.8% of the population of the entire city of São Paulo, although the population growth rate continues to be higher than the municipal average (PMSP, 2016). São Mateus' municipal human development index (HDI), which measures the population's income, education, and longevity, according to the Atlas of Human Development in Brazil, reached 0.732 in 2010 (UNDP; FJP; IPEA, 2013), below the municipal average of 0.8 (PMSP, 2016).

Although the district of São Mateus is more urbanized than its neighboring districts, like them it suffers from various urban infrastructure problems: basic sanitation deficiencies, the presence of a large number of substandard housing units, and violence. According to information from local people, the São Mateus district has a large concentration of people living

in favelas (Favela de São Mateus, as it is known) and according to data from the São Paulo City Hall, in 2010, 11.5% of the households in the district belonged to favelas (PMSP, 2016).

The region also suffers from precarious housing conditions: in 2010, 23.06% of the population of the São Mateus district were living in areas of irregular occupation that should be regulated (PMSP, 2016). Another relevant piece of information, according to the São Paulo Municipal District Proposals Notebook (2016), despite the expansion of the sewage network in 2000, by 2010, 13% of households had no access to the service. In general, basic sanitation in the region is poor, as recognized by the municipal government itself.

The reality found in the district, despite the environmental relevance of the region for the metropolitan context, was far from aspects such as the universalization of environmental sanitation through water supply systems, with quality, and without interruptions; sanitary sewage, especially adequate treatment and final disposal; rainwater management, including transport, detention, retention, absorption and drainage; urban public cleaning, from the collection, including selective collection, transportation, transshipment, treatment, and final disposal of household waste, and sweeping and cleaning of public places and roads (PMSP, 2016, p. 10).

From an environmental point of view, although the Atlantic Forest is not fully preserved as a biome, it still features 391 hectares of dense ombrophilous forest and 130 hectares of heterogeneous forest, located more significantly in the district of Iguatemi (PMSP, 2016). The São Mateus district is in two river basins: the Ribeirão Oratório basin and the Rio Aricanduva basin.

The district of São Mateus is home to an electricity substation and an extensive distribution line run by ENEL. Under the overhead line station lie the streets and avenues, forming large walled blocks at the points where the towers are installed, with an area of between 5,000 and 8,000 m².

Landscapes vary in these places. At times, the towers are surrounded by (irregular) occupations, at other times they are overgrown with weeds and/or accumulated rubble and garbage, yet sometimes they have been transformed into well-kept vegetable gardens. These include the two gardens chosen for the research: Cidades sem Fome and Horta da Dona Sebastiana, both of which have a formal partnership with the utility company responsible (ENEL), through a loan agreement.

4.2.2 Property 1 – ONG Cidades sem Fome Garden

The NGO Cidades sem Fome was founded in 2004, aiming to develop sustainable agriculture projects in urban areas, as well as environmental education, breaking down food prejudices, and developing new habits by introducing vegetables into the daily diet. The NGO manages 51 school gardens and 33 urban gardens (16 of which are under the line), involving around 156 vegetable growers.

The vegetable garden studied is based in the sub-district of São Mateus, in the municipality of São Paulo, and covers an area of approximately 7,000 m². It produces around 31 types of vegetables, such as lettuce, cauliflower, coriander, and beet, among others, organically, not only for self-consumption but also for sale. The products are sold in the fruit and vegetable market set up by the NGO in front of the garden, as well as to companies and schools.

The gardens run by the NGO Cidades sem Fome have a social business organizational structure, aimed at generating income for those involved and the financial autonomy of the

project. The income generated in each garden is not mixed with that of the others. The income collected, after removing operating costs (around 20%), is distributed among the local actors (workers from that garden).

Based solely on the partnership between the NGO Cidades sem Fome (Cities without Hunger) and the energy utilities, there are currently 16 vegetable gardens producing in the East Zone of São Paulo in the transmission line buffer corridor, involving 50-60 people in the production, harvesting, and sale of products, with an average income of around two minimum wages.

The NGO Cidades sem Fome received financial support from ENEL at the start of the project, because the company wanted to create a model project to be replicated. It also received support from Petrobras, Caixa, and international foundations. The grocery store, which was recently set up to sell produce from the garden, was funded by the New Zealand embassy.

On the one hand, it is important, over time, to consolidate the projects as a social business, solving social problems in a financially self-sustaining way. “The idea is to produce and sell more and more so that the project can sustain itself through sales. When I need a truck, I depend on favors, on investors. The idea is to have a reserve fund from sales. So that in a year, if I no longer have investors, the project will survive.” (personal communication, July 27, 2022).

On the other hand, there is a need for external investment for implementing the garden, which can incubate the project for 12 to 18 months, including the payment of a grant for the people who will work on it, because although the project can, over time, take off on its own, a garden takes an average of six months to start producing: one month to clear the land, one month to plant, and three to four months for harvesting.

Figure 1

Cidades sem Fome Garden (a: garden facade; b, c and d: planting under the tower).



4.2.3 Property 2 – Dona Sebastiana Garden

On the other side of the street is Dona Sebastiana's vegetable garden, established over 10 years ago. It was only two years ago that the loan contract with Enel (the current utility company responsible) was formalized in her name. Initially, the loan agreement was signed with Eletropaulo and her husband. With his death, she had to start negotiations for a new partnership.

Bananas are grown on the property (its main source of income), although it has been adapting the plantations, removing some trees so as not to compromise the lines and to comply with the utility company's guidelines. It also produces different types of lettuces, chicory, escarole, watercress, arugula, radish, cabbage, cauliflower, kale, Non-Conventional Food Plants, such as sorrel, taro leaves, ora-pro-nobis, lamb's ear), herbs (lemon balm, mint, fennel, and other spontaneous plants), vegetables/roots (sweet potatoes, beet, carrots, turmeric, cassava), corn, bananas, and lemons. Of the total 6,000 m², it occupies 4,000 m², using 80% of this space for cultivation. The other 2,000m² are shared with another family, who also grow vegetables.

The surplus produced from Dona Sebastiana's garden is sold to the local community within the garden itself. The below-market price makes the products more accessible to the population in need. The enterprise relies on the help of family members. Unlike the NGO Cidades sem Fome, it has never received financial subsidies from the utility company. It produces its own compost with food scraps brought in by the local community and tree prunings brought in by the energy utility itself.

It participates in other social projects aimed at tackling food insecurity and promoting women's empowerment, holding discussion groups for women in the community, and focusing on gender equality. To this end, it relies on the support of the Kairós Institute, a social organization created in 2000 to promote projects for the development of agroecology and the guarantee of healthy food. It is also a member of AAZL (Associação dos Agricultores da Zona Leste), which brings together farmers from the region, providing agroecological assistance and fostering partnerships for the sale of products at organic fairs in the cities.

Figure 2

“Property 1” Garden (a: facade; b and c: planting under the tower).



4.3 Comparative Analysis Between Urban Towers

Table 1 shows a comparative analysis of the characteristics of the two gardens studied, with the main information obtained regarding the type of contract signed with the concessionaire, the form of local organization, the existence of partnerships and financial subsidies from financial institutions and/or companies, the composting system, water collection for irrigation, the marketing of products, and the legal relationship between the person responsible for the garden and other gardeners.

Table 1

Comparative analysis between urban gardens in transmission line buffer corridor in the district of São Matheus, São Paulo/SP.

CHARACTERISTICS	ONG CIDADES SEM FOME	DONA SEBASTIANA
FORMAL CONTRACT/DEADLINE	Yes (ENEL) – 5 years	Yes (ENEL) – 5 years
ORGANIZATION	Social business	Family
PARTNERSHIPS	empresas e fundações internacionais	Associations, institutes, and NGOs.
FINANCIAL SUPPORT	Yes	No
COMPOSING	Purchase	Production
RAINWATER HARVESTING	Yes	Yes
MARKETING PRODUCTS	Own fruit and vegetables, supplying companies and schools.	In the garden and schools (NGO partnership).
HORTICULTURISTS	11 people.	The owner, two employees, and some volunteers.
WORKERS' CONTRACT OR AGREEMENT	Individual microentrepreneurs/invoice issuing.	Receive per diem.
TECHNICAL SUPPORT	Yes	No
PROFESSIONAL TRAINING	Yes	In the beginning, they were given guidance on cooperatives, associations, and some planting tips.
INCOME OBTAINED	75% to 80% distributed among the workers (each receives an average of 2 minimum wages), the remainder to be used for funding.	Payment of employees per diem and surplus for reinvestment in the garden and Dona Sebastiana's livelihood.
AREA/PERCENTAGE CULTIVATED	8.000 m ² /80% of the area.	6,000m ² , with 4,000 for Dona Sebastiana Garden and 2,000m ² for another family/80% of the area.
TYPES OF CROP	Vegetables and legumes.	Vegetables, legumes, some fruit, medicinal herbs, and PANCS.



RESTRICTIONS	Height: no higher than 1.80 from the floor.	Height: no higher than 1.80 from the floor.
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Source: Elaborated by the authors based on the results of the fieldwork.

4.4 Urban Gardens and the Sustainable Development Goals (SDGs) of the 2030 Agenda

The Sustainable Development Goals (SDGs) of the 2030 Agenda define priorities and aspirations for global sustainable development, calling for global action between different levels of government in the 193 UN member countries, companies, and society in general, aiming to improve people's quality of life while respecting human rights and the limits of the planet (UN, 2015). In Brazil, to implement the 2030 Agenda, the National Commission on Sustainable Development Goals (CNODS) was created in 2016, which assigned the task of producing the indicators to the Institute for Applied Economic Research (IPEA), a complex task due to the difficulty in constructing a methodology and gathering data. However, the CNODS was terminated by Decree No. 9,759 of April 11, 2019.

To monitor compliance with the targets, assess progress, and the challenges to be faced, the UN has adopted global indicators. It is up to the member states, which have approved the document, to produce their national indicators, in addition to analyzing and implementing the actions and government programs required to comply with the SDGs.

“Sustainable development indicators are essential tools for guiding action and supporting the monitoring and evaluation of progress towards sustainable development” (IBGE, 2015. p. 12; in Portuguese), however, the task of producing indicators is complex due to the difficulty in constructing a methodology and obtaining data (IPEA, 2020).

Regarding SDG 2 – Zero Hunger and Sustainable Agriculture, which aims to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture, the UN has established 13 indicators to monitor compliance with the eight targets. In addition to the global indicators, a further 28 national indicators have been proposed, such as the IBGE's Municipal Agricultural Survey (PAM).

The number of indicators reveals the importance and seriousness of the issue. Hunger and food insecurity affect millions of people in Brazil and around the world. As a result, projects aimed at agroecological urban horticulture, which seek to provide healthy food to the poorest and most needy people, have gained more visibility and prominence. Another point to highlight is the diversification of agricultural production, this factor being more important for agricultural sustainability than specialization, which is economically beneficial in the short term (Silva et al., 2025).

The bibliographical references used in this study, as well as the field research conducted, show that community or family urban gardens based on agroecological practices, although on their own they may not be enough to eradicate hunger, nor do they guarantee the fulfillment of all the SDGs and their targets, there is no denying the importance of the agents' efforts, the improvement in the quality of life of all the people involved, and the help in developing greener cities.

The concept of “green cities” – resilient, self-sufficient, and with social, economic, and environmental sustainability – is usually associated with urban planning in more developed countries. It suggests high-tech eco-architecture, cycle paths, and closed-loop industries that produce no waste.

Yet it has a special application and significantly different social and economic dimensions in low-income countries. There, the basic principles of greener cities can guide urban development that ensures food security, decent work, decent income, a clean environment, and good governance for all citizens (FAO, 2012, p.3).

The analysis of the work carried out in the urban gardens studied allows us to recognize their contribution to the fulfillment of some of the SDGs of the 2030 Agenda, in particular SDG-2 (zero hunger and agriculture); SDG-11 (make cities and communities sustainable); SDG-12 (ensure sustainable production and consumption patterns), and SDG-17 (strengthen the means of implementation and partnership for sustainable development).

Table 2 shows how the urban gardens under the energy towers studied contribute to meeting the targets of four of the SDGs proposed by the 2030 Agenda, linking the objectives, specific targets, and the contribution made by the work carried out in the gardens.

Table 2

Contributions of urban gardens to meeting the goals and SDGs of the 2030 Agenda.

ODS	GOAL	CONTRIBUTION
02 – FOME ZERO AND SUSTAINABLE AGRICULTURE.	2.1 End hunger and ensure access for all people, in particular the poor and people in vulnerable situations, including children, to safe, nutritious, and sufficient food all year round.	They improve the quality of food for the actors involved in the project and the local community, making it more accessible thanks to lower prices and greater proximity.
	2.2 End all forms of malnutrition, including chronic malnutrition and malnutrition in children under five years of age, and meet the nutritional needs of adolescent girls, pregnant and lactating women, as well as older people.	Same as above.
	2.3 Doubling the agricultural productivity and income of small-scale food producers, particularly women, indigenous peoples, family farmers, shepherds, and fishermen, including through secure and equal access to land and other productive resources and inputs, knowledge, financial services, markets, and opportunities for value addition and non-agricultural employment.	They generate jobs and income. In the case of Dona Sebastiana's vegetable garden, the appreciation of women's work also stands out.
	2.4 Ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, help maintain ecosystems, and strengthen the capacity to adapt to climate change.	They transform landscapes. They are implemented under power towers, in places previously used for dumping rubble and waste. They use no fertilizers or chemical fertilizers, increasing the amount of green areas and drainage in cities. They also promote rainwater harvesting.
	2.5 Maintaining the genetic diversity of seeds, cultivated plants farmed and	

	domesticated animals, and their respective wild species, including through diversified and properly managed seed and plant banks. 2.a Increase investment, including by strengthening international cooperation, in rural infrastructure, research, and extension of agricultural services, technology development, and plant and animal gene banks.	A variety of foods are grown; they use both Creole and conventional, non-genetically modified seeds. In the case of the garden run by the NGO Cidades sem Fome, investments are received from companies and foundations, including international ones.
11 – MAKING CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT, AND SUSTAINABLE.	11.3 Increase inclusive and sustainable urbanization, and the capacity for participatory, integrated, and sustainable planning and management of human settlements, in all countries. 11.6 Reducing the per capita negative environmental impact of cities, including special attention to air quality, and municipal waste management, among others. 11.7 Providing universal access to safe, inclusive, accessible, green public spaces, in particular for women and children, older people, and people with disabilities. 11.8 Substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans for inclusion, resource efficiency, climate change mitigation and adaptation, and disaster resilience.	They promote the integration of the community with nature and the involvement of the community in the search for partners, financial subsidies, and/or support from public authorities. They enable the management of solid waste, either by buying compost from those who produce it or by producing it themselves. They offer access to green spaces, especially for women, by holding conversation circles. The urban gardens are implemented in areas that were once abandoned, subject to the accumulation of waste due to irregular disposal, under the power towers, providing a significant improvement in the landscape and environmental quality, as well as integrating the local community more closely around the purpose of the garden.
12 – ENSURING SUSTAINABLE PRODUCTION AND CONSUMPTION PATTERNS.	12.2 Achieving sustainable management and efficient use of natural resources. 12.3 Halve global per capita food waste, at retail and consumer levels, and reduce food losses along production and supply chains, including post-harvest losses. 12.4 Achieve the environmentally appropriate management of chemicals and	They produce healthy food without using chemicals and reusing food waste as fertilizer. They reduce losses by shortening the distance between production and consumption. They also reuse leftovers to produce compost.

	all waste throughout their life cycle, in line with internationally agreed frameworks, and significantly reduce their release into the air, water, and soil, to mitigate their negative impacts on human health and the environment.	They do not use pesticides and/or chemical fertilizers.
	12.5 Substantially reduce waste generation through prevention, reduction, recycling, and reuse.	The food produced is consumed and sold. They also resort to composting. In the case of Dona Sebastiana, they produce on-site organic waste discarded by the community.
	12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and integrate sustainability information into their reporting cycle.	The establishment of the gardens inspired the concession companies to formalize sharing and create projects for this purpose, which became part of the company's reports, as well as being publicized on social networks.

Source: Elaborated by the authors based on the results of the fieldwork.

5 Final Remarks

Based on the research carried out, comparing statistical data, a bibliographical review, a field visit, and interviews, we concluded upon the importance of projects to encourage and implement community or family urban gardens, based on agro-ecological practices, as tools to combat hunger, achieve food security, transform and develop sustainably in all its aspects, and above all, restore the dignity of the human person.

We can also infer that the safety restrictions on the use of the area and exposure to electromagnetic fields do not prevent the establishment of urban gardens, as long as the height of the specimens to be used and the safety zones are respected. It should also be noted that it is uncertain whether the restrictions and precautions set out are sufficient to prevent any effects of electromagnetic fields from those already experienced by the population living in the surrounding area.

From a legal point of view, the responsibility for managing the area lies with the concessionaire in charge, who must set the technical specifications and safety restrictions and formalize the contracts with the bidders for the use of the area.

Through the technical visits and interviews, we found that urban gardens provide access to healthier food for the poor, offer mechanisms for technical and professional training, work, and income for immediate collaborators, and provide environmental education for the local community, creating better eating habits and encouraging reflection on the importance of respecting nature.

In terms of the vegetable gardens next to the power towers, there are other positive impacts, such as a reduction in trespassing and irregular construction in these areas without any regard for safety restrictions, dumping of rubble and garbage, accumulation of undergrowth, as well as providing a greater sense of security for the surrounding community.

In the search for ways to encourage the implementation of agro-ecological community urban gardens, with special attention to the empty, unbuilt spaces under the power transmission towers, public agents should take a new look, one that is not limited to merely supplying hoes and sachets of seeds. There is an urgent need to create public policies to encourage the development of urban agriculture and small-scale vegetable growers.

Given the difficulties faced by communities in dealing with the concessionaires responsible for the areas, local councils should act as facilitators of communication between the companies and community representatives, and together with the concessionaires provide technical, logistical, and even financial help, through partnerships, to prepare the land and start planting.

Credit lines must be provided to enable the implementation of urban gardens, thereby boosting food production in urban areas where poverty hotspots are located. Small farmers must have the same conditions to produce as large producers. To achieve this, we must recognize that people do not start from the same place on their journeys, while some start at an advantage, others face many barriers. We need to balance this dynamic so that the principle of equality and social justice can truly be fulfilled.

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