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► **To cite this version:**

Ouiam Fatiha Boukharta, Loïc Sauvée, Fabiana Fabri, Luis Manuel Navas-Gracia, Leticia Chico-Santamarta. Contribution of urban agriculture in ensuring a healthy and sustainable food system in the metropolis of Rouen, France. AScUS – Actionable Science for Urban Sustainability Conference, AScUS, Mar 2024, Troyes, France. <hal-04523391>

HAL Id: hal-04523391

<https://normandie-univ.hal.science/hal-04523391v1>

Submitted on 27 Mar 2024

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HAL Authorization

AScUS – Actionable Science for Urban Sustainability Conference

20 – 22 March 2024, Troyes, France

Contribution of urban agriculture in ensuring a healthy and sustainable food system in the metropolis of Rouen, France

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Abstract:

Urban agriculture and gardening in cities is nowadays increasingly recognized through initiatives such as the Milan Urban Food Pact (MUFP, 2015). Moreover, there is a growing awareness on the part of citizens of the significant and positive contribution that a link with nature can make to our mental health and well-being (Uhlmann et al., 2018; Boukharta et al., 2024a). The present study focuses on the analysis of two urban agriculture practices in the city of Rouen, France, where an evaluation has been made of the value distribution created by through their implementation, as well as an assessment of the benefits they bring in the economic, social and environmental terms. This work analyses the governance structures of these initiatives, in order to identify their feasibility and financing. The methodology consists of interviews with stakeholders involved in the operation, including project managers, members of the municipality, and other actors, and where the findings are analysed through NVivo Software. The results show that the two social cases evaluated have a common main objective, which is to ensure a better green environment for the city's inhabitants, while reconnecting them with nature and offering them the opportunity to grow their own fresh food and improve their well-being (Boukharta et al., 2023). Regarding the governance, both structures have a well-defined structure that enables them to be well organized and stable, allowing for a better flow and continuity of these urban practices (Halloran and Magid, 2013).

Introduction:

Providing a healthy and accessible food supply is now one of the most urgent and pressing challenges facing the world, since, according to the United Nations Program, 60% of the population will live in urban areas by 2030 (UN-Habitat, 2011). Urban agriculture has therefore become the way to address food insecurity in cities (FAO, 2019).

Urban agriculture is the cultivation, processing and distribution of food products by growing plants in and around urban areas (Poggi et al., 2021), and is increasingly seen as an essential component of food security where researchers see it as a highly promising pillar of food supply ensuring a reconnection with nature (Paganini and Lemke, 2020), serving to foster the development of new positive social and cultural projects (Childers and Diaz, 2000), and improving the mental health and well-being of the inhabitants (Boukharta et al., 2024a).

The purpose of this investigation is to examine the interaction between decision-making structures, stakeholder involvement and the benefits of urban agriculture projects, through the evaluation of decision-making, the cost and benefit of such projects, and the distribution of the value created, with the resulting benefits.

Methodology:

The approach used was to conduct interviews with the stakeholders involved in the operation, in order to gain an in-depth understanding of our problematics. Interviews were conducted with project leaders, managers, farmers, employees and volunteers. In addition, field visits for observation and experimentation were carried out for better analysis and investigation. The two cases evaluated are "Le Champ des Possibles" and "Le Jardin de l'Astéroïde", both located in the Rouen Metropolis (Figure 1). Moreover, the findings are processed through an empirical analysis using NVivo software, for its effectiveness in processing qualitative data (NVivo, 2019).

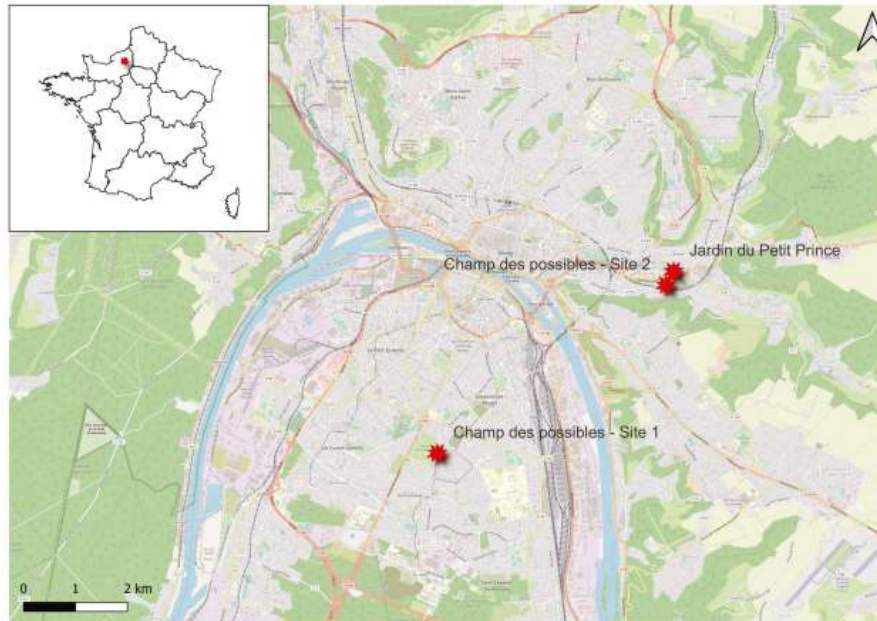


Figure 1: Location of the initiatives evaluated in Rouen using QGIS Software. (Source: the authors)

The first urban agricultural case refers to a community garden where all participants work on the same land and share the harvested products and the second to allotment gardens; where each member has an individual plot to work on his products and harvest them for his own consumption. These two initiatives will be described and presented in greater detail in the "Results" section.

Data collection and analysis

The in-depth analysis used in this investigation is based on the three-pillar approach to sustainability, involving in particular the combined environmental, social and economic dimensions (Bastian et al., 2013), and which is most often used in the field of urban agriculture (Artmann and Sartison, 2018; (John and Artmann, 2024).). For this research study, the steps followed are intended to start with a definition of the research problem and objective, then the formulation of relevant elements and the definition of the hierarchy, and the comparison of results based on responses and other sub-criteria. In order to achieve these objectives, there is first a selection of the case study cities, then of the various stakeholders with whom the interviews were conducted, the design and implementation of the interviews and the conduct of the interviews and analysis.

Results:

1- Presentation of the Cases

Case 1: « Le champ des Possibles »

The first evaluated case is "Le Champ des Possibles" which is a non-profit association that aims to help people eat better by educating them about dietary diversity, food consumption and food processing at all stages, while integrating cooking into their activities. It covers two sites that were previously industrial estates, both located in the Rouen.

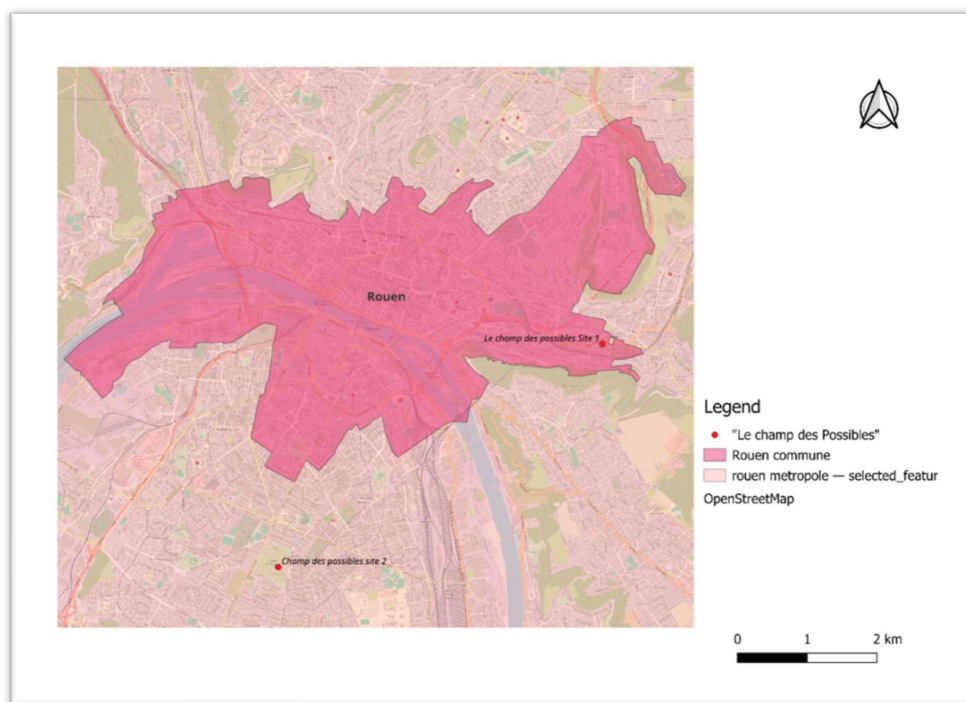


Figure 2: Location of both sites of "Le Jardin de l'Astéroïde" in the city of Rouen and Rouen Metropolis using QGIS Software. (Source: the authors)

The association focuses on the educational and social aspects, where they organize constructive weekly activities and workshops for residents, as well as educational sessions for children. In addition, they apply the "farm to fork" concept, where all the produce harvested from the garden is cooked by the members, in a kitchen they have within the community garden (Figure 3). This helps create social bonds, fraternity and sharing between members, along with the effect it has on people's well-being and self-confidence (Boukharta et al., 2024a).



Figure 3: "Le champ des Possibles" (source: site web: <https://www.lechampdespossibles-rouen.org/>)

In addition to the social, educational and environmental aspects, "Le champ des Possibles" is also promoting an economic aspect, where they sell the seedlings at local markets, on-site, at open days or directly to clients, as well as renting and paying for certain equipment that enables them to make a profit. The interviewees say that this sale "isn't enough to pay an employee", but that it can still help them to have a small economic side to their business.

Case 2: « Le Jardin de l'Astéroïde du petit prince »

The second case evaluated is "Le Jardin de l'Astéroïde du petit prince", an urban garden also located in Rouen (Figure 4), whose focus is on renting individual plots to local residents so that they can grow their own fruit and vegetables. Before the garden was created, it was an abandoned area where cars used to park.

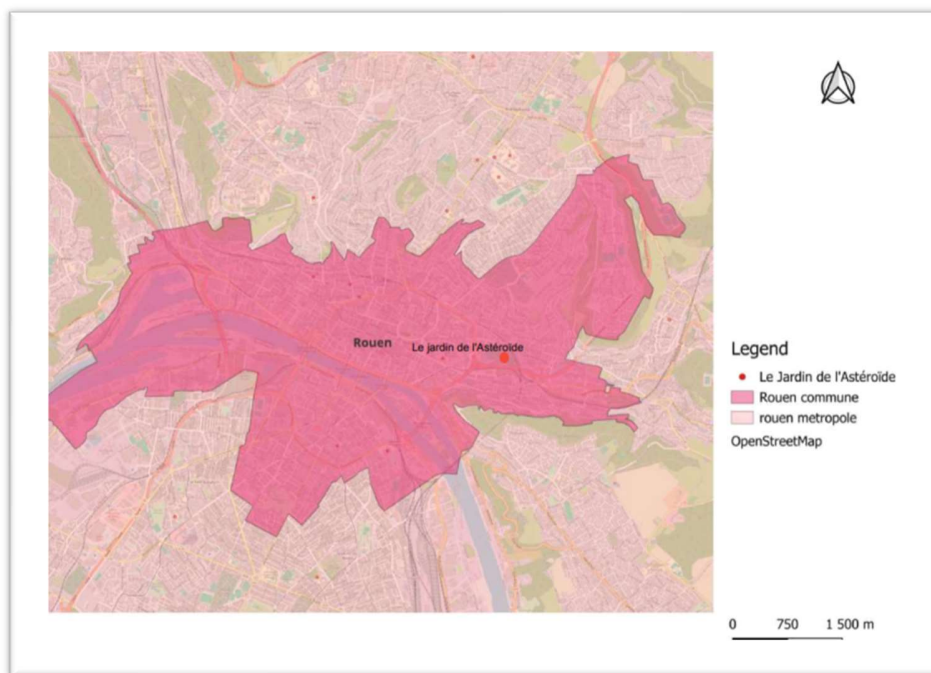


Figure 4: Location of both sites of "Le Jardin de l'Astéroïde" in the city of Rouen using QGIS Software. (Source: the authors)

"Le Jardin de l'Astéroïde" does not organize social or educational activities for external guests. Only members can benefit from the advice of an agronomist engineer who supports them and shares his knowledge, and also members can help each other (obviously each plot has its own owner). Members are not allowed to use chemicals, and composting is generally done by members or other volunteers (Figure 5).



Figure 5: "Le Jardin de l'Astéroïde" (Source: <http://www.jardin-asteroide.fr/>)

The use and consumption of harvested produce is solely for personal use or exchange between members. In fact, each member with a plot has the right to harvest all his or her own produce and use it for self-consumption. Unlike "Le champs des Possibles", "Le Jardin de l'Astéroïde" does not sell fruit, vegetables, plants, herbs or seedlings.

2- Economic, social and environmental aspects:

When conducting the in-depth interviews, interviewees were asked a number of questions about the social, economic and environmental impacts of their involvement in these projects and the resulting contributions. Figure 6 gives a clearer picture of these three key aspects, drawn from the results of interviews, and where the arrows refer to the link between each aspect to the other.

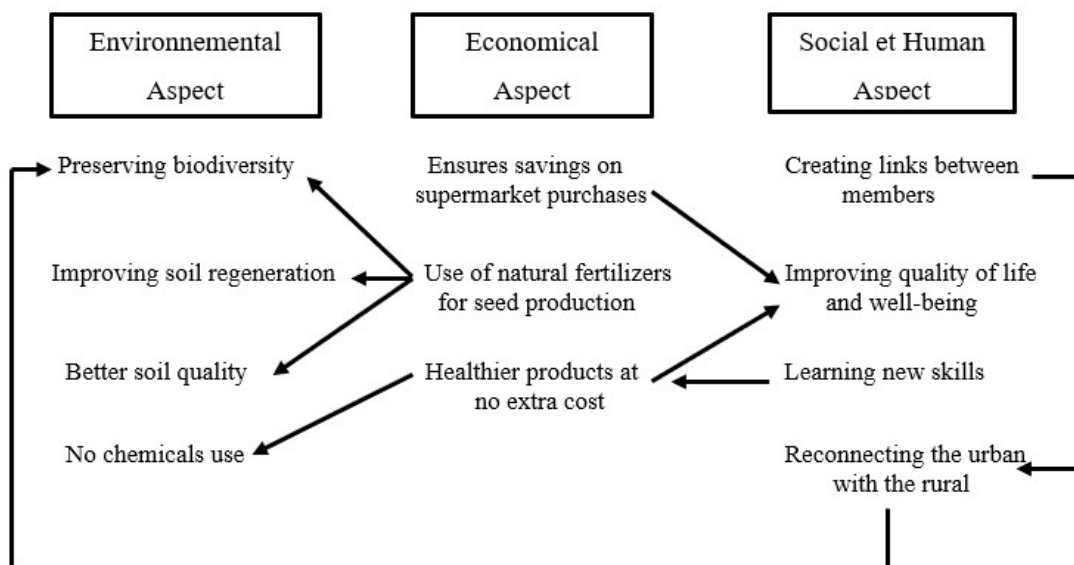


Figure 6: Economic, social and environmental aspects identified from the interviews (Source: Boukharta et al., 2023, based upon the interviewees responses and further literature research)

Regarding the environmental aspect, both initiatives agree that the use of natural, relatively inexpensive fertilizers for food production helps to improve soil quality while providing better air purification. Another important aspect is the social aspect, which involves

creating links between different participants, which will help to ensure good social inclusion as well as reconnecting urban areas with rural areas. The same applies to the economic aspect, which involves making savings on supermarket purchases, thereby improving the consumer's quality of life and well-being. Indeed, all the interviewees agree that their implementation within those initiatives allowed them to improve their quality of life and living conditions.

3- Governance structure and coordination mechanisms

The governance of "Le Champ des Possibles" can be considered a non-profit association, since it carries out its educational and learning activities, while also having a developed economic component. The association is financed by the Metropole and the city of Rouen, as well as by donations from volunteers and participants. As far as "le Jardin de l'Astéroïde" is concerned, it is a non-profit association, as none of the participants has the right to sell the produce. This urban garden currently receives no support from any entity, as they believe that the annual fees participants pay to rent the plot each year are sufficient. Concerning the organization of the value chain, both entities have a well-structured office consisting of a president, director, employees and interns, and where each employee has his or her own task, but always strives to help the other achieve its goals.

Discussion:

Urban agriculture in cities has attracted growing interest due to its potential benefits in terms of socio-cultural development, public health, the environment and the economy (Santo et al., 2016). In this study, we explain that urban agriculture offers various benefits and contributes to our quality of life, health and physical and moral well-being, demonstrating the importance of involving and integrating urban spaces into our daily lives, which is in line with the results found by Yusoff et al. (2017) that show the importance that urban areas can ensure to strengthen links between residents.

Regarding the economical aspect, this study shows that the implementation of urban agricultural practices helps to make some economies since the residents are harvesting and using their own fruits and vegetables. This is in line with the work of Robert and Yengué

(2017), where members claim that these gardens provide them with "quality" vegetables that are "healthier" and, above all, more economical.

Both cases analyzed have a well-defined governance structure, consisting of a president, directors and employees, who are responsible for the proper management of the company. In "Le Champ des Possibles", each member has his or her own task, but they always help each other to achieve their goals, which is different from "Jardin de l'Astéroïde", where, in general, everyone works on his or her own plot and reaps what they have sown.

Finally, the results of the interviews made it clear that there is in fact a ranking of importance between the three pillars of sustainable development, where the economic dimension of urban agriculture was rated as the least important, and which is in line with the work carried out by John and Artmann (2024) and Boukharta et al. (2023). Indeed, the suggestion would be that the approach to the three pillars of sustainability needs to be reconsidered, bearing in mind that a successful economy and a healthy society depend on a safe environment (John and Artmann, 2024).

Conclusion:

Nowadays, urban agriculture and gardening in cities is increasingly recognized seen the numerous benefits it provides to the population (MUFP, 2015). This investigation shows that the implementation of those areas helps to ensure many benefits, which can be categorised into the three pillars of sustainable development: economic, social and environmental aspects (Boukharta et al., 2023), and which helps to address food insecurity in cities (FAO, 2019)

The structure of governance mechanisms is well defined in both cases, enabling initiatives to identify their needs with the state, the metropolis, the city of Rouen, other private subventions, and thus, obtain subsidies and advance their projects, with the aim of creating sustainable, green cities.

Both cases evaluated were carried out in Rouen, located in a metropolitan region whose main objectives are to support the environment and agriculture within cities, in a

context of industrial transition. To this end, local authorities are encouraging these projects and increasingly setting up subsidies to facilitate their involvement within cities, with urban agriculture now becoming a key research area due to its relevance to current challenges (Türker and Akten, 2022).

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