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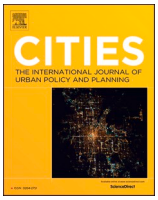

Disentangling metropolis-city relationships in the governance of sustainability transitions: An in-depth exploration of the case of Rouen, France

Ouiam Fatiha Boukharta [a,b], Loïc Sauvée [b], Fabiana Pena-Fabri [b], Leticia Chico-Santamarta [a,c], Luis Manuel Navas-Gracia [a,*]

[a] TADRUS Research Group, Department of Agricultural and Forestry Engineering, University of Valladolid, Spain
[b] InTerACT 2018.C102 Research Unit, Institut Polytechnique UniLaSalle, Rouen 76000, France
[c] Global Impact Department, Harper Adams University, Edgmond, Shropshire TF10 8NB, UK

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ABSTRACT

Urban agriculture, defined as a system of growing, processing and distributing food in cities, is currently emerging as a sustainable solution for ensuring food autonomy and resilience, particularly with rapid population growth and urbanization. This article aims to explore a multi-level governance system, through the hypothesis that two levels of governance (Metropolis and City of Rouen - France) effectively complement each other in the domain of urban agriculture, using institutional consultation mechanisms, such as coordination committees and regular meetings with project leaders, while monitoring urban agricultural projects, coordinating initiatives, specifying responsibilities and resolving disagreements. A total of 19 semi-structured interviews were conducted, to gain a better understanding of their actual achievements and future goals. The results show that many similarities exist relating to social aspects and education, consumption of fresh products and the desire to ensure the long-term viability of urban projects. However, many differences were highlighted, such as the selection of urban agricultural projects, where the metropolis is less strict than the city in terms of plot size and soil analysis requirements. This paper is recommended as a basis for future research to maximize the implementation these projects, toward more sustainable cities, and eventually in other institutional contexts.

1. Introduction

Nowadays, one of the main future challenges facing our society is to meet the demand for consumable products for the 9 billion people expected by 2050, while limiting the impact of food production on the environment (Randahl & Belcheva, 2017). The local food system has therefore been widely examined in various frameworks for its importance in defining principles for ensuring the sustainability and protection of the food system through its internal balance and coherence with the external environment (Atkočiūnienė et al., 2022). These modes of cooperation and related practices continue to grow and evolve over time, leading to the collaborative and collective construction of a vision of the type of farming systems that should be sustained, through the participation and contribution of stakeholders (Boukharta et al., 2023).

Furthermore, urbanization trends and the diffusion of political power and responsibility lead to the inescapable conclusion that cities around the world have an ever-increasing role in sustained economic growth and sustainable development, and that will be increasingly expected more of the municipal authorities that they take the initiative and assume their responsibilities for local development (Gilbert et al., 2013). From this perspective, challenges related to land use and municipal regulations, as well as concerns about community food security, make urban agriculture (UA) a key element of urban planning and a major issue that needs to be addressed (Meenar et al., 2017).

UA is a system of growing, processing, distributing, and/or selling food or food products through the intensive cultivation of plants or livestock in urban areas, and which can take a variety of forms and occupy a variety of locations (Menconi et al., 2020). Within the cities, several urban farming practices are being implemented, with the aim of guaranteeing the three aspects of sustainable development -social, environmental and economic- and providing ecosystem services to residents and the city (Boukharta et al., 2024; Menconi et al., 2020).

* Corresponding author at: Av. de Madrid, 50, 34004 Palencia, Spain.
E-mail address: luismanuel.navas@uva.es (L.M. Navas-Gracia).

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Numerous municipalities recognize UA as an integral part of planning and zoning practices and are developing policies to facilitate it. However, the process of its integrating into planning and land-use practices remains inconsistent, with insufficient reporting of its social, economic and environmental impacts (Meenar et al., 2017). Therefore, mapping out the role of local authorities in sustainable urban development, as well as the framework for cooperation to carry out the goals and programs of the Habitat Agenda, will be central to the discussions and negotiations in this investigation (Gilbert et al., 2013).

This research article aims to identify the various interests and ambitions of two institutional levels, the metropolis and the city, and to assess whether they are aligned and complementary, starting from an initial hypothesis that there is a coherent and synergistic relationship between both entities, in which their respective policies and objectives converge and mutually support each other in the pursuit of common outcomes. Indeed, exploring jointly these two entities is of major conceptual and theoretical interest, as this multi-level governance assessment can fill important gaps in the existing literature on urban sustainability and resource management (Mougeot, 2005a, 2005b).

In order to address this issue, a mixed-methods approach was adopted, including semi-structured interviews, observations and field work, where 19 interviews were conducted with representatives from the Rouen metropolitan region and the city of Rouen, located in the Normandy region of France. This area of investigation is largely known for its potential for agricultural production, partially unexplored in other studies, and from which this study will lead to an in-depth assessment at different scales and across multiple dimensions.

This article follows the following sequence: First, an overview of a specific contextual framework including information on UA and its benefits, along with an explanation of governance for sustainability transitions, which is necessary to understand our hypothesis, that is also defined and presented in this section. Second, the methodology used is more explored and detailed in order to make understanding more efficient and understandable. Third, the results section would present the outcomes obtained from this analysis concerning the authorities' perception of the implementation of urban agricultural projects (UAP) in cities, the norms and standards they apply, through a qualitative analysis that has been carried out through NVivo Software, allowing us to answer our hypothesis and draw interpretations, discussions and conclusions.

2. Conceptual framework and hypothesis

For a better understanding, many concepts are explained in the following sub-sections, along with the hypothesis of this research is presented, where it highlights how our analysis had been conducted, and following which problematic and concern to solve.

2.1. Concepts and literature review

2.1.1. Urban agriculture (UA)

UA is as any type of activity located within or at the periphery of a city and aimed at providing products and ecosystem services to the residents, such as having access to fresh fruits and vegetables, physical and mental health benefits, mitigation of social and economic problems, and community resilience (Menconi et al., 2020). This definition can be shortened into the processing and distribution of food products by growing plants in and around cities (Poggi et al., 2021), which corresponds clearly to the purpose of this study. Moreover, UA is increasingly seen as an essential component of food security and is regarded by researchers as a highly promising pillar of food autonomy (Mougeot, 2005a, 2005b; Paganini & Lemke, 2020), hence the need to address this evolving issue in this research paper. Many forms of UA are currently being practiced as a part of green infrastructures, including community gardens, allotments, school gardens etc. (Menconi et al., 2020), where community gardens can be defined as a collectively gardened open garden area, managed and operated by members of the local community, dedicated to the cultivation of food and/or flowers (Genter et al., 2015: Menconi et al., 2020); Allotments are defined as plots of land assigned by local authorities for the cultivation of fruit, vegetables and herbs destined for personal use and consumption (Tharrey et al., 2020); and finally, as the name implies, school gardens are areas of land within schools dedicated to a series of agricultural activities linked to food education and involving the participation of pupils, enabling them to acquire nutritional knowledge (Hsiao, 2021). This investigation focuses on community and allotment gardens, as these are the most frequently UAP used in the assessed region, and generate greatest output and results.

The benefits of implementing UAP within the cities can be categorized into three aspects: economic, environmental, and social benefits (Boukharta et al., 2024). The social benefits include increasing "social cohesion and integration", along with reducing feelings of anxiety and improving mental health and wellbeing, and by making these areas a "refuge sector" for unemployed workers, retired people, and/or failed entrepreneurs (Palau-Salvador et al., 2019; Shafieisabet & Mirvahedi, 2022). The economic aspect is more considered as being a source of income while providing direct access to fresh products, which would allow to improve the economic situation of many households along with making savings, as it reduces the amount spent on groceries (Bonuedi et al., 2022). The final aspect is environmental, where it has been proven to promote greening and environmental enhancement, while supporting adaptation to climate change (Pollard et al., 2018), since they help limit extreme weather events, thus improving the quality of urban life and the urban environment (Sanyé-Mengual et al., 2016).

2.1.2. Governance for sustainability transitions

Effective governance in UAP requires consideration of the multi-level dynamics of decision-making (Wolfram, 2019). Indeed, governing these transitions requires an integrated approach that involves diverse actors at different levels, which implies institutional innovations and adaptive governance practices that can respond to the complexities and uncertainties associated with these processes (Avelino & Wittmayer, 2016).

Many forms of governance exist to ensure the sustainability of the UA section, principally collaborative and polycentric governance. Polycentric governance consists of mutual adjustments and involves multiple actors, interacting internally and across scales with the aim of sharing governance, encouraging innovation and policy diffusion, and supporting flexibility through the rapid reconfiguration of policy networks to achieve specific goals (Morrison, 2017). Regarding the collaborative governance, it refers to a collaborative arrangement in which one or more public bodies directly engage non-state stakeholders in a collective decision-making process that is formal, consensual and deliberative, and which aims to develop or implement public policies or manage public programs or assets (Ansell & Gash, 2008).

Effective governance of sustainability transitions in UA involves coordinating local initiatives with regional and national policies to maximize synergies and avoid conflicts of interest (Frantzeskaki et al., 2018), while emphasizing the importance of citizen engagement and participatory approaches to ensure that sustainability initiatives are rooted in the needs and aspirations of local communities (Avelino & Wittmayer, 2016).

Moreover, the growth of the food industry has nowadays increased food availability and product delivery times, while reinforcing the concentration of production, processing and marketing capital. At the same time, the awareness and risk perception of many consumers has increased (Atkočiūnienė et al., 2022), where the supply of agricultural inputs and the production, packaging, processing, transport and distribution of food account for 19–29 % of global greenhouse gas emissions; and they exert significant pressure on natural resources (Vermeulen et al., 2012). It is therefore essential to reform food systems in the direction of greater sustainability to ensure the transition to a low-carbon,

resource-efficient society (Dedeurwaerdere et al., 2017).

2.1.3. Urban planning tools managing UA

To address this current situation, a number of specific urban planning tools exist to ensure that UA is recognized and supported as a valuable component of urban life, including land-use planning, or It involves conducting land-use studies that enable planners to understand the types of agricultural activities that take place in urban areas. Environmental capacity and sensitivity assessments, to determine land suitability and productivity, as well as its response to agricultural activities. Land inventories, to identify land available for UA and facilitate access to it for urban farmers. Of all the above, among the most important practical tools is the involvement of resource mapping and Geographical Information Systems to analyze an area's potential for UA, thus facilitating planning and decision-making.

2.2. Hypothesis

The hypothesis drawn in this research paper is that the two levels of governance (Rouen Metropolis and City of Rouen) are effectively complementing each other in the domain of UA through institutional consultation mechanisms, such as coordination committees and regular meetings with project leaders and associations, while monitoring their UAP, coordinating initiatives, specifying responsibilities and resolving disagreements. Moreover, this multi-level analysis enables the exchange of information and the adaptation of strategies according to local and national needs, ensuring greater operational synergy and efficiency, enabling the development of well-informed UAP that are consistent with what is required and what is produced.

3. Material and methods

This investigation was conducted in France, in the metropolis of Rouen, located in the north of France. In terms of methodology, several interviews were conducted with local and regional authorities, to understand the current situation of UA in the city and the metropolis, with the aim of understanding what they intend to achieve and their principal objectives for future urban development.

3.1. Study area: Metropolis and city of Rouen

This investigation explores two administrative scales, exploring both metropolitan and municipal perspectives in the Normandy region of France toward the involvement of UA, while integrating strategies that address social and environmental challenges at different administrative scales (Mougeot, 2005a, 2005b). Furthermore, effective coordination between these levels can therefore facilitate the creation of urban planning policies that support UA, thereby contributing to the sustainability of cities by providing green spaces and improving access to improving access to fresh, locally produced food (Sarker et al., 2019), while also making a significant contribution to the resilience of cities by enabling better resource management and a more effective response to food crises (De Zeeuw et al., 2011).

The Rouen Normandie metropolitan region was chosen because it is characterized by the size of its vast area dedicated to agricultural activities (Fabri et al., 2024) and ongoing urban support from local authorities (Birks et al., 2022). In addition, the actions of the metropolis and the city of Rouen around UA projects are increasingly developed, where higher expectations in terms of agricultural renewal are met, due to land pressure and the significantly low level of food self-sufficiency (around 10.6 %) (Métropole de Rouen Normandie, 2019). All these aspects underline the need for an in-depth assessment of the feasibility of implementing this approach at its various levels of governance, the structural factors influencing its application and the weaknesses encountered.

3.2. Location of the study area

The Rouen Normandy Metropolis, centered on the city of Rouen and located in France's Normandy Region, presents an interesting case of inter-municipal grouping (500,000 inhabitants and 71 municipalities; MRN Métropole Rouen Normandie Site, 2015). This industrial and port area is in social and ecological transition, with a green belt of 25,600 ha of woodland (Birks et al., 2022). Since 2020, the Rouen Normandy Metropolis has been announcing its ambition to make this zone "the epicenter of the socio-ecological transition" (RNM Rouen Normandy Metropolis, 2020).

Starting in 2020, the Metropolis of Rouen Normandie has announced its ambition to make this region "the epicenter of the socio-ecological transition" and the "capital of the Next World" (RNM, 2020; Birks et al., 2022), and to rely on a concerted approach to action, across subjects, with the idea of leading the ecological transition in a port and industrial city, and therefore, represents an essential contribution to the sustainable development goal of creating sustainable cities and communities (Sonti & Svendsen, 2018).

3.3. Data collection

To respond to our problematics and hypothesis, a mixed-methods approach was adopted involving semi-structured interviews, observation, field investigation, and discourse analysis of public documents, providing an in-depth assessment at different scales and across multiple perspectives, including detailed, qualitative information on respondent perceptions (Thurman, 2018). Indeed, this qualitative analysis has a significant heuristic valueespecially for the researches related to the governance aspects (Huberman & Miles, 2002; Mohajan, 2018; McNulty et al., 2013), as it provides an in-depth understanding of the social, environmental and institutional dynamics of UAP, thereby revealing aspects that are essential to the long-term development and sustainability of these initiatives. The interview guide was prepared by our research team and approved by professionals with expertise in the discipline. It included open-ended questions on the interests and motivations of participants from both local and regional entities on the subject, perceived benefits related to the city and region, lived experiences and their own conceptions on the subject, available resources and future plans, obstacles encountered throughout their activities, and their relationships with UA project managers, with other organizations and among the neighborhoods. Some of the main questions are presented in Table 1.

Table 1
Some of the questions included in the interview guide prepared and carried out with our interviewees (Source: the authors).

Interviewee	*Questions*
Actors from the Metropolis/ City of Rouen	Can you tell us a bit about yourself and your position within the metropolis/city of Rouen? Can you give me an overview of current city/ metropolitan policy regarding field projects and their integration into urban planning? How has this policy evolved over time? What have been the main changes or initiatives in this area? (timeline) What are the main objectives of the city/metropolis in terms of field projects and their impact on the local community? When you choose a plot of land or an UA project, what criteria do you base your decision on? And when you were working on these projects, did you encounter any obstacles? How do you keep in touch with other actors (project managers, residents, companies, etc.)? What do you think the creation of these urban agricultural spaces within cities brings to people's daily lives?

The questions have been prepared following a consecutive of questions to gain a better understanding and evaluation of each of both entities, since it is necessary to evaluate each of the different aspects, for a thorough and well-designed structure (Table 1).

Table 1 illustrates the main questions addressed to our interviewees, where it can be seen that there is a continuum of questions to obtain a better understanding and assessment of each of the two entities, since it is necessary to assess different aspects, for a thorough and well-designed structure, and which enabled us to gather a lot of information and data helping to reach our objectives and solve the problematics, more fully outlined in the results section.

Some of the questions interviewed are related to self-presentation and position within the entity, as this information is necessary for the proper continuity of the questionnaire and a better understanding of the governance structure and policy of the city/metropolis. Additionally, other questions related to the entity's main objectives are asked, as it is necessary to assess the UAP's current challenges and future planning, along with their ongoing contact with other stakeholders and institutions to assess the interaction of the multi-level governance system and mutual results.

3.4. Stakeholders interviewed

This research is based on the evaluation of two entities - the Metropolis of Rouen and the City of Rouen - The mentioned metropolis and its central city were selected as being broadly representative of French Regions where green spaces and environmental protection are more important, and where various projects related to UA are being planned. Numerous interviews were conducted at different levels. Data were collected using purposive and well-structured sampling: $n = 19$ semi-structured interviews conducted from January to April 2024 with key informants ($n = 6$ directors, $n = 8$ managers and $n = 5$ UA program leaders) from both entities, of whom $n = 11$ representatives of the Rouen metropolis and n = 8 representatives of the city of Rouen. Interviews were exclusively conducted with representatives, as decisions are taken in their hands and they are the ones who define the various conditions for the implementation of UAP. So, for each local entity and department, the number of directors, managers and project leaders is countable, resulting in a total of 19 interviews, a fairly large number of interviews that allowed us to reach data collection saturation, where all our answers were obtained, with even a few repetitions.

The characteristics of the UA program participants are presented in Fig. 1, where, for each of the joint respondents, their role is explained in more detail to provide a better understanding of their position:

It's worth noting that in this research article, interviews were conducted with actors holding important positions within the city and metropolis of Rouen (Fig. 1). Indeed, interviewing them was necessary to better understand the current situation of UA and to respond to our problematic and objectives.

The interviews were done in different manners, including face to face, online and telephonic meeting, in order to respond to the availability of the interviewee and his preferences. All interviews were voice-recorded, with the permission of the interviewees, while preserving the anonymity of each, and coding was carried out on a blind basis. Qualitative data was collected through the semi-interviews that were conducted in French, transcribed using Descript software and translated into English, and coded using NVIVO Software, one of today's leading qualitative data processing software packages (NVivo, 2019).

4. Results

The results section will present in detail all the substantial results obtained from the interviews conducted. Indeed, numerous aspects were analyzed, with the aim of responding to our main problematic which consists of assessing and analyzing the relationships between the metropolis and the city of Rouen in the governance of sustainability transitions, exploring their similarities and differences and determining the links between them.

1. The results of this study are structured around seven key points, each chosen to assess and analyze the relationships between the metropolis and the city of Rouen and their governance of transitions toward sustainability, exploring their similarities and differences and determining the links between them:
2. *Chronology of UA Initiatives:* tracing the evolution of initiatives, examining how these historical relationships influence current governance dynamics.
3. *Policies of the City and Metropolis of Rouen:* comparing local and metropolitan policies, analyzing their similarities and differences to understand how they complement or contradict each other.
4. *Objectives targeted by UA:* this section analyses strategic convergences or divergences and tests the hypothesis that aligned objectives facilitate cooperation.
5. *Criteria for Site Selection:* revealing their respective priorities and enabling us to understand how decisions are made and coordinated.
6. *Support, Monitoring and Continuity:* This point examines institutional and community support at each level of governance, assessing its role in the continuity and success of UAP.

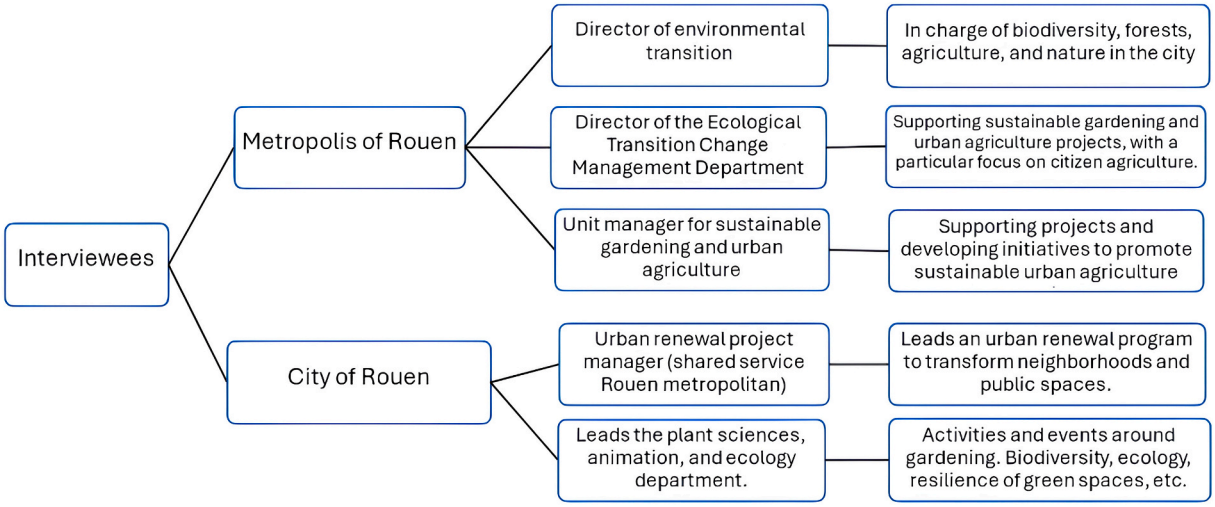

Fig. 1. Actors interviewed from the metropolis and city of Rouen, their position, and the main functions they perform.

7. *Benefits of UA Obstacles Encountered:* this point measures the impact of projects on both levels, along with the challenges they are facing.
8. Summary of the main findings of this investigation: where a diagram is presented to provide a more concrete, global visualization of the outcomes, including similarities and differences between the two entities, along with a more precise explanation of the multi-level perspective that exists between them.

Each point contributes to an in-depth understanding of the governance relationships between the metropolis and the city of Rouen in promoting transitions toward sustainability and UAP.

4.1. Timeline and history of UA

With the aim of understanding the evolution of the actions carried out in each of the Rouen metropolitan area and the city of Rouen. Our interviewees answered the question: "Is it possible to give me a chronology of the actions carried out by the city/metropolis in relation to this?", which enabled to identify the main milestones in the involvement of urban spaces within cities. This comparison of historic and contemporary UA initiatives between the city and the metropolis would also allow to deepen the analysis of their multi-level governance.

4.1.1. Metropolis of Rouen

Findings from interviews with stakeholders in the metropolis indicate that there has been a chronology of actions and milestones that have made UA an important element today, as shown in Fig. 2.

Historically, the Rouen metropolitan area has had allotments and allotment gardens, which are clearly not very well identified by an older population. Shared gardens were quite marginal. Until about ten years ago, there were hardly any. The second most significant milestone was in 2013, when the city launched the Gardeners' Club, with the aim of encouraging gardening, supporting initiatives to make gardens more resilient and ensuring the preservation of ecosystems. The third stage was in 2021, at the end of the COVID pandemic. This was the launch of the "metropole nourricière" call for projects, which stemmed from a genuine political desire to develop shared garden projects. So, in concrete terms, our interviewee points out that "in concrete terms, before 2021, there was no scheme at the metropolitan level that really supported the creation of shared gardens". Finally, in 2023, Agri Paris Seine was created as an associative structure bringing together seven cities, namely the metropolis of Rouen, the city of Paris, Greater Paris, etc., which aims to "reduce the impact of food production on the environment, along with improving collective catering between towns and residents", as stated by an intervener from the metropolis (Fig. 2).

4.1.2. City of Rouen

The following Fig. 3 shows that there is also a chronology within the city of Rouen concerning the actions carried out around UA and its implementation within cities, as well as the implication of these ideas over time:

The first point mentioned by our interviewee was that about ten years ago, the city decided to encourage the maintenance and development of market gardening. Several stakeholders intervened, namely in the *Repainville district* in Rouen. In 2011, as part of the Agenda 21 proposals, the green space department initiated a shared garden project in Rouen's *Lombardie district*, which one of the interviewees described it as "originally being a striking wall", and which the city proposed to transform into a shared garden. And so, it was between 2011 and 2014, that the garden took off in terms of activity and convinced the elected officials that it was a very effective device in terms of social links. According to one of our speakers reacting directly in this area, the year 2014 was a key period, when "the municipal council adopted the charter aimed at developing a network of shared gardens in the city". More recently, there has also been a demand for the creation of collective orchards, to introduce the whip-tree aspect into these schemes. Finally, in 2020, residents of Rouen were able to make an online request for sidewalk clearing, via the Green Thread scheme, which consists of clearing sidewalks to free up strips of land for local residents (Fig. 3).

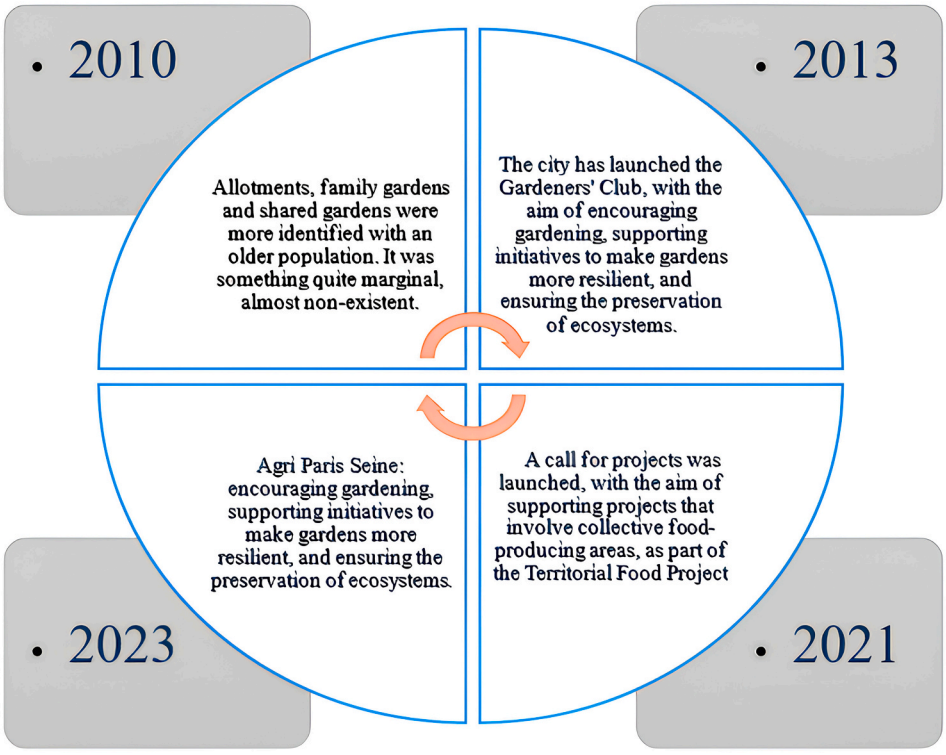

Fig. 2. Chronology of Rouen's metropolitan main actions carried out toward UA (Source: the authors, from the interviews conducted).

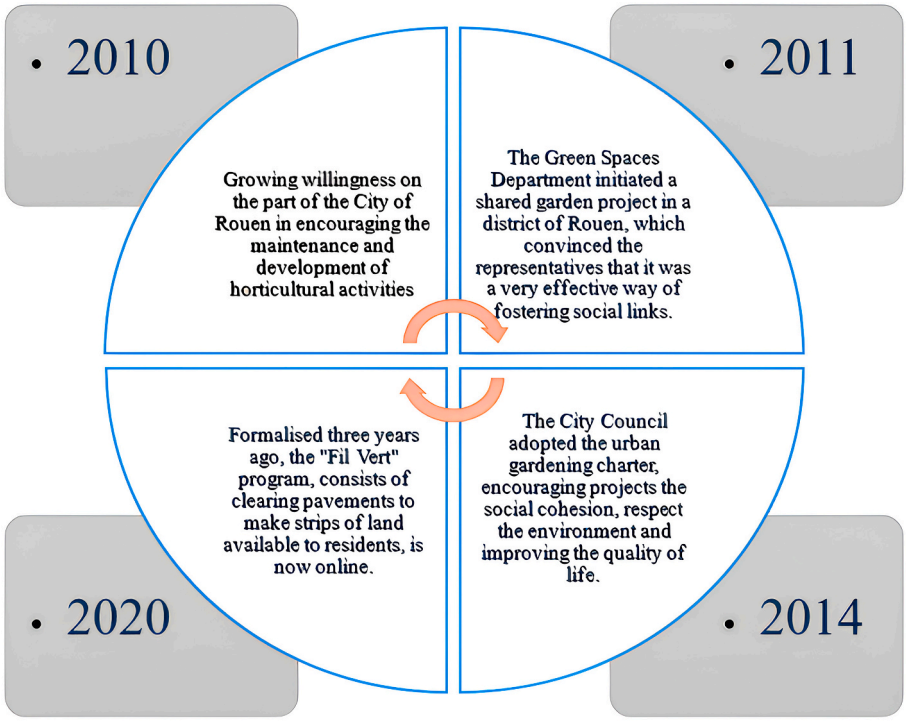

Fig. 3. Chronology of the city of Rouen's main actions carried out toward UA (Source: the authors, from the interviews conducted).

4.2. City and metropolitan Rouen policies in relation to the involvement of UAP

Table 2 shows that the Rouen metropolitan area and the city of Rouen have different approaches toward the implementation of urban agricultural practices in cities.

In the Rouen metropolis, the interviews conducted confirm that they have involved agriculture policy for around ten years. According to the interviews, representatives from both entities agree that "UA does not necessarily serve an economic purpose, but is rather one of those complex projects that have to do with food, acculturation and education in an urban environment". For this reason, local authorities deal with all agricultural initiatives and sectors that have economic autonomy based on agricultural production. Moreover, the most encouraged UAP are those that have a strong link with the local population, and which aim in particular to restore an urban link with seasonality, food quality, knowledge of products and their applications (Table 2).

Regarding the city of Rouen, the interviews conducted confirm that the development of public spaces and the living environment is planned through an urban renewal program under an agreement signed with the National Agency for Urban Renewal (ANRU) in the *Hauts-de-Rouen* and *Gramont neighborhoods*, where Nine districts of the city are involved. In addition, our interviewees from the city stated that "UA in Rouen is a relatively limited compared with the rest of the metropolis, because we don't really have any farmland. So, we're getting involved in UA by trying to develop short supply chain initiatives". The real responsibility for UA lies with the metropolis. But the city of Rouen is also involved, seeing urban gardening as part of this (Table 2).

Table 2
City and metropolitan Rouen policies toward implementing UAP.

Metropolis of Rouen	*City of Rouen*
The metropolis has been involved in agricultural policy for around ten years.	There is an urban renewal program under an agreement signed with the National Agency for Urban Renewal
UA is more concerned education in the urban environment and not solely an economic purpose.	Relatively small theme compared with the rest of the metropolis.
The main searched objective is to restore an urban link to seasonality and quality food	The city of Rouen is also involved in urban agricultural practices, seeing urban gardening as part of this.

Source: the authors, from the interviews conducted.

4.3. Objectives that the metropolis of Rouen and the city of Rouen wish to realize regarding the implementation of UA within the cities

One of the main questions that have been asked to our interviewees from the city of Rouen and the Metropolis of Rouen are their main objectives and perspectives they are willing to achieve while implementing UAP. Indeed, this aspect is fundamental for a better understanding and analysis of the current situation of UA, which will give a clearer picture and identify if the two authorities share the same desired outcomes or not. The following Fig. 4 is presenting the key elements that have been identified by our interviewees from the two authorities.

From Fig. 4, and according to the interviews conducted with the Rouen metropolitan authorities, the first aspect mentioned by the director of the metropolitan authority's environmental transition is the issue of zero net artificialization, which is enshrined in law, where he stated that it means, "destroying less and less space, systematically, in order to seek to re-naturalize it, something that is and should be seen as a constant concern". In addition, the unit manager in charge of supporting sustainable gardening and UA within the metropolis emphasized that "contributing to food self-production on the territory, would enable access to self-production and greater food for quality, seasonal and organic, something that today constitutes a real lever for eating well and consuming well while being less dependent on imports". In addition, she added that bringing plants back into the city, in whatever form, also contributes to making cities more breathable, through demineralization, particularly in highly urbanized areas. Finally, the director of the Ecological Transition department mentioned the need to re-localize production, which also ties in with our region's food self-sufficiency (Fig. 4). She pointed out that currently, less than 5 % of our region's surface area is dedicated to agriculture and emphasized that "this is far from enough to guarantee the food self-sufficiency of our 500,000

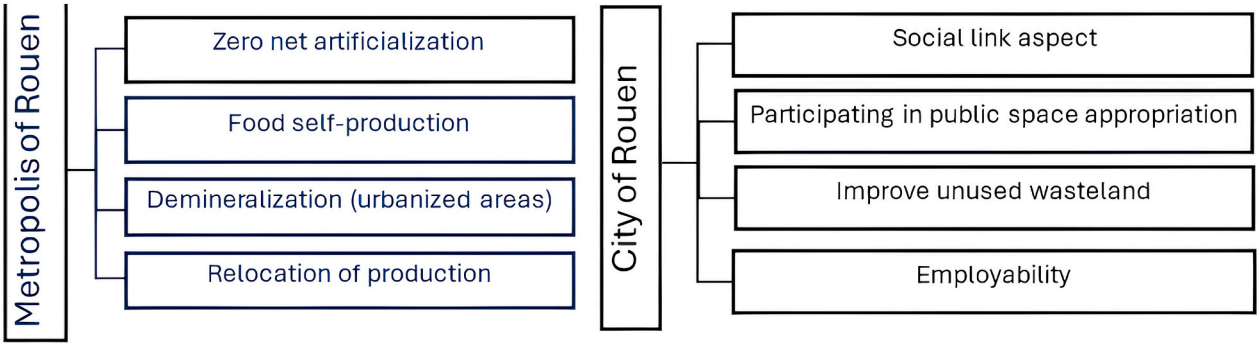

Fig. 4. Objectives that each of the city/metropolis of Rouen are tending to realize toward UA (**Source:** the authors, from the interviews conducted).

inhabitants".

4.4. Selection of criteria for UAP plots

The following Fig. 5 is clearly s that the criteria used to select UAP are not very "strict", since their main objectives are to create sustainable, green cities, and to encourage people to learn how to feed themselves and re-connect with nature.

From the interviews carried out and from Fig. 5, it can be noticed the Rouen Metropolis emphasizes that one of the main criteria on which they base themselves is the number of shared gardens supported per edition, since the idea is to be able to say that the project has enabled the emergence of so many square meters of cultivated surface area in such and such a period. In addition, there's the number of events held per year, as well as the number of visitors and the number of days the gardens are open to the public. Indeed, for these criteria, the higher the number, the more the project in question is encouraged. Another important point cited was the "autonomy with regard to food", as well as "indicators linked to community living", since this type of place brings sociability, along with additional income. Finally, it was mentioned that, if necessary, soil analyses can be carried out, while opting for the protection of drinking water catchments (Fig. 5).

As far as the city of Rouen is concerned, the first criterion cited by the head of the plant sciences, animation and ecology department is to "check with the urban planning department that there are no real estate projects on the land in question, to make sure that the land is not just available for a few months, but rather for years". He also added that "in general, agronomic analyses can be carried out if necessary, but projects are never made on land on which there is a history of suspicions of possible pollution". On the other hand, he adds that there may be a need to import compost, and possibly change the topsoil layer on the surface, giving the example of the Lubrizol incident in Rouen, which was handled by ADREAL, and which required a major procedure to treat the land. On this point, pollution analyses can be carried out on some target gardens, but in the case of shared gardens, there is often no doubt as to the quality of the soil. All that's needed is agronomic analysis to determine the level of organic matter, water retention capacity, etc. (Fig. 5).

4.5. Project support, follow-up, and continuity

Regarding the maintenance of relations and contacts with the various stakeholders, both representatives from the two entities report that they are "in regular contact, particularly with project developers".

4.5.1. Metropolis of Rouen

Our interviewee from the Rouen metropolis mentioned that there are three main stages in project implementation:

Preparatory phase: one of the staff will meet people in the field and ask them to explain the project they want to carry out, along with technical recommendations, mobilisation, etc. to help them prepare their proposal. The aim is to assist them in completing their application, while giving them advice on how best to organize it.

Individual support: Depending on the type of project, the target audience, the location, etc., the metropolis entrusts the support for each project to a service provider. In this way, the metropolis designs the

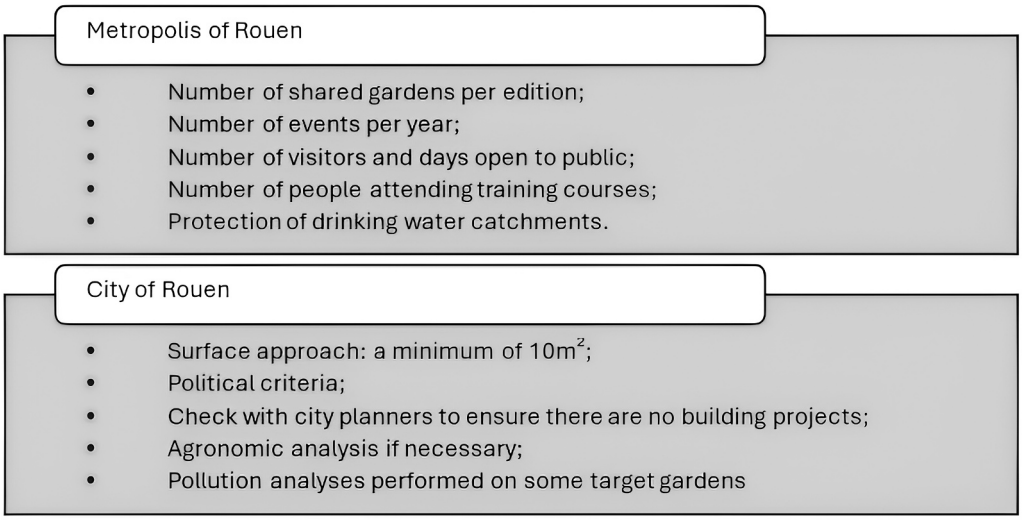

Fig. 5. Criteria used by each of the city/metropolis of Rouen toward implementing Urban Agricultural Practices (**Source:** the authors, from the interviews conducted).

support and allocates a couple of sessions, rising to seven sessions a year, depending on each individual case.

Feedback and analysis (if necessary): The service providers act as a link between the projects and the metropolis during the first year, providing feedback and analysis where necessary. At the end of this period, the city will contact the project leaders again for a review, which may or may not take the form of a face to face meeting, as there are many projects.

4.5.2. City of Rouen

This is partly the same with the metropolis of Rouen, which explains that there are three main stages: Consultation, formalization, and handover of the land to the association:

Consultation: which consists of a few meetings to explain what a shared garden is, to explain the method that the city wants to adopt and then to work on defining the project.

Formalization: where an official event is held with the elected representatives, to make it official in the neighborhood that the city supports the project, and that all the inhabitants of the neighborhood, who were not aware of the project, can ask all the questions they might have. In this stage, formalizing the partnership that will be established between the City of Rouen and the association.

Handover of the land to the association: often takes place after the work that has been carried out by the city, when there's an official inauguration to sign the agreement, and above all for the association, to sign the urban gardening charter, but in a very official way.

4.6. Benefits and obstacles of including UAP

The conducted interviews enabled to identify many of the benefits and obstacles that UAP bring to the population and to the city itself. Table 3 summarizes the main points raised by our interlocutors:

From the interview's responses summarized in Table 3, most of our interviewees mentioned that one of the main benefices of implementing UAP is "recreate contact with nature, to enable reconnection with the seasons, climate, biodiversity, pests, diseases, etc. ... along with the capability to plant, to experience the seed growing, to reconnect with the earth and nature, and to food production". This contact with nature can be complementary to the food aspect, since gardening gives the consumer a real sense of satisfaction in eating what has been produced in a healthy, diversified way. Moreover, the social aspect was widely cited, as these places are places of sociability and exchange, social lines in the city, and represent a vector of human contact, a vector of learning too, between members and through training courses, since these aspects have an important impact on physical, moral health and well-being. These aspects, mentioned above, allow the achievement the resilience of community agri-food systems in urban areas, since the establishment of the UAP, as it provides access to different sources of food, protects the environment and green spaces, helps homeowners to make savings, etc. (Table 3).

Table 3
Benefits of integrating UA practices into the city and its impact on people's daily lives.

	Benefices	*Limitations*
Metropolis of Rouen	Autonomy in relation to self-supply	Reconstitute a suitable growing base Creation of a network of associations
City of Rouen	Conservation of green spaces Bringing nature back to the city Learning ground and place	Setting up the association
Both entities	Healthy and varied consumption of products Places for socializing and sharing Reconnecting with nature Reconnecting with food and cooking Resilience of urban communities	Human resources Ensuring the long-term viability of projects Food Autonomy

Source: the authors, from the interviews conducted.

Regarding the obstacles and limitations, as far as the city of Rouen is concerned, the interviews conducted confirm that they didn't experience any real difficulties or obstacles when it came to implementing UAP. However, the human resources issue had been mentioned, i.e., sometimes it's necessary to rely on relays in the departments and services, which are more their domain. Our speaker pointed out that "there are three stages in bringing a project to fruition: the land, the project and the creation of the association". Land, a project and a supporting structure. The project is supported directly by the city, which sets out all the rules to be respected, so there's no copying and pasting. The project must be defined by each group of residents. And then the last stage, which is perhaps the most complicated, is for an association to be set up. But emphasizes that, so far, they've never had any obstacles on this point, and that this stage may just take a little longer on certain projects.

The Metropolis of Rouen, on the other hand, has several obstacles to overcome. Firstly, it has to deal with "poor-quality or very disadvantaged land", where in this case the metropolis is obliged to reconstitute a suitable growing base (Table 3). Then, there's the creation of a network of associations able to carry out this type of project, knowing the inhabitants and capable of doing so, but emphasizing that this doesn't really cause any major problems, as there are also people from outside who come and this creates many opportunities for conviviality, mutual aid and socialization, and this is the example where, at some point, the inhabitants need to take charge of this type of project.

Finally, the critical voices concern the main obstacles that were mentioned by all our speakers about the issue of ensuring the long-term viability of UAP and enabling a sufficient food autonomy of the region. In other words, the local authorities are willing to help creating urban spaces, but the main constraint they are trying to avoid is failing to ensure the sustainability of these projects (Table 3), since the goal is "to keep these projects for years" and that "these forms of UA could help to ensure healthy consumption and access to fresh food, but could not fully feed the city", as mentioned by an interviewee from the metropolis of Rouen.

4.7. Summary of the main findings of this investigation

The results presented below can be illustrated in the diagram below in Fig. 6, which shows a simplified overview and summary of the main points:

From the diagram featured in Fig. 6, it is clear that there are several points of convergence and divergence between the two entities. The start-up period for the implementation of these UAP seems to be more recent in the city than in the metropolis. Moreover, both entities focus on the three aspects of sustainability, but at different scales, in which the metropolis is more focused on education and social aspects, and the city additionally includes the economic aspect as an important component that makes a difference in the daily lives of the inhabitants. Fig. 6 also demonstrates that a number of common points are mentioned by the metropolis and the city, which relate more to their interest in implementing such projects and the support they would give to the realization of UAP. The long-term sustainability of the projects is a main common objective, aiming to implement these projects as long as possible, wishing to ensure a self-sufficient food production within the city and the metropolis. Another important aspect to consider in this diagram is the multi-level governance perspective, where the in-depth interview results show that there is a coherent synergistic relationship between the two entities, in which they are both aligned on the same main objective, and where a proper contact and structure between them enables a better implementation of the UAP and the achievement of effective and efficient actions.

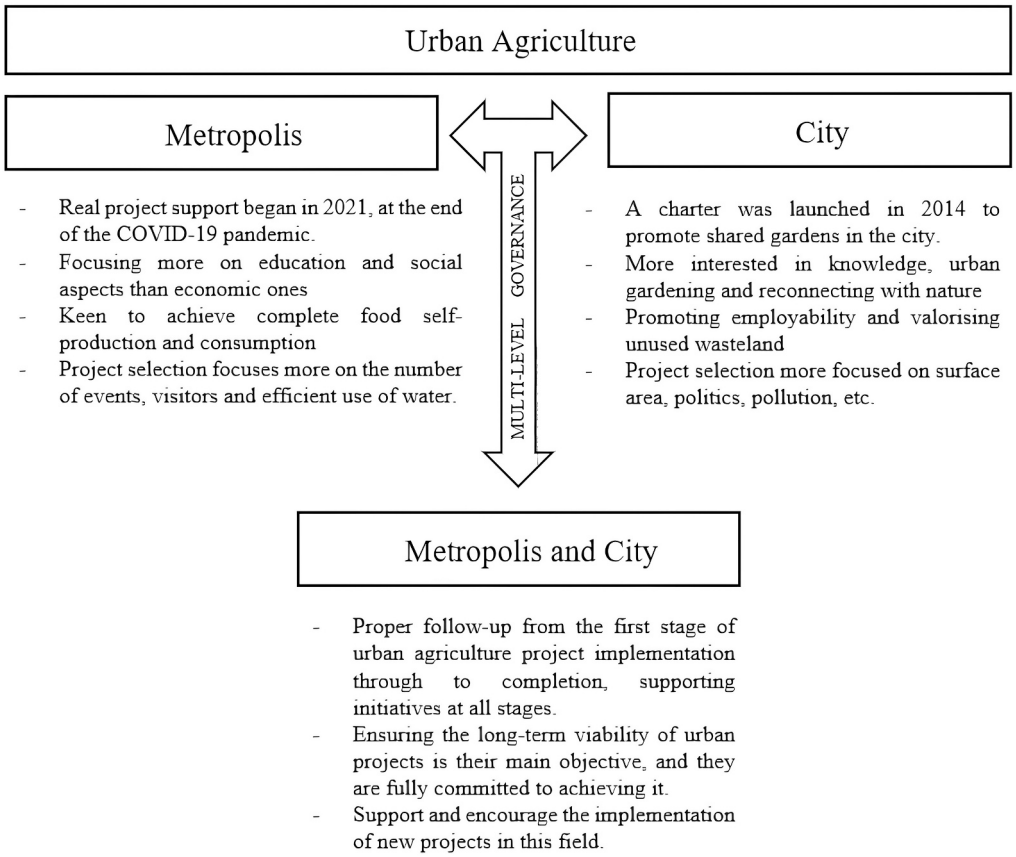

Fig. 6. Summary of the main findings of this investigation in relation to the metropolis and the city of Rouen.

5. Discussion

UA has become a topical issue due to its numerous benefits for both residents and the city itself (Dubbeling et al., 2019). This research investigation took as its starting point the hypothesis that the two levels of governance - the Metropolis of Rouen and the City of Rouen - have an effective complementarity in the field of UA, ensuring greater synergy and operational efficiency, enabling the development of well-informed UAP that are consistent with what is required and what is produced. Furthermore, this starting hypothesis also assumes that these two entities have common objectives, aligning with the three aspects of sustainable development (economic, environmental and social), while helping young associations and residents to develop their projects. To analyze these hypotheses, semi-structured interviews were conducted with stakeholders from each of the two entities, asking precise and straightforward questions in order to obtain as many answers as possible to our problematic questions.

The findings of this investigation have been grouped into seven main points, which were presented in the results section and will be further discussed in the following points. It is important to emphasize that, while this research draws on studies conducted in various regions to provide a broader context for UA, the references provided do not constitute direct evidence of the effects of UA in Rouen. However, they are intended to place local findings within a broader discourse on UA, highlighting trends and challenges observed elsewhere. The present research is essentially based on local, empirical data drawn from interviews with key Rouen stakeholders from the local authorities, and the analysis focuses on their perceptions and experiences. This distinction is essential, as it ensures that the conclusions drawn are based on the specific local context, rather than generalized from other regions.

Regarding the chronology of the actions carried out, the interviews conducted with the stakeholders of each of the city of Rouen and the metropolis confirm that the integration of UA within cities is a recent term, which began around ten years ago, and which is in line with the work carried out by Yan et al., 2022, which highlights that despite the importance of UA, its implementation and the attention it attracts is growing considerably over the years. Furthermore, this comparative historical analysis has shown that there is a well-structured governance dynamic that supports UAP, helping their implementation and achievement of goals, with support potentially coming from both entities and other initiatives through a multi-level system of governance. Indeed, this finding has been confirmed by most stakeholders interviewed in this investigation, along with Sano et al. who highlight the need and necessity for a well-designed government structure contributing to the smooth running of projects, through a study that has been conducted in the Republic of Guinea (Sano & Kassim, 2021). Another aspect that has been mentioned by all our interviewees is that the metropolis has very clear stages linked to calls for projects, support for projects including collective food-producing and above all relations with other French regions in terms of sustainable development and the preservation of ecosystems. This aspect has also been mentioned by Urban Policy Platform, 2023, which conforms that metropolises are multidimensional and address complex situations, which simultaneously include social, economic, community, sustainability or digital aspects, among other issues. On the city side, local entities are more encouraging projects including the social cohesion, respecting the environment and improving the quality of life. These findings are well aligned with the work carried out by Qian et al. confirming that cities with good smart infrastructure including UA spaces demonstrate greater resilience in the event of a crisis, as they have a more efficient flow of information and are less reliant on physical space (Qian et al., 2024).

The second aspect concerns policies of each of the entities in relation to the involvement of UAP, where in the metropolis of Rouen and the city of Rouen agree that UA is more concerned on education, protection

of the environment and not solely for an economic purpose. In fact, this was confirmed by the systematic review carried out by Boukharta et al. in 2024, where the analysis revealed that social and environmental results take precedence over economic ones. However, the city's stakeholders mentioned a limitation in this sense, relating to the fact that the land is relatively small compared to metropolitan land, making it more complicated to carry out these practices. In this sense, Sanyé-Mengual et al. show that there is an absence of UA in Barcelona's current sustainability policies and suggests that the perception of UA must be as an activity with a social vocation rather than one of food and economic production, so as not to slow down the process of creating UA policies and institutionalizing them through sustainability planning, something that results in there being a lack of confidence in the benefits of local production in terms of sustainability (Sanyé-Mengual et al., 2016).

The third aspect concerns the objectives that each of the metropolis of Rouen and the city of Rouen are willing to realize. In this point, the interviewees responses have shown that there are many objectives, including the improvement of unused wastelands and demineralization, as pointed out by many studies as Gawryszewska et al. (2019) in Manchester (England) and Elbardisy et al. (2021), in Galliera–Bologna (Italy). However, many common points have been mentioned in this aspect, where the social link aspect has been mentioned by all our interviewees. This is in line with work carried out in Australia by Kingsley et al. who mention that several social benefits are associated with UA, including well-being and improved health, and Kirby et al. who drew this same conclusion from an analysis carried out in numerous European cities (Kingsley et al., 2019; Kirby et al., 2021). The second most mentioned aspect is food self-production and the consumption of fresh food and vegetables, which was also mentioned in 2023 by Boukharta et al. who indicate that this production is healthier and more nutritious and that when people produce their own products, they learn better and eat better.

Many criteria exist for selecting one UAP or another, depending on the entity and the objectives sought. Our analysis has shown that the Rouen metropolitan authority and the city of Rouen have many objectives in common. However, the selection criteria differ between them. The Rouen metropolitan authority confirms that it encourages the implementation of these projects and that it tries to make the criteria less strict in order to encourage people and associations to become more involved. In other words, if there aren't too many, they'll select them all. If there are too many, they'll select on the basis of, for example, the number of events that will be organized, the number of people involved and who will take part, with the emphasis on protecting drinking water catchments. In fact, many studies are in line with this aspect, since, according to the 2006 study by Mubvami et al. in Philippines, local authorities are now seeking to ensure a consensus-building process to address food production issues and develop a vision for the city's development. On the other hand, the city of Rouen has more limitations than the metropolis, since it has to verify with urban planners and architects that the area proposed for the UAP has no construction projects, to ensure that the project will last for many years (or always). Indeed, there is the political issue that the city must confirm with local by-laws and policies, in order to follow the rules and do things properly, along with a soil analysis that may be necessary before accepting a UAP, especially if the space was industrial, or a pollution analysis since these projects are located in cities. Secondly, some of the interviewees mentioned that the area must be a minimum of $10m^2$, otherwise it will not be accepted for an UAP. The above criteria were also addressed by Fricano & Davis, 2020, through a study conducted in Southern United States, highlighting the need to involve urban planners in the regulation and monitoring of UA areas, as they contribute to the implementation of UA policies and programs and advise local decision-makers.

The city of Rouen and the Rouen metropolitan area both maintain regular contact with stakeholders and project developers but differ in their implementation processes. The metropolis of Rouen emphasizes a structured approach with a preparatory phase where representatives engage with the community, individualized support from service providers tailored to each project's specifics, and ongoing feedback and analysis, culminating in a review after the first year. In contrast, the city of Rouen follows a three-stage process: initial consultation meetings to define the project, a formalization event with elected representatives to declare city support and engage the community, and a formal handover of the land to the association with an official signing ceremony. Both approaches ensure stakeholder involvement but vary in their methods of project support and formalization. This is affirmed and cited by Masuda et al., 2022, underlining that effective collaboration between the various stakeholders is essential to achieving the goals of sustainable development and, consequently, good progress in urban practice and more resilient cities, through an analysis made in several cities in Japan.

Last but not least, interviews with stakeholders from the Metropolis of Rouen and the City of Rouen highlighted numerous benefits and obstacles associated with UAP. Key benefits include reconnecting with nature, which helps residents appreciate the seasons, climate, and biodiversity while experiencing the satisfaction of growing and consuming their own food, aligning with recent studies such as those by Russo et al. (2017) and Specht et al. (2014). These projects also enhance social interactions and community engagement, significantly impacting physical and mental well-being, as supported in Soga et al., 2017 However, it is important to recognize that the involvement of UAP can also present limitations. Indeed, results have shown that the implementation and effectiveness of such projects can vary considerably depending on local conditions, including available suitable land, soil quality, etc., along with the availability of economic resources, notably financial support from local authorities and the continued follow-up. In addition, it should be noted that effective government management is essential to ensure the sustainability of these initiatives, and where this is a key factor, the human aspect and commitment represent a major challenge today. Indeed, similar findings were mentioned in Orsini et al., 2013 who highlighted that the implementation of UAP faces challenges such as low-quality land requiring rehabilitation and the creation of a network of competent associations. Finally, although urban agriculture has its advantages and many positive aspects, it cannot today guarantee long-term viability and food sufficiency, which can be a limitation and a challenge to achieve at the same time, and similar conclusions have been made by many scientists, such as Edmondson et al. (2020) and Opitz et al. (2016), who have stressed the importance of ensuring the long-term viability of projects and helping to ensure food self-sufficiency.

6. Conclusion

UA is increasingly recognized for its multiple benefits around the world (Calvet-Mir & March, 2019). Indeed, this is an increasingly relevant topic in the science and planning of urban food systems aimed at ensuring household self-sufficiency and food sufficiency, protecting the environment, creating social links, reconnecting people with nature, etc. (Boukharta et al., 2024; Diekmann et al., 2020; Smith et al., 2013). The study hypothesized that the Metropolis of Rouen and the City of Rouen complement each other effectively in promoting UA, while ensuring synergy and operational efficiency in their governance. The findings of this analysis confirmed that the two entities share common objectives aligned on the economic, environmental and social aspects of sustainable development, and that they work together to support young associations and residents in the development of their projects.

The interviews revealed that while both levels of governance maintain regular stakeholder engagement, they differ in their implementation processes and project selection criteria. However, this diversified but structured approach ensures that UAP are fully supported and formalized and adapted to their needs and specific requirements. The city of Rouen focuses on smaller-scale projects that strengthen social cohesion, respect the environment and improve quality of life. However, it can face challenges such as the need for human resources and pollution. On the other hand, the Rouen Metropolitan Area supports larger

and more diversified initiatives, but has to deal with issues such as the quality of land and the creation of a network of competent associations. Moreover, both organizations stressed the importance of ensuring the long-term viability of UAP, which requires ongoing support and collaboration to overcome obstacles and maximize the benefits of UA. However, regardless of the actual significance of UA, various potentially transferable results on governance could be achieved, underlining its essential role in promoting sustainable and resilient urban communities.

It should be underlined that this study presents some limitations. First, the Rouen metropolis contains about 9 main cities and the results specific to Rouen, although it is the main city and seat of the metropolis, may not be directly applicable to others with different contexts, and therefore, future research could focus on the evaluation and study of another city, which would allow a comparison of the evolution of UAP across several cities in the metropolis. Second, although the aim has been to focus on local authorities, it would be very interesting to have a full understanding from residents and associations of the impact of UAP in their lives. These limitations should be taken into consideration and may guide future research to improve the understanding and implementation of UAP.

Many recommendations can be drawn from this analysis, both for the metropolis and the city of Rouen. Indeed, they should be in closer contact with urban planners and architects, to define the area where the urban practice will be carried out and to ensure that it will not be used in any future type of construction or building. Furthermore, they should provide ongoing support for the initiatives, striving to meet their needs and support their ambitions for future achievements. Finally, both entities should launch an ongoing call for projects around this type of initiative, to raise awareness among citizens of the role it plays for them and for future generations.

This research study provides a highly relevant response to a current and future challenge, focusing on the complementarity between the levels of governance of the Metropole of Rouen and the City of Rouen in the promotion of UA. This investigation is one of the first evaluations in this specific field, highlighting the issues of sustainability, community support and urban green development associated with UA. Given the growing importance of these UAP in guaranteeing food self-autonomy and sufficiency, improving quality of life, strengthening the resilience of urban communities and recreating the contact with nature, this subject deserves particular and ongoing attention from decision-makers, researchers and local stakeholders. Overall, this study is recommended as a basis for future research aimed at maximizing the implementation of the UAP, in order to maximize the benefits of UAP while overcoming the identified barriers, for a more sustainable future and resilient cities.

CRediT authorship contribution statement

Ouiam Fatiha Boukharta: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Loïc Sauvée:** Writing – review & editing, Visualization, Validation, Supervision, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Fabiana Pena-Fabri:** Writing – review & editing, Visualization, Validation, Software, Methodology, Formal analysis, Data curation, Conceptualization. **Leticia Chico-Santamarta:** Writing – review & editing, Visualization, Validation, Supervision, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Luis Manuel Navas-Gracia:** Writing – review & editing, Visualization, Validation, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no competing interests.

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Data availability

Data will be made available on request.

References

Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory, 18*(4), 543–571.

Atkočiūnienė, V., Vaznonienė, G., & Kiaušienė, I. (2022). The role and functions of stakeholders in the development of local food systems: Case of Lithuania. *European Countryside, 14*(3), 511–539.

Avelino, F., & Wittmayer, J. M. (2016). Shifting power relations in sustainability transitions: A multi-actor perspective. *Journal of Environmental Policy & Planning, 18*(5), 628–649.

Birks, C., Féménias, D., & Machemehl, C. (2022). Citizen participation in urban forests: Analysis of a consultation process in the metropolitan area of Rouen Normandy. *Urban Planning, 7*(2), 174–185.

Bonuedi, I., Kornher, L., & Gerber, N. (2022). Agricultural seasonality, market access, and food security in Sierra Leone. *Food Security, 14*(2), 471–494.

Boukharta, O. F., Pena-Fabri, F., Chico-Santamarta, L., Navas-Gracia, L. M., & Sauvée, L. (2023). Governance structures and stakeholder's involvement in urban agricultural projects: An analysis of four case studies in France. *International Food and Agribusiness Management Review, 27*(1), 76–93.

Boukharta, O. F., Huang, I. Y., Vickers, L., Navas-Gracia, L. M., & Chico-Santamarta, L. (2024). Benefits of non-commercial urban agricultural practices—A systematic literature review. *Agronomy, 14*(2), 234.

Calvet-Mir, L., & March, H. (2019). Crisis and post-crisis urban gardening initiatives from a southern European perspective: The case of Barcelona. *European Urban and Regional Studies, 26*, 97–112.

De Zeeuw, H., Van Veenhuizen, R., & Dubbeling, M. (2011). The role of UA in building resilient cities in developing countries. *The Journal of Agricultural Science, 149*(S1), 153–163.

Dedeurwaerdere, T., De Schutter, O., Hudon, M., Mathijs, E., Annaert, B., Avermaete, T., & Vivero, J. L. (2017). The governance features of social enterprise and social network activities of collective food buying groups. *Ecological Economics, 140*, 123–135.

Diekmann, L. O., Gray, L. C., & Thai, C. L. (2020). More than food: The social benefits of localized urban food systems. *Frontiers in Sustainable Food Systems, 4*, Article 534219.

Dubbeling, M., van Veenhuizen, R., & Halliday, J. (2019). Urban agriculture as a climate change and disaster risk reduction strategy (Special Issue. *Field Actions Science Reports. The Journal of Field Actions, 20*, 32–39.

Edmondson, J. L., Cunningham, H., Densley Tingley, D. O., Dobson, M. C., Grafius, D. R., Leake, J. R., & Cameron, D. D. (2020). The hidden potential of urban horticulture. *Nature Food, 1*(3), 155–159.

Elbardisy, A., William, Y., Sherif, M., Aboulnaga, M., & Guedes, M. (2021, October). Sustainable refurbishment of abandoned urban areas: the case study of former SIAPA area. In *In IOP conference series: Earth and environmental science*. Galliera–Bologna, Italy: IOP Publishing. Vol. Vol. 863, No. 1, p. 012014.

Fabri, F., Sauvée, L., Demba, M., & Boukharta, O. F. (2024). Requalification territoriale soutenable par l'agriculture urbaine. Etudes de cas au Havre et à Rouen| Cahiers Costech., 7| 2024.

Frantzeskaki, N., Hölscher, K., Bach, M., & Avelino, F. (2018). *Co-creating sustainable urban futures* (p. 11). Future City: A primer on applying transition management in cities.

Fricano, R. J., & Davis, C. (2020). How well is urban agriculture growing in the southern United States? Trends and issues from the perspective of urban planners regulating urban agriculture. *Journal of Agriculture, Food Systems, and Community Development, 9*(2), 31.

Gawryszewska, B. J., Łepkowski, M., & Wilczyńska, A. (2019). City wastelands: Creating places of vernacular democracy. In *Urban gardening and the struggle for social and spatial justice* (pp. 38–58). Manchester University Press.

Genter, C., Roberts, A., Richardson, J., & Sheaff, M. (2015). The contribution of allotment gardening to health and wellbeing: A systematic review of the literature. *British Journal of Occupational Therapy, 78*, 593–605.

Gilbert, R., Stevenson, D., Girardet, H., & Stren, R. (2013). *Making cities work: Role of local authorities in the urban environment*. Routledge.

Hsiao, H. (2021). Characteristics of urban gardens and their accessibility to locals and non-locals in Taipei City. *Taiwan. Landsc. Ecol. Eng., 17*, 41–53.

Huberman, M., & Miles, M. B. (2002). The qualitative researcher's companion. Sage.

Kingsley, J., Foenander, E., & Bailey, A. (2019). "You feel like you're part of something igger": Exploring motivations for community garden participation in Melbourne, Australia. *BMC Public Health, 19*(1). https://doi.org/10.1186/s12889-019-7108-3

Kirby, C. K., Specht, K., Fox-Kämper, R., Hawes, J. K., Cohen, N., Caputo, S., & Blythe, C. (2021). Differences in motivations and social impacts across UA types: Case studies in Europe and the US. *Landscape and Urban Planning, 212*, Article 104110.

Masuda, H., Kawakubo, S., Okitasari, M., & Morita, K. (2022). Exploring the role of local governments as intermediaries to facilitate partnerships for the sustainable development goals. *Sustainable Cities and Society, 82*, Article 103883.

McNulty, T., Zattoni, A., & Douglas, T. (2013). Developing corporate governance research through qualitative methods: A review of previous studies. *Corporate Governance: An International Review, 21*(2), 183–198.

Meenar, M., Morales, A., & Bonarek, L. (2017). Regulatory practices of UA: A connection to planning and policy. *Journal of the American Planning Association, 83*(4), 389–403.

Menconi, M. E., Heland, L., & Grohmann, D. (2020). Learning from the gardeners of the oldest community garden in Seattle: Resilience explained through ecosystem services analysis. *Urban Forestry & Urban Greening, 56*, Article 126878.

Métropole de Rouen Normandie (2019). Stratégie Alimentaire pour une Métropole en transition. Site https://www. metropole-rouen-normandie. fr/sites/default/files/publication/2019/PAT. pdf.

Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of economic development, environment and people, 7*(1), 23–48.

Morrison, T. H. (2017). Evolving polycentric governance of the great barrier reef. *National Academy of Sciences of the United States of America, 114*(15). Apr 11. E3013–21.

Mougeot, L. J. (2005a). *Agropolis: The social, political, and environmental dimensions of urban agriculture*. IDRC.

Mougeot, L. J. (2005b). Agropolis: The social, political, and environmental dimensions of urban agriculture. IDRC.Mubvami, T., Mushamba, S., & De Zeeuw, H. (2006). Integration of agriculture in urban land use planning. Cities farming for the future: Urban agriculture for green and productive cities. RUAF, IIRR and IDRC, Silang, the Philippines, 54-74.

MRN Métropole Rouen Normandie Site. (2015). *A laboratory site for a new city-river relationship*. living cities 2, Vol. Vol. E17. Europan Europe https://www.europan-europe.eu/media/default/0001/28/e17_fr_metropole_rouen_normandie_en_pdf.pdf.

NVivo. (2019). *What is NVivo?*. Available online at https://www.qsrinternational.com/nvivo/what-is-nvivo [consulted on: 14/02/2019].

Opitz, I., Berges, R., Piorr, A., & Krikser, T. (2016). Contributing to food security in urban areas: Differences between UA and peri-UA in the global north. *Agriculture and Human Values, 33*, 341–358.

Orsini, F., Kahane, R., Nono-Womdim, R., & Gianquinto, G. (2013). Urban agriculture in the developing world: A review. *Agronomy for Sustainable Development, 33*, 695–720.

Paganini, N., & Lemke, S. (2020). "There is food we deserve, and there is food we do not deserve" food injustice, place and power in urban agriculture in Cape Town and Maputo. *Local Environment, 25*(11–12), 1000–1020.

Palau-Salvador, G., de Luis, A., Pérez, J. J., & Sanchis-Ibor, C. (2019). Greening the post crisis. Collectivity in private and public community gardens in València (Spain). *Cities, 92*, 292–302.

Poggi, S., Vinatier, F., Hannachi, M., Sanz, E. S., Rudi, G., Zamberletti, P., & Papaïx, J. (2021). How can models foster the transition towards future agricultural landscapes?. In *, Vol. 64. Advances in ecological research* (pp. 305–368). Academic Press.

Pollard, G., Roetman, P., Ward, J., Chiera, B., & Mantzioris, E. (2018). Beyond productivity: Considering the health, social value and happiness of home and community food gardens. *Urban Science, 2*(4), 97.

Qian, X., Chen, M., Zhao, F., & Ling, H. (2024). An assessment framework of global smart cities for sustainable development in a post-pandemic era. *Cities, 150*, Article 104990.

Randahl, K., & Belcheva, T. (2017). Collaboration towards a 'sustainability transition': A case study of the Agri-food sector on Gotland, Sweden.

RNM Rouen Normandy Metropolis. (2020, September 11). La métropole Rouen Normandie, capitale du monde d'après [Rouen Normandy Metropolis, capital of the World After] [Press release]. https://www.metropole-rouen-normandie.fr/presse/2020/la-metropole-rouen-normandie-capitale-de-lapres-demain-se-construit-aujourdhui-9523.

Russo, A., Escobedo, F. J., Cirella, G. T., & Zerbe, S. (2017). Edible green infrastructure: An approach and review of provisioning ecosystem services and disservices in urban environments. *Agriculture, Ecosystems & Environment, 242*, 53–66.

Sano, M. A. A., & Kassim, S. (2021). Waqf governance in the Republic of Guinea: Legal framework, issues, challenges and way forward. *ISRA International Journal of Islamic Finance, 13*(2), 194–210.

Sanyé-Mengual, E., Anguelovski, I., Oliver-Solà, J., Montero, J. I., & Rieradevall, J. (2016). Resolving differing stakeholder perceptions of urban rooftop farming in Mediterranean cities: Promoting food production as a driver for innovative forms of UA. *Agriculture and Human Values, 33*, 101–120.

Sarker, A. H., Bornman, J. F., & Marinova, D. (2019). A framework for integrating agriculture in urban sustainability in Australia. *Urban Science, 3*(2), 50.

Shafieisabet, N., & Mirvahedi, N. (2022). Benefits of rural-urban interactions for sustainable food security in Iran. *Human Geographies, 16*(1), 19–31.

Smith, V. M., Greene, R. B., & Silbernagel, J. (2013). The social and spatial dynamics of community food production: A landscape approach to policy and program development. *Landscape Ecology, 28*(7), 1415–1426.

Soga, M., Gaston, K. J., & Yamaura, Y. (2017). Gardening is beneficial for health: A meta-analysis. *Preventive Medicine Reports, 5*, 92–99.

Sonti, N. F., & Svendsen, E. S. (2018). Why garden? Personal and abiding motivations for community gardening in New York City. *Society & Natural Resources, 31*(10), 1189–1205.

Specht, K., Siebert, R., Hartmann, I., Freisinger, U. B., Sawicka, M., Werner, A., & Dierich, A. (2014). UA of the future: An overview of sustainability aspects of food production in and on buildings. *Agriculture and Human Values, 31*, 33–51.

Tharrey, M., Sachs, A., Perignon, M., Simon, C., Mejean, C., Litt, J., & Darmon, N. (2020). Improving lifestyles sustainability through community gardening: Results and lessons learnt from the JArDinS quasi-experimental study. *BMC Public Health, 20*, 1798.

Thurman, N. (2018). *Mixed methods communication research: Combining qualitative and quantitative approaches in the study of online journalism*. SAGE Research Methods Cases.

Urban Policy Platform. (2023, mai). Horizon 2030: Metropolitan solutions to global challenges. https://urbanpolicyplatform.org/wp-content/uploads/2023/06/Horizon-2030.METROPOLITAN-SOLUTIONS-TO-GLOBAL-CHALLENGES-2023May.pdf.

Vermeulen, S. J., Campbell, B. M., & Ingram, J. S. (2012). Climate change and food systems. *Annual Review of Environment and Resources, 37*, 195–222.

Wolfram, M. (2019). Learning urban energy governance for system innovation: An assessment of transformative capacity development in three south Korean cities. *Journal of Environmental Policy & Planning, 21*(1), 30–45.

Yan, D., Liu, L., Liu, X., & Zhang, M. (2022). Global trends in urban agriculture research: A pathway toward urban resilience and sustainability. *Land, 11*(1), 117.