# ECOSYSTEMS IN THE URBAN SYSTEM: URBAN GARDENS UNDER THE UMBRELLA OF META-GOVERNANCE

## Case studies of the Urban Gardens in Paris


### Summary

This paper examines how the conditions for self-organized urban gardens, and the meta governance strategies deployed by local governments influence the ecosystem services and provision of these spaces.



Supervisor: Carley Pennink

Institute of Housing and Development Studies

Erasmus University Rotterdam

Student: Tiago Chauvel – 452254

MSc in Urban Governance


Word count: 19 785 words

# Summary

In the context of network governance, urban gardens in Europe have been gaining prominence in the urban system, pushing urban actors to adopt new roles in the green space provision arena. City councils have had to adopt new roles that are compatible with the networked nature of urban gardens by using meta-governance strategies. We study the effects of self-organization determinants and meta-governance strategies on the ecosystem services two Parisian urban gardens provide. We combine two analytical tools from different academic backgrounds: urban green space literature and network governance. Data were collected via three methods. First, 13 interviews were conducted with garden adherents and public officials. Second, observations of the urban gardens have been done. Third, the analysis of policy documents was carried. The study suggests a dynamic interactive governance of urban gardens, with multiple associative actors, volunteers, and governmental actors involved. We found that these gardens provide various ecosystem services (e.g., water management, urban heat island mitigation, limiting pollution). Besides these ecosystem services, urban gardens also provide social-ecological services by creating a relational space where urban dwellers socialize and interact with the urban ecosystem pedagogically. In addition, this paper sheds light on the conditions affecting the self-organization of these gardens. Boundary-spanning activities were particularly vital for self-organization's health. In addition, the results highlighted other determining factors such as (i) the presence of a facilitative association, (ii) the electoral cycle, (iii) the attitude of public officials, (iv) the presence of an expert. Furthermore, we concluded that the local district council engaged in several meta-governance strategies. More precisely, it engaged in supportive actions for the urban gardens, created a strategic framework, formulated rules of the play, and adopted a networker role. This paper concludes that the interaction between the meta-governance strategies and the self-organization determinants forge urban gardens that provide a range of ecosystem services vital for city dwellers. Such services must be better understood to comprehend the contribution of urban gardens to urban ecosystems and develop a more relational approach to urban greenery. This study ends with a set of recommendations for policy and research.

# Preface

This paper is the result of an academic adventure marked by intellectual confinements and physical liberations. Throughout the writing of my thesis, I was only capable of advancing my work thanks to a number of people that stood by my side and that I would like to acknowledge.

I would like to thank my supervisor Carley Pennink, who has always helped me to dodge redundant theoretical questions, and concentrate on the actual relevant points. In between pleasant discussions, with a refreshing insouciant mood you have always made me engage with theoretically constructive debates, with my topic and with the act of researching more broadly.

I would also like to acknowledge Ingmar van Meerkerk for the advices and encouragements. Your initial counseling put me in the right track to find my topic.

I would also like to thank the adherents of the Jardin Louis Blanc and the Poireau Agile for the kind welcome. You helped me to research my topic with generosity and openness.

In addition, I would like to thank my girl-friend, Laetitia, who has been a formidable friend during this journey. You helped me to think through deadlocks, to regain motivation, and to get distracted when necessary.

I would also like to show gratitude to my family, who have managed to encourage me from the other side of the ocean. You made me persevere with my ideas, my ambitions, and to be reflexive regarding my choices.

Finally, I would like to thank my friends Rafael and Jean Michel, for the stimulating discussions and the resting times. You helped me to think and to smile.

I hope you will all appreciate this piece of work, forged by you and my academic odyssey.

# Table of contents

# List of tables

# List of Images



# List of Figures

# 1. Introduction:

Today, more than half of the world's population resides in cities. Inescapably, urban concerns have become fundamental to any discussion on human futures (Govindarajulu, 2014). Similarly, the degradation of the biosphere, where life finds itself, and the approaches to preserve it has also gathered great attention. Notoriously, the urban environment is often portrayed as a world of "concrete," distant and disconnected from "nature" (West et al., 2020). In line with Kiel's (2003) paper on Urban Political Ecology, we argue that the city did not separate the urban from the 'natural,' instead, we look at urbanization as a "process by which new and more complex relationships of society and nature are created" (p.729). Although a post-materialistic and information-driven society characterizes the twenty-first century, the interdependencies between "nature" and the urban space have rarely been this striking (Luederitz, 2015; Keil, 2003). Urban green spaces being considered "ecological elements within cities" are at the intersection of nature and the urban (Belmeziti et al., 2018, p.2). These green landscapes in the middle of the concrete structures provide essential services to city dwellers, among which ecosystem services (ES) (Belmiziti et al., 2018; Fors et al., 2015). These are "services that are either directly produced by ecological structures within urban areas, or peri-urban areas" (Luederitz et al., 2015, p2). The essential nature of these services makes the adequate provision of green spaces a critical factor of city well-being. It brings attention to the capacity of local administrations and citizens to provide and maintain sufficient green spaces. With local governments facing more constraints (e.g., budget cuts) in maintaining greenspaces in Europe, self-organized urban gardens are emerging. These community-driven green spaces emerge in the urban system through various channels (e.g., participative budgeting, political resistance, etc.) and maintain themselves by articulating their network. In the context of increasing complexity and interrelatedness of societal, urban, and environmental issues and the interdependencies of urban actors, the obsolescence of traditional and bureaucratic forms of government has become indisputable. Thus, opening the way for network and interactive governance arenas and the deployment of meta-governance strategies (Røiseland and Vabo, 2015; Torfing et al., 2012; Edelenbos). The shift from government to governance sheds light on the necessity of new forms of governance. In this paper, we aim to explore the relationship between the new forms of networked and meta governance emerging in the city of Paris and the effects on the ecology of urban gardens.

## 1.1. The Urban Gardens and the ecological functions

The urban green spaces have regained attention in the past few decades (Boulton et al., 2018).

They have a solid potential to mitigate urban contribution to climate change and have the power to support the city's adaptation to the new climatic reality (Belmeziti et al., 2009; Govindarajulu, 2014;

Mathey et al., 2011). In addition, they contribute to improving urban hydrology and the preservation of biodiversity, among other inputs (Govindarajulu, 2014; Reis et al., 2019, Lepczyk et al., 2021). Today, urban gardens are increasingly taking these roles (Jagt et al., 2019; Rosol, 2016).

Urban gardens, which are also often referred to as Community gardens, have grassroots characteristics and are defined by Rosol (2016) as "public green spaces run by volunteers" (p.19). They are often characterized by providing forms of collective urban agriculture. They have a social function (e.g., fostering social ties), an educational, and economic (e.g., food production). Furthermore, they have an ecosystem function, which is what we aim to examine in this paper. This ecological or ecosystem function can be defined as: "the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life" (Luederitz, 2015, p.2). The way these services are expressed in urban green space will be further elaborated in the theoretical section of this paper.

In this research, we are interested in the ecological functions urban gardens carry.

## 1.2. Who supplies green spaces?

In order to understand how cities can rethink and further the services urban gardens provide, we focus on the supply conditions for urban gardens.

The primary provider of public greenspaces today is municipal governments (Boulton et al., 2018). With the increased rate of urban population growth, the greenspace supply in large cities is under pressure. In addition to the demographic pressure, there is a financial one, with the municipal budgets dedicated to green space provision in European cities widely decreasing (Jagt et al., 2019). Indeed, in the UK, local authorities' budgets were cut by 20% on average from 2010/2011 to 2013/2014. These cuts affected the budget of parks and green spaces, with 86% of UK parks seeing a budget cut during the same period (Jagt et al., 2019). This decrease in the available budget for urban green space provision brought many municipal governments to consider the involvement of non-state actors in the provision of urban green space. Different strategies were employed in European cities to facilitate this transfer of responsibility, such as creating skills training programs and funding mechanisms (Jagt et al., 2019; Lawrence et al., 2015).

This paper focuses on the self-organized management of green spaces (e.g., community gardens). In recent years, self-organization is becoming an increasingly common form of civic engagement (Edelenbos et al., 2018). Community self-management appears as a convincing alternative for citizens to push their agendas and influence the changes they wish to see within their community (Edelenbos et al., 2018; Nederhand et al., 2016). This holds true for urban green spaces. In European

cities, such as Paris and Berlin, community gardens are proliferating across the city (Rosol, 2010; Mairie de Paris, 2020).

This increased attention to the role of non-state actors, and more specifically to self-organization, in the maintenance and provisions of green spaces is evidence of the switch from government to governance. Governance designates a systemic and complex process of governing in which a plurality of actors, with different and complementary resources, act to govern the society in which they find themselves (Sørensen, 2006; Gerrits, 2012).

## 1.3. Governance and Meta-governance: a deeper look at the theory.

In the green space provision arena, this shift towards governance practices manifests itself in the delegation of provision and maintenance tasks to non-state actors (Jagt et al., 2019). As it is stated in Paris Climate Plan: "The city wishes to develop further the mode of Governance, in order to engage more regularly the actors of the territory in the action and reflection of Paris towards carbon neutrality" (Plan Climat de Paris, 2020, p.81). This switch from Government to Governance sets the context in which the delegation of tasks and responsibilities to non-governmental actors happens. Regarding the provision of green spaces, responsibilities have been shared on many occasions to urban gardens (Rosol, 2010; Kleinhans, 2017). This delegation suggests new roles and expectations for the various actors (e.g., self-organized citizens and local government) and new types of greenspaces.

In the scientific literature, scholars have gone beyond the concept of governance to conceptualize the term "Meta-governance." The term is vaguely defined as "the governance of governance" or the "organization of self-organization" (Gjatelma et al., 2019). It serves as a means to solve governance frailty, and it has been defined by Sørensen (2006) as "a way of enhancing coordinated governance in a fragmented political system based on a high degree of autonomy for a plurality of self-governing networks and institutions" (p.100). Meta-governance strategies have been discussed in the scholarly bound arena, but their empirical evidence regarding specific policy arenas, among which the urban green space provision, remains scarce.

## 1.4. Problem Statement

The problem we aim to address in this research finds its roots in this inevitable transition in the way the green spaces emerge and are maintained in the urban system.

Most local governments in Europe cannot adequately provide, create and maintain green spaces alone (Jagt et al., 2019). They have seen their respective budgets shrink, and the demand for greenspaces increase. Thus, the pro-active community actors of the urban system present themselves as possible partners, able to co-create and co-maintain the greenspaces (Torfing et al., 2012; Sorensen and Torfing, 2016). In the city of Paris, local governments have engaged with self-organized actors in order to maintain an adequate provision of greenspaces. In the 10th district of the capital, more than half of the greenspaces there found were created by the local government from 2015 to 2020, collaborating with self-organized civic actors. It is of great importance to understand how this collaboration is carried and how it affects the space's environment and ecosystem value.

The appearance of the interactive forms of governance and the emergence of self-organization as a pro-active actor shaping the urban landscape means that a better understanding of the emergence and maintenance of self-organization within the urban system is necessary (Molenveld et al., 2021). Moreover, Ansell and Gash (2007) identified various characteristics of the relationship between local administration and citizen initiatives which partially determine the success and failure of the collaborative arrangement. However, the determinants of the success and failure of the collaboration between the urban gardens and the city council within the green space policy area remain under-investigated. This is problematic for the establishment of adequate and pertinent policy action and collaborative network arrangements.

Further, Fors et al. (2015) surveyed empirical scientific studies on the impact of participation on urban green spaces and found that there is a considerable lack of research, "calling for a re-focus to case-level research, [to understand] how participation processes might best lead to high quality green spaces" (Fors et al., 2015, p.1). Fors et al. (2015) insist on the need for research focusing on the effect of participation (e.g., self-organization) on the physical quality of green spaces. (i.e., how does the urban green space performs environmentally and meets local needs for use). They found that an extensive portion of the research on citizen participation and community-led management in greenspace provision uses attractive rhetoric claiming the benefits of participation without empirically testing these assumed benefits. Therefore, a study with specific consideration regarding the physical quality of greenspaces is fundamental.

Moreover, there is little academic research aiming to understand the interplay between the conditions for self-organization, the meta-governance strategies adopted by local governments, and the ecological and ecosystem functions of the community-led urban green spaces (Molenveld, 2021). Research concerning meta-governance and self-organization has rarely been used to understand how interactive governance arenas and meta-governance affects the quality of urban gardens as new forms of green space provision (Nederhand et al., 2016; Sorensen, 2006). We believe that in the context of networked urban systems in the era of climate disruption, it is of utmost importance to understand how

the interactions between these actors in the urban system affect the contribution of the green spaces to urban ecology.

In addition, research aiming at evaluating the ecosystem and urban services of urban green spaces has very rarely coupled qualitative inquiry such as interviews and surveys with physical observations of the space. Camps-Calvet et al. (2016) have demonstrated that urban gardens in Barcelona provide relevant social, cultural, and ecosystem services. However, the ES were measured with surveys responses which is problematic and limiting, as the findings are subject to the respondent's perceptions. Thus, it is necessary to use a tool that is less subject to the respondents' perceptions (Belmiziti et al., 2019). This study aims to use another analytical tool to measure ES in urban gardens based on physical observations of the space (Belmiziti et al., 2019). This tool is not affected by the gardener's bias and aims to shed light on the ecosystem contribution of the urban garden's green space components.

Thus, we want to discern the effects of the interaction of meta-governance strategies and the self-organization conditions on the ecosystems functions found in community-led urban gardens. This will help us understand what roles the Tenth District Parisian city council takes, and how this affects the self-organization within the green space interactive governance arena, and how this, in turn, affects the ecological quality of the urban garden within the urban system.

## 1.5. The Scientific Relevance

The scientific relevance of this study lies in four theoretical and empirical deficiencies in this area of academia and urban public administration. First, with the emergence of new forms of green space provision, characterized by collaborative networks of actors, understanding the roles of local government and the effects of the meta-governance strategies on the green space arena is essential for theory and practice. Second, in line with urban climate mitigation and adaptation approaches, investigating how these new roles and the meta-governance strategies adopted affect the ES provided by these green spaces is important. Third, shedding light on the conditions for these self-organized community gardens to emerge and adequately provide ES is crucial for the successful emergence and maintenance of these gardens within the urban system. Fourth, there is a lack of case study research aiming at comprehending the relationship between Community-led management and greenspace quality. Amid these research gaps, we formulate the following research question:

What are the effects of self-organized greenspace management and meta governance strategies on the ecological services of urban gardens and the municipality's roles within the interactive governance arena?

Sub questions:

- What is the nature of self-organized management of urban gardens?
- What are the different ecosystem services provided by self-organized green space management?
- What is the effect of the meta-governance strategies adopted by the city council on the urban gardens and the ecosystem service they carry?

# 2. Theoretical framework

In order to effectively lay the conceptual ground on which this research will take place, it is vital to take into account several theoretical considerations. Firstly, it is essential to state the approach taken in this paper when looking at the urban systems: the urban ecology approach. Secondly, it is crucial to understand what we mean by urban gardens' ecosystem services. Thirdly, we want to elaborate on what self-organization is and on the relationship between self-organized community management and the urban gardens' capacity to provide ecosystem functions. Fourthly, the network governance context will be introduced, with specific consideration for interactive governance theories. Fifthly, the theory on meta-governance will be explained in order for us to understand what meta-governance strategies local governments deploy in order to steer the networked urban system. Finally, this section ends with the conceptual research model, a visualization of the research problem, and the objective.

## 2.1. Which approach to the Urban System? An introduction to urban ecology.

The field of Urban Ecology reveals the interaction between the human organization and green spaces' capacity to provide ecosystem services, and therefore inspires this paper's guiding approach. Urban ecology has become increasingly present in urban studies since the twenty-first century (Keil, 2003; Wu, 2014). This field of research has greatly benefited from complex system theory and has progressively incorporated it into the field of urban studies (Keil, 2003; Wu, 2014). The most significant contribution of urban ecology has been breaking apart the commonly heard tale of the unnatural city and the inhuman nature.

Urban ecology has various branches, based on differing definitions of what it is (Wu, 2014). Luck and Wu (2002) defined urban ecology as "the relationship between spatial patterns of urbanization and ecological processes" (p.328). Similarly, Alberti (2008) defined the field as "the study of the ways that human and ecological systems evolve together in urbanizing regions" (preface, p.15). The pillars that sustain the field of urban ecology are, therefore: (i) the assumption that cities are complex ecological systems, in which humans are the dominant actor; (ii) the assumption that in order to manage these systems, undivided attention has to be given to the interactions and mechanisms linking the humans and ecological systems and (iii) the assumption that these urban ecological systems are inherently mutable, and for cities to become ecologically resilient, patterns and processes linking the human and the ecological realm in the urban context must be comprehended (Alberti, 2008).

There are numerous facets of the urban ecological system. The relationships, patterns, and processes shaping the systems expand to the study of geography, geology, hydrology, biology, sociology, among others. Indeed, urban activities significantly influence human well-being, affecting water networks, deregulating micro-climates, altering soil nutrition, and other harmful environmental externalities (Alberti, 2008). In the past few years, "a clear focus of urban ecological research is on biodiversity and ecosystem services, energy consumption and its sustainability, multifunctional landscapes (design and planning), and carbon footprint for climate change studies" (Breutse et al., 2013, p. 676).

In this paper, we are concerned with the role urban gardens have in this urban ecological system. Such an approach is crucial as "we cannot study urban ecosystems unless we also understand how humans and their organizations function in them" (Alberti, 2008, p.4). This brings us to the ES provided by urban gardens within the urban system.

## 2.2. Which ES for green spaces

This subsection will present the ES green spaces provide and how they are manifested in urban green landscapes.

In the past century, green spaces were seen as very important but having a somewhat limited function (Boulton et al., 2018; Belmeziti et al., 2018; Grupta et al., 2012). They were a place for exercise, for kids to play and have fun with nature, for cultural and educational events to take place (Harnik, 2012). Academia has not granted attention to the and ES of urban green spaces until the early 2000s (Bolund and Hunhammar, 1999).

Precursors of the study on ES are Robert Constanza, Rudolf de Groot, and Stephen Farberk, who attempted for the first time to give an economic value to the world biomes' ecosystem services.

Their paper defined ES as "the benefits the human population derive directly or indirectly from ecosystem functions" (Constanza et al., 1997, p.253). They attempted to estimate the monetary value of 17 ES, such as climate regulation, soil formation; food production; nutrient cycling in 16 different biomes.

The research opened the door for other academics from other fields to inquire about the importance of ES. Luederitz et al.(2015) inspired themselves from Constanza et al.'s (1997) definition of ES to introduce the urban ecological services, which they defined as "the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfil human life" (p.2). This is the definition that inspires our approach to urban ecosystem services.

In the urban studies field, Bolund and Hunhammar (1999) were among the pioneers. In their paper, the researchers stressed that different geographical scales imply different services, as certain ES are only available locally or globally (Bolund and Hunhammar, 1999). As they were concerned with the ES in the urban environment, more precisely in the city of Stockholm, they have filtered the 17 ESs and came up with six ESs available in the urban context, namely: Air filtering; Micro-climate regulation; Noise reduction; Rainwater drainage; sewage treatment; recreational and cultural value (Bolund and Hunhammar, 1999). These urban ES have subsequently been used in multiple types of research on ES (Baro et al., 2015; Luederitz et al., 2015; DEFRA report, 2005).

The dissection of the ES is argued to be beneficial for two reasons: it brings a structure when analyzing the ecological capacity, function, and practices. Escobedo et al. (2011) pinpoint the importance of identifying and distinguishing the ES into three dimensions: (i) services, (ii) functions, and (iii) benefits found in the urban environment. For instance, tree shade is an ecosystem *(i) service*. It is a service provided by the urban ecosystem affecting the well-being of the city dweller. The ecosystem's primary *(ii) function* is the primary production of vegetation, which is at the root of the tree shade existence. The *(iii) benefit* steaming from this service is the cooling or heating effect and the cooling or heating cost reduction (Escobedo et al., 2011; Bolund and Hunhammar, 1999).

Firstly, urbanites tend to value outcomes of ES, such as satisfactory air quality. However, many of these urban residents are indifferent or unaware of the service-producing such outcome (e.g., dry deposition of pollutants to the leaf's surface). Therefore, highlighting the ES, which contribute to the well-being of urban living, is essential, so city dwellers are sensitized about the importance of such services for their daily life (Cavanagh et al., 2009).

Secondly, this deeper examination of the concept of ES facilitates the identification of the physical characteristics determining the function, the service, and the benefit encountered. These distinctions between function, service, and benefit are the basis for assessing the physical aspects of

urban green space ecological functions. It will allow us to operationalize these concepts and translate them into identifiable and measurable elements.

Furthermore, Belmiziti et al. (2018) have created a typology of green spaces ecological functions (see Table 1), and an inventory of the elements contributing to the types of functions (See Table 2). The authors created the typology based on a thorough literature review, including the ES classifications presented above. They have proposed a table that facilitates determining the physical characteristics of a space that does or do not contribute to a given ecosystem service. The inventory operationalizes the ecosystem services by attaching one or several services to a green space component. This way, permitting to measure and to determine the ES by using green space components as ES indicators.

| Urban service classes | Urban services |
|---|---|
| **Water management** | To reduce the volume of water exported from the space |
| | To retain the peak flow (temporary storage) |
| | To refill the water-table |
| | To receive water from another space |
| **Direct services to people** | To favour leisure and recreational activities |
| | To form social ties |
| | To produce food |
| | To support cultural activities |
| | To improve city attractiveness |
| | To direct way |
| | To direct way |
| | To limit urban heat island effects |
| | To limit air pollution |
| | To reduce noise |
| **Biodiversity** | To offer a habitat for fauna and flora |
| | To offer a temporary refuge for fauna and flora |
| | To offer corridors for fauna and flora |
| | To offer migratory halts for fauna |
| | To offer food resources for the fauna |

*Table 1. typology of urban services (from Belmiziti et al., 2018, p.6)*

Thus, the ES found within urban gardens will be explored through the physical observation of the space. This contrasts with other research concerned with ES found in urban gardens, which have usually inquired about urban gardens' services via surveys and interviews.

*Table 2. Relationship between green space components and urban services (from Belmiziti et al., 2018, p. 6)*

| Greenspace components / Urban services | | Trees | | Shrub | | | Herbaceous | | | Floral | Mineral | | | Aquatic | Temporary water | | | Others | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | AB |
| To manage stormwater from the space | 1 | + | + | + | + | + | + | + | + | + | + | + | + | | + | | + | | | | + | + | | | + | + | + | + | +s |
| | 2 | + | +d | | | | +d | +d | +d | +d | +d | +d | | | +d | +d | +d | +d | + | + | + | + | + | + | +d | +d | + | + | +d |
| | 3 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | + | + | + | + | + | + | + | + | + | + | |
| | 4 | | | | | | | + | + | +s | +s | +s | + | + | +s | | +s | | | | + | + | | | | | | | +s |
| To manage stormwater from another space | 5 | | +d | | | | +d | +d | +d | +d | +d | +d | | | +d | | +s | | | + | + | + | + | + | | | | + | +d |
| To support urban activities | 6 | + | + | + | | + | + | | + | + | + | + | + | + | + | | | | | + | + | | | | | | | | |
| | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | + | |
| | 8 | | | | | | | | +z | +z | | +z | | | | | | | | | | | | | | | | + | |
| To improve the attractiveness of the city | 9 | + | + | + | + | + | + | | + | + | + | + | + | + | +z | +z | | | + | + | | | | | | | | + | |
| To serve as an intermediary space | 10 | | | + | | | | | + | | | + | | | + | + | | + | | | | | | | | | | | |
| | 11 | | + | + | + | + | + | | | | + | + | | + | | | + | + | | | | | | | | | | | |
| To provide sufficient habitat to support fauna and flora | 12 | + | + | + | + | + | + | + | | | + | + | | + | | | | | | + | + | | | | | | + | |
| | 13 | + | + | + | + | + | + | + | | | + | + | | + | | | | | | + | + | | | | | | + | |
| To allow the movement of fauna | 14 | | + | + | + | + | | + | + | + | + | + | + | + | | | | | | | | | | | | | | + | |
| | 15 | + | + | + | + | + | + | + | + | + | + | + | + | + | | | | | | | | | | | | | | + | + |
| To provide feeding ground for fauna | 16 | | + | + | + | + | + | + | + | + | + | + | + | + | | | | | | | | | | | | | | + | |
| Physical well-being | 17 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | | | | + | + | | + | | | | + | |
| | 18 | | + | | | | | + | + | + | + | + | + | + | | | | | | | | | | | | | | + | + |
| | 19 | | + | | | + | + | | | | | | | | | | | | | | | | | | | | | + | |
| Psychological well-being | 20 | + | + | + | | | | | + | + | | + | | | | + | | | | | | | | | | | | + | |
| | 21 | + | + | + | + | + | + | + | + | + | + | + | + | + | | | | | | + | + | | | | | | | | + |

**Symbol meaning:** +: the urban service is "highly probable", +d: the urban service is "on condition" (it is provided if the plot is on **d**epression), +s: the urban service is "on condition" (it is provided depending on the permeability of the **s**oil), +z: the urban service is "on condition" (it is provided depending on the size of the plot).
**Greenspace components abbreviation:** A: Lone tree, B: Afforestation, C Roadside trees, D: Lone shrub or rosebush, E: Hedge, F: Massif, G: Shrubby wasteland, H: Grass, I: Lawn, J: Meadow, K: Herbaceous wasteland, L: Permanent flower massifs, M: Seasonal flower massifs, N: Localised permeable area, O: Localised impermeable area, P: Linear permeable area, Q: Linear impermeable area, R: Permanent water with green cover, S: Permanent water with no green space, T: Permeable green space on depression with temporary water, U: Permeable non green space on depression with temporary water, V: Impermeable green space on depression with temporary water, W: Impermeable non green space on depression with temporary water, X: Mulch with cover, Y: Mulch without cover, Z: Green roof, AA: intensive farming, AB: Litter.
**Urban services abbreviation:** 1: To reduce the volume of water exported from the space, 2: To retain the peak flow, 3: To limit pollution, 4: To recharge the groundwater 5: To receive and manage water from another space, 6: To favour pleasure and recreational activities, 7: To produce food for the inhabitants, 8: To support cultural activities, 9: To improve the attractiveness of the city, 10: To serve as a pathway, 11: To form a barrier, 12: To offer a habitat for fauna and flora, 13: To offer a temporary refuge for fauna, 14: To serve as a corridor for fauna, 15: To offer a halt for migrating fauna, 16: To provide food for fauna, 17: To mitigate urban heat island effects, 18: To clean the air, 19: To reduce noise pollution, 20: To form social ties, 21: To observe nature.

## 2.3. From Government to Governance? Network and Interactive Governance

### 2.3.1. Why Network Governance ?

Network governance has its roots in the critique of traditional forms of administration and their functionality (Torfing et al., 2012). With governments becoming increasingly incapable of responding to the increasing societal complexity, the unstable urban dynamics, and the ever-growing diversification, the legitimacy, and efficiency of the traditional models of control via the hierarchy and the market are

decaying (Edelenbos and van Meerkerk, 2016; Røiseland and Vabo, 2016; Sørensen and Torfing, 2016). It is amid the deterioration of the traditional models of representative government in the west that Network Governance emerges. Kickret, Klijn, and Koppenjan (1997) define as "A set of relatively stable relationships which are of a non-hierarchical and interdependent nature, linking a variety of actors, who share common interest with regards to a policy and who exchange resources to pursue their shared interests acknowledging that cooperation is the best way to achieve common goals" (p.1).

Thus, due to increased fragmentation of policy and decision-making provoked by "functional differentiation and institutional fragmentation of governing processes," new civic and private actors now have more influence on societal governance (Røiseland and Vabo, 2016; p.5). Sørensen (2002) stresses that political governance does not function or express itself in the same way due to an increased autonomy of actors other than the sovereign state. In the context of network governance, horizontal networking gains prominence, bringing facilitators, and administrative coordinators to the front line of political governance and pushing the role of the Weberian neutral public administrator to obsolescence.

Indeed, the questioning of the hierarchical and bureaucratic state and the modes of government that followed (e.g., NPM) has popularized the concepts of Governance and Networks since the early 2000s (Røiseland and Vabo, 2016; Sørensen and Torfing, 2016). The idea underlying these concepts is that the big government is no longer at the apex of public value and decision-making. Instead, decisions are being taken increasingly horizontally, and public value is being created organically within governance networks. Nevertheless, concretely, if governance happens horizontally and in a fragmented landscape, where are decisions and actions taken?

Sørensen and Torfing (2016) emphasize the role of governance networks, which they define in five points: (i) "relatively stable and horizontal articulation of interdependent but operationally autonomous actors; (ii) who interact through negotiations; (iii) which takes place within regulative, normative, cognitive and imaginary frameworks; (iv) that is self-regulating within limits set by external agencies; and (v) which contributes to the production of public purpose" (p.9). Although this definition considers the most prominent aspects of governance networks, we would like to adjust the definition to the systems thinking, and the Urban Political Ecology perspective is taken in this paper. The assumption that the articulation of interdependent but operationally dependent actors is relatively stable does not match our approach. We want to give attention to the unpredictable nature of these relationships instead, thus including the complex nature of political and societal problems in the equation (Gerrits, 2012; Senge, 2004; Klijn and Koppenjan, 2012).

Therefore, in this network governance stage, characterized by complex problems, horizontal interaction among several interdependent but partially autonomous actors, the deficits of the traditional forms of representation and citizenship become striking. As Gerrits (2012) states, "the idea of a central and somewhat omnipotent decision-maker was abandoned for a pluralist approach that recognized that

decision-making takes place in multi-actor settings where power is not (only) dependent on formally assigned authority, but also on the resources that actors can possess" (p.50). In response to these deficiencies, policymakers and societal actors perceive interactive policy-making as a plausible strategic response. Such a form of policy-making enhances self-organization and broadens the scope of direct forms of participation. Inevitably, Interactive governance accentuates the need to look at interactions between the various actors constituting the political and societal landscape.

### 2.3.2. A more profound look into the interactions: Interactive Governance

Edelenbos and van Meerkerk (2016) define Interactive governance as "a situation of reflexive modernity where the expansion of participation and self-organization has become a prerequisite for welfare-state" (p.1). Torfing et al. (2012) elaborate further, stating that interactive governance is "the complex process through which a plurality of social and political actors with diverging interests interact in order to formulate, promote and achieve common objectives by means of mobilizing, exchanging, and deploying a range of ideas, rules and resources" (p.14). This form of- and approach to- governance enables governments to act more coherently and wholly by giving attention to "the interactions and initiatives of a plurality of public, societal and private actors in dealing with complex issues" (Edelenbos and van Meerkerk, 2016; p.1). This approach to governance undoubtedly highlights the need for new governmental roles and a re-conceptualization of what and how does governance govern.

Gerrits (2012) stresses "the position of the government, itself a loose collection of different actors, is more or less equal to others in the networks, not in terms of its properties but rather in what it can achieve" (p.51). Thus, government and community are brought to act jointly in the urban system in order to ensure the welfare state. The government "needs the self-organizing power to ensure the welfare state" while the community needs "government participation providing resources to make interactive governance happen" (Edelenbos and Van Meerkerk, 2016, p. 10). This can make interactive governance seem like a dreadful erratic process, in which democratic norms and values can easily be lost or transformed in the middle of the pluralist political governance. Thus, putting democracy in peril (Dahl, 1956).

Therefore, Interactive Governance arenas are not necessarily more effective or democratic as many suggest. They're level of success is highly determined by the institutional responses local governments give, and the strategies used to overcome the government's failures (Kleinhans, 2017; Torfing et al., 2012). In recent years, governance scholars have brought to the spotlight to the role of self-organization and the meta-governance theories as a mean to overcome the governance deficiencies within the urban system

## 2.4. Self-Organization

### 2.4.1. A working definition

Governments are decreasingly capable of providing solely the public services citizens seek (Edelenbos et al., 2014). Therefore, citizens are increasingly self-reliant and self-organized. "We are witnessing a fundamental change in civic engagement around public affairs, leading to new forms of community self-organization […], active citizens increasingly want to engage in informal and loosely structured organizations to advance their agendas in the public sphere" (Edelenbos et al., 2014, p.52).

The concept of self-organization has first emerged in natural sciences and complex system thinking (Edelenbos et al., 2014; Nederhand et al., 2016). In past years, complex system thinking has come to flood the realm of policymaking and public administration since the turn of the century, bringing the concept of self-organization to the social sciences arena (Teisman et al., 2009; Gerrits, 2012; Senge, 2008). Edelenbos, van Meerkerk and Schenk (2016) define self-organization as "bottom up initiatives that are community-driven and aim to advance public administration and policy making via sustainable models of cooperation among citizens" (p.53). This definition appears appropriate for public administration studies and policymaking and highlights the most critical aspects of self-organization.

Nonetheless, Boonstra and Boelens (2011) propose a definition that integrates the urban ecology approach taken by this study and includes the system framework of thinking. They define self-organization as "initiatives that originate in civil society from autonomous community-based networks of citizens, who are part of the urban system but independent of government procedures" (p.12). In complement to both of these definitions, Milward and Provan (2003), Nederhand et al. (2016), and Sharpf (1994) have demonstrated that self-organization does not emerge in a vacuum. On the contrary, it emerges and sustains itself in what has been labeled "the shadow of hierarchy." It suggests that the state power persists and that "despite the rhetoric of governance-beyond-the-state, new governance spaces are still inscribed with a state agenda" (Taylor, 2007; p.314). Based on these complementary definitions and approaches, we define self-organization as:

*A community-driven initiative, which emerges from a network of citizens within a hierarchical network aiming to advance their objectives and needs in the policymaking and public administration arena, via independent and sustainable models of citizens cooperation, thus becoming active subjects in the urban system in order to steer it according to their interest.*

Our definition is valuable and necessary for our study as it incorporates the most pertinent dimensions addressed in our research. First, It comprises the systemic approach, and the emergent position of the self-organization within the urban system. Second, it includes the hierarchical context in which the self-organization emerges, which echoes the meta-governance strategies studied in this paper.

Third, it defines self-organization as active subjects of the urban system, which refers to the instrumental character of self-organization within the urban system.

### 2.4.2. Conditions and determinants of Self-organization

Nederhand, Bekkers, and Voorberg (2016) have identified in the literature six factors influencing the emergence, the objective, the process, and the consequences of the self-organizing initiative.

Firstly, self-organization often requires a trigger to launch the interaction and organization among citizens (Nederhand et al., 2016; Edelenbos et al., 2012; XXXX). For instance, in the urban garden "Hopital de Saint Louis" in Paris, the decision by the local government to allow the construction of a building in a vacant spot generated a reaction from the neighborhood residents. The neighborhood inhabitants reacted and decided to pro-actively organize themselves in order to create a shared urban garden (Mairie de Paris, 2021)

Secondly, trust plays a vital role in the emergence and consolidation of self-organization (Nederhand et al., 2016; Edelenbos et al., 2012; Edelenbos et al., 2017). Trusting relationships are the basis upon which solid and robust self-organization sustains itself. There are many ways through which trust is built and cultivated. Nederhand et al. (2016) and Stone (2011) have stressed the importance of a shared history, existing networks, and past collaborations.

Thirdly, the elaboration of a shared goal and a mutual objective is necessary for a self-organizing group to sustain itself through time (Nederhand et al., 2016; Bekkers, 2004).

Fourthly, an appropriate environment for discussion and deliberation within the self-organization enabling a shared understanding and information and value system will facilitate the consolidation of the self-organized actor (Nederhand et al., 2016; Boonstra and Boelens, 2011). For this to occur, adequate information and communication channels must be in place, and space for deliberation and concertation must exist.

Fifthly, the presence of boundary-spanners, who engage in connecting the external actors with the organization at hand forge the quality, the maintenance, and the nature of the community-led group (Nederhand et al., 2016; Edelenbos et al., 2018; van Meerkerk et al., 2012; van Meerkerk and Edelenbos, 2018). Boundary-spanning activities consist of channeling information, experiences, resources, and values and engaging in shared leadership to build support, legitimacy, and commitment (Warsen et al., 2018; van Meerkerk et al., 2012; Nederhand et al., 2016;). Boundary spanners can vary significantly in their activities, personalities, and functions.

Sixthly, the level of adaptability is a key determinant of the self-organization position in the urban system (Nederhand et al., 2016; Boonstra and Boelen, 2011). The self-organized assemblies benefit from sufficient levels of flexibility and autonomy (Boonstra and Boelen, 2011).

Although self-organization is affected by all the factors mentioned above, we believe it is still largely influenced by the governmental institutions and actions in the urban system (Nederhand et al., 2016; Mees et al., 2018; Edelenbos and van Meerkerk, 2018).

### 2.4.3. Implications of community-led management for green space provision

Research on the effect of citizen participation and civic initiatives on green space provision has been gaining attention in recent years (Jagt et al., 2019). As stated in the introduction, since the financial crisis of 2008, local governments in the UK and other European countries had their budget for green space provision and maintenance slashed. The trend is expected to continue (Jagt et al., 2019). Therefore, local administrations started looking for alternatives to provide the public good (Rosol, 2010; Sharpf, 1994). On many occasions, the 'delegation' of this responsibility was given to citizen assemblies and civic society more generally (Jagt et al., 2019; Rosol, 2010; Edelenbos and van Meerkerk, 2016; Molenveld, 2021). That is why it is essential to understand the effect of civic initiatives and meta governance strategies on the provision of green spaces and their ecological functions.

In their article, Boulton et al. (2018) analyzed 104 peer-reviewed papers on green space provision and found five main resource factors affecting it: maintenance of budget, community engagement, data acquisition and management, professional expertise, and systems operation. Additionally, Boulton et al. (2018) found that political leadership and governance tools are crucial determinants of green space provision. It is concluded in their study that the lack of political leadership can heavily hinder the quality, durability, and accessibility of urban green spaces. Governance structures are similarly a crucial factor influencing the capacity of the governance system to collaborate, cooperate and find collective agreement (Badiu et al., 2016).

Many authors have concluded in their studies the importance of citizen participation and self-organization in the provision of urban green spaces. Indeed, Baycant-Levent and Nijkamp (2009) have found that "the involvement of the community in the planning process [and] a collaborative and enabling partnership between local authorities, local business and voluntary groups is necessary for successful urban green space development" (p.10). Similarly, Boulton et al. (2018) concluded in their study that the involvement of the citizenry in the management of green spaces is a crucial factor influencing the accessibility, quality, and durability of the green space. Roy (2011) revealed the "counter neo-liberalism" capacity of self-organization involvement in greenspace provision, as well as the risk of

decreasing welfarist responsibilities of local authorities. In sum, the importance of citizen participation in providing green spaces in the urban landscape is well accepted in the academic literature.

Buijs and his and her colleagues (2017) also brought a valuable contribution to the literature on self-organization and green space provision, and more specifically, on ecological services of green space provision. They concluded that active citizenship in the management and provision of greenspace contributed to the space's social, institutional, and environmental resilience. Furthermore, the active involvement of citizens was also seen to strengthen innovation, diversification, and experimentation (Buijs et al., 2017). The researchers also highlighted the challenges faced by municipal governance and the necessity to engage in Mosaic forms of governance. Mosaic governance "demands a context-sensitive approach to planning, acknowledging relations and interdependencies not only between ecological and social scales, but also between geographically distinct urban landscapes, community identities and specific practices of active citizen groups across the city." (p.3).

Buijs et al.'s (2017) contribution to our study is underlining the importance of mosaic governance practices and comprehensively bringing attention to the various benefits citizen participation can have on ecological services and ecosystem conservation.

## 2.5. Meta governance strategies

The term meta-governance first emerged in the academic realm in the mid-1990s to respond to governance failures. In the face of the increasing complexity of the urban system and the more significant number of actors and issues involved, and the fragmented capacity of actors, meta-governance flourished as a way to coordinate governance. It means coordinating multiple self-governances and steering a fragmented system, characterized by many self-organized networks, towards the desired direction. Sørensen (2006) describes it as an indirect form of governing that influences various self-organizing processes. She highlights the importance of looking at it as an umbrella concept, englobing the various toolkits use to organize and govern self-regulated and self-organized entities.

The vague nature of the concept makes the materialization of meta-governance hard to grasp (Gjatelma et al., 2019). As a result, the way meta-governance is practically carried out and manifested in the governance arena, and more precisely in the urban system, remains open to discussion. Nonetheless, several authors have attempted to define the means by which meta-governance strategies are deployed.

Jessop (1998) was the first author to use the concept of meta-governance to describe the organization of the self-organization. In his work, he stressed that the term "does not amount to the installation of a monolithic mode of governance. Rather, it involves the management of complexity and plurality" (p.42). Years later, this inspired authors such as Sorensen (2006) and Nederhand and her colleagues to dive deeper into the manifestation of this "management of complexity and plurality."

Sorensen (2006) researched the extent to which and the way Danish politicians engaged in meta-governance strategies in the early twenty-first century. In order to comprehend how engaged they were, she needed to categorize different forms of manifestation of meta-governance. Although she deems the categorization incomplete and considers it impossible to categorize meta-governance strategies fully, she proposed four distinct ways to meta-govern. They are (i) hands-off framing of self-governance; (ii) hands-off storytelling; (iii) hands-on support and facilitation; (iv) hands-on participation.

First, hands-off framing of self-governance refers to an indirect way to steer the self-organization through the passing of reflexive laws, creating incentives that will enhance the choices of the self-organized systems towards what the meta-governor desires.

Second, hands-off storytelling strategies are very much influenced by social constructivist thinking. They emphasize that the meta-governor can indirectly steer the social or urban system via the construction of political and social meaning and identity. Henceforth, meta-governance can influence and forge the interests of the self-organizing actors through the construction of meaning and identities that characterize the self-organized actor (e.g., images of friend-enemy relations, visions of past and future of individuals and the actors, etc.).

Third, meta-governance can be exerted through direct support and actions that aim to facilitate the self-organizing actor's role or goal. It is done in a non-assertive manner, which means that the meta governor does not aim at achieving her or his objective. Here, the purpose of the meta-governor is to promote the self-organizing's endeavor.

Fourth, the meta-governor can directly influence the outcome of the self-organized actor by participating in the self-governing process. However, in this case, the meta-governor gives up any hierarchical and authoritative position it may have. Instead, it participates in the self-organizing process according to the rules and norms applied by the self-organized actors. All these approaches and strategies are not mutually exclusive. On the contrary, they might complement each other and hence constitute a meta-governance approach. Sorensen's (2006) was a milestone in the meta-governance literature and inspired the increasing number of papers on the subject in the years to come.

Nederhand and her colleagues (2016) formulated a typology based on Sorensen's (2006) and Kooiman's (1994) work, with six components constituting the meta-governance toolbox. They translated the meta-governance strategies into measurable strategic meta-governing elements.

The first strategy which meta-governors can adopt is to develop a strategic framework (Nederhand et al., 2016). It entails elaborating administrative checks imposed on the self-organizing group and with which the community garden has to comply.

Second, there is the monitoring procedures strategy. It consists of developing procedures and performance indicators to monitor the process and enable the assessment of the community project's output.

Third, the governmental actor has the choice of engaging in "framing and storytelling." This subtle strategy involves creating a narrative, a shared story that aims to create the sense of shared goal or belief. It sets the 'appropriate' discursive context for the self-organized actors to pursue the government's desired direction.

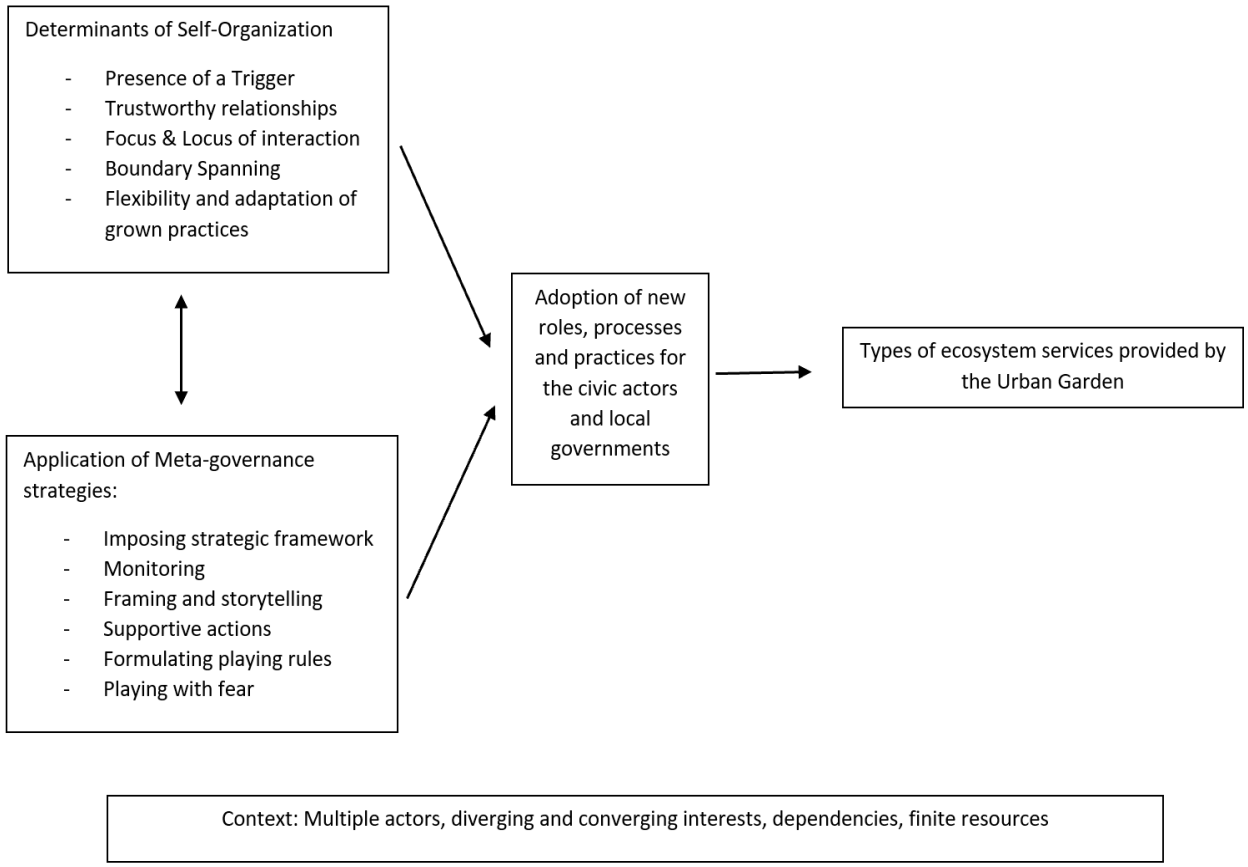
The fourth strategy is to support and assist the self-organized actors by giving relevant information, providing financial support, or offering or facilitating access to a vital resource for the grassroots initiative (e.g., a meeting place, etc.).

Fifth, local governments can formulate the rules of the game. This strategy calls for more direct government intervention, such as allocating a position to a relevant actor, formulating, or, more broadly, designing an institutional setting in which self-organization emerges.

The sixth and final strategy at hand for meta-governors is to "discipline the self-organizing process by playing with 'fear'" (Nederhand et al., 2016, p.1067). The 'playing with fear' strategy can be employed subtly or explicitly. Simply, it consists of the government using the remains of its hierarchical position to steer the network towards the desired direction. The government has access to specific resources such as authority, money, knowledge, among others, which may allow it to take on more hierarchical and imposing roles (Scharpf, 1994). Thus, echoing the shadow of hierarchy in which self-organization emerges.

Thus, the six strategies presented above constitute how meta-governance expresses itself. Plus, it brings together the various tools governments have to steer the urban governance network to the desired outcome. Here, we will be using these strategies as the elements of our independent variable that affect and influence the forms, goals, and procedures used by the self-organized actors which constitute the urban landscape.

*Figure 1: Conceptual model: A Heuristic theoretical framework to understand the processes and results of self-organized urban gardens on the ecological function they carry (Inspired by Nederhand et al., 2016; p.1068)*




# 3. Research Strategy

This study is a qualitative explanatory research. It is concerned with explaining the effects of the self-organized management of urban gardens and the meta-governance strategies on the provision of ecological green spaces in Paris and on the actors' roles (e.g., city council and urban gardens) within green space provision arena have. In order to carry this research effectively, we have selected two case studies located in the tenth district of the French capital. We selected two contrasting case-studies in order to reach an adequate analytical explanation of the interplay between meta-governance strategies, self-organization conditions, the urban garden's ecological functions and the actors' roles within the interactive arena (Yin 2009).

## 3.1. Data collection methods

The data used in our study was collected through three distinctive techniques.

First, we used interview guides in order to ensure our semi-structured interviews were consistent throughout the data-gathering. The interview guides are structured in three distinctive parts, investigating three dimensions of the relationship we want to investigate (Appendix A). Each section can be regarded as a translation of our theoretical concepts into interview questions that can function as indicators. The first section concerns the factors influencing self-organization ("Was there a triggering event that made the urban garden emerge? How did it affect the assembly of citizens?"). The questions asked are inspired by the interview guide presented in Nederhand et al.'s (2016) article (Appendix B). The second part of the interview guide consists of asking questions regarding the ecological functions of the green spaces and the factors influencing the ecological motivation of the interviewees ("Is there an actor that facilitates the ecological practices that the volunteers adhere to in this garden?"). The interview's third segment is concerned with the meta-governance strategies deployed by the municipality and the extent to which such strategies stimulate or frustrated the ecological motivations of the urban garden ("Was there any physical or human support provided the local government?"). This last section was also heavily influenced by the interview guide present in the article written by Nederhand, Bekkers, and Voorberg (2016) (Appendix C). Finally, a separate interview guide solely concerned with the Meta-governance strategies was created and used to interview public officials. The findings of the interviews contribute to understanding the factors influencing the self-organization, the ecological practices and motivations of the garden's volunteers, and the influence of the meta-governance strategies on the self-organization and the garden's ecosystem services.

Second, we incorporated into these findings the physical observation of the green spaces. We visited the two urban gardens and recorded the vegetation found in each plot constituting the entirety of the space. Once the components were identified, they were analyzed according to the green space component inventory created by Bemiliziti and his colleagues (2018). Thus table conceptualized by Belmiziti et al. (2018) contributed to identifying the physical characteristics linked to ES provision in both gardens.

Third, policy documents and publicly available governmental content on the creation and maintenance of urban gardens were gathered and finalized.

## 3.2. Data analysis

The sample used in this study was found via the snowballing approach. In order to initiate the snowballing sampling, we made sure to purposively select three relevant respondents: one board member of the Poireau Agile garden, one board member of the Jardin Louis Blanc garden, and one respondent in charge of the green space provision in the tenth district's city council. At the end of each account, interviewees were asked to share the contact of other members of their cabinets or indicate how to contact other relevant respondents.

We conducted 13 semi-structured interviews with the users and citizen-managers of the green space selected (two interviews with board members of the Jardin Louis Blanc garden and three interviews with the Poireau Agile board members, two interviews with a loyal adherent of each self-organized garden). In addition, we also conducted interviews with the city officials responsible for the green spaces in the TD (five interviews with Parisian public officials that were or are currently in charge of the green space provision in the city, and one interview with the director of Graine de Jardin, an association in charge of accompanying the creation of urban gardens in France and who was strongly involved in the green space provision arena). Interviews lasted between 22 minutes and 180 minutes. Interviews were conducted face-to-face when interviewees agreed, or via zoom or e-mail. The interviews were recorded when respondents gave their permission; otherwise, field notes were taken to mark their answers and allow subsequent coding.

The data steaming from the interviews were analyzed with the help of the qualitative data analysis software Atlas. ti. The software was chosen as it enables us to quantify the qualitative data gathered, and it facilitates the systemic analysis of the different variables thanks to the network coding option. Further, we exported the coded interviews and, therefore, the categorized and classified data to the excel software to permit the data's adequate visualization.

The findings produced by this research can be regarded as internally valid because they are the fruit of thorough observations, long in-depth discussions, and sustained and prolonged participation in the governance arena of the 10th district Parisian urban gardens. Such a method ensures congruence between the developed ideas and the observations and data analysis (Bryman, 2012). However, the external validity of our research is limited. This research is concerned with two specific urban gardens, ingrained in specific political and urban contexts proper to the city's region.

Concerning the reliability of this paper, efforts were carried out to limit the possible researcher's biases, such as using existing analytical peer-reviewed tools. Furthermore, although the study was conducted by a sole researcher, research strategy choices and findings were shared regularly with an experimented peer-reviewer.

# 4. Findings and Analysis: Limiting pollution, boundary spanning, and formalized playing rules.

The findings of this study can be categorized into three groups. First, the findings regarding the ecosystem and urban services provided by the garden will be displayed. These findings stem from the

field observations and the subsequent analysis carried out with the table presented in Belmiziti et al.'s (2018) paper. Second, the interview's results regarding the conditions for self-organization and their influence on the ecological practices and the ecological functions found within the garden are presented. Finally, we introduce the data gathered in the interviews regarding the different meta-governance strategies deployed by the local government of the TD and the municipality of Paris to steer the self-organized green spaces.

## 4.1. Ecological community gardens: which ecosystem services?

Measuring the ES in both case studies consisted of thorough field observation of the gardens. The results suggested that the disparities between the greenspace components present in each garden make the gardens generate the different ecosystem and urban services.

### 4.1.1. Poireau Agile Garden: limiting pollution and urban heat island effect.

*Image 1: The area of Poireau Agile Garden (area of study) within the Villemin Garden. The agile leak has an area of 220 square meters*


Within the Poireau Agile Garden, a total of 70 different plots were identified. Forty-five of these plots are shared among the various adherents of the 'Agile Leak.' Four other plots are also shared among the adherents but cannot be seen within the garden's map because they were only recently added to the existing garden. The remaining plots were created to account for the space common to all adherents, such as the Hedge that surrounds and delineates the gardening space. It is important to note that these plots combined account for only 220 square meters of garden.

Carrying the observations of the 70 plots in the garden enabled us to identify three green space components that are densely present in the garden. The communitarian green space comprises meadows, seasonal flower massifs, permanent flower massifs, and hedges.

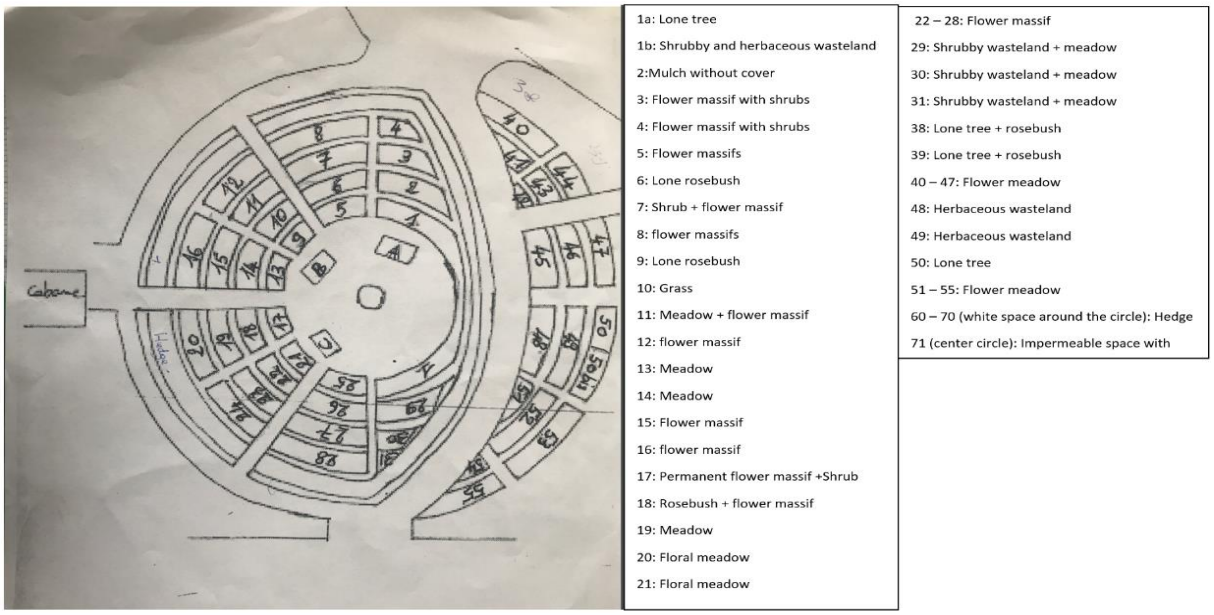



*Image 2: The different green space components of the Poireau Agile garden according to the garden's plots.*

According to the inventory conceptualized by Belmiziti and his colleagues, a meadow refers to "herbeceous plants that are close, dense, high and dominated by grasses" (Belmiziti et al., 2018, p.5). Seasonal flower massifs refer to "a set of flowers planted in the form of a massif [in which] the folliage is only present for only one season throughout the year" (Belmiziti et al., 2018, p.5). Permanent flower massifs have permanent foliage throughout the year. Finally, hedges are defined as a "set of shrubs planted […] to a dense shrub cord" (Belmiziti et al., 2018, p.5).

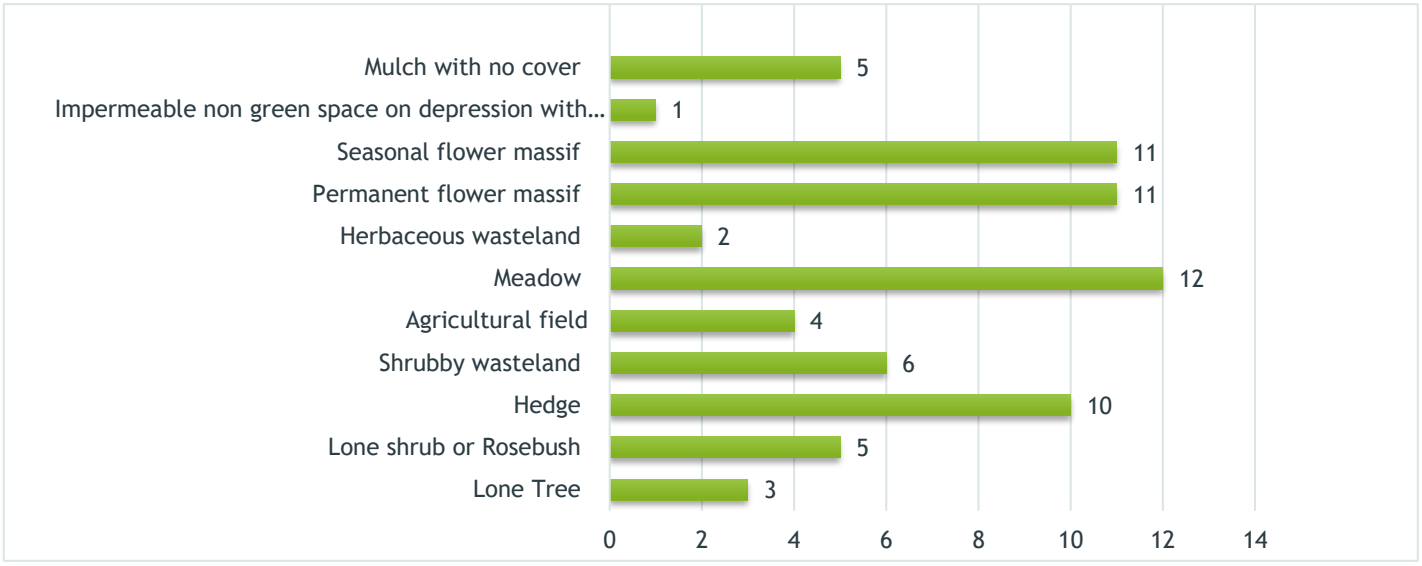
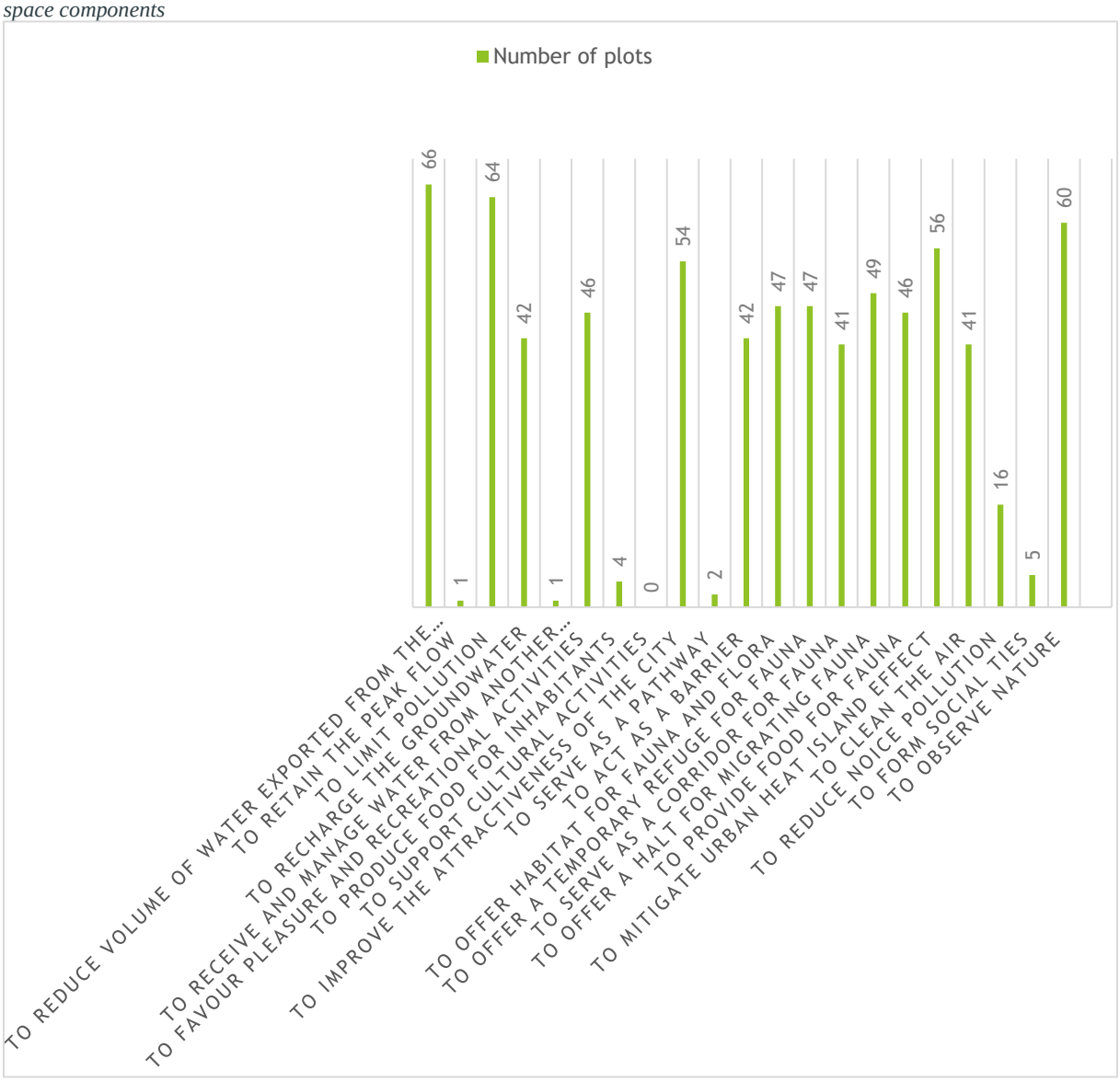



*Figure 2: Physical analysis of Green space components in the Poireau Agile Garden, according to the typology by Belmiziti et al. (2018)*

These greenspace components have different ES that can be identified and further examined. Indeed, we identified 16 ES in the Poireau Agile urban garden out of the 21 services presented in the green space component table.

*Figure 3: Ecosystem and Urban services provided by the Poireau Agile garden according to the type and number of green space components*




By examining the frequency and existence of the components in the space, together with the service attached to their presence, we can conclude that the Poireau Agile community garden provides mainly five types of urban and ecosystem services. First, it "reduces the volume of water exported from the space." This service refers to the water management capacity the Poireau Agile Garden has. Due to the prevalence of components such as flower massifs, meadows, and shrubby areas (e.g., Hedges, shrubby wasteland), the community garden prevents water from being exported to the space, thus, contributing to the proper reception of stormwater in the urban environment. Second, it limits pollution. Third, it increases the city's attractiveness with the colorful flower massifs and the bucolic atmosphere it brings to the Parisian district. According to our analysis, this third service is not related to urban

ecology, but it is comprised of the tool offered by Belmiziti and his colleagues. Therefore, we will refer to it strictly as an urban service. Fourth, the green space contributes to mitigating the urban heat island effect. Similar to the water management characteristics above-mentioned, the vegetation found in the garden has cooling traits, which help to limit urban heating. Fifthly, the fact that the garden is open and composed of a mix of low and high vegetation with different plots enables visitants to observe nature and learn about the different fauna and flora found there.

Thus, the physical contribution of the Poireau Agile garden to the urban ecology, according to the analytical tool proposed by Belmiziti et al. (2018), is that of preventing water from the space of being exported, limiting pollution, mitigating the urban heat island effect, and enabling nature observation by the residents of the area.

### 4.1.2. Louis Blanc Garden: water management and social activities.

The greenspace structure of the Louis Blanc garden is rigorously different from the Agile Leak. As it was already mentioned, the space is secluded. It finds itself in the street, and it is closed to the public five days a week. This, together with the self-organization determinants, which are further elaborated in the sequence of this paper, forged a garden that has different components, and therefore, different ecosystem and urban services to offer to the urban system.


*Image 1: The area of the Louis Blanc Garden (area of study) situated in the Louis Blanc street. The Louis Blanc garden has an area of 550 square meters.*

The adherents of the garden are mainly concerned with the gardening of their kitchen garden. Contrary to the Agile-leak, the plots of the garden are not "owned" by any adherent. All the adherents have the right to garden all the plots collectively. Therefore, the diversity found in the garden is less striking. Further, the fact that the garden is closed enables the amateur gardeners to cultivate fruits and vegetables, which will not be stolen or damaged by non-participants. This reality contrasts significantly with the context in which the Agile leak finds itself.

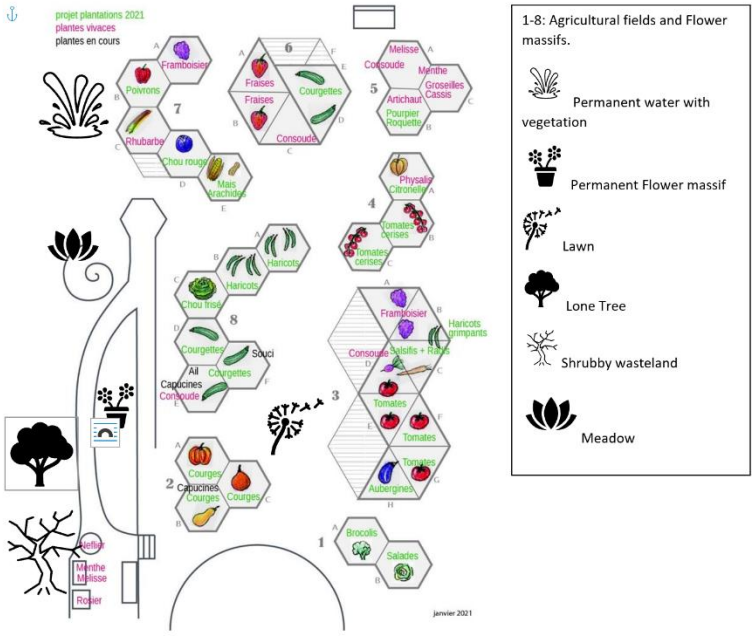



*Image 4: Map of Louis Blanc Garden components, provided by the garden's co-direction, and subsequently modified by researchers*

Therefore, the garden is concerned chiefly with perma-culture practices and the questions on how to sustainably provide food without using any phytosanitary products while simultaneously contributing to the local ecosystem. It is important to note that as opposed to the Poireau Agile garden, the Jardin Louis Blanc had enough budget to afford trays for off-soil agriculture (see image 5). This is crucial if one wants to cultivate eatable food in Paris, as the city's soil is infested by plum and other polluting materials that contaminate cultivated vegetables and fruits (Jolivet, 2005).

*Image 5: Louis Blanc Garden seen from the neighboring building. Picture given by one of the garden's adherents.*

For our analysis, we divided the garden into 55 plots, and we analyzed the content and the size of the plots via satellite images available on google earth. This step was necessary as the garden did not have a map of the plots and their sizes like the Poireau Agile garden. Out of the 55 plots, 13 were a wooden built environment, where adherents can meet, socialize and discuss the plans for cultivation and cultural events. Fourteen plots were attributed to the category "Lawn," as they are characterized by short-cut grass in which the adherents walk by. Ten plots are dedicated to cultivating fruits and vegetables, as they have the privilege to be located within off-soil cultivation trays. Three of them are characterized by a lone tree. Three of them together form a seasonal flower massif. Three other plots together make up a large meadow full of aromatic herbs. Four more constitute a Hedge, which

delineates the end of the garden in the back of the garden. Two plots are a Litter area. And three other plots form a permanent water space with vegetation.

These greenspace components engender an important role of the Louis Blanc garden within its neighborhood's residents and local climate. It provides mainly five types of ecosystem and urban

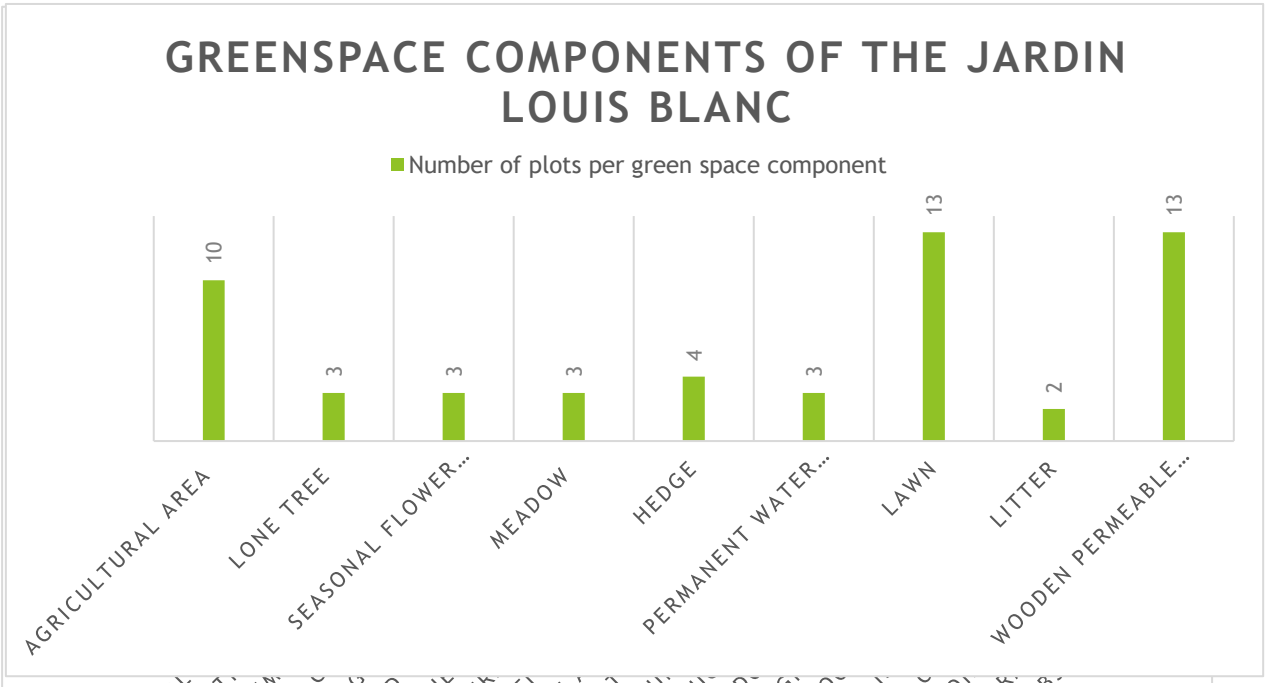



*Figure 4: Green space components in the JBL*

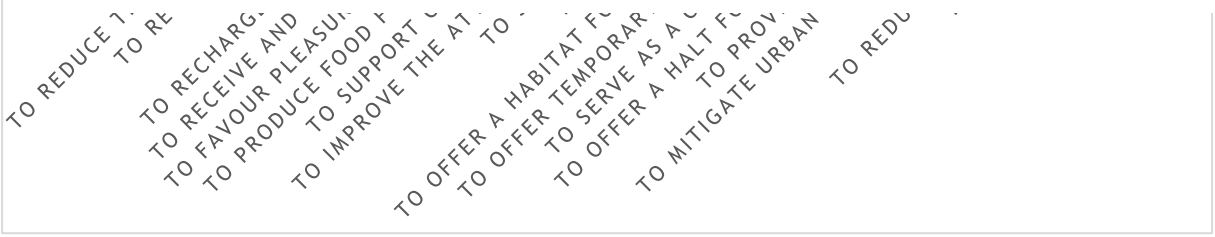



*Figure 5: ES according to the green space component and its recurrence in the garden*

services. First, the Louis Blanc garden contributes to reducing the volume of water exported. Similar to the Agile leak, the financed community garden has a strong stormwater management capacity. Second, it limits pollution. According to Belmiziti et al.'s (2018) inventory, the fabulous presence of lawn areas and permeable areas enables an excellent pollution mitigation capacity. Third, it improves the attractiveness of the city. Fourth it enables users to observe nature (although such service is diminished by the strict opening hours of the garden, which are only from 14hr to 18hr every Wednesday and Sunday). Fifth, in contrast with the Agile leak, the Louis Blanc Garden scores much higher in the urban services linked to creating social ties and the support of cultural activities. The reason for this is the less densely vegetated area, with larger lawn spaces and permeable spaces where people can walk and interact. Interestingly enough, the presence of these more inviting components and the lack of herbaceous and densely vegetated areas make the garden score low in services such as reducing noise pollution and the heat island effect.

Thus, the analysis of the physical greenspace components of the Louis Blanc garden enables us to reveal the stormwater management capacity of the space, its essential function when limiting pollution, and increasing the city's attractiveness. Moreover, notably, its structure, mainly composed of lawns and permeable areas, enables the space to have a more significant social and cultural function.

### 4.1.3. A revealing comparison: contributing to humans and non-humans

The comparison carried between the Poireau Agile, and the Louis Blanc reveals a significant difference regarding the types of ecosystem and urban services provided and the target group who benefits from it.

On the one hand, the Poireau Agile garden has vital biodiversity functions, such as providing habitat for fauna and flora and a temporary refuge for fauna. According to the Belmiziti et al.'s (2018) table, the garden does not support cultural events, and it does not have great potential when it comes to strengthening and fostering social ties. Due to its idyllic appearance and dense and herbaceous vegetation, the garden supports the mitigation of noise pollution and the urban heat island effect. Such agglomeration of services supports and sustains urban biodiversity. The fact that the garden provides habitat and refuge for non-humans suggests that the human urban dwellers are not the only actors targeted by the garden and probably not the only ones to enjoy and relish the picturesque and rustic nature that can be found in the heart of the Villemin public park.

On the other hand, the Louis Blanc garden is characterized by open areas, with lawns ad permeable surfaces where humans can easily interact and garden together. It facilitates interactions and the existence of cultural activities and events in the space. Although the garden is constituted by components that also offer habitat and refuge for fauna and flora and contribute to limiting the urban heat island effect, the most probable service provided by the components there found is linked to human interactions. As observed in the graphics, the Louis Blanc garden facilitates the creation of social ties, the creation of a pathway, and stimulates cultural activities. With most of the gardening in the space being concerned with eatable vegetables and fruits, adapted and attractive to the human diet, the practices and components indicate that the space targets mostly human actors in the urban system.

### 4.1.4. Limitations of the Ecosystem service analysis and Belmiziti et al.'s (2018) tool of greenspace components and urban services.


*Image 6: Ecosystem services that are not included in the greenspace component analysis tool of Belmiziti et al.'s (2018)*

The physical analysis from our field observations is valuable and provides an essential contribution to understanding the role urban gardens take in the urban system and their contribution to urban ecology. Further, it contributed to shedding light on the non-tangible services these spaces provide for urban dwellers, such as urban heat island effect mitigation and water management capacities.

Nonetheless, our analysis via the greenspace component table provided by Belmiziti et al. (2018) has drawbacks. These limitations are three-fold.

First, the very usefulness and most remarkable quality of the above-mentioned tool is its default. The tool is relatively simple and can be applied in all kinds of urban greenspaces, making it less effective in exploring the more specific and unique features urban gardens might have and their subsequent functions. For instance, an "insect hotel" was created in both urban gardens, offering habitat and refugee for the insects and the pollinators. Other types of anthropogenic habitats for fauna, such as birdhouses and diverse vegetation areas, were also created. Nonetheless, the green space component grid does not include this type of component. The same is valid for agricultural plots. The grid presents one type of agricultural green space component (e.g., "intensive agriculture"). Both urban gardens have several plots destined for agriculture; however, the plots are cultivated according to permaculture practices and, therefore, do not have the same ES as the table suggests. Thus, the issue is the general scope taken by the greenspace components inventory table. It allows one to see the big picture but inhibits one from zooming in and further analyzing particular components.

Second, the table attempts to attribute certain urban services, such as "to form social ties" or to "support cultural activities" according to the presence of a specific green space component. This is problematic and misleading. As explained in the later section of this paper, both urban gardens studied have a solid pedagogical, cultural and social function. The attempt to estimate these functions solely via

the observations of physical components may be incomplete. It is essential to complement these physical observations with qualitative interviews or surveys to understand the cultural and social function of the space according to the users, adherents, and participants of the space.

Third, when it comes to measuring the urban services, many other factors, besides the nature of the components, come into play. For instance, according to the tool used in this study, the Louis Blanc urban garden has a higher probability of supporting cultural activities than the Poireau Agile garden. Nevertheless, the latter is open every day of the week, during the whole day, due to its location within a public park. Instead, the Louis Blanc Garden is only open twice a week, from 14hr to 18hr on Sundays and Wednesdays. These opening hours can significantly affect the "to support cultural activities" urban service stipulated by the table. This suggests that, when attempting to measure urban services, many other factors must be taken into account to conclude that such service is provided. This is less true regarding the ES, such as "to provide habitat for fauna and flora" or "to provide refuge to fauna," as these are almost solely dependent on the nature of the component found there. However, these ES can only be provided as long as the gardens' users and adherents act in fauna and flora-friendly manner. This means that information panels (such as the one found in figure 5., in which it states that using coffee to protect certain plants from parasites is an efficient way to protect the plants without hurting the non-harmful ecosystems around), are also important determinants of the ecosystem services found in the space.

Thus, although the tool provided by Belimiziti et al. (2018) is an excellent step into facilitating the study of the ecosystem and urban services that green space can provide, it must be accompanied by other research methods, or it must be tailored to the specific space being studied. In the case of urban services, a qualitative inquiry with adherents, users, and participants of the space is of great value to better understand the social services it may offer. Concerning the ecosystem services, it is important that the table continues to be refined and more complete to incorporate a greater variety of greenspace components, thus allowing it to be used in a larger number of contexts.

### 4.1.5. Going beyond ecosystem services: introducing “social ecological services”

The previous section focused on the ES of the green spaces studied and the urban functions provided. Our findings stemming from the observations and our results analyzed in the in-depth interviews suggest a gap in the various functions attributed to the space. Thus, the chiasm defining the services of the greenspace as either urban or for the ecosystems is insufficient and hides many dimensions of the

interaction of the space with other urban actors (e.g., urban dwellers).

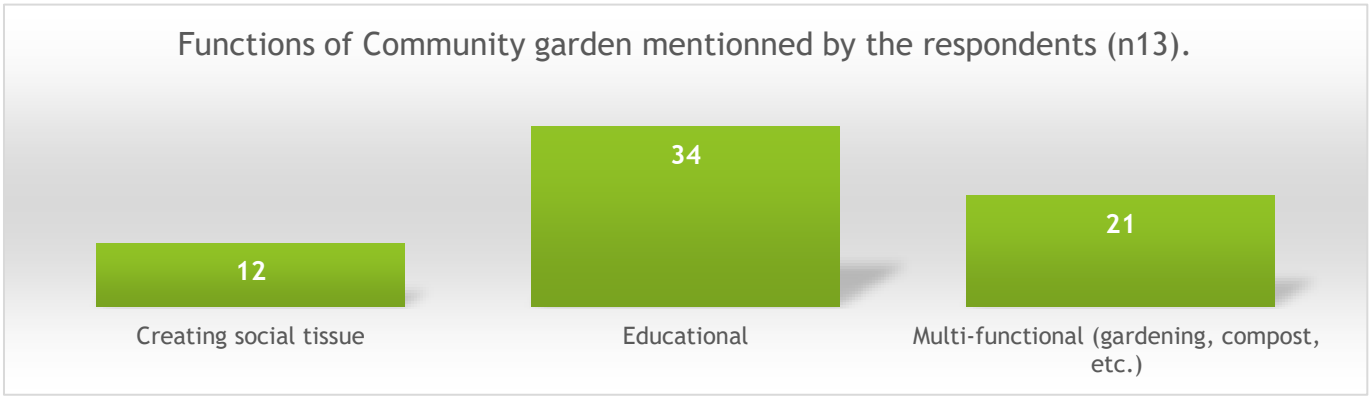



*Figure 6: Functions other than ecosystem services mentioned by respondents (n13).*

As the Figure.5. shows, respondents overwhelmingly evoked the predominant educational function of the urban gardens. Respondent no5, a former public official responsible for the creation of many urban gardens in the Parisian urban environment, stressed:

*"Let's say that the Community Gardens are ambassadors of the ecological practices in the urban milieu. They are partners that are opened in the neighborhood. Many Parisians discover what is compost, biology, ecology etc. through the contact with these gardens" (Code 5:10)*

Respondent no3 added:

*"We necessarily learn because we are in contact with those who know gardening, biology and by dint of putting our hands in the ground, to see what we grow, what we plant, and how it all works and how it evolves, it is formative." (Code 3:12)*

Such educational function of the greenspace is not stressed accordingly within the terms urban services and ecosystem services. Both terms used in the table created by Belmiziti et al., (2018) do not englobe this facet of the services provided by the green space to the urban system and its residents.

### 4.1.6. Summary of the ecological functions carried by the Poireau Agile and the Jardin Louis Blanc

Conclusively, the observation of the ecosystem and ecological services provided by the community gardens were revealing. We found that both gardens have different ecosystem functions. While the Poireau Agile garden has a high probability of mitigating urban heat island effect and mitigating pollution, due to its dense and bucolic natural architecture, the Jardin Louis Blanc has a great potential to support cultural activities, and to contribute to urban water management. This is due to the greater lawn area and the presence of a permeable aquatic area within the garden. We also identified an important function both urban gardens have: an educational function. During the interviews, many

respondents highlighted the great pedagogical contribution to urban ecology that urban gardens have. In there, people learn, share and build their ecological and environmental awareness. This is a formidable ecosystem service provided by the garden; to produce awareness amongst the largest species population of the urban ecosystem.

Revealing this service enabled us to identify the deficiencies of Belmiziti et al.'s table (2018). Which consist on the incapacity of the table of revealing the wholeness of the ecosystem functions a space can provide. We do not want to devalue the work of the researchers, as this table is of great value, and a step towards a better understanding of the ecosystem functions a space can provide. Conclusively, the observation of the ecosystem and ecological services provided by the community gardens were revealing. We found that both gardens have different ecosystem functions. While the Poireau Agile garden has a high probability of mitigating the urban heat island effect and pollution due to its dense and bucolic natural architecture, the Jardin Louis Blanc has a great potential to support cultural activities and contribute to urban water management. This is due to the greater lawn area and a permeable aquatic area within the garden. We also identified a critical function both urban gardens have: an educational function. During the interviews, many respondents highlighted the outstanding pedagogical contribution to urban ecology that urban gardens have. In there, people learn, share, and build their ecological and environmental awareness. This is a formidable ecosystem service provided by the garden; to produce awareness amongst the largest population of the urban ecosystem. We have called this ecosystem service which happens in a human dimension, the "ecological social function." Revealing this service enabled us to identify the deficiencies of Belmiziti et al.'s table (2018), which consists of the incapacity of the table of revealing the wholeness of the ecosystem functions a space can provide. However, we do not want to devalue the work of the researchers, as this table is of great value and a step towards a better understanding of the ecosystem functions a space can provide.

## 4.2. Self-organization: Boundary-spanning and trustworthy relationships, the pillars of the self-organized gardens in the greenspace arena.

In this study we looked at the several factors influencing self-organization. According to Nederhand et al. (2016), there are five factors that influence the way self-organization emerges and maintains itself in the system. These are: (i) the presence of a trigger; (ii) trustworthy relationships; (iii) focus and locus of the interaction; (iv) the presence of boundary-spanning activities and; (v) the adaptation of grown

practices.

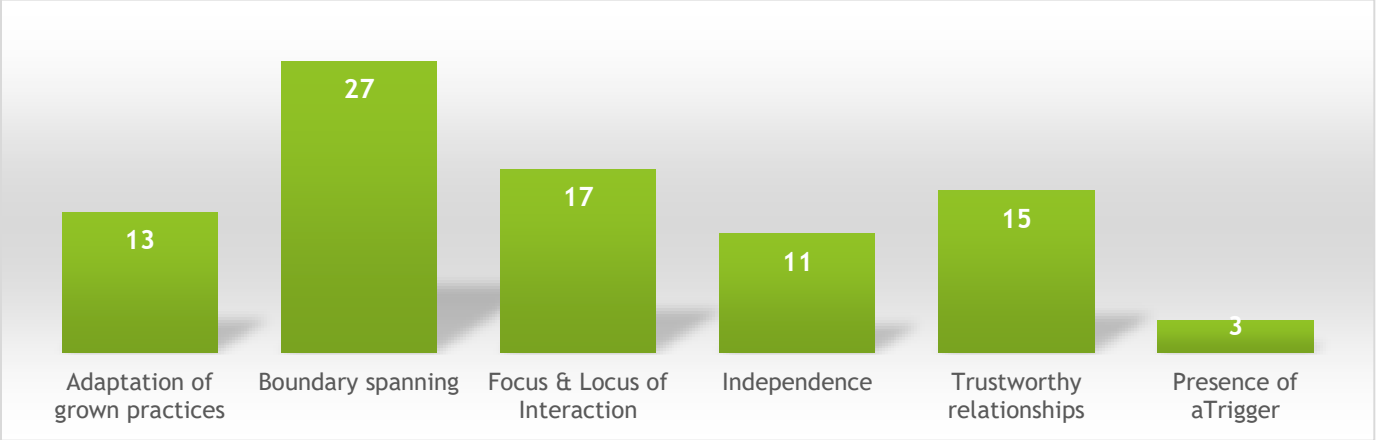



*Figure 7: Determinants of self-organization according to respondents (n13)*

Our research findings indicate that certain factors influencing self-organization are more determinant than others when it comes to urban gardens. Indeed, the most mentioned factor influencing the urban garden's capacity to act within its arena is the presence of boundary spanner activities. Of course, the other factors, such as trusting relations and focus and locus of the interaction, are essential as well, as they are pre-conditions for an adequate boundary-spanning role. However, they have been less frequently mentioned as important factors influencing urban garden activity.

### 4.2.1. Boundary spanning: "It is necessary"

The results of our in-depth semi-structured interviews suggest that there is one overwhelmingly important determinant of self-organized gardens in the greenspace arena: the presence of boundary-spanning activities or the presence of a boundary-spanner. The reason for this is because urban gardens in Paris rarely have any fixed income. Boundary Spanners enable the garden to act in the urban system without this fixed income by (i) building solidarity relationships in which goods and services are exchanged without monetary input and by (ii) acquiring subsidies by the municipality. They finance specific small-scale projects with the small contribution adherents are allowed to make. However, these contributions are insufficient when it comes to financing larger-scale projects, renovations, or events.

Furthermore, the urban gardens have a sense of partnership and barter deeply ingrained in the gardens' identity. That is why both self-organized gardens are highly engaged with the associative network of the city and the local municipality. As respondent no9 stated:

*"The vision that we have within the Ville Main Jardin (association of Poireau Agile) is that if we need any support, we are gonna go find it, and we tell ourselves that we will be convincing enough" (Code 7:34)*

Indeed the idea of finding financial or material support within the network in which the garden finds itself is deeply ingrained in the garden's identity. Respondent no 1, from the same garden, highlights:

*"We could pay certain things with our contributions. But that's not how we should do it […] We need, actually, to invest our time in building partnerships with others, in order for our association to be diffused, and this way, bigger. That's how you motivate people who would never know about the garden, to come and see, and who knows become a participant." (Code 1:43)*

The same holds for the Jardin Louis Blanc. Respondent no 5, who is one of the members of the administrative bureau and therefore has greater responsibilities within the garden, confirmed that:

*"We are here for this (members of the bureau) to make the link between the adherents and all the other organisms with whom we are in a partnership with. We are boundary spanners. […] It is necessary. Because many adherents come to bring their compost, but are not at all interested about the administrative tasks. We do the dirty job. We answer e-mails, we write the reports for the municipality etc." (Code 4:18 and 4:19)*

The boundary-spanning activities are important for three reasons.

First, the garden must be present in the greenspace network arena and within the associative network. It is through this network that the self-organized group can find materials and support. It is also via the various partnerships that the urban gardens gain increased visibility, increasing their number of adherents and participants. According to one of the critical administrative members of the Poireau Agile, having an increased number of adherents is essential for the garden if it wants to have a political voice, and this way, change the way the institutions regard urban gardens and urban ecology. Respondent no1 elaborates on the benefits of partnerships within the associative network governance arena:

*"We had a water tank financed by I don't remember who, then the neighborhood council financed a crusher. The photo exposition was financed by the municipality of the tenth district. […] The apiculture outfits for the children was financed by IBM, because there was one adherent who worked there." (Code 1:45)*

Second, through these boundary-spanning activities, the garden engages with other associations and actors that do not necessarily act in the same dimension of the urban system. Through the boundary-spanning activities, the self-organization enters into contact with actors with functions other than

providing communal green space. As respondent no 5, a former elected official highly implicated in the diffusion of Parisian community gardens, says:

*"Sometimes we had to do the mediation between the districts. Sometimes, there was less affinity between the gardens or between the municipality and the gardens. We worked a lot on creating first contact between the gardens and people who worked with social insertion and professional insertion as well, including an association called AURORE, in order to make the garden have other functions. By the way, we had on person who was dedicated to that: respondent no10". (Code 5:27)*

Respondent no10 added:

*"Yes I acted as intermediary. But, mainly because I was myself an activist for Parisian greenspaces". (Code 10:23)*

Third, the boundary-spanning activities were also essential to resolve conflict. At first, there was an enormous resistance from the city administration in delegating public spaces to a group of residents to cultivate because of fears of privatization of the public space. These conflicts were resolved through boundary-spanning activities. Since then, boundary-spanning activities during the creation and maintenances of gardens are perceived by the two gardens, and the public officials interviewed as essential. For example, respondent no9 worked in the municipality during the creation of the Louis Blanc garden and testified that:

*"I almost only did that (boundary spanning). It is a lot of relational work. You have to make sure there aren't any blockage. […] Because, like everything, there are problems with the neighbors, with the elderly who are afraid or do not want to be disturbed, and you have to deal with these conflicts."*

Conclusively, although all determinants of self-organization highlighted by Nederhand and her colleagues were mentioned at specific points by the garden adherents and the public officials interviewed, the presence of a boundary-spanner was essentially the most commonly mentioned factor of success. Our findings suggest that the importance of the boundary-spanner activities is three-fold: (i) it enables the gardens to obtain materials and support via their network; (ii) it enables the garden to expand its functions by connecting with other actors; and (iii) it ensures a smooth creation and evolution of the community garden by mitigating possible conflicts and blockages.

Additionally, we noted that the importance of the boundary spanner varied from one garden to another. In the Poireau Agile, the boundary spanner was necessary, especially in its emergence in 2005 because of the garden's frugal position within the unwelcoming network. The respondents from the gardens stressed the necessary activity of strengthening the network and blurring the boundaries between associations and other actors. This is because the garden emerged in a less supportive environment. In the Jardin Louis Blanc, the boundary spanner role was facilitated by the many supportive actions of the municipality. In the Jardin Louis Blanc, the municipality informed the board members of their boundary

spanning role, put the board members in contact with associations, and it acted itself as a boundary spanner in the early stages of the project when the garden was not yet consolidated within the network. This difference is mainly related to the level of accessibility of the greenspace network arena and the role of government. The network has adapted to the increasing presence of urban gardens, and the government has adopted more adequate roles, facilitating boundary-spanning activities.

### 4.2.2. New factors influencing self-organized community gardens? Exploring new fronts.

The factors influencing self-organization mentioned by Nederhand et al. (2016) are not tailored to urban gardens. Our findings suggest that when it comes to the ecological functions community gardens may have, many factors beyond the five determinants mentioned by Nederhand and her colleagues come to play. As shown in figure 7, during the interviews carried in our study, respondents stressed the influence of five factors on the capacity of the self-organized garden to engage in ecological practices and provide ES. These are namely: (i) the presence of a facilitative and supportive association; (ii) the attitudes of

public officials; (iii) the presence of an expert within the self-organization; (iv) the electoral cycle.

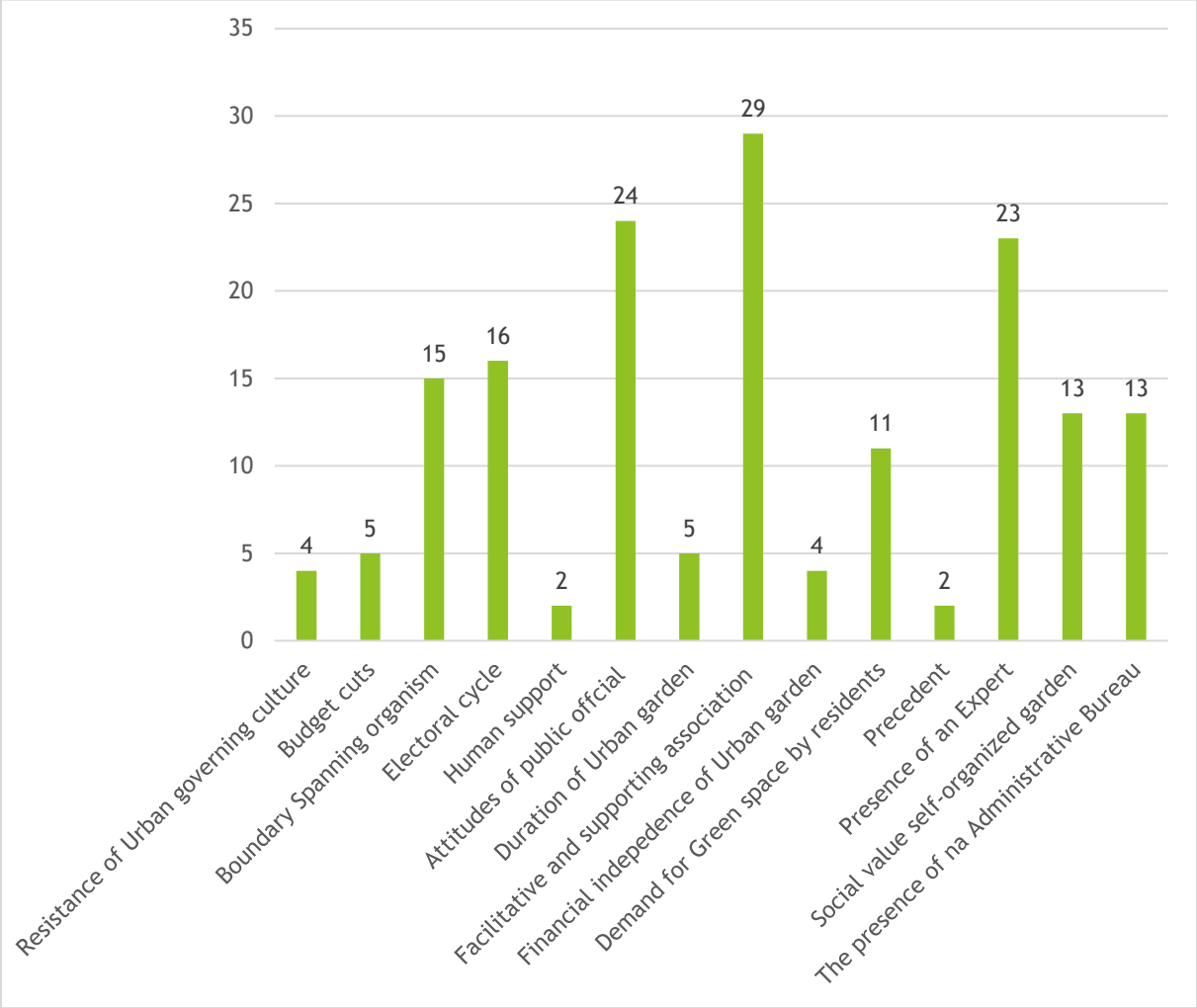



*Figure 8: New determinants of self-organization management of urban garden identified*

### 4.2.3. The presence of a facilitative and supportive association

A facilitative association was mentioned 29 times as a factor influencing the emergence and maintenance of the self-organization, and the ES there found. Both gardens, the Poireau Agile and the Jardin Louis Blanc, regardless of the very different context in which their emergence took place, had a facilitative association's helping hand.

In the case of Poireau Agile, the community garden was put in contact, by the municipality of the tenth district, with an association called Graine de Jardin. The objective was to have an actor to guide the process and facilitate the garden's creation. As one of the public officials interviewed highlights:

*"Some collectives had difficulty in setting up associations, so we had a small budget to commission an association to provide support. There was for example the Graine de Jardin for the garden Ville main." (Code 5:15)*

In the case of the Jardin Louis Blanc, the Jardin d'Alice association (in English 'Alice's garden') took the role of supporting the emergence of self-organization. The public official who was responsible for the initial project of creation of the community garden stressed that the association that took the responsibility of accompanying the emergence of the garden implemented its vision in the self-organized assembly and took into its hands the responsibility of listening and managing all the actors that wanted to take part in the project. She stated that:

*"We had this accompaniment from Alice's garden. So, it's a great structure. The whole collective is extraordinary. They have a vision. [...] They have this... they live in this world of tomorrow, and they really embody it and so they have managed this kind of accompaniment of emergence of the desires of each one, they have done a work of listening and welcoming and of collective, and of learning to work together, of learning to listen to each other, of learning to cooperate." (Code 9:29)*

Thus, the facilitative association has two roles in the emergence of the community garden. On the one hand, it takes responsibility from the local government, giving it space and time to work on other gardens and projects. This delegation to the association is useful for the public actor as it only has a limited amount of funds and time to invest in creating a community garden. On the other hand, the already existing association, such as Graine de Jardin and the Jardin d'Alice, can teach the emerging organization how to build its vision, identity, processes, and practices that will shape its role within the urban system.

### 4.2.4. The attitude of public officials

The second new factor affecting the emergence and maintenance of self-organization in the shadow of hierarchy identified in this study is the attitude of public officials. This factor was mentioned 24 times as an important determinant of the garden's successful maintenance and emergence. Throughout our inquiry, we found that public officials' positive or negative attitudes did not only directly affect the possibilities for gardens to emerge, but it also affected the institutional setting in which these gardens might or not emerge.

For instance, the "Charte Main Verte," which will be discussed in greater detail in the Meta-governance section of this paper, is a crucial element for the existence of the Parisian community gardens. The same is true for other institutional settings, such as supportive educational locations for community garden adherents, etc. Implementing these elements was only possible thanks to the remarkable tenacity of a devoted public official, who was determined to create an environment that welcomes democratic initiatives such as community gardens. Her vital role and perseverance were

mentioned in seven interviews carried out in this study, including interviews with adherents of the gardens. When interviewed, she said:

*"I got into a bit of a militant mode within my elected office. [...] I organized a day trip to Lille for them to see (there were urban gardens in Lille) [...] and when we came back, the elected official said "okay let's go" (talking about creating an adequate institutional setting for community gardens)" (Code 10:19)*

The attitude of public officials does not only influence the institutional setting in which the gardens emerge. It can also influence the creation and emergence of a garden. Respondent no6, who was present in the entire process of emergence of the Poireau Agile garden, and also acted as a boundary spanner between the municipality and the association, said:

*"The answer depends a lot on the presence (or absence) of an elected official who is motivated to get involved and take the lead. This is why there have been waves of shared gardens created in Paris, by period and by arrondissement. The example of Maria Lafuente (not real name) elected representative of the 20th district, is very remarkable" (Code 6:18)*

Respondent no 9 added:

*"It's also important to know that the personal side plays a huge role in the realization of projects […] if two civil servants get along well, the project will go through more easily than if the elected person doesn't like your face." (Code 9:7)*

The attitude of public officials also influences more immediate needs of urban gardens, such as financing and provision of materials. On many occasions, the self-organized assembly decides to obtain support via the municipality rather than the associative network at hand. This choice is valid for more basic needs, such as compost trays, soil, etc. In this case, public officials may take a networker role, and in this way, help the garden to find its needs with another actor that may be able to offer its support. In these situations, the responsiveness of public officials is a crucial factor. These results echo the meta-governance findings, highlighting the importance of meta-governance choices made by public officials. How public officials respond to the urban gardens' needs and position within the interactive arena significantly affects its capacity to strive in the urban system as a competent partner.

### 4.2.5. The presence of an Expert

This factor relates to the capacity of community gardens to engage in ecological practices and their capacity to maintain itself in the network governance arena. An expert can have experience and competencies in the various fields in which the self-organization engages itself. Regarding community

gardens in Paris, which have a solid ecological identity, an expert on agronomy, biology, permaculture, ecology, etc., is of great importance. Additionally, having a person with administrative and judicial competencies is also an important aspect that facilitates the emergence and maintenance of the self-organized space. AS respondent no 1 stated:

*"You need competences on all domains actually" (Code 1:18)*

Most respondents that were adherents of the community gardens stated that the presence of an expert was not per se essential but incredibly helpful for the garden to orient itself. This expertise is valid for the ecological practices the adherents are engaged with and the administrative and legal tasks. Respondent no8 stated:

*"It may not be essential, but it surely brings some legitimacy. If you don't know anything about it... it doesn't help people to find their way." (Code 8:5)*

Respondent n06, who had previous experience and competencies in agronomy, biology, and participative democracy, commented on his role in the garden:

*"[The ecological practice] either it works by obligation, without real adhesion for many gardeners, or the collective adheres by the enthusiasm transmitted by the pilot [the expert]. So, it is not necessary but it helps a lot." (Code 6:15)*

Thus, having an 'adherent expert' within the garden does not come as a condition for the garden to engage in ecological practices, nor having an administrative geek is a pre-requisite for the garden to survive within the urban system, but the presence of such an actor can be decisive. It can facilitate the learning of other participants, bring legitimacy to the project and its cause, and help the self-organized group orient itself.

Conclusively, we identified three new determinants affecting how the self-organized community gardens evolve and maintain themselves in the shadow of hierarchy. Firstly, the presence of a facilitative and supportive association is a factor that strongly influences how the self-organization emerges and how it gets acquainted with its position within the urban system. This finding has considerable implications for theory. Understanding that the evolution of the self-organization in the shadow of the hierarchy does not happen in a void under the hierarchical shadow, but rather in a system of actors, which can sometimes be crucially supportive, is a contextual assumption that has not been recognized in the academic field of self-organization yet. Secondly, the influence of the public official's attitudes is not surprising as it indicates how the shadow of hierarchy manifests itself. The fact that public officials have a strong influence in the evolution of self-organization strengthens the assumption that self-organization does indeed evolve in the shadow of hierarchy. Finally, the influence of having an expert within the self-organization reveals the limitations of the self-organization. Although the group of auto-governing gardeners has a solid potential to self-teach themselves and learn with each other, having a

competent individual on certain domains can be desirable. It facilitates the process of learning by bringing legitimacy and by guiding the direction of the learning process.

### 4.2.6. The Electoral cycle

The electoral cycle has been mentioned 16 times as a factor influencing self-organized community gardens. It is because the demand for green spaces in Paris is salient. The city is heavily compact, dense and there is a never-ending dilemma between increasing the amount of available housing or increasing the number of urban green spaces. Since the early 2000s in the tenth district, inhabitants showed their desire for an increased quantity of greenery in the city. Thus, elected officials have understood that community gardens are a solid strategy to acquire votes and heighten their approval ratings. Respondent no9, who worked as a public official of the tenth Parisian district, highlighted:

*"The elected officials make things happen. They push projects. Since they want votes, they respond to the persistent demands of citizens. This is where the citizens association has a great impact and importance." (Code 9:1)*

This representativeness of interests would suggest a good performance of the local democracy, as the actions taken by public officials are under the demands and needs of the residents. In this case, representation could be considered to be relatively effective. However, some respondents who acknowledged the importance of having the support of elected officials and who acknowledge the value of having a local government that allows the self-organization to govern itself freely nuanced the matter. Respondent no7 stated:

*"The city council is more interested in creating new gardens for electoral purposes; this is more profitable than consolidating what exists. The City Council lets us work, it's not bad, it's even a lot, but they don't do much." (Code 6:17)*

Therefore, although the electoral cycle pushes the municipality to be responsive to the resident's needs, and therefore the community garden needs as well, electoral strategies aiming to acquire votes can be more worried about the marketing stemming from the creation of a garden than with the adequate and proper maintenance and support needed for the perpetuation of the existent gardens.

### 4.2.7. Summary of determinants of self-organization.

In conclusion, our findings suggest that the most critical factor influencing the maintenance and success of self-organized gardens is the presence of a boundary spanner and boundary-spanning activities. We found that the relevance of the boundary-spanner activities is three-fold: (i) it enables the gardens to obtain materials and support via their network; (ii) it enables the garden to expand its functions by

connecting with other actors; and (iii) it ensures a smooth creation and evolution of the community garden by mitigating possible conflicts and blockages. Moreover, although extremely valuable, the factors mentioned by Nederhand and her colleagues do not necessarily grasp the complex set of determinants that influence self-organized urban gardens in Paris. Indeed, other factors appear to influence self-organization largely. These are (i) the presence of a facilitative association, (ii) the attitude of public officials, (iii) the presence of an expert, and; (iv) the electoral cycle.

## 4.3. Meta-Governance strategies: Supportive actions within an arena with formulated playing rules

The last pillar of our conceptual framework explored during our study is the types of meta-governance strategies implemented by the Parisian municipality and the tenth district city council. We analyzed the interviews and the policies implemented by the Parisian municipality to understand why and how meta-governance strategies shape the direction and identity of the Parisian community gardens. More precisely, the Poireau Agile and the Jardin Louis Blanc. In this section, we will first present the extent to which each meta-governance strategy was implemented. After, we will discuss the result of the combination of these strategies. Finally, we will present two new strategies that we have identified, which constitute the meta-governance toolbox.

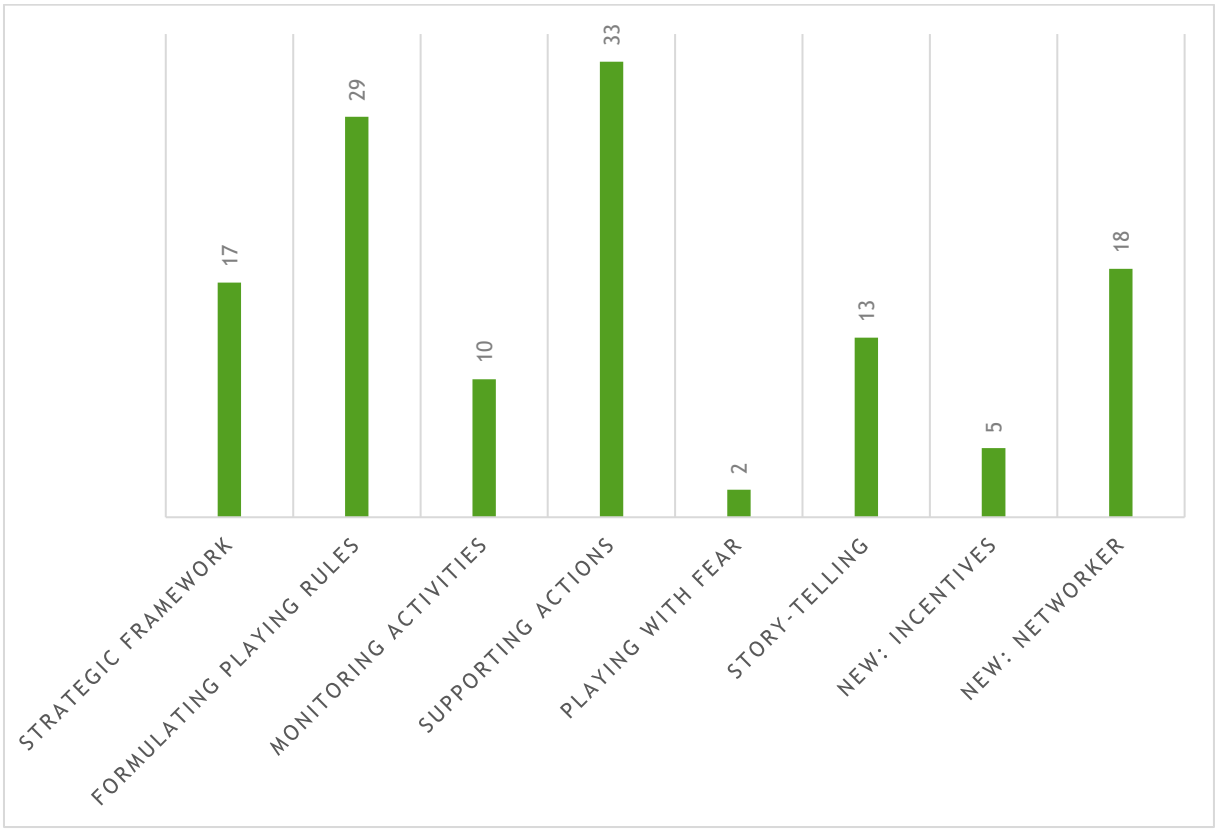



*Figure 9: Recurrence of meta-governance strategies mentioned by respondents (n13)*

### 4.3.1. Supportive actions

The "supportive actions" strategy was the most commonly mentioned among all the interviewees. We coded 33 sections of interviews as such. This is because the municipality of Paris and the local city council provide support on various fronts.

It offers contacts by putting the newborn collective garden in contact with more prominent associations that can accompany the process of emergence. It offers expert knowledge by, for instance, bringing a Compost-master (an expert on composting) to the garden in order for him or her to teach the basic rules of composting. What is more, it created, jointly with other associations, an "Outil-theque," a library of tools, for gardeners to come and lend gardening tools. The tenth district city council also organized large get-togethers thrice a year to strengthen the network of gardeners and share new possibilities, experiences, and learn from each other. However, the city council does not offer much financial help. The Louis Blanc garden was an exception that confirms the rule. It only received an initial budget because it emerged out of the participative budgeting process. Otherwise, most of the support is material. As respondent 2 said, "There are punctual aids according to the opportunities, the needs, the things that come up. The Choya was an idea that we had after repeated heatwaves. We thought, "Uh la, we must help them to save water" (Code 2:22). Besides this, the municipality affords the electricity and the terrain in which the garden is located.

The adherents of both gardens expressed their content with the current support. Respondent n4 answered the question "Do you feel supported by the city council?" by saying

*"Of course, definitely. We are very supported. And in addition to that we are free to do what we want. They gave us the permission, and said 'now you manage it". And we do it. And we are held accountable, which is normal" (Code 4:31).*

A respondent who worked with the city council stressed: "We are facilitators, giving them a place, visibility, advice, and access to expertise when its needed" (Code 5:14).

However, not all interviewees thought that the type of help was the right one. Respondent n9, who also worked within the greenspace provision branch for the tenth district city council, stressed that more should be done. There is a lack of human support aiming at facilitating the process of collaboration within the network. This was revealed to be true for the Poireau Agile garden, which has not been able to renovate its Compost trays by lack of volunteers or associations able to help them with it.

### 4.3.2. Formulations of rules-of-play

This strategy consists of more direct government intervention, such as allocating a position to a relevant actor, formulating "rules of the game," or, more broadly, designing an institutional setting where self-

organization emerges. Like the strategic framework forging the urban gardens, the Charte Main Verte equally acts as a statement of the rules of play. It imposes several requirements, commitments, and rules that the gardens must follow. For instance, all gardens must give a yearly summary in which they explain the events that were carried out during the year, etc.

The charter also states that gardens must be open to the neighborhood. This rule consists of opening at least twice a week during at least half of the day. Additionally, the document strongly suggests that gardens contact other local actors, such as schools, colleges, associations that work with social insertion, etc. Respondent n2, a public servant, said: "for me the two instruments we have are the Charter, and then a bit of committee organizing, with the green committee and the events to which the gardens have engaged to participate" (Code 2:11)

One of the respondents, who has a decisive role in the elaboration of the charter, recalled that the charter's objective was to implement a particular set of rules and good practices on how to jointly and adequately take care of "the commons"—echoing Elinor Ostrom's principles on how to use and preserve the commons sustainably. This set of guidelines contribute to the prevalence of ecological practices within urban gardens. Respondent n3, which is a member and co-director of the Jardin Louis Blanc, highlighted the role of the existing rules: "Oh yes, there are a lot of rules that we must not break. We're not going to have fun putting pesticides and chemicals in our plantations. Oh no, that's for sure." (Code 3:22).

### 4.3.3. Strategic Framework

The presence of a strategic framework entails elaborating administrative checks imposed on the self-organizing group and with which the community garden has to comply. These strategic frameworks act as a form of guidance.

In both community gardens, the district's city council and the city's municipality imposed a specific type of strategic framework. The most commonly cited and influential one is the "Charte Main Verte," equivalent to a Green Thumb Charter. The Charter includes a set of principles that must be inserted in the garden's identity, such as "a participative process"; "the creation of social links,"; "the respect of the environment." In addition to the principles, once the garden signs the Charter convention, the self-organization is committing itself to many engagements such as "to be open at least twice a week"; "to write a yearly briefing," "to be inclusive, and adequately managed"; etc. Furthermore, the Charter indicates that it is strictly forbidden to use Phyto-sanitary products and that garden must be engaged in maintaining the local biodiversity.

All the interviewees have expressed their satisfaction with the strategic framework imposed by the municipality. "It is an internal regulation. But it is good to take it seriously because there are very

important things," said respondent 8 (Code 8:9). Nonetheless, the strategic framework is accompanied by only an insufficient level of monitoring. It is rare that the municipality comes and checks if everything is being done as instructed. While some garden adherents think this is of utmost importance that recurrent monitoring is conducted to ensure adequate accessibility and respect of the urban garden norms. Others think respecting the self-organization's autonomy is vital, and it is what ensures the respect of the norms present in the Charter.

### 4.3.4. Framing and Story-telling

Today, the municipality of Paris explicitly stimulates citizens to engage in these forms of self-organization. The municipality has launched a program called "Vegetalisons Paris," in which citizens are stimulated to make the city greener by themselves. It consists of a participative greenery initiative, in which inhabitants can get a permit and thus the right to garden unused spaces and in which they can get support from the municipality to do so. This was not the case twenty years ago, but after a certain level of trust was attained between the public institutions and the self-organizations, the city is actively contributing to the community garden narrative. The narrative also has strong stances on ecological debates, clearly encouraging gardens to engage in sustainable and ecologically responsible practices. Respondent n2, which is a current public official in the tenth district, stated:

*"The City of Paris adopts a 0 tolerance to phyto-sanitary products in its gardens. In all spaces that belong to the city. So, the Agile Leak garden and the other community gardens, which exist partly thanks to the city, are strongly incited not to use these phyto-sanitary products." (Code 2:2)*

One of the co-directors of the Jardin Louis Blanc adds that "there is a coherence amongst all actors (including the municipality). And this coherence is the eco-responsibility" (Code 4:28).

Finally, one of the respondents (5) who had an essential role in the emancipation of community gardens within the city complemented:

*"[The narrative] came to be because there are programs to encourage residents to garden under the road trees. There was the creation of the gardening permit. And all this narrative has a very strong link with the community gardens" (Code 5:23)*

Interestingly enough, while the Jardin Louis Blanc garden emerged in a context in which this narrative was already prevalent, the Poireau Agile garden emerged as the political fight to establish this very narrative that is now existing. The emergence of community gardens around the city and the

trustworthy relationships between self-organization and city council were the actual catalyzer of this narrative that is cherished today by most members of Parisian community gardens.

### 4.3.5. Monitoring activities

Monitoring activities are pretty absent in the meta-governance toolbox of the tenth district city and council and the Parisian municipality. This is because the budget shortage of government branches responsible for carrying out such activities inhibits the possibility of doing so. Besides, creating performance indicators and assessing the level of performance of the garden would handicap the motivations of the self-organization. The only moment monitoring activities were mentioned by the respondents is when talking about the re-signing of the Charter and the gardens permits. Respondent n2 elaborates on this:

*"The only moment where there is an evaluation, is every three years, when we re-evaluate the Charter and the signature of the permits and the community gardens, which is every three years. It's a bit what engages us and them" (Code 2:13).*

Thus, monitoring activities are recurrent. Nonetheless, they have the role of establishing and formalizing the engagement of all participant actors.

### 4.3.6. Playing with Fear

None of the respondents talked about playing with fear strategies. Many of them, when asked, said that they never had such an experience with the municipality. Some civil servants added that this was not part of the idea. Many respondents have rebutted: "We are partners."

### 4.3.7. A new meta-governance strategy: The networker city council?

Throughout our inquiry on meta-governance strategies, a recurrent role of the municipality became more salient. The public actor often acted as a networker. In the work of Nederhand et al. (2016), the networker role was included in the meta-governance strategy concerned with providing supportive actions. Nonetheless, the recurrence and the importance of the networker strategy seems to be overly noticeable for it to be considered a supportive action, among others. Meta-governance being defined as a mode of governance concerned with "complexity and plurality," it appears remarkably coherent to add the networker strategy as a meta-governance strategy of its own (Jessop, 1998, p.42).

In the two case studies observed, the local city council engaged in the networker role with frequency. As respondent n2 stressed: "we also link them so that they can give each other tips, for cultivations, for taking care of the garden, for the choice of plants and all that. And also so that they can help each other in the summer for who is going to water what, or for needs in compost, or needs in soil. That way, everyone can help each other" (Code 2:7). This role of the municipality was important for both gardens to constitute themselves and solidify themselves as self-organized actors in the green space provision arena.

Such a role reverberates the importance of boundary-spanning activities. However, it must not be blurred with boundary-spanning. This networker role goes beyond simply blurring boundaries between organizations. It consists of taking a bird's eye view and using its slightly hierarchical position to connect actors to co-operate towards the same purpose. Thus, we believe it is of great interest to include such a meta-governance strategy in the meta-governor toolbox when studying the role of the public actor within the green space network governance arena.

### 4.3.8. Summary: Meta-governance strategies

The municipality of Paris and the city council of the Parisian TD have de facto engaged in many meta-governance strategies. Although the use of monitoring activities and the fear were not recurrent or completely absent, the public actors manipulated the other strategies extensively to steer the self-organization towards the desired direction.

Firstly, the local government imposed a strategic framework on the community gardens. By creating the Charte Main Verte, it created a sort of interior rules of procedure on how to manage a self-organized garden adequately. Most of the 'rules of procedure' are concerned with inclusivity, openness, and the ecological responsibility of the space (e.g., biodiversity conservation, ecologically friendly products, etc.).

Secondly, the city council has used the story-telling strategy with the Parisian urban system. With a continuously increasing set of permits and rights for participative urban greenery, the local government has created, together with civil society and other associative actors, a favorable narrative for the creation of urban gardens. Furthermore, stimulating ecological practices and certain ecosystem services.

Thirdly, our findings have shown that the municipality of the TD and Paris has supported the urban gardens and the ecological practices attached to them by providing materials, facilitating access to expert knowledge, and by increasing the capacity of the garden to act as an ecological actor within the urban space by giving them increased visibility and legitimacy.

Fourthly, the local public actor has formulated playing rules, according to which the community gardens must act. The self-organized gardens are accountable to these procedures and rules, although they are expressively not bothered. The rules push the community gardens to be open, inclusive, and respectful of the environment.

However, it is essential to highlight a factor that this research has not covered. This study has not explored the extent to which the participants and users of the urban gardens are already sensitized about the ecology and the respect for the environment. Assuming that the urban environment is complex and that the interactions that take place within the urban system affect all actors, it is not easy to estimate the extent to which it is the meta-governance strategies that brought the self-organized actors to engage in ecological practices, or if it is the other way around. Respondent no2 stated: "what we have realized is that the people that take care of the community gardens are already very, very, very aware of the good [ecological] practices." Thus, this, together with the testimony of other respondents regarding the emergence of community gardens in the early 2000s, suggests that community gardens have influenced and forged an institutional framework that is more adapted to their existence in the long run. Today, in turn, the institutional framework facilitates its creation. Trust and longevity seem to be important factors contributing to this transition.

Finally, the meta-governance strategies implemented by the city council and the city's municipality favor several ecosystem services.

# 5. Discussion

The results of this paper suggest that the city of Paris has seen a transition in the past 20 years in the way urban green spaces are provisioned. As a result, urban community gardens have multiplied, and the urban system in which they emerge has become more welcoming to their existence. In this section, we want to shed light on the meaning of our most important findings.

## 5.1. Unveiling an interactive governance arena

This research suggests that there is an emerging governance network arena that deserves further attention from both research and policy. Following Sorensen and Torfing's (2016) definition, the governance network in which the case studies find itself consist indeed of (i) "relatively stable and horizontal articulation of interdependent but operationally autonomous actors; (ii) who interact through negotiations; (iii) which takes place within regulative, normative, cognitive and imaginary frameworks; (iv) that is self-regulating within limits set by external agencies; and (v) which contributes to the production of public purpose" (p.9).

Revealing the existence of this arena had and has tremendous implications for policy and the role of government. Indeed, this has required the city council to change and adapt its role, confirming the findings of Buijs et al. (2017) regarding the necessity of more holistic and mosaic governance when dealing with governance networks. Instead of sticking to a hierarchic role, we saw that the municipal government of the tenth district has started to engage in more facilitative roles. This switch is evidenced by the adoption of the following meta-governance strategies: (i) the use of supportive actions, (ii) the creation of a strategic framework, (iii) the use of framing and story-telling, (iv) and the engagement on a networking role.

These strategies help the city council to steer the network in the desired direction: the creation of socially dynamic, pedagogical, and ecological community gardens, independent from government financing and direct supervision, and which are regarded as partners in the urban system. Now that this governance network has been identified, future research must investigate the democratic anchorages of this network (Torfing et al., 2012). This research would entail a greater focus on understanding the monitoring of the interactive arena, the participation criteria (e.g., entry requirements), the accountability mechanisms, and the democratic processes there found.

## 5.2. Urban gardens and self-organization

Interestingly, our findings confirm that certain factors influencing adequate green space provision are replicable for urban gardens. Boulton et al.'s (2018) findings' regarding the necessity of professional expertise, political leadership, and governance tools for valuable green space provision were empirically verified in the case of urban gardens. The conditions for self-organization, present in the model of Nederhand et al., 2016 which was used in this paper, are not sufficient to understand self-organized and community-led urban gardens. The green space dimension of the self-organization implies other conditions: (i) the attitude of public officials; (ii) the electoral cycle; (iii) the presence of an expert within the association able to guide, to a minimal extent, the practices and the self-organization and; (iv) the presence of a facilitative association. Thus, the study's analytical tool to be applied to urban gardens, these new determinants for self-organization must be included in the analysis.

Additionally, we have identified a causal relationship between the factors. Although the triggering event was not mentioned extensively in the interviews, it was pretty often related to the existing trusting relationships, suggesting that the triggering event was at the root of the prevailing trust between adherents. In turn, the trusting relationships enabled the good work of the boundary-spanner and the knowledge transfer of the expert. Thus, further research should aim to understand the causal mechanisms between the determinants of urban gardens.

### 5.3. The effects of urban garden management and meta-governance on ES

The effects of the self-organized management of urban gardens jointly with the meta-governance strategies that frame it on the ES are three-fold. First, we found that urban gardens mitigate the urban heat island effect, manage stormwater, and create habitats for fauna and flora. Such services are partly the consequence of the meta-governance strategies adopted by the city council (e.g., strategic framework which forbids the use of phytosanitary products) and the self-organization management (e.g., presence of experts involved and dedicated to sustainable gardening practices). Second, we found that the Poireau Agile garden, which emerged from grassroots movements, is more welcoming to living non-human actors, such as fauna and flora, than the Jardin Louis Blanc, which is mainly characterized by lawn areas, which favor cultural and social activities. This might be the case because the municipality is more interested in humans' votes than in the non-existing political voice of non-humans actors of the urban system.

Further large-scale quantitative research aiming to understand the relationship between the municipality's involvement in creating urban gardens and the accessibility of these gardens for fauna and flora should be carried. Third, we have found that ES included in the tool used in this study, conceptualized by Belmiziti et al. (2019), lacks a vital dimension of ecosystem services. From an urban ecology and sustainability science approach, it is essential to look at relational thinking. This implies coupling human systems with ecological systems and understanding the inextricable connectedness (West et al., 2020). Accordingly, any change in human systems inevitably brings about changes in the ecosystem and the system more generally. That is why we believe it is of great importance to include what we call "Social-ecological services" within ecosystem services. *Social-Ecological services* are services that increase the awareness of humans regarding the fundamental value of ecosystems, in turn producing a learning process that triggers a greater sense of responsibility, a greater sense of co-existence, and of the intrinsic relation between the human and non-human, thus, changing the way humans relate to the ecosystem. These services must be included in the green components and ecosystem service inventory and must be further comprehended to better understand the effects of urban gardens and green spaces more generally on the urban ecology. In addition, including such a term would allow the coupling of the urban planning discipline with urban ecology and sustainability science, promoting a more systemic analysis of the urban system and forging a more symbiotic relationship between disciplines.

## 6. Conclusion

This research examined the effects of self-organized greenspaces and meta-governance strategies on the ecosystem services urban gardens provide.

In order to do so, we conducted 13 in-depth interviews with prominent urban garden adherents and policymakers, conducted field observations of green space components, and analyzed policy documents. After examining the results, we have found that both urban gardens studied offer a variety of ecosystem services. These services are the result of the emergence of self-organized urban gardens in interaction with governmental meta-governance. In both case studies analyzed, the new relationship between self-organization and meta-governance, contributes to the existence of urban gardens, which provide essential ecosystem and social services.

Firstly, the ecological and ES provided by both case studies are priceless. On the one hand, we have found that the Poireau Agile, a garden created in the heart of a public park, is characterized by the shrubby and rustic natural landscape, highly contrasting with the rest of the public park. The shrubby and dense natural area provides habitat for fauna and flora, thus supporting non-human life in the urban system. Other components that can be found in the garden contribute to the capacity of the garden to mitigate the urban heat island effect and limit pollution. The fact that the community garden is located within a public park supported the confrontation of traditional public gardening with alternative, more environmentally friendly manners to garden the public space. The fact that the public park is open every day, all day long, also contributes to the educational function of the space.

On the other hand, the Jardin Louis Blanc is characterized by its secluded area, ample lawn space, and a green pond. This structure contributes to social functions; it is easier for people to have events and social interactions. Nonetheless, the space is closed five days a week which limits its educational capacity. The space's ES provided consists greatly of managing stormwater and mitigating pollution. The difference between these two gardens, which have emerged in antagonistic contexts, brings questions to the surface. While the Agile leak, which was created in a moment where the urban system was not yet welcoming community gardens, supports habitat for non-humans, the Louis Blanc garden, which was financed by a participative budgeting initiative led by the city council, instead supports human-related activities such as agricultural gardening, and cultural events. This fact makes us question: "are government-initiated urban gardens more concerned with human activities, than with the co-existent of humans and non-humans in green spaces:"

Secondly, regarding self-organization, our findings point to the importance of boundary-spanning activities and the presence of a boundary spanner. This is because the self-managed community gardens are characterized by scarce financial resources and an extensive network of partners and adherents. Thus, boundary-spanning activities appear as an effective and alternative way to procure materials, knowledge, partners, and projects. Furthermore, these boundary-spanning activities greatly support the maintenance of ecological practices and ecosystem services. It is by spanning the boundary between actors (e.g., municipality, facilitative associations, etc.) that the garden is capable of providing social ecosystem services; such as educational activities and events, a compost location for residents,

and ecosystem services, by acquiring adequate soil, and material to maintain de garden's components. Besides constating the importance of boundary-spanning, our research has also revealed several other factors influencing the emergence and maintenance of community gardens and their ecosystem services. These are

- the attitude of public officials within the city council and the neighborhood's council;
- the electoral cycle;
- the presence of an expert within the association able to guide, to a minimal extent, the practices and the self-organization; and
- A facilitative association.

Thirdly, regarding the meta-governance strategies present in the network governance arena of green space provision, our results have indicated that the local governments of Paris, both the central municipality and the Tenth district city council, engage in mainly three meta-governance strategies stipulated by Nederhand and her colleagues. These are namely:

- the presence of story-telling strategies,
- the elaboration of a strategic framework to monitor and guide the self-organization and,
- the existence of supportive actions.

This does not mean that the local authorities do not engage in the other meta-governance strategies. Instead, we suggest that the ones that mostly steer the self-organization are the ones previously mentioned. These strategies facilitate the existence of self-organization and the provision of ES and social ecosystem services. The strategic framework imposed by the municipality stresses the garden's duty to engage in ecological practices, of being inclusive and engaging with the other actors of the urban system. In addition to the existing meta-governance strategies, we have found that the tenth district and the Parisian municipality also engage in a networker role that facilitates the emergence and maintenance of the self-organizing actor within the urban system arena. Nonetheless, the meta-governance strategies are still lagging when responding to the gardens' needs in terms of expertise and human support. More has to be done to address simple needs, such as renovating the compost tray, etc. More efforts are needed to engage in more networker roles to ensure that the self-organizing actor can procure its needed human support by itself.

Although this research provides valuable insight into the urban garden arena in Paris, and contributes to a better understanding of the effects of meta-governance strategies and self-organization on the provision of ES, certain limitations must be acknowledged. The fact that this research focuses on two case studies hampers the generalizability of the findings. In addition, the observation of green space components was done solely by one researcher without a second observant to limit biases. Nonetheless, the study contributes to interesting theoretical discussions by bringing empirical case-specific evidence

which stimulates the theoretical debate on the role of self-organization and meta-governance in the networked provision of welfarist functions.

# 7. Recommendations

Our research has revealed several under-studied areas of green space provision research.

This research aimed to understand better the effects of governance arena interactions on the services urban gardens provide. We showed the diverse set of vital services, and now we think it is essential that research on how to better value the services and integrate them to the urban governance realm.

Future studies should include comparative research exploring the differences of the ecosystem, and social ES provided both in community gardens and traditional public parks to understand the implications of the presence of community gardens in the urban system. Longitudinal comparative studies could also reveal how the interaction between top-down forms of green space provision and grassroots ones affects gardening and green space provision practices.

Additionally, more research should be done addressing the level of inclusivity of community gardens and aiming to understand how they increase the accessibility of urban dwellers to green spaces in the city. For example, urban gardens are usually closed five days a week, which can be problematic.

Further, quantitative research aiming to understand the effects of adhering and participating in a community garden on environmental awareness should be carried to understand better the implications of community gardens for ecological sensitivity and environmental awareness within the urban system. Moreover, research should aim to understand the urban garden's longevity determinants in order to enlighten the different needs urban gardens have in a different context. Finally, in a more practical scope, research focusing on the different types of boundary-spanning activities, their obstacles, and their effectiveness and consequences in the urban system should be carried out to reveal what boundary-spanning activities are most effective within the governance network.

In the realm of policy-making, we believe local governments should engage to a greater extent in networking possible partners within the green space arena. Urban gardens need more human support to solve particular problems. The city council should create the bridge between urban gardens and facilitative associations or other actors willing to provide the human support needed. This role could be beneficial as well in case the urban garden necessitates some expertise for any activity. Such government involvement should be done with harmony without stepping in the autonomy of the urban garden.

In addition, the city council should engage in a relation-shift, fostering a policy-making culture that perceives the urban green as another urban living actor providing an array of vital services.

Increasingly understanding the services these spaces provide and the needs of these spaces can allow to best combine ecosystem, social and urban services within urban gardens. Furthermore, it can help the good long-term maintenance of these new urban phenomena.

## Reference List:

Aalbers, C. B., and Sehested, K. (2018). Critical upscaling. How citizens' initiatives can contribute to a transition in governance and quality of urban greenspace. Urban Forestry and Urban Greening, 29, 261-275.

Ansell, C., and Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, *18*(4), 543-571. https://doi.org/10.1093/jopart/mum032

Baró, F., Haase, D., Gómez-Baggethun, E., and Frantzeskaki, N. (2015). Mismatches between ecosystem services supply and demand in urban areas : A quantitative assessment in five European cities. *Ecological Indicators*, *55*, 146-158. https://doi.org/10.1016/j.ecolind.2015.03.013

Baycan-Levent, T., and Nijkamp, P. (2009). Planning and Management of Urban Green Spaces in Europe : Comparative Analysis. Journal of Urban Planning and Development, 135(1), 1-12. https://doi.org/10.1061/(ASCE)0733-9488(2009)135:1(1)

Bolund, P., and Hunhammar, S. (1999). Ecosystem services in urban areas. *Ecological Economics*, *29*(2), 293301. https://doi.org/10.1016/S0921-8009(99)00013-0

Boulton, C., Dedekorkut-Howes, A., and Byrne, J. (2018). Factors shaping urban greenspace provision : A systematic review of the literature. *Landscape and Urban Planning*, *178*, 82101. https://doi.org/10.1016/j.landurbplan.2018.05.029

Buijs, A. E., Mattijssen, T. J., Van der Jagt, A. P., Ambrose-Oji, B., Andersson, E., Elands, B. H., and Steen Møller, M. (2016). Active citizenship for urban green infrastructure : Fostering the diversity and dynamics of citizen contributions through mosaic governance. Current Opinion in Environmental Sustainability, 22, 1-6. https://doi.org/10.1016/j.cosust.2017.01.002

Boonstra, B., and Boelens, L. (2011). Self-organization in urban development : Towards a new perspective on spatial planning. *Urban Research and Practice*, *4*, 99-122. https://doi.org/10.1080/17535069.2011.579767

Camagni, R., and Gibelli, M. C. (1996). Cities in Europe: globalisation, sustainability and cohesion. *Presidenza del Consiglio dei Ministri, Dipartimento Politiche Comunitarie, European Spatial Planning, Rome, Poligrafico dello Stato*.

Camagni, R. (2017). Sustainable Urban Development : Definition and Reasons for a Research Programme. In R. Capello (Éd.), *Seminal Studies in Regional and Urban Economics : Contributions from an Impressive Mind* (p. 261282). Springer International Publishing. https://doi.org/10.1007/978-3-319-57807-1_13

Dahl, Robert A. 1956. Preface to democratic theory. Chicago: University of Chicago Press.

Escobedo, F. J., Kroeger, T., and Wagner, J. E. (2011). Urban forests and pollution mitigation : Analyzing ecosystem services and disservices. Environmental Pollution, 159(8), 2078-2087. https://doi.org/10.1016/j.envpol.2011.01.010

Edelenbos, J., van Meerkerk, I., and Schenk, T. (2018). The Evolution of Community Self-Organization in Interaction With Government Institutions : Cross-Case Insights From Three Countries. The American Review of Public Administration, 48(1), 52-66. https://doi.org/10.1177/0275074016651142

Fors, H., Molin, J. F., Murphy, M. A., and Konijnendijk van den Bosch, C. (2015). User participation in urban green spaces – For the people or the parks? Urban Forestry and Urban Greening, 14(3), 722-734. https://doi.org/10.1016/j.ufug.2015.05.007

Gjaltema, J., Biesbroek, R., & Termeer, K. (2019). From government to governance…to meta-governance : A systematic literature review. *Public Management Review*. http://www.tandfonline.com/doi/abs/10.1080/14719037.2019.1648697

Govindarajulu, D. (2014). Urban green space planning for climate adaptation in Indian cities. *Urban Climate*, *10*, 3541. https://doi.org/10.1016/j.uclim.2014.09.006

Harnik, P. (2012). Urban Green : Innovative Parks for Resurgent Cities. Island Press.

Jagt, A. P. N. van der, Elands, B. H. M., Ambrose-Oji, B., Gerőházi, É., Møller, M. S., and Buizer, M. (2017). Participatory Governance of Urban Green Spaces : Trends and Practices in the EU. NA, 28(3), Article 3. http://arkitekturforskning.net/na/article/view/853

Jessop, B. (1998). The rise of governance and the risk of failure: The case of economic development. Oxford, UK: Basil Blackwell.

Jolivet, C. (2005). Premiers résultats du RMQS: une auréole de plomb autour de Paris. 7.

Kleinhans, R. (2017). False promises of co-production in neighbourhood regeneration : The case of Dutch community enterprises. *Public Management Review*. http://www.tandfonline.com/doi/abs/10.1080/14719037.2017.1287941

Ianniello, M., Iacuzzi, S., Fedele, P., and Brusati, L. (2019). Obstacles and solutions on the ladder of citizen participation : A systematic review. Public Management Review, 21(1), 21-46. https://doi.org/10.1080/14719037.2018.1438499

Lanfranchi, G., Herrero, A. C., Palenzuela, S. R., Camilloni, I., and Bauer, S. (2018). *The new urban paradigm* (No. 2018-70). Economics Discussion Papers.

Lepczyk, C. A., Aronson, M. F., Evans, K. L., Goddard, M. A., Lerman, S. B., and MacIvor, J. S. (2017). Biodiversity in the city: fundamental questions for understanding the ecology of urban green spaces for biodiversity conservation. *BioScience*, *67*(9), 799-807.

Luederitz, C., Brink, E., Gralla, F., Hermelingmeier, V., Meyer, M., Niven, L., Panzer, L., Partelow, S., Rau, A.-L., Sasaki, R., Abson, D. J., Lang, D. J., Wamsler, C., and von Wehrden, H. (2015). A review of urban ecosystem services : Six key challenges for future research. Ecosystem Services, 14, 98-112. https://doi.org/10.1016/j.ecoser.2015.05.001

Milward, H., & Provan, K. (2021). *Managing networks effectively*.

Molenveld, A., Voorberg, W., Buuren, A. V., and Hagen, L. (2021). A qualitative comparative analysis of collaborative governance structures as applied in urban gardens. Public Management Review, 0(0), 1-22. https://doi.org/10.1080/14719037.2021.1879912

Nassauer, J. (1988). The Aesthetics of Horticulture : Neatness as a Form of Care. *HortScience*, *23*.

Reis, C., and Lopes, A. (2019). Evaluating the Cooling Potential of Urban Green Spaces to Tackle Urban Climate Change in Lisbon. *Sustainability*, *11*(9), 2480. https://doi.org/10.3390/su11092480

Rosol, M. (2010). Public Participation in Post-Fordist Urban Green Space Governance : The Case of Community Gardens in Berlin. *International Journal of Urban and Regional Research*, *34*(3), 548-563. https://doi.org/10.1111/j.1468-2427.2010.00968.x

Røiseland, A., and Vabo, S. I. (2016). Interactive–or counteractive–governance? Lessons learned about citizen participation and political leadership. In Critical reflections on interactive governance. Edward Elgar Publishing.

Rupprecht, C. D. D., and Byrne, J. A. (2014). Informal urban greenspace : A typology and trilingual systematic review of its role for urban residents and trends in the literature. *Urban Forestry and Urban Greening*, *13*(4), 597611. https://doi.org/10.1016/j.ufug.2014.09.002

Rupprecht, C. D. D., Byrne, J. A., Garden, J. G., and Hero, J.-M. (2015). Informal urban green space : A trilingual systematic review of its role for biodiversity and trends in the literature. *Urban Forestry and Urban Greening*, *14*(4), 883908. https://doi.org/10.1016/j.ufug.2015.08.009

Scharpf, F. W. (1994). Games Real Actors Could Play : Positive and Negative Coordination in Embedded Negotiations. *Journal of Theoretical Politics*, *6*(1), 27-53. https://doi.org/10.1177/0951692894006001002

Sørensen, E. (2002). Democratic theory and network governance. *Administrative Theory & Praxis*, *24*(4), 693-720.

Sørensen, E. (2006). Metagovernance : The Changing Role of Politicians in Processes of Democratic Governance. *The American Review of Public Administration*, *36*(1), 98-114. https://doi.org/10.1177/0275074005282584

Sørensen, E., & Torfing, J. (Eds.). (2016). Theories of democratic network governance. Springer

Taylor, M. (2007). Community Participation in the Real World : Opportunities and Pitfalls in New Governance Spaces. *Urban Studies*, *44*(2), 297-317. https://doi.org/10.1080/00420980601074987

Torfing, J., Peters, B. G., Pierre, J., and Sørensen, E. (2012). Interactive governance: Advancing the paradigm. oxford university Press on demand.

Torfing, J., Peters, B. G., Pierre, J., & Sørensen, E. (2012). The governance debate and the rise of interactive governance. nteractive Governance: Advancing the Paradigm; Oxford University Press: Reino Unido, 9-32.

West, S., Haider, L. J., Stålhammar, S., & Woroniecki, S. (2020). A relational turn for sustainability science? Relational thinking, leverage points and transformations. Ecosystems and People, 16(1), 304-325. https://doi.org/10.1080/26395916.2020.1814417

WHO. (1997). World Health Organization. Obesity: Preventing and Managing the Global Epidemic: Report of the WHO Consultation of Obesity.

Wu, J. (2014). Urban ecology and sustainability : The state-of-the-science and future directions. Landscape and Urban Planning, 125, 209-221. https://doi.org/10.1016/j.landurbplan.2014.01.018

Yin, R. K. (2009). Case study research: Design and methods (Vol. 5). sage.

# Appendix

## Appendix A: Semi-structured interview Guide (in French)

### Guide de l'entretien pour la recherche sur l'auto-gestion d'espaces verts et les effets sur les pratiques éco-responsables

Bonjour à tous. Voici une présentation des questions qui seront posée lors de l'entretien que nous aurons. L'entretien est structuré en trois sections portant des questions sur trois thèmes différents.

- Premièrement, les questions portant sur l'apparition et la maintenance de l'auto-gestion sont posés.
- Deuxièmement, les questions portant sur l'Écologie dans les Jardins Partagés (motivations, expertise et capacités) sont investigué.
- Troisièmement, des questions reposant sur le rôle et la contribution de la mairie et de la préfecture sont posés.

#### *Apparition et Consolidation de l'auto-gestion*

Dans les téories de l'auto-gestion, nous parlons de six facteurs principales influençant la qualité et la soutenabilité de l'espace auto-géré. Ceux-ci sont :

- (i) la présence d'un évènement déclencheur ;
- (ii) la présence d'une relation de confiance entre participants et dans le réseau ;
- (iii) Objectif commun et partagé ;
- (iv) la présence d'un environnement approprié à la discussion et délibération ;
- (v) la présence d'un passeurs de frontière ;
- (vi) Adaptabilité et flexibilité.

#### *Présence d'un élément déclencheur*

Comment s'est initier le jardin partagé dans le lequel vous participez ?

- Il y a-t-il eu un élément déclencheur ? (construction d'un bâtiment, d'une route etc., programme de végétalisation municipale etc. ) ?

- Selon vous, si il a eu un élément déclencheur, qu'est ce qui a été déclenché : Un sens de communauté : Un sens de porbleme ou objectif commun : Un appel à l'emancipation :

- Pensez vous que l'évènement en particulier (par exemple la construction de bureau) a-t-il influencer la génération d'idée spécifique (ex : une gestion ecologique etc.) Ç

***Relations de confiance***

Est-ce que le groupe de volontaire qui a créer le jardin et le groupe qui maintien le jardin debout aujourd'hui se connaissait déjà :

- Comment avez-vous fais pour cultiver un esprit de groupe avec les autres volontaires afin de faciliter la collaboration entre tous les adherents :

- Diriez vous qu'il y a un sens d'appartenance dans le Jardin : Le sens de groupe ou d'appartenance a t- il frustré ou stimulé l'auto-gestion :

- Avez-vous de la confiance sur la Mairie du 10$^{e}$ ou celle de Paris : Par exemple, si vous demandez des fonds, vous vous attendez a une interaction plutôt fluide ou vous besoin seront prit en compte sans contrainte ou plutôt le contraire :

- Avant d'intégrer le Jardin, étiez-vous sceptique du rôle que la Mairie pouvait jouer en relation au jardin partagé :

***Abilité de se concentrer sur l'échange et l'interaction entre idée, information, connaissance et experience***

Êtes vous en contact avec d'autres associations : (la cloche, jardins d'Alice etc.) : Pourquoi :

- A travers quels canaux de communication les relations avec ces associations se maintiennent-elles : Est-ce-que ce sont de canuax de communications formels : Pourquoi :

- Avez-vous un but commun, clairement defini (le Jardins et les autres organization ) : Cela frustre ou stimula l'autogestion :

- Il y a-t-il de la confiance entre vous et les autres associations : Est-ce une relation plutôt basée sur la solidarité et l'entre aide ou plutôt basée sur des nécessités mutuelles : Pourquoi :

- Pensez vous que cela frustre ou facilite l'auto-gestion du Jardin : Pourquoi :

Avez-vous un canal de communication avec la Mairie : Il y a-t-il des comptes rendu a rendre : Ces comptes rendu stimule-t-il l'autogestion du Jardin ou les pratiques écologiques :

- Que signifie la Chartre de la main verte pour vous : Un guide : Un reglement : ou un document auquel vous etes indifferent :

- A quelle occasion avez-vous contacter les associations ou la mairie :

- Est-ce-que la plus part des relations entretenues avec la mairie sont d'ordre de financement de projets :

***Passeurs de frontières*** *: (Un passeur de frontières peut être une personne ou une organisations qui est en charge de briser les frontières existantes entre une organisations et une autre. Par exemple, un embassadeur est un passeur de frontière classique. Un passeur de frontière peut être formellement designé, ou informellement apparaitre comme tel).*

Il y a -t-il un passeur de frontière qui facilite l'interaction entre le jardin et les autres associations :

Il y a-t-il un passeur de frontière qui facilite l'interaction avec la municipalité :

Quelle est le rôle de la co-direction dans le Jardin : Facilite-t-elle la maintenance efficace du Jardin :

***Adaptivité des roles et des pratiques*** (En théorie, les initiatives d'auto-gestion se retrouve souvent à des situation où elles doivent s'adapter à une nouvelle réalité. Par exemple, s'il y a une réduction des fonds ou e l'espace physique accordée à l'autogestion etc.)

Dans le passé, le jardin a-t-il du adapter les roles des adherents et des co-directeur du à des facteurs externes :

- Comment est apparue l'idée de contribution financière des adhérents : Pensez-vous que cela a été fait pour une plus grande autonomie et adaptivité :

- En quoi cela peut-il contribuer au jardin partagé :

- Avez-vous du changer vos plans due a des pressions externes : Si oui comment cela s'es passe :

***Valeurs Ecologiques des espaces verts***

- Quelle est la principale motivation pour l'engagement que vous avez par rapport aux pratiques écologiques :

- Est-ce-que le réseau dans lequel le jardin se situe (association comme la cloche, le jardin d'Alice etc.) facilite les pratiques écologiques :

- Avez-vous rencontrer des adversités lors des implementation de pratiques écologiques :

- Comment procurez-vous le materiel et l'expertise pour les pratiques écologiques :

- Il y a-t-il un acteur ou un facteur qui facilite particulièrement cette tache :

***Meta-gouvernance*** (dans le contexte d'un société plus interdépendante et pluraliste, les formes de gouvernement hiérarchique et bureaucratique s'érode. Des manières plus collaborative de gouverner se mettent en place, et les gouvernement municipaux trouvent d'autres moyens plus subtiles pour assurer leurs intérêts ; c'est ce qu'on appelle la meta-gouvernance)

Avez-vous, autant que participant du Jardin Partagé, senti que le gouvernement local a déployé les stratégies suivantes :

- Des évaluations administratives de plusieurs sortes (compte rendu etc.), des reglementation stratégiques visant a guider l'auto-gestion :

    - La présence ou l'absence de ces pratiques a-t-elle stimuler ou pas le jardin partagé :

- Des évaluations et des notes basés sure des critères

    - La présence ou l'absence de ces pratiques a-t-elle stimuler ou pas le jardin partagé :

- La présentation d'un discours, une histoire ou une narrative qui donne du sense au jardin partagé (par ex : « La mairie du 10e s'engage a faciliter une vegetalisation démocratique du quarties etc. »)

    - La présence ou l'absence de ces pratiques a-t-elle stimuler ou pas le jardin partagé :

- La provision et le soutien au Jardin Partagé afin que celui-ci puisse se procurer les resources nécessaires (financement, contacts, information, expertise, espaces etc.)

    - La présence ou l'absence de ces pratiques a-t-elle stimuler ou pas le jardin partagé :

- La structuration des relations entre associations et entre acteurs gouvernementaux et le jardin partagé (par exemple : formaliser la communication, formaliser des « règles du jeu »)

    - La présence ou l'absence de ces pratiques a-t-elle stimuler ou pas le jardin partagé :

- L'utilisation de la peur. C'est-à-dire, des reglementation, ou interventions imposé hiérarchiquement par le gouvernement local, sans la concertation des organizations et individus participants à l'auto-gestion :

    - La présence ou l'absence de ces pratiques a-t-elle stimuler ou pas le jardin partagé :

## Appendix B : The interview guide destined to public officials (in French)

Premièrement, est-ce-que vous voyez la Mairie du 10è imposer, ou inciter certaines pratiques ou habitudes écologiques dans l'arrondissement?

Est-ce-que ces incitations/subventions sont imposer ou proposer a des associations auto-gere ?

Aujourd'hui, dans le cadre de votre fonctions, voyez-vous le gouvernement local déployé les stratégies suivantes pour renforcer ces pratiques:

- **Des évaluations administratives de plusieurs sortes** (compte rendu etc.), des **réglementation stratégiques visant a guider l'auto-gestion** :

    - La présence ou l'absence de ces pratiques stimule-t-elle, a votre avis, des pratiques écologiques dans les jardins partage ?

Yves Contassot, adjoint au maire chargé de l'Environnement

- Des **évaluations et des notes basés sur des critères** (Écologie, compostage etc.)

    - La présence ou l'absence de ces pratiques stimule-t-elle, a votre avis, des pratiques écologiques dans les jardins partage ?

- La **présentation d'un discours, une histoire ou une narrative** qui donne du sense au jardin partagé (par ex : « La mairie du 10$^{e}$ s'engage a faciliter une vegetalisation démocratique du quarties etc. »)

    - La présence ou l'absence de ces pratiques stimule-t-elle, a votre avis, des pratiques écologiques dans les jardins partage?

- La **provision et le soutien au Jardin Partagé** afin que celui-ci puisse se procurer les resources nécessaires (financement, contacts, information, expertise, espaces etc.)

    - La présence ou l'absence de ces pratiques stimule-t-elle, a votre avis, des pratiques écologiques dans les jardins partage ?

- La **structuration des relations entre associations et entre acteurs gouvernementaux** et le jardin partagé (par exemple : formaliser la communication, formaliser des « règles du jeu »)

    - La présence ou l'absence de ces pratiques stimule-t-elle, a votre avis, des pratiques écologiques dans les jardins partage ?

- **L'utilisation de la peur.** C'est-à-dire, des **reglementation, ou interventions imposé hiérarchiquement** par le gouvernement local, sans la concertation des organizations et individus participants à l'auto-gestion :

    - La présence ou l'absence de ces pratiques a-t-elle stimuler ou pas le jardin partagé :

Pensez-vous qu`il y a u environnement propice a la collaboration entre acteurs civique et gouvernemental pour ce genre de questions (jardin partage et pratiques ecologique) ?

D'apres vous, quel est le rôle de la mairie du 10$^{e}$ aujourd'hui rapport au jardins partage ecologique de l'arrondissement. Et quel devrait être le rôle au cas ou il y a quelque chose qui devrait changer ?

## Appendix C: Table inventory of greenspaces components and their ecological functions (Belmiziti et al., 2019)

| Greenspace components | | Trees | | Shrub | | | | Herbaceous | | | | Floral | | Mineral | | | | Aquatic | | Temporary water | | | Others | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Urban services | | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | AB |
| To manage stormwater from the space | 1 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | + | | | | + | + | | | + | + | + | + | +s |
| | 2 | | +d | | | | +d | +d | +d | +d | +d | +d | | | +d | +d | +d | +d | + | + | + | + | + | + | +d | +d | + | | +d |
| | 3 | + | + | + | + | + | + | | + | + | + | + | + | + | + | + | + | | + | + | + | + | + | + | + | + | + | + | |
| | 4 | | | | | | | + | +s | +s | +s | +s | + | + | +s | | +s | | | | + | + | | | | | | | +s |
| To manage stormwater from another space | 5 | | +d | | | | +d | +d | +d | +d | +d | +d | | | +d | | | | + | + | + | + | + | + | | | | + | +d |
| To support urban activities | 6 | + | + | + | | + | + | | + | + | + | + | + | + | + | | | | + | + | | | | | | | | + | |
| | 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | + | |
| | 8 | | | | | | | | +z | +z | | +z | | | +z | +z | | | | | | | | | | | | + | |
| To improve the attractiveness of the city | 9 | + | + | + | + | + | + | | + | + | + | + | + | + | | | | | + | + | | | | | | | | + | |
| To serve as an intermediary space | 10 | | | + | | | | | + | | | + | | | + | + | + | + | | | | | | | | | | | |
| | 11 | | + | + | + | + | + | | | + | + | | + | + | | | + | + | | | | | | | | | | | |
| To provide sufficient habitat to support fauna and flora | 12 | + | + | + | + | + | + | + | | + | + | | + | | | | | | + | + | | | | | | | + | | |
| | 13 | + | + | + | + | + | + | + | | + | + | | + | | | | | | + | + | | | | | | | + | | |
| To allow the movement of fauna | 14 | | + | + | + | | + | | + | + | + | + | + | | | | | | | | | | | | | | + | | + |
| | 15 | + | + | + | + | + | + | + | + | + | + | + | + | | | | | | | | | | | | | | | + | | + |
| To provide feeding ground for fauna | 16 | | + | + | + | + | + | + | + | + | + | + | + | | | | | | | | | | | | | | | + | | |
| Physical well-being | 17 | + | + | + | + | | + | + | + | + | + | + | + | + | + | | | | + | + | | + | | | | | + | | |
| | 18 | | + | | | | | + | + | + | + | + | + | + | | | | | | | | | | | | | + | + | |
| | 19 | | + | | | + | + | + | | | | | | | | | | | | | | | | | | | | + | |
| Psychological well-being | 20 | + | + | + | | | | | + | + | | + | | | | + | | | | | | | | | | | | + | |
| | 21 | + | + | + | + | + | + | + | + | + | + | + | + | + | | | | | | + | + | | | | | | | | + | |

**Symbol meaning:** +: the urban service is "highly probable", +d: the urban service is "on condition" (it is provided if the plot is on **d**epression), +s: the urban service is "on condition" (it is provided depending on the permeability of the **s**oil), +z: the urban service is "on condition" (it is provided depending on the size of the plot).
**Greenspace components abbreviation:** A: Lone tree, B: Afforestation, C Roadside trees, D: Lone shrub or rosebush, E: Hedge, F: Massif, G: Shrubby wasteland, H: Grass, I: Lawn, J: Meadow, K: Herbaceous wasteland, L: Permanent flower massifs, M: Seasonal flower massifs, N: Localised permeable area, O: Localised impermeable area, P: Linear permeable area, Q: Linear impermeable area, R: Permanent water with green cover, S: Permanent water with no green space, T: Permeable green space on depression with temporary water, U: Permeable non green space on depression with temporary water, V: Impermeable green space on depression with temporary water, W: Impermeable non green space on depression with temporary water, X: Mulch with cover, Y: Mulch without cover, Z: Green roof, AA: intensive farming, AB: Litter.
**Urban services abbreviation:** 1: To reduce the volume of water exported from the space, 2: To retain the peak flow, 3: To limit pollution, 4: To recharge the groundwater 5: To receive and manage water from another space, 6: To favour pleasure and recreational activities, 7: To produce food for the inhabitants, 8: To support cultural activities, 9: To improve the attractiveness of the city, 10: To serve as a pathway, 11: To form a barrier, 12: To offer a habitat for fauna and flora, 13: To offer a temporary refuge for fauna, 14: To serve as a corridor for fauna, 15: To offer a halt for migrating fauna, 16: To provide food for fauna, 17: To mitigate urban heat island effects, 18: To clean the air, 19: To reduce noise pollution, 20: To form social ties, 21: To observe nature.

## Appendix D : Analytical model by Nederhand et al., (2016)

**Table A1: Analytical model**

| *Relevant factors regarding the process of self-organization* | *Indicators* |
|---|---|
| Output of self-organization: new service arrangements | Has an order been established in terms of the creation of an organization that has a legal status, a budget and staff to carry out activities? |
| Presence of a trigger | Did a disruptive event stimulate self-organization? Has this led to the generation of specific ideas? Why? |
| Trustworthy relationships | Did a sense of belonging and reciprocity stimulate or frustrate self-organization? Why? |
| Ability to focus on the exchange of and interplay between ideas, information, knowledge and experience | Did a clear and shared focus that structured the interactions either stimulate or frustrate self-organization? Why? |
| Presence of a physical and/or virtual locus of interaction | Did the use of a physical or virtual location with recurrent interactions stimulate or frustrate self-organization? Why? |
| Presence of boundary-spanning activities | Did the presence of key individuals that were able to link people, ideas and resources and that were able to protect the interaction between the involved actors stimulate or frustrate self-organization? Why? |
| Flexibility of the involved actors to adapt existing roles and other practices, including relevant legal frameworks | Did the willingness and ability to change existing roles, positions and regulations stimulate or frustrate self-organization? Why? |

(*continued*)

## Appendix E: Analytical model by Nederhand et al., (2016)

**Table A1: (*Continued*)**

| *Relevant factors regarding the process of self-organization* | *Indicators* |
|---|---|
| *Factors related to meta-governance* | |
| Application of meta-governance strategies | Government acted as a meta-governor, thereby deploying the following strategies: |
| A. Presence of strategic frameworks | Did the use of all kinds of administrative checks, based on strategic frameworks and guidance notes, stimulate or frustrate self-organization? Why? |
| B. Presence of monitoring activities | Did the use of benchmarking to monitor self-organization frustrate or stimulate self-organization and why? |
| C. Presence of framing and storytelling activities | Did storytelling by the meta-governor stimulate or frustrate self-organization? Why? |
| D. Presence of supportive actions | Did provision of and access to vital resources, such as information, knowledge, finance, buildings and contacts by the meta-governor, stimulate or frustrate self-organization? Why? |
| E. Formulating playing rules | Did the structuring of positions and relationships between the involved actors as well as the formulation of rules-of-play by the meta-governor stimulate or frustrate self-organization? Why? |
| F. Playing with fear | Did threats by the meta-governor to impose top- down regulations/interventions stimulate or frustrate self-organization? Why? |