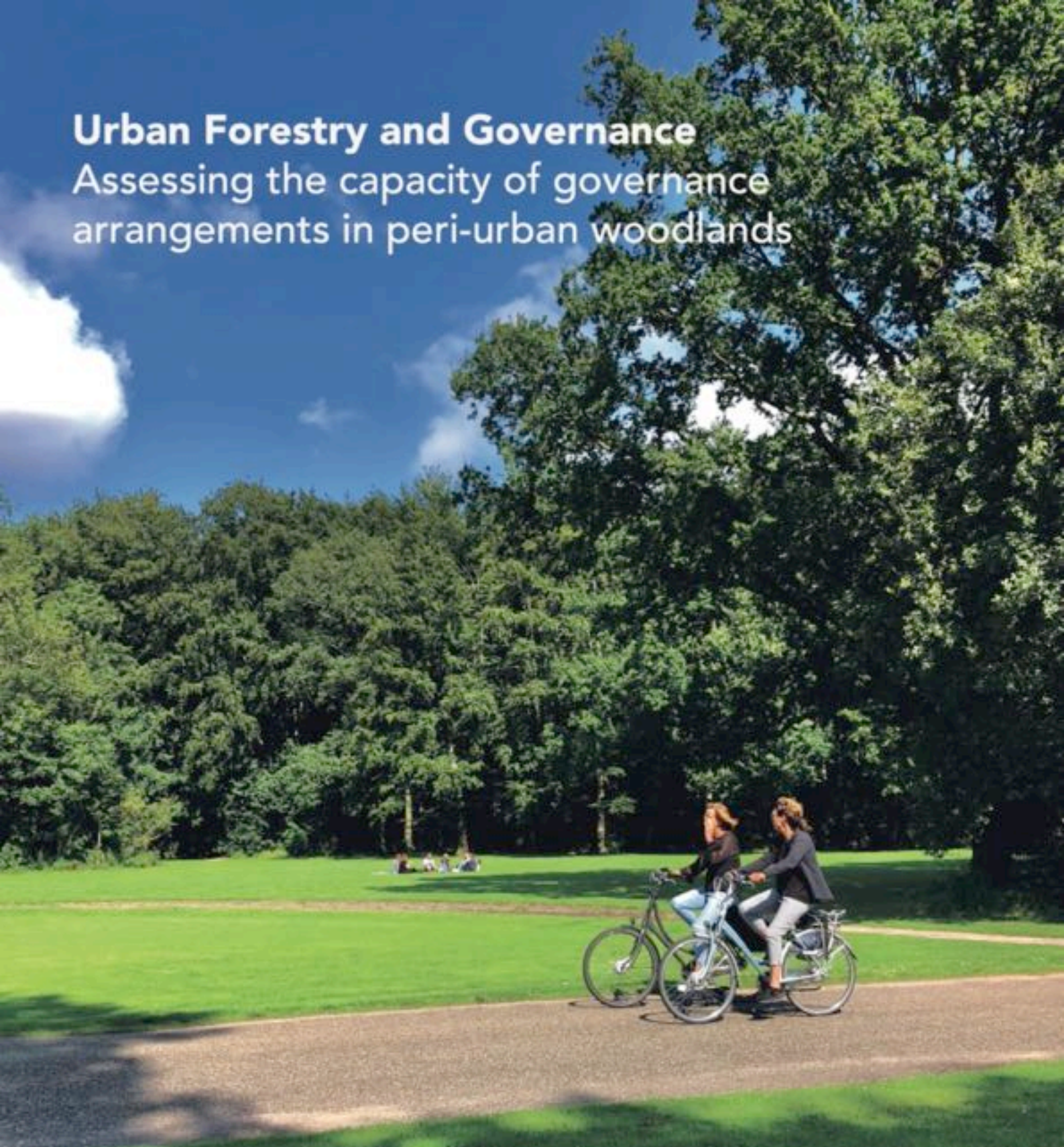
Urban Forestry and Governance

Assessing the capacity of governance arrangements in peri-urban woodlands



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Doctoral Dissertation of
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Prof. Federica Larcher (co-supervisor)

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Summary

In urban forestry (UPF) scientific literature, urban forest governance (UFG) – described as the structures, rules, interactions, and processes that influence decisions and actions and lead to the establishment and maintenance of trees and woodland resources in urban environments - is considered as key to establishing an enabling environment (e.g. policies, regulations, resources, partnerships, and activities) able to set inclusive, effective, and efficient decision-making processes aimed at optimizing the delivery of expected benefits to society and, in this way, contributing to addressing urban challenges.

Scholars, however, have paid limited attention to this interdisciplinary topic in the last few years. Despite UFG-related issues are recently gaining momentum, most studies about UPF tend to focus on technical challenges and benefits associated with the establishment and management of urban forests (UFs) – here understood as socio-ecological systems including all trees and woodlands resources located in and around urban areas, but relatively few contributions have investigated governance and decision-making aspects. Studying UFG is particularly relevant to understanding its complexity due to its multi-actor and multi-level nature, typical bottlenecks (e.g. fragmentation of responsibilities; lack of knowledge; limited resources allocated) and relevant changes related to the introduction of several innovations in the environmental policy domain during the last decades.

In this context, scientific literature calls to deepen the understanding of factors influencing the success, or failure, of urban green space governance, including UFs, and how to assess them. Therefore, a deeper investigation of UFG issues is needed to comprehend how decisions are made by governmental and non-state actors and influenced by stakeholders, and what their performances are. In this regard, this study aims to investigate the capacity of UFG, meant as the ability of actors to effectively collaborate and implement policies to achieve targeted goals and address societal issues, combining governance processes and impacts assessment, to identify those factors influencing their success as a precondition for their improvement in contexts of change by providing a guide for scholars and practitioners.

In particular, the study's objective is to answer the following research questions: (i) what are the criteria that a UPF initiative must satisfy to be identified as successful from a governance perspective? (ii) how can these criteria be used to understand how actors' decisions are made and their related impacts? (iii) what lessons can be learned to improve UFs management from the assessment of their governance arrangements?

To answer research questions, a conceptual framework was developed deductively. Taking the Giddens' Structuration theory as the foundation of this study, related concepts of 'political modernization', 'Policy Arrangement Approach' (PAA), and 'Governance Capacity Approach' (GCA), were introduced to guide the development of the methodological framework. In particular, the GCA – defined as the ability of actors and stakeholders to cooperate to successfully limit or solve societal problems and enhance people's quality of life in cities – was central to conducting the assessment.

In this light, a set of qualitative and intertwined criteria were identified - i.e. participation, inclusiveness, integration, direction, resources allocated, learning, and effectiveness - and linked with the PAA's analytical dimensions – i.e. actors, discourses, rules, resources/power – to which activities-dimension was added, to build the governance capacity assessment framework addressing both institutional capacity and governance performance. Criteria were operationalized to investigate UFG arrangements in two flagship multifunctional peri-urban woodlands selected as case studies – i.e. BoscoInCittà (Milan, Italy) and Amsterdamse Bos (Amsterdam, Netherlands) adopting a mixed research approach including several methods i.e. document analysis, semi-structured interviews, site visits, and web-based surveys.

Aiming to contribute to the UPF international scientific debate, findings illustrate several differences between the cases assessed, especially in terms of citizens engagement process, institutionalization, management approach, and resources allocated, confirming a not straightforward relationship between institutional capacity and governance performance for the success of UFG. Indeed, as emerged from the cases assessed, this study shows different ways in which peri-urban woodlands can be effectively steered and, in doing so, it highlights several lessons learned.

The main insights it provides refer to the importance of establishing collaborative and multi-level networks as a key factor to carry out activities finalized at achieving expected benefits. However, collaboration should not be limited to the operational level, since external actors and stakeholders may represent an added value also in co-producing knowledge and creating shared visions. In line with this, horizontal and vertical integration constitutes another critical factor for the success of UFG, both to gain political and local support over time, and to develop comprehensive management plans aligned with municipal and supra-municipal planning tools. Finally, this thesis suggests that the allocation of adequate economic resources, for which governmental actors still play a key role, and the development of specific capacities to attract diverse funding sources, are crucial to achieving UFG effectiveness, even in absence of comprehensive and formal management, implementation and monitoring plans.

Keywords

urban environmental governance; governance arrangements; good governance; urban and peri-urban woodlands; mixed research approach; urban forest management.

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List of abbreviations

AUP	Algemeen Uitbreidingsplan Amsterdam
ESs	Ecosystem Services
FAO	Food and Agricultural Organization of United Nations
GCA	Governance Capacity Approach
NUA	New Urban Agenda
PAA	Policy Arrangement Approach
PAFS	Piano di Assestamento Forestale Semplificato
PASM	Parco Agricolo Sud di Milano
PTC	Piano Territoriale di Coordinamento
PTG	Piano di Governo del Territorio
SDGs	Sustainable Development Goals
SGPSs	Spatial Governance and Planning Systems
UFMPs	Urban Forest Management Plans
UFs	Urban Forests
UPF	Urban and peri-urban forestry
UGI	Urban green infrastructure
UFG	Urban forest governance
WFUF	World Forum on Urban Forests
WHO	World Health Organization

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1. Introduction

1.1. Research context

Urban change patterns significantly contribute to the fragmentation and degradation of natural habitats, reduction of biodiversity, alteration of hydrological systems, energy flows and nutrient cycling (Alberti *et al.*, 2018; Seto *et al.*, 2013; Alberti, 2005), particularly in the current *Urban Age*[1] characterized by rapid urbanization, increasing global population, changing climate, and health crisis (i.e. Covid-19 pandemic). Considering also the increasing shrinking of green spaces in cities due to urban densification and sprawl dynamics (Aalbers, 2018; Hoffmann *et al.*, 2017; Mincey *et al.*, 2013), the protection, enhancement, and restoration of urban green spaces, and ecosystem services (ESs) provided by them, are becoming increasingly crucial for pursuing sustainable and resilient urbanization in the upcoming future (Elmqvist *et al.*, 2015).

To address these issues, cities, and their governments, collaborating with non-governmental actors and stakeholders, play a key role in responding to socio-ecological changes through the development of sound policies and plans aimed at enhancing and protecting urban green infrastructure (UGI). As fundamental elements of UGI, urban forestry is receiving increasing attention at global scale as a multifunctional land use approach due to the numerous services and goods trees and forests are able to provide to urban society. The term urban forestry, first mentioned in the nineteenth century, experienced a renewed interest during the 1960s when its modern concept was introduced by Professor Jorgensen at the University of Toronto, Canada. He defined this approach as: "a specialized branch of forestry and has as its objectives the cultivation and management of trees for their present and potential contribution to the physiological, sociological and economic well-being of urban society. These contributions include the overall ameliorating effect of trees on their environment, as well as their recreational and general amenity value" (Jorgensen, 1986:173).

[1] The term is drawn from the LSE Cities' research program of the same name (https://urbanage.lsecities.net)

Over time this concept has evolved hand in hand with its introduction in contexts characterized by diverse cultures, traditions, languages and landscapes (Randrup *et al.*, 2005; Konijnendijk, 2003). Among the various definitions that can be found in the literature (see Konijnendijk *et al.*, 2006) a relevant effort in providing an updated and more comprehensive one has been recently made by FAO (2016:2), which describes urban and peri-urban forestry (UPF) as the management of tree and woodland resources in and around cities to ensure the optimization of the ESs provided by them. Unlike other definitions, this one particularly aims at standardizing and harmonizing the concept of UPF to overcome differences among different contexts and regions worldwide. In addition, it includes also the term peri-urban, which is relevant considering both the general lack of comprehensive planning in urban fringes, where relevant parts of UFs are usually located, and the ambition of improving urban-rural linkages overcoming their historical dichotomy (Ravetz *et al.*, 2013). Furthermore, FAO (2016:2) define also urban forests (UFs) as socio-ecological systems embracing all tree and woodland resources located in and around urban areas, and identify various types of UFs, which can differ on the basis of their shape, size and ESs provided. These types can include, for instance, urban and peri-urban woodlands, city parks, urban greenways, street trees, pocket parks, trees in private gardens and public squares (see Fig.1. for some examples).

Despite the role of UFs in addressing human-nature relationships has changed throughout the history (see e.g. Lawrence, 2008; Miller, 1997; Johnston, 1996), nowadays their integration in urban environments is gaining momentum due to the wide-range of tangible and intangible services delivered to dependent urban communities such as e.g. climate regulation; air pollutants removal; flood risk reduction; provision of food, raw materials and medicines; enhancement of biodiversity; provision of habitat for plant and animal species; improvement of citizens' wellbeing and physical and mental health; aesthetics value enhancement, knowledge transfer, and enrichment of the sense of community (Randrup & Jansson, 2020; Dobbs *et al.*, 2018; van den Bosch and Nieuwenhuijsen, 2017; WHO, 2017; Salbitano *et al.,* 2015; Nowak & Dwyer, 2007; Konijnendijk & Gauthier, 2006; Miller, 1997).

In urban areas, however, trees and woodlands are also exposed to several challenges that need to be taken into account by municipal managers and other actors involved in the planning, management and monitoring stages, to maintain a consistent and equitable provision of ESs and benefits (Steenberg *et al.*, 2016). Nowak *et al.* (2010) identified as main challenges for urban trees their vulnerability to insect and diseases, natural catastrophic events, invasive plants, conflicts with urban development and grey infrastructure, air pollution, and climate change effects.

Fig.1. Examples of UFs: 1) peri-urban forest: *Bois de Boulogne*, Paris, France (source: http://bitly.ws/oEVZ)**; 2) Street trees: Mississippi State Highway,** USA (source: http://bitly.ws/oEVV); **3) Trees in a private garden: the *Begijnhof*, Amsterdam, Netherlands** (source: author)

The integration of UGI, including tree and woodland resources, in cities and towns has been promoted also by recently adopted international agreements. In this regard, the *New Urban Agenda* (NUA) recognizes the importance of creating and maintaining networks of multifunctional, inclusive and accessible green spaces as drivers of socio-economic development, urban resilience attainment, and human well-being and biodiversity

improvement (UN-Habitat, 2016). Also referring to the *2030 Agenda for Sustainable Development and its Sustainable Development Goals* (SDGs), and in particular the *SDG11: Make cities and human settlements inclusive, safe, resilient and sustainable*, UFs as socio-ecological systems can make a valuable contribution in the achievement of its numerous targets (FAO, 2018). Awareness about the relevance of UFs in pursuing sustainable urbanization was also recently raised at the first *World Forum on Urban Forests*[2] *(WFUF)* (2018) hosted in Mantua, Italy. This international event played a relevant role in promoting UF research and practices at global scale, particularly highlighting the necessity to pay more attention to governance and management aspects, both in the Global North and Global South.

In this light, it is crucial to understand how cities govern their UFs. Urban forest governance (UFG) plays a key role in planning, implementing and managing sustainable (Clark *et al.*, 1997), resilient (Hale *et al.*, 2015), and cost-effective UFs (Lawrence *et al.*, 2013), especially considering the complexity characterizing urban areas due to the presence of a broad range of actors and stakeholders operating at multiple scales, competing interests at stake and, therefore, more complicated decision-making in comparison with rural areas (van der Jagt & Lawrence, 2019; Lawrence & Dandy, 2012). Effective UFG needs to establish an enabling environment – e.g. rules, regulations, policies, resources, and partnerships - able to cope with urban challenges in order to set just, inclusive, and efficient decision-making, optimize the provision of ESs, and contribute in delivering the sustainable development agenda. To do so, UFG has to be integrated in the overall institutional framework and, in particular, into urban and spatial planning and policy domains (Randrup & Jansson, 2020). Indeed, the adoption of a holistic perspective, characterized by a fruitful collaboration and interaction between all involved, harmonization of conflicting public and private interests, and definition of shared visions and strategies, is key to promote the strategic role of UFs as fundamental part of cities' infrastructure system (FAO, 2016). In this way, UFG can significantly contribute in

[2] https://www.wfuf2018.com

addressing challenges as urban-rural linkages improvement, disparities reduction, public health promotion, biodiversity enhancement, jobs creation, and climate change adaptation.

1.2. Overall aims of this study

With regard to the research context illustrated above, this study focuses on urban and peri-urban woodlands – described as social-ecological systems spanning more than 0.5 ha in size and characterized by trees higher than 5 meters, a canopy cover of more than 10 percent, and uncultivated ground vegetation (Duinker *et al.*, 2017; FAO, 2012) - and their governance arrangements. Exploring the functioning of governance is particularly important considering the challenges generally associated with their governing activities such as e.g. fragmentation of responsibilities among different municipal departments (silo-effect); lack of awareness, knowledge and political support; scarce monitoring, research and evaluation activities; limited resources allocated; and lack of integrated management with the local authorities (Pauilet *et al.*, 2019; Borelli *et al.*, 2015; Sangester *et al.*, 2011). Considering these bottlenecks, properly planning, designing and managing urban woodlands requires effective governance arrangements capable of settling comprehensive and inter-sectoral coordination and a long-term vision, supported by adequate resources, needed to fulfill the potential of trees and other socio-environmental elements to achieve their targeted-goals and provide benefits to society (Randrup & Jansson, 2020). This also implies that there is the necessity of establishing governance arrangements having the appropriate capacities to perform their mandate and make the management of urban woodlands successful.

In international literature there is a general lack of studies addressing the assessment or evaluation of success factors or governance capacity in UPF projects and programs (Konijnendijk *et al.*, 2021; Wirtz *et al.*, 2021). This knowledge gap needs to be filled if we want to understand how UFG capacity influences the quality of urban woodlands and the provision of services and goods to urban dwellers. In this vein, this Ph.D. investigation has

a twofold overall aim. Firstly, it aims to contribute to the growing international UPF debate, particularly deepening the research agenda on its governance aspects in order to improve the knowledge on this theme, which is considered poorly explored by several scholars (Wirtz *et a*l., 2021; Ordóñez *et al*., 2019; 2020; Konijnendijk *et al*., 2018; Ostoić *et al*., 2018; FAO, 2016; Ostoić & Konijnendijk, 2015; Lawrence *et al*., 2013). Secondly, its aim lies also in investigating urban forest governance particularly focusing on how decisions are made (i.e. governance processes) and their performance (i.e. governance impacts) in relation to the management of urban and peri-urban woodlands. Exploring these aspects is central to identify the capacity of governing authorities influencing the success, or the failure, of UF initiatives as a precondition for their improvement in contexts of change, by providing guidance for policy-makers and also researchers.

1.3. Thesis outline

In Chapter 2 the *state-of-the-art* on UFG research is explored through an interdisciplinary critical review of the international scientific and grey literature. The chapter links UPF and governance literature presenting the main concepts, terminology, core dimensions, and existing assessment approaches related to UFG. It was key to identify knowledge gaps, refine research objectives and questions and, therefore, define the conceptual and methodological frameworks required for this Ph.D. investigation.

In Chapter 3, on the basis of the knowledge gaps identified, the research objectives of this study and specific research questions developed are presented. In addition, it illustrates the conceptual background developed for the scope of this investigation. Starting from Giddens's Social Structuration Theory, as the theoretical foundation, in the chapter related concepts as 'political modernization', the Policy Arrangement Approach and 'Governance Capacity Approach' are introduced.

Next, Chapter 4 presents the methodological framework of the study. In particular, the constructivist research philosophy, case study research design, data collection methods,

qualitative assessment criteria, and the UFG capacity assessment framework, are described in detail.

In Chapter 5, in line with the PAA's analytical dimensions, two case studies selected i.e. *BoscoInCIttà*, in Milan, Italy, and *Amsterdamse Bos*, in Amsterdam, Netherlands, are contextualized to illustrate how and by whom these UF initiatives were established, for what reasons, under what institutional frameworks, and what their role is within the wider urban contexts in which they are located.

Chapter 6 presents the results of the assessment conducted using the qualitative criteria identified to investigate the governance capacity in the Italian and Dutch cases. Firstly, the linkages between the methodology applied and the findings are explained and, next, the institutional capacity and governance performance of the cases are presented. Finally, Chapter 7, going back to the theoretical and methodological frameworks, presents a critical discussion of the assessment carried out for the cases and answers research questions posed. In particular, reflecting on the validity and transferability of the approach and methods adopted and related lessons learned from this research.

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2. Introducing urban forest governance and its assessment: A state-of-the-art

This chapter presents the main insights on UFG and its assessment approaches identified through a critical review (Grant & Booth, 2009) of international scientific and grey literature. The review was performed by selecting the most relevant contributions from peer-reviewed journal papers on scientific database, i.e. Scopus and Web of Science, including articles published between 2000-2021, which was recognized as an adequate timeframe considering the increasing interest paid to this theme in the last few years. In addition, as UFG is a relatively poor explored topic in the scientific literature, also contributions from both grey literature and cited references found in the selected papers, regarded as being of particular interest, have been included providing highly valuable supplementary information to this study.

The main aim of this chapter, therefore, is to investigate the *state-of-the-art* of UFG research as a key step to illustrate theoretical concepts, terminology and governance dimensions shaping this topic and existing assessment/evaluation approaches. To this end, the chapter starts by introducing the definition of UFG and UPF principles influencing it. Afterwards, it continues illustrating the main dimensions characterizing UFG, and associated challenges, which are key to understand its complexity. Next, two sections discuss the existing assessment approaches applied to forest governance and, to conclude, the main insights from the literature reviewed and research gaps are highlighted.

This critical literature review was particularly relevant to guide the development of the research questions and related theoretical and methodological frameworks needed to conduct this doctoral investigation.

2.1. Urban forest governance: definition, principles and core dimensions

The concept of governance, emerged in the 1980s, in the last decades has moved across a wide range of different disciplines and policy domains being re-interpreted depending on the field and level to which it was applied (Buizer *et al.*, 2015; Krahmann, 2003). Among the various definitions provided by literature, governance can be defined as "*the many*

ways in which public and private actors from the state, market and/or civil society govern public issues at multiple scales, autonomously or in mutual interaction" (Arts & Visseren-Hamakers, 2012:4).

The shift from 'governance by government' to 'governance with, and even without, government', with an increasing involvement of no-state actors, occurred also in UPF (Mattijssen *et al.*, 2017; Buizer *et al.* 2015; Konijnendijk, 2014). It was fostered by the introduction of New Public Management policies by neoconservative governments (Nuppenau, 2009; Lindholst, 2008; Kjær, 2004), and the adoption of international agreements - i.e. the Aarhus Convention, UNCD's Local Agenda 21, and the European Landscape Convention – that significantly contributed to further this transition (Molin, 2014), although often public authorities, particularly municipalities, still play a fundamental role in steering large urban green areas (Mattijssen *et al.*, 2015).

In the field of UPF, notwithstanding the increasing interest towards the topic of UFG (e.g. Wirtz *et al.*, 2021; Coenen *et al.*, 2020; Ordóñez *et al.*, 2020; 2019; van der Jagt & Lawrence, 2019), there is not a univocal definition describing it in scientific literature. Nevertheless, Lawrence *et al.* (2013:1) broadly define UFG as the structures, rules, interactions and processes influencing actors' decisions and actions in the establishment and maintenance of UFs and provision of the benefits to urban society.

UFG is influenced by UPF guiding principles that depict the latter as being an *integrative*, *participatory*, *strategic* and *multifunctional* approach (Konijnendijk, 2012; Randrup *et al.*, 2005). Its *integrative* principle refers to the necessity of incorporating different elements of UFs within a holistic approach (Pauleit *et al.*, 2005; Mock, 2004). Integration should be both 'horizontal', overcoming fragmentation of responsibilities and resources, and 'vertical', linking governance arrangements at different scales (Konijnendijk, 2014). Linked to the latter aspect, *participation is* central for promoting decentralization, collaboration, social inclusion, transparency and accountability, as well as fair sharing of benefits and access to forest resources (Konijnendijk *et al.*, 2018; Sheppard *et al.*, 2017; van Herzele *et al.*, 2005). This is strictly related also to the *strategic* nature of UPF, which implies the necessity of developing long-term and holistic policies and plans focusing on

new societal needs and urbanization challenges (e.g. tackling climate change effects, enhancing biodiversity, improving human health and well-being), and not only on UFs maintenance (Janson *et al.*, 2020), in line with its *multifunctionality*, to deliver economic, environmental, and socio-cultural benefits to dependent urban and peri-urban citizens (Endreny, 2018; Ottish & Krott, 2005; Tyrväinen *et al.*, 2005; Mock, 2004).

Hence, UFG plays a pivotal role in leading the way towards the establishment and management of thriving UFs. Indeed, the success or failure of UPF initiatives depends on how actors and stakeholders make decisions influencing the management and maintenance of UFs (Randrup & Jansson, 2020; Hudson, 2014). In line with this, several core and overarching governance dimensions characterizing UFG were identified in the literature, their presentation follows.

2.1.1. Institutional framework: urban forest policies, planning and land tenure

Urban forest policies, laws and regulations

Urban forest policies, as a result of the political process, define the principles outlining shared visions and directions aimed at guiding decision-making, types of collaboration and coordination between actors, and implementation actions (Jansson *et al.*, 2020; Sheppard *et al.*, 2017; Ottish & Krott, 2005). Being context-specific, they can significantly vary between different cities and countries in terms of scale, authorities' responsibilities, funding streams, and sectors involved (FAO, 2016; Conway & Urbani, 2007), influencing UFG processes and activities in different ways. In some countries, UPF is guided by national and regional policies (FAO, 2016; Konijnendijk, 2003), as in the case of the *England's Community Forestry* (see Pollard & Tidey, 2009). However, generally UF policies are developed at local level, where they can be more effective (Hudson, 2014), by municipal and metropolitan public authorities, in collaboration with a wide range of stakeholders, enabling afforestation programs, such as e.g. the *Living Melbourne-our metropolitan urban forest* and *Vancouver's Urban Forestry Strategy* (see Coenen *et al.*, 2020; FAO, 2018; Gulsrud *et al.*, 2018; Lafortezza *et al.*, 2017).

Although an increasing diffusion of UF policies worldwide, it is important to notice that many cities, especially in the Global South, still lack of policies to effectively govern their UFs (FAO, 2016) and, in addition, that UFG arrangements usually have to deal with several challenges to develop and implement sound policies such as e.g. the fragmentation of responsibilities; conflicts with policy and planning tools addressing other urban issues; limited financial resources, and lack of knowledge, skills and political support (Britt & Johnston, 2008; Knuth, 2005; Ottish & Krott, 2005; Konijnendijk, 2003).

As well as policies, laws at national level, generally in accordance with international agreements, define general standards and legal frameworks influencing the governance and management of forests at sub-national and local level (Lawrence *et al.*, 2011). They may refer to different sectors such as e.g. urban development and land use, public infrastructure, cultural and natural capital conservation (FAO, 2016). However, in some countries, cities can enact their own laws and regulations to govern UFs on both private and public areas (Yung, 2018; Daniel *et al.*, 2016; Lawrence *et al.*, 2011; Schmied & Pillmann, 2003). Regulatory mechanisms can take many forms – e.g. ordinances, codes, incentives - and vary in terms of goals, delivery mechanisms and community's needs (Lavy & Hagelman III, 2019; Daniel *et al.*, 2016; Pincelet *et al.*, 2013; Zhang *et al.*, 2009; Schmied & Pillmann, 2003). Commonly these regulations are included within by-laws defining public authorities' and citizens' responsibilities in tree management, activities allowed (e.g. tree protection, tree removal), and sanctions (Sheppard *et al.*, 2017; Miller *et al.*, 2015). Their success may be fostered by engaging the local community, allocating adequate financial support, and defining enforcement authorities (Zhang *et al.*, 2009).

Urban Forest Planning

Planning in UPF represents the intermediate level between decision-making and effective implementation of actor's decisions on the ground (i.e. design and maintenance activities) (Nilsson *et al.*, 2012). Affecting the establishment and management of UFs, planning is central to provide the expected forest benefits and achieve the targeted-

objectives (Ottish & Krott, 2005). It can take different forms e.g. daily operational maintenance, monitoring plans, budgeting, or national long-term strategic plans (e.g. China's National Forest City program) (Lawrence *et al.*, 2011).

At urban scale, despite UPF may be integrated in diverse sectoral plans, the main planning tools influencing the provision of UFs and influencing UFG commonly pertain to urban environmental and land-use planning (Lawrence *et al.*, 2011; Knuth, 2005). Environmental planning - e.g. UGI and biodiversity plans - is strictly linked with UFG due to its influence on UF planning, policies and practices. In this regard, Lafortezza *et al.* (2017) analyzed the cases of Milan and Melbourne to show how the role of UGI planning can be key, also in absence of a specific a UF plan, to drive the conservation and creation of new UFs by adopting a strategic approach. Moreover, UFs have showed to be central elements also in urban climate adaptation and mitigation plans (Safford *et al.*, 2013; Bowler *et al.*, 2010), as in the case of the *Copenhagen Climate Adaptation Plan,* which recognizes the distribution of trees and green networks across the city as preferred option as urban heat island effect mitigation measure (City of Copenhagen, 2011). Land use planning instead, defining the forms and functions of the urban fabric by zoning and regulating urban development, can secure the ground for the creation of new, and protection of existing, UFs. In the last decades, UPF has been increasingly integrated into urban and territorial planning systems, for example as a part of urban regeneration and urban greening plans (Lawrence & Dandy, 2012). An example in this regard is the '*Corona Verde*' (Green Crown Strategic Plan) of Turin, Italy, which fostered the implementation of relevant UPF initiatives as part of a complex environmental regeneration plan for the city and its metropolitan area primarily aimed at enhancing the general environmental quality by creating an extensive network of green and blue infrastructure (Cassatella, 2013).

The importance of sound planning is recognized by numerous studies (e.g. Lafortezza *et al.*, 2017; Sanesi *et al.*, 2017; FAO, 2016; Li *et al.*, 2008), however, UFs are not always effectively planned, as witnessed by the cases of Sao Paulo, Brazil (Choi, 2011), and Addis Ababa, Ethiopia (Fetene & Worku, 2013), where population growth coupled with rapid

urbanization caused a significant fragmentation, degradation and shrinkage of urban green and forested areas.

To address the above issues, in recent years strategic planning at city-region level emerged as a more comprehensive approach to limit the loss of forested areas and meet new challenges and societal demands (Jansson *et al.*, 2020; Sanesi *et al.*, 2017; Lafortezza *et al.*, 2013). In this regard, urban forest management plans (UFMPs) (Fig.2) are crucial to address trees vulnerabilities and optimize the delivery of benefits (McBride, 2017).

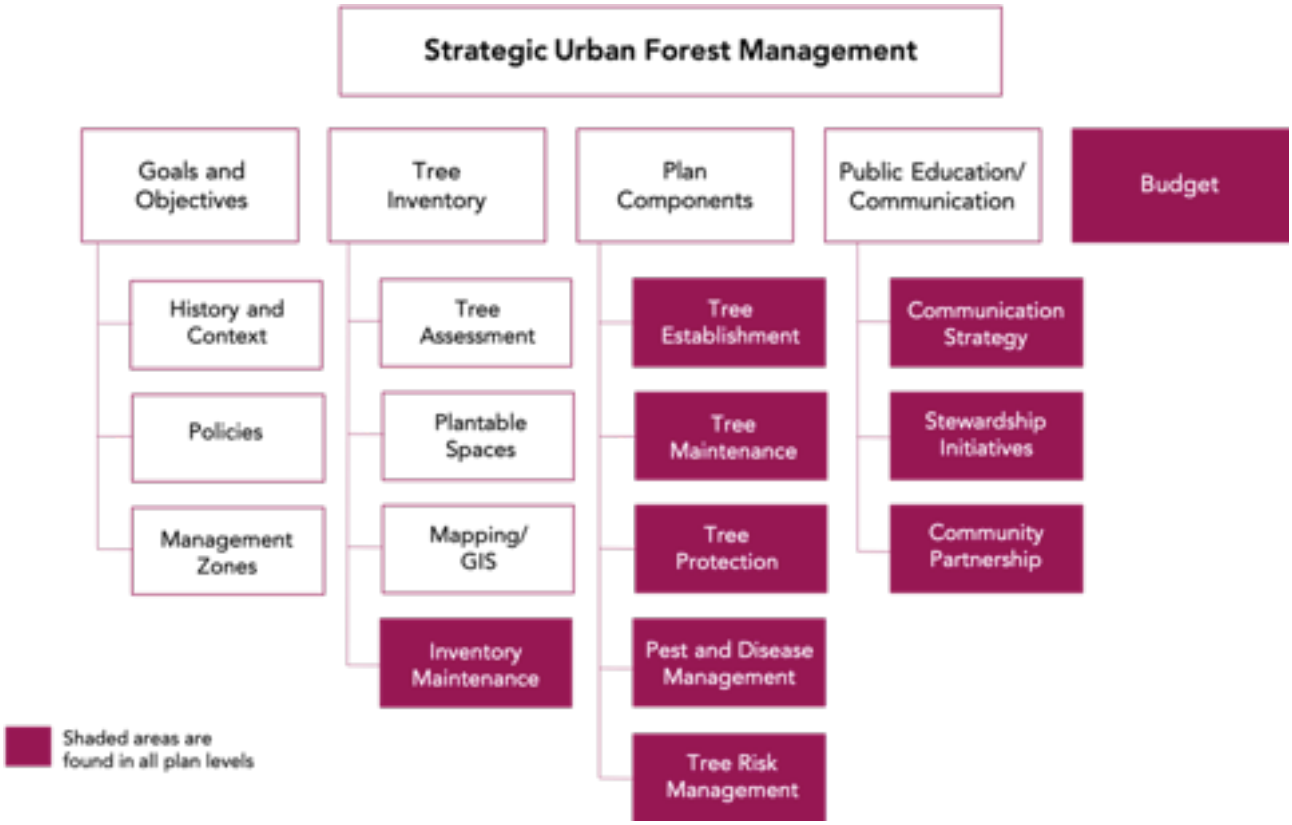

Fig.2. Components of a strategic urban forest management plans (UFMPs)

(source: reproduced from van Wassenaer *et al.*, 2012:32)

UFMPs are commonly developed following several stages: (i) assessment of tree resources, including history, status, and present issues; (ii) outlining of overall aims and specific goals; (iii) development of the strategic vision; (iv) implementation of the plan; (vi) setting of an associated monitoring and evaluation program (McBride, 2017; FAO, 2016). UFMPs refer to three organizational levels - i.e. strategic, tactical, operational - and diverse

timescales (Fig.3) (Randrup & Jansson, 2020; Gustavsson *et al.*, 2005). At strategic level, goals, objectives and targets are set and resources are allocated. Usually this stage refers to a 10-year management timescale, or even more, required to implement the UF vision. For instance, van Wassenaer *et al.* (2012) highlight the case of municipalities in Canada that agreed a 20-year horizon as the most appropriate time-framing to implement UF management strategies. The tactical level concerns the implementation plans for the day-to-day on-the-ground activities, its main function is to link the strategic and operational levels (Gustavsson *et al.*, 2005). Finally, at the operational level specific actions are defined, usually referring to a quinquennial temporal timeframe that, within an adaptive management perspective, allows to review the strategic plan and adapt it to emerging new needs and challenges.

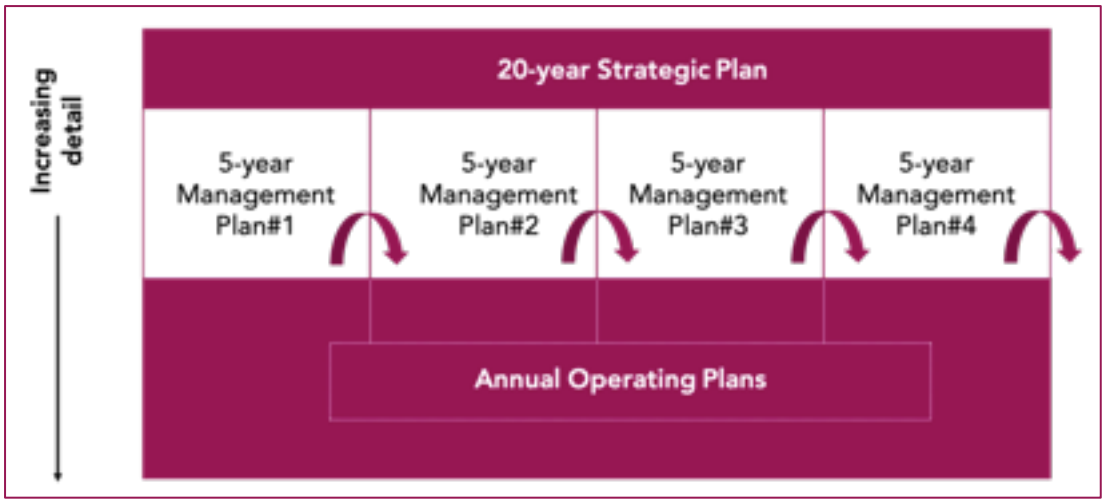

Fig.3. Urban forest management plans temporal frameworks

(source: reproduced from van Wassenaer *et al.*, 2012:31)

Land tenure, access and use rights

Land tenure can be defined as: *"the complexity of norms, by-laws and customary behaviors that rule the ownership and possession of, and access to, land"* (FAO, 2016:25). It is particularly relevant for UFG as the status of landownership – e.g. public, semi-public or private - and access and use rights - e.g. rights to cycling or to make use of trees goods - have implications both in terms of access, control, and environmental justice (Perkins,

2014; Lawrence *et a*l., 2011), and in relation to structure, composition and, therefore, health and resilience of trees and woodlands resources (Zhao *et al.*, 2010; Dobbs *et al.*, 2013). In cities, UFs are owned by different actors such as e.g. private property-owners - e.g. residents and entrepreneurs, municipalities, as well as regional and national authorities (Zhao *et al.*, 2010). Generally, a substantial part of UFs in a city is privately owned by landowners able to influence their features and define specific rights (Daniel *et al.*, 2016; Gustavsson *et al.*, 2005). This may negatively affect minorities and low-income citizens by further limiting their opportunities to access to urban green areas - e.g. parks, urban woodlands (Perkin, 2014; Landry & Chakraborty, 2009; Wolch *et al.*, 2005).

In the western world, however, UFs are usually publicly owned. Indeed, local authorities play a critical role in providing green spaces to enhance urban dwellers' health and wellbeing (Dobbs *et al.*, 2013), although their level of influence vary along the urban-rural gradient and between countries (Gulsurud *et al.*, 2018). Referring to national authorities instead, a relevant example is the Chinese policy ownership, which states that the land in cities is owned by the state that is responsible to identify the sites for implementing new tree-planting initiatives (Yao *et al.*, 2019).

2.1.2. Actors, stakeholders and governance arrangements

Role of actors and stakeholders

In comparison to rural contexts, forest governance in urban areas is generally characterized by a greater complexity due to the wide amount of actors involved in the decision-making and stakeholders potentially influencing it (Lawrence *et al.*, 2013; 2011). As a result, developing the full potential of UF initiatives requires close collaboration and interaction between public and private actors making final decisions and implementing them on the ground. In this regard, it is useful to distinguish between actors and stakeholder: the former are traditionally referred to as those individuals or organizations directly involved in the definition of the UF vision and in its operative implementation on the ground, while the latter refers to the beneficiaries and secondary actors having stakes

in the decision-making and directly affected by decisions and related actions (Reed, 2009; De Blois & Coninck, 2008). They can be clustered in the following four categories (Sheppard *et al.*, 2017; Buizer *et al.*, 2015; Lawrence *et al.*, 2013):

1. ***Governmental-actors***: they historically held primary responsibility in the planning, design, and management of UFs. In particular, operating at various and different scales and levels, governmental authorities play a key role in defining and shaping the composition, structure, and extension of trees and woodlands resources in and around cities (Ordóñez *et al.*, 2019; Ambrose-Oji *et al.*, 2017);

2. ***Civil society***: it includes citizens, stakeholders and volunteers, also organized in groups or associations, which usually are the primary beneficiaries of UF services and goods (Nilsson *et al.*, 2012), involved at various degree in decision-making and maintenance activities.

3. ***Private business***: it may refer to, for example, water and utility companies, developers, companies investing in tree-planting and management activities for social corporate responsibility, private contractors, and other actors involved in the so called 'green industry' that can have a meaningful influence on final decisions.

4. ***Other third party intervenors***: in this category includes NGOs, professional organizations, UPF experts, and academicians that often play a crucial role when state-actors are not significantly involved (Sheppard et al., 2005), or in supporting public authorities in delivery UFs through, for instance, tree-planting, monitoring, evaluation and research activities.

Public and private actors and/or stakeholders can collaborate and interact in UPF establishing different types of UFG arrangements, as illustrated in the next section.

Urban Forest Governance Arrangements

Referring to governance arrangements in UPF, despite they are very context-specific, the *European Commission's Seventh Framework Programme project Green Surge - Green Infrastructure and Urban Biodiversity for Sustainable Urban Development and the Green Economy*[3] identified six types of UGI governance arrangements, including UFG, based on their goals and structures across 12 European countries (Ambrose-Oji *et al.*, 2017). As illustrated in Fig.4, these types can range from self-governance to governmental regulation. Their description follows.

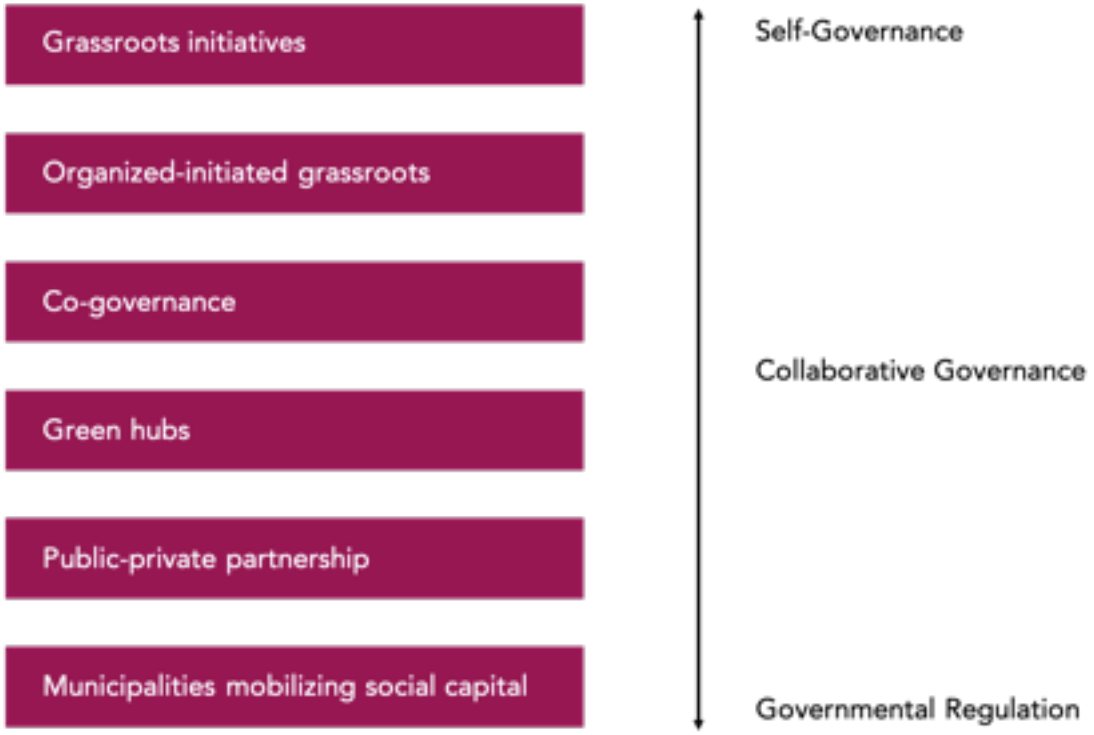

Fig.4. Types of UFG arrangements

(source: adapted from Buijs *et al.*, 2016; and FAO, 2016)

1. ***Grassroots initiatives***: they usually refer to small-scale initiatives established on public land and managed by local residents aimed at achieving community objectives. An example of this type is the *Picasso Food Forest* (Fig.5), an urban

[3] https://cordis.europa.eu/project/rcn/110888/factsheet/en

community food forest established in Parma, Italy, run by an informal grassroots movement involving active citizens, which provides edible fruits, vegetables, and herbaceous plants to local residents and reconnects them to nature and healthy lifestyles (Riolo, 2018).

2. ***Organization initiated grassroots initiatives***: it refers to NGOs or social enterprises fostering active citizenship to attain both community and municipal goals. They usually operate on public land, or on land with public access, through a shared power model between organizations and citizens involved, in some case coordinated by municipalities. An example is the *Volkspark Lichtenrade* (People's Park Lichtenrade) in Berlin, Germany, a community-managed urban woodland created in the 1979 by local residents for preventing housing development on the area, protecting natural resources, and providing recreational services to local residents and tourists (Mattijssen *et al.*, 2017; Rosol, 2010).

3. ***Green hubs***: it is an innovative type of governance arrangement recently emerged to address urban sustainability issues. These hubs are described as experimental and creative partnerships including non-governmental organizations, social enterprises, businesses and citizens that aim to build networks and knowledge to develop UFs and accomplish community and municipal goals. The 'Park Hack' project is an example. It was established in London in 2015 through a partnership between Groundwork London and the London Borough of Hackney to develop and test new business models aimed at raising funds for creating new urban green spaces and UFs (Ambrose-Oji *et al.*, 2017).

4. ***Co-governance***: this refers to partnerships between municipalities and non-state actors, including citizens, also organized in groups. Its advantage lies in the enhancement of the decision-making democracy due large involvement of affected stakeholders' (Burton & Mathers, 2014). UF initiatives characterized by a co-

governance approach are usually established on municipal land with the purpose of achieving both municipal and community goals. An example of this type has taken place in the Danish residential area of Sletten, in Holstebro, where the co-management of public woodland edges bordering residential areas is used to overcome potential conflicts deriving from the different and overlapping residents' and local authorities' interests (Fors *et al.*, 2018).

5. ***Public-private partnership***: this type is characterized by businesses establishing and maintaining urban green spaces, including UFs, in return for formal rights allowing them to use those spaces in line with their purposes. These type of UF initiatives can serve both municipal and private business objectives. For instance, at the Mitsui Sumitomo Marine Insurance headquarters in Tokyo, Japan, a 4,700m² public wooded area were realized at its base (see Fig.5) in compliance with the new regulations on building design (*Building Standards Act)* introduced by the government to improve the quality of built environment through the provision of bonus volume- or height-control allowances to building projects fulfilling environmental quality criteria (e.g. creation of publicly accessible green spaces) (Konijnendijk *et al.*, 2018).

6. ***Municipalities mobilizing social capital***: in this case public authorities involve citizens, also organized in groups, in strategic or site level initiatives by consultation and information engagement approaches, participative planning and/or management and maintenance of UFs. This approach primarily serves municipal objectives, but it may be also oriented to attain community goals. For instance, the municipality of Prato, Italy, started the 'Prato Urban Jungle' (PUJ) project (Fig.5). It is aimed at realizing a city-scale urban renewal project strongly focused on the greening of buildings and afforestation of public spaces in several deprived

neighborhoods through a participatory planning process (Municipality of Prato, 2021[4]).

Each of the type of UFG arrangement illustrated above is characterized by different advantages and challenges. In this regard, it is important to carefully consider since the beginning what type of governance approach is the most appropriate to ensure a successful management of socio-environmental resources in UPF to deliver benefits and attain long-term goals initially targeted. In particular, challenges to be considered may refer to: gaps in specific knowledge and skills; lack of leadership; conflicting interests and lack of trust; inequality in power distribution among actors; poor adaptability to changes and new demands; and external changes in policy and funding (Macura *et al.*, 2015; Jones *et al.*, 2005).

Fig.5. UFs developed and managed under different governance arrangements: 1) Mitsui Sumitomo Marine Insurance HQ in Tokyo, Japan (source: JBIB[5]) **; 2) Picasso Food Forest in Parma, Italy (**source: Fruttorti di Parma[6]**); 3) 'Prato Urban Jungle' project** (source: Municipality of Prato).

[4] http://www.pratourbanjungle.it/it/il-progetto/pagina894.html
[5] http://jbib.org/english/goodpractices/msad
[6] http://www.fruttortiparma.it/foodforest.html

2.1.3. Resources allocated and power distribution

Financial resources to deliver urban forests

Implementing and preserving thriving UFs implies UFG arrangements able to make relevant investment in terms of staff, equipment, knowledge, and maintenance (Escobedo & Seitz, 2012). Sustaining urban greening costs in the last decades has been challenging for public authorities due to public budget cuts, especially in the immediate 2008 post-crisis austerity period (Colding *et al.*, 2020). As a consequence, municipalities, but also other governmental actors, started to increasingly rely on external sources and innovative delivery mechanisms for financing UPF. These may include e.g. sponsorships, purpose taxes, grants, incentives and ESs revenue (e.g. Payment for Ecosystem Service).

In addition to statutory grants and incentives (e.g. China, Yao *et al.*, 2019), EU funding-programs (e.g. Horizon 2020, Interreg) in Europe, and building-construction rights (Konijnendijk *et al.*, 2018; Lawrence *et al.*, 2011) as primary inputs to funding UPF, also several new funding schemes have been used by public actors. Recently, for instance, the Municipality of Milan launched the project *ForestaMI*[7] to finance the planting of 3 million trees across the city within 2030 through donations from individuals and private organizations. This program has been relevant also to develop a strategic UF vision and to create an urban green spaces inventory, two crucial tools for achieving the program's aims: improvement of metropolitan air quality; increase of tree canopy cover by 5%; connection of urban green spaces; and improvement of public-private partnerships.

Also combing private-public funding can help in financing UFP initiatives as experimented by the City of Melbourne, Australia, through the *Urban Forest Fund*[8]. This fund is aimed at implementing new UF projects on privately-owned land either through *partnering* (i.e. matching 50% of the total cost), or *supporting* (e.g. donations) (Kiss *et al.*, 2019).

Furthermore, private or public steering bodies in UPF can also generate income through revenue as, for example by selling timber, despite generally the primary function of urban

[7] https://forestami.org/en/

[8] https://www.melbourne.vic.gov.au/community/greening-the-city/urban-forest-fund/Pages/urban-forest-fund.aspx

woodlands is not timber-production; organizing financially beneficial cultural, recreational and sport activities; and hosting events (e.g. festivals, exhibitions, conferences).

Setting an adequate budget, diverse funding sources, and secured additional funds for planning and managing UFs is crucial. Indeed, the availability of resources, in addition to defining power distribution dynamics among actors, also allows steering bodies to adopt a proactive management approach rather than reactive.

The role of knowledge

Besides funding, a critical resource in UFG is knowledge in its different forms (Miller *et al.*, 2015). Implementing and managing UFs requires complex and diverse knowledge, including 'expertise', 'local' and 'lay' knowledge (Lawrence & Dandy, 2012), which may refer to technical challenges, social aspects, and also users' perceptions and preferences. This implies that to have a comprehensive knowledge of socio-environmental aspects requires the involvement of a wide-range of actors and stakeholders with different backgrounds, interests and concerns.

Up-to-date knowledge in UPF is crucial, especially for public authorities willing to census and mapping all tree and woodland resources within their administrative boundaries. However, as observed by several scholars (van der Jagt & Lawrence, 2019; Gerhardt, 2010; Britt & Johnston, 2008), often public authorities lack of adequate skills and/or financial resources to develop and manage urban tree inventories. In order to overcome these issue, steering bodies in UPF often collaborate with external professionals such as e.g. private consultants, technicians, academics, and local residents, while also providing learning and training activities for their own staff members (Ugolini *et al.*, 2018).

However, despite the increasing involvement of a wide range of professionals, practitioners and local residents in decision-making, many challenges still characterize knowledge production and exchange in UPF, as for instance: gender imbalance; lack of adequate skills and scarce interest in improving them; lack of accessibility to scientific studies (Ugolini *et al.*, 2015).

Furthermore, UPF science-policy interface plays a relevant role in ensuring the success of UF initiatives, as demonstrated by the increasing demand for scientific information in several studies - e.g. benefits and ESs value, achievable tree-canopy cover levels, and climate change effects (e.g. Nowak, 2017; Campbell *et al.*, 2016; Ordóñez *et al.*, 2015; Ugolini *et al.*, 2015; Janse & Konijnendijk, 2007; Spilsbury & Nasi, 2006; Konijnendijk, 2004). Supporting the sound management of UFs requires also socially-inclusive planning processes adopting a knowledge co-production approach (Campbell *et al.*, 2016) aimed at actually including in the decision-making knowledge about users' demands for forest goods and services and their preferences and not only experts' knowledge and preferences (Lawrence *et al.*, 2011; Janse & Konijnendijk, 2007).

Power distribution among actors

In UPF power is described as the ability of actors to achieve the desired outcomes through their interaction, collaboration and capacity of influencing the behavior of other actors and stakeholders, either in competition or jointly, involved in the decision-making (Lawrence & Dandy, 2012; Lawrence *et al.*, 2011). In this regard, the shift from 'government' to 'governance' in the environmental policy domain has brought as a consequence the establishment of innovative governance arrangements and, therefore, new forms of interaction and power distributions among those involved at various levels and scales (Arnouts *et al.*, 2012).

Power exerted by actors may refer to several aspects of UFG - e.g. public allocation of funding for maintaining urban trees and woodlands, deployment of local residents' time for volunteering (Ambrose-Oji *et al.*; 2017) – and it is closely linked to the possibility for actors to have access to the allocated resources (e.g. funding, knowledge) and their capacity to mobilize them for influencing the decision-making and final deliberations (Andriollo *et al.*, 2021; Lawrence *et al.*, 2013).

Usually, landowners are seen as the most powerful actors in UFG for their capacity of significantly influencing the characteristics and transformation of UFs through their agency

and resource mobilization; while local and communities, which have generally limited access to resources, are seen as the less powerful actors (Lawrence & Dandy, 2012). The latter is particularly the case of UFs managed and maintained by groups of active citizens where the municipal authorities maintain the land ownership and, in some case, play a 'watchdog role' (Mattijssen *et al.*, 2017).

Attempts to address unbalanced power dynamics have been experimented, for example, in urban regeneration projects including the establishment of new UFs by empowering the local community in the decision-making. However, these types of participatory processes not always have been successful in actually including citizens' discourses in final deliberations (Jansson *et al.*, 2019; van der Jag *et al.*, 2017; Lawrence & Dandy, 2012).

2.1.4. Urban forest governance processes

Discourses

Discourses represent an essential aspect to be considered for understanding UFG complexity, especially considering their influence on the planning, management and maintenance of UFs deriving from a broad range of actors' and stakeholders' interests and views included in policies' and plans' objectives and operational activities.

The term discourse might appear as misleading due to the various and diverse meanings scholars ascribe to it. Indeed, it can refer to the most varied type of cultural and social productions, ranging from communication, text, and maps to frames, and as social practices (Berg, 2009). Arts & Buizer (2009:343) describe discourses as: *"interpretative schemes, ranging from formal policy concepts and texts to popular narratives and story lines, which give meaning to a policy issue and domain"*.

Ostoić and Konijnendijk (2015) exploring scientific literature on UPF published during the period 1988-2014 identified various discourses driving UFG, namely: (i) the managerial discourse concerning UFs management's reasons and approaches; (ii) the civic involvement discourse implying the need to make cities more liveable; (iii) the ESs

discourse, which refers to the optimization of the multiple services provided by trees and woodlands; (iv) the biodiversity discourse regarding the potential contribution of UFs in its enhancement; (v) the urban planning discourse stressing the importance of integrating UPF into the overall urban governance and planning system; and (vi) the green infrastructure discourse concerning the importance of connecting UFs with larger network of urban blue and green areas.

In addition, other scholars focused their investigation on the evolution of discourses in different contexts. For instance, Van Herzele (2014) analyzed the genealogy and institutionalization of UF discourse within spatial planning in Flanders, Belgium, which was the result of long-standing advocacy and campaign activities carried out by the 'Flemish Forestry Association' aimed at gaining more power within spatial politics, making recognition of their professional identity, and expanding forested lands in urban and peri-urban areas. Besides, Park & Young (2013) illustrated the evolution of UF discourses in the Republic of Korea. Their study clearly shows how the discourse on sustainable development created the conditions to adopt UF policies at national and sub-national level and foster the decentralization of power to local administrations, citizens and private sector.

Participative approaches

Public participation in UPF is key to guide decision-making informed by local knowledge and lead them towards the assessment of various alternative plans and policies and the selection of the most adequate. Moreover, if perceived as legitimate, transparent, fair, and inclusive, public participation can become crucial to improve public trust, inform all involved, reduce uncertainty, and cope with limited resources (Sheppard *et al.*, 2017; Reed *et al*. 2009; Beckley *et al.*, 2006). Buizer *et al*. (2015:8) defines participatory governance of urban green spaces as: "arrangements in which citizens, entrepreneurs, NGOs and other non-governmental parties develop and manage networks of urban green spaces at different levels, with or without formal authorities". Users engagement in UFG, which in the last decades is increased both in planning activities and on-going management (Fors

et al., 2020), might be encouraged by several factors e.g. stakeholders' interest in improving their physical and mental health, enhancing urban environmental quality, and building friendly relationships building (Zare *et al.*, 2015). On the other hand, constraints in participating may refer to low confidence of authorities in involving people, lack of comprehensive UF plans, scarce motivations, awareness and knowledge, and socio-economic issues of stakeholders (e.g. income, education, occupational status) (*ibid*).

To carry out participatory processes, various tools and ideal approaches differing on the basis of their degree of inclusion, actual influence and effectiveness, can be implemented (Sheppard *et al.*, 2017; van der Jagt *et al.*, 2016):

1. ***Information***: it implies forms of participation that are often indirect and passive (e.g. official reports, informational websites), involving little *vis-à-vis* interaction and dialogue between public authorities and civil society. This approach, where information flow is unidirectional and feedbacks are not required by UF governing bodies, is considered useful for 'educating and inform the public' with objective information;

2. ***Consultation****:* in this case state-actors are open to include civil society's views (e.g. experts, local residents) in the decision-making to have a clear picture of the different interests and concerns at stake. Sometimes, this approach, characterized by a bidirectional information flow and both direct and indirect techniques (e.g. surveys, questionnaires, public hearings and meetings), is used just to legitimate already-taken decisions and address current, or prevent future, conflicts by UF governing bodies (e.g. municipalities) without any obligation to include less powerful stakeholders' views in final deliberations (Wamsler *et al.*, 2020; Cornwall, 2008);

3. ***Collaboration****:* in this case power is delegated to non-state actors allowing them to exert the power of actually influencing the contents of, for instance, management

policies or plans. This is usually an interactive process, centered on dialogue among people with shared responsibilities. In this case, tools consist mostly of direct techniques, including e.g. task forces, round tables, public advisory committees, and workshops (Beckley *et al.*, 2006).

4. ***Cooperation****:* it refers to joint decision-making and sharing of rights, resources, responsibilities and power between governmental and non-state actors. The level of decentralization and cooperation may vary greatly depending on to the type and scope of the UF initiative, however, in this case civil society can significantly influence the definition of goals and actions. Usually, cooperation is characterized by high levels of interaction and can take the forms e.g. community forest boards, co-management teams and steering committees.

As observed by Sheppard *et al*. (2017), although relationships may exist between levels of engagements described here and certain UFG arrangements (see Fig.4) (e.g. generally indirect and passive participation approaches are associated with hierarchical UFG arrangements) a combination of different techniques may result in more successful and democratic participative process. Indeed, implementing a certain technique is not sufficient to ensure a proper participative and democratic decisions-making by itself, because being involved in the process does not automatically mean having a voice to influence final deliberations (Lawrence & Dandy, 2012). It depends on "how people take up and make use of what is on offer, as well as on supportive processes that can help build capacity, nurture voice and enable people to empower themselves" (Cornwall, 2008:275).

Nonetheless, Wamsler *et al*. (2020) observed how the involvement of stakeholders in nature-based solutions (NBS) planning may hamper sustainability outcomes due to the rise of personal interests, lack of environmental awareness, lack of civic engagement, and mistrust towards the effectiveness of the participative approaches adopted.

Monitoring and evaluation of urban forest resources

Supporting successful UF governance and management requires regular monitoring and evaluating activities to gather and interpret high quality data on trees and other natural resources. Monitoring is key for collecting information to keep track of UFs dynamics also in relation to targeted-management objectives (Morgenroth & Östberg, 2017; Sanesi *et al.*, 2007) and, therefore, to improve the knowledge base on UFs and their changes. In this light, tree inventories are crucial to provide data for driving informed decision-making processes, monetizing ESs, validating public investments, and reducing governmental taxes for UFs privately-owned (Gulsrud *et al.*, 2018).

Schipperijn *et al.* (2005:399) distinguish three types of information for the creation of tree inventories: (i) *basic urban forest information* - i.e. location, species, diameter at breast height (DBH), size, age, and height; (ii) *environmental and ecological information* - i.e. environmental status of UFs, benefits provided by trees, data on abiotic (e.g. climate, soil, air and water) and biotic (e.g. vegetation, plant and animal species) elements; (iii) *socio-cultural information* – i.e. socio-economic, psychological, aesthetic and cultural information. The variables to be measured should be clearly specified in tailor-made monitoring plans associated to management strategies, and measures performed by appointed actors and stakeholders – e.g. local governments, NGOs, academics, and citizens also organized in groups or associations (Morgenroth & Östberg, 2017). Type and quality of information collected may depend on several factors characterizing the UF initiative to be monitored and evaluated - i.e. context, goals, motivations, available budget, and technical knowledge. Though, information collected can greatly vary, for example, Roman *et al.* (2013) in their analysis of 32 local monitoring programs across the United States noticed that the majority of the data gathered were related to: tree characteristics (e.g. species, health condition rating, mortality status, diameter at breast height); maintenance issues (e.g. pruning, watering, mulching, and infrastructure conflicts); and site features (e.g. location type, land use, ground cover, soil characteristics).

In this context, various methods and tools have been developed for monitoring urban woodlands and trees. These include technological solutions, recently defined by Galle *et al.* (2019) as the *'Internet of Nature'*, such as cloud storage, computing, and remote sensing technologies (e.g. LiDAR) to understand the complexity of both environmental and social features. Moreover, the use of innovative software and technology (e.g., i-Tree[9]) allows the assessment of trees and forests structure, functions, and ESs. However, in their review on monitoring activities of community woodlands in the United Kingdom, Lawrence & Ambrose-Oji (2015) observed how often these are mostly related to quantitative outputs (e.g. number of trees planted) and, to a lesser extent, qualitative outcomes evaluation (e.g. well-being enhanced), instead of focusing on their long-term impacts.

2.2. How to assess urban forest governance?

Considering the various existing literature strands, forest governance can be assessed using different methods and tools, although most of the approaches developed to date refer predominantly to international and national level (e.g. IEEP, 2019; Dang *et al.*, 2016; WRI, 2013; FAO, 2011; GFI, 2009; WB-ARD, 2009), while at local level proper assessment or evaluation approaches are still limited (Secco *et al.*, 2014), especially in relation to urban environments. In addition to that, as observed by Secco *et al.* (2011; 2014), forest governance studies usually adopt a descriptive and analytical approach rather than focusing on the assessment or evaluation of governance quality (i.e. good governance) and/or its long-term impacts. In this vein, and in line with the aims of this study, in the following two sections the main insights from the international scientific and grey literature on the assessment of forest governance are presented.

2.2.1. 'Good governance' and urban forestry

The concept of good governance, emerged in the late 1980s as a consequence of the introduction of innovative management practices based on the model of private

[9] https://www.itreetools.org

businesses codes (Lockwood *et al.*, 2010), was introduced by international organizations (see Kaufmann *et al.*, 2009), and it made its way also in the field of natural resource management (NRM) (Tacconi, 2011).

According to FAO (2011:10), "*governance is generally considered 'good' if it is characterized by stakeholder participation, transparency of decision-making, accountability of actors and decision-makers, rule of law predictability. 'Good governance' is also associated with efficient and effective management of natural, human and financial resources, and fair and equitable allocation of resources and benefits*".

In this regard, good (environmental) governance is commonly linked to several principles defined for understanding its quality. In Table.1 two of the main set of principles identified in the literature to assess governance in natural resource management (NRM) and forestry are illustrated. Lockwood *et al.* (2010), based on international literature insights (e.g. Borrini-Feyerabend *et al.*, 2006; Kaufmann *et al.*, 2003; European Commission, 2001) and experts' opinions, identified eight principles for assessing good governance and providing normative guidance for NRM. These principles were adopted to assess good governance also in urban environments as, for example, in the study of Coffey *et al.* (2020) to investigate four urban greening initiatives in Melbourne, Australia. Additionally, Secco *et al.* (2011), in their conceptual framework for investigating good forest governance at local level, identified other governance assessment key-dimensions and sub-dimensions (afterwards refined in their follow-up study (Secco *et al.*, 2014).

Table.1. Good governance assessment principles and key-dimensions in NRM and forestry

(source: reproduced from Lockwood *et al.*, 2010; and Secco *et al.*, 2011)

Good governance principle in NRM (Lockwood *et al.*, 2010)	Description	Forest governance key-dimensions (Secco *et al.*, 2011)	Forest governance subdimensions
Legitimacy	"(a) the validity of an organization's authority to govern that may be (i) conferred by democratic statute; or (ii) earned through	**Sustainable 'glocal' development**	"environmental impacts; Social impacts; Economic impacts; Institutional Changes; Equity in

	the acceptance by stakeholders of an organization's authority to govern; (b) that power being devolved to the lowest level at which it can be effectively exercised; and (c) the integrity with which this authority is exercised" (p. 991)		cost and benefit distribution"
Transparency	"a) visibility of decision-making processes; (b) clarity with which the reasoning behind decisions is communicated; and (c) ready availability of relevant information about governance and performance in an organization.' (p.993)"	**Transparency**	"documentation; Information flows to external stakeholders; Feedback: quality, quantity, procedures, contents"
Accountability	"a) allocation and acceptance of responsibility for decisions and actions; (b) demonstration of whether and how these responsibilities have been met"(p. 993)	**Accountability**	"clarity of roles (who is held accountable?); Division of responsibility: balance, co-responsibility; monitoring and reporting"
Inclusiveness	"opportunities available for stakeholders to participate in and influence decision-making processes and actions. Governance is regarded as inclusive when all those with a stake in governance processes can engage with them on a basis equal to that provided to all other stakeholders"(p.993)	**Participation**	"representativeness; stakeholder inclusion; empowerment; equity (participation of all actors, women, minorities)"
Fairness	"a) the respect and attention given to stakeholders' views; (b) consistency and absence of personal bias in decision-making; and (c) the consideration given to distribution of costs and benefits of decisions" (p.994)	**Efficiency**	"resources allocation; Costs vs. outputs; Respect of deadlines; Management of risk; Quality of monitoring"

Integration	"(a) the connection between, and coordination across, different governance levels; (b) the connection between, and coordination across, organizations at the same level of governance; and (c) the alignment of priorities, plans, and activities across governance organizations" (p.995)	**Effectiveness**	"objectives vs outputs; Inter-organizational, inter-sectoral, multi-level coordination; Changes in institutional arrangements and actions; Available financial resources (for participation, transparency, etc.)"
Capability	"the systems, plans, resources, skills, leadership, knowledge, and experiences that enable organizations, and the individuals who direct, manage, and work for them, to effectively deliver on their responsibilities" (p. 996)	**Capacity**	"competences; professionalism; collaborative learning; transfer of knowledge"
Adaptability	"(a) the incorporation of new knowledge and learning into decision making and implementation; (b) anticipation and management of threats, opportunities, and associated risks; and (c) systematic reflection on individual, organizational, and system performance" (p. 996)		

2.2.2. Existing assessment approaches for forest governance

Despite the rise to prominence of the normative view of governance, as illustrated in the previous section, also mixed approaches have been developed for assessing forest governance. These approaches may take into account processes, outputs, outcomes, and

impacts[10], or their integration, according to the evaluation's objectives. Adopting a mixed approach is central to provide a more solid methodology, and, therefore, more reliable results, in comparison to one focused on only one aspect (Wilde *et al.*, 2009). As argued by Raushmayer *et al.* (2009), for effectively assessing the governance of natural resources, the combination of process- and outcome-oriented approaches represents a more robust and reliable method for several reasons: (i) a normative reason related to the standard of good governance; (ii) the advantage of compensating different approaches weaknesses and uncertainties; and (iii) the importance of applying a timely evaluation as a corrective device to the governance processes and related policies implementation.

However, previous studies on environmental governance assessment focused principally on procedural aspects (e.g. inclusiveness) rather than on substantive concerns (e.g. socio-ecological outcomes) of governance arrangements, also because assessing governance outcomes or impacts can be complicated and contested (Bennett & Satterfield, 2018). In this regard, only recently UFG assessment started to draw scholars' attention resulting in the development of several assessment frameworks focused on various aspects. Hansmann *et al*. (2016), for example, advanced some considerations for the evaluation of UF partnerships highlighting the importance of considering their direct outputs, indirect outcomes, and process variables in order to identify success factors in a multi-dimensional sustainability perspective, while Watkins *et al.* (2013) defined an approach to evaluate social-ecological outcomes in neighborhood and non-profit UPF initiatives. The latter focused on two aspects i.e. tree success and the capacity of tree-planting initiatives to increase community capacity building to be measured through the use of several indicators (i.e. tree survival and growth; tree knowledge; neighbor familiarity; neighbor trust; collective action). As shown by these examples, existing UFG assessment methods usually

[10] OECD (2010) in its *Glossary of Key Terms in Evaluation and Results Based Management* clarifies the terminology on governance aspects of main interest in the field of evaluation, such as: "(i) processes: *internal dynamic of implementing organizations, their policy instruments, their service delivery mechanisms, their management practices, and the linkages among these*; (ii) outputs: *the products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes;* (iii) outcomes: *the likely or achieved short-term and medium-term effects of an intervention's outputs*; (iv) impacts: *positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended*". Available at: https://unsdg.un.org/sites/default/files/OECD-Glossary-of-Key-Terms-in-Evaluation-and-Results-based-Management-Terminology.pdf

focused on limited aspects rather than adopting a holistic approach. An exception to this it might be considered the *assessment framework for urban green spaces governance arrangements* (including urban woodlands*)* developed by Buijs *et al.* (2015). It is aimed at investigating urban green space initiatives' success or failure, as they are perceived by stakeholders, through descriptive, interpretative and evaluative questions based on the *Policy Arrangement Approach* (PAA, Liefferink, 2006; Arts & van Tatenhove, 2004). In addition, recently Wirtz *et al*. (2021) developed a methodology to assess successful factors in UPF from a governance perspective. They based the study on Canadian UPF experts' opinions and identified 'financial resources', 'data-driven decision-making' and definition of 'goals, objectives, and targets' as the most important factors influencing the success of UFG arrangements.

2.3. Synthesis of international literature insights and research gaps

Reviewing academic and grey literature was crucial to provide an overview as comprehensive as possible on UFG and identify its main dimensions, and related challenges, existing assessment methods, and also knowledge gaps. Referring to the latter, as highlighted by several scholars (Wirtz *et al*., 2021; Ostoić *et al.,* 2018; 2015; Ambrose-Oji *et al.,* 2017; Lawrence *et al.,* 2013; Bentsen *et al.*, 2010), UFG still is a relatively poor explored topic, especially concerning empirical evidences, although it is crucial understanding its complexity to inform urban policies and, therefore, attain sustainable and resilient urbanization through the optimization of ESs provided by trees and woodlands.

International literature calls to deepen the understanding of factors influencing the success of UFG arrangements and how to assess them (Boulton *et al*., 2021; Wirtz *et al*., 2021; Ordóñez *et al.* 2019), as well as investigate the effects that actors and stakeholders involved may have on the quality of urban green areas (Aalbers, 2018). Exploring these aspects appears to be particularly relevant to lead towards a sound planning and management of UFs and provide comprehensive guidance to academics and policy-

makers (van Oudenhoven *et al.*, 2012). In this regard, the studies reviewed showed a general lack of knowledge about assessment methods for UFG, especially referring to its outcomes and impacts. Indeed, existing evaluation/assessment approaches tend to focus predominantly on governance outputs (Lawrence & Ambrose-Oij, 2015), while scholars call to deepen UFG issues through the development of approaches capable of integrating the assessment of governance processes and impacts at local level (Wirtz *et al.*, 2021; Ordóñez *et al.*, 2020; 2019; FAO, 2016; Hansmann *et al.*, 2016; Ostoić & Konijnendijk, 2015; Secco *et al.*, 2014; Lawrence *et al.*, 2013). It is considered particularly important to make UF initiatives effective and efficient and, in addition, ensure equality in the delivery of ESs and benefits to society (Konijnendijk *et al.*, 2018).

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3. Objectives of the study, research questions and conceptual background

In line with the research context and knowledge gaps identified in the previous chapters (Chapter 1 and 2), the current one presents the study's objectives, specific research questions and the conceptual background developed to investigate UFG arrangements. It is organized as follows. In the first section the aims, objectives and research questions are outlined. Next, the conceptual background of this study is introduced by discussing the Giddens' structuration theory (Giddens, 1984), adopted as the theoretical foundation of this study, and the related concepts of 'political modernization' (van Tatenhove *et al.*, 1999; 2000; Leroy & Arts, 2006) and 'Policy Arrangement Approach' (PAA, Arts & van Tatenhove, 2004). To conclude, in line with the theoretical perspectives of the PAA, the 'Governance Capacity Approach' (GCA) (Arts & Goverde, 2006) is presented as central theoretical approach to build the UFG assessment framework and guide the selection of related criteria.

3.1. Aims, objectives and specific research questions

This Ph.D. investigation focuses on the assessment of governance arrangements guiding complex socio-ecological systems (Ostrom, 2009) as urban and peri-urban woodlands. In particular, it aims at assessing UFG in order to understand how decisions are made by governmental and non-state actors and influenced by stakeholders (i.e. governance processes), and what their performance are (i.e. governance impacts). The choice of embracing a place-based approach (see Molin, 2014) to assess UFG reflects the willingness of exploring the relevance of governance quality at site level in guiding urban woodlands, implementing policies, and providing the expected benefits to citizens, contributing in this way to address urban challenges through collaborative decision-making processes and actions.

In this vein, the study's specific objective is to investigate the capacity of UFG, here understood as the ability of actors to effectively collaborate and implement policies to

achieve targeted-goals and address societal issues (van der Molen, 2018; Koop *et al.*, 2017; Dang *et al.*, 2016; Arts & Goverde, 2006), combining governance processes and impacts assessment in order to identify those factors influencing their success as a precondition for their improvement in contexts of change by providing a guidance for policy-makers and scholars for future research on this theme.

As illustrated in Fig.6, the relevance of assessing governance processes and impacts (governance capacity) lies in their key role in influencing the management of UFs, optimization of the ESs delivered to users/citizens/stakeholders (one-way arrows from UFG arrangements to UF benefits delivery), and improvement of the decisions and procedures utilized by collaborative UFG to govern urban woodlands (red-dotted arrow implying the possibility of adapting and improving UFG arrangements as a result of the assessment).

Furthermore, in the conceptual framework illustrated below, the role of users/citizens is acknowledged (two-way arrow between users/citizens/stakeholders and UF benefits delivery) as relevant both for supporting the provision of various benefits (e.g. through collaboration in the delivery of socio-cultural and environmental services, as well as in the maintenance of urban woodlands), and for influencing, as stakeholders, UFG arrangements and final deliberations, from which they are in turn influenced (two-way arrow from UFG and users). Finally, considering UPF as a highly context-dependent approach, also the influence on actors' and stakeholders' interactions and collaboration deriving from the wider socio-economic, political, and environmental context in which the UF initiatives under study are located has to be taken into account.

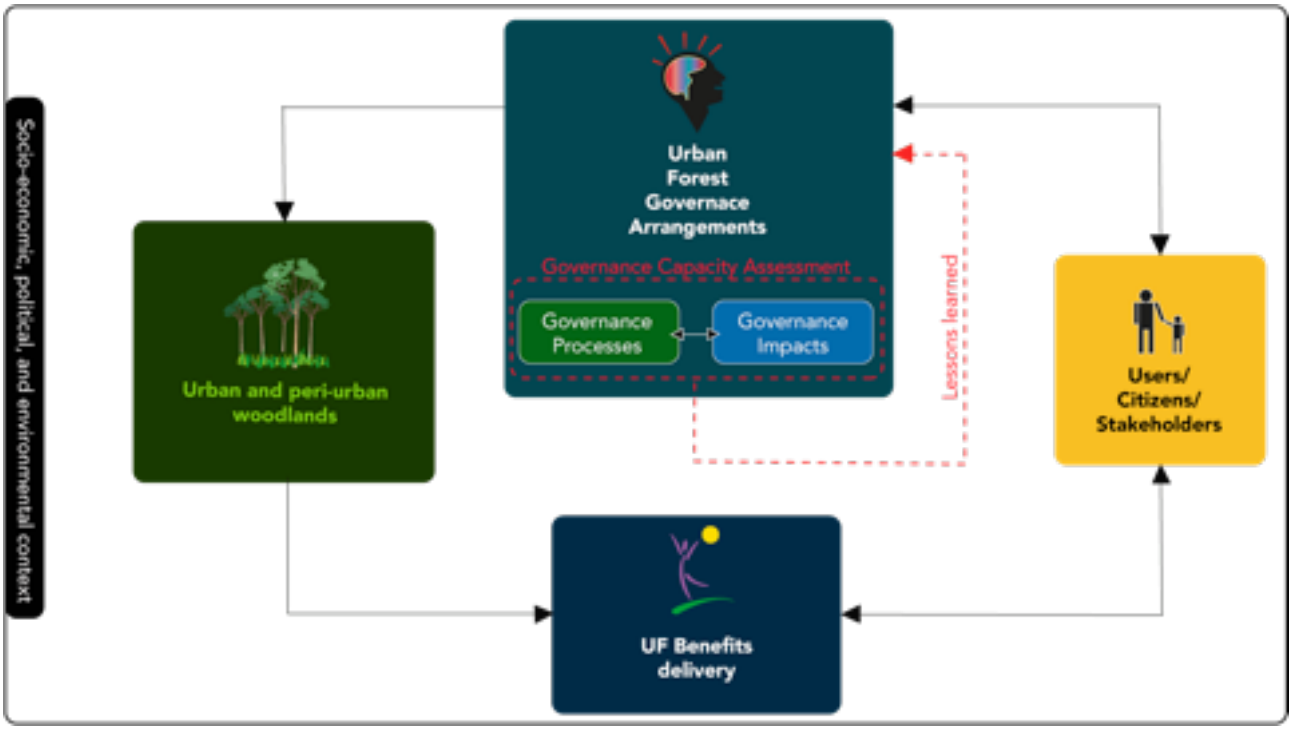

Fig.6. Conceptual framework illustrating the objective of this Ph.D. investigation

In order to have a comprehensive understanding of how UFG works and accordingly derive insightful lessons to govern and manage urban woodlands in a sustainable, resilient and cost-effective way, this doctoral investigation will focus on the following research questions:

1. What are the criteria that an UPF initiative must satisfy to be identified as successful from a governance perspective?

2. How can these criteria be used in order to understand how actors' decisions are made and their related impacts?

3. What lessons can be learned to improve UFs management from the assessment of their governance arrangements?

With regard to the above questions, in the next sections the conceptual background proposed for guiding the methodological framework and, consequently, answering them is presented.

3.2. Conceptual background

3.2.1. The Social Structuration Theory

The Social structuration theory elaborated by the British sociologist Anthony Giddens represents the theoretical basis of this investigation. In his book '*The Constitution of Society*', Giddens (1984:2) states: "*the basic domain of study of the social sciences, according to theory of structuration, is neither the experience of the individual actor, nor the existence of any of social totality, but social practices ordered across space and time*". In line with this statement, the theory of structuration highlights, in contrast with asymmetrical and dualistic perspectives on social sciences (i.e. structuralism and functionalism), how social systems are organized as regularized social practices, which are the foundations of the constitution of two dependent sets of phenomena: 'agency' - individual or group capabilities, intentional or unintentional, affecting the environment - and 'structure'– the physical and ideational conditions which define the range of actors' actions. These are the central elements structuring the Gidden's theoretical approach, which is based on the 'duality of structure', meaning that structures lead and limit agency's behavior and actions, while agencies influence social structures simultaneously. Therefore, structuration theory emphasizes the interplay between human agency and society rather than only one of them and focuses on processes rather than static patterns.

Giddens (1984) abstractly conceptualizes 'structure' as 'rules' and 'resources' that are produced and reproduced by interacting agents. Rules are described as an aspect of 'structure' composed by the normative elements and 'codes of signification' by groups; while resources are interpreted both as 'allocative resources' (material, e.g. land ownership and financial resources), which influence the physical environment, and as 'authoritative resources' (e.g. organizational, policy plans) influencing the action of human agents.

Furthermore, both rules and resources imply the generation and exertion of a range of casual powers. In Gidden's theory, power can be interpreted both in a 'broad' sense, referring to the ability to get things done and to make a difference in the world, and in a 'strict' sense, which implies domination of both human agents over nature (allocative resources), and of some agents over others (authoritative). In addition to that, actors can express the rules they apply in their practices discursively in order to reason their social conditions and, in particular, their actions. For describing it, Giddens uses the term 'discursive consciousness', which has to be distinguished from the 'practical consciousness' that is about the "stocks of unarticulated knowledge" that actors use to orient their actions (Giddens, 1984: 7).

As better discussed below, the concepts of rules, resources and discursive consciousness here presented have inspired the work of Arts & van Tatenhove (2004) and Leroy & Arts (2006) in developing the 'Policy Arrangement Approach' to investigate innovative policy and governance arrangements.

3.2.2. 'Political Modernization' and the 'Policy Arrangement Approach'

As mentioned in Chapter 2, the concept of governance was recently introduced to describe the shift from 'governing by government' to 'governing *with* and *even without* government' in the environmental policy field, including UPF (Konijnendijk, 2014; Hysing, 2009). It emphasizes the decentralization of the of governmental power, exerted by national and sub-national political institutions hierarchically organized to set and implement policies (Hysing, 2009; Kajer, 2004), in governing urban green and forested areas in favor of more democratic, inclusive and multi-centered governance arrangements, in which private and public societal actors are engaged, at various degrees, in the planning and management of public issues trough policy networks and various organizational structures (Jansson *et al.*, 2019; Arts & Visseren-Hamakers, 2012; Kajer, 2004). In this regard, inspired by the social structuration theory illustrated above, van Tatenhove *et al.* (2000) introduced the concept of 'political modernization' to understand long-term structural changes in the political domain in relation to practices, and *vice versa*, in contexts

characterized by new demands and rapid transformations (Arts & van Tatenhove, 2006). In particular, Arts & van Tatenhove (2004; 2006) interpret political modernization as an analytical and normative concept and tool aimed at capturing 'shifts in governance' and, in addition, understanding new roles and responsibilities among state, market agencies and civil society organizations. In analyzing political modernization as a relevant process in the environmental domain, Arts *et al*. (2006) observed several shifts in the policies of Western states thereafter the Second World War: from the '*early modernization'* phase - where the state was both the allocative and authoritative 'power container', and the main discourse lied in the ability of agents to shape the socio-physical reality ('manageable society') – to the current *'late modernization'* stage - where the idea of 'manageable society' is being redefined due to processes of change as globalization and individualization, and the discourses on governance, interdependence and cooperation between state, civil society, and market become central.

Political modernization processes implied the creation of innovative governance arrangements, also in the case of environmental governance – here defined as: "*the formal and informal institutions, rules, mechanisms and processes of collective decision-making that enable stakeholders to influence and coordinate their interdependent needs and interests and their interactions with the environment at the relevant scales*" (Tacconi, 2011:240). Indeed, as argued by several scholars (Frantzeskaki *et al.*, 2016; Young & McPherson, 2013; Bai *et al.*, 2010; Mol, 2009; Sellers, 2002), environmental governance plays a key role for experimenting innovative policies and practices aimed at transitioning towards more sustainable and resilient development and urbanization.

In this light, and in line with the work of Arts & van Tatenhove (2004) on political modernization, Leroy & Arts (2006) elaborated the concept of 'ecological modernization', which refers to structural changes in the environmental policy domain and, more specifically, to the interpretation of new forms of multi-level and multi-actor governance arrangements taking place. As observed by Konijnendijk (2014), the use of the term 'modernization' is to be interpreted in a positive way in relation to the emergence of new

and more democratic forms of environmental governance involving non-state actors and local communities.

In order to analyze and understand shifts in environmental governance, Arts & van Tatenhove (2004) developed the 'Policy Arrangements Approach' (PAA) by combining 'rules' and 'resources', as conceptualized by Giddens (1984), and actors and their partnerships with the Hajer's discourse theory (1995) that stresses the role of storylines and motivations behind policies and actors' practices. PPA is an analytical tool frequently applied in the field of (urban) environmental governance and policy analysis (e.g. Aalbers, 2019; Matijssen *et al.*, 2017; Ayana *et al.*, 2017), based on four analytical dimensions:

- ***Rules of the game***: this dimension defines a policy domain and, in particular, it refers to institutions as sets of legislation, regulations, and norms, that lead and limit the behavior of actors in raising issues, formulating policies and making decisions.

- ***Actors and coalitions*:** it refers to all the actors sharing resources and/or interpretations of policy discourses relating to the rules of the game. Actors may strategically form coalitions or partnerships in order to strengthen their influence for the achievement of their targeted goals.

- ***Resources/Power***: the concepts of resources and power are strictly linked. It is due to the fact that the latter refers to the mobilization, sharing, and deployment of resources and, therefore, to the capacity of agents to significantly influence who determines policy outcomes.

- ***Discourses*:** this dimension refers to the interpretative schemes, including, for example, both formal policy contents to popular storylines, that are produced, reproduced, and transformed in a particular set of practices in order to give meaning to a policy domain.

The four dimensions of the PAA are interlinked, hence any change of one of them induces change on the others, as illustrated by the tetrahedron in Fig.7.

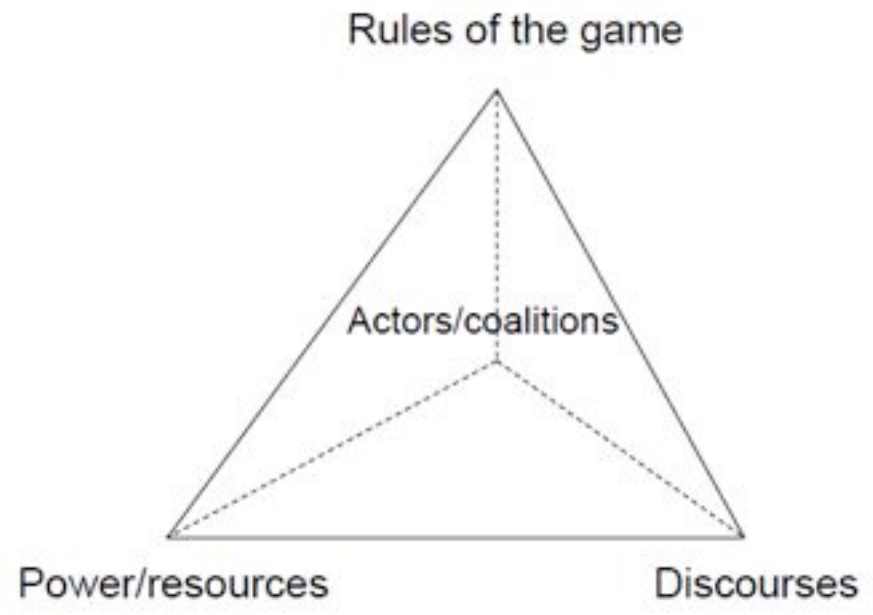

Fig.7. Policy Arrangements Approach's dimensions

(source: Liefferink, 2006:48)

3.2.3. The 'Governance Capacity Approach'

Answering the research questions of this study requires the adoption of a theoretical approach to guide the assessment of UFG processes and impacts. As illustrated above, the PAA is an analytical tool that cannot be applied to assess UF policies or governance arrangements. In this regard, Arts & Goverde (2006:69) argue that: "[the PAA] helps to describe, understand and explain policy practices from a specific perspective, but it does not offer instruments to evaluate and prescribe policy making". Hence, in line both with the theoretical concepts aforementioned and the existing approaches developed and applied by scholars for evaluating/assessing different aspects of forest governance at various scales (see Chapter 2), for this study the 'Governance Capacity Approach' (GCA) (Arts & Goverde, 2006) was chosen to guide the assessment of UFG in urban woodlands. GCA has some relevant similarities with the PAA. Both refer to the scientific literature

strand related to innovative environmental governance and adopt a critical approach to policy analysis (Arts & Goverde, 2006). Moreover, as observed by Dang *et al.* (2016), GCA and PAA represent different aspects of policy-making, with the latter referring to the 'what' (e.g. actors' discourses, problem identification and goals delineation), and the former indicating the 'how' (actors' actions and strategic policy-plan).

The concept of governance capacity was introduced to assess the capacity of emerging types of governance arrangements during the 1980s as response to several changes in public administration - e.g. privatization, agencification, decentralization, and public participation (Di Mascio & Natalini, 2018; Kjær, 2011; 2004). In urban context, governance capacity is described as the ability of actors and stakeholders to cooperate with the aim of successfully limiting or solving societal problems and enhancing people' quality of life (Dang *et al.*, 2016; Arts & Goverde, 2006; González & Healey, 2005; Nelissen, 2002). It is influenced by several factors as: interactions between private and public actors and their respective behavior; formal and informal rules shaped by institutions and agents; allocation of resources enabling actors' and partnerships' actions and practices; and meaningful inclusion of actors' and stakeholders' discourses within the decision-making (Dang *et al.*, 2016; Kjær, 2011; Arts & Goverde, 2006; González & Healey, 2005; Kooiman, 2003).

Different types of governance capacity have been investigated by scholars in the last few years. They have focused on diverse aspects such as e.g. knowledge coproduction (van der Molen, 2018), effective change enabling (Koop *et al.*, 2017), flexibility (Termeer *et al.*, 2015), integration (Emerson *et al.*, 2012), or innovation (González & Healey, 2005). However, for this study, considering the overall aims and research questions, the focus is on actors' cooperation and, in particular, on institutional capacity and governance performance of UFG (Fig.8), concepts that are presented in more detail below.

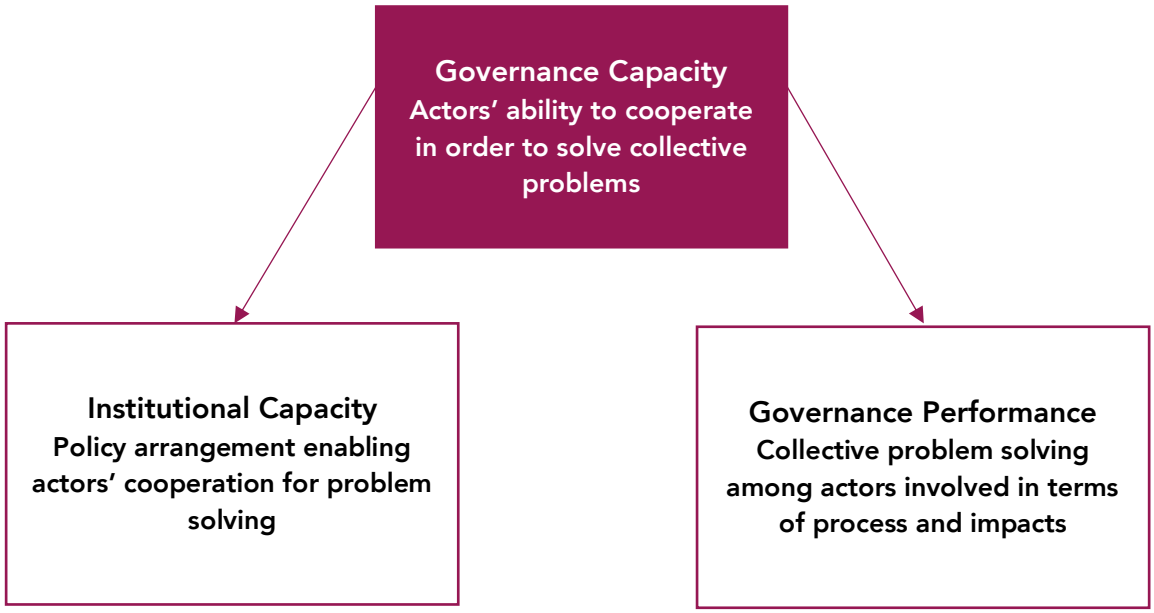

Fig.8. 'Governance Capacity Approach' conceptual scheme

(source: reproduced from Dang *et al.*, 2016:5)

Institutional capacity refers to the potential that actors and stakeholders have to contribute to the solution of societal issues, for whose purpose they have been created, carrying out certain practices and activities (Dang *et al.* 2016; Nelissen *et al.*, 2000). It implies that a governance arrangement is structured and organized in such a way – e.g. allocation of adequate resources, involvement of key actors, and inclusion of different discourses - that it enables actors and stakeholders to effectively interact and cooperate in order to achieve common objectives and avoid failure due to lack of congruence (Arts & Goverde, 2006). The term congruence was borrowed by Arts & Goverde (*ibid*) from Boonstra (2004), pointing out that institutional governance capacity should be assessed paying particular attention to the coherence among the policy dimensions. With regard to this, the authors take into account three types of congruence:

1. ***strategic*:** it refers to the extent to which actors are able to share discourses and respective interests. This can be improved through deliberation and mutual learning among all those involved in the decision-making process (e.g. organization of workshops, digital labs, scenario-building session);

2. ***structural-internal****:* it refers to the coherence between the different dimensions of a policy arrangement. In particular, it concerns the coherence between actors' and stakeholders' views, rules of the game, and available resources characterizing a certain policy arrangement. Its enhancement can be attained by e.g. including or excluding certain actors and stakeholders, choosing to allocate or not certain resources, and changing or updating rules of the game;

3. ***structural-external*****:** this indicates the extent to which the policy arrangement is included in the wider institutional framework. This type of congruence, despite all the difficulties, may be improved in the long-term by reshaping structures and reviewing policy recommendations in line with the context of reference and related priorities.

Governance performance indicates the realized capacity of governance arrangements to carry out all those activities that are meant to accomplish actors' objectives in order to solve or limit societal problems (Dang *et al*. 2016; Arts & Goverde, 2006; Graham & Fortier, 2006). In the context of this study, it can be described as the capacity to affect UFs management decisions and the related impact of actions taken by the steering bodies. Its assessment is based on the notion of good governance – here understood as governance characterized by inclusive and transparent decision-making, accountability of actors, and also by efficient and effective management and equitable allocation of resources, as well as fair distribution of benefits (Konijnendijk *et al*., 2018; FAO, 2011) - and the *JEP-Triangle* (Nelissen, 2002). The latter (see Fig.9) is a fine tool introduced by Nelissen *et al*. (2000) to assess the performative capacity of innovative governance arrangements shaped by a three-way approach, referring to the corners of the triangle, integrating various and interacting logics and criteria:

1. ***Juridical approach****:* it refers to the fact that government bodies, usually, operate within a democratic and constitutional context and, for this reason, they have to

conform to several principles - such as e.g. legality, impartiality, representation, and equity - which influence decision-making processes, their contents, and final deliberations;

2. ***Economic-managerial approach**:* this indicates the effective execution of tasks and activities by governmental or governance bodies. This approach may relate to the use of criteria such as e.g. effectiveness, efficiency, implementation capacity, and maintainability, which are needed to assess the success of public and private governing bodies' actions and improve them in the medium- and long-term;

3. ***Socio-political approach**:* this approach acknowledges the structural and cultural values of democracy. It may refer to criteria such as e.g. political representativeness, distribution of power among actors, transparency of decision-making, openness, and participation, to assess governance arrangements (Arts & Goverde,2006; Nelissen, 2002; Nelissen *et al.*, 2000).

Fig.9. JEP-Triangle scheme for assessing good governance in UPF

(source: Arts & Goverde, 2006:77)

Arts & Goverde (2006) argue that governance capacity is shown by the type of interaction and conflicts between the three dimensions described above. Indeed, as illustrated in Fig.12, the ribbons of the triangle refer to different interacting and, in some case, conflicting principles – i.e. flexibility, legality, accountability, responsivity, certainty, participation, and autonomy – that each one of the three approaches described above needs to ensure for improving the quality of UFG in a certain context. In this regard, considering its influence in terms of socio-economic, institutional, and environmental conditions and changes (Dang *et al*. 2016; Macura *et al*., 2015; Nelissen, 2002), for the assessment of institutional capacity and governance performance it is crucial also to be attentive to the context influencing actors' actions in the planning and management of urban and peri-urban woodlands.

For the scope of this investigation, the theoretical concepts described in this chapter and, in particular, the PAA's analytical dimensions combined with the GCA were adopted as a basis to develop the assessment framework and related criteria (see Chapter 4) needed to investigate UFG processes and impacts.

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4. Methodological framework

4.1. Research philosophy and design

Considering the theoretical approaches discussed in the previous chapter, this one presents the methodological framework of this study by describing the research philosophy adopted and the related methods chosen to answer research questions.

This study is based on the constructivist scientific research philosophy, also called interpretivism, which assumes that scholars interpret the social reality subjectively, on the basis of their background, experiences and interests (Creswell, 2009). In line with this, the study approach is based on qualitative methods, which allow providing a detailed description of the social reality under study, although quantitative methods can be used too. As stated by Creswell (2009:8) "*qualitative researchers seek to understand the context or setting of the participants through visiting this context and gathering information personally. They also interpret what they find, an interpretation shaped by the researcher's own experiences and background*".

Taking into account also the interdisciplinary nature of UFG as a research topic and the focus of this study on poorly explored issues, a deductive research approach was adopted. It is key to support the generation of new knowledge and theoretical clarification useful for future research, as well as for guiding policy-makers, by a theory testing process aimed at proving if the theoretical concepts, approaches and methods highlighted in international scientific literature (see Chapter 2) apply to the empirical analysis of case studies object of this investigation (Flick, 2009; Hyde, 2000).

In this light, following the constructivist research philosophy, for this doctoral investigation a case study research strategy was adopted to answer research questions and address knowledge gaps identified in international scientific literature. Case study is acknowledged as a fine research design to answer to 'how' and 'why' research questions (Yin, 2017), as in this case, and for studying in-depth, as well as assessing, complex social phenomena such as UFG arrangements. Yin (2014:49) describes case study research with a definition highlighting its scope: *"[case study] is an empirical inquiry that investigates a*

contemporary phenomenon (the "case") in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident", while Flyvbjerg, (2006) acknowledges case study research as crucial to investigate context-dependent complex issues, as UFG, and, through their in-depth analysis, develop new theoretical insights as a result of their generalizability.
Furthermore, as argued by Yin (2014:44): *"the case study's unique strength is its ability to deal with a full variety of evidence – documents, artifacts, interviews, and observations"*. In this regard, a multimethod approach including document analysis, semi-structured interviews, site visits and web-based surveys was adopted for this study and, in addition, as better illustrated below, several selection criteria have been applied to identify the most appropriate and feasible case studies for pursuing the scope of this investigation.

4.1.1. Comparative case study research and selection process

As widely acknowledged in scientific literature, case selection is a key stage for properly applying a case study research design (Gerring, 2008; Seawright & Gerring, 2008; Geddes, 1990). For this investigation case studies were carefully and strategically chosen in order to assess UFG arrangements. Among the various existing approaches for performing case studies selection, here an 'information-oriented selection strategy' was applied. This type of selection strategy refers to the '*maximum variation case*', which allows to *"obtain information about the significance of various circumstances for case process and outcome"* (Flyvbjerg, 2006: 34). Further, a comparative case study approach was adopted due to its strength in stimulating theory-building by examining two or more cases and producing context-dependent knowledge from which theoretical generalization can be developed, although it is not always possible (Flyvbjerg, 2006). However, for the scope of this study it seems appropriate to compare at least two case studies in order to understand the complexity of UFG and explain how different factors in a certain context may influence the success or failure of UF initiatives from a governance perspective.
Aiming to select representative and different case studies, several criteria were used to choose among a wide-range of UF initiatives across Europe (see Tab.3). The intention was

to select at least two 'diverse case studies' characterized by several different features in order to improve the representativeness of the cases (Seawright & Gerring, 2008). The criteria applied for the selection process refer to:

1. ***Different spatial governance and planning systems****:* spatial governance and planning systems (SGPSs) are crucial for defining land-use in cities, guiding and controlling urban and territorial development, and engaging multiple actors in decision-making (Berisha *et al.*, 2020). SGPSs can be described as 'institutional technologies' allowing public authorities to steer physical transformations in urban areas through the allocation of spatial development rights (Janin Rivolin, 2012). Based on the classification of existing European model of SGPSs undertaken by Berisha *et al.* (2020), which cluster them into five main groups (see Tab.2), this criterion aims at providing a wide representative of governance and spatial planning families in the selection of UFG arrangements to be assessed. As illustrated in Tab.3, to carry out the cases selection various examples of UF initiatives, clustered on the basis of their respective spatial governance and planning systems, were taken into account.

2. ***Longstanding UF initiatives and mature (peri-) urban woodlands****:* in order to assess the processes and impacts of UFG arrangements, the case studies selected need to be characterized by mature woodlands and trees as factors expressing long-standing UF management and maintenance practices. Indeed, mature urban and peri-urban woodlands - where trees have been growing for at least 10-20 years - are potentially able to fully provide ESs they were planted to, in comparison to younger trees (ISA, 2013). In this view, selecting case studies with enduring management activities allows to better understand how decisions made over time have shaped the areas object of study and influenced governance impacts.

3. ***Diverse UFG arrangements****:* in the selection of the case studies great prominence was given also to the difference among the UFG arrangements identified across Europe (see Chapter 2). It is important in order to study in-depth urban and peri-urban woodlands characterized by diverse governance dimensions such as, for instance: size, form of organization, location, budget, and different governance style and management approach.

4. ***Pragmatic criteria****:* selection of case studies was also influenced by pragmatic criteria such as: availability of reliable data and information; availability of experts on the topic for collaborating with and to be hosted as visiting PhD research fellow; working language.

As illustrated below (Tab.2 and Tab.3), the suitability of the various UF initiatives identified to be selected as case studies was explored by matching them to the criteria described above. In this regard, a decreasing relevance was assigned to the criteria following this order: (i) long-standing UF initiatives and mature urban woodlands; (ii) pragmatic criteria; (iii) difference in types of UFG arrangements; and (iv) dissimilarity in SGPSs. As a result, some were excluded not fitting the *longstanding UF initiatives and mature (peri-) urban woodlands-criterion* – i.e. *Bosco della Giretta* (Milan, Italy) and *Picasso Food Forest* (Parma, Italy) both established less than 30 years ago. Next, cases whose investigation could have been negatively affected by possible language barriers were also omitted – i.e. Beneasa Forest (Bucharest, Romania); *Bois de Boulogne* (Paris, France); Bratislava Forest Park (Bratislava, Slovakia); Kanuni Sultan Süleyman Urban Forest (Istanbul, Turkey); Saxon Garden (Warsaw, Poland); Tivoli Park (Ljubljana, Slovenia); Zvezdara Forest (Belgrade, Serbia). Additionally, referring again to pragmatic criteria, the Belvoir Park Forest (Belfast, Northern Ireland), Collserola Park (Barcelona, Spain), Djurgården (Stockholm, Sweden), Epping Forest (London, England); *Jægersborg Dyrehave* (Copenhagen, Denmark), Sonia Forest (Warsaw, Polonia), were not taken into account due

to the difficulties in accessing to secondary data, and/or lack of key contacts or relevant institutions studying UPF to be hosted as visiting Ph.D. fellow to conduct the fieldwork.

Among the cases fitting all the criteria, *BoscoinCittà* (Wood-in-the-City), Milan, Italy, *Amsterdamse Bos* (Amsterdam Forest*)*, Amsterdam, Netherlands, and *Volkspark Licthtenrade*, Berlin, Germany, were selected as the most suitable cases for this investigation. The main reason behind this choice lies in the willingness of assessing three very different UFG arrangements (see Tab.4): municipality-led (*Amsterdamse Bos*); co-governance (*BoscoInCittà*); and organized-initiated grassroots (*Volkspark Licthtenrade*). Moreover, they also present differences in terms of SGPSs (see Tab.3), respectively: the Italian 'conformative system', which gives rights for spatial development through a preventive binding zoning and assign responsibility for projects compliance to the developers; and the Dutch and German 'market-led neo-performative systems' that is characterized by the adoption of binding zoning and the approval of the development projects before the assignment of spatial development rights (Berisha *et al.*, 2020). Additional reasons that made them more suitable than others refer, especially for *BoscoInCittà* and *Amsterdamse Bos*, in their status as flagship UF initiatives in the European context (Forrest & Konijnendijk, 2005), having inspired similar UF projects in other countries, and the poor attention paid to the study of their governance aspects in international scientific literature. Finally, the availability of data, information and experts, both in the Italian and Dutch contexts, as well as the opportunity to be hosted as visiting research fellow at the Wageningen Environmental Research institute, Wageningen, Netherlands, to study in-depth the Dutch case study, have been all decisive factors in the selection of these cases.

However, in the end, the initial intention to include in the study a third case, the *Volkspark Licthtenrade* (Berlin, Germany), was later ruled out because of the limitations due to the Convid-19 pandemic and related difficulties in properly investigating it, therefore, only the UFG arrangements of *BoscoInCittà* and *Amsterdamse Bos* were investigated and assessed.

Tab.2. European Spatial Governance and Planning Systems (SGPSs) and potential UF case studies

(adapted from Berisha *et al.*, 2020)

Spatial Governance and Planning Systems	Description	Countries	Potential Case Studies
State-led systems	Spatial development mainly state-driven	Denmark, Finland, France, Iceland, Ireland, Norway Sweden, UK	Djurgården, Stockholm, Sweden; Jægersborg Dyrehave, Copenhagen, Denmark; Belvoir Park Forest, Belfast, Northern Ireland, UK; Epping Forest, London, England, UK; Richmond Park, London, England, UK; Bois de Boulogne, Paris, France;
Market-led neo-performative systems	Spatial development driven by state-market mixed interests	Austria, Czech Republic, Estonia, Germany, Latvia, Lithuania, Netherlands, Slovakia, Slovenia, Switzerland,	*Amsterdamse Bos*, Amsterdam, Netherlands; Grunewald, Berlin, Germany; Volkspark Lichtenrade, Berlin, Germany; Bratislava Forest Park, Bratislava, Slovakia; Tivoli Park, Ljubljana, Slovenia;
Conformative systems	Market-driven spatial development with different degrees of public authorities' control	Belgium, Bulgaria, Croatia, Greece, Hungary, Italy, Liechtenstein, Luxemburg, Portugal, Spain, Turkey, Romania	*BoscoInCittà*, Milan, Italy; Parco Nord, Milan, Italy; *Bosco della Giretta*, Milan, Italy; Monsanto Forest Park, Lisbon, Portugal; Collserola Park, Barcelona, Spain; Baneasa Forest, Bucharest, Romania; Sonian Forest, Brussels, Belgium; Kanuni Sultan Süleyman Urban Forest, Istanbul, Turkey; Picasso Foof Forest, Parma, Italy
Proto-conformative systems	Spatial development driven by market forces. State-led implementation of plans and top-down relations between levels of planning	Albania, Bosnia & Erzegovina, Macedonia, Montenegro, Serbia, Kosovo	Zvezdara Forest, Belgrade, Serbia;
Misled performative systems	Public authority assigns land-use and development rights on a case-by-case basis. Spatial development is primarily market-driven	Cyprus, Malta, Poland	Saxon Garden, Warsaw, Poland;

Tab.3. Potential UF cases associated with case study selection criteria

UF Initiative	Country	City	Longstanding UF initiatives and mature (peri-) urban woodlands	UFG arrangements (see Buijs et al., 2016)						Pragmatic criteria			
			Established more than 30 years ago	Grassroots initiatives	Organized-initiated grassroots	Co-governance	Public-private partnership	Goverment-led	Other	Secondary data availability	Potential working language barriers	UF experts availability (External PhD supervisors)
Amsterdamse Bos	Netherlands	Amsterdam	x					x		x		x
Baneasa Forest	Romania	Bucharest	x						x		x	
Belvoir Park Forest	Northern Ireland	Belfast	x					x		x		
Bois de Boulogne	France	Paris	x					x		x		
BoscoInCittà	Italy	Milan	x			x				x		x
Bosco della Giretta	Italy	Milan				x				x		x
Bratislava Forest Park	Slovakia	Bratislava	x				x				x	
Collserola Park	Spain	Barcelona	x					x		x		
Djurgården	Sweden	Stockholm	x					x		x		x
Epping Forest	England	London	x					x		x		x
Grunewald Forest	Germany	Berlin	x					x		x		x
Jægersborg Dyrehave	Denmark	Copenhagen	x					x		x		
Kanuni Sultan Süleyman Urban Forest	Turkey	Istanbul	x					x			x	
Monsanto Forest	Portugal	Lisbon	x					x		x		
Parco Nord	Italy	Milan	x					x		x		x
Picasso Forest	Italy	Parma	x	x						x		
Richmond Park	England	London	x					x		x		x
Saxon Garden	Poland	Warsaw	x					x			x	
Sonian Forest	Belgium	Brussels	x					x			x	
Tivoli Park	Slovenia	Ljubljana	x					x			x	
Volkspark Lichtenrade	Germany	Berlin	x		x					x		
Zvezdara Forest	Serbia	Belgrade	x					x		x	x	

4.2. Methods and data collection

Document analysis

Document analysis is a qualitative method to collect secondary data needed to study in-depth the case studies selected. It implies reading and analyzing scientific literature (i.e. peer-reviewed journal articles, books and book chapters) and grey literature (e.g. policy and planning documents, official reports, websites and newspaper articles). As stated by Merriam (1988:118): "*document of all types can help the researcher uncover meaning, develop understanding, and discover insights relevant to the research problem".* In line with this, Bowen (2009) observed how document analysis can serve several functions such as e.g. gathering information on the context and historical background of case studies; helping to generate interview research questions; providing supplementary research data (e.g. empirical data); understanding changes over time (e.g. in relation to governance or management approach evolution); and verifying data gathered from different sources.

In this vein, the sources to be analyzed include technical reports and planning and policy documents (see Annex 1), which were identified by querying a search engine as Google. In this case, particular attention was paid to resources available on the websites of *Amsterdamse Bos* and *BoscoInCittà* and related public authorities (e.g. Municipalities of Milan and Amsterdam). In addition, some of the documents not available online were also provided by the staff managing the two peri-urban woodlands (e.g. *Piano di Assesstameto Forestale Semplificato 2015-2030* of *BoscoInCittà*).

Moreover, scientific literature papers were searched according to several integrated eligibility criteria. Studies selected were limited to English- and Italian-language scientific peer-reviewed articles, including book chapters, conference proceedings and research notes, published in the last 50 years - an adequate timeframe considering that the two cases were established in 1934 and 1974, respectively. The literature search was performed in September 2019 using a scientific digital database as Scopus. Studies were sought using several keywords to be found in the articles title, abstract and keywords of the papers: 'BoscoInCittà'; 'BoscoInCittà' and 'governance'; 'BocoInCittà and

'management'; 'BoscoInCittà' and 'urban forestry'; 'BoscoInCittà' and 'policy'; 'Amsterdamse Bos' and 'governance', 'Amsterdamse Bos' and 'management'; 'Amsterdamse Bos' and 'urban forestry'; 'Amsterdamse Bos' and 'policy'. In total only 5 articles were retrieved, which confirms how the two cases have been poorly studied by scholars. Full papers were downloaded from Scopus when possible, otherwise from other online scientific databases (i.e. ResearchGate and Academia.edu). Additionally, cited references found in the selected scientific articles retrieved considered as particularly valuable to study in-depth the UFG arrangements under analysis were taken into account (see Annex 1 for the full list). Finally, through a text analysis (Krippendorff, 2018), the papers and documents were classified on the basis of the PAA's dimensions (see section 3.2.2).

Sites visits and observations

Site visits, field notes and observations have been used for this study. They were important for getting familiar with the peri-urban woodlands areas object of the study and, in particular, to identify their landscape elements, multifunctional venues and facilities and also to understand how residents and visitors behave within the parks, despite the limitations to the Covid-19 restriction measures applied in the two Countries.

During the site visits, field notes were taken as written record of field observations for providing a contextual description of observable elements of a field setting (e.g. time and data observations were made, characteristics of people in the setting) and, for example, the description of social processes and key interactions (Silverman, 2011). In addition to field notes, site visits and observations have been conducted also using a useful tool such as photography (*Ibid*). Information were collected also during workshops and seminars attended debating the selected case studies and their governance, in particular: *World Forum on Urban Forests* (Mantua, 2018; Milan, 2019); *Le Città come Foreste Urbane: da Expo 2015 all'Agenda 2030* (Cities as Urban Forests: from Milan Expo 2015 to the 2030 Agenda) (Milan, 2019);

Semi-structured interviews

In combination with document analysis, interview is a critical qualitative method for gathering information from a multiple viewpoint in order to present a picture of the case studies as much comprehensive as possible. Research interviews are central to gain data on a specific phenomenon, especially if the interviewees are key informants with different backgrounds, knowledge, and perspectives on UFG and management (e.g. regional and municipality officials on both strategic and operational level, local entrepreneurs, academicians, etc.).

For this study, open-ended semi-structured research questions (see Annex 2 and 3) were used as method to gain detailed insights on actors' views on the UFG arrangements in the selected case studies (Silverman, 2011). Key informants to be interviewed were selected following a 'convenience sampling strategy' (Gentles *et al.*, 2015), which implied the selection of actors and stakeholders able to provide in-depth and valuable information on the phenomena under investigation (Carpenter & Suto, 2008). In this regard, designing open-ended semi-structured questions was particularly useful for structuring the interviews as a natural conversation between the interviewer and the respondents (Wengraf, 2001).

Web-based surveys

A mixed (quali-quantitative) survey was set to gather views from experts external to the governance arrangements object of the study but well-informed about their processes, structures and activities.

This method was chosen to limit as much as possible potential biases and avoid a self-assessment from actors directly involved in the governance and management of *BoscoInCittà* and *Amsterdamse Bos*. The purpose of the web-based surveys was to collect information about several aspects of the two UFG arrangements, in line with the criteria included in the assessment framework (see section 4.3.1. below), namely: participation; strategic planning and management; vertical and horizontal integration; monitoring and evaluating activities; resources allocation; and effectiveness. In this vein, two online

questionnaires, one for each case study, were created using *Google Forms*[11], which was identified as a fine web service for the purpose of this study, considering also the limited scale of the survey, and sent by email to a list of potential responders between May and August 2021.

Responders, mostly municipal officers and academics working on UPF-related issues, were identified through a snowball sampling (Parker *et al*. 2019). They were asked to fill out the questionnaire through an initial invite sent via email, followed, when required, by a reminder email after two weeks. Each of the questionnaires contained a list of 37 open-ended and multiple-choice questions (in Italian for *BoscoInCittà* and in English for *Amsterdamse Bos*) (see Annexes 4 and 5), developed on the base of both data collected through the other aforementioned methods and the critical review of the literature concerning UFG and assessment approaches (see Chapter 2).

Triangulation of data collected

Improving and verifying data and information collected through the diverse methods illustrated above requires the triangulation of different sources of evidence (Yin, 2014). Triangulation is a qualitative research strategy implying the use of multiple research methods and data sources useful to develop a more comprehensive picture of the *phenomena* under study (Patton, 1999). Indeed, the alignment of multiple views and perspectives deriving from diverse sources of data is key for enhancing the quality, credibility and validity of data collected (Denzin, 1978).

Among the different triangulation types described in the literature (see e.g. Denzin, 2015; Flick, 2004), for this investigation, the triangulation of data collected (Denzin, 2015) through the use of different qualitative and quantitative methods – i.e. document analysis, semi-structured interviews, and web-based surveys – was applied as a strategy to validate the different data sources by comparing and cross-checking them. This process was important to gain a more detailed and in-depth understanding of UFG arrangements

[11] https://www.google.com/forms/about/

object of the study, especially considering their complexity due to the involvement of numerous actors and stakeholders operating at different scales and bringing into decision-making diverse interests.

4.3. A framework to assess urban forest governance capacity

Considering the theoretical concepts introduced in the previous chapter (Chapter 3), combining the *Governance Capacity Approach* (GCA) and *Policy Arrangement Approach* (PAA) allows to develop a framework to interpret the data collected through the methods illustrated above and, therefore, assess both types of governance capacity, institutional capacity and governance performance.

As suggested by Dang *et al.* (2016), to develop the governance capacity assessment framework (see Tab.6) three steps need to be followed: (i) departing from the *actor, stakeholders and partnership* governance dimension as entry point due to their key role in making decisions and shaping the other governance dimensions - i.e. *discourses, institutional framework, and resources and activities* - from which they are in turn affected; (ii) define the criteria needed to operationalize the governance capacity elements and, therefore, assess institutional capacity and governance performance for *BoscoInCittà* and *Amsterdamse Bos*; (iii) taking into account the interlinkages between governance capacity elements and the wider socio-economic and environmental context characterizing the two cases selected. In this light, the assessment framework and related criteria, illustrated in Fig.10, were adapted from Dang *et al.* (2016), whose work refer to the assessment of the national forestry reform in Vietnam, to a site level (peri-urban woodlands). The choice of this framework was dictated by the necessity of assessing both governance processes and impacts and answer the first two research questions of this study (see Chapter 3), namely: (i) What are the criteria that a UPF initiative must satisfy to be identified as successful from a governance perspective? (ii) How can these criteria be used in order to understand how actors' decisions are made and their related impacts?

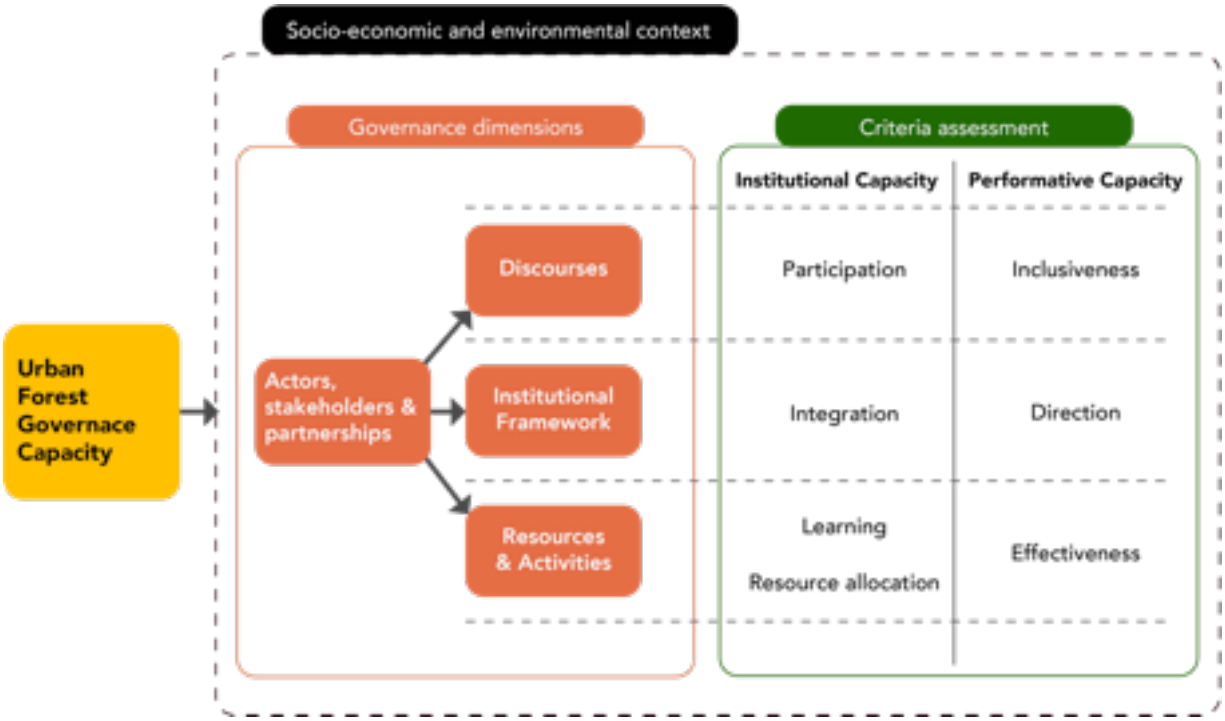

Fig.10. Urban Forest Governance Capacity Assessment Framework

(adapted from Dang *et al.*, 2016)

4.3.1. Detecting the framework: governance elements and assessment criteria

Criteria selected to assess the potential capacity, i.e. institutional capacity, and realized capacity, i.e. governance performance, in the two cases are based both on issues highlighted in scientific literature and emerged through the critical review of the literature (see Chapter 2), as well as on insights arose during the fieldworks carried out in Milan and Amsterdam, are described below.

Taking into account the participatory nature of UPF (Sheppard *et al.*, 2017; Konijnendijk, 2012; Randrup *et al.*, 2005), in order to understand to what extent the ***discourses*** on which *BoscoInCittà* and *Amsterdamse Bos* were established and managed over time are shared among actors and stakeholders involved, two criteria were adopted. Referring to institutional capacity, the criterion ***participation*** focuses on the presence of formal/informal rules, venues, and specific procedures, crucial for enabling and fostering the participation and representation of different actors' and stakeholders' discourses and interests (Bennett & Satterfield, 2018; Lockwood, 2010). Indeed, to develop shared

discourses and relating visions and strategies it is crucial to adopt rules defining in which way civil society can be engaged (Conrad, 2011), provide spaces/venues where to arrange their meetings (Carcasson & Sprain, 2010), and design suitable engagement processes to appropriately gather their inputs (e.g. workshops, roundtable, surveys) (Bryson *et al.*, 2013). To assess the nature and quality of participation approaches respectively adopted in the two case studies, ***inclusiveness*** was used as a criterion to investigate the extent to which different actors' and stakeholders' discourses are actually taken into account within the decision-making process allowing them to meaningfully influence final decisions and related actions. Integrating a wide range of participants' views into the policy-making process is believed to lend greater legitimacy and equality to planning and management decisions, as long as the powerless stakeholders are allowed to influence final deliberations (Aitken, 2010; Carcasson & Sprain, 2010). As observed by Díaz-Reviriego *et al*. (2019:457), "*inclusiveness has not only a procedural dimension, but also a substantive dimension, relating to the inclusiveness, or otherwise, of the outcomes generated through these procedures*". In this regard, reference is made to the '*public participation spectrum in woodland planning'* (Fig.11) to assess inclusiveness and understand who is involved, when and how, and what their actual contribution to policymaking is.

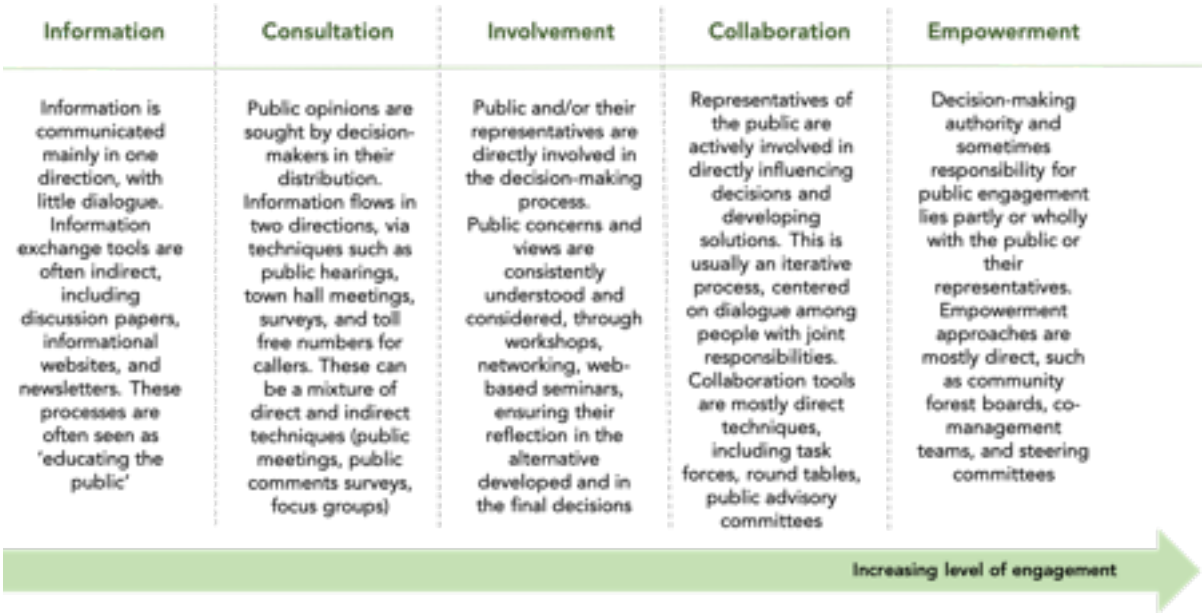

Fig.11. Public participation spectrum in urban forest planning

(source: adapted from Sheppard *et al.*, 2017; and Conrad, 2011)

Concerning the second element of governance capacity, ***institutional framework***, in terms of institutional capacity the focus is on the integrative principle of UPF (Konijnendijk, 2012; 2014) and its relevance in terms of UF planning and governance. In particular, the criterion ***integration*** refers to the assessment of the coordination of urban woodland plans' vision with other sectoral urban and territorial policies and plans – e.g. climate change, education, green infrastructure network, well-being and health, etc., bringing the policy 'silos' together (***horizontal integration***), and their connection between different governance levels (multi-level governance) to understand whether coordination mechanisms with other public or/and private actors and stakeholders are in place (***vertical integration***) (Coffey *et al.*, 2020; Secco *et al.*, 2014; Lockwood *et al.*, 2010). These two types of integration are acknowledged as crucial for influencing urban woodland planning and management strategies (Ordóñez *et al.*, 2020). Looking at governance performance, here the assessment focuses on urban woodland strategic policy-plans and their role within the wider urban and territorial context. Successfully planning and managing urban trees and woodlands requires the adoption of a strategic plan which is crucial to guide the optimization of forest ESs delivery, and related reduction of EDs, and attain the desired outcomes in a multifunctional perspective (Wirtz *et al.*, 202; Randrup & Jansson, 2020). Therefore, the criterion ***direction*** aims to examine the adoption, or not, by the two governance arrangements selected as case studies of a strategic policy-plans comprehensively and clearly defining urban woodland management aims, goals, actions, and an appropriate timeframe (Bennett & Satterfield, 2018; Lockwood *et al.*, 2010; Graham *et al.*, 2003), as result of their horizontal and vertical integration. As argued by Gibbons & Ryan (2015:615), a comprehensive urban woodland strategic plan "*reviews the current state of the resource, includes a vision for the future state with goals and objectives, addresses goals and objectives with specific action steps for implementation, and includes a plan for monitoring progress toward those goals and vision*".

Finally, as third element of the governance capacity framework, ***activities and resources*** have been assessed using several criteria. Concerning institutional capacity, ***learning*** refers to the implementation of regular monitoring and evaluation activities of key environmental

and socio-cultural elements and values, including also communication of their findings to public authorities and civil society aiming to co-produce knowledge and respond to findings influencing the decision-making process (Bennett & Satterfield, 2018; Gibbons, 2015). Furthermore, ***resource allocation*** concerns the available resources - i.e. land, funding, staff, knowledge, expertise - enabling actors to carry out their activities and achieve the targeted-goals or the key values inspiring the management of the two peri-urban woodlands. Considering the resources allocated, targeted-goals, and actions defined by the adoption of strategic and operational plans, it is key assessing the ***effectiveness*** of actors' decisions to understand their impacts. Effectiveness is here understood as the extent to which governance arrangements are capable of achieving their targeted-goals (Graham *et al.*, 2003), particularly referring to environmental (i.e. woodland and natural resources quality; improved biodiversity; linkages with other urban green areas) and socio-cultural outcomes (i.e. well-being and health benefits perceived; improved skills and knowledge; community development).

Finally, as suggested by Dang *et al.* (2016), to complete the assessment it is needed to take into account both the inter-linkages between each element of the framework, and the urban and socio-economic contexts influencing respectively the governance arrangements in Milan and Amsterdam.

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5.Setting the context: introducing case studies and their governance arrangements

This chapter introduces the two case studies selected for this doctoral investigation, *BoscoInCittà* and *Amsterdamse Bos*. It is aimed at illustrating the main governance dimensions – e.g. actors, stakeholders, discourses, rules and activities - characterizing the two UF initiatives as a propaedeutic analysis to inform the assessment of their governance capacity, which is presented in the next chapter. In this regard, in the next two sections, in line with the PAA's analytical dimensions (see section 3.2.2.), the cases are analyzed to understand how and by whom these UF initiatives were established, for what reasons, under what institutional frameworks, and what their role is within the wider urban contexts in which they are located.

5.1. *BoscoInCittà,* Milan, Italy

Milan is internationally recognized as a tertiary city-hub, particularly for its cultural and financial services, and for being among the richest cities in Europe in terms of GDP per capita (OECD, 2018). It is the second most populated city in Italy, after Rome, with a population of about 1.4 million (Municipality of Milan, 2018[12]), while its metropolitan area counts over 3 million inhabitants (ISTAT, 2020[13]). In addition to its economic relevance, Milan is also a major agricultural center (Quaglia & Geissler, 2018) and a ground-breaking city, in the Italian context, in terms of UGI promotion and development (Lafortezza *et al.*, 2017). Currently, 13,4% of the city of Milan's total surface is covered by public urban green spaces (Municipality of Milan, 2016[14]) of which 1,46% is covered by urban trees (ISPRA, 2018). Urban trees and woodlands, despite not representing the main element of Milan's UGI network, since the 1980s have played a key role at metropolitan scale as response to increasing urban sprawl and natural capital degradation and fragmentation (Canedoli *et al.*, 2017; Sanesi *et al.*, 2016; Carovigno *et al.*, 2011).

[12] https://www.comune.milano.it/documents/20126/2313917/cleta_zone_eta_2018.pdf/ce666426-e63b-596c-e764-61e9182f1d3e?t=1555407542306
[13] http://dati.istat.it/Index.aspx?DataSetCode=DCIS_POPRES1
[14] https://www.pgt.comune.milano.it/sites/default/files/allegati/RA_All2_Tabella_3_3_0.pdf

In this context, *BoscoInCittà* is a public peri-urban woodland located in the western part of Milan, close to the districts of Figino, Quinto Romano and Quarto Cagnino, and included within the *Parco Agricolo Sud di Milano* (PASM, Milan's Southern Agricultural Park), a large protected rural area running around the south perimeter of the city (Fig.12). It was established in the 1974 on (initially) 35ha of neglected public land granted by the Municipality of Milan to *Italia Nostra Onlus*, an Italian no-for profit organization traditionally committed in protecting and promoting historical, artistic and environmental heritage.

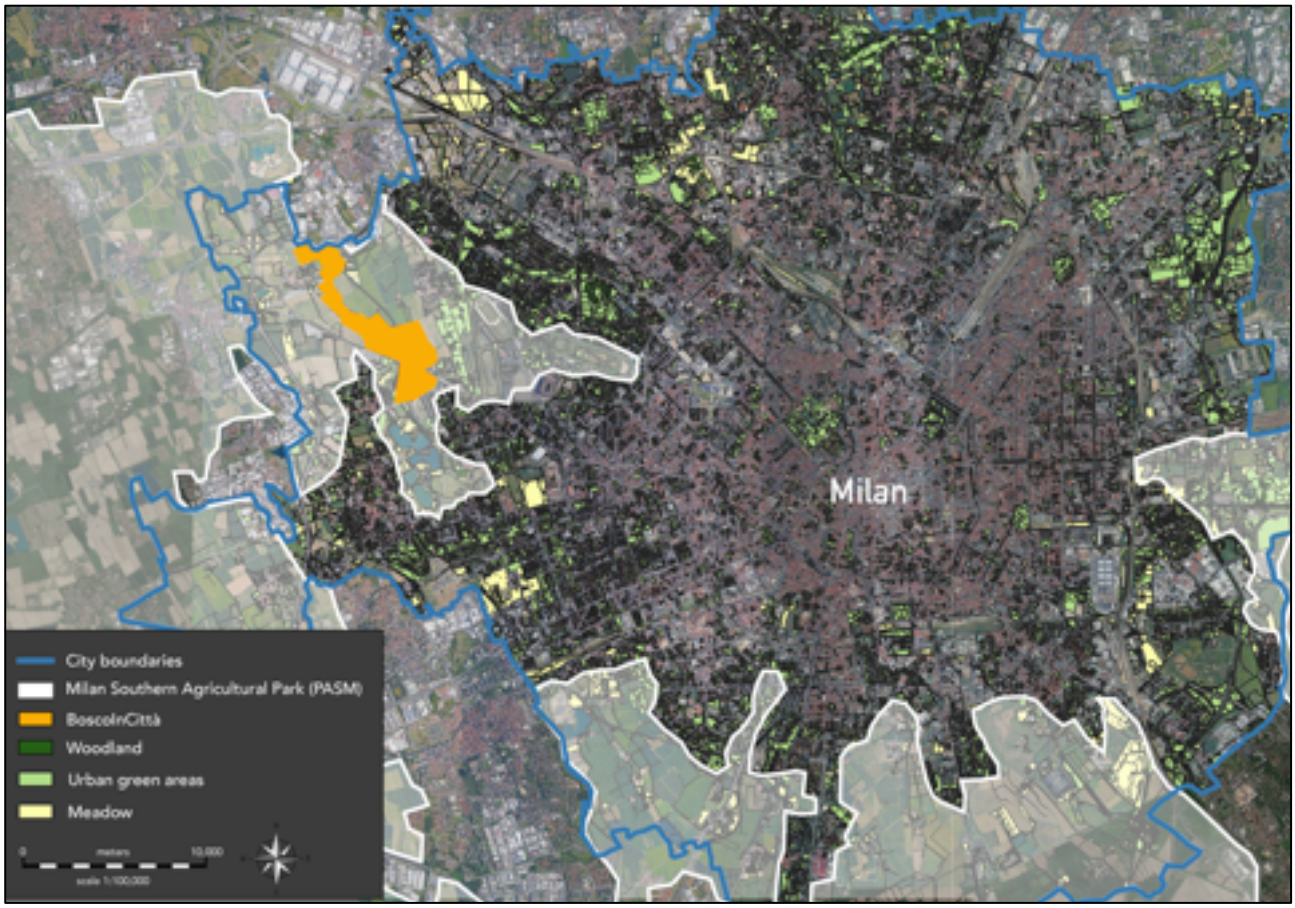

Fig.12. *BoscoInCittà* within the wider Milan metropolitan area

(source: own elaboration on Lombardy Region data, 2020)

As first example of UPF realized in Italy, its innovative approach in terms of planning, design and management of the area was recognizable since the beginning (Fini, 2017; Ferrari, 2004). Nowadays, *BoscoInCittà* covers around 120 ha of forest plantations and natural areas. The park includes also other landscape elements (Fig.13) such as meadows,

waterways, orchards, garden allotments, natural paths, a lake, and an ancient farmstead, *Cascina San Romano*, which is the headquarters of *Italia Nostra Onlus*.

Fig.13. Land use *in BoscoInCittà*

(source: own elaboration on Lombardy Region data, 2020)

Concerning the governance dimensions characterizing the Italian case, which are schematized in Fig.14, the main discourses behind the creation of *BoscoInCittà* refer to the *Italia Nostra Onlus'* willingness of addressing socio-environmental issues affecting Milan during the 1970s, such as increasing air pollution, urban sprawl and rapid loss of agricultural and forested lands. In those years *Italia Nostra Onlus* organized several campaigns for promoting the creation of new urban green spaces aimed at both improving citizens' health and well-being, and providing leisure opportunities to citizens (Italia Nostra, 2014). This significantly influenced public opinion and, as a consequence, encouraged the Municipality of Milan to lease the management of a neglected agricultural peri-urban area to the NGO that, involving thousands of citizens in place-making, created

BoscoInCittà with the goal of enhancing the environmental quality of the area, providing recreational and cultural services to urban and peri-urban dwellers, and improving urban ecological networks through the creation of linkages with the neighboring urban parks (i.e. *Parco di Trenno* and *Parco delle Cave*) (Italia Nostra, 2014). Currently, discourses from local governments and *Italia Nostra Onlus* are in line with those triggering the establishment of the UF initiative in the 1970s (Buijs *et al.*, 2019).

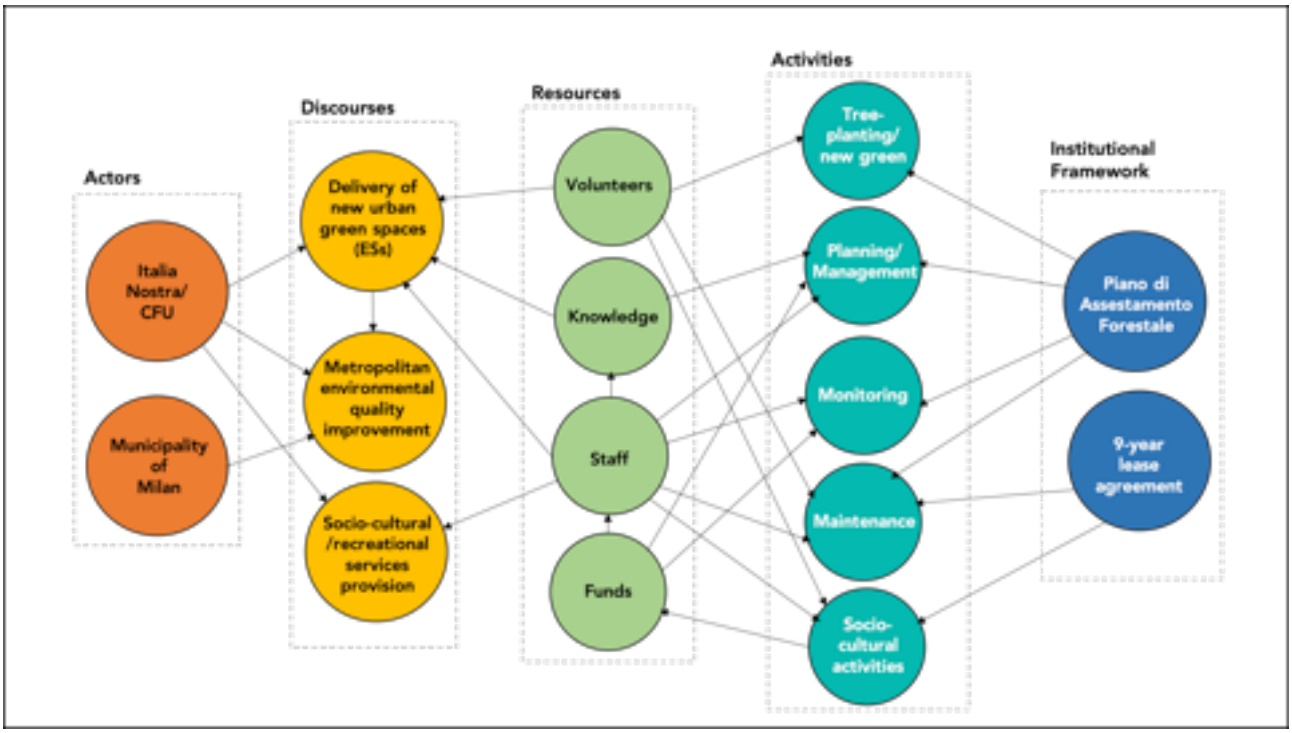

Fig.14. The governance dimensions of *BoscoInCittà* and their connections

(own elaboration)

BoscoInCittà is a precursor in terms of governance innovativeness. It is characterized since the beginning by a co-governance arrangement (Fig.15) where the Municipality of Milan and *Italia Nostra-Centro di Forestazione Urbana* (hereinafter CFU) are the primary actors involved. The municipality is involved through its *Direzione Quartieri e Municipi: Area Verde, Agricoltura e Arredo Urbano* (Green Areas, Agriculture and Urban Design department), while CFU is a task group of *Italia Nostra Onlus* specifically created in 1981 to manage and maintain *BoscoInCittà*. In terms of power distribution CFU is responsible at strategic, tactical and operative level at site scale, in line with the policies adopted at

metropolitan and urban scale by the Metropolitan City of Milan, responsible for the PASM management, and the Municipality of Milan. Indeed, as defined by the *Convenzione d'Uso dell' Area* (nine-year lease agreement), CFU take care of the maintenance, conservation and enhancement of the area, while the Municipality of Milan plays a 'watchdog role', as landowner and backer, implying the supervision of management activities outputs and outcomes. As observed by Ambrose-Oji *et al.* (2017), however, over the years CFU have been able to gain greater independence from the municipality in the decision-making process.

Woodlands and trees management and maintenance activities of the area are regulated and guided by the *Piano di Assestamento Forestale Semplificato 'BoscoInCittà' 2015-2030* (PAFS, Forest Management Plan '*BoscoInCittà*' 2015-2030). Activities involve also other stakeholder as local residents, often organized in volunteer groups, and external experts or academicians, which occasionally collaborate in specific tasks (e.g. monitoring; scientific consultancies). The former are involved in the maintenance of the park (Italia Nostra, 2019; 2020), while the latter - e.g. foresters, botanists, architects, zoologists - are mostly involved in research and monitoring activities. They are not officially engaged in the decision-making process, but when called upon may play a supportive role (Fig.15, dotted-arrows) for providing inputs to CFU.

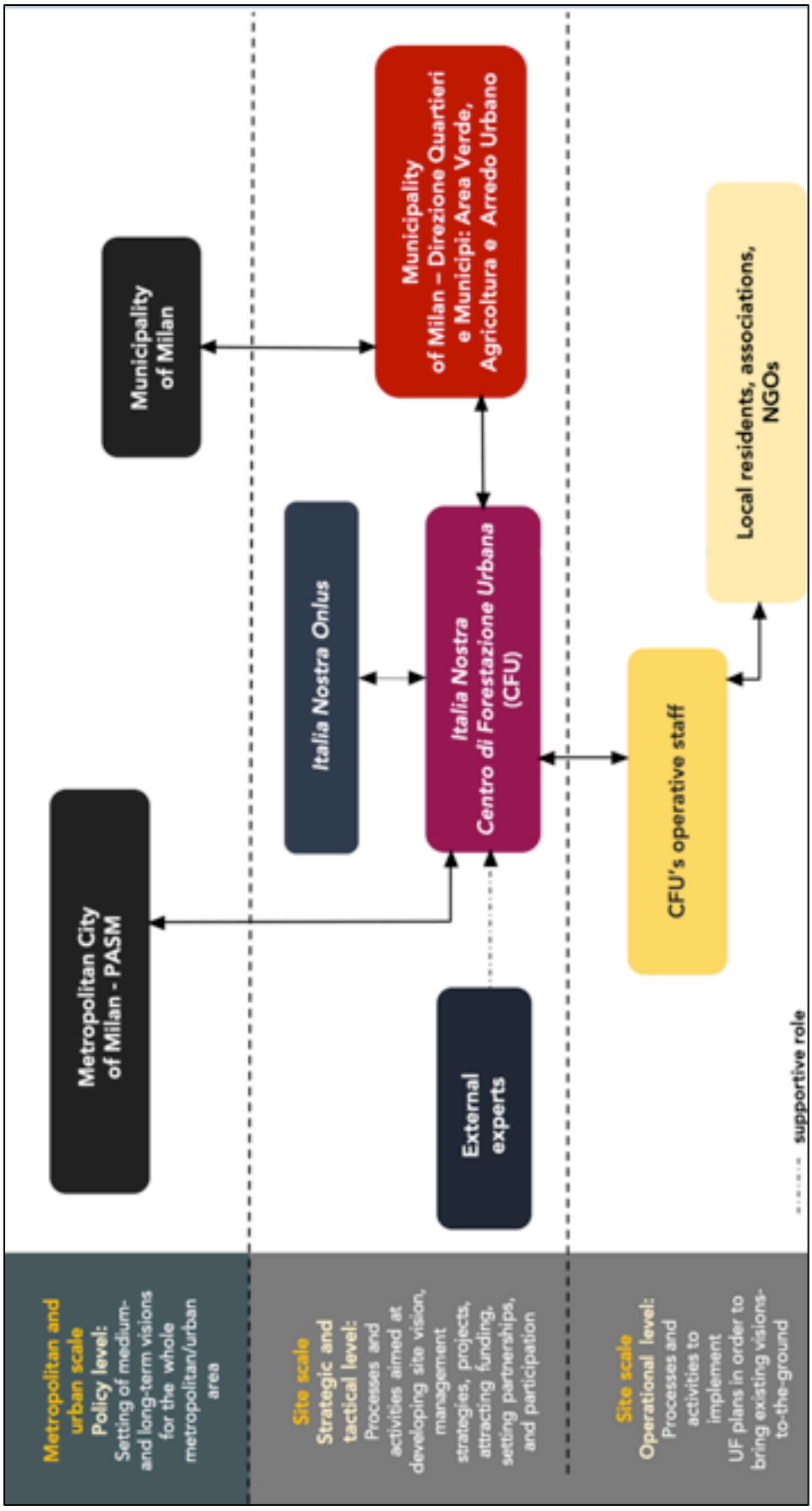

Fig.15. Scheme of *BoscoInCittà* governance

(source: own elaboration)

5.2. *Amsterdamse Bos*, Amsterdam, Netherlands

Amsterdam is the largest city in the Netherlands with a population of over 870,000 inhabitants, while its metropolitan area counts more than 2 million people (Municipality of Amsterdam, 2020[15]). It is particularly known for its financial and advanced business services, creative- and service-oriented industries, and for being a popular touristic destination. Furthermore, Amsterdam is also globally recognized as a leading city in the field of urban sustainability due to the innovative solutions developed and implemented in recent years (e.g. Amsterdam Smart City and Circular Economy projects, see Dalla Fontana & Boas, 2019). In recent years, considering the challenges Amsterdam is currently facing – i.e. growing population, urbanization pressure, densification dynamics, and climate change effects – the municipality has started to pay particular attention to UGI as economic assets (Municipality of Amsterdam, 2017; Havik & Buizer, 2015) and as a measure to enhance human health and well-being, mitigating the impacts of climate change and providing socio-cultural services to urban and peri-urban dwellers. Although since 2016 the amount of green areas per inhabitant has decreased from 71,4 m2 to 70,0 m2 (van Zoelen, 2018), currently, public green areas cover around 10% of Amsterdam's total surface and, among the different UGI types identified, 30% is covered by trees (Municipality of Amsterdam, 2017).

Framed in this urban context, *Amsterdamse Bos* is a peri-urban woodland located in the south-west side of the city, with an extension of 1,000ha (initially 895ha), falling within the administrative boundaries of three municipalities, namely: Amsterdam, Amstelveen, to the east, and Aalsmeer, to the south (Fig.16). Established in 1934, it is one of the first relevant example of UF initiative realized in Europe. Its development was profoundly inspired by foreign projects as the Hamburg *Stadtpark* and other urban parks in Great Britain (Dupon & van der Werf, 2019; Radrup *et al.*, 2005).

[15] Source: https://data.amsterdam.nl/datasets/bx_HyaOipADV-Q/stand-van-de-bevolking-amsterdam/

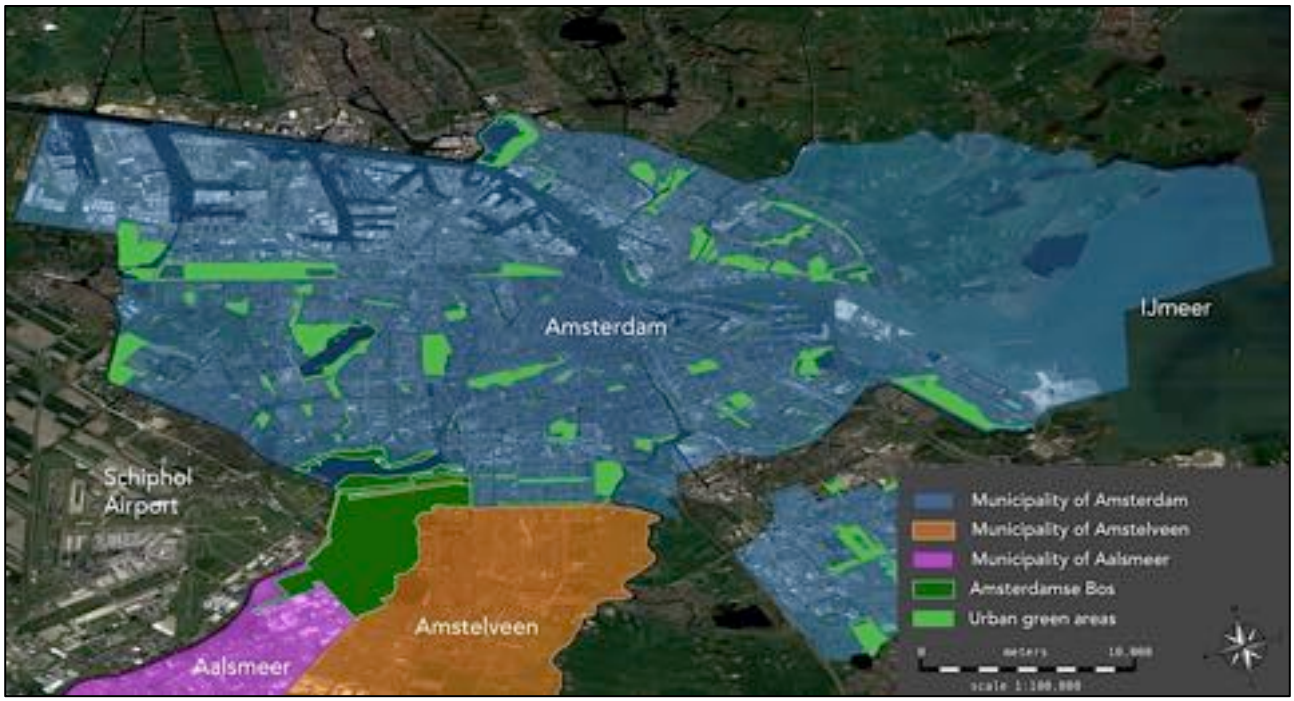

Fig.16. *Amsterdamse Bos* and its urban context

(source: own elaboration on City of Amsterdam data, 2020)

Nowadays, *Amsterdamse Bos* is characterized by a forested area covering over 400 ha and composed by more than 200,000 trees of different species. Since its establishment, inspired by the *De Stijl Art Movement* (Jellicoe & Jellicoe, 1987), the park was designed with the goal of focusing more on social purposes rather than only on aesthetics design, for this reason equal areas of woodlands, open areas, and water bodies were realized (Konijnendijk, 2018; Simson 2005). Its landscape is also characterized by an artificial lake, the *Nieuwe Meer,* and two man-made ponds, the *Poel* and the *Bosbaan*, mainly used for recreational purposes. In addition, several sport and recreational facilities can be found around the park - e.g. the visitor center '*De Boswinkel'*, an open-air theatre, a goat farm and a swimming pool, strengthening its multifunctional role within the wider urban context, as well as numerous bridges recognized as national monuments (Fig.17). *Amsterdamse Bos* is a peri-urban woodland of metropolitan interest, and its role is becoming more and more central due to the foreseen urban population growth in the upcoming future (Municipality of Amsterdam, 2020). It has registered a growing trend in terms of visits over the years, from around 4.5 million annual visits in 1997 (Tate, 2015), to around 6 million in 2012 (Municipality of Amsterdam, 2019).

Fig.17. *Amsterdamse Bos* map

(source: adapted from Municipality of Amsterdam, 2015)

Referring to its governance dimensions (see Fig.18), and in particular to discourses, in the early 1900s the necessity of creating new urban green spaces in Amsterdam was initially conceived by the Dutch botanist Jacobus Thijsse to improve citizens' quality of life, especially lower-class significantly affected by poor housing conditions and health issues (Dupon & van der Werf, 2019). The original aim behind the park construction was to create an urban woodland to be managed under ecological principles, rather than with the typical silviculture approach, providing leisure and recreational services to urban dwellers (Simson, 2005). However, despite this, also a socio-economic motivation arose due to the 1930s global financial crisis affecting the city at that time. Indeed, the construction of the park became the largest unemployment scheme in the city, leading to the employment of more than 20,000 workers between 1934 and 1940 (Municipality of Amsterdam, 2020[16]). It contributed also to strengthen the sense of belonging and identity of the Amsterdam's citizens towards the *Amsterdamse Bos* (Tate, 2015). Nowadays, the main discourses guiding its management are in line with its past and, in particular, they refer to finding a balance between nature conservation, with a focus on biodiversity enhancement, climate change effects mitigation and adaptation, and recreational services provision within a sustainable development perspective (Municipality of Amsterdam, 2020).

Since its establishment, the *Amsterdamse Bos* management fell under the responsibility of different departments within the Municipality of Amsterdam. However, in 1990 it was given to the park its own governing body: the *De Bosorganisatie* (Forest organization) (Van der Werf & Dupon, 2016). Within the municipality-led governance arrangement steering *Amsterdamse Bos* (see Fig.19), *De Bosorganisatie* is one of the primary actors, along with the Municipality of Amsterdam's departments involved in the decision-making (i.e. Spatial Planning and Sustainability, Traffic and Public Space, and City Works departments), and the Municipality of Amstelveen. The Municipality of Amsterdam is the most powerful actor due to its importance as national and economic hub, landowner, and public authority responsible for the management, funding, administration, and maintenance of the park.

[16] Source: https://www.amsterdamsebos.nl/english/history/

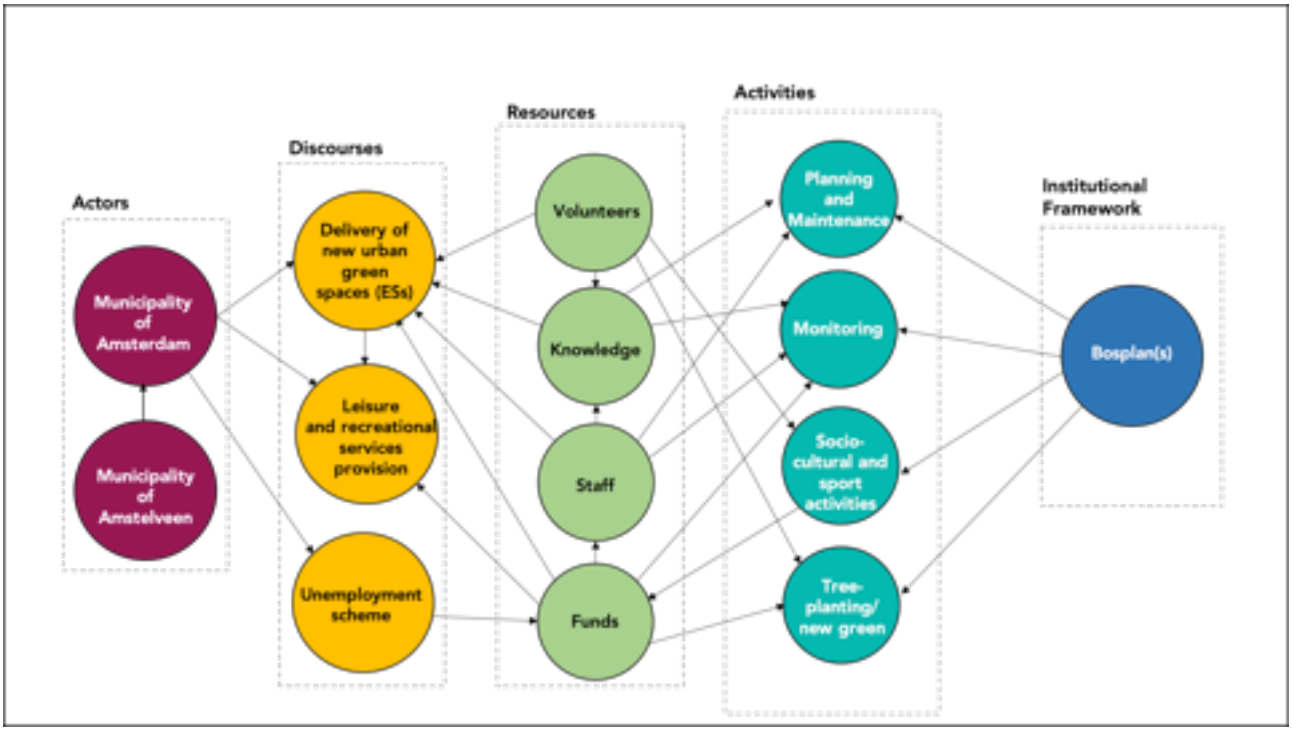

Fig.18. *Amsterdamse Bos*' governance dimensions and their linkages

(source: own elaboration)

The Municipality of Amstelveen, instead, collaborate in the management and maintenance of the park (Personal communication, Municipality of Amsterdam's officer, 2020) being responsible for granting permits, drawing up regulations and (revision of) zoning plans, and in 2020, for the first time, it has started playing an active role in drafting the new management policy-plan (i.e. *Bosplan 2020-2030)*.

Furthermore, central government, owning the land underneath the A9 motorway, which cross the park, is formally involved in decision-making through the *Ministerie van Infrastructuur en Waterstaat* (I&W, Ministry of Infrastructure and Water Management) (Personal communication, Municipality of Amsterdam's officer, 2020).

Stakeholders supporting the decision-making include entrepreneurs working in the park (e.g. sport and recreational facilities, restaurants, food vendors); environmental associations and volunteers with responsibilities in maintenance, monitoring (flora and fauna), reception and educational activities; and the water company (*Hoogheemraadschap van Rijnland)*, which is responsible for the water quality monitoring and dikes management, although it is not formally involved in the decision-making (Personal communication,

Municipality of Amsterdam's officer, 2020). Therefore, as indicated by the dotted-arrows in Fig.19, entrepreneurs, local residents and the water company play just a supportive role in the decision-making providing views and observations.

Concerning the management strategy, throughout the years the approach has changed substantially. From the phytosociological approach applied at beginning with the *Boshplan (1931)*, in 1994 with adoption of the *Amsterdamse Bos Policy Plan (1994)* a new ecological approach focused on ecological values enhancement and protection was introduced (Dupon & van der Werf, 2019; Tate, 2015; Stedelijk Beheer Amsterdam, 1994). In 2011, with the approval of the *Bosplan 2012-2016* the management approach started to focus on catering the increasing social and recreational demand expressed by Amsterdam's citizens (Tate, 2015). Finally, at the time of writing this dissertation, the *Bosplan 2020-2030* has been recently approved. Its main aim lies in finding a balance between the protection and enhancement of natural resources and the provision of recreational and cultural services, in line with the previous management plan.

In terms of activities, *Amsterdamse Bos'*s staff, environmental associations and volunteers are responsible for the maintenance of natural (e.g. tree-thinning and planting, shrubs pruning, waste collection) and infrastructure and facilities around the park (e.g. maintenance of bridges and paths). Recreational and sport activities - including e.g. bicycle, boat and canoe rentals, riding stables, swimming, theatrical performance, festival and events organization - are provided by private entrepreneurs and also by the *Amsterdamse Bos'* staff. Additionally, also educational and cultural services are provided; these include nature and artistic workshops for local students and visitors (Personal communication, local artist, 2020), excursions and boat trips carried out by the forest rangers, and also 'green' training courses, internship and work opportunities offered particularly to students a disadvantaged people.

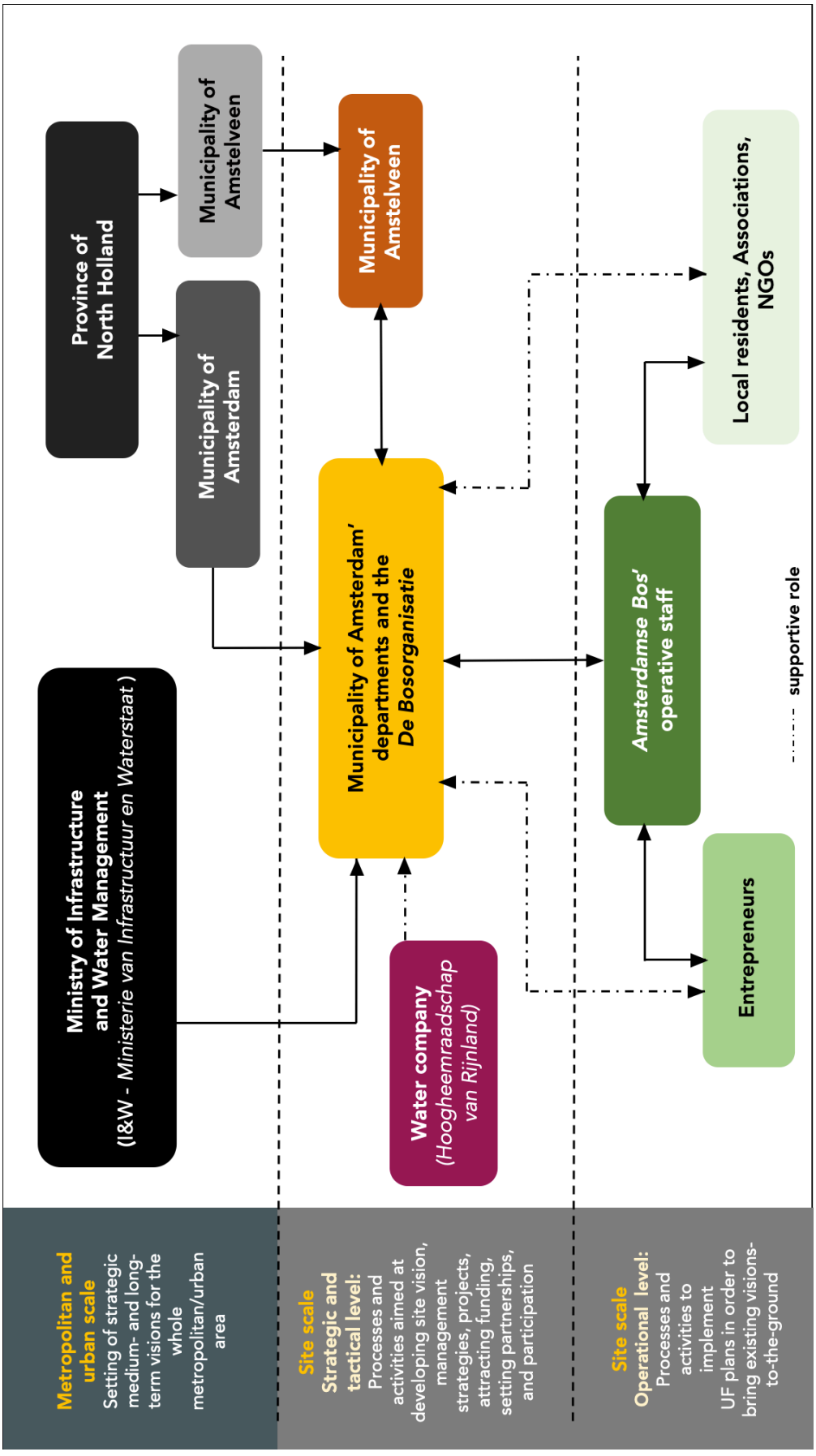

Fig.19. Scheme of *Amsterdamse Bos* governance arrangement

(source: own elaboration)

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6. Results of the urban forest governance capacity assessment: the cases of *BoscoInCittà* and *Amsterdamse Bos*

This chapter presents the results of the capacity assessment conducted for the governance arrangements of *BoscoInCittà* and *Amsterdamse Bos*. Their assessment is based on data collected through the methods illustrated in Chapter 4 i.e. document analysis, semi-structured interviews, site visits, and web-based surveys. Document analysis allowed to understand the dimensions characterizing the governance arrangements of the two cases and inform their assessment. Several sources were taken into account, namely: planning and policy documents, official reports, scientific articles, books, and book chapters (see Annex 1 for the full list). Referring to semi-structured interviews, in total 17 key informants, with different job roles, from strategic to operational level, and backgrounds, were interviewed – i.e. 9 for *BoscoInCittà* and 8 for *Amsterdamse Bos* (see Annex 2 and 3) - between February 2020 and August 2021, with different modalities - i.e. *vis-à-vis*, by phone, video-calls, and emails. Interviews resulted to be a valuable method to understand the complexity of the two cases and investigate the many aspects shaping their UFG capacity. Key informants contacted showed willingness to provide insightful information and data proving a good awareness and knowledge about the governance and policy arrangements steering the peri-urban woodlands. Great variability in responses was observed for the Dutch case, probably because key informants interviewed have different perspectives on how to interpret the role of *Amsterdamse Bos* due to the fact they work in diverse municipal departments. Also, sites visit and workshops attendance have been valuable to gather further information on the case studies, especially referring to their physical configuration, users' activity observation, actors and stakeholders involved, and services provided. Finally, concerning surveys, of the 30 possible respondents only 10 web-based surveys were successfully completed by external experts, corresponding to an overall 33% response rate, despite those who did not participate in the first round were further invited to take part by a follow-up email. In particular, for the Dutch case study of the total 10 experts emailed only 5 fulfilled the questionnaire (50%), while for *BoscoInCittà* the response rate was lower (25%), with only 5 respondents out of

20 potential responses. Surveyed population was characterized by an age group ranging from 40 to +60 for the case of *Amsterdamse Bos*, while for *BoscoInCittà* the majority of respondents was younger, 30-40 years old (see Fig.20).

Concerning gender, as illustrated in Fig.21, in both cases respondents were predominantly male (60%), it might be linked to the fact that generally most of the professionals involved in UPF are male (see e.g. O'Herrin *et al.*, 2020; Bardekjian *et al.*, 2019). Finally, in terms of education, 60% of responding experts to the *BoscoInCittà* questionnaire hold a Ph.D., as most of them are academics (i.e. professors, research fellows) (Fig.21). Surveys were particularly beneficial, along with interviews, to gather perception-based evidence on the functioning of UFG arrangements here assessed. However, in both questionnaires experts expressed some uncertainties. In the case of *BoscoInCittà* poor knowledge was observed in relation to: participation processes and actual degree of stakeholders' views inclusiveness; existence of implementation and monitoring plans; collaboration between actors involved; public availability of data. Similarly, also Dutch experts were unable to provide details about: management plan comprehensiveness; existence of associated implementation and monitoring plans; monitoring regularity; and availability of information.

Data and information collected through the methods discussed above were analyzed, triangulated, and successively interpreted through the UFG capacity assessment framework adapted from Dang *et al*. (2016) (see section 4.3), and results presented in the following sections.

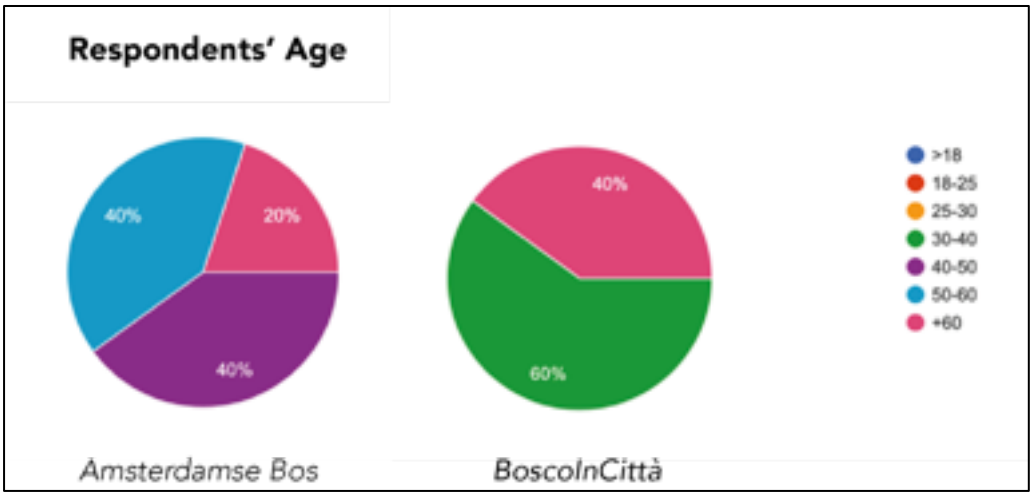

Fig.20. Survey respondents 'age group

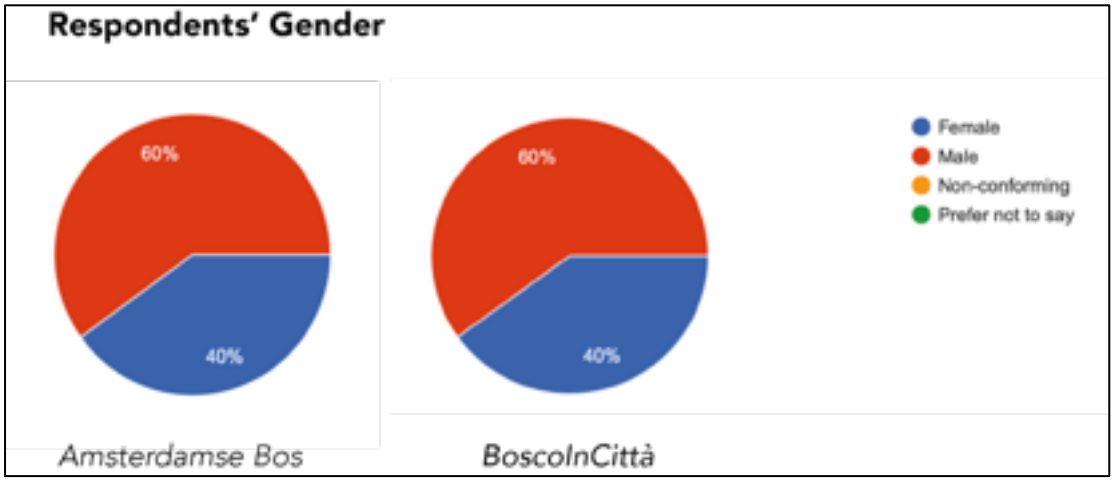

Fig.21. Survey respondents 'gender

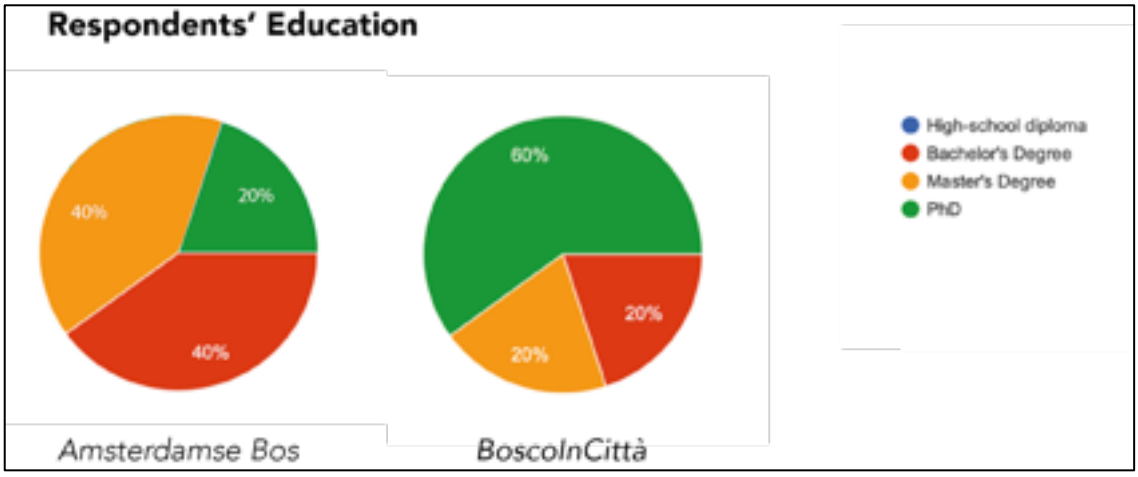

Fig.22. Survey respondents 'education

6.1. Institutional Capacity

6.1.1. Participation

Participation-criterion aims to understand whether formal or informal rules, spaces and/or venues, and digital tools, guiding and fostering participation processes are in place as precondition to engage citizens.

In the case of *BoscoInCittà* not formal rules guiding public participative process have been officially stated. Indeed, neither the nine-years lease agreement, nor the PAFS 2015-2030 make specific reference about how to involve citizens in decision-making and planning processes; this despite the fact that the Municipality of Milan through the enactment of its *Regolamento del Verde* (2017) (RdV, Urban Green Space Regulation) made specific reference to the importance of fostering citizens engagement in the management of public green spaces.

Moreover, concerning venues and digital tools, *Cascina San Romano* (San Romano farmstead) and common areas open to the public (Fig.23), as well as *BoscoInCittà*'s website, newsletter, and Facebook, YouTube and Instagram accounts, are available spaces and tools that could be used to foster and improve meaningful citizens engagement and, therefore, inclusion of their discourses in final deliberations.

For the case of *Amsterdamse Bos* not formal rules guiding public participation have been officially defined. However, participation is carried out following informal rules set up by the *Bosorganisatie* (Forest organization) and Municipality of Amsterdam. For this purpose, several venues where to host workshops, public meetings, and roundtables with the aim of gathering citizens' views and concerns are in place (Fig.23). Venues generally used are the *Boswinkel* (Visitors' Centre), *Land van Bosse* (event open-air site), *Bostheater* (open-air theater), *Boshuisje Vogeleiland (Vogeleiland* houses*)*, *Bosbeheer kantoor* (Forest management office) (Personal communication, Municipality of Amstelveen's manager, 2021). In addition, a key role to gather citizens' views and inform them about management choices and initiatives, especially during the last year due to Covid19-related restrictions, has been played by digital tools as web-based surveys and *Amsterdamse Bos*' newsletter,

website, and Facebook and Instagram accounts (Personal communication, Municipality of Amsterdam's senior policy advisor, 2020).

Fig.23. *BoscoInCittà*' and *Amsterdamse Bos*' venues: 1) *Cascina San Romano*; 2) Boswinkel; 3) *Bostheater* (source: author)

6.1.2. Integration

This criterion was used to assess the coordination of the peri-urban woodlands plans' vision with other sectoral urban policies and plans, as well as actors and stakeholders collaboration and integration at the same (horizontal integration) and different level of governance (vertical integration).

In terms of horizontal integration, at urban scale *BoscoInCittà* is an integral part of the *Milan's Piano di Governo del Territorio* (PGT, Milan's urban masterplan) adopted in 2020, and its *Rete Ecologica Comunale* (REC, Municipal Ecologic Network Strategy), which identifies it as key peri-urban woodland both for enhancing the metropolitan agro-environmental system that surrounds the park, and as a critical green patch for the foreseen creation of a metropolitan peri-urban park. However, apart from urban greening

policies, *BoscoInCittà* over the years have not been officially integrated in sectoral policies or plans defined by other municipal departments (Personal communication, Municipality of Milan's officer, 2021), despite in the nine-year lease agreement clear reference is made to the CFU's role to collaborate in addressing relevant urban issues by providing e.g. educational and recreational opportunities and professional training services, which are often carried out thanks to a governance network involving e.g. schools, boy scout, and other associations.

From a vertical perspective, integration in supra-municipal plans and collaboration with other actors characterize the governance in the Italian case. Vertical integration is reflected in the inclusion of the *PAFS 2015-2030* both in the *Piano di Indirizzo Forestale* (PIF – Metropolitan Strategic Forest Plan), aimed at protecting wooded areas and enhancing forestry-pastoral resources, and the *Piano Territoriale di Coordinamento del Parco Agricolo Sud* (PTC, Territorial Coordination Plan of the PASM), which acknowledges *BoscoInCittà* as a peri-urban woodland to be protected as an area of high naturalistic interest. Moreover, the approval of the *PAFS 2015-2030* is the result of an effective collaboration between public and private actors at different level of governance - i.e. CFU, *Italia Nostra Onlus*, Municipality of Milan, Metropolitan City of Milan, Municipality of Settimo Milanese, A2A Ambiente S.p.a., Capholding - showing the capacity of sharing decision-making competencies and collaboratively interact in order to delineate a collective management vision. The collaboration between private and public actors implies also an outwards distribution of planning and management functions, as well as power, traditionally belonged to local authorities, despite the lack of an adequate participative approach.

Concerning *Amsterdamse Bos,* its municipality-led governance has been characterized since the beginning by a horizontal integrative approach. The 1931*Boshplan* - the plan designed for the construction of the park - was developed through an integration of the vision of several municipal sections - i.e. the Town Planning section of the Amsterdam Public Works Department, along with the Utility Works and Horticulture sections (Tate, 2015). Later, it was also included in the 1935 *Algemeen Uitbreidingsplan Amsterdam* (AUP, Amsterdam's General Expansion Plan 1935) (Fig.24), the first Amsterdam's masterplan

recognizing the prominent role of green public spaces in improving citizens' well-being. More recently, collaboration between other municipalities (i.e. Municipality of Amstelveen) and different municipal departments allowed to implement and develop green policies[17] included in the *Structuurvisie Amsterdam 2040* (Amsterdam's Structural Vision 2040) (Personal communication, Amsterdamse Bos's senior policy advisor, 2020), in particular: the *Agenda Groen 2015-2018* (Green Agenda 2015-2018), a policy document which led to the improvement of the *Amsterdamse Bos*' ecological networks (Municipality of Amsterdam, 2020), and the *Groenvisie 2020-2050* (Green Vision 2020-2050) that identifies the park as a mature forest key to enhance biodiversity and provide recreational services through an ecological management approach (Municipality of Amsterdam, 2020). In addition, horizontal integration is reflected also in the inclusion of several urban sectoral policy's goals[18] into the *Bosplan 2020-2030* thanks to an interdepartmental collaboration. These refer to climate change, sustainable mobility and energy, water quality, provision of educational, sport, and employment opportunities (Municipality of Amsterdam, 2021).

Concerning vertical integration, as confirmed by most of survey respondents (60%), governance and management activities are the result of interaction and collaboration between actors and stakeholders operating at different level of governance. At national level interaction and negotiation with the *Ministerie van Infrastructuur en Waterstaat* (I&W, Ministry of Infrastructure and Water Management) was crucial, for example, to define compensation measures related to the A9 motorway widening project that implied the cut of several trees (Personal communication, *Amsterdamse Bos*' senior policy advisor, 2020); while at provincial level, collaboration with the Province of Noord-Holland (North Holland Province) and the *Hoogheemraadschap van Rijnland* (Rijnland Water Board) led to the improvement of ecological networks, water quality, and dykes management[19]. Finally, as illustrated in the previous section, also engagement of citizens is considered as important in an integrative perspective.

[17] https://www.amsterdam.nl/bestuur-en-organisatie/volg-beleid/groen/
[18] https://www.amsterdam.nl/bestuur-en-organisatie/volg-beleid/amsterdamse-bos/
[19] https://www.amsterdamsebos.nl/natuur/natuurgebieden/ecologische/

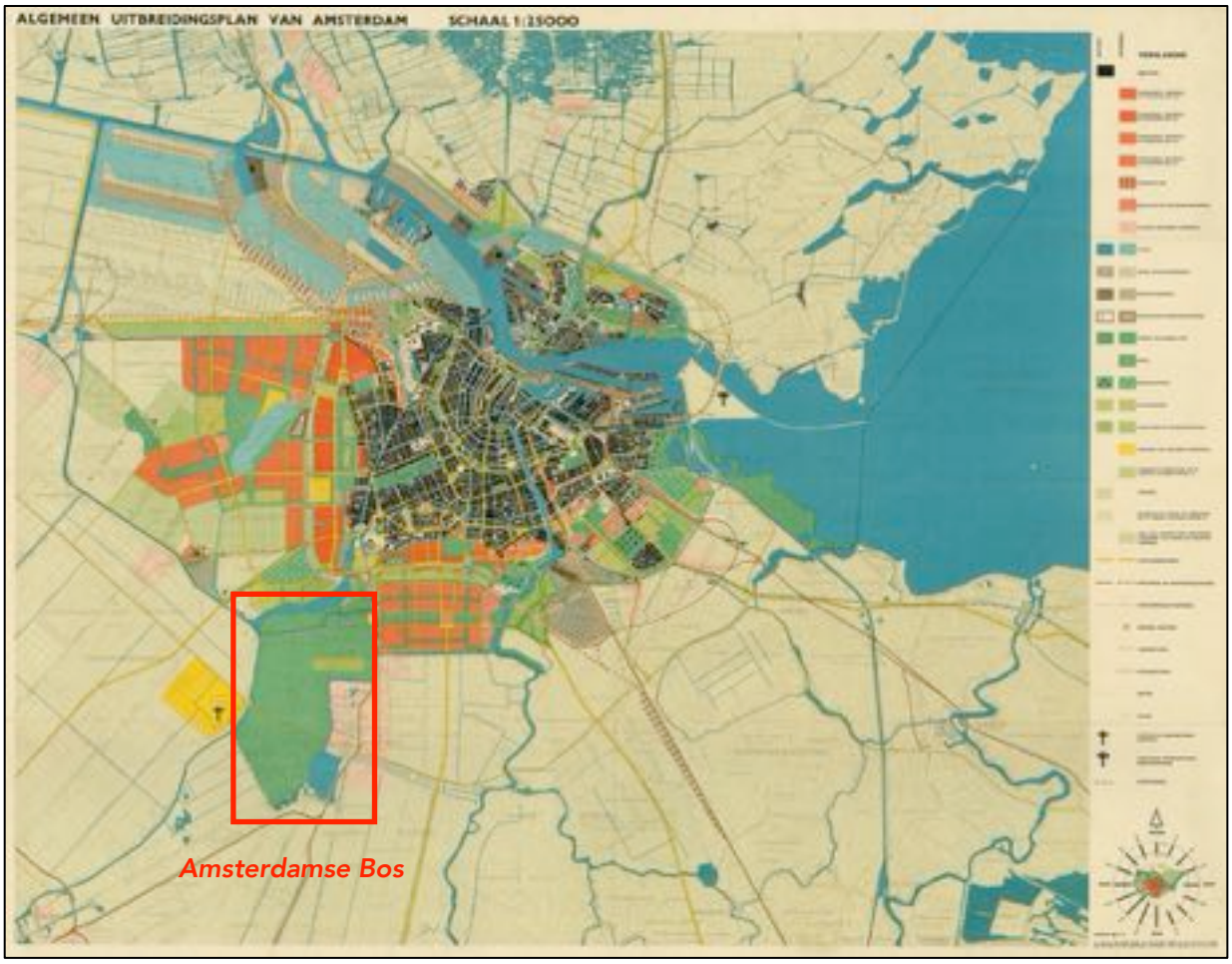

Fig.24. General Expansion Plan for Amsterdam, 1935

(source: adapted from Municipality of Amsterdam[20], 2019)

6.1.3. Resources allocated: land, funding, knowledge and staff

Resource allocated is a critical criterion to investigate actors' and stakeholders' potential to carry out their tasks and achieve in this way the targeted-objectives. In particular, it refers to land, funding sources, technical and local knowledge, and staff employed.

BoscoInCittà is located on a public area privately managed by CFU. The land, still under the control of the Municipality of Milan, was granted to *Italia Nostra Onlus* in 1974 allowing the creation of the peri-urban woodland. With regard to funding, with the creation of the "*Comitato Amici del Bosco*" (Friend of the Wood Committee) in 1977, the financial support for developing and managing the park was ensured until the 1983, when the Municipality

[20] https://www.amsterdam.nl/stadsarchief/stukken/plannen/aup/

of Milan started to provide financial support to the initiative, as defined in the first lease-agreement signed (Italia Nostra, 2014). Currently, public funding covers around 80% of the total budget required (Personal communication, Municipality of Milan's officer, 2020). The remaining 20% comes from the revenue budget that is provided both by external contributions - e.g. fund-raising activities, sponsorships, grants - and revenues from events, educational and recreational activities offered (Personal communication, Italia Nostra-CFU's staff member, 2020). Over the years, this financing model has proven to be more cost-effective for the Municipality of Milan by having lower costs in comparison with the average costs of its contracting-out scheme (Global Service Milano) for the management and maintenance of other urban green areas (Milan Municipality's officer, personal communication, 2020). Technical knowledge to manage and maintain woodland and other natural resources is mostly provided by *CFU*'s staff (i.e. agronomists, foresters, and naturalists), which includes about 30 people working in different areas of expertise (Fig.25).

Fig.25. *Italia Nostra-CFU's* internal organization structure

(source: own elaboration)

When needed, also external experts such as e.g. environmental consulting companies and universities are involved in specific monitoring and evaluation activities. Local knowledge from residents' observations, instead, is formally poorly considered (Personal communication, Italia Nostra-CFU's staff member, 2021). Indeed, local residents in

addition to *CFU*'s staff, are mostly involved as key resource for park maintenance, which contributes to lower its management costs.

Regarding *Amsterdamse Bos*, the Municipality of Amsterdam controls the land, despite the park is mostly located within the administrative boundaries of the Municipality of Amstelveen, and it is responsible also for funding allocation, knowledge and staff management. In terms of funding, to build the park the Municipality of Amsterdam took advantage of the opportunity to acquire the status of unemployment scheme, funded by the central government, making it economically feasible despite the global crisis occurring during the 1930s (Municipality of Amsterdam, 2020; Dupon & van der Werf, 2019). Currently, around 70%-80% of the total budget comes from public funds. The revenue budget, deriving from sport, recreational and cultural activities hosted in the park, covers the outstanding 30%-20% (Personal communication, Municipality of Amsterdam's senior policy advisor, 2020). However, as highlighted in the *Bosplan 2020-2030* (Municipality of Amsterdam, 2021:49), a structural financial shortfall has been registered in the last years. This financial shortage, further exacerbated by the cancelation of many events and activities as a consequence of Covid-19 health crisis's restrictions (Personal communication, Municipality of Amsterdam's officer, 2020), negatively affects the maintenance and conservation of forest and vegetational resources, as well as infrastructure in the park (e.g. bridge, roads and paths, facilities) (Personal communication, Amsterdamse Bos' staff, 2021). With regard to the staff, around 50 people of the *Bosorganisatie* are involved in the governance and management of the park. As illustrated in Fig.26, these are organized in four different teams. However, referring to staff employed in other municipal departments, both key informants interviewed and survey respondents consider it as not suitable, especially at urban and metropolitan strategic level.

Technical knowledge is provided by *Amsterdamse Bos'* staff, despite sometimes municipal or external experts can be involved to address specific needs, while local knowledge comes from participation of citizens involved in decision-making, as environmental associations - e.g. *Vrienden van het Amsterdamse Bos* (Friends of the Amsterdam Forest) or individual volunteers – or taking part in several maintenance activities such as e.g. tree-

thinning and planting, shrubs pruning, waste collection (Personal communication, *Amsterdamse Bos*' staff member, 2021).

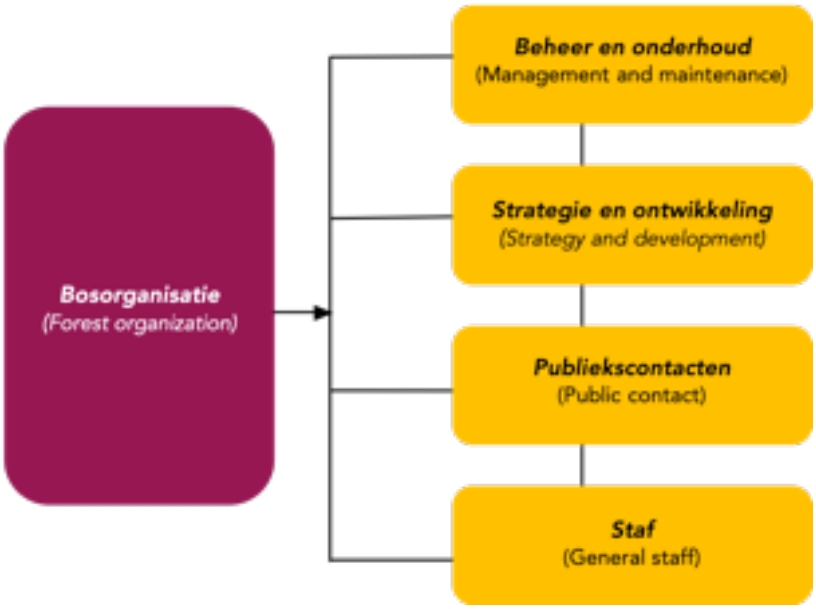

Fig.26. *Amsterdamse Bos'* internal organization

(source: adapted from https://www.amsterdamsebos.nl/organisatie/bosorganisatie/)

6.1.4. Learning

Learning refers to the implementation of regular monitoring, research and evaluation activities to inform data-driven decision-making processes and management plans development in the two peri-urban woodlands.

For *BoscoInCittà*, in the *PAFS 2015-2030* the only mention about monitoring concerns the pest and disease management and related removal of trees (PAFS, 2015), but there is no reference to an associated monitoring plan. However, key informants interviewed, documents analyzed, and experts surveyed (60% of the total, while the remaining 40% were not aware of it) confirm that monitoring and evaluation activities are regularly performed by CFU's staff and external professionals.

Among the various aspects monitored and evaluated experts respondent to the survey highlighted the following: trees health and stability (80% of total respondents); trees age,

height and diameter at breast height (80%); trees location and species (40%); water and soil quality (20%); and biodiversity (40%). In addition, also soil quality, fauna (e.g. amphibians, reptiles, birds), invasive species and reforestation evolution are regularly monitored. In this case, data collected through monitoring activities are not publicly available but freely accessible on specific request to CFU or Municipality of Milan, despite 60% of survey respondents indicate that data are properly communicated to actors involved in decision-making or management activities, while the remaining 40% of experts surveyed were not aware of it.

In the Netherlands, monitoring of natural resources is mandatory for municipalities, as required by the *Natuurbeschermingswet 2017* (Nature Conservation Act, 2017)[21]. Therefore, the Municipality of Amsterdam is formally obliged to monitor and evaluate the status of *Amsterdamse Bos'* natural resources. Moreover, the requirement of carrying out monitoring is further strengthened by the *Subsidiestelsel Natuur-en Landschap* (Subsidy System for Nature and Landscape), a subsidy scheme financed by the *Noord-Holland* (North-Holland Province) to protect natural areas and landscapes, of which the *Amsterdamse Bos* is part. Monitoring for *Amsterdamse Bos* are guided by the *Monitoringsplan, 2011* (Monitoring plan, 2011) that, as highlighted in the *Bosplan 2020-2030* (Municipality of Amsterdam, 2020:55), should be updated in the upcoming years. These activities are carried out by the municipal staff, forest rangers, external consultancy companies (e.g. *Bureau Waardenburg)*, and also volunteers (Personal communication, *Amsterdamse Bos*' staff member, 2021). Data are collected in relation to, as confirmed by expert survey respondents and key informants interviewed, i.e. tree location and species (60% of respondents); trees health and stability (60%); trees age, height and diameter at breast height (40%); water quality (40%); biodiversity level (40%); annual number of visitors and their satisfaction (40%); and soil quality (20%). Vegetational resources, local fauna (e.g. reptiles, birds and insects) and water quality are regularly monitored as well. The latter, important from a recreational and ecological perspective, is evaluated by the

[21] https://www.amsterdam.nl/bestuur-en-organisatie/volg-beleid/groen/flora-fauna/

Hoogheemraadschap van Rijnland (Rijnland Water Board). Data gathered are stored and published on the *Nationale Databank voor Flora en Fauna* (National Database for Flora and Fauna), although they are not fully accessible freely (Personal communication, *Amsterdamse Bos*' team leader, 2021). Additionally, visitors' statistics (e.g. experience satisfaction, sources of information, favorite activities and users' conflicts), usually conducted on a yearly basis, since 2000, by the *Onderzoek, Informatie en Statistiek Afdeling* (Municipal Department of Research, Information and Statistics), are publicly and freely available (e.g. *Amsterdamse Bos 2017*, *12e meting naar bezoek en waardering voor het Amsterdamse Bos onder stadsbewoners*[22]). These surveys are particularly useful for understanding the evolution of visitors' demands and preferences (e.g. in the last years, most users have expressed a preference towards nature-related activities, while large-events are increasing less appreciated), preventing potential conflicts and, thus, updating rules and management policy plans in the future.

6.2. Governance performance

6.2.1. Inclusiveness

Inclusiveness was chosen as criterion to assess the nature and quality of participation and, in particular, to investigate the extent to which actors and stakeholders' discourses are actually included in final deliberations influencing management objectives and actions.

The co-governance arrangement steering *BoscoInCittà* did not set a formal participation process allowing a bidirectional flow of information between CFU and citizens. This excludes stakeholders from having the opportunity to actually influence decision-making and final deliberations. Stakeholders here are only informed (e.g. through CFU's website, newsletter and annual reports) about final decisions made by CFU, in agreement with the Municipality of Milan, area management and related objectives, aims and specific actions

[22] *Amsterdamse Bos*, 2017. 12th measurement of visits and appreciation for the *Amsterdamse Bos* among city residents. Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiyxdCeyrDzAhUHMewKHRM_Bk0QFnoECAkQAQ&url=https%3A%2F%2Fwww.amsterdamsebos.nl%2Fpublish%2Fpages%2F442624%2Fomnibusonderzoekamsterdamsebos2017.pdf&usg=AOvVaw3vgiIVUlcX-UzQIBSbNnUN

to be taken (Personal communication, CFU' staff member and Municipality of Milan's officer, 2021). Sometimes, however, informal observations and concerns from citizens (e.g. by email or through informal conversations with volunteers working in the park) are reported to CFU's staff (Personal communication, CFU' staff member and Municipality of Milan's officer, 2021). Therefore, as already mentioned above, although the term participation is seen as one of key values driving the place-keeping approach adopted by CFU (Personal Communication, CFU's member staff, 2020), here citizens are only engaged in maintenance activities in collaboration with the operative staff (i.e. active citizenship), while their involvement in decision-making is neglected.

Amsterdamse Bos instead is characterized by an inclusive decision-making process, as revealed by semi-structured interviews and analysis of official documents i.e. *Dromenboek Amsterdamse Bos 2011* (Amsterdamse Bos Dream Book 2011[23]) and the *Inspraakversie Bosplan Amsterdamse Bos 2020-2030*[24] (Public participation version of the *Bosplan* 2020-2030). These reports highlight the numerous observations presented by e.g. local residents (also organized in associations/NGOs), academicians, entrepreneurs, experts, and other local authorities (i.e. Province of North Holland) in the decision-making process and the willingness of including them in the management plan drafting. In this case stakeholders are both kept informed about decisions made and consulted by the *Amsterdamse Bos*' staff through public meetings, workshops, roundtables and web-based surveys (Personal communication, Municipality of Amstelveen's team manager, 2021). Hence, in the participatory planning process a wide range of actors and stakeholders have the opportunity to express their views and meaningfully influence final deliberations, as confirmed by 80% of survey respondents, although some stakeholders reported to have not being actually included in the drafting of the *Bosplan 2020-2030* (Personal communication, *Amsterdamse Bos*' entrepreneurs, 2021). However, despite some concern, setting an inclusive participation process was crucial to integrate different

[23] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiKgaTu-rDzAhXw_7sIHTlYD2IQFnoECAgQAQ&url=https%3A%2F%2Fwww.amsterdamsebos.nl%2Fpublish%2Fpages%2F442624%2Fdromenboek_amsterdamse_bos_def_25_april_2011.pdf&usg=AOvVaw26RUS7lPlejUy3kV8WJq-n

[24] https://www.amsterdamsebos.nl/nieuws/2021/nota-beantwoording-aangepast-bosplan/

perspectives and interests, also in terms of conflicts resolution (Personal communication, Municipality of Amsterdam's officer, 2020).

6.2.2. Direction

This criterion refers to the adoption, or not, of comprehensive and tailor-made policy-plans to manage peri-urban woodlands. It investigates whether UFG arrangements have been able to define a plan clearly illustrating aims, goals, actions and an adequate timeframe to manage socio-ecological resources.

As briefly in Chapter 5, *BoscoInCittà* management is guided by two documents defining its aims, objectives and related activities: *Convenzione d'uso d 'area* and *Piano di Assestamento Forestale Semplificato 2015-2030* (PAFS 2015-2030). The former is an agreement established between CFU and the Municipality of Milan, renewed every 9 years since 1983, defining the responsibilities (e.g. carrying out educational and recreational activities and maintaining green and forested areas) and general objectives (e.g. improving the ecological connection) to manage *BoscoInCittà* as key multifunctional area within the wider urban context of Milan. The *PAFS 2015-2030* instead focuses on the management and maintenance of forest resources, but it does not include only the area of *BoscoInCittà*, but also the other neighboring peri-urban woodlands – i.e. *Parco delle Cave, Bosco della Giretta, Area del Depuratore (Capholding), Termovalorizzatore (A2A), Parco dei Fontanili di Rho* - that form the '*Parchi di Cintura Urbana dell'Ovest Milanese'* (Western Milan Green Belt) (see Fig.27). In line with this, the *PAFS 2015-2030*'s objectives, to be achieved within 2030, imply the optimization of the ESs provided by the peri-urban woodlands included in the plan, and improvement of their ecological connections in a context significantly fragmented due to urban sprawl. The plan was developed starting from the analysis of the metropolitan context, focusing on existing tree and woodland resources and current legislation.

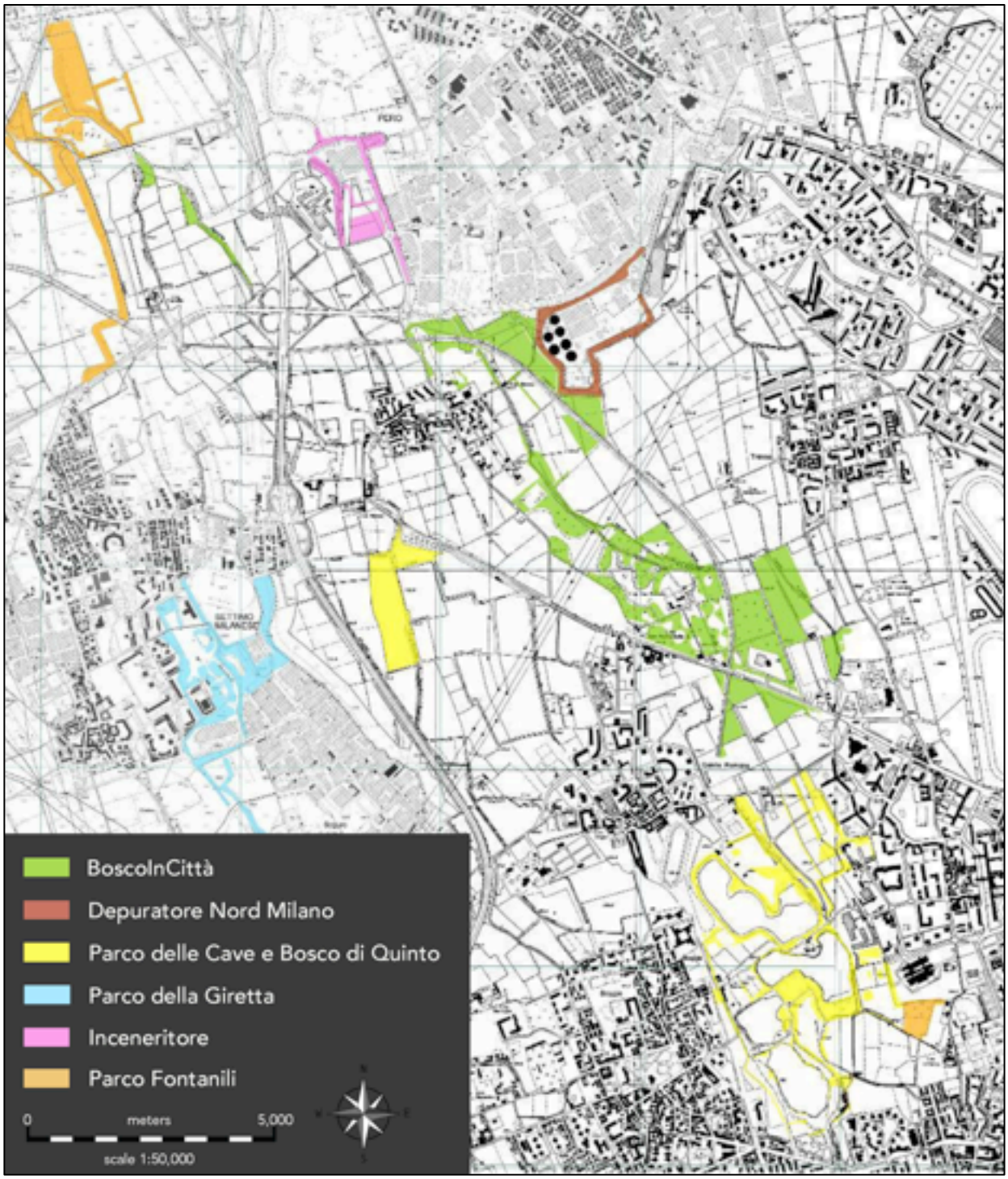

Fig.27. Peri-urban parks included in the Western Milan Urban Green Belt vision

(source: adapted from PAFS, 2015)

Conditions of the woodlands were accurately analyzed paying particular attention to: tree location and species; tree age and their evolutionary stage; trees diameter; trees height; and woodlands phytosanitary aspects. In addition to that, also climatic, botanical,

geopedological and faunal features were taken into account (PAFS, 2015). All these analyses allowed to identify vulnerabilities, risks and also potential areas of intervention to enhance forest resources and ESs provision. In line with the objectives and analysis results, specific actions were defined. They concern tree thinning and cutting, tree-planting, pruning, elimination of competing herbaceous species, and containment of invasive species, conservation of selected trees, and ecological connections improvement.

Concerning the *Amsterdamse Bos* management approach, throughout the years it has changed substantially. From the phytosociological approach applied at the beginning with the *Boschplan* (1934), with the adoption of the *Amsterdamse Bos Policy Plan* (1994) a nature-oriented approach, more focused on natural resources and biodiversity protection, was introduced (Tate, 2015; Stedelijk Beheer Amsterdam, 1994). Additionally, the park was divided in different functional zones, which were later confirmed in the *Bosplan 2012-2016* (Fig.28). Currently, the park is managed by the recently adopted *Bosplan 2020-2030*. It is the first plan jointly developed by the Municipality of Amsterdam and Amstelveen. In line with the previous plan (*Bosplan 2012-2016*), it comprehensively addresses socio-environmental ambitions for the peri-urban woodland. Its strategic vision clearly expresses the aim of balancing the conservation of natural and cultural heritage with the provision of socio-recreational services (e.g. sport, events, leisure, and educational activities. This approach led to a re-zoning of the park in three main areas (Fig.28): (i) *natural zone*: it is the area with higher natural value aimed at preserving natural and landscape elements; (ii) *rest zone*: characterized by lower natural value, in comparison to natural zone, and focused on providing spaces for relaxation and leisure; and (iii) *activity zone*: where the emphasis is on recreational and sport activities and (new) facilities are allowed (e.g. goat farm, climbing park, open-air theater). In comparison to the previous plans, in the *Bosplan 2020-2030* the natural and rest zones were expanded in order to foster natural capital protection and meet new users' preferences, as illustrated in Fig.28.

The plan's objectives, to be achieved within a 10-year timeframe, are clustered in four main themes: (i) conservation and enhancement of natural and cultural values; (ii) improvement of park's accessibility and sustainable mobility (i.e. public transport, bike

lanes); (iii) integration between nature protection measures, leisure and recreational activities; and (iv) awareness raising about the multifunctional role of the *Amsterdamse Bos* within the metropolitan area (Municipality of Amsterdam, 2020). These general objectives were formulated considering several dynamics taking place in the park and in the surrounding areas: fauna and flora conditions; infrastructure and facilities maintenance status; increasing number of visits in the park, especially during the Covid-19 health crisis; urbanization pressure (e.g. A9 motorway widening); new demands for services; conflicts between different uses in the park; and climate change effects.

Fig.28. *Amsterdamse Bos*-zoning evolution over time

(source: adapted from Municipality of Amsterdam, 1994; 2021)

The plan specifies also actions required to implement the aforementioned objectives on-the-ground. They are illustrated considering their priority and the economic resources needed to realize them (Municipality of Amsterdam, 2020:52). Moreover, a 5-years maintenance plan and annual implementation plan are in place to guide the achievement of targeted-objectives and implementation of specific actions.

6.2.3. Effectiveness

Effectiveness was included as a criterion to understand the extent to which UFG arrangements in peri-urban woodlands are capable of achieving their targeted-goals and act in line with their discourses and management values.

Concerning *BoscoInCittà,* since 1974 when it was established, the discourses and objectives driving *Italia Nostra Onlus*' action, and lately CFU, were aimed at improving the environmental quality of the area. In this respect, the mobilization of resources (i.e. funding, volunteers, technical knowledge) allowed to establish the park and, throughout the years, increase forest plantation and enhance biodiversity. From an environmental and ecological perspective, especially in a highly fragmented context as the Milan's peri-urban interface, this must be considered as a success, also because the area was formerly a neglected farming land. Moreover, the collaboration between CFU and Municipality of Milan, and the alignment of their objectives, has proved to be effective also in improving the ecological networks with the neighbors urban parks – as agreed by key informants and 100% of the experts surveyed, accordingly with the *PAFS 2015-2030*'s objectives for creating the *Cintura Verde dell'Ovest Milanese* (Western Milan Green Belt) (see Fig.27).

In terms of benefits provided, key informants and surveyed experts' perceptions indicate environmental education and awareness raising as the most relevant, consistently with the CFU's discourses and nine-years lease agreement's general objectives. This positive impact has been achieved thanks to educational and cultural activities offered by CFU to a wide range of users (from schoolchildren to adults). Moreover, experts surveyed recognize citizens' health and well-being improvement and sense of belonging as other important benefits delivered. Activities such as e.g. Nordic walking, garden allotments management, and tree-maintenance, significantly contributed to provide these physical, health and socio-cultural services to involved stakeholders and users. Additionally, although it is not mentioned as an objective neither in the 9-year lease agreement nor in *PAFS 2015-2030*, experts perceived also climate change mitigation as one of the main benefits linked to this UF initiative.

In sum, the Italian case can be considered as governed by an effective UFG arrangement, which over the years has been able to achieve the desired outcomes through the alignment of the municipal and private goals, a regular stream of public funding over the years, and a successful place-making and place-keeping approach. As evidence of CFU's effectiveness in governing the park, the Municipality of Milan entrusted to the NGO also the management of other public green and forested areas in the city (i.e. Cava Ongari and Porto di Mare).

In the case of *Amsterdamse Bos*, despite the increasing urbanization pressure to which the park is subject, the Municipality of Amsterdam has been able over the years to preserve natural resources from major urban development taking place in the surrounding areas, as confirmed by key informants interviewed and experts surveyed (60% of total survey respondents), although *Schiphol Airport* intense activity and *A9 motorway* still affect users and biodiversity. Moreover, as in the Italian case, the municipality has proved to be effective also in improving the ecological connections of the park with other neighboring green areas. An example in this regard is the *Schinkelbos* (Schinkel Forest), a 40ha expansion area realized in 1999 as a part of the *Groene As* (Green Axis), a regional green infrastructure network between Amstelland and Spaarnwoude (Fig.29). Additionally, *Amsterdamse Bos* is recognized as also successfully contributing to the climate adaptation objectives of the Municipality of Amsterdam by absorbing 530 tons of CO_2 per day (Municipality of Amsterdam, 2021). These look as successful achievements in line with the discourses and management plans' objectives (i.e. *Bosplan 2012-2016* and *Bosplan 2020-2030*) that pursuing the protection of natural capital as key green resource of the city as a whole.

Furthermore, as other key management objective, the provision of socio-recreational services to dependent communities has been central for the Municipality of Amsterdam. In this vein, key informants and surveyed experts identified the enhancement of citizens' health and well-being, improvement of knowledge and skills (e.g. volunteers), raise of environmental awareness, provision of jobs and entrepreneurs opportunities, improvement of aesthetic perceptions, and increasing sense of community and belonging

among residents as main benefits delivered. This was made possible by the delivery of numerous services and organization of multiple events (e.g. concerts, theater shows, art courses, job opportunities for disadvantaged people and sport activities), as well as the adoption of a demand-oriented approach and re-zoning of the park (e.g. expansion of the activities zone in line with the *Structuurvisie Amsterdam 2040,* Amsterdam's Structural Vision 2040).

Fig.29. Ecological connection between *Amstelland* and *Spaarnwoude*

(source: Municipality of Amsterdam, 2022)

In the end, we can argue that the municipality-led governance of *Amsterdamse Bos* has been effective over the years in balancing nature protection measures with the delivery of a wide-range of socio-cultural and recreational services, in line with the main *Bosplan 2012-2016's* objectives and local community's discourses, although its action has not always been supported by adequate financial resources, thanks to the central role recognized to

the park in the urban and spatial planning systems, the actual involvement of a wide range of actors and stakeholders, and a clear development vision.

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7. Discussion and conclusive remarks

This last chapter summarizes and critically discusses the key results of the governance capacity assessment conducted for the cases of *BoscoInCittà* and *Amsterdamse Bos*, as outlined in Table.4 below. In doing so, as initially mentioned in the introduction of this thesis, this work aims to contribute to the international debate on UFG providing methodological and theoretical insights, potentially useful both for future studies and policy-making, to investigate governance processes and impacts and understand success factors in UF initiatives.

Table.4. Results of the governance capacity assessment of the case studies

Institutional Capacity	*BoscoInCittà*	*Amsterdamse Bos*
Participation	Medium	Medium
Integration	Medium	High
Resources allocated	Medium	Medium
Learning	High	High
Governance Performance	***BoscoInCittà***	***Amsterdamse Bos***
Inclusiveness	Low	High
Direction	Low	High
Effectiveness	High	High

The chapter is structured as follows. Firstly, answer to the first two research questions posed by the study are introduced illustrating the validity of the methodology applied – i.e. criteria, methods, and interpretative framework - to assess UFG capacity. Next, a more in-depth critical reflection on the criteria adopted to assess institutional capacity and governance performance is proposed emphasizing lessons learned. Then, limitations and shortcomings of this study and future research agenda on UFG assessment are discussed in the conclusive section.

7.1. Successful urban forest governance, how to recognize it?

International literature calls to deepen the understanding of factors influencing the success, or failure, of governance arrangements in UPF and how to assess them (Boulton *et al.*, 2021; Wirtz *et al.*, 2021; Ordóñez *et al.* 2019). In this regard, this study proposes a methodological approach for addressing these knowledge gaps and, in particular, for investigating the capacity of actors and stakeholders to collaborate and interact in UFG to deal with growing urban complexity and provide the expected benefits to society.

In order to answer the first research question posed by this study - *what are the criteria that an UPF initiative must satisfy to be identified as successful from a governance perspective?* – several assessment criteria were identified as central to investigate the most relevant factors influencing both governance processes and impacts in UPF and, therefore, the success of UFG arrangements within a holistic perspective.

Considering that no standard criteria have been defined for measuring governance capacity at local scale so far, especially referring to UFG, their selection was based on the exploration of different strands of scientific literature (i.e. environmental governance, critical policy analysis and evaluation, natural resources management), existing forest governance assessment approaches (Dang *et a*l., 2016; Secco *et al.*, 2014; Lockwood *et al.*, 2010), and issues emerged during the fieldwork in Milan and Amsterdam. As a result, a set of intertwined qualitative criteria were drawn - i.e. *participation*, *direction*, *learning* and *resource allocation,* to inform *institutional capacity* assessment, and *inclusiveness*, *integration,* and *effectiveness* to assess *governance performance* - and identified as suitable for advancing our understanding of UFG functioning and stimulating a more informed discussion of what a successful UFG is.

In their selection, particular attention was paid to ensure a mix of fact-based (i.e. from policy, planning and legal documents, and site visits) and perception-based (i.e. through interviews and surveys) evidences from their operationalization. As highlighted by Secco *et al*. (2014), it is crucial to reduce as much as possible the risk of bias and errors in assessing governance arrangements.

Criteria selected proved to be appropriate for comprehensively assessing the capacity and success of UFG, resulting in line with the principles influencing UPF approach - i.e. *participative*, *integrative*, *strategic* and *multifunctional* (Randrup *et al*., 2005; Konijnendijk, 2003) and studies exploring UFG success factors in Canada - e.g. availability of funding; data-driven decision-making; future vision and clear aims and objectives (Wirtz *et al*., 2021), and in the European context - e.g. strategic and cross-sectoral planning; regular monitoring; involvement of no-governmental actors; establishment of actors coalitions - as highlighted by Pauleit *et al*. (2019) in discussing the outcomes of the GREEN SURGE project. Finally, criteria look also consistent with the recommendation proposed by Lawrence & Ambrose-Oji (2015) to pay more attention to socio-cultural and contextual factors in forest governance assessment. Indeed, focusing only on quantitative criteria (e.g. no. of trees planted or no. of people attending public meetings) it may limit the understanding of inter-linkages between the UFG elements chosen to be assessed (Dang *et al*., 2016).

Concerning the second research question of this study - *how can these criteria be used to understand how actors' decisions are made and their related impacts?* – being governance here understood as: "t*he many ways in which public and private actors from state, market and/or civil society govern public issues at multiple scales, autonomously or in mutual connection"* (Arts & Visseren-Hamakers, 2012:4), and due to the *multi-level* and *multi-actor* character of (urban) environmental policies (Leroy & Arts, 2006), a governance capacity assessment framework, adapted from Dang *et al.* (2016), focused on actors' and stakeholders' collaboration and interaction was adopted to operationalize the criteria selected, answer the second research question, and draw attention to gaps and challenges.

Based on the PAA's governance dimensions – i.e. *actors, stakeholders and partnerships*; *discourses*; *institutional framework*; and *resources* (Arts & van Tatenhove, 2004), to which the *activities-dimension* was added to include all those practices carried out by actors and stakeholders involved to achieve their goals (Mattijsen *et al*., 2017) - the framework results

as a fine tool to interpret the complexity of UFG and empirically investigate its capacity in a comparative perspective, which is key to extrapolate generalized lessons learned.

The framework and the criteria chosen effectively allow to combine governance processes and impacts assessment (i.e. *cross-fertilization*), and their evolution over time, providing in this way a more solid and consistent methodology, and reliable results, in comparison with evaluative approaches investigating only one aspect of (urban) environmental governance (Rauschmayer *et al.*, 2009; Wilde *et al.*, 2009). Its adoption can foster our understanding of how actors' collaboration is crucial also at the local level to shape (potentially) inclusive, strategic, data-driven, and effective decision-making and develop comprehensive UF management plans. By making these processes clearer to policy-makers and researchers it can help in improving UFG over time, by adapting decisions, planning tools, and policy arrangements at various scales and in different urban and peri-urban contexts.

The framework provides insights into how UFG arrangements characterized by e.g. different actors involved, development dynamics, institutional frameworks, strategic vision, and power relations, as in the cases of *BoscoInCittà* and *Amsterdamse Bos*, can be consistently compared also across different countries or regions. In this regard, using generalizable criteria and standardized definitions - e.g. UFs, UPF (FAO, 2016; 2012) - was key to give to the assessment approach a common language potentially applicable in very different contexts and capable to foster the exploration of critical success factors. Naturally, this may vary in certain contexts as, for instance, in the Global South where more informal UF initiatives may be found. Therefore, it is worth notice that, especially at local level, for bottom-up governance arrangements (e.g. grassroots UF practices), the operationalization of the framework and criteria might be difficult to carry out due to the potential lack of available secondary data and marginal relevance of some criteria (e.g. integration and direction).

7.2. What have we learned?

To answer the third research question - *what lessons can be learned to improve UFs management from the assessment of their governance arrangements?* – the results presented in Chapter 6 are critically discussed in the following sections aiming to translate them in governance and policy insights for both scholars and practitioners.

7.2.1. Participative and inclusive decision-making processes

Relevant contributions in scientific literature underline the importance of including a wide range of different discourses in policy-making to ensure its quality based on normative governance principles such as e.g. fairness, equity, transparency and legitimacy (Buijs *et al.*, 2019; Sheppard *et al.*, 2017; Tacconi, 2011; von Gadow, 2002). Thus, participative and inclusive decision-making processes are considered by several scholars as a crucial factor for a successful and 'good' governance in UPF (Fors *et al.*, 2020; Duiker *et al.*, 2017; Ostoić & Konijnendijk, 2015). In this vein, in both cases assessed a medium institutional capacity was observed in relation to participation. Indeed, although in both *BoscoIncittà* and *Amsterdamse Bos* public open spaces, venues, and digital tools are in place, even if not always effectively utilized, it is principally the lack of specific and clearly stated rules guiding participative and inclusive decision-making that seems to weaken their engagement processes, especially in the Italian case. Indeed, concerning inclusiveness, in the case of *BoscoInCittà* citizens' discourses are not officially included into decision-making. Primary actors, i.e. *Italia Nostra Onlus*-CFU and Municipality of Milan, resulted to be not very prone to take into account citizens' observations and views in final deliberations, showing low governance performance. However, the crucial role played over the years by CFU in fostering active citizenship (Buijs *et al.*, 2019) in some cases allows to gather observations through informal consultations with volunteers and users involved into day-to-day maintenance. Nevertheless, it results to be a rather limited participatory approach not fully in line with the principle of inclusiveness, also considering that CFU

privately steers a peri-urban woodland located on municipal land, mostly relying on public funds, and claims participation as one of its key management values.

Unlikely the Italian case, in Amsterdam the municipality, and specifically the *De Bosorganisatie*, over the years has shown to have a better understanding of the importance of collaborating and interacting with a broad range of stakeholders to develop management policy-plans based on shared discourses and aimed at limiting potential users' conflicts. This allowed to attribute to the *Amsterdamse Bos* governance arrangement a high governance performance in relation to inclusiveness.

Therefore, results indicate that, although similarities in terms of institutional capacity, the governance performance of the cases in ensuring high standards of inclusiveness differs greatly. This sheds light on how actors' willingness and power can significantly influence the extent to which stakeholders' discourses are meaningful included into decision-making process when, despite the availability of adequate resources enabling participative processes, specific rules have been not formally established. This is strictly linked to power and justice issues, largely addressed in literature (see e.g. Carmichael & McDonough, 2018; Campbell & Gabriel, 2016; Poe *et al.*, 2013), that may negatively affect less powerful actors and stakeholders potentially exacerbating already existing socio-cultural inequalities. Hence, although not all type of UFG arrangements require to be fully participative and inclusive, as argued by Borelli *et al*. (2021:216): "it is important to identify ways to ensure an integrated and transdisciplinary participation of diverse actors in decision related to the governance of urban green spaces and green interventions".

7.2.2. Integrative and strategic governance and policy arrangements

UPF is described as an integrative and strategic approach for the planning, design, and management of woodlands and trees resources (Randrup & Jansson, 2020; Konijnendijk, 2012). In this regard, cases here assessed shown several differences in relation to the adoption of integrative and strategic approaches.

Evidences indicate horizontal and vertical integration (collaboration and interaction among actors operating at the same and different levels of governance) are crucial for several reasons: firstly, to integrate UF initiatives, in particular self-governance and 'bottom-up' experiences (i.e. *BoscoInCittà*), into the urban and spatial planning and policy systems; secondly, to develop strategic, comprehensive and tailor-made policy-plans to properly manage urban and peri-urban woodlands addressing socio-environmental, ecological and economic challenges (e.g. *Bosplan 2020-2030*); and thirdly, to align urban woodlands policy-plans' vision with other sectoral urban planning tools and policies in order to strategically respond to specific challenges (e.g. *PAFS 2015-2030; Bosplan 2020-2030*).

In this light, the Municipality of Amsterdam over the years has shown high institutional capacity thanks to the prolific collaboration set up between municipal departments and with national and provincial public authorities, as well as local residents, associations, and entrepreneurs working in the park. It was crucial to develop strategic and inclusive policy-plans (e.g. *Bosplan 2012-2016*; *Bosplan 2020-2030*), clearly defining aims, objectives, actions and timeframes, encompassing also specific implementation and monitoring plans and, therefore, attain an high governance performance. This is consistent with studies supporting the importance of sound planning and design to effectively create and manage urban green spaces, including UFs (Wirtz *et al.*, 2021; Gibbson & Ryan, 2015; Ordóñez, & Duinker, 2013).

Also in *BoscoInCittà,* CFU over time has been able to arrange valuable collaborations with public authorities (e.g. with Metropolitan City of Milan to develop the *PAFS 2015-2030*), and integrating in its governance network other local institutions and associations (e.g. schools, boy-scout and sport associations), involving them in several activities. It undoubtedly shows a good propensity to cooperate with other actors and stakeholders at different level of governance and, thus, a medium institutional capacity. However, lack of proper interaction between municipal departments, regulatory rather than strategic management tools (i.e. 9-years lease agreement), broadly defined management goals, lack of integration of urban level socio-cultural concerns into its policy-plan (i.e. *PAFS 2015-2030* focuses only wooded resources management), and dependence on technical

expertise, are all factors evidencing low governance performance in developing and adopting a holistic and strategic plan clearly defining a future vision for the park.

Differences in terms of governance performance between the two cases might be due to their diverse level of institutionalization and type of governance arrangements, as well as the different contexts and legislative frameworks they are embedded in. For instance, as *BoscoInCittà* was established outside the planning and policy tools in force in 1974, echoing the words of Lawrence & Ambrose-Oji (2013), it can be argued that in the Italian case policies learned from the UF initiative rather than the reverse. It may be for this reason that a certain degree of informality has been kept in its management approach, especially referring to the definition of specific management plans and related goals and actions. This is not the case instead for *Amsterdamse Bos*, which instead was integrated in the Amsterdam's masterplan (*General Expansion Plan for Amsterdam, 1935*) since the beginning and established through an interdepartmental shared vision, process that is still in place nowadays.

Therefore, results indicate that actors' capacity and willingness to effectively collaborate and interact with the final aim of sharing their vision (high institutional capacity), may influence the adoption, or not, of comprehensive management plans integrating different discourses (high governance performance). However, as aforementioned in section 7.1., in the case of grassroots or community-led UF initiatives (i.e. *BoscoInCittà*), for example, developing and adopting an official management policy-plan integrating urban and territorial issues might be not a primary concern for the successful management of the area. Hence, it can be argued that for successful UFG building collaborative governance networks aimed at catering citizens' needs and demands in some contexts may assumes a greater relevance than the adoption of official comprehensive planning tools at site or local level, although the latter are reasonably recognized in literature as desirable (e.g. Randrup & Jansson, 2020; Gibbons & Ryan, 2015).

7.2.3. Resourceful, informed and effective governance for multifunctional peri-urban woodlands

As largely acknowledged in literature, adequate resources allocation and regular monitoring, evaluation and research activities are understood as to be key success factors for the effectiveness of UFs governance and management action at various scales (Wirtz *et al.*, 2021; Lawrence *et al.,* 2013).

Results confirm that having available diversified sources of funding and, as a consequence hiring valuable human resources endowed with adequate skills, knowledge and expertise, at both strategic and operational level, are all crucial factors to effectively govern and manage urban and peri-urban woodlands. Indeed, lack of financial resources may determine a reactive management approach, rather than proactive, and a detachment between what is provided for in management policy-plans' vision and the reality on-the-ground. In this respect, the Dutch case study clearly shows how actors experience difficulties in managing and maintaining the park due to the public funds cutting occurred in the las few years. In this case, setting a new type of governance arrangement (e.g. partnership with the Municipality of Amstelveen), or finding new sources of financing (e.g. fee-paying car park) may help in overcoming the financial constraints and achieve the targeted-goals. Hence, developing specific capacities and innovative solutions for attracting diversified sources of funding – e.g. donations, sponsorships, grants - is crucial to carry out management tasks and activities, as accomplished over the years by CFU's staff for *BoscoInCittà*.

Capacity of developing strategic policy-plans and projects involves also the integration into the decision-making of both technical and local knowledge as fundamental resource to optimize the delivery of ESs and benefits. In this regard, while in both the cases technical knowledge is generally provided by in-house staff and occasionally external experts, assessed, a meaningful inclusion of local residents' knowledge into decision-making was observed only in Amsterdam, while in Milan it seems rather limited. This is strictly connected with participation and inclusiveness issues highlighted above, and therefore with the limited influence that powerless actors or stakeholders may experience. However,

in addition to most powerful actors' willingness, as in the case of *BoscoInCittà*, in some cases lack of proper integration of local knowledge into decision-making may be influenced also by citizens' low understanding and awareness of what entails managing urban green spaces, or even by their lack of interest and support (e.g. see Almas & Conway, 2017). Nevertheless, local knowledge needs to be recognized as an important element of decision-making to address urban woodlands complexity and, in this way, avoid planning and management approaches relying only on theoretical insights and technical expertise.

Therefore, considering the respective weaknesses in terms of resources allocated in the two cases – with *BoscoInCittà* having limitations in terms of local knowledge inclusion, while Amsterdamse Bos lacks of adequate economic resources – both UFG arrangements were assigned a medium institutional capacity.

Linked with knowledge, results indicate also learning as central element for UFG success, with both cases showing high institutional capacity in this regard. Indeed, in addition to co-production of knowledge, between experts, academicians, and local residents, monitoring and evaluation activities can foster data-driven decision-making and properly inform and orient final deliberations. In this vein, although scientific literature highly recommend to develop and implement monitoring plans to keep track of changes over the years (Morgenroth & Östberg, 2017; Miller *et al.*, 2015; Nowak *et al.*, 2013), the case of *BoscoInCittà* shows how monitoring can be regularly performed, and urban woodlands successfully steered adapting decisions and actions when needed, even without the adoption of an official monitoring plan, despite in the Italian case transparency issues emerged not being the data publicly available. However, once again, this depends on the contextual factors, as well as from the type of governance arrangements set, natural resources to be managed, purposes of the UF initiative, availability of funds, and related institutional framework. Carrying out UF monitoring is demanding in terms of human and financial resources to be deployed and, as a consequence, its regular implementation, as observed in Amsterdam, can be significantly influenced by both the establishment of specific rules intended to make monitoring mandatory, e.g. *Natuurbeschermingswet 2017*

(Nature Conservation Act, 2017), and provision of public incentives or financing schemes, e.g. *Subsidiestelsel Natuuren Landschap* (Subsidy System for Nature and Landscape). Hence, institutional framework and incentives may influence actors' actions. In this regard, besides specific rules, it is central to adopt tailor-made monitoring strategies and experimenting innovative solutions by integrating top-down and bottom-up approaches to gather relevant data and lower the costs as, for example, through the 'Internet of Nature' approach suggested by Galle *et al.* (2019).

Looking at the effectiveness of UFG arrangements, despite the various weaknesses discussed above about the cases here assessed, *BoscoInCIttà* and *Amsterdamse Bos* are both internationally recognized as flagship successful UF initiatives. CFU management of *BoscoInCittà* indicates that, despite low levels of inclusiveness, scarce management plan comprehensiveness, and lack of formal implementation and monitoring plans, a successful and comprehensive on-the-ground management can however be carried forward. Indeed, the co-governance arrangement adopted in Milan, which over time has become more similar to a self-governance arrangement driven by CFU, has shown how a large wooded peri-urban area can be steered and developed through a certain level of informality without fail to fulfill its general goals.

Amsterdamse Bos results to be a peri-urban woodland effectively steered through a governance and management approach in line with the recommendations outlined in scientific literature (see Chapter 2) - i.e. participatory planning process, inclusiveness, horizontal and vertical integration, comprehensive management plan, regular monitoring and evaluation activities. However, the Dutch case shown how the lack of financial resources resulted to be a major concern partially affecting the implementation of its management vision and, in particular, the maintenance of natural and anthropic resources in the park, confirming how this element is key to successful UFG, as highlighted in other studies (Wirtz *et al.*, 2021; Davies, 2020; Merk *et al.*, 2012).

In the end, it can be argued that both UFG arrangements assessed, despite the different approaches adopted, significantly and successfully contributed to enhance urban environmental quality, deliver recreational and cultural services, provide jobs, improve

ecological networks, and strength community bond and identity, in line with the discourses characterizing their action since the beginning. In both cases collaboration among actors and stakeholders over the years has been crucial to achieve shared goals and limit issues such as urban sprawl, green space fragmentation and air pollution (high governance performance).

7.3. Conclusive remarks and future research agenda

The guiding idea of this study lies in developing an assessment approach able to include the most relevant elements characterizing processes and impacts of UFG arrangements in order to understand their capacity and success factors. However, in moving from theory to the practical operationalization of the criteria and assessment framework, this evaluative exercise had to deal with some limitations that may cause a partial understanding of UFG capacity.

Firstly, some criteria initially identified as suitable for the scope of this study were discarded due to the difficulties in gather reliable data and information to assess them. In particular, missed factors that could be assessed refer to *adaptability* and *efficiency* criteria. The former refers to the extent of new knowledge and learning are actually included in decision-making in order to anticipate threats, opportunities, and risks within a proactive management approach (Coffey *et al.*, 2020; Bennett & Satterfield, 2018; Lockwood *et al.*, 2010), while the latter indicates the optimal deployment of human, financial and time resources allocated aimed at avoiding unnecessary waste or delay in management and implementation activities (Secco *et al.*, 2014; PROFOR/FAO, 2011). For both criteria, difficulties in gather quality and reliable data averting a self-assessment by actors involved represented a relevant limitation for their investigation and, therefore, for their inclusion in the assessment framework.

Secondly, the limited number of case studies investigated may have affected the study's results. The choice of investigating only two cases in different European contexts was made on the basis of the resources available and timescales set up for this PhD

investigation in order to be able of properly analyzing and assessing a complex phenomenon as UFG. For these reasons the assessment of a third case study was rejected. Applying the assessment approach here proposed to explore additional case studies may be useful to have a more comprehensive picture of UFG and its institutional capacity and governance performance. As aforementioned, for its operationalization in different contexts and regions worldwide, potential limitations in terms of transferability, such as availability of reliable data and key informants, language barriers, and relevance of the criteria to be applied - which should be tailored to the specific context of reference, should be taken into account both by researchers and practitioners.

Thirdly, reflexivity needs to be taken into account in a context of knowledge production. Nevertheless, being this study developed on the constructivist research philosophy (see Chapter 4), it implies that the researcher's perspective and assumptions can influence the assessment's results. As argued by Arts & Goverde (2006:73) in their conceptualization of the GCA: "evaluators can and may make their own judgment, as long as this is done in a transparent and self-critical mode". Therefore, for this study the author's experiences, both as a researcher and practitioners in the field of UPF, have certainly influenced the research process and UFG arrangements investigation. Efforts to limit biases and errors, however, were carefully deployed in order to ensure rigorous and quality research. In this regard, considering reflexivity as an opportunity instead of a problem, the limit, in this case, may refer to the collection of perception-based evidences, mostly due to the rather low response rate to the web-based surveys. Additionally, for the two cases it would have been useful also conduct site interviews or focus groups with local residents and users of the parks to better understand their perspectives, especially in relation to *inclusiveness*, *learning* and *effectiveness* criteria. Unfortunately, it was not possible due to the Covid-19 pandemic restriction measures.

This study, in line with what is called for in scientific literature, encourages future research able to further improve the methodological approach and evidence base for assessing UFG success factors also focusing on other aspects than collaboration and interaction among actors and stakeholders as proposed in this study. The framework could

be improved and refined including different or innovative criteria not considered for this investigation, as mentioned above. Furthermore, future research may focus on the application of this assessment approach on UFG arrangements steering tree resources on private land, which usually represent the majority of cities' tree canopy cover (Daniel *et al.*, 2016). Indeed, understanding the capacity of private actors to interact and collaborate for solving or limiting urban and territorial challenges could be interesting to understand UFG functioning and success when influenced by different regulations, power dynamics, ownership, and access rights. Also the operationalization of the UFG assessment framework in more informal contexts, characterized, for example, by insecure land tenure or lack of specific policies or plans, are encouraged, as well as comparison between cases at different scales should be taken into account whether considered as valuable.

To conclude, the comparative exercise here proposed, focusing on the assessment of two European-based case studies, shows that the relationship between institutional capacity and governance performance**,** is not always straightforward, which is consistent with findings of Dang *et al.* (2016)'s study. Additionally, as discussed above, the assessment shows how urban and peri-urban woodlands can be effectively and successfully governed in different ways and, in line with this, it suggests several lessons learned:

- Most powerful actors' willingness coupled with the lack of specific and mandatory rules may undermine the establishment of meaningful participative and inclusive planning processes in UPF.

- Limited vertical and/or horizontal integration and poor citizens participation can negatively affect the development of cross-sectoral and shared strategies, co-production of knowledge, and attainment of political and local support over time.

- In some contexts, establishing collaborative UFG networks may assume a greater relevance than adopting official management plans to effectively govern UFs and achieve the desired outcomes.

- State-actors, particularly local governments, still play a primary role in UFG, especially concerning funds and land allocation. However, no-governmental actors' capacity to attract alternative funding sources is increasingly crucial.

- Lack of clearly stated rules and incentives can negatively influence actors' actions in developing official implementation and monitoring plans and sharing related data.

- The level of management plans comprehensiveness is not directly related to the UFG effectiveness achieved over time. Actors' actions and resource availability may play a more relevant role in comparison to formal policies and regulations.

These insights look consistent with the literature reviewed in Chapter 2. However, although the criteria, framework applied and discussions here proposed may help in better understanding UFG at local level, as argued by Pauleit *et al*. (2019) in presenting the outcomes of the GREEN SURGE project, when taking into account generalized conclusions it is crucial to be aware of the local context peculiarities and, therefore, the necessity of combining "the strengths of different actors in order to match the needs of a specific situation" (*ibid*:13). As mentioned above, this was confirmed also by the assessment of the two cases selected for this study, which proved to be solid in providing reliable data and insights on how UFG works and may be improved over time.

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Annex 1: List of the documents analyzed for the two cases

Case study	Legislative, planning and policy documents	Case study	Legislative, planning and policy documents
BoscoInCittà	Convenzioni Italia Nostra CFU – Comune di Milano (Nine-year lease agreement)	***Amsterdamse Bos***	*Agenda Groen 2015-2018* (Green Agenda 2015-2018)
	Piano di Indirizzo Forestale (PIF)		*Algemeen Uitbreidingsplan Amsterdam*, 1935 (General Expansion Plan for Amsterdam)
	Piano di Territoriale di Coordinamento Provinciale (PTCP)		Amsterdamse Bos 1994 Policy Plan
	Piano di Coordinamento del Parco Agricolo Sud di Milano (PTC)		*Bosplan 2012-2016*
	Piano di Assestamento Forestale Semplificato 2015-2030 (PAFS)		*Bosplan 2020-2030*
	Piano Regolatore Generale of 1953 (PRG)		*Gedragscode bosbeheer 2010-2015* (Forest management code of conduct)
	Piano di Governo del Territorio di Milano (PGT)		*Groenvisie 2050. Een leefbare stad voor mens en dier*
	Rete Ecologica Comunale (REC)		*Structuurvisie Amsterdam 2040* (Amsterdam's Structural Vision 2040)
	Regional law no. 31/2008 "Testo unico delle leggi regionali in materia di agricoltura, foreste, pesca e sviluppo rurale"		
	Regolamento del Verde (RdV) di Milano		

	National law no. 10/2013 "Norme per lo sviluppo degli spazi verdi urbani		
	National urban green space strategy: "Resilient and heterogenous urban forests for citizens' health and wellbeing"		
	Technical reports		Technical reports
	Ambrose-Oji et al., 2017. Innovative governance for urban green infrastructure: A guide for practitioners. Work Package 6: GREEN SURGE Deliverable 6.3.		Municipality of Amsterdam, 2011. Dromenboek Amsterdamse Bos. Onderweg naar het Bosplan
	ISPRA (Istituto Superiore per la Protezione e la Ricerca Ambientale), 2018. XIV Rapporto Qualità dell'ambiente urbano, no. 82.		Municipality of Amsterdam, 2017. Plan Amsterdam 'Building a green city'
	Italia Nostra, 2011. Sentieri in città. II serie/anno 8, no.17, Aprile 2011.		Municipality of Amsterdam, 2019. Amsterdamse Bos 2019. 13e meting naar bezoek en waardering voor het Amsterdamse Bos onder stadsbewoners
	Italia Nostra, 2014. Sentieri in città. 1974 – 2014: Milano per il Bosco, il Bosco per Milano. Quarant'anni di Boscoincittà. II serie/anno 11, no. 24, Settembre 2014.		Havik, G. et al. 2015. Amsterdam, The Netherlands - Case Study City Portrait. Wageningen University (WU), The Netherlands
	Italia Nostra, 2019. Relazione di Sintesi 2018. BoscoInCittà. Italia Nostra – Centro di		Stedelijk Beheer Amsterdam, 1994. Amsterdamse Bos:

	Forestazione Urbana, Milano.		Visitors' Information on Forestry Practice
	Italia Nostra, 2020. Relazione di Sintesi 2019. BoscoInCittà. Italia Nostra – Centro di Forestazione Urbana, Milano.		van der Werf, J., Dupon, S., 2016. Cultuurhistorische verkenning Amsterdamse Bos. Tussen natuur en ontspanning
	Scientific papers, books and book chapters		Scientific papers, books and book chapters
	Canedoli, C., Crocco, F., Comolli, R., & Padoa-Schioppa, E., 2018. Landscape fragmentation and urban sprawl in the urban region of Milan. Landscape Research, 43(5), 632-651.		Dupon, S., Van der Werf, J., 2019. Amsterdamse Bos: A biography of an urban forest. Thoth Publishers, Bussum, Netherlands.
	Carovigno, R., Calvo, E., Colangelo, G., Dentamaro, I., Lafortezza, R. and Sanesi, G., 2011. The afforestation of rural landscape in Northern Italy: new benefits and services to society.		Forrest, M., & Konijnendijk, C. C., 2005. A history of urban forests and trees in Europe. In Urban forests and trees (pp. 23-48). Springer, Berlin, Heidelberg.
	Ferrari, L., 2004. Il bosco quale elemento di riordino dello spazio metropolitano: l'esperienza di" Boscoincittà" a Milano. Luoghi e paesaggi in Italia, 1, 119.		Jellicoe, G., & Jellicoe, S., 1987. The landscape of man: shaping the environment from prehistory to the present day. New York: Thames and Hudson.
	Fini, G., 2017. Boscoincittà: nature, agriculture, spaces of freedom. Dialogue with Silvio Anderloni about the construction of a peri-urban park.		Konijnendijk, C.C., 2018. The Forest and the City. The Cultural Landscape of Urban Woodland. Second Edition, Springer International.

	Lafortezza, R., Pauleit, S., Hansen, R., Sanesi, G. and Davies, C., 2017. Strategic green infrastructure planning and urban forestry. In Routledge handbook of urban forestry (pp. 179-193). Routledge.		Tate, A., 2015. Amsterdamse Bos. In Great city parks (pp. 283–292). Routledge, London and New York.
	Quaglia, S., & Geissler, J. B., 2018. Greater Milan's foodscape. A neo-rural metropolis. In Integrating Food into Urban Planning, Cabannes, Y. and Marocchino, C. (eds.) (pp. 276-291). UCL Press; Rome, FAO.		
	Sanesi, G., Colangelo, G., Lafortezza, R., Calvo, E. and Davies, C., 2016. Urban green infrastructure and urban forests: A case study of the Metropolitan Area of Milan. Landscape Research, 42(2), pp.164-175.		

Annex 2: Open-ended interview questions for the analysis of urban forest governance arrangements

Generic questions to the interviewee

1. Could you give me some information about your background?
2. What is your role within the governance of the urban woodland?

Context

1. What is the urban woodland's role in the wider urban and metropolitan context (particularly referring to the green infrastructure network)?
2. Do you have any data/information on the number of visitors/users attracted per year?
3. If yes, has the trend changed over time? And if yes, how? What about the different social groups using the park?

Discourses

1. How and why did the urban forest initiative come about?
2. How have the aims to be achieved through park management evolved over time?
3. What are the current objectives in the management of the park?

Institutional framework

1. What are the planning and policy (at different scales – urban, provincial, regional) influencing the governance and management of the urban woodland?
2. Has the urban forest initiative contributed to any change in planning practices or policies?
3. Do you have a specific management plan for the park?

Actors, stakeholder and partnerships

1. **What are the primary stakeholders involved in the governance of the urban woodland?**
2. **What formal and what informal rules shape the partnership between the stakeholders?**
3. **How is the power distributed? Is there any law/regulation defining it?**
4. **Who are the other stakeholders involved (e.g. volunteers, entrepreneurs)? What is their role in decision-making?**

Resources and activities

1. **Who provides the (technical/local) knowledge needed for the management of the park?**
2. **Are the citizens consulted and engaged in decision-making? How? Conflict resolution?**
3. **How is the urban woodland management and maintenance funded? Revenues?**
4. **What are the main management activities (e.g. maintenance, educational, awareness, entrepreneurial) carried out by which stakeholders involved?**
5. **What are the monitoring and evaluation activities carried out (e.g. fauna, flora, soil, water)? Are the data available?**

Annex 3: Overview of key informants interviewed

Case study	No. of interviewees	Interviewees' background	Interviewees' job position
BoscoInCittà (Milan, Italy)	9	1. Agronomist 2. Forester 3. Forester 4. Forester 5. 6.Urban planning (x2) 7. Forester 8. Agronomist 9. Forester	1. CFU Staff 2. CFU Consultant 3. CFU Staff 4. Regional forestry authority's manager 5. 6. Urban green municipal department's officer 7. Urban forestry expert 8. Metropolitan City of Milan's officer (South Milan Agricultural Park) 9. CFU Forester
Amsterdamse Bos (Amsterdam, Netherlands)	8	1. 2. Political science (x2) 3. Political science and urban planning 4. Arboriculture and Landscape 5. Political science 6. Economics 7. Forestry 8. Geography	1. 2. Senior policy advisor (x2), *Amsterdamse Bos* 3. Sustainability and spatial planning's municipal team leader, Mun. of Amsterdam 4. District management's officer, Mun. of Amstelveen 5. Strategic adviser, Mun. of Amsterdam 6. Entrepreneur 7. Forester, *Amsterdamse Bos* 8.Team leader, *Amsterdamse Bos*

Annex 4: *BoscoInCittà*'s survey questions

Questionario sul sistema di governance e gestione del BoscoInCittà di Milano

Questa indagine si inserisce nell'ambito delle attività del Dottorato di Ricerca in 'Urban and Regional Development' del Politecnico di Torino – Dipartimento Interateneo di Scienze, Progetto, e Politiche del Territorio (DIST). Il questionario, che gentilmente ti chiediamo di compilare, è finalizzato a investigare il sistema di governance e gestione del Bosco In Città di Milano e ad approfondire come l'area, e le relative risorse socio-ambientali che la caratterizzano, sono gestite e valorizzate tramite la collaborazione tra Italia Nostra – CFU e il Comune di Milano.
La partecipazione al questionario è volontaria e la sua compilazione richiede all'incirca 20 minuti. L'identità del compilatore non sarà pubblicata, garantendo il suo anonimato, mentre gli altri dati relativi all'indagine saranno trattati in modo aggregato nel rispetto delle regole sulla privacy e delle regole deontologiche per trattamenti a fini statistici o di ricerca scientifica pubblicate come previsto dal GDPR (UE) 2016/679 e dal D.Lgs. n. 196/2003 "Codice in materia di protezione dei dati personali".

Grazie anticipatamente per la disponibilità e il tempo dedicato alla compilazione.
***Required**

1. Email *

.....

Informazioni personali

2. Età

- >18
- 18-25
- 25-30
- 30-40
- 40-50
- 50-60
- +60

3. Genere a cui senti di appartenere

- Femminile
- Maschile
- Non mi sento rappresentat* da nessuna delle precedenti categorie
- Altro

4. Titolo di studio

- Diploma
- Diploma di laurea
- Laurea specialistica
- Dottorato di ricerca
- Altro

5. Professione*

.....

Partecipazione pubblica

6. Sono presenti norme formali e/o informali che regolano e facilitano il coinvolgimento della cittadinanza nel processo decisionale di BoscoInCittà.

- Sì
- Sì, anche se le norme non sono formalmente esplicitate in un regolamento
- No
- Non ne sono a conoscenza

7. Potresti specificare quali norme regolano la partecipazione pubblica nel caso di BoscoInCittà?

.....

8. Sono presenti apposite strutture e spazi destinati a ospitare incontri pubblici (es. riunioni, workshops, etc.) e raccogliere opinioni al fine di favorire la partecipazione al processo decisionale della cittadinanza?

- Sì
- No
- Non ne sono a conoscenza

9. Nello specifico, quali spazi e/o strutture vengono utilizzate?

……

10. Sono utilizzati strumenti e risorse digitali (es. questionari on-line, social network) al fine d coinvolgere la cittadinanza nel processo decisionale e raccogliere varie e diversi opinioni interessi.

- Sì
- No
- Non ne sono a conoscenza

11. Quali strumenti digitali vengono utilizzati nello specifico?

……

Inclusione

12. Nel processo decisionale vari e diversi attori sono effettivamente coinvolti (più scelte possibili).

- Residenti locali
- Esperti/professionisti
- Accademici
- Imprenditori
- Associazioni no profit
- Altre istituzioni pubbliche
- Altro

13. Nel processo decisionale la cittadinanza è effettivamente coinvolta attraverso l'utilizzo di diversi approcci.

- I cittadini sono informati delle decisioni e delle iniziative intraprese tramite newsletter, siti web e report ufficiali.
- I cittadini sono consultati nell'ambito di incontri pubblici, sondaggi, focus group, al fine di raccogliere le loro opinioni e feedback riguardo la gestione dell'area.
- I cittadini sono direttamente coinvolti nel processo decisionale e le loro osservazioni e feedback effettivamente influenzano le decisioni finali e le relative alternative.
- **I cittadini collaborano attivamente con Italia Nostra–CFU e il Comune di Milano in ogni aspetto d processo decisionale, compresa l'identificazione delle soluzioni preferite.**
- **I cittadini, organizzati in un comitato, prendono direttamente le decisioni riguardo la gestione dell'area.**

14. Il processo decisionale risulta essere equo e inclusivo: i commenti e le istanze di tutti i soggetti interessati vengono accolte coinvolgendo cittadini appartenenti a diverse fasce d'età, etnie e sesso.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

Visione

15. Il piano di gestione dell'area è stato sviluppato partendo da una valutazione dello status delle risorse arboree, vegetazionali e socio-economiche a disposizione.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

16. Il piano di gestione e la convenzione d'uso dell'area tra Comune di Milano e Italia Nostra – CFU illustrano chiaramente la visione futura per la gestione e lo sviluppo dell'area specificando obiettivi e target da raggiungere in un arco temporale definito.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

17. Al piano strategico di gestione è associato anche un piano operativo per l'implementazione delle varie azioni da intraprendere.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

18. Il piano di gestione dell'area include anche un piano di monitoraggio finalizzato a valutare il raggiungimento, o meno, degli obiettivi prefissati e gli impatti di medio/lungo periodo.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

Integrazione

19. Il piano di gestione dell'area rispecchia e integra la visione e le direttive di politiche e piani di livello superiore.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

20. Potresti specificare i piani/politiche che maggiormente hanno influenzato il piano di gestione di BoscoInCittà ed, eventualmente, le discordanze?

……

21. Il piano di gestione di BoscoInCittà integra la visione di diversi dipartimenti del Comune di Milano facendo chiaro riferimento alle sfide da affrontare a livello urbano nei prossimi anni (più scelte possibili).

- Cambiamenti climatici
- Consumo di suolo
- Turismo e attività ricreative
- Educazione e cultura
- Salute e benessere dei cittadini
- Tutela e valorizzazione della biodiversità
- Altro……..

22. Il piano di gestione dell'area è il risultato dell'effettiva collaborazione e coordinamento tra diverse organizzazioni a diversi livelli di governance.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

23. Potresti specificare quali organizzazioni/istituzioni?

……

Apprendimento

24. Nella gestione del BoscoInCittà le attività di monitoraggio e valutazione degli impatti di medio e lungo periodo vengono effettivamente eseguite regolarmente.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

25. Le varie risorse naturali componenti l'area del BoscoInCittà sono oggetto di monitoraggio e valutazione (indica gli elementi effettivamente monitorati, più scelte possibili).

- Ubicazione e specie degli alberi
- Età, altezza e diametro degli alberi
- Stato di salute e stabilità degli alberi
- Qualità delle acque
- Qualità del suolo
- Biodiversità
- Altro……..

26. I dati e le informazioni raccolte sono pubblicamente e gratuitamente disponibili e i risultati dell'attività di monitoraggio vengono comunicati agli altri attori coinvolti nel processo decisionale (es. comunicazione tra Italia Nostra-CFU e i vari dipartimenti del Comune di Milano coinvolti).

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

Risorse disponibili

27. Il finanziamento stanziato dal Comune di Milano per la gestione dell'area ad opera di Italia Nostra – CFU è ritenuto congruo e adeguato al raggiungimento degli obiettivi prefissati.

- Sì
- No, sarebbe necessario incrementarlo
- Non ne sono a conoscenza
- Altro……..

28. In aggiunta al finanziamento pubblico stanziato dal Comune di Milano, anche altri ricavi derivanti dalle attività organizzate Italia Nostra–CFU contribuiscono al budget totale per l gestione dell'area (seleziona le attività che garantiscono ricavi aggiuntivi, più scelte possibili).

- Vendita del legname
- Organizzazione di eventi
- Organizzazione di attività educative
- Organizzazione di attività sportive e ricreative
- Altro……..

29. Lo staff a disposizione – per numero di persone, conoscenze e capacità – è ritenuto adeguato al perseguimento degli obiettivi prefissati e alla realizzazione delle relative attività di gestione e manutenzione.

- Sì
- Sì, ma sarebbe necessario formare lo staff per acquisire nuove competenze
- No, sarebbe necessario inserire nuove figure professionali
- Non ne sono a conoscenza
- Altro……..

30. Le attività di gestione del BoscoInCittà da parte di Italia Nostra – CFU ha goduto nel corso degli anni di un effettivo supporto politico.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

31. Nel corso degli anni si sono verificate occasioni in cui il supporto politico è venuto meno. Se sì, con quali conseguenze?

……..

Adattabilità

32. Il sistema di governance e il piano di gestione dell'area (PAF) sono flessibili e, nel corso de anni, sono stati capaci di adattarsi ai cambiamenti di carattere socio-economico e ambientale. (seleziona i fattori che maggiormente hanno contribuito a influenzare il sistema di governance e gestione dell'area negli anni, più scelte possibili).

- Rischi, vulnerabilità e minacce associate al patrimonio arboreo e vegetazionale
- Effetti dei cambiamenti climatici
- Riduzione delle risorse economiche disponibili
- Scarso supporto politico
- Crescente richiesta di nuovi servizi ricreativi e/o educativi
- Altro……..

33. Il piano di gestione del BoscoInCittà (PAFS 2015-2030) viene aggiornato regolarmente (es. ogni 5 anni), al fine di poterlo adattare a nuove esigenze e domande.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

34. Le informazioni e i dati derivanti dalle attività di monitoraggio e valutazione sono ritenute cruciali per informare il processo decisionale e adattare la gestione dell'area.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

Efficacia

35. L'attività di gestione del BoscoInCittà sono effettivamente in grado di garantire il raggiungimento degli obiettivi prefissati nel piano di gestione dell'area (PAF) e dalla Convenzione d'uso dell'area.

- Sì
- No
- Non ne sono a conoscenza
- Altro……..

36. Il sistema di governance e gestione del BoscoInCittà ha contribuito negli anni a fornire molteplici benefici di carattere sociale, ambientale ed economico alla cittadinanza (seleziona quali secondo te sono i principali benefici forniti, sono possibili più scelte).

- Miglioramento della qualità ambientale dell'area
- Mitigazione degli effetti dei cambiamenti climatici
- Adattamento ai cambiamenti climatici
- Educazione ambientale
- Miglioramento della conoscenza e delle competenze in campo ambientale delle cittadinanza (es. per i volontari)
- Miglioramento del benessere e della salute dei cittadini (es. attraverso la partecipazione ad attività ricreative/sportive).
- Creazioni di nuovi posti di lavoro e di opportunità imprenditoriali.
- Miglioramento della percezione visiva ed estetica dell'area.
- Altro……..

37. L'attività di gestione di Italia Nostra–CFU ha permesso negli anni di sviluppare varie connessioni ecologiche con le altre aree verdi limitrofe contribuendo alla realizzazione de c.d. 'Cintura Verde dell'Ovest di Milano'.

- Sì
- Sì, ha significativamente contribuito al miglioramento delle connessioni ecologiche a scala urbana e metropolitana
- Ha contribuito solo marginalmente
- No
- Non ne sono a conoscenza
- Altro……..

Annex 5: *Amsterdamse Bos'* survey questions

Survey on the governance and management system of the Amsterdamse Bos

This survey is part of the research activity of the PhD course in 'Urban and Regional Development' of the Polytechnic of Turin - Interuniversity Department of Regional and Urban Studies and Planning (DIST). This questionnaire, which we kindly ask you to fill out, is aimed to investigate the governance and management system of the Amsterdamse Bos in order to better understand how the socio- environmental resources of the Amsterdamse Bos are managed and valorized by the City of Amsterdam and other actors directly involved in the decision-making. The questionnaire, whose compilation is voluntary, takes approximately 25 minutes to be filled out. Regarding your personal data, they will not be published in any case, while the other information collected for the study will be elaborated in an aggregate manner in compliance with the European (General Data Protection Regulation – GDPR, 2016/679) and Italian (Legislative decree 196/2003 – Code regarding the protection of personal data) legislation on protection of data and their use for statistical or research purposes. Thanks in advance for your availability.

*Required

1. Email*

.....

Personal information

2. Please state you age below

- >18
- 18-25
- 25-30
- 30-40
- 40-50
- 50-60
- +60

3. Please state your gender below.

- Female
- Male
- Non-conforming
- Prefer not to say

4. Education*

- High-school diploma
- Bachelor's degree
- Master's degree
- PhD
- Other

5. Occupation*

……..

Participation

6. Formal and/or informal regulations defining and enabling public participation of citizens in the decision-making process are in place.

- Yes
- Yes, but not formal regulation defines the rules to engage citizens into decision-making
- No
- I do not know
- Other……..

7. If yes, could you specify what regulations?

……

8. Adequate spaces and venues are used to host public meetings, workshops, etc., in order to foster public participation into the decision-making of the Amsterdamse Bos.

- Yes
- No
- I do not know
- Other……..

9. Could you specify what spaces or venues are used?

…….

10. Several digital tools (e.g. on-line surveys; social networks) are used to gather opinions, views, and interests from the citizens involved.

- Yes
- No
- I do not know
- Other……..

11. If you know, could you specify which digital tools are used?

…….

Inclusiveness

12. In the decision-making process of the Amsterdamse Bos a wide range of stakeholders are actually involved (more choices possible).

- Local residents
- Experts
- Academicians
- Entrepreneurs
- Associations/NGOs

- Other public authorities
- Other……..

13. In the decision-making process citizens are involved in different ways and with diverse approaches (more choices possible).

- Citizens are kept informed of decisions and initiatives undertaken by the governing body through newsletters, websites, and official reports.
- Citizens are consulted by the governing body through public meetings, surveys, focus groups, etc. in order to collect their views, opinions and feedback.
- Citizens are directly involved in the decision-making and their concerns and observations are included in the final decisions and in the alternatives developed by the governing body.
- **Citizens actively collaborate with the governing body in every aspect of the decision-making, including the development of alternatives and identification of preferred solutions.**
- **Citizens, organized in community forest boards or steering committees, directly make decisions the management and development of the urban woodland.**
- Other……..

14. The decision-making is fair and inclusive. It actually engages minorities without discrimination in terms of age, sex, social class and ethnicity.

- Yes
- No
- I do not know
- Other……..

15. Do you think there are categories excluded from the decision-making?

……..

Direction

16. The Amsterdamse Bos management plans have been developed starting from the evaluation of the state of the woodland and vegetational resources, as well as of the socio-economic aspects at disposal.

- Yes
- No
- I do not know
- Other……..

17. The Amsterdamse Bos's management plans comprehensively illustrate the vision for the future state of the woodland and clearly defines the objectives, goals and timeframe for achieving them.

- Yes
- No
- I do not know
- Other……..

18. The Amsterdamse Bos's management plans have bee associated with an implementation plan defining the actions to be undertaken in order to achieve the targeted-goals.

- Yes
- No
- I do not know
- Other……..

19. The Amsterdamse Bos's management plans include also a plan for monitoring and evaluating progress towards objectives and goals achievement and impacts over time.

- Yes
- No
- I do not know
- Other……..

Integration

20. The Amsterdamse Bos's management plans properly reflect and integrate the vision of policies and plans at urban, regional and national scale.

- Yes
- No
- I do not know
- Other……..

21.Could you specify the most relevant plans or policies actually influencing the Bos Plan (current and past) and potential discordances?

…….

22. The Amsterdamse Bos management plan integrates the vision of the different municipal departments involved in the decision-making including the main urban issues to be addressed in the upcoming future (more choices possible).

- Climate change
- Tourism and recreational activities
- Education and culture
- Health and well-being
- Conservation and enhancement of biodiversity
- Land take
- Other……..

23. The Amsterdamse Bos management plans over the years have been developed through effective collaboration between several organizations operating at different governance level.

- Yes
- No
- I do not know
- Other……..

Learning

24. As part of the management of the Amsterdamse Bos, monitoring and evaluation activitie of medium- and long-term impacts are effectively performed on a regular basis.

- Yes
- No
- I do not know
- Other……..

25. Various aspects of tree and other natural resources, as well as socio-economic dynamics characterizing the Amsterdamse Bos are monitored and evaluated (more choices possible)

- Trees location and species
- Trees age, height and diameter at breast height
- Trees health and stability
- Soil quality
- Water quality
- Biodiversity level
- Number of annual visitors
- Visitors experience satisfaction
- Other……..

26. Data and information gathered through monitoring activities are publicly and freely available, and results are communicated to other actors involved in the decision-making.

- Yes
- No
- I do not know
- Other……..

Resource allocation

27. The public funds allocated by the City of Amsterdam for the management of the Amsterdamse Bos is considered adequate to achieve the targeted-goals.

- Yes
- No
- I do not know
- Other……..

28. In addition to public funds, the governing body of the Amsterdamse Bos can count also o revenues coming from various sources (more choices possible).

- Timber selling
- Events/concerts organization
- Educational activities
- Sport and recreational activities
- Other……..

29. The number, knowledge, skills and expertise of the current staff is considered adequate to carrying out the governance and management activities and achieving the goals.

- Yes
- No
- I do not know
- Other……..

30. The governance and management of the Amsterdamse Bos has benefited from an effect political and public support and commitment over time.

- Yes
- No
- I do not know
- Other……..

Adaptability

31. The governance arrangement and the management plan of the Amsterdamse Bos are flexible a have been capable of adapting themselves to changing socio-economic and ecological conditions over time, such as: (more choices possible)

- Risks, threats and vulnerabilities associated with trees and other natural resources (risk management).
- Reduction of the available budget.
- Lack of political support.
- New societal needs and demands
- None of the above
- Other……..

32. The Amsterdamse Bos' management plans over the years have been regularly updated (e.g. every 5 years) in order to adapt them to changing conditions, new challenges and demands.

- Yes
- No
- I do not know
- Other……..

33. Information and data collected through monitoring and evaluation activities are effectively included into decision-making and they actually influence the final decisions.

- Yes
- No
- I do not know
- Other……..

Effectiveness

34. Governance and management activities are effective and actually provide the expected outcomes defined in the management plan.

- Yes
- No
- I do not know
- Other……..

35. Governance and management activities have contributed to provide several social, environmental, and economic benefits to citizens and visitors over time (select the more relevant benefits provided in your opinion, more choice possible).

- Enhancement of environmental quality of the area
- Mitigation of climate change
- Adaption to climate change
- Raise of environmental awareness
- Knowledge and skills improvement (e.g. through volunteering)
- Health and well-being enhancement (e.g. through sport and recreational opportunities)
- Provision of jobs and entrepreneurs opportunities
- Improvement of aesthetic perceptions
- Increasing sense of community and belonging among residents
- Other……..

36. Governance and management activities have significantly contributed to connect the Amsterdamse Bos with the adjacent green spaces as part of the wider urban green infrastructure network.

- Yes
- Yes, it has particularly contributed to improve ecological connections over time
- It has contributed marginally
- No
- I do not know
- Other……..