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著者(和文)	DIEGO MARTIN SANCHEZ
Author(English)	Diego Martin Sanchez
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Urban Forestry Practices: Toward More-than-Human Commons

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Yoshiharu Tsukamoto Laboratory

Tokyo Institute of Technology
Department of Architecture and
Building Engineering

Diego Martín Sánchez

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Thesis Abstract

Ecological degradation in contemporary cities is a consequence of industrial expansion and population concentration that neglects interactions beyond humans. In the wake of this crisis, enhancing urban commons is fundamental to weaving connections between citizens and resources in densely built environments. This thesis focuses on urban forestry as a care practice that, by reusing various materials resulting from tree maintenance, has the potential to create relationships between urban inhabitants and forests. Taking as case studies emerging local practices around the world to understand their networks, Tokyo metropolitan parks to reveal their physical assemblages, and the design of pavilions as possible architectural prototypes, urban forestry is revealed as a practice capable of diversifying membership and constructing more-than-human commons in the city.

Urban Forestry Practices:
Towards More-than-Human Commons

— Networks, Assemblages and Prototypes —

1
Introduction

Unlike other materials, wood grows in our cities. However, the presence of resources is unnoticeable to the urbanite. Since the beginning of modern period, city dwellers have gradually become disconnected from the natural environment, becoming highly dependent on industrial products. The total reliance on services provided by larger entities has caused the loss of connectivity and skills that link citizens to the non-human territory. This dichotomy between the human and natural ecosystems has its foundations in the epistemological division between nature and culture. During the 17th century Western philosophers developed a mechanistic view, alienating themselves from the natural realm, changing their conception of something that nourishes to something that is out there to be exploited.[1] (Fig. 1.1)

It was only in the 1970s, when evidence of ecological disasters was apparent in the city, that the fantasy of eternal progress without consequences was challenged by strong environmental awareness and activism. But although this is a well-known rubric, social structure still maintains this strong division reflected in the rural and urban binary, defining the former as a place of production and the latter as a place of consumption. This relationship is always situated in a specific context and time, and is therefore affected by the underlying assumptions formed at a particular moment in history, which despite being proven harmful can still have long-lasting effects, determining what to consider and what to leave out when thinking architecture and urbanism. Design practice is utterly influenced by the extent to which planners understand the relationship between humans and the larger surrounding world that includes other beings.

Architecture and urbanism can no longer afford a rationale based on capitalist and consumerist premises, but it should move towards a logic of repair and coexistence. Without an absolute rupture and dealing with the real physical fabric, it seems urgent to reimagine commons in the city that can accommodate multi-temporal and multi-species needs. It is time to overcome the dichotomy that distinguishes urbanization in opposition to nature, framing the latter as "the other." A series of questions arise: How would it be an interspecies understanding of arquitecture and urbanism, where not only humans benefit? What are the conditions that ensure coexistence with other living beings while enriching urban commoning? In this scenario, urban forestry emerges as a practice capable of dissolving this boundary by fostering connections between humans and non-humans in the city, encouraging participation through resources accessibility. Urban forestry can reformulate the way architecture and urbanism are conceived, creating new types of governance across diverse entities and nurturing more-than-human interactions in the city.

Fig. 1.1
Georg Agricola, De Re Metallica, 1556. Intensive use of wood , industries in the late Middle Ages and the Reinaissance. Nature as something to be exploited. Appear in Carolyn Merchant, "The Death of Nature. Women, Ecology and the Scientific Revolution", 1983.

1.1 Review of the relevant literature on more-than-human commons

Exposing the material relations and outcomes that extends between trees and humans in the city, practices of urban forestry unfold in a specific tension that regulates the coexistence of human and non-human actions, forming an ecological whole, an assemblage. To redefine urban forestry as a practice capable of constructing more-than-human commons, it is necessary to review critical discourses revolving around this framework as the theoretical foundation of the present thesis. The geographer Patrick Bresnihan revisits the theory of commons from material and immaterial perspectives to build an argument towards "commoning" or "the continuous making and remaking of the commons through a shared practice" capable of dissolving the binary between the natural and the social approaches. According to Bresnihan "more-than-human commons means making an intellectual leap into contexts where social and material resources are already immediately and intimately shared between humans and non-humans." [2]

The first perspective is based on the importance of Elinor Ostrom's argument, a pioneer in the logic of scarcity who emphasized regulations of accessibility to "common pool resources" in order to avoid their exhaustion. Bresnihan detects the flaws of this vision, since it responds to neoliberal policies in which control of natural resources is equivalent to control of capital. [3] The second perspective, commons from a purely social aspect, has more to do with diverse intelligences developed by humans. But this approach is also problematized by Bresnihan, since these practices usually avoid addresing the natural world that is exhausted or that needs to be cared for. Under this frame what matters are the immaterial relationships that produce human commons such as work, creativity, ideas or knowledge. The third perspective advanced by feminist scholars, anthropologists and vital materialists criticizes the understanding of commons in these two separate ways. Even though the material vs. immaterial / natural vs. social are analytically helpful, placing them as opposites excludes the complex relations between the two. Bresniham builds on this last approach to state that "the commons is not land or knowledge. It is the way these, and more, are combined, used and cared for by and through a collective that is not only human but also non-human."[4]

In this regard, the commons emerges as a negotiation between the first perspective, the limits, and the second perspective, the possibilities. This thesis, focusing on urban forestry, also has this projective character, criticizing industrialization but without returning to a pre-modern state. Staying in the city rejects a nostalgic, almost pastoral idea that Leo Marx identifies in his seminal text, "The

Machine in the Garden" where he points out industrialization as "the capitalist-driven process by which a predominantly rural and agricultural society became predominantly urban and industrial" but simultaneously problematizes the rural seen with "metaphysical superiority to the urban, commercial forces that threaten it". [5] Staying in the city and considering what kind of commons related to the natural realm can be created there, is to follow Donna Haraway's creed, "staying with the trouble" facing the conflicts and contradictions that this search implies with a reparative attention. [6]

Furthermore, rethinking forestry in the urban transcends its own capitalist motto that dismisses all practices that are not economically beneficial. In the city, material worth is demonstrated in the disposal practices, which following global-market premises disregard all that matter that cannot be easily commercialized. Whether a material is considered waste or not varies, regardless of its performance capability. [7] This highlights the subjectivity of what constitutes waste and how organic debris is perceived. Tim Ingold reminds that in fact, "the properties of materials are not fixed attributes of matter but are processual and relational. To describe these properties means telling their stories." He reminds the origins of the word 'material' recalling another anthropologist, Nicholas Allen, that observes that *mater* "has a complex history involving feminine-gender Latin and Greek words for wood . . . which is or has been alive". Ingold continues adding that "far from being the inanimate stuff typically envisioned by modern thought, materials in this original sense are the active constitutents of a world-in-formation".[8] This capacity for relationship and affective value embedded in the wood that can unravel the commons is captured in Aaron Sankin's photograph (Fig.1.2). In the Harlem neighborhood there was an elm tree famous for bringing good luck. When it was cut down, a popular tap dancer planted a new 'Tree of Hope', perpetuating the shared behavior of touching the tree before going to perform. The stump of the old tree sill holds an animistic imagery for those who see it as an essential element to go onstage, the matter retains life through the social relationships it creates.

Fig. 1.2
Aaron Siskind.
*Wishing Tree.*1937

The trees of the streets of New York are also the focus of Zoe Leonard, who shows in the series of photographs "Tree+Fence" the struggles of the living matter between "resistance and symbiosis" when it intersects with artificial barriers, expressing the interdependencies between nature, culture and growth.[9] (Fig. 1.3.)The idea of matter in transcience is also expressed in "Moment" by Yasuhiro Ishimoto. Well-known for his photographs of the Katsura Imperial Villa, in his late-year work, Ishimoto shows the city of Tokyo through matter in transition, depicting fallen leafs blending with the asphalt. In this *moment* is no longer distinguishable the man-made from the nature-made matter.[10] (Fig. 1.4.)

Fig. 1.3
Zoe Leonard,
Tree + Fence series, 1998

Fig. 1.4
Yasuhiro Ishimoto,
Moment (Toki) 2004

These images resonate with the words of Jane Bennett: "Humanity and nonhumanity have always performed an intricate dance with each other. There was never a time when human agency was anything other than an interfolding network of humanity and nonhumanity; today this mingling has become harder to ignore." Following a vital materialist approach Bennett draws on Deleuze and Guattari to include "non-human bodies as members of a public" that participate in "conjoint action", in contrast to an environmentalist perspective that understands them as merely passive context. Bennett defines "assemblages" as "ad hoc groupings of diverse elements, of vibrant materials of all sorts" that possess emergent properties, an "ability to make something happen" based on their performance as a whole and not so much on the individual parts.[11]

Anna Lowenhaupt Tsing defines also landscapes as places of "patchy assemblages" that include both human and nonhuman participants., voicing the idea of diverse earthlings as active members in world-making, where possibilities and potentials rely on their collaborations. She explains how ecologists found the notion of assemblage useful in describing ecological community. "Assemblages, in their diversity, show us what later I call the 'latent commons,' that is, entanglements that might be mobilized in common cause. Because collaboration is always with us, we can maneuver within its possibilities. We will need a politics with the strength of diverse coalitions—and not just for humans." [12] Her definition unravels assemblages as "open-ended gatherings" forming various coalitions between humans and non-humans in the making. This reminds David Nash sculptures in the Grizadele forest, which are made by mutual agency between him and the trees, always "working *with* the environment". In 'A Sense Of Place' Nash shows several sketches of his project for the willow ladder. (Fig. 1.5)

In spatial planning Jonathan Metzger engenders this sensitivity towards non-humans with the concept of "caring for place", as "territorial attachments" that are "geographically proximate and related" seeking a "relational-materialist conceptualization of places as ontologically and epistemologically messy entities". [13] This implies a change of focus towards a post-human performativity to understand the complex relationships that constitute a place. In recent years feminist science and technology studies have reconfigured the term "care" to also include multi-species concerns.[14] Maria Puig de la Bellacasa conceptualizes care as repair and maintenance work that considers "more than human worlds", examining "how to care" as an analytical tool that recognizes the agency of different actors (humans, living beings or things).[15] In this framework, urban forestry as a practice of care and maiteinance exposes the implicit assumptions of modern urbanism as a human-centered discipline, instilling a holistic rethinking of nature in the city that can create more-than-human commons.

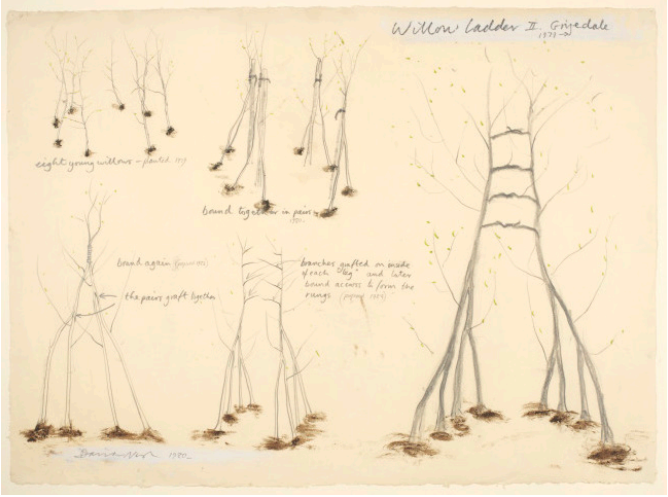

Fig. 1.5
David Nash,
Willow Ladder from
Sketch from V & A Museum1984

1.2 Review of the relevant literature on urban forestry

Although the use of "urban forestry" has not been directly addressed in architecture, the term has been widely used in academic disciplines such as forestry, landscape, or planning sciences. Different definitions understand it as the care of trees, planning the urban forest as a health infrastructure. This section will review the relevant literature from these disciplines, with the current discussions that frame it as a productive activity or intersections the theory of commons, to see how architecture can advance these notions while learning from them.

Urban Forestry as a Discipline

Since the beginning of the 20th century, Urban Forestry schools have started to appear in several countries such as Canada, the USA, or Australia. Urban forestry is a relatively new discipline, independent of architecture. It is situated between forestry engineering, environmental engineering, ecological studies, urban planning, and landscape architecture as an academic discipline. One of the most relevant authors in the emerging field of 'Urban Forestry', Cecil C. Konijnendijk, has several publications attempting to a comprehensive definition.[16] He distinguishes it from 'urban greening' by the scientific approach and professional recognition in different countries, including also other non-arboreal vegetation structures. According to Konijnendijk "Urban forestry should be seen as only one of a series of strategic, interdisciplinary, and participatory approaches aimed at optimizing planning and management of urban green structures in order to provide multiple benefits to urban societies."

There is consensus on the multifaceted character of the study of urban forests, as it incorporates the mixed methods, emphasizing historical perspectives as well as the interaction of biophysical and human legacies. However, more interdisciplinary research is needed to understand how urban forests have developed in various cities, including the urban form. Thus, forestry scientists call on urban geographers, sociologists, anthropologists, architects, landscape architects, urban planners, and ecologists to collaborate in this joint mission.[17] Urban forests are also explored from landscape architectural design, recognizing its capacity mainly as a recreational setting. Indicating the dissolution of the boundary between city and landscape and acknowledging the open-endless in its spatial and temporal boundaries but without registering its productive potential.[18] In planning, the urban forest is valued for its ability to reduce the city's temperature, adopting terminology such as 'Urban Greenery' to consolidate an environmental infrastructure that mediates between climate and buildings. In planning, the urban

forest is valued for its ability to reduce the city's temperature, adopting terminology such as 'Urban Greenery' to consolidate an environmental infrastructure that mediates between climate and buildings.[19]

In Japan, several studies addressed its geographical condition as a forest archipelago from the viewpoint of wood use. Also, applied in this framework, we find reviews on the urban forest from environmental psychology and environmental studies. Some examine the correlations between the degree of sociability and the trees' presence.[20] Others regard the interplay between the urban forest's history and its topography as a decisive link to its permanence in Tokyo's urban fabric.[21] From the field of geography and political ecology, different arboricultural regions have been identified in metropolitan Tokyo. Additional studies explore citizen participation in tree planting and its relationship to neoliberal agendas, assessing pre-existing cultures of relationship with trees. Bolthouse reminds that "diverse arboricultures populate the abstract notion of 'Tokyo's urban forest'. Yet the arboreal architectures of our surroundings are simultaneously constitutive of people and place, habits and habitus." He gives examples of neighborhood groups that have reclaimed former urban forests as commons, taking care of their upkeep. Among their many activities, they clear bamboo thickets, open up accessibility for local use and encourage the production of firewood and logs for mushroom cultivation.[22]

Also, agricultural meteorologists have advice that participative urban forestry in Tokyo can significantly impact mitigating the heat island effect.[23] Sehauchi and Fukunari have assessed the current state of the urban forest in Tokyo regarding its quantitative characteristics, extent, the number of trees, and significant species. They were revealing an emphasis on the visual aesthetic value of the selected species and their significance in case of natural disaster emergencies.[24] From the revegetation analysis of species composition in Europe and the United States, research suggests that the creation of a resilient Japanese urban forest should be based on the promotion of species biodiversity, advocating the incorporation of indigenous species, and the need to train personnel specialized in urban forestry.[25] Landscape and ecological engineering studies indicate the urban forest as recreational and aesthetic and as a wildlife habitat, capable of incorporating nature into the city. One example is given comparing Tokyo Harbour Wild Bird Park with other parks in the metropolitan area, indicating the emergence of agricultural patches in the city since the Edo period as a possible solution for future sustainable urbanism that maintains a diverse ecological environment.[26]

Urban Forestry as a Productive practice

In this thesis, urban forestry is also understood as a productive practice where urban forests can foster inter-species commons, moving from a passive to an active function. Some pioneering initiatives reuse the products resulting from their maintenance to find a new purpose. The thesis will analyze this potential of alternative urban forestry practices capable of diversifying the interaction between inhabitants and natural resources in the city environment.

However, when urban forestry is analyzed from a productive lens, it tends to be framed only based on its quantitative characteristics, regarding sole numbers. There is a separation in social, aesthetic, ecological, climatic, economic, or productive benefits. It is in this last category that forest resources from the maintenance of urban forests are placed. The conclusion is that as wood, fruit, or mushrooms prove a minimal production outcome compared with industrial forestry, there is no market value and can therefore be ignored.[27] Even so, there are cities such as Seattle where the harvested timber is used to maintain the urban forest or Tehran, where it is used for city buildings' formwork. It is also acknowledged that there are some cases where trees are fruit-bearing in urban orchards, identifying productive urban trees throughout history. Examples of this practice are the apples handpicked by the citizens in Moscow or the abundant cherry trees planted in Tehran's empty plots to prevent illegal use.[28]

Cecil C. Konijnendijk identifies biofuel, berries, or medicinal plants as creative applications, referring to them as 'Fruitful forest.' Although the discussion focuses on the urban forest's cultural and spiritual role, it conveys that production in modern urban forestry can be very innovative with possible routes for research.[29] David J. Nowak prepares four categories of factors to consider when assessing a specific urban forest's economic value, such as its structural attributes, density, and composition, its impact on citizens' health or the ecosystem. Nowak establishes an interdependence between the forest structure, the ecosystem services produced, and its economic value, indicating that computer software tools such as i-Tree do not yet include the potential value of resources such as wood or their transformation into energy.[30] Other studies include how the use of biomass from the urban forest as sustainable energy by transforming it into bioethanol and biogas in a medium-sized city can cover 93% of the energy needs of public transport[31]; or various guidelines about urban wood in comparison with standardized industrial lumber. [32]

In Japanese academia, the relationship with the productive means of forestry focuses mainly on the timber industry's formation, its rapid growth during the post-war decades, and the resulting environmental transformations.

Regarding the urban environment, studies such as that of Satoshi and Takaguchi analyze quantitative data on the amount of annual bio-debris produced in Tokyo's 23 wards from parks and streets. They indicate that excluding the amount that is diverted to landfills or incinerators, 81% is recycled, most commonly into woodchips and compost. They finally suggest reducing the distances traveled to the final destination by including processing facilities within the parks.[33] Other studies, which also focus on biomass from tree pruning in the 23 wards, indicate that CO2 emissions in sports facilities could be reduced by 50%.[34] For example, there are cases where the energy used to heat the showers in the sports fields is generated by a biomass boiler using woodchips from the park's trees. [35] The use of woodchips as a construction material in particleboard has also been examined to build panels in dry environments under light loads.[36]

Although these studies present an indispensable research base, there is still a gap in the existing literature exploring the connective capacity between natural resources and citizens. Therefore, this thesis seeks to reveal the social gathering properties of forest resources, understanding that the action of caring for trees can increase social interaction by widening access to natural resources, considering a more-than-human dimension.

Urban Forestry as Commons

From the field of ecological economics, the notion of 'Urban Green Commons' is discussed from "their role in promoting diverse learning streams, environmental stewardship, and social-ecological memory". The debate relates their success to diversity in property rights and participants. It elucidates how these characteristics contribute to cities' resilience in times of vulnerability and uncertainty. Due to urbanization patterns and lack of management models, there is a "mismatch between cultural and ecological diversity." Also, there is a tendency to regard these two as inversely proportional, yet, many cities emerge in natural ecosystems with rich biodiversity.[37] Other studies record the importance of partnerships between public, private, and community sectors for successful urban forestry projects, reminding those social relationships are as crucial as the urban environment's physicality.[38] Still, there is a lack of in-depth inquiry concerning the connections with specific urban forestry resources.

In geography and sociology, commoning practices are used as an analytical lens for looking at the peri-urban context. Attending to conservation efforts, they give agency to the displacement of plants across territorial boundaries to blur notions of control over land conservation in a private property. Benjamin Cooke and Ruth Lane remind us to pay "attention to more-than-humans is one way of reviving and reprioritizing collective conservation endeavors in a way that positions humans and more-than-humans as collective subjects, as opposed to a

more traditional resource management-oriented relationship."[39] In the Japanese context and from the field of life sciences, there is developing research with the concept of iriai (commons) on community forest management by Authorised Neighbourhood Associations to respond to revised legal but solely applied in rural settings.[40] Also related to Iriai's concept and the ecology of satoyama but applied to suburban or peri-urban areas is the "matsutake crusaders" group. To grow this type of mushroom is necessary to recreate its conditions in the forest and therefore care for the whole ecosystem. For this purpose, they involved neighbours and mushroom enthusiasts in the form of an association. Despite not contrasting this with other examples and focusing exclusively on matsutake production, he concludes that as care increased, so did the resources and diversified the activities and actors involved, creating multispecies commons. Satsuka remarks that "new commons demonstrate that the revitalization of natural ecology is inseparable from social ecology".[41]

Urban Forestry in Architecture

In the last decade, climate emergency has pushed architecture to commit both to sociology and ecology. A growing number of publications are rethinking the urban environment together with green resources in a symbiotic manner. Like Mohsen Mostafavi advocating for "Ecological Urbanism" as the basis for a speculative design method that fosters innovative spatial practices.[42] Alternatively, the "Capital Agricole" exhibition imagines Paris as a hybrid metropolis where the circular management of natural resources is embedded in its urban fabric. [43] Also, Cyntia Santos Malaguti recently investigates the use of urban wood in São Paulo, concluding the need for a systemic design approach towards this untapped resource.[44]

Recent publications present a view of wood in a trans-scalar manner, from cell to the territory, defining this principle for trans-scalar as further trans-disciplinary and trans-temporal. In Daniel Ibañez words: "a trans-scalar practice smashes all assumptions of what a discipline's product is or ought to be."[45] These concerns are also shown in the catalog of the exhibition at the Serpentine Gallery in London, exploring the political layers embedded into the global timber industry's governance.[46] The architectural duo Cooking Sections took a similar approach at an exhibition and symposium at Columbia University in 2019. Together with a collective of tree experts of different disciplines, they reflected on trees' rights, problematizing the recent neoliberal approach to the urban forest. This includes denouncing the green infrastructure as a tool for offsetting the city's carbon emissions, as well as recognizing trees as independent agents with their own stories intertwined with the city's narrative and their human inhabitants.[47] In the same year, another exhibition and symposium at Princeton curated by Sylvia Lavin raised how architecture as a discipline participates in the "tree conversation",

indicating that should be the politics of collaboration that produces the forest. [48] She continued exploring the role of trees in architecture representation since the beginning of architecture drawings. [49] This thesis will build on the current momentum of approaching architecture through commons theory and more-than-human approaches, filling this gap in the literature and creating a holistic approach from network to urban installation and design.

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1.3 Aim of the thesis

Architecture and urbanism are facing a paradigm shift in the Anthropocene era, from capitalistic logics to ecological concerns. The current climate crisis instigates these fields to remodel our relationships within the city, imagining alternative practices that work with the existing while rejecting the premise of infinite resources. This thesis focuses on urban forestry as a means of questioning the underlying industrial assumptions of the modern city, where the creation of more-than-human commons has been neglected. The coupling of humans and trees gives resilience to urban systems instead of reinforcing the vulnerability of contemporary living.

Urban forestry differs greatly from conventional forestry in that its goal is not to transform extracted wood into a commodity but to care for city trees. Precisely because it is not an industrial productive activity, its material outcomes are usually discarded as waste. Yet, being situated in the urban context, with a high population density, expands the possibilities of participation of diverse actors, as well as the use of resources resulted from tree management - not only logs, but also leaves, branches or fruits. The value that underlies urban forestry is not a marketable one, but that of the relationships it creates. This thesis uses the lens of urban forestry, drawing on the theory of the commons, aiming to unfold the web of relationships and material outcomes that span between trees and humans in the city.

1.4 Objects of study: emergent practices, urban parks and architectural pavilions

In the very union of the words 'urban' and 'forestry' there are two conflicting forces. If understood from a purely industrial perspective, it is a total contradiction to announce a forestry practice within the city, since it would not be cost-effective. That is why the same cedar tree is not perceived in the same way in the countryside, where it is seen as a productive material, as when it is located in the city, where it is perceived as an element for aesthetic pleasure. This perception, is also related to the long trajectory of the notion of commons based on an anthropocentric vision, where humans are the main agents in the making and the only beneficiaries.

Urban forestry as an object of study is selected precisely to dissolve the epistemological duality of the natural versus the social, assuming the urgency of transcending this binomial to an understanding of the commons as a dynamic interaction.

In this manner, urban forestry emerges as a critical framework to subvert the implicit barriers and assumptions that shapes our relations with the natural resources in the city, which are (Fig. 1.6):

1) The realm of nature is situated in the rural world.
2) Nature in the city is not productive but aesthetic.
3) Parks are just the absence of built environment.
4) Urban forestry is only professional tree maintenance.
5) The material value of trees is limited to wood.
6) Wooden houses are not urban forests.
7) Architecture design should be site-specific.

Also, for the purpose of clarifying throughout the thesis what urban forestry consists of, where it can happen and how it can be associated with architecture, the selected case studies had to be meaningful in answering these questions. Therefore, geographical location is not a determining factor in the selection. What is crucial is their suitability to the object of study and the proposed methodology, as well as considering the ability to access information. There is no linear selection that responds to a territorial understanding, from the global to the city scale, but a need to choose relevant cases that answer the what, where, and how of urban forestry.

To investigate what creates urban forestry practices, we examine their network of actors, selecting emerging cases from around the world. In this inquiry, the global view was important to show as much diversity as possible to hold an overall understanding of the current status of the practice. To study where urban forestry practices are situated, we examined urban parks as the places with a high concentration of trees. Tokyo was then selected as the case context because of the possibility to visit all the case studies. To reveal how architectural design can be related to urban forestry, we examine different prototypes. Thus, we chose two pavilions in Shenzhen because our direct involvement in the design allowed us to test the theoretical framework in reality.

What is urban forestry practice?

Emerging practices from around the world have been chosen to present a holistic view of contemporary urban forestry initiatives. They contrast with the defintion of forestry as a profit-driven practice and contradict the idea that links timber extraction with natural resource exploitation in rural areas. This assumption was rigidly constructed throughout the industrialization of the 20th century, which neglected the consideration of richer relations between human and non-humans within the city. The selection of these case studies, being situated in the urban, produces frictions towards the industrial standardized vision. Exploring the relationships between trees, resources, and citizens is an opportunity to learn how they are entangled, clarifying how these practices are constructing commons within the city.

Where can urban forestry be situated?

Urban parks are the site par excellence where trees are concentrated in the city and therefore, have a special relevance to understand the places where the practice of urban forestry could be enhanced. Taking into account the specific context of Tokyo, metropolitan parks are presented as a critical case study to explore how the maintenance of trees is physically embodied within the metropolis. The park, as a modern facility, reflects assumptions about the city configuration, which have designated areas as buildable and non-buildable, understanding parks as the mere absence of construction for aesthetic and leisure purposes. Furthermore, the contemporary park assumes that tree care should be managed by government-contracted professionals and without citizen participation. This inaccessibility to maintenance tasks implies the presumption of the citizen as a spectator, who behaves passively in a ready-made park. However, it is important to reframe parks as overlooked places for constructing more-than-human commons developing an understanding of how urban forestry materializes in its premises.

How architecture can relate with urban forestry?

Urban forestry as a practice qualified to create more-than-human commons implies an epistemological shift to consider architecture, recording not only existing realities, but developing a special attentiveness to those relations that are still latent. This means grounding architectural practice in its projective capacity, exploring emerging properties in realities that are yet to become, that have not yet matured, but are in the process of materializing. Architecture can developed a design methodology taking into account both the possible practices and the situated context. In this framework, pavilions in Biennials present an opportunity to put architecture under critical inspection, carrying out creative actions for the formation of more-than-human commons through urban forestry practices.

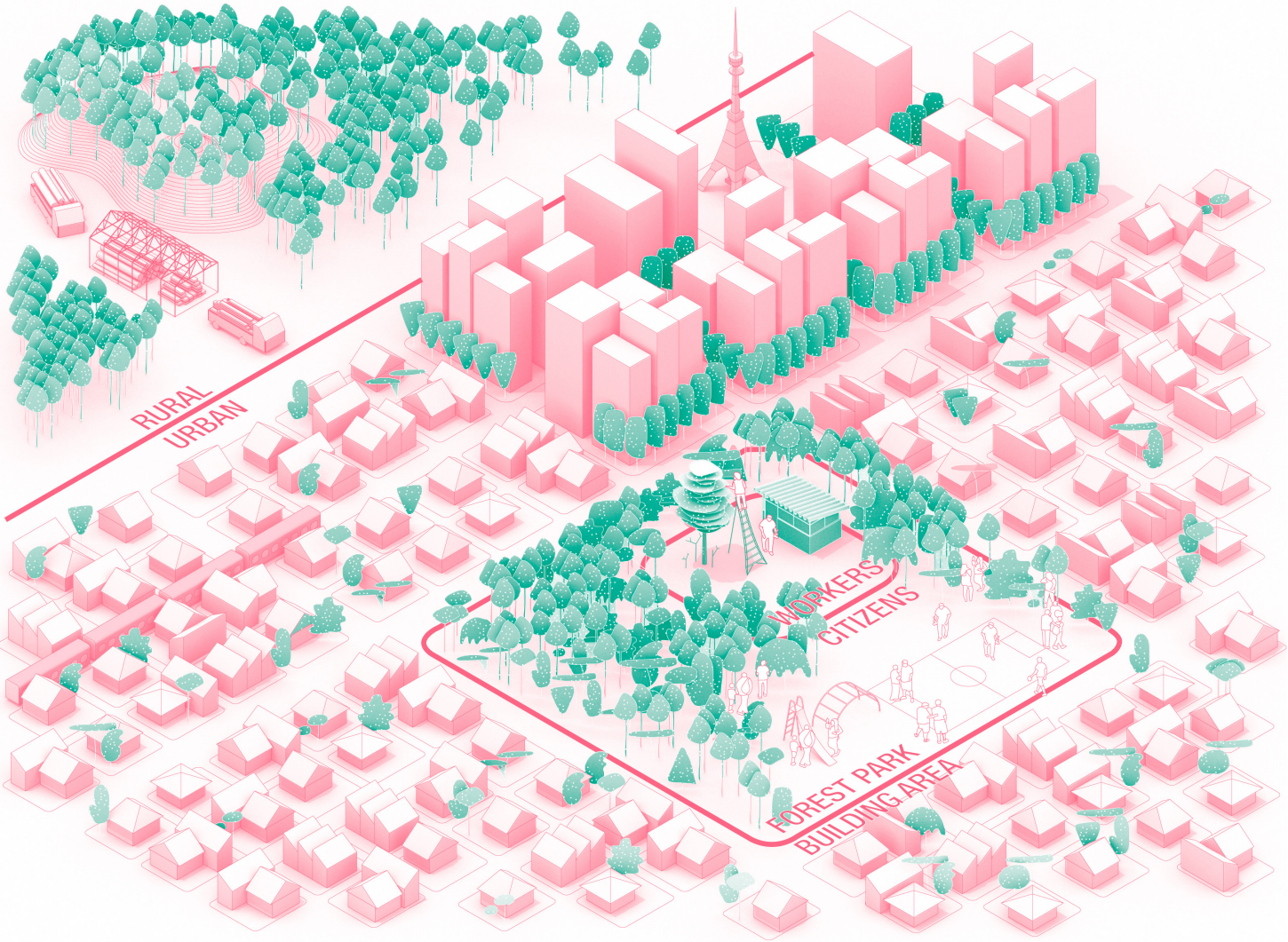

Fig. 1.6
Barriers in the city regarding urban forestry practices that creates binaries: rural vs. urban, forest park vs. building area, workers vs. citizens.

1.5 Methodology

This thesis provides a critical framework for understanding how urban forestry can expand more-than-human commons in the city, following a methodology through case studies. The main approach to researching urban forestry is through resource accessibility, which is examined as a central aspect in the following chapters. Combining qualitative and quantitative analysis according to the case study. Adapting the resource accessibility approach to the different objects of study - emergents practices, urban parks and architectural pavilions - by developing specific notions, uncovers the various tactics by which the construction of more than human-commons may occur in the city, dissolving different barriers between the natural and the social, and revealing the latent possibilities. Establishing methodologies that reflect on profound changes, such as the ecological dimension, allows a redefinition of the discipline of architecture conventionally focused on author's projects to a more holistic approach, transcending the professional responsibility of the building to the way in which our living environments are conceived, registering complex articulations between citizens and non-human agents.

Emergent practices are studied through the sequential relationship of resources and members, using the notion of Networks. The analysis is conducted on case studies of local initiatives from diverse geographies, to deploy a comprehensive understanding of the current networks of urban forestry. In urban parks resource accessibility is discussed through the notion of Urban Forestry Element, and its combination in Urban Forestry Assemblages. This analysis helps understanding the actual sites for urban forestry in a metropolitan area, showing Tokyo as a relevant case study. Two architectural pavilions positioned in the propositive realm are used through the notion Prototypes. A design methodology is presented, taking into account what has been learned from the networks and assemblages, in order to improve the creation of commons, opening accessibility to the city's resources through the practice of urban forestry.

1.6 Thesis organization and summary

This thesis is structured in five chapters and a complementary appendix containing extended material corresponding to each section. (Fig. 1. 07) The present introduction chapter presents the theoretical background on more-than-human commons and its possibilities for the architecture and urbanism fields, clarifying the methodological approach and objects of study. The relationship between urban forestry is tested and substantiated by comparison with real case studies to build up a grounded theoretical framework. Networks, Assemblages and Prototypes notions are put into specific models to present paradigmatic aspects and to develop a deep understanding of each case.

Chapter 2 presents emerging practices in urban forestry through a collection of case studies from various countries. These bold initiatives extend the reach of conventional forestry through various networks generated by the use of the city's tree resources, revealing the potential of urban forestry to foster citizen participation through accessibility. Delving into the different networks that deploy a resource-member correlation, i.e. the transformation of resources and the participation of members. This chapter analyses and compares diverse networks by discussing the connections and type of resources at the stages of sourcing, extraction and transformation. The networks show the capability of weaving complex relationships that transcend the purely productive purpose of conventional forestry.

In Chapter 3, the urban park was selected for its relevance as a place associated with tree care, a public facility that contains a significant concentration of trees. The existing traces of urban forestry in parks show glimpses of the messy entanglements of tree care, holding far-reaching possibilities to create more-than-human commons within the city. The methodology takes as a case study the Tokyo Metropolitan Parks conducting quantitative and qualitative analysis through the means of immersive field work and questionnaires, to reveal how urban forestry practices materialize within the parks. Regarding the spatial relations between humans and/or non-humans with resources, different Urban Forestry Elements have been found, as well as their collection in groups within the parks forming Urban Forestry Assemblages. The chapter creates a comprehensive framework that reveals these places for urban forestry as important beacons for urban commoning.

Chapter 4 explores the possibilities of urban forestry practices. Section 4.1 synthesises and compares the findings learned from the Networks and Assemblages - Chapter 2 and Chapter 3 - examining the possibilities of application for constructing more-than-human-commons through urban forestry practices. It reveals what has already been achieved and what is still dormant. For this purpose, a set of guidelines are indicated by contrasting the current situation in Tokyo through conclusions drawn from innovative urban forestry practices worldwide, revealing what has already been achieved and what is still latent. Section 4.2. provides a design methodology that learns from the previous guidelines and addresses the intersection between tree resources and the urban environment by examining two pavilions designed by Tsukamoto Laboratory for the Shenzhen Biennial of Urbanism and Architecture 2017 and 2019. These projects are the means to reveal the possibility of transforming green waste into resources for reconstructing urban commons based on existing livelihoods. Potentialities and failures are shown, rethinking commons in the contemporary metropolis.

Finally, Chapter summarizes all the previous chapters, draws conclusions, makes final considerations and addresses the directions of future research. This thesis shows how considering urban forestry practices more-than-human commons are possible in the city.

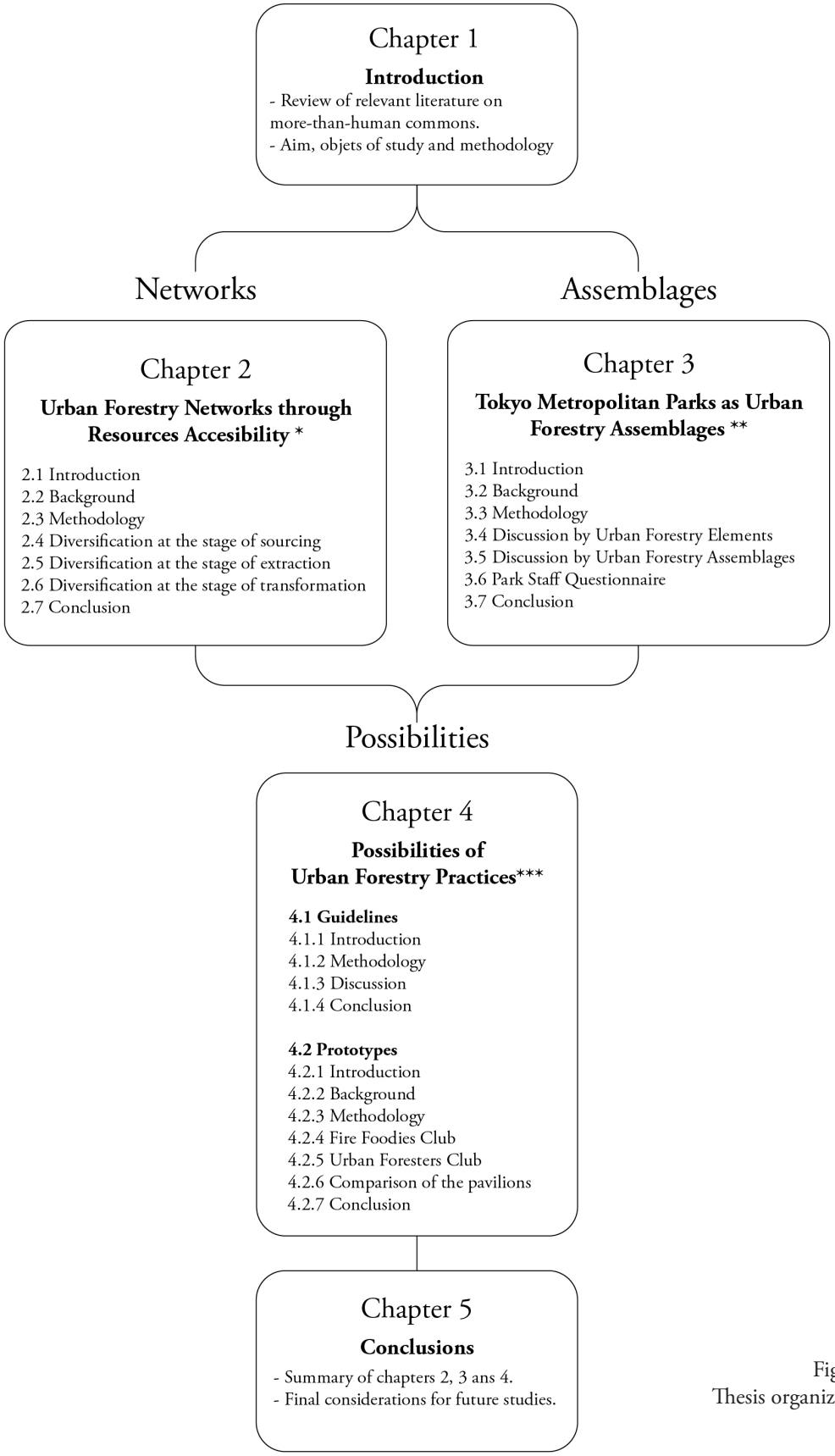

Fig. 1.7
Thesis organization

Related research papers

* Martín Sánchez, Diego, Yoshiharu Tsukamoto, Yeo Kai Wen, Noemí Gómez Lobo. "Rethinking Urban Forestry through Resources Accesibility." Accepted for publication in *AIJ Journal of Technology and Design* (June, 2021)

ID: AIJ2010044-09

** Martín Sánchez, Diego, Yoshiharu Tsukamoto, Noemí Gómez Lobo. "Tokyo Metropolitan Parks as Urban Forestry Assemblages - Rethinking more-than-human commons in the city" Under review in Journal of Asian Architecture and Building Engineering (sent December, 2020)

ID: JAABE2012495UP

*** Martín Sánchez, Diego, Yoshiharu Tsukamoto, Noemí Gómez Lobo. "Pavilions revealing the possibility of urban forestry as commons - Case studies on "Fire Foodies Club and "Urban Foresters Club" at UABB -" published in *AIJ Journal of Technology and Design,* Vol. 26, No.64 (October, 2020): 1230-1235

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2
Urban forestry networks through resources accesibility

2.1 Introduction: emerging urban forestry practices

Unlike other materials, timber grows in our cities. However, since the beginning of modern urbanization, city dwellers have been gradually disconnected from natural resources, becoming highly dependent on industrial products.[1] This chapter uses the urban forestry lens, drawing on commons and actor-network theories, to unfold the web of relationships and material outcomes that span between trees and humans in the city.[2] Urban forestry involves maintaining the metropolitan greenery, with the resulting wood ordinarily discarded as waste. Yet, initiatives around the world are finding uses for the 'afterlife' of urban trees, yielding a wide range of artefacts, from furniture to building design.[3] Such alternative practices are not economically competitive by the standards of conventional forestry due to the small volume and size of harvested lumber. Rather, they recognize the innate value of the tree, constituting 'urban forestry networks' that catalyze community-building and rethink supply chain models.[4]

This study aims to clarify the potential of urban forestry to fostering citizen participation through resources accessibility. By comparing the networks of international case studies, this critical analysis presents a counternarrative to the typical forestry production line, with timber regarded not as a passive material, but an active agent of diversification during all stages of sourcing, extraction and transformation. The report argues that emerging urban forestry practices can reformulate the way architecture and urbanism are conceived, creating new types of governance across diverse entities and nurturing more-than-human interactions in the city.[5]

2.2 Background: definitions of urban forestry

In order to compensate for the loss of natural habitat in rapidly urbanizing contexts, planners began to reintroduce "nature" into city areas, primarily by planting trees. These are the groves, parks, gardens and street trees that are commonly defined as "urban forest". Its history dates back to the 15th century in Europe, where wooded lands owned by the nobility were managed as hunting grounds or royal gardens.[6] Dan Handel indicates how European forests where not longer considered part of nature as depicted in the tapestries but a "production environment by labor and aristocratic interests." (Fig. 2.1.) It was only during the rapid industrialization of the 19th century that urban forests were gradually opened to the public, with increasing importance given to parks in improving the quality of life of the working classes. At the end of the 19th century, trees were widely introduced into public spaces in North America, with the aim of providing shade and aesthetic pleasure.[7]

Nevertheless, urban forests not only have a beautification purpose but also help to clean the air, reduce the heat island effect and contribute to water retention. Recent decades has seen a greater recognition of this broader contribution of trees to the physiological, sociological and economic well-being of citizens. Nowadays, urban forests are understood as resourceful natural grounds that have the capacity to foster inter-species commons, moving from a passive function to an active one.[8]

In this sense, the practice of urban forestry —the care of trees in the city— has the potential to strengthen social interaction by expanding access to the natural resources available in the city.[9] This notion contrasts with conventional forestry practice as an industrial process that always follows the same sequence, identified in this study as the "spine of urban forestry". Starting from the forest source, the logs are extracted by professional foresters, to finally be transformed into timber in an industrial sawmill.

When "forestry" is introduced in the city as "urban forestry", it undergoes a major shift, focusing on the maintenance of trees rather than the production of lumber, regardless of the possible material value of the surplus logs and other forest resources. The daily maintenance of urban forests generates a large amount of debris such as branches, leaves or logs from cutted trees, which are often considered a burden on municipal authorities. However, local initiatives are considering these by-products, which do not circulate in conventional forestry, as an untapped resource.[10] This report analyses the potential of alternative urban forestry practices to connect city dwellers through the process of diversifying and transforming their networks.

Fig. 2.1
Tapestry of woodcutters at work, Tournai workshop, XV Century. Musée des Arts Décoratifs, Paris.
The World for Worlds is still forest. Anna-Sophie Springer & Etienne Turpin (eds.), 2017
31

2.3 Methodology: resource-member networks

Case studies with distinctive urban forestry practices from around the world were collected through websites and various digital publications. A total of fifteen cases were selected on the condition that they used tree resources, covering different geographical contexts in order to achieve greater variety in the performance of these programs.

Under the term "urban forestry," distinctive case studies with practices worldwide were collected through academic and non-academic websites and digital publications—selected cases on the condition that they transform resources from the urban forest. The next requirement was the availability of literary sources to trace the urban forestry's full sequence, from the trees to the extracted resources and their transformation into final products, as well as the members involved in each stage.

Within each program's information sources, we highlighted those episodes in which resources appeared, noting those participants in charge of their transformation and outcome. In this manner, the whole network was drawn by correlating different actors and resources. A total of fifteen cases were selected in this manner, covering different geographical contexts to achieve a greater variety in these programs' performance. Cases with similar networks in the same geographical context to avoid repetition were not included to prevent duplication. The case studies were then arranged in chronological order according to their year of establishment. (Fig 2.3.)

In order to clarify the urban forestry network in each case, a framework is established based on the relationships between the resources and the members involved. These resource-member interactions are repeated throughout the programs, with one member always present to mediate between an incoming and outgoing resource. The connections are drawn at each stage of forestry: sourcing, extraction and transformation. First the forest source is located (resource), then the actors who access it (members), next the raw materials that are extracted from it (resource), finally the participants who process them (members) and the resulting products (resource). (Fig. 2.4)

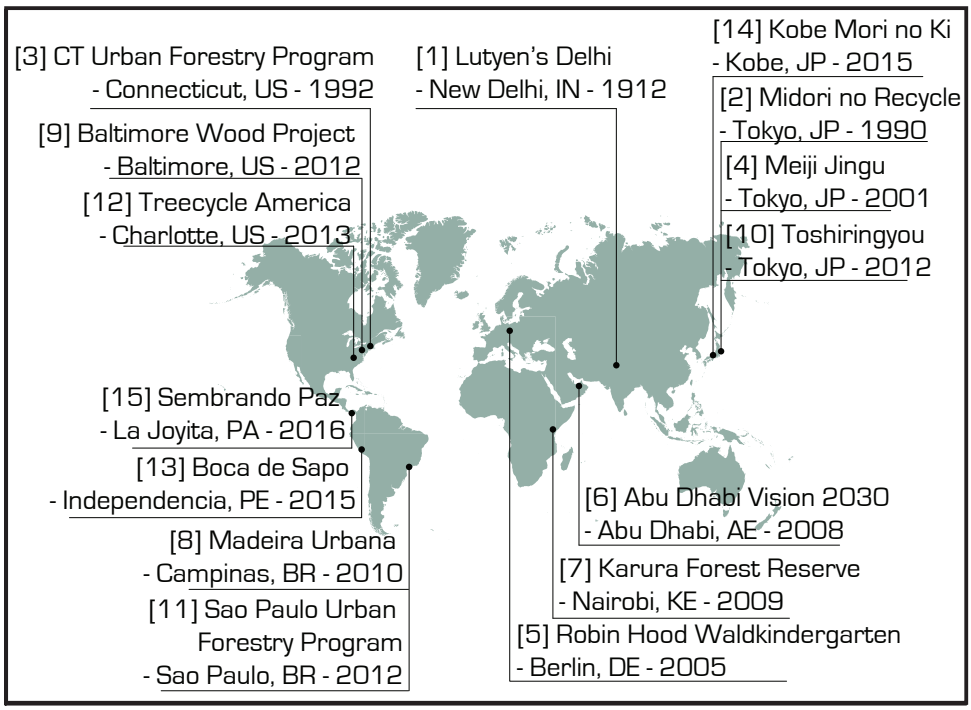


Fig. 2.2
List of Case
Studies

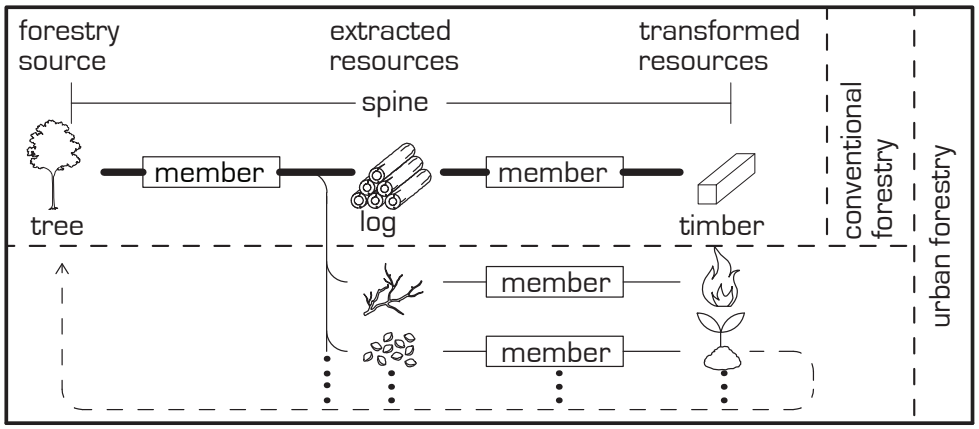


Fig. 2.3
Urban Forestry
Framework.

Forestry source is defined by the type of urban forest from which each network starts. The study identifies five types: park, street trees, private gardens, forest in city and deconstruction sites. (Table 2.1) Extracted resources are those natural raw materials obtained directly through the practice of urban forestry. In addition to tree logs, which are the main product of conventional forestry, the study also includes other frequently underestimated tree resources such as: branches, leaves, seeds, fruits, bark, wild trees, and also wood recovered from deconstruction activities. (Table 2.2.)

Forestry source
park
street
private
forest in city
deconstruction

Table 2.1. Urban Forestry Sources


Park


Street


Private


Forest in City


Deconstruction

Extracted resources
log
branch
bark
leaf
fruit
seed
wild sapling
salvaged timber

Table 2.2. Extracted Resources


log


leaf


wild sapling


branch


fruit


salvaged timber


bark


seed


misc

Transformed resources are generated by the application of diverse processes to those extracted resources. Some of them preserve the material properties of the tree such as: dry logs, timber, furniture, buildings, wood crafts or soft pavements. Others are consumed: firewood, wood chips, charcoal, food, medicine or dye pigments. And others contribute to the reproduction of the forest itself such as: mulch, biocompost, saplings or planted trees. (Tab.2.3)

Transformed resources		
mulch	dried log	firewood
biocompost	timber	woodchip
sapling	building	charcoal
ash	furniture	energy
tree	park furniture	food
	woodcraft	medicine
	soft pave	dye

Table 2.3. Extracted Resources


dried log

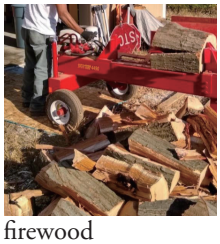

tree


sapling


furniture


timber


building


firewood


park furniture

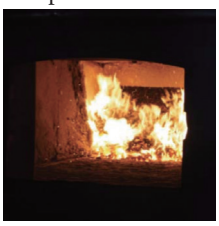

woodcraft


soft pave


mulch


woodchip


charcoal


energy


biocompost


herb


dye


food

Membership is crucial to determine the accessibility to resources and therefore to understand how urban forestry is undertaken, regarding the entity and the character of the members. Entity indicates the purpose of the members involved, being identified as follows: Municipal (M.) agencies that manage certain competencies; Business (B.) that operate for financial ends; Social enterprises (S.) aimed at providing social benefits, such as hiring people with employment difficulties; NPOs (N.) that operate exclusively for social benefits; and independent Individuals (I.) without any of the previous intentions. The character of the Members that participate in the network are listed (Tab.2.4) in two groups: Personnel, which refers to individuals such as: urban forester, carpenter, designer, resident, volunteer, farmer, etc.; and Organizations, which refers to venues and facilities: warehouse, sawmill, mulch production, power plant, school, etc.

Member		
Entity	Personel	Organisation & Facilities
municipal (M.) social enterprise (S.) NPO (N.) business body (B.) individual (I.)	**urb**an forester **car**penter **des**igner **far**mer **coo**k **vol**unteer **res**idents **misc**	**war**ehouse **saw**mill **mul**ch producer **ret**ailer **ene**rgy plant **sch**ool **misc**

Tabke 2.4.
List of members that have interaction with the resources in any of the stages of sourcing, extraction or transformation.

What makes these networks 'urban' are the diverse type of resources and members involved. These cases start their network from urban forestry sources, such as street trees, parks, gardens, and even deconstruction materials, not the conventional ones in rural forestry networks. The entities and members reflect the diversity found in cities, like municipal bodies, social enterprises, NPO, schools, volunteers, etc. Also, the aim is not to judge whether a practice is better by comparison. Its objective is to reveal the existing panorama's diversity, extracting the possible applications to create an urban forestry network or reinforce an existing one.

Analysis Example

Once the previous data is collected for all the cases, a network diagram of the urban forestry program is drawn following the sequence of forestry sources, member, extracted resources, member and transformed resources. For example, case nº 2 "Midori no Recycle" is studied (Fig.2.5). Midori-no-Recycle is an urban forestry practice operating in Tokyo since 1990. In this case, the network starts from park and street trees (forestry sources), that are maintained by Municipal urban foresters (M.uf). They collect fallen trees (extracted resources) and convert them in a municipal warehouse (M.war) into dried logs (transformed resource). These are then sawn into timber (transformed resource) by a private sawmill (B. saw). This urban timber is further converted by the sawmill (B.saw) into stakes for park maintenance, and by the urban foresters (M.uf) in conjunction with residents (I.res) into furniture and woodcraft (transformed resource). A local school (S.sch) also uses this timber for furniture making workshops (transformed resource). In addition, leaves and branches (extracted resources) generated by the municipal foresters (M.uf) are transformed into compost in a Municipal sawmill (M.saw). This whole process is understood as the network of urban forestry.

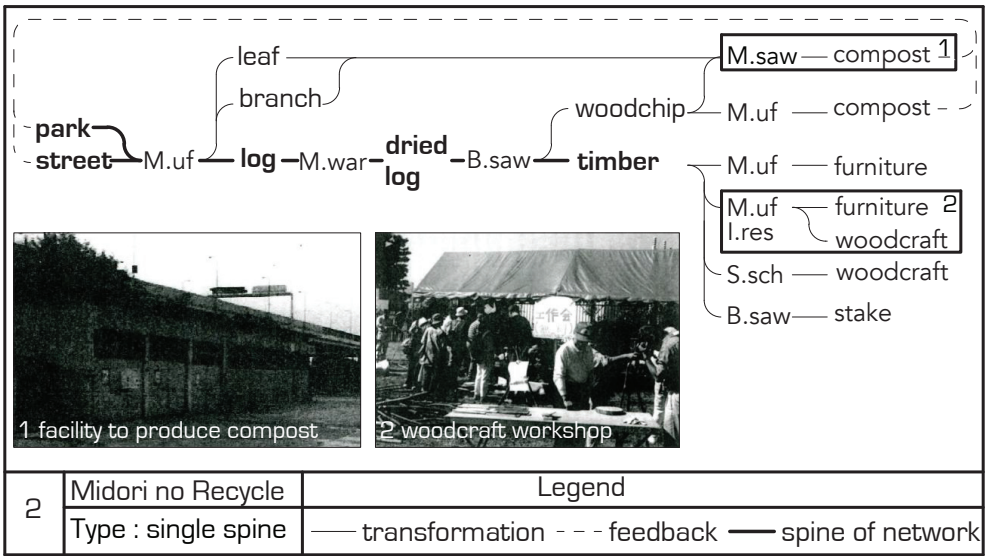
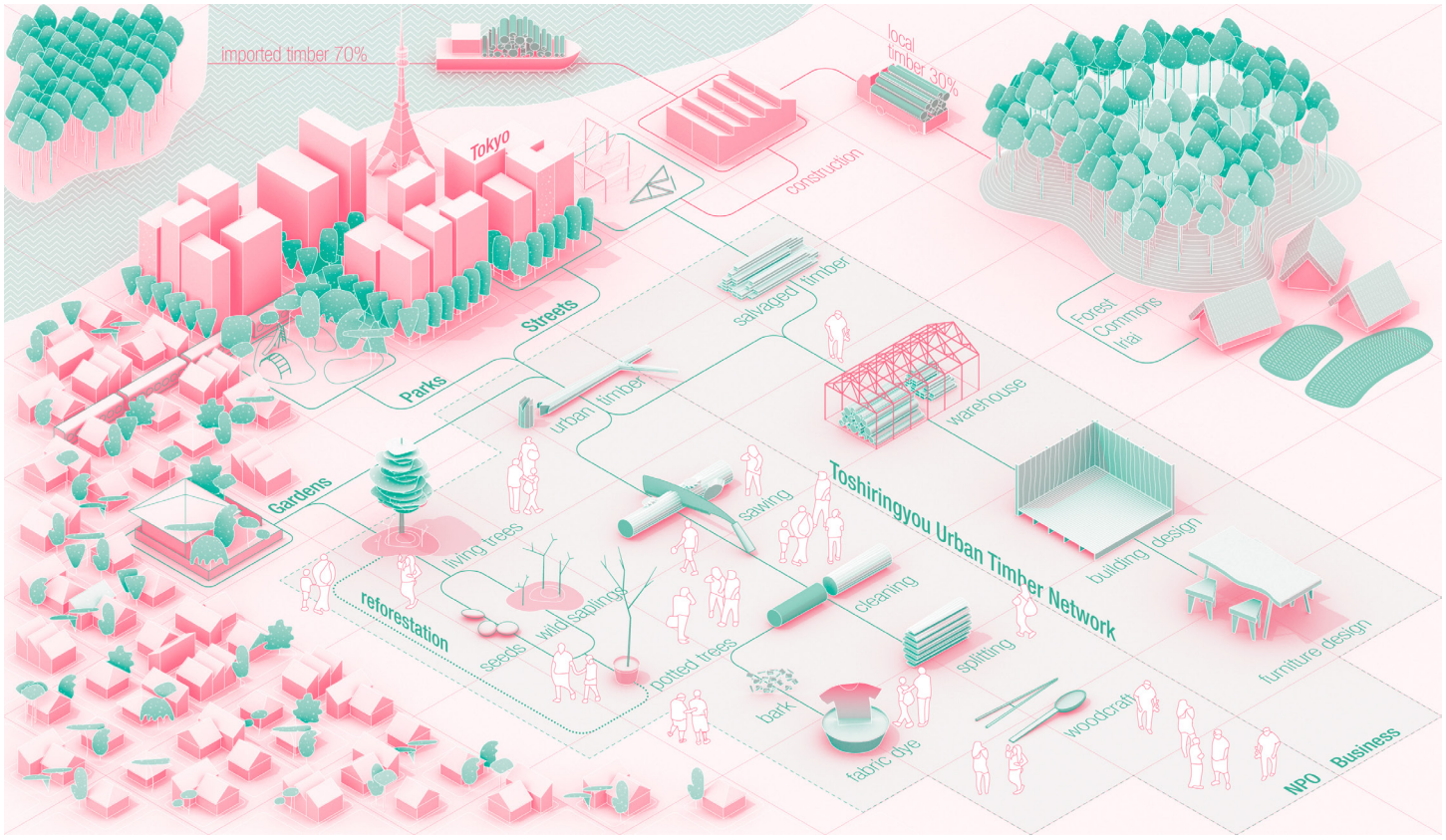


Fig. 2.4
Analysis
Example

Network of Urban Forestry

Once the method for processing the data is established, it is applied in the same manner to draw the network diagram of all fifteen cases, which are then compiled in Fig. 2.6. The first round of analysis is conducted by contrasting the morphology of all networks focusing on the forestry spine (highlighted in bold), which is the set of connections within the network that resembles the conventional forestry sequence: tree-log-timber. Through this comparison four different patterns were found: Single-Source Spine (No. 2, 3, 6, 8, 12), the Double-Source Spine (No. 9, 10, 11, 14), Soft Spine (No. 4, 13) and Spineless (No. 1, 6, 15).

Fig. 2.7
Example of urban forestry network. Toshiringyou



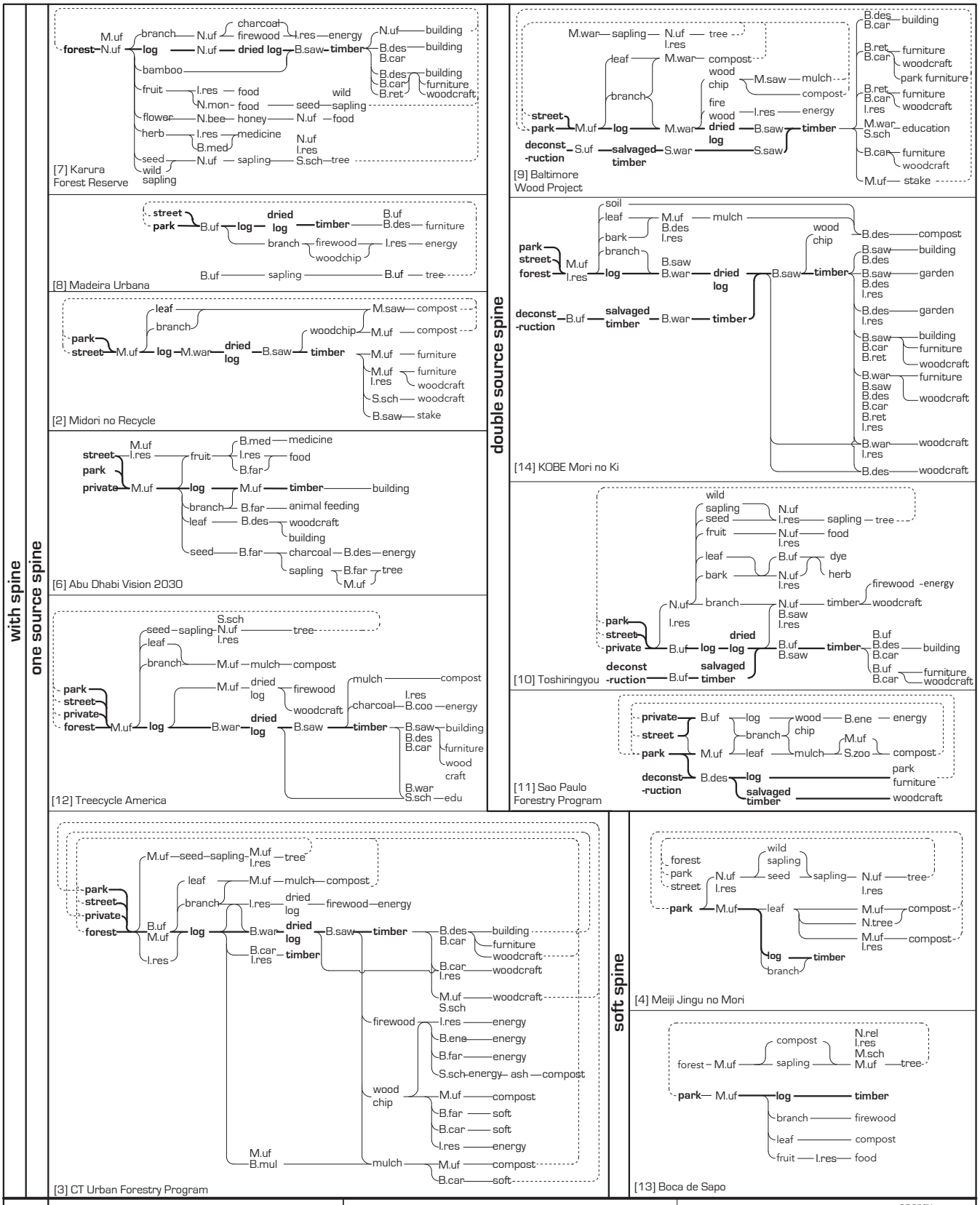
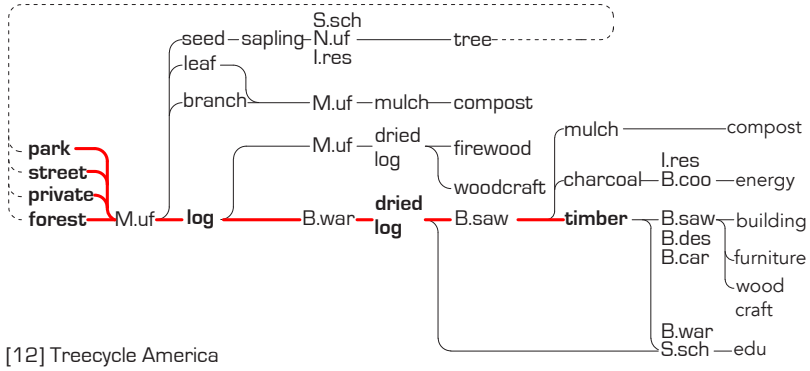


Fig. 2.5 Network of Urban Forestry

Single Source Spine

Single Source Spine (no.2,3,6,7,8,12) is themost similar to the conventional forestry practice, for having a clear line of transformation from log into timber. The membership is mostly dominated by municipal and business entities (no.2,3,6,7,8,12), with only one case that has NPO involvement (no.7). However, the involvement of residents and NPO further triggered the branching of the network with unconventional resources. For example, Treecycle America(no.12), is an initiative in Charlotte, proposed by Damon Barron, owner of a timber warehouse and sawmill, to the municipality of USDA in order to overcome the issue of urban wood waste. 300,000 pounds of usable wood is disposed of each day in the Charlotte region. The network is formed by local sawmills and other wood related woodworkers like designers and carpenters. The network collects fallen tree logs from these urban forest maintenance and sent to a local warehouse and sawmill to be transformed into timber for multiple commercial use.

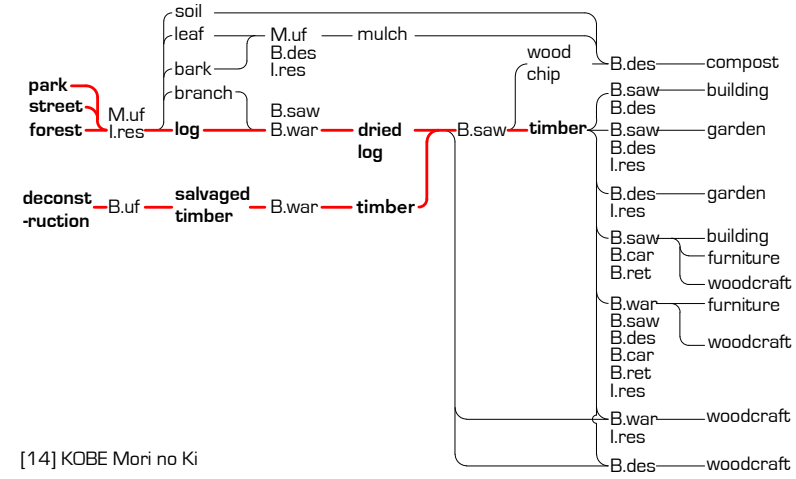


[12] Treecycle America

Fig. 2.8
Fell logs from urban forest maintenance are collected and transformed into timber for wooden products , Treecycle America, Charlotte. (no.12)

Double Source Spine

Double Source Spine (no.9,10,11,14) corresponds to the forestry network with one source with an addition alternative source from deconstruction material. It is noticable that, most of the salvaged timber are by business entities (no.10,11,14), with a unique member participation, of a social enterprise in Baltimore Wood Project (no.9). This due to the fact that the direct accessibility to urban trees are limited and deconstruction has been uncovered as an alternative method to start up urban forestry practice. An example, Kobe Mori no Ki (no.14) is a joint local initiative between municipality and business entities. Marunaka - run by Sharewood - serves as a warehouse that collects and processes salvaged timber from building deconstruction, along with logs collected from the maintenance of the city forest which is carried out by the municipality and residents in Rokkosan. The initiative to start a warehouse, which was also an old ship repair warehouse, was inspired by the background of Hyogo port as a repair port for ships and reselling salvaged furniture from oversea; and the issue that there is no storage space for fell logs from Rokkosan.



[14] KOBE Mori no Ki

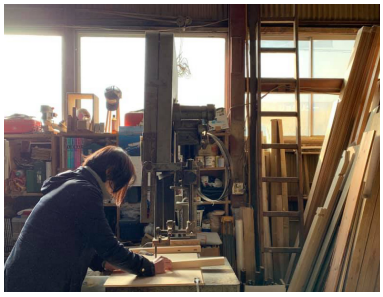
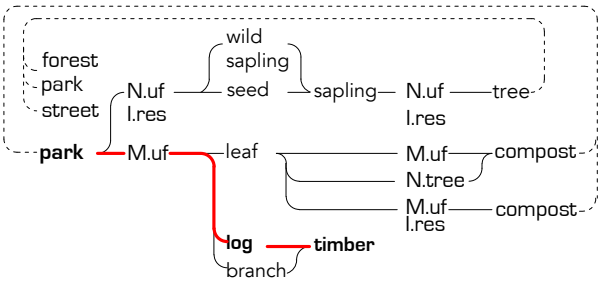


Fig. 2.9
Fell logs from forest and salvaged timber from deconstruction and carpentry workshops are collected to be transformed into timber for wooden products , KOBE no Mori no Ki, Kobe. (no.14)

Soft Spine

Soft Spine refers to network which the transformation of log and timber is present, but not as the main resource of transformation. The two cases(no.4,13) are dedicated to wellbeing and reproduction of trees through seed, sapling and compost. The cases also widens the scope out of the initial forestry practice by contributing to another forestry sources. It is noticable that residents involvements are always accompanied with NPO involvement. Meiji Jingu no Mori (no,4) is a 100 year-old forest park project in Tokyo dedicated to the Meiji Emperor donated by people from all over Japan during the establishment in 1920. As a sacred ground, both caretaker and visitors are not allowed to extract anything from the forestry sources for the past 80 years. In this cause, fallen leaves are collected by caretaker and return to the forest ground as nutrition (compost). Fallen branches and logs are also collected and transformed into timber for maintenance within the park. However, recent involvement of NPO Hibiki, seeds and saplings are extracted and nursed within the forest park. The saplings are used for replantation of coastal areas affected by 311 Tohoku earthquake through "Forest of Life", returning the "seeds of life" back to areas in need.

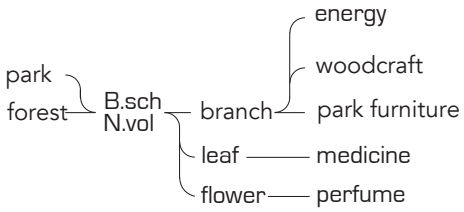


[4] Meiji Jingu no Mori

Fig. 2.10
Acorn seeds in Meiji Jingu are collected from the forest park through a workshop by NPO with residents participation to be used to run a tree nursery, Meiji Jingu no Mori, Tokyo. (no.4)

Soft Spine

Spineless (no.1,5,15) this type of network lacks the logs to timber transformation, but present other extracted resources that unfold elaborate transformation paths involving a wide diversity of entities and focusing on the communal value over economic profits. One case is Robin Hood Waldkingarten (no. 5), a "forest kindergarten" in Berlin where children use city parks as their classroom. Children collect branches or other resources, making their own toys and even building up their own playground. Since the previous analysis concerns the morphology of the network in each case, a second round of examination is proposed to unearth the diversification in urban forestry. To this end, the networks are split in three stages: sourcing, extraction and transformation. Then, they are rearranged and grouped to reveal the tendencies in the relationships between resources and members.



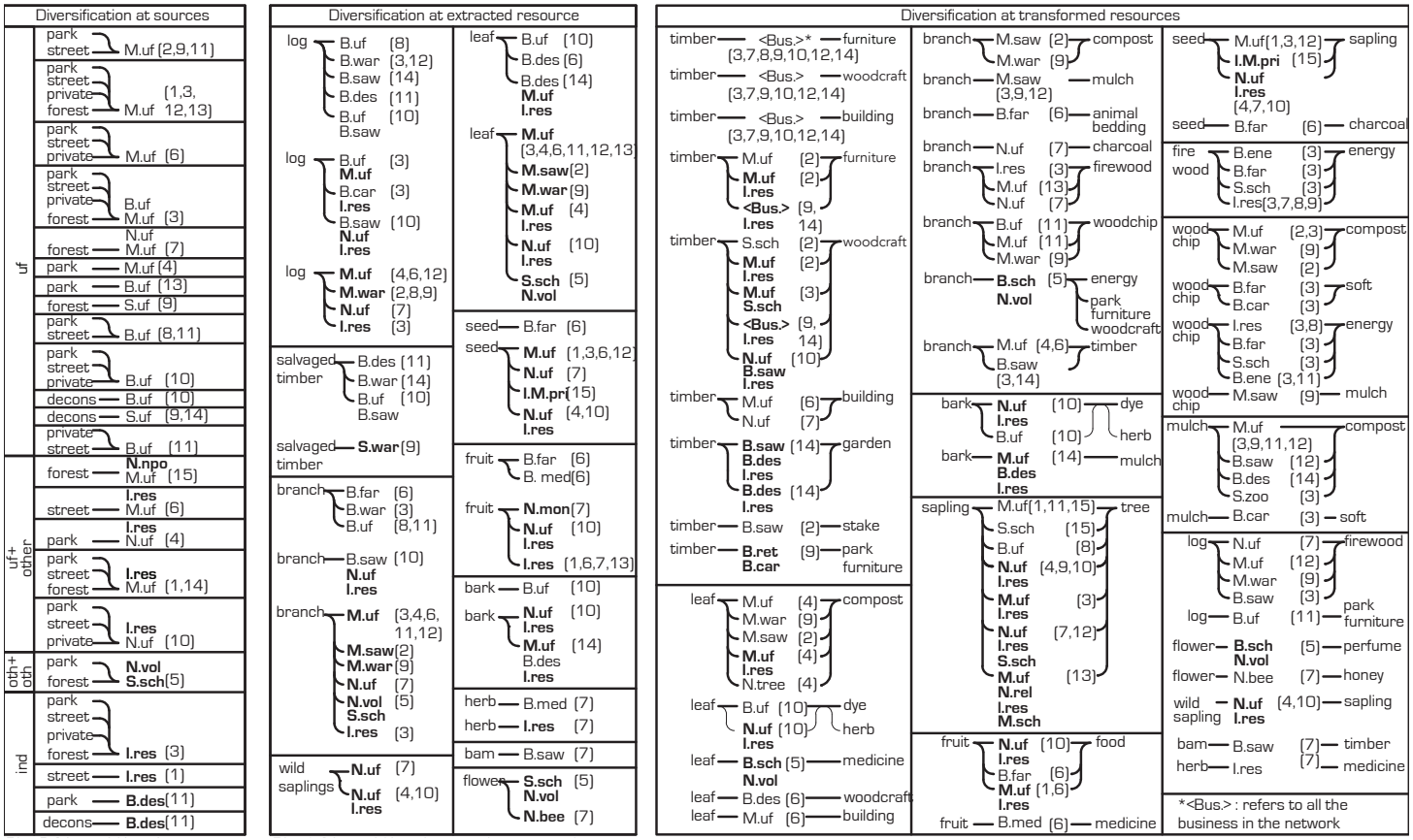
[5] Robin Hood Waldkindergarten

Fig. 2.11
Branches are picked up in park during classes and transformed into everyday plaything, Robin Hood Waldkindergarten, Berlin. (no.5)

Diversification in Urban Forestry

Since the previous analysis concerns the morphology of the network in each case, a second round of examination is proposed to unearth the diversification in urban forestry. To this end, the networks are split in three stages: sourcing, extraction and transformation. Then, they are rearranged and grouped to reveal the tendencies in the relationships between resources and members. (Table 2.6)

Table 2.6
Diversification in Urban Forestry at the stage of Sourcing Extraction and Transformation



2.4
Diversification at the stage of sourcing

To investigate diversification at the sourcing stage, connections between "forest sources and members" are collected from all cases, and then repeated instances are grouped together and organized by membership. In this stage urban forester appears as the critical actor for determining the diversification in urban forestry, being present in the wide majority of cases. This tendency reflects the professionalization around the accessibility to sources, even in the urban context. Moreover, the predisposition of municipal urban forester (M.uf) accessing parks and street trees, shows how closed are the networks when dealing with municipally owned sources. Thus, the diversification happens when members other than urban foresters access forestry sources, such as partnerships with residents (no.1,4,6,10,14,15). This diversification exposes the importance of professionals like urban forester to open the accessibility to forestry source for citizens. Furthermore, there are also a few cases that access sources without the presence of urban foresters.

One of these cases takes place in New Delhi (no.1), where the avenues are planted with fruit-bearing trees by the government (M.uf) to provide citizens (I.res) with jamun fruits for consumption. During peak seasons, the rights to harvest jamun fruits are auctioned to offset the maintenance costs of the urban forest. The case of Robin Hood Waldkindergarten (no.5) displays an interesting diversification at this stage by opening the accessibility in a combined effort of a school (S.sch) together with volunteers (N.vol) and children, that reframes urban parks as a grounds of education through natural forestry resources. In Sao Paulo (no.11), several artists access urban trees as a material source for their artworks; like sculptor Hugo Franca (B.des) who accesses fallen park trees and transforms them into park furniture at the same location. (Fig. 2.13)

Fig. 2.13
Artist Hugo Franca (B.des) crafts furniture directly from fell tree on spot in the park. (no.11)

2.5 Diversification at the stage of extraction

The same method is applied at the stage of extraction. The relationship between "extracted resources and member" are gathered and assembled according to resources and entities. Similarly to industrial forestry, logs are the key resource in the extraction stage, and they show a clear tendency of business entities (B) accessing them. Thus, the diversification comes at the involvement of entities other than business. Observing the extracted resources that are usually disregarded in conventional forestry, it shows that business entities gradually disappear in favor of more diversity of members and partnerships. For example most of the members that access seeds are non-business, with a propensity towards municipal, non-profit and individuals. The involvement of non-business entities further reinforces the diversification with extraordinary resources such as bark, herbs, wild saplings and flowers.

Karura Forest Reserve (no.7) in Nairobi presents a successful network through the diversification of entities other than business. Neighboring residents are hired as forest caretakers (N.uf), removing invasive species like eucalyptus trees (log) which are then utilized as timber resources for forest maintenance such as building barriers, bridges or watch towers. The forest is also a resourceful ground for extracting fruits and herbs for the residents (I.res) on a daily basis and during emergencies. In Baltimore Wood Project (no.9), two different social enterprises hire residents (I.res) who face employment difficulties to extract salvaged timber from abandoned houses (S.uf) and process it into usable timber (S.war). In this case, opening the resource extraction accessibility contributes both to recirculate a discarded resource and to reintroduced citizens into society. A similar example is found in Sembrando Paz (no.15), an initiative proposed by convicted citizens (I.M.pri) to run a tree nursery inside the prison with native seeds provided by the Red Cross(N) and the Municipality (M.uf). Through the dedication to the program, imprisonment period can be reduced at the same time that the city is reforested with lost local species.

Fig. 2.14
Eucalyptus are transformed into timber by the caretaker (N.uf) to be utilised as material for maintenance. (no.7)

2.5 Diversification at the stage of transformation

Lastly, for assessing the diversification at the stage of transformation, all the relationships between "extracted resource-member-transformed resource" are collected. These network fragments are grouped firstly according to extracted resources and secondly to the final transformed resources. As seen in previous stages, citizens involvement broadens the utilization of urban forestry resources. It is noticeable then that the tendency in the transformation stage is that resources are accessed by single members. Hence, the diversification comes under the existence of partnership between members. This consideration renders timber, as the resource with the strongest ability to foster partnerships due to its wide range of possible transformations already embedded in conventional forestry networks. However, further diversification in membership can also be found around other resources such as branches, leaves, bark, saplings, seeds or flowers. These collaborations between members often expand the potential of transformation of resources, such as the unique application of bark into fabric dye (no.10), or the usage of leaves directly from the park as medicine (no.5).

In Connecticut Urban Forestry Program(no.3), each municipality(M.uf) is collaborating with local mulch producer (B.mul) to operate on municipal land rent-free. As a return, the municipality residents (I.res) are allowed to drop off any tree and green resources generated at no cost. Urban foresters(M.uf) also collaborate with Greenwich High School (S.sch) by conducting urban timber processing workshops for students using the the trees felled for the school expansion. Tokyo's Toshiringyou(no.10), started in 2012 by an architect trained as urban forester (B.uf); that when is hired to fell a tree in a residential area, runs urban forestry workshops (N.uf) that involve residents and children (I.res) in utilizing diverse forestry resources like logs, branches, leaves, bark, saplings, or seeds. In this manner, although residents (I.res) have no direct access to log extraction due to the restrictions of professionalism, the urban forester (B.uf) changes into NPO (N.uf) to enable residents accessibility to forestry sources. (Fig. 6)

Fig. 2.15
Barks are transformed as dye and herb under workshop with involvement of Machimono(N.uf) and residents(I.res). (no.10)

Combination of Diversification

After obtaining the diversifications through the stage at forestry source; extracted resources; and transformed resources : members other than urban foresters access forestry source; the involvement of entities other than business; and existence of partnership , the fifteen case studies have been reassessed and grouped according to the combination of diversification (Fig.27). 6 characters were found. 13 cases shows combination of diversification of at least two stages, with 9 cases showing direct accessibility of other members to forestry sources.

First, among 13 cases with combination of at least two stages, it is noticable that the tendency lies in the existence of diversification at the stage of extracted resources. 5 and 6 demonstrate greater accessibility to extracted resources (log, branch and seed) by diverse members triggers strong and diverse partnership at the stage of transformed resources. This reveals the importance of the accessibility to extracted resources to foster involvement, utilization and stewardship.

However, 3 and 6 demonstrate that it is important for citizens to access forestry sources in order to expand the diversification of extracted resources. For example, access to park, street and private trees by diverse members like, schools and residents expands the extracted resources to extraction of fruit, bark, wild sapling and flower, which has potential to attract more partnership through future development.

In 1,4,5 and 6 with strong partnership, it is shown that, although situated in the city, timber transformation is still crucial to expand urban forestry network through various partnership and also to include citizens participation. For example, workshops by business and municipal allow for participation diverse timber transformation (furniture, woodcraft and garden), as leisure for adults and education for young citizens.

Case	Source R	Source M	Extraction R	Extraction M	Transformation R	Transformation M	Transformation R	Transformation M	Transformation R
8	**street***	B.uf	**log**	B.uf	**dried log**	B.uf	**timber**	B.uf+B.des	furniture
	park*		branch	B.uf	firewood	l.res	energy		
					woodchip				
				B.uf	sapling	B.uf	tree*		
13	natural forest	M.uf	soil	M.uf+N.rel+	tree*				
	park*	M.uf	wild sapling	l.res+M.uf					
			log	M.uf	**timber**				
			branch	M.uf	firewood				
			leaf	M.uf	compost*				
			fruit	l.res	food				
1	street*	M.uf	seed	M.uf	sapling	M.uf	tree*		
		l.res	fruit	l.res	food				
					medicine				
5	park	S.sch	branch	S.sch+N.vol	energy				
	forest	+N.vo			woodcraft				
		l			park furniture				
			leaf	S.sch+N.vol	medicine				
			flower	S.sch+N.vol	perfume				
6	**park**	M.uf	**log**	M.uf	**timber**	M.uf	building		
	private		branch						
				B.far	animal food				
			leaf	B.des	woodcraft				
					building				
	street		seed	B.far	charcoal	B.des	energy		
					sapling	B.far	tree		
			fruit	B.med	medicine				
		l.res		l.res	food				
				B.far					
15	natural	M.uf+	seed	l.M.pri	sapling	M.uf	tree*		
	forest*	N.npo				S.sch			
	private*								
	street*								
	park*								
11	**deconstr.**	B.des	**salv.timber**	S.des	woodcraft				
	park*	B.des	**log**	S.des	park furniture*				
		M.uf	leaf	M.uf	mulch	M.uf	compost*		
	street		branch			S.zoo			
		B.uf		B.uf	woodchip	B.ene	energy		
	private		log						
14	**deconstr.**	S.uf	**salv.timber**	B.war	**clean salv.**	B.saw	**timber**	B.saw+B.des	building
	park	M.uf+	**log**	B.saw+B.wa	**dried log**			B.saw+B.des+l.res	garden
	street	l.res						B.des+l.res	garden
	forest							B.saw+B.car+B.ret	building
									furniture
									woodcraft
								B.war+B.saw+B.des	furniture
								+B.car+B.ret+l.res	woodcraft
			branch				Woodchip	B.des	compost
			leaf	M.uf+B.des	mulch				
			bark	l.res					
			soil						
2	**park***	M.uf	**log**	M.war	**dried log**	B.saw	**timber**	M.uf	furniture
	street*							M.uf+l.res	furniture
									woodcraft
								S.sch	woodcraft
								B.saw	stake
							woodchip	M.uf	compost*
								M.saw	compost*
			leaf						
			branch						
7	**forest***	M.uf+	bamboo			B.saw	**timber**	N.uf	building*
		N.uf	**log**	N.uf	**dried log**			B.des+B.car	building
								B.des	building+
								B.car	furniture+
								B.ret	woodcraft
				N.uf	charcoal	l.res	energy		
			branch		firewood				
			fruit	N.mon	food	N.mon	seed	N.mon	sapling*
				l.res	food				
			seed	N.uf	sapling	N.uf+l.res	tree*		
						+S.sch			
			wild sapling			N.uf			
			flower	N.bee	honey	N.uf	food		
			herb	l.res	medicine				
				B.med					

Case	Source R	Source M	Extraction R	Extraction M	Transformation R	Transformation M	Transformation R	Transformation M	Transformation R
12	**park***	M.uf	**log**	B.war	**dried log**	B.saw	**timber**	B.saw+B.des+B.car	building
	street*								furniture
	private*								woodcraft
	forest*							B.war+S.sch	education
							mulch	B.saw	compost
							charcoal	l.res+B.coo	energy
				M.uf	dried log	M.uf	firewood		
							woodcraft		
			branch	M.uf	mulch	M.uf	compost		
			leaf						
			seed	M.uf	sapling	S.sch+N.uf	tree*		
						+l.res			
9	**deconstr.**	S.uf	**salv.timber**	S.war	**clean salv.tir**	S.saw	**timber**	B.car+B.des	building
	street*	M.uf	**log**	M.war	**dried log**	B.saw		B.car+B.ret	furniture
	park*								woodcraft
									park furnit.
								B.car+B.ret+l.res	furniture
									woodcraft
								B.car	furniture
									woodcraft
								M.war+Sch	education
								M.uf	stake*
					firewood	l.res	energy		
					woodchip	M.saw	mulch*		
			branch			M.war	compost*		
				M.war	compost*				
			leaf						
				M.war	sapling	N.uf+l.res	tree*		
4	**park***	M.uf	**log**	M.uf	**timber**				
			branch						
			leaf	M.uf	compost*				
				N.tree					
				M.uf+l.res					
		N.uf+	seed	N.uf+l.res	sapling	M.N.uf	tree*		
		l.res	wild sapling			+l.res			
	street*								
	forest*								
	park*								
3	**park***	l.res	**log**	B.car+l.res	**timber**				
	street*	B.uf+		B.war	**dried log**			B.car+l.res	woodcraft
	private*	M.uf				B.saw	**timber**		
	forest*							B.car+B.des	building*
									furniture
									woodcraft*
								M.uf+S.sch	woodcraft*
							firewood	l.res	energy
							woodchip	B.ene	energy
								B.far	energy
								S.sch	energy
									compost
							woodchip	M.uf	compost
								B.far	soft
								B.car	soft
								l.res	energy
								M.uf	compost*
				M.uf+B.mul	mulch			B.car	soft*
				l.res	dried log	l.res	firewood	l.res	energy
			branch						
				M.uf	mulch	M.uf	compost*		
			leaf						
		M.uf	seed	M.uf	sapling	M.uf+l.res	tree*		
10	**deconstr.**	B.uf	**salv.timber**			B.uf+B.saw	**timber**	B.uf+B.car+B.des	building
	park*	B.uf	**log**	B.uf	**dried log**			B.uf+B.car	furniture
	street*								woodcraft
	private*			N.uf+B.saw	timber	N.uf+B.saw	firewood	N.uf+B.saw+l.res	energy
		N.uf+	branch	l.res		+l.res	woodcraft		
		l.res	seed	N.uf+l.res	sapling	N.uf+l.res	tree*		
			wild sapling						
			bark	B.uf	herb				
			leaf	N.uf+l.res	dye				
			fruit	N.uf+l.res	food				

Fig. 2.7
Combination of
Diversification

2.7 Conclusion: correlation in the resource-member diversification

This chapter has identified urban forestry as a critical practice for rethinking natural resources accessibility in the city. After examining the urban forestry background, this paper has presented the potential of alternative urban forestry practices for nurturing commons in the city. For uncovering this untapped potential, a framework is established based on the network of relations between resources and members and fifteen alternative urban forestry practice from different geographies have been analised.

The first round of analysis was conducted by contrasting the morphology of all networks focusing on the forestry spine. By spotting which section of their networks operate besides the log to timber transformation, four different types of characters are discovered: single source spine, double source spine, soft spine and spineless. It was observed that the network of urban forestry gradually becomes more open to public access along with the disappearance of the spine, but also it presents less complex entanglements in terms of members involvement.

The diversification in urban forestry was further investigated by examining the totality of resource-member relations independently of the programs. At the stage of sourcing it is found that the accessibility to the urban forest is still very professionalized, thus the diversification is driven by the appearance of other members in partnership with urban foresters or even operating independently. Diversification at the stage of extraction is revealed whenever entities are accessing extracted resources without business purposes. Additionally, the more the extracted resources differ from the conventional logs, the more diversified are the entities involved. Regarding the stage of transformation, diversification occurs whenever a member partnership is materialized to transform resources. These types of associations between members often disclose unexpected transformations of certain resources. Finally, urban timber is revealed as the crucial resource for developing rich urban forestry networks involving diverse partnerships with its wide transformation potential. However the study also has found that the accessibility to other untapped forestry resources unlocks the potential of urban forestry to foster more-than-human commons in the city.

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3
Tokyo metropolitan parks as urban forestry assemblages

3.1
Introduction: current status of urban forestry practice in Japan

Walking through a park in Tokyo one can encounter various modes of matter at different stages. A pile of leaves in the process of becoming compost, mysterious pavilions that shelter tree branches under corrugated steel roofs, logs scattered along the paths, sudden patches of overgrown grass secured by a thin rope, ultra-tall sheds housing a collection of ladders or small trolleys filled with brooms, buckets, dustpans and wooden chunks. This collection of seemingly unrelated things are the physical traces of urban forestry, the practice that centers on the maintenance of trees in metropolitan areas.1 The aim of this study is to establish a framework that can reveal these hidden places for urban forestry as important beacons for constructing more-than-human commons by investigating their relations within Tokyo Metropolitan Parks.

The historical evolution of the forestry industry in Japan, a forest archipelago where wood has been the building material par excellence, has been widely addressed by several scholars. 12 From the historical role of forests as 'commons' (iriai) managed collectively by rural communities; 13 the formation of the timber industry during the Edo period to provide construction material cities; the exponential growth of this industry during the postwar decades, and the resultant environmental transformations.14 (Fig 3.1.)

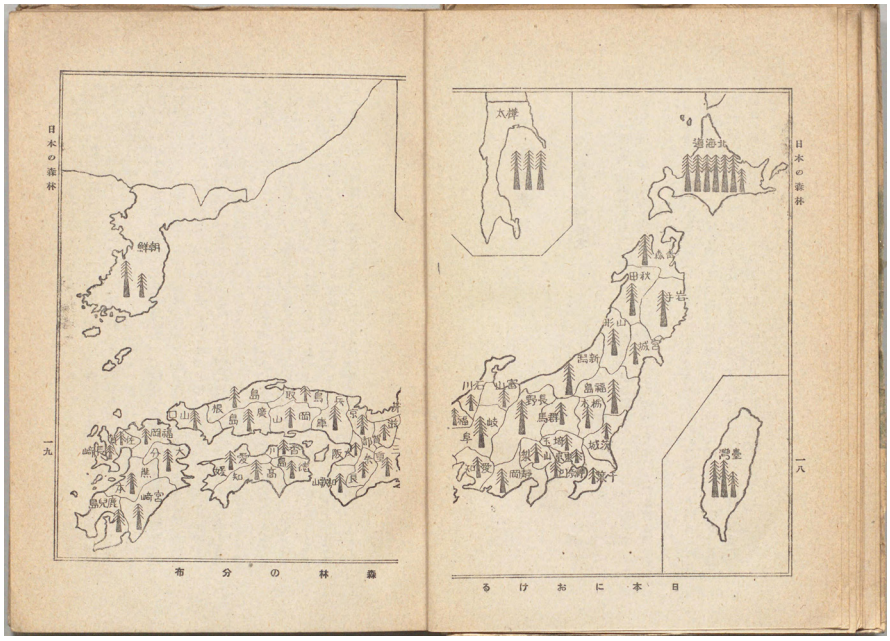


Fig.3.1. Conventional Forestry in rural areas. Map in *Shining Forest*, Katushiko Ohno,1944

However, the concurrent growth of urban forests in Japanese cities although studied from an ecological point of view, 15 remains a gap in the existing literature as assemblages which harbor untapped potentials for weaving connections between natural resources and citizens.16 As explained above, conventional forestry practice finds a different meaning when situated in the urban environment. Although urban green commons have been studied in other countries, 17 it is necessary to discover its intersection with the Japanese context.

Urban forestry, the maintenance of urban forests, is a practice that is bound up with the life cycle of trees, and for that reason it does not cease. It consists of repetitive actions in a dynamic and open-ended process that is in constant regeneration.18 The spatial and temporal rhythms of green management and its material flows are always variable. In fact, Tokyo's humid subtropical climate favors tree growth and, together with the presence of seasonal typhoons that increases the number of fallen trees, makes urban forestry a year-round activity that produces large amounts of diverse natural resources. 19 (Fig 3.2.)

Fig.3.2. Intense mainteinance work after Typhoon Hagibis after large trees have fallen at Rinshino-mori Park Tokyo, October 2019

Nevertheless, tones of byproducts resulted from this tree maintenance process are labeled as waste. While sometimes they found material afterlives, as in the case of the transformation of logs into woodchips or energy, they are usually discarded.20 This highlights the subjectivity in what constitutes waste and how biodebris is perceived.21 This sorting practice is generally carried out by professionals within park facilities without the participation of local residents. What is decided to be kept as resource continues its cycle of transformation, and what is catalogued as disposable is removed from the park as "industrial waste".(Fig. 3.2)

A typical day's work in urban forestry is linked to the flow of resources as they are sourced, extracted and transformed within the park. Workers often gather at the service center, pick up tools, walk or drive small carts, prune trees and accumulate the resulting material, which is then transferred to the biodebris yard for further processing into wood chips or disposed as waste. The invisibility of these activities is facilitated by the series of fences, signs to stay-out or not to trespass. They are only accessible to workers in the facility.

In Tokyo Metropolitan Parks urban forestry activity is mainly performed by hired professionals, and any left resource that could present a potential danger for the visitors is removed from the premises. The urban forestry workers navigate the park riding bicycle or a mini truck, wearing a wide trouser coveralls, a helmet, a pair of jika-tabi shoes, and a thick belt packed with pruning tools. A towel around the neck and a hanging katori-senko (incense to repel mosquitoes) are added to the outfit to bear the hot and humid Japanese summer.

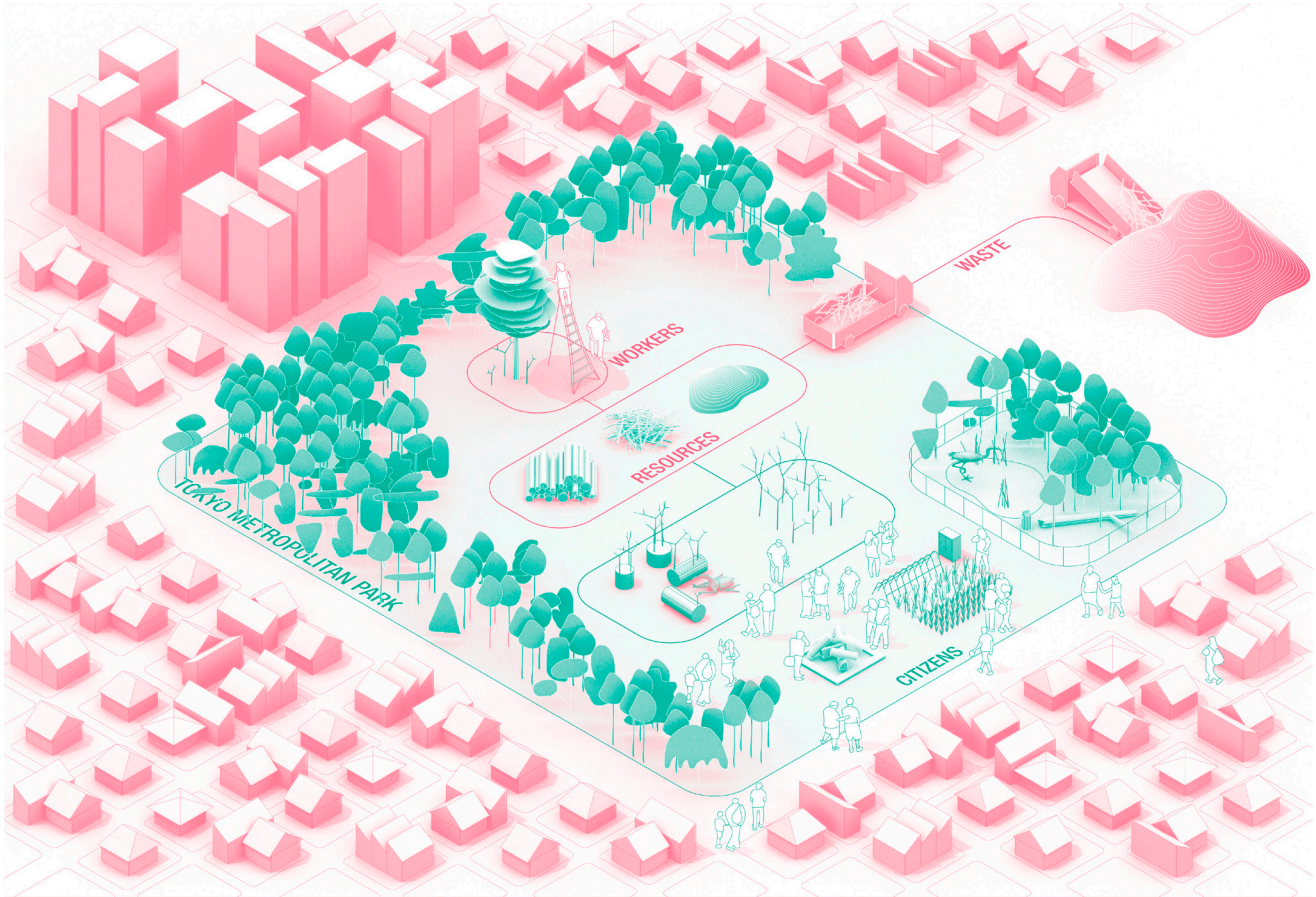


Fig. 3.2
Urban Forestry Network in Tokyo Metropolitan Parks

3.2
Background: parks as urban forestry sites

In Edo - the old name for Tokyo during the feudal regime - entertainment in the ordinary life of most of the urban population was not related to green areas. Commoners lived in only 20% of the territory with a population density five times higher than in the current 23 wards. The urban forests were in the 65% of the land occupied by the wealthy elites and in the 15% of the religious property. When the imperial restoration ended the Tokugawa Shogunate, the domains of the feudal lords (daimyo), the residences of the wealthy warriors (samurai), and the grounds of the temples and shrines, went from private to state ownership. 23 Many of the urban forests resulting from this expropriation became accessible to commoners, by their transformation facilitated by the Tokyo Grand Council Parks of 1873.

In this way, the contemporary definition of parks as public spaces finds its roots in the Meiji era (1868-1912) following Western ideologies of civic culture. In their early stages they were conceived as places that served the purposes of the state, which sought to improve environmental, hygienic, ornamental and recreational conditions in crowded residential areas, as well as to portray a modernized society. When Tokyo was devastated by the Great Kanto Earthquake in 1923, green spaces transcended their beautification status to become places of survival. In the following decade, more urban parks were created to act as effective firebreaks in crowded built-up areas.

In 1939, the Tokyo Green Space Planning Commission launched a proposal for a green belt for the capital to limit suburban expansion. This “green space” (ryokuchi) was also conceived as a fertile area with forests and farmland. During World War II, urban forests were used as emergency shelters that could provide essential resources such as food or timber. The parks became productive land for growing vegetables or rice, using tree logs for firewood. Thomas R. H. Ravens indicates in his book “parkscapes” that “food became very scarce in Japan in 1944 and even scarcer during the winter of 1945–1946, and city parks were partly plowed under to grow grain and vegetables.” A group of students grow food in a plot in Tokyo’s Hibiya Park. (Fig. 3.3.) Even though designe for purely aesthetic pleasure, it turned into fertile grounds in case of emergency showing the latent potential of the soil. They also housed many barrack-style dwellings, and even today, urban forests still serve as shelter for the needy. 24

Fig. 3.03
Hibiya Park in 1944, was transformed into a productive field for growing food. Tokyo Metropolitan Park Association.

Post-war legal frameworks, such as the 1956 City Parks Law or the 1968 City Planning Law, ensured the creation of parks, establishing that only 2 percent of the total area could be devoted to facilities - 5 percent when these were cultural - and providing funds to transform sites formerly devoted to military defense, scientific research or industry into green spaces. The demand for housing construction was so pressing that the Japan Housing Corporation began building in the planned greenbelt area. However, groups of citizens concerned about the environmental impact demanded the protection of urban forests, raising awareness of their beneficial role. Between the 1970s and 1990s, the number of parks in Tokyo tripled, with different public-private coalitions helping to plant trees and new decrees such as "tree contracts" that reduced inheritance taxes for those who allowed the public to use their private green spaces. 25

Amendments to the 1992 City Planning Law and the 1993 Basic Environmental Law facilitated the inclusion of non-bureaucratic stakeholders in design planning, as well as civic participation (machizukuri). Academic critics, such as historian Kimura's Shōzaburō, encouraged broadening the perspective of civic reconstruction beyond social and economic aspects, addressing community sustainability as "no longer human-centered but nature-centered".26 However, the current management of the parks, including the activities of participation of the neighbors, still maintains an anthropocentric vision oblivious to the non-humans, this study argues that is possible to advance towards contemporary environmental concerns through the practice of urban forestry.

3.3 Methodology: materials of the study and definitions

Minding that the present study focuses on urban forestry within the park, and not general park management, the framework is established addressing only the relations around resources that derive from tree maintenance, based on the understanding of urban forestry as a practice of care capable of constructing more-than-human commons, that is, of mutualistic relationships between humans (workers, citizens) and/or non-humans (forest).

This study uses quantitative and qualitative data to advance the understanding of the current state and the spatial consequences of urban forestry practice within Tokyo parks. Urban forestry practice occurs in large urban forests within the dense urban fabric of Tokyo. Therefore, those parks within the 23 special wards and directly managed by the Metropolitan Government are selected as case study. As well as some representative cases of major urban forests managed by the Central Government, the Imperial House or Meiji Jingu.

Of the 5300 hectares that comprise the more than 8000 parks in Tokyo, 2000ha are formed by only 82 parks directly managed by the Metropolitan government. These are selected for providing a large sample of the urban forest and consistent urban forest maintenance. Of those 82, the ones located outside the 23 special wards are excluded, and the cemeteries and zoos. Other six representative cases are included for being vital urban forests of central Tokyo, managed by the Central Government, the Imperial House, or Meiji Jingu. (Fig. 3.4)

No.	Name	Year Est.	No.	Name	Year Est.
1	Ueno	1873	21	Zenpukujigawa/Wadabori Park	1964
2	Shiba Park	1873	22	Komazawa Olympic Park	1964
3	Koishikawa Botanical	1877	23	Mizumoto Park	1965
4	Hibiya Park	1903	24	Higasi Ayase Park	1966
5	Meiji Jingu	1920	25	Shinozaki Park	1967
6	Kyu Shiba Rikyu	1924	26	Ukima Park	1967
7	Meiji Jingu Gaien	1926	27	Yoyogi Park	1967
8	Daiba Park	1932	28	Akatsuka Park	1974
9	Sarue Park	1932	29	Odaiba Marine Park/Daiba	1975
10	Kiyosumi Gardens	1938	30	Tokyo Port Wild Bird	1978
11	Koishikawa Korakuen	1938	31	Oi Central Seaside	1978
12	Rikugien Gardens	1939	32	Kameido Chuo Park	1980
13	Mukojima Hyakkaen	1946	33	Hikarigaoka Park	1981
14	Hama rikyu Gardens	1949	34	Nakagawa Park	1986
15	Shinjuku Gyoen	1949	35	Higashi Shirahige	1986
16	Kitanaomaru	1949	36	Rinshi no mori	1989
17	Institute for Nature Studies	1954	37	Jonanjima Seaside	1991
18	Toyama Park	1956	38	Kiba Park	1992
19	Kyu Furukawa	1957	39	Ojima Komatsugawa	1997
20	Kinuta Park	1964			

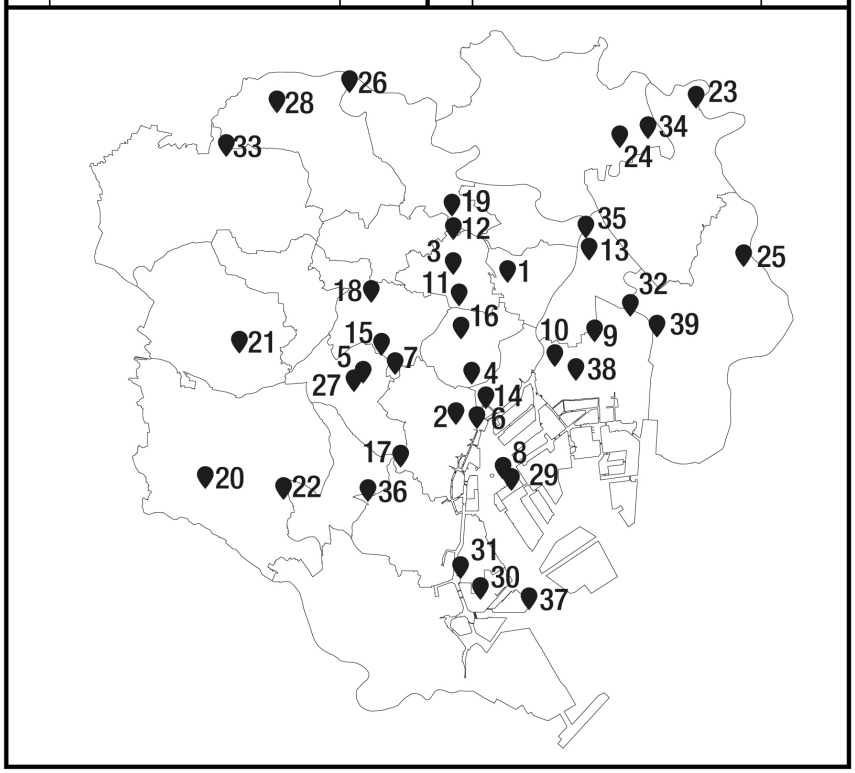


Fig. 3.4
Case study list of Tokyo Metropolitan Parks

As previously introduced, conventional urban forestry is centered around the maintenance of trees by professional workers, as a result, this activity produces a great amount of forestry resources such as leaves, branches or logs that are normally discarded as waste. Therefore, this study introduces the term Urban Forestry Element (UFE) as those places related to such resources - either actively when they use them directly, or in a latent way, when they could use them but are still untapped - being an Urban Forestry Assemblage (UFA) the collection of urban forestry elements within the park.

Definition of Urban Forestry Elements

All the parks indicated in the case study list were visited and urban forestry elements of several types were distinguished across all the park surface. (Fig. 3.5) Sanctuary are enclosed patches of forest (E) or fenced grasslands prepared for different insects to thrive (I), where forestry resources fall naturally onto the ground, being consumed, decomposed or nurtured by different beings that transform them into rich soil, allowing the forest ecosystem to self-maintain. Field are patches of land that utilize the power of the soil to grow and reproduce trees or plants that could benefit from the resources generated in the park. These are open-air tree nurseries (N), where seeds and saplings are nurtured; tree orchard (O), community gardens and farming grounds (C) where daily productive activities occur.

Device are constructions of different sorts that allow the workers to undertake the necessary tasks for the maintenance of trees. These are the service center (S) that behaves as the park staff headquarters; the tool shed (T) and ladders shed (L) that house various instruments necessary for dealing with trees; vehicle shed (V) where different means of transport such as carts, cars, trucks and cranes are parked; greenhouse (G) where the workers reproduce tree saplings; and the resource yard (Y) where different urban forestry byproducts are sorted and stored before being sent away as waste.

Biodebris are leftovers of tree maintenance that find diverse afterlives inside the park. These are piles of leaves gathered for making compost (P) that fertilize the same park grounds; piles of wood that nurture the emergence of certain living beings (W); and log sections reutilize as park benches (B). Attractor are constructions prepared for citizen enjoyment that could potentially utilize orestry resources in the park. These are the places for open fire (F) where wood from tree pruning could be utilized as fuel; and ateliers (A) for conducting workshops and educational activities where urban forestry resources could be transformed.

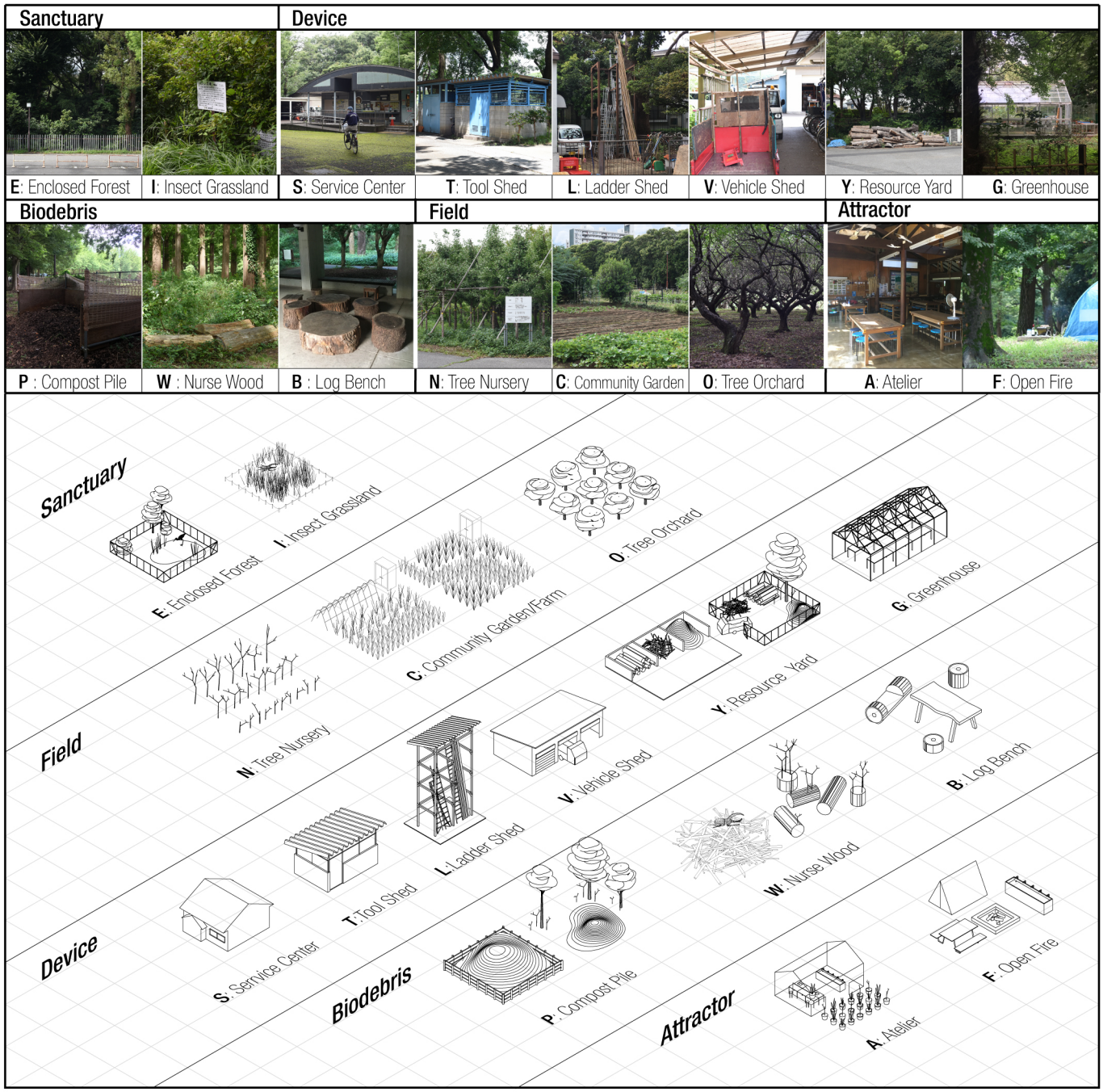


Fig. 3.5
Urban Forestry Elements
(UFE)

Analysis Example

In order to be able to compare all the case studies, the UFE discovered during the site visits are noted for all the parks, complementing this information with temporality and urban forest composition. Compiling all the information in a comprenhensive table as seen in the analysis example (Fig. 3.6.)

No.	Name	Temporality		Urban Forest Composition						Urban Forestry Elements															
		Establishment	Previous Stages	Shape	Area (Ha)	Trees	Tree/Ha	Water	Ground	Device						Biodebris			Field			Attrac.		Sanct.	
	林試の森									S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
36	Rinshinomori	1989	Ag/Rs/Rs+Hs/Rs	Elongated	12.08	6,100	505	Pd,Sp	Nt	○	○	○	○	○	-	○	○	○	○	○	○	○	○	-	○

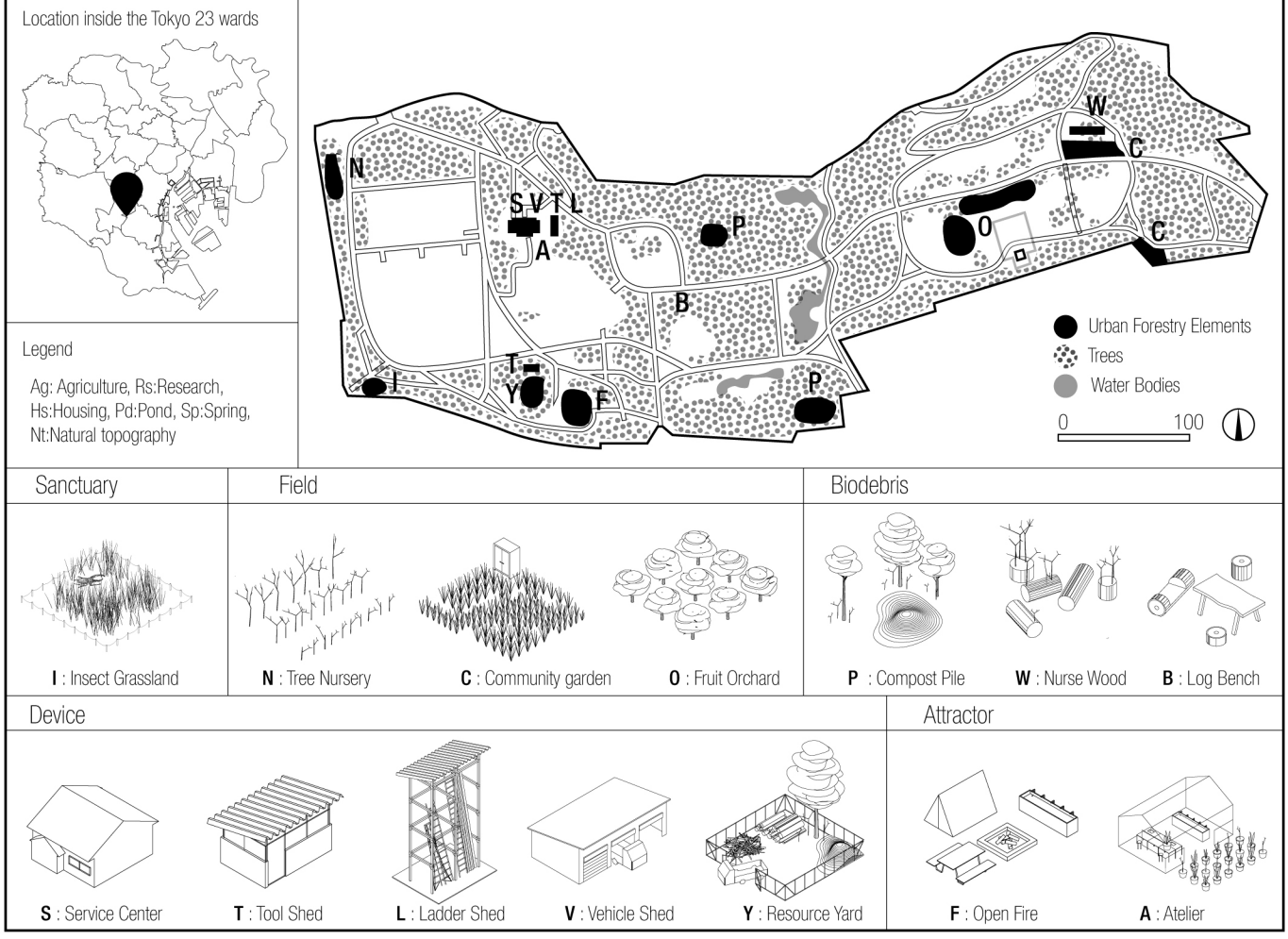


Fig. 3.6
Analysis Example

Temporality, in which the year of establishment is indicated, and the previous stages to becoming a park, these being Agriculture(Ag), Disaster Prevention(-Di), Industry(Id), Housing(Hs), Infrastructure(If), Imperial(Im), Landfill(Lf), Military(Mi), Forest(Fo), Old Settlements(Os), Daimyo Residence(Rd), Religious(Rg), Research(Rs), Sports(Spt), Storage(Str). The date of establishment is relevant to know the historical context of each park as well as the different program changes because, as commented in the introduction, it is an urban typology that was introduced with the Meiji modernization experiencing different stages in time.

Urban Forest Composition, in which the shape, area of the park, number of trees, density of trees per hectare are noted; bodies of water being: Beach(Bc), Fountain(Ft), JabuJabu(Jb), Moat(Mt), Ocean(Oc), Pond(Pd), Large Pond(P-dL), River(Rv), Spring(sp), Stream(St) Sewage(Sw) Tidal Flat(Tf); and type of ground: Artificial topography(Af), Natural topography(Nt), Landfill(Lf), Flatland(Fl). As for the shape, there are three types, compact (Co) when they do not have a predominant direction, elongated (El) when they have a predominant direction and fragmented (Fr) when it is divided by significant boundaries.

Once the previous data is collected for all the cases, a drawing is made of each park mapping its perimeter, the forested areas, the paths and the water bodies, as well as the location of the urban forestry elements discovered during the visits. In the case of Rinshinomori, no. 36, (Fig. 4) the table shows that it was established as a park in 1989 after having gone through the stages of agriculture (Ag), center for forestry research (Rs), housing after WWII (Hs) and again research institution (Rs). It is characterized as an elongated park with 12 ha, more than 6100 trees and a canopy density of 505 tree/ha, which means one tree every 4.5 m. It has water bodies of jabu-jabu pond (Jb) –Japanese water playground–, water spring (Sp) connected to a pond (Pd) and a rich natural topography.

There are many urban forestry elements throughout the park, with a distinguishable core of Device elements composed by service center (S), tool shed (T), ladder shed (L) and vehicle shed (V), that has an Atelier (A) attached to it. An additional aggrupation is formed by another tool shed (T), resource yard (Y) and Open Fire (F). Spread throughout the surface and attached to the main paths is possible to find other elements such as nursery (N), insect grassland (I), tree orchard (O), community gardens (C) and nurse wood (W), while piles of compost (P) are located inside the forested areas.

Fig. 3.7 Comprenhensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements																
		Est	Previous Stages	Sha	Area	Trees	Tree	Water	Gro	Devices						Biodeb			Field			Attr		San		
				pe	(Ha)		/Ha		und	S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
4	Hibiya Park	1903	Rd/Mi	Co	16,16	3.100	192	Pd	Fl	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-
6	Kyu-Shiba-rikyu Gardens	1924	Rd/Im	Co	4,31	1.900	441	PdL	Af	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-
10	Kiyosumi Gardens	1932	Rd	Fr	8,10	4.100	506	PdL	Af	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-
19	Kyu-Furukawa Gardens	1956	Rd	Co	3,07	2.600	847	Pd	Af	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-
8	Daiba Park	1928	Mi	Co	2,99	590	197	Oc	Lf	-	○	-	○	-	-	-	-	-	-	-	-	-	-	○	-
12	Rikugien Gardens	1938	Rd	Co	8,78	5.600	638	PdL	Af	○	○	○	○	○	-	-	-	-	-	-	-	-	-	○	-
30	Odaiba Marine Park	1975	Mi/Str/Lf	Fr	13,40	1.900	142	Bc,Oc	Lf	○	○	-	○	-	-	-	-	-	-	-	-	-	-	○	○
1	Ueno Park	1873	Rg	El	53,85	8.800	163	PdL	Nt	○	○	○	○	○	-	-	-	-	○	-	-	-	-	-	-
2	Shiba Park	1873	Rg	Fr	12,25	4.200	343	St	Nt	○	○	-	○	○	-	-	-	-	-	-	○	-	-	-	-
11	Koishikawa Korakuen	1938	Rd	Co	7,08	3.000	424	PdL	Af	○	○	○	○	○	-	-	-	-	-	○	○	-	-	-	-
13	Mukojima-Hyakkaen	1939	Rd	Co	1,08	870	806	Pd	Fl	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-
35	Nakagawa Park	1986	Ag/Id/If	Fr	12,06	2.400	199	Rv,Sw	Af	○	○	-	○	○		-	-	-	-	-	○	-	-	-	-
36	Higashi-Shirahige Park	1986	Ag/Id,Hs	El	10,31	2.700	262	Rv	Fl	○	○	○	○	○	-	-	-	-	-	○	-	-	-	-	-
40	Ojima Komatsugawa	1997	Rd/Id/If	Fr	24,93	4.700	189	Rv	Af	○	○	-	○	○	-	-	-	-	○	○	-	-	-	-	-
9	Sarue Park	1932	Str/Im	Fr	14,50	5.500	379	St,Rv	Fl	○	○	○	○	○	-	○	○	○	○	-	○	-	-	-	-
18	Toyama Park	1954	Rd/Mi,Hs	Fr	18,64	5.200	279	Jb,St	Af	○	○	○	○	○	-	-	○	○	-	○	-	-	-	-	-
24	Higashi-Ayase Park	1966	Ag	El	15,89	6.900	434	Sp,St	Fl	○	○	-	○	○	-	○	-	-	-	○	-	-	-	-	-
25	Shinozaki Park	1967	Ag,Str	Fr	30,26	6.500	215	Rv	Fl	○	○	-	○	○	-	○	-	-	-	○	-	○	-	-	-
27	Yoyogi Park	1967	Mi/Hs,Spt	Co	54,05	10.400	192	Pd	Fl	○	○	○	○	○	-	○	○	-	-	-	○	-	-	-	-
33	Kameido-Chuo Park	1980	Id	Fr	10,32	3.000	291	Rv	Fl	○	○	○	○	○	-	○	-	-	○	-	○	-		-	-
38	Jonanjima Seaside Park	1991	Lf	El	14,11	1.000	50	Bc,Oc	Lf	○	○	-	○	○	-	-	○	-	-	-	-	○	-	-	-
39	Kiba Park	1992	Str/If	Fr	23,87	17.000	712	Jb,Rv	Lf	○	○	-	○	○	-	○	-	-	○	○	-	○	-	-	-
3	Koishikawa Botanical	1877	Rd/Rs	El	16,15	9.000	557	Sp, St	Nt	○	○	-	○	○	○	○	○	-	○	○	○	-	○	○	○	-
5	Meiji Jingu	1920	Rd/Im/Rg	Co	70,00	36.000	514	Pd,Sp,St	Af		○		○	-	-	○	○	-	○	○	-	-	-	○	
7	Meiji Jingu Gaien	1926	Rd/Mi	El	48,00	5.000	104	Ft	Fl	○	○	○	○	○	○	○	○	-	○	-	-	-	-	○	-
14	Hama-rikyu Gardens	1946	Rd/Im	Co	25,02	6.100	244	Oc,PdL	Lf	○	○	○	○	○	-	○	-	-	-	-	○	-	-	○	○
15	Shinjuku Gyoen Imperial	1949	Rd/Rs/Im	Co	58,30	20.000	343	PdL	Fl	○	○	○	○	○	○	○	○	○	○	-	-	-	○	○	○
16	Kitanaomaru+Kokyo	1949	Im/Rd	Fr	64,50	18.400	285	Mt,PdL	Af	○	○	-	○	○	-	-	○	-	○	-	-	-	-	○	-
17	Institute for Nature Study	1949	Os/Rd/Mi/Di/Im/Rs	Co	20,00	15.380	769	Pd	Af	○	○	-	○	○	○	○	○	○	-	-	-	-	○	○	○
20	Kinuta Park	1957	Di/Spt	Co	39,17	11.000	281	Pd,St	Nt	○	○	○	○	○	-	○	○	-	-	○	-	-	-	○	○
21	Zenpukujigawa+Wadabo	1964	Os/If	El	43,92	10.700	244	PdL,Rv	Fl	○	○	-	○	○	-	○	○	-	○	-	-	○	-	○	○
22	Komazawa Olympic Park	1964	Spt/Ag,Di/Spt	Co	41,35	7.300	177	Jb	Fl	○	○	○	○	-	-	○	-	-	-	○	-	-	-	○	○
23	Mizumoto Park	1965	If/Ag	El	96,30	18.900	196	PdL,Rv,St	Fl	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
26	Ukima Park	1967	If	El	11,73	3.400	290	Jb,PdL	Fl	○	○	○	○	○	-	○	-	-	○	○	-	-	-	○	○
29	Akatsuka Park	1974	Fo/Os/Ag	El	25,54	7.650	300	Ft	Nt	○	○	-	○	○	-	○	○	○	○	○	○	○	-	○	○
31	Tokyo Port Wild Bird	1978	Fo/Lf/Nt	El	36,00	11.050	307	Oc,PdL,Tf	Lf	○	○	○	○	○	-	○	○	○	○	-	○	-	○	○	○
32	Oi Central Seaside Park	1978	Lf	Fr	41,30	13.600	329	Oc,Bc	Lf	○	○	-	○	○	-	-	○	○	-	-	-	○	○	○	○
34	Hikarigaoka Park	1981	Ag/Mi/Mi,Hs	Co	60,78	16.300	268	Pd	Fl	○	○	-	○	○	-	○	-	-	○	-	-	○		○	○
37	Rinshi no mori	1989	Ag/Rs/Rs,Hs/Rs	El	12,08	6.100	505	Jb,Pd,Sp	Nt	○	○	○	○	○	-	○	○	○	-	○	-	○	○	-	○

Prev.Stages:Agriculture(Ag),DisasterPrevention(Di),Industry(Id),Housing(Hs),Infrastructure(If),Imperial(Im),Landfill(Lf),Military(Mi), Forest(Fo),Old Settlements(Os),Daimyo Residence(Rd),Religious(Rg),Research(Rs),Sports(Spt),Storage(Str)

Water:Beach(Bc),Fountain(Ft),JabuJabu(Jb),Moat(Mt),Ocean(Oc),Pond(Pd),LargePond(PdL),River(Rv),Spring(sp),Stream(St)Sewage(Sw)

Ground:Artificial topography(Af),Natural topography(Nt),Landfill(Lf),Flatland(Fl). Shape:Compact(Co),Elongated(El),Fragmented(Fr)

All the information from the 39 cases is compiled into a comprehensive table. (Table. 1). The first analysis is conducted considering the totality of the parks, to understand what are the general characteristics as a whole. Regarding temporality, from the 1920s to the 1990s there was a gradual and constant creation of parks, with the 1960s being the decade when most of them were opened. It has been proven that their activities have changed several times in their location, demonstrating their adaptability, adjusting to social perception over time. Two thirds of the parks have more than one previous stage, and it is very common to have changed their use between 2 and 3 times, but it can be as many as 6 times. The most repeated use is that of residence, samurai and imperial grounds, followed by industrial and storage facilities.

Regarding composition, the most common area is between 10 and 20 ha, with a great diversity of sizes distributed homogenously between the minimum range of 1 ha and the maximum of 96 ha. As for the shape, there is a similar number of cases for each type (compact, fragmented and elongated). These factors indicate a great diversity in the morphological character of Tokyo Metropolitan Parks. Considering the number of trees, the inclination is to have between 2000 and 10000 trees, the minimum being 1000 and the maximum 36000. Trees/ha is important parameter to know the density of the urban forest, from a minimum of 50 to 800 trees/ha. The tendency being 200 to 300 trees/ha, assuming one tree every 5.5 m. Most of the park incorporate an artificial water body, being the most common the pond. More than half have a relation with a natural body of water like streams, springs or rivers. Regarding the ground most of them have remarkable topography, both naturally existing and artificially created. Half of them have a human intervened ground, either to create the landscape topography or to make the ground by the means of landfill.

3.4 Discussion by Urban Forestry Elements (UFE)

Reading the table considering all the parks reveals the tendencies of each UFE. Device are the most common elements, being present in all the parks. Service center, tool shed, vehicle shed and resource yard appear in the vast majority of cases, constituting the core elements of typical tree maintenance. More than half of them have specialized tall sheds for stairs and long tools. Biodebris appears in 25 cases, more than half, the most common being compost piles which are only missing in 4 cases, followed by nurse wood which constitutes just under half of the cases. Log benches are the least common with only 9 cases. Field are the second most common elements, presenting 30 cases. (Fig.3.8) Most of them are nurseries, followed by community gardens and orchards, often appearing only

one type of field per park. Attractor are the scarcest elements, appearing in 13 cases. Only in three cases more than one attractor is present. They always appear together with Biodebris and often when there is Field. The least common of all the elements is the Atelier with only 7 cases. Sanctuary appears in 20 cases, with the enclosed forest being the predominant case - there is only one without it - and usually accompanied by insect grassland.

Fig. 3.8
Field element
in Tokyo Wild
Bird Park

Also, when considering the combination of all UFE, distinct inclinations can be observed. It is noteworthy that once an element of Biodebris is found, it usually appears with other types, having a variety of combinations. It is also remarkable that while Biodebris and attractor appear whenever there are Fields, Fields can appear independently. Likewise, although the Sanctuary may appear alone, in the vast majority of cases they do so in combination with the other three types of elements. The Atelier only acts together with the Sanctuary, showing a relationship in parks that have an especially natural character. (Fig. 3.9)

Fig. 3.9
Atelier element
in Tokyo Wild
Bird Park

When looking at Temporality and Urban Forest Composition, different park characteristics are revealed together with the UFE. Attending to the year of establishment, all the parks established in the 1960s and 1970s have the elements Biodebris and Field, with open fire only appearing from the 1960s onwards. Regarding previous stages, it is found that Atelier only appears when there is an institution that is carrying or has carried out research. All the Sanctuary elements rarely appear in fragmented shape parks. (Fig. 3.10) This may indicate that the enclosed forest where different species thrive, although not accessible, is usually adjacent to the rest of the park.

Fig. 3.10
Sanctuary element in Mizumoto Park

When Field element exist, parks tend to be larger than 10 ha. Similarly, regarding Biodebris, two thirds of the parks that present it are bigger than 20 ha. (Fig. 3.11) The number of trees is also a determining factor for Biodebris, exceeding 5,000 trees, with half of the parks presenting above 10,000 trees, being the tendency in terms of density 200 trees/ha. Finally, running bodies of water and natural topography tend to appear with Field element.

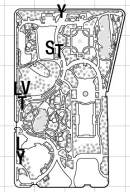
Fig. 3.11
Biodebris element in Meiji Jingu

3.5 Discussion by Urban Forestry Assemblages (UFA)

The UFE presented in the previous section enable different degrees of resource accessibility. Firstly, those corresponding to Device, are only used by workers, being very difficult to access by citizens, as they require the necessary knowledge to operate with tools and perform the most professional tasks. Then, those corresponding to Biodebris imply an active use of resources that already exist in the parks, and although are generated by the workers, they present latent commons for diverse members to participate. Field and Attractor are the ones that most easily connect citizens and resources, such as those that are operated by workers but are open access (Nursery, Orchard) and those that are prepared for citizens but do not yet use the resources produced in the park (Community Garden, Open Fire, Atelier). Finally, Sanctuary is exclusively for non-human use, since in this element specifically restricts human access. By analyzing the collection of UFE in each park, namely the Urban Forestry Assemblage, regarding this accessibility aspect different characters can be commented on distinguishing five types of assemblages (Fig. 3.12)

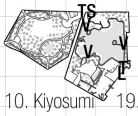
0 100 500

I. Professional Care



04. Hibiya

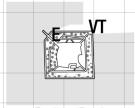
06. Kyu Shiba-rikyu



10. Kiyosumi

19. Kyu Furukawa

II. Self-maintained patch



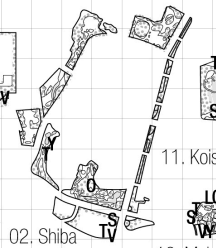
08. Daiba Park

12. Rikugien

29. Odaiba Marine

III. Disconnected Cooperation

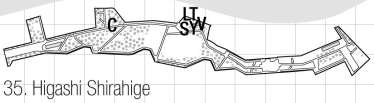
34. Nakagawa



02. Shiba

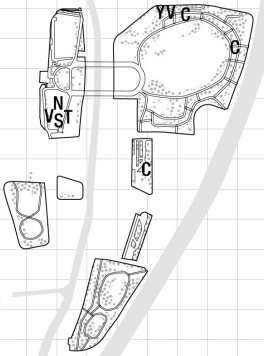
11. Koishikawa Korakuen

13. Mukojima-Hyakkaen



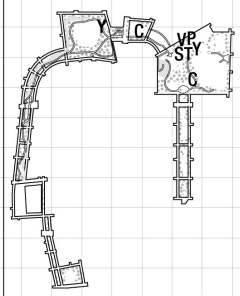
35. Higashi Shirahige

01. Ueno

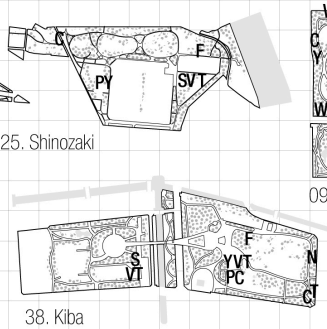


39. Ojima Komatsugawa

IV. Resourceful Interaction

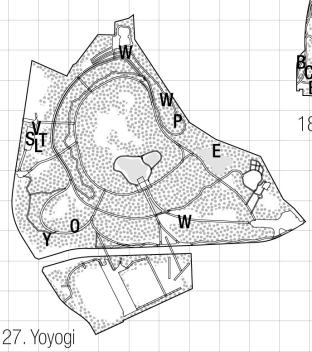


24. Higashi Ayase

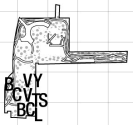


38. Kiba

09. Sarue Park

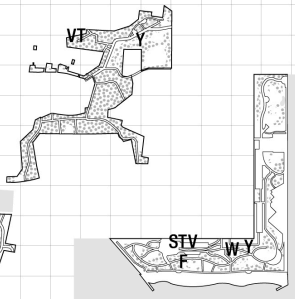


27. Yoyogi



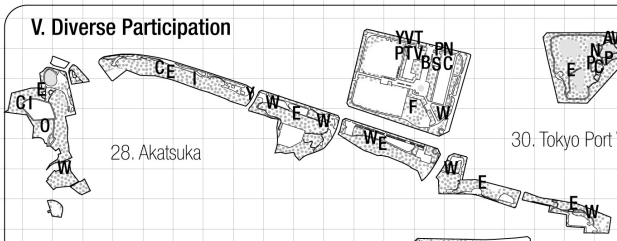
18. Toyama Park

32. Kameido Chuo

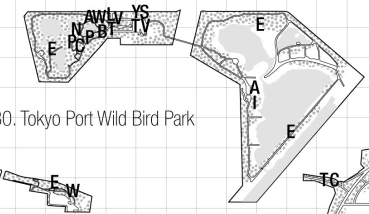


37. Jonanjima

V. Diverse Participation

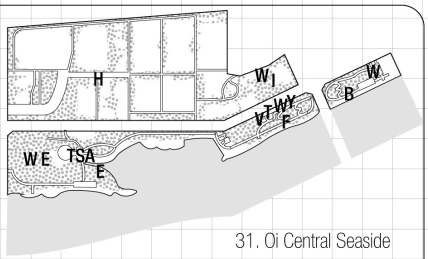


28. Akatsuka

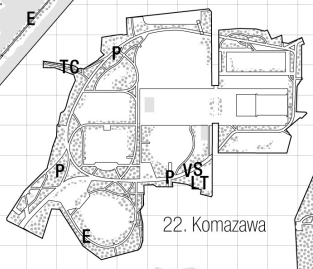


30. Tokyo Port Wild Bird Park

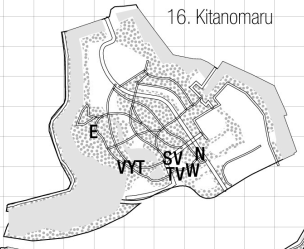
26. Ukima



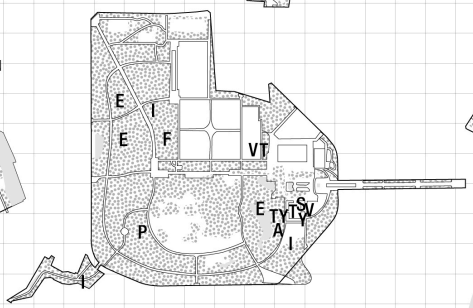
31. Oi Central Seaside



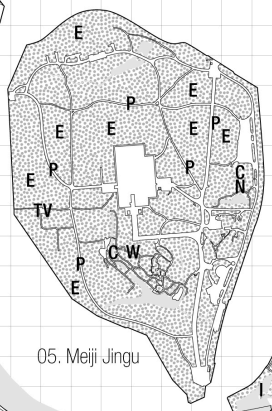
22. Komazawa



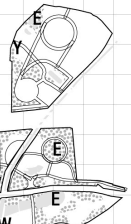
16. Kitanomaru

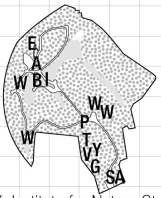


33. Hikarigaoka



05. Meiji Jingu

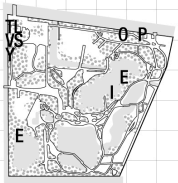




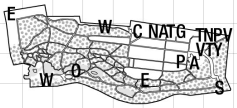
17. Institute for Nature Study

07. Meiji Jingu Gaien

23. Mizumoto

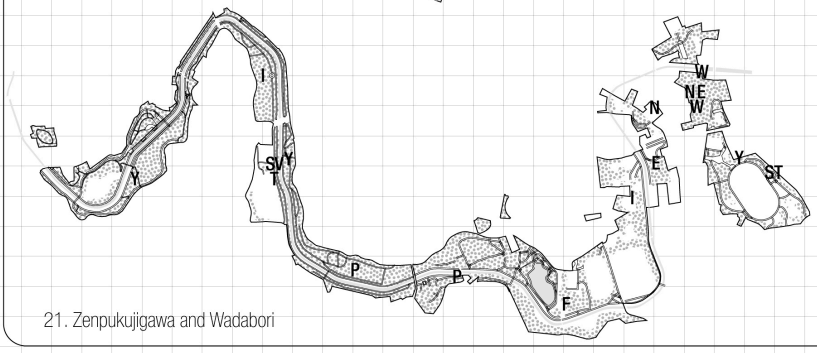


14. Hama Rikyu Garden

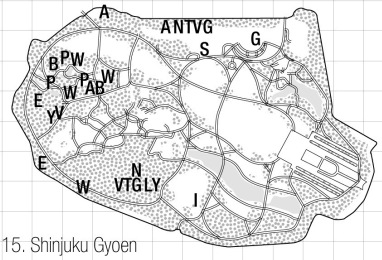


03. Koishikawa Botanical Garden

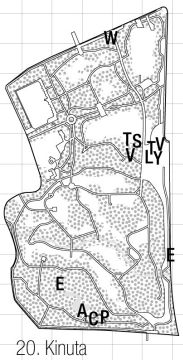
36. Rinshinomori



21. Zenpukujigawa and Wadabori



15. Shinjuku Gyoen



20. Kinuta

Professional Care

Professional Care are those assemblages where workers center exclusively in tree and gardening care, e.g. Hibiya Park.(Fig 3.13.) It is the most standard group, presenting a collection of elements only of the Device type. Although it is essential for the health of urban trees, it does not present specific elements that deal with resources, thus reducing the possibility of collaboration between diverse members. All of them were created before 1950, and in the previous stages were residences of wealthy elites. Their shape is mainly compact and their size is small in relation to the rest of the parks, having less than 10 hectares, artificial topography, no more than 5000 trees and presenting different canopy density.

Fig. 3.13
Hibiya Park, Enclosed concentration of UFE (L,V,T) only accessible to workers

Self-maintained Patch

Self-maintained Patch are those assemblages where urban forestry is carried out by workers, but also present parts where the forest regenerates without human intervention, e.g. Odaiba Marine Park. (Fig. 3.14) This group is similar to the previous one, but although the resources are discarded as waste in most of the park, the presence of the Sanctuary element indicates that resources are used by non-humans in the areas of restricted access. For example, if a tree falls, it naturally decomposes to provide nutrients for the creatures that inhabit the urban forest. Its characteristics are also compact, less than 10 hectares and no more than 5000 trees.

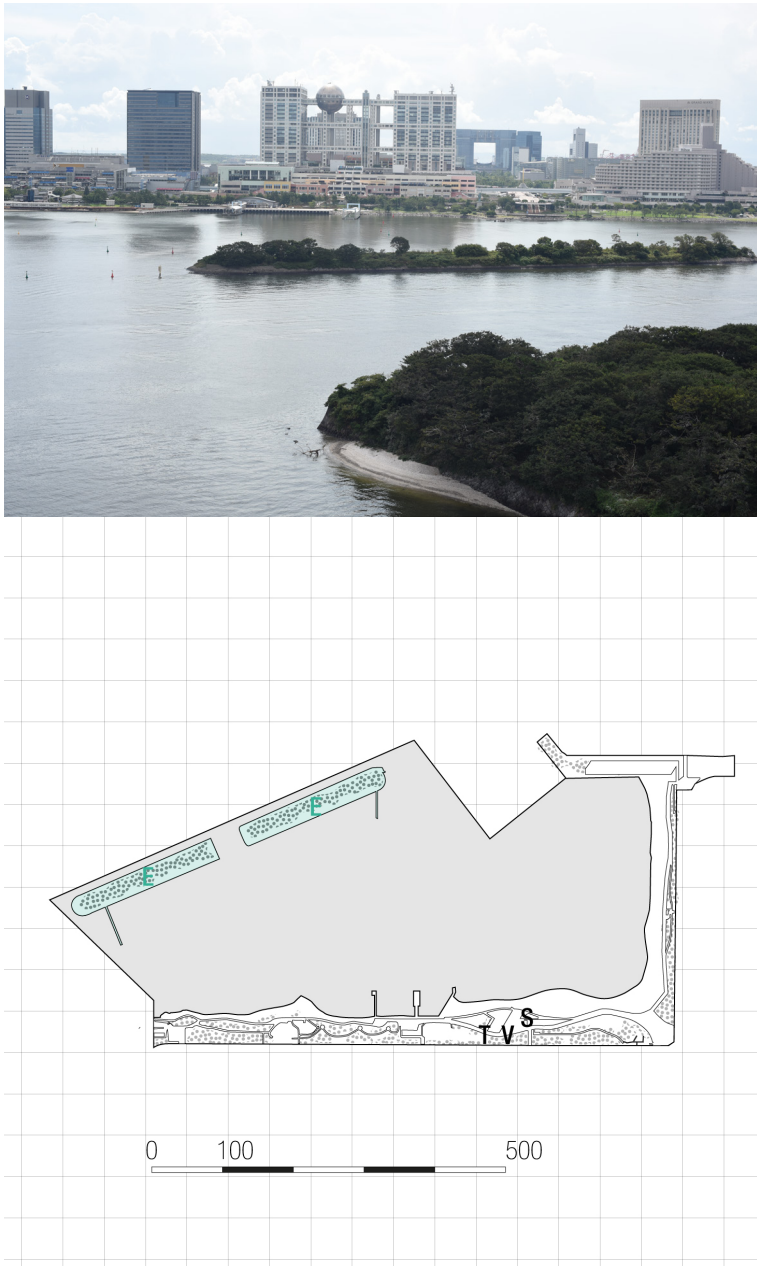


Fig. 3.14
Odaiba Marine Park with Sanctuary elements (E)

Disconnected Cooperation

Disconnected Cooperation are those assemblages that, even though contain devices that could trigger citizen participation through resource utilization, the forestry resources are disregarded as waste, e.g. Nakagawa Park. (Fig. 3.15)
Like the previous one, in this group only the combination of another element appears together with Device. In this case Field elements do not currently use resulting resources from urban forestry - they are lost as residues – but it could potentially be used, as for example organic matter as fertilizer. According to the establishment date, three subgroups can be observed: those opened in Meiji, which were previously religious grounds; those before the war, which were residences; and those after the 1980s, which were industrial sites prior to becoming a park. There is a diversity of shapes and sizes, most commonly they tend to be small with less than 12 ha, but there are two very large parks of 25 and 50 ha. They don not have many trees, less than 5000, but they present in almost all the cases running water bodies having different topographical features.

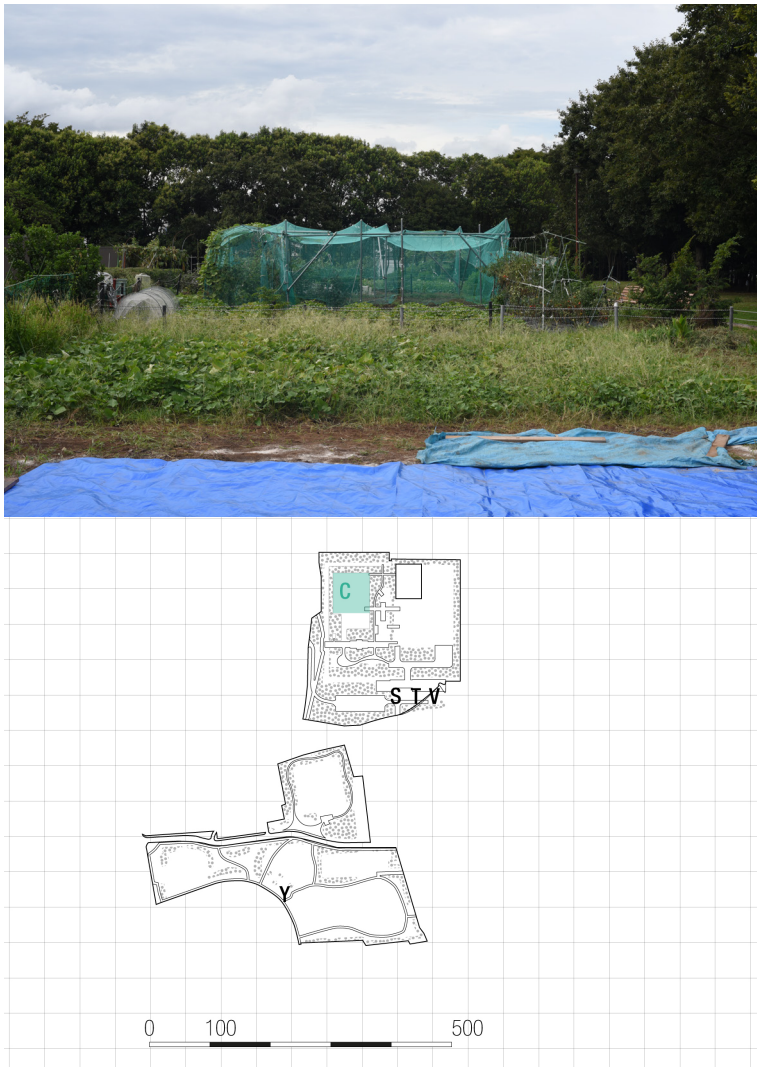


Fig. 3.15
Nakagawa Park
Community
garden (C)
that could
potentially use
resources from
tree maintein-
ance

Resourceful Interaction

Resourceful Interaction are those assemblages with prolific urban forestry practices where resources are being transformed and could be further utilized through citizen participation, e.g. Yoyogi Park. (Fig. 3.16) In this group appears for the first time the element Biodebris, implying the active use of resources in the park and presenting the latency of diversifying the members involved in the maintenance of trees together with the Field and Attractor. This assemblage presents a critical threshold, tending to be over 10 ha, have more than 50,000 trees, and a density of more than 200 trees/ha. Their establishment date is mainly post-war. Other characteristics are a tendency to be fragmented, to have running water and a flat ground.

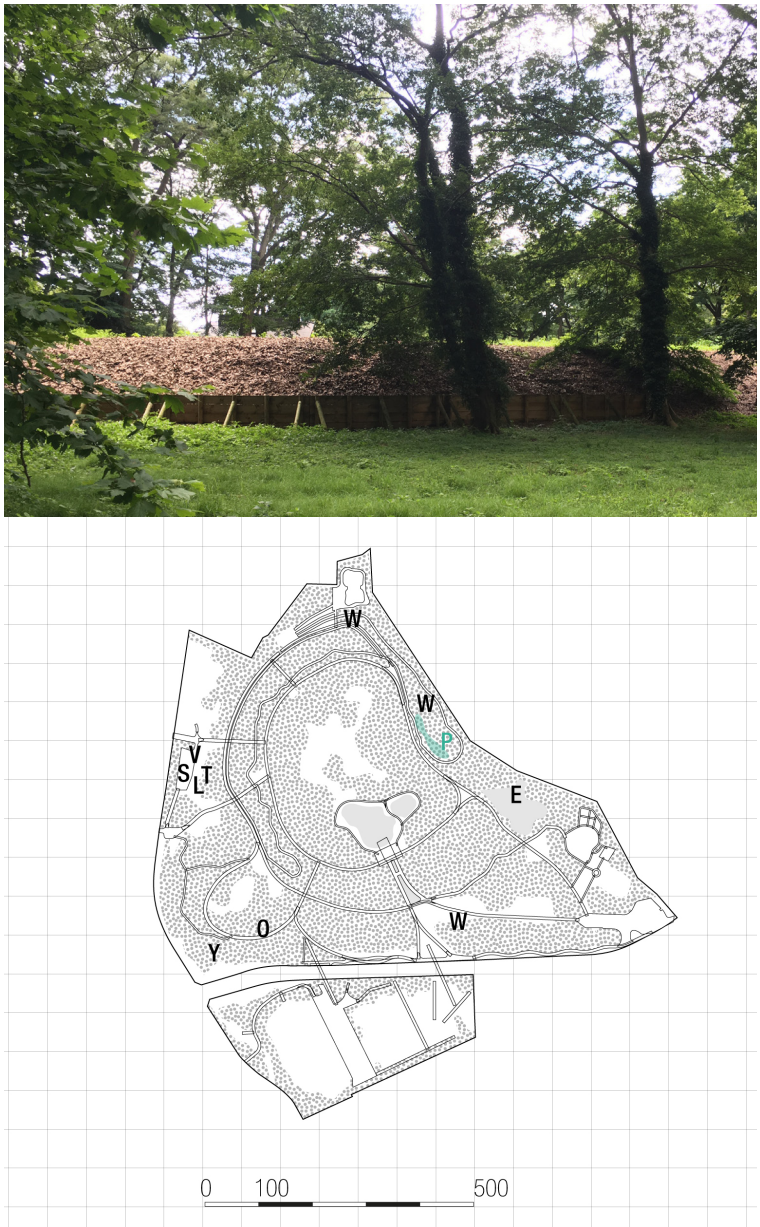
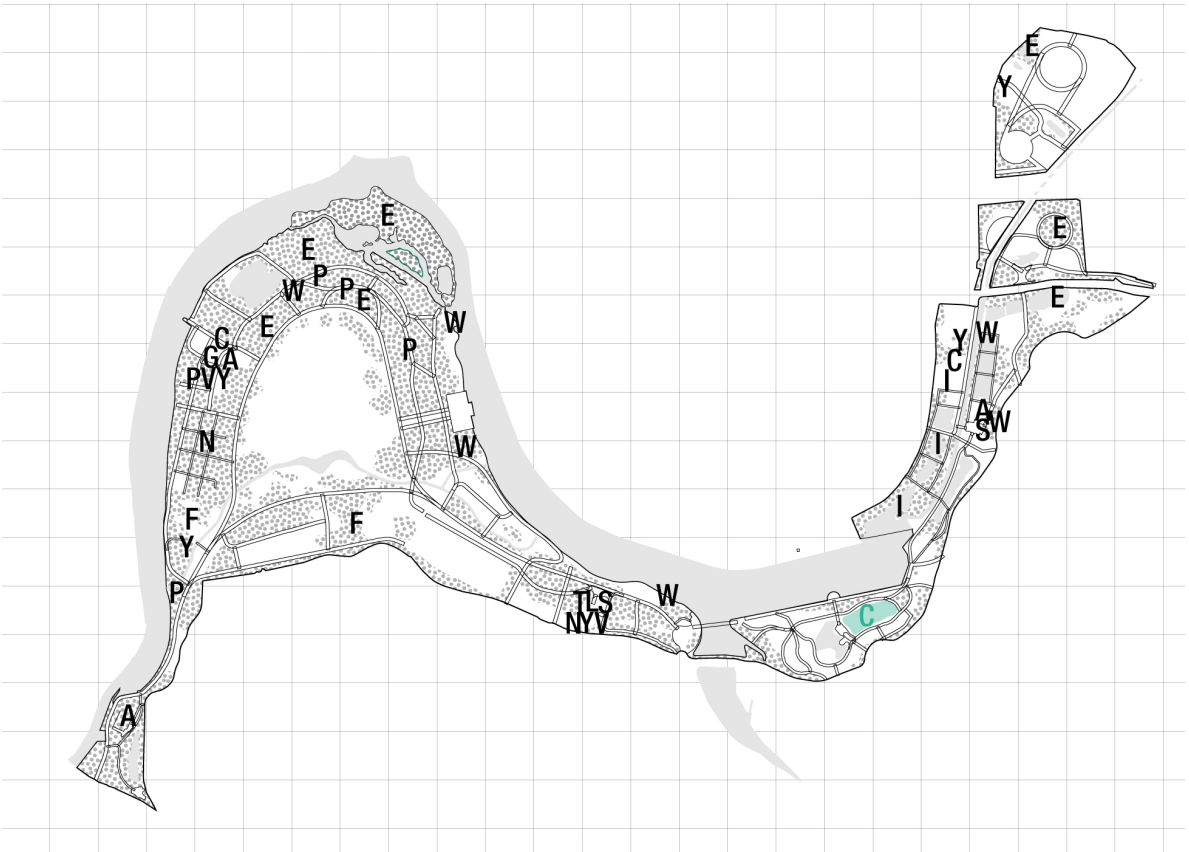


Fig. 3.15
Yoyogi Park ,
active resources
in the park, as
compost pile
(P)

Diverse Participation

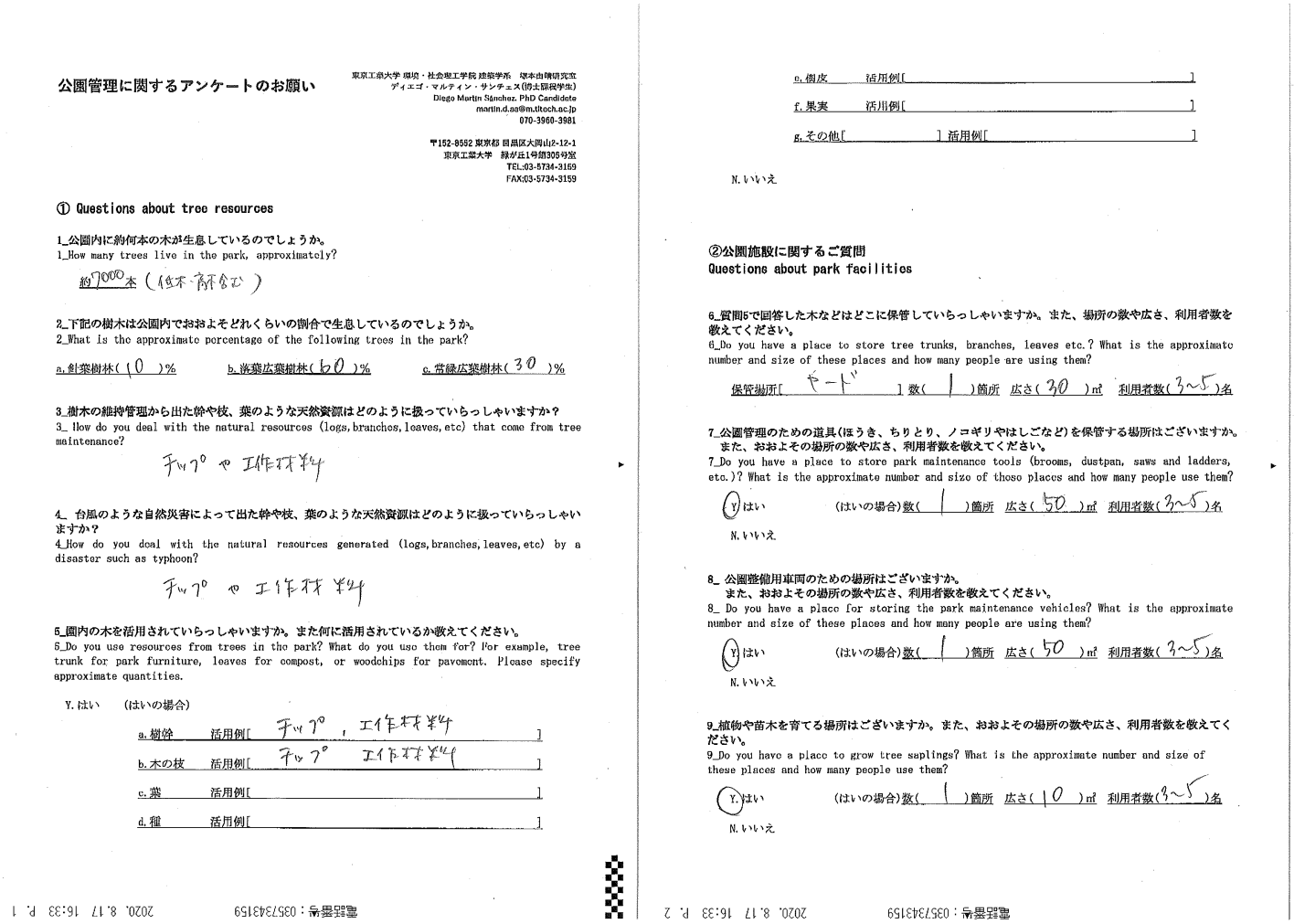
Diverse Participation are those assemblages that foster care interdependences between workers, trees, citizens and resources through all the combination of every UFE type, presenting the greatest potential of urban forestry for more-than-human commons, e.g. Mizumoto Park. (Fig. 3.17)This group contains all types of elements, and therefore the maximum accessibility. It is characterized by a great concentration of parks created in the post-war period. Those that are prior to the 1940s were residences that have varied their use through several stages. It is the group where the research phase prior to being establish as a park is more common, being the only group where the Attractor Atelier appears. As for shape, there are elongated and compact, being few fragmented. They are all very large, tending to have more than 30 ha and more than 10,000 trees. The most common density is between 200 and 300 trees/ha. However, in this case the water and the ground are not determining, since they present a diversity of types.

Fig. 3.17
Mizumoto Park, citizens taking care of different fiels, community garden (C)



3.6
Park Staff Questionnaire

A questionnaire was sent to all the 39 case studies to learn exactly how and to what extent each of these parks was dealing with their resources. The staff who answered the survey are municipal employees responsible for managing the day-to-day operations of the park, working in the permanent offices within its premises. Twenty-four parks responded, and the remaining ones either did not reply or refuse to respond, indicating that urban forestry activity is not evident to visitors or is even hidden. The questions sent consisted of three themes: 1) how the park behave regarding the management of urban forestry resources, 2) who performs the urban forestry work, and 3) what kind of activities are open to outsiders. (Fig 3.18)



公園管理に関するアンケートのお願い

東京工業大学 環境・社会理工学院 建築学系　塚本由晴研究室
ディエゴ・マルティン・サンチェス(博士課程学生)
Diego Martin Sánchez, PhD Candidate
martin.d.aa@m.titech.ac.jp
070-3960-3981

〒152-8552 東京都 目黒区大岡山2-12-1
東京工業大学　緑が丘1号館305号室
TEL:03-5734-3159
FAX:03-5734-3159

① Questions about tree resources

1_公園内に約何本の木が生息しているのでしょうか。
1_How many trees live in the park, approximately?
約7000本（低木・芝除く）

2_下記の樹木は公園内でおおよそどれくらいの割合で生息しているのでしょうか。
2_What is the approximate percentage of the following trees in the park?
a.針葉樹林（10）%　b.落葉広葉樹林（60）%　c.常緑広葉樹林（30）%

3_樹木の維持管理から出た幹や枝、葉のような天然資源はどのように扱っていらっしゃいますか？
3_ How do you deal with the natural resources (logs, branches, leaves, etc) that come from tree maintenance?
チップや工作材料

4_ 台風のような自然災害によって出た幹や枝、葉のような天然資源はどのように扱っていらっしゃいますか？
4_How do you deal with the natural resources generated (logs, branches, leaves, etc) by a disaster such as typhoon?
チップや工作材料

5_園内の木を活用されていらっしゃいますか。また何に活用されているか教えてください。
5_Do you use resources from trees in the park? What do you use them for? For example, tree trunk for park furniture, leaves for compost, or woodchips for pavement. Please specify approximate quantities.

Y. はい　(はいの場合)
a. 樹幹　活用例[チップ、工作材料]
b. 木の枝　活用例[チップ　工作材料]
c. 葉　活用例[　　]
d. 種　活用例[　　]

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e. 樹皮　活用例[　　]
f. 果実　活用例[　　]
g. その他[　　]活用例[　　]

N. いいえ

②公園施設に関するご質問
Questions about park facilities

6_質問5で回答した木などはどこに保管していらっしゃいますか。また、場所の数や広さ、利用者数を教えてください。
6_Do you have a place to store tree trunks, branches, leaves etc.? What is the approximate number and size of these places and how many people are using them?
保管場所[ヤード]数(1)箇所　広さ(30)㎡　利用者数(3~5)名

7_公園管理のための道具(ほうき、ちりとり、ノコギリやはしごなど)を保管する場所はございますか。
また、おおよその場所の数や広さ、利用者数を教えてください。
7_Do you have a place to store park maintenance tools (brooms, dustpan, saws and ladders, etc.)? What is the approximate number and size of those places and how many people use them?
(Y.)はい　(はいの場合)数(1)箇所　広さ(50)㎡　利用者数(3~5)名
N. いいえ

8_ 公園整備用車両のための場所はございますか。
また、おおよその場所の数や広さ、利用者数を教えてください。
8_ Do you have a place for storing the park maintenance vehicles? What is the approximate number and size of these places and how many people are using them?
(Y.)はい　(はいの場合)数(1)箇所　広さ(50)㎡　利用者数(3~5)名
N. いいえ

9_植物や苗木を育てる場所はございますか。また、おおよその場所の数や広さ、利用者数を教えてください。
9_Do you have a place to grow tree saplings? What is the approximate number and size of these places and how many people use them?
(Y.)はい　(はいの場合)数(1)箇所　広さ(10)㎡　利用者数(3~5)名
N. いいえ

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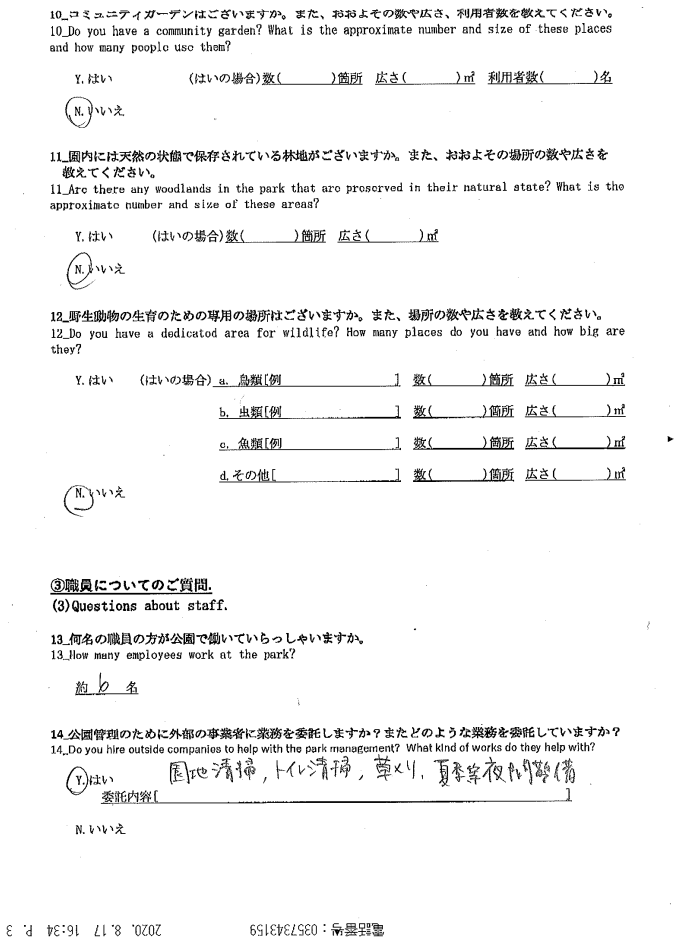
Fig. 3.2a
Questionnaire Sample



10_コミュニティガーデンはございますか。また、おおよその数や広さ、利用者数を教えてください。
10_Do you have a community garden? What is the approximate number and size of these places and how many poople use them?

Y. はい　(はいの場合)数(　　)箇所　広さ(　　)㎡　利用者数(　　)名
(N.) いいえ

11_園内には天然の状態で保存されている林地がございますか。また、おおよその場所の数や広さを教えてください。
11_Are there any woodlands in the park that are proserved in their natural state? What is the approximate number and size of these areas?

Y. はい　(はいの場合)数(　　)箇所　広さ(　　)㎡
(N.) いいえ

12_野生動物の生育のための専用の場所はございますか。また、場所の数や広さを教えてください。
12_Do you have a dedicatod area for wildlife? How many places do you have and how big are they?

Y. はい　(はいの場合) a. 鳥類[例　　] 数(　　)箇所　広さ(　　)㎡
b. 虫類[例　　] 数(　　)箇所　広さ(　　)㎡
c. 魚類[例　　] 数(　　)箇所　広さ(　　)㎡
d. その他[　　] 数(　　)箇所　広さ(　　)㎡
(N.) いいえ

③職員についてのご質問.
(3) Questions about staff.

13_何名の職員の方が公園で働いていらっしゃいますか。
13_How many employees work at the park?

約 6 名

14_公園管理のために外部の事業者に業務を委託しますか？またどのような業務を委託していますか？
14_Do you hire outside companies to help with the park management? What kind of works do they help with?

(Y.) はい　委託内容[園地清掃，トイレ清掃，草刈，夏季宿直警備]
N. いいえ

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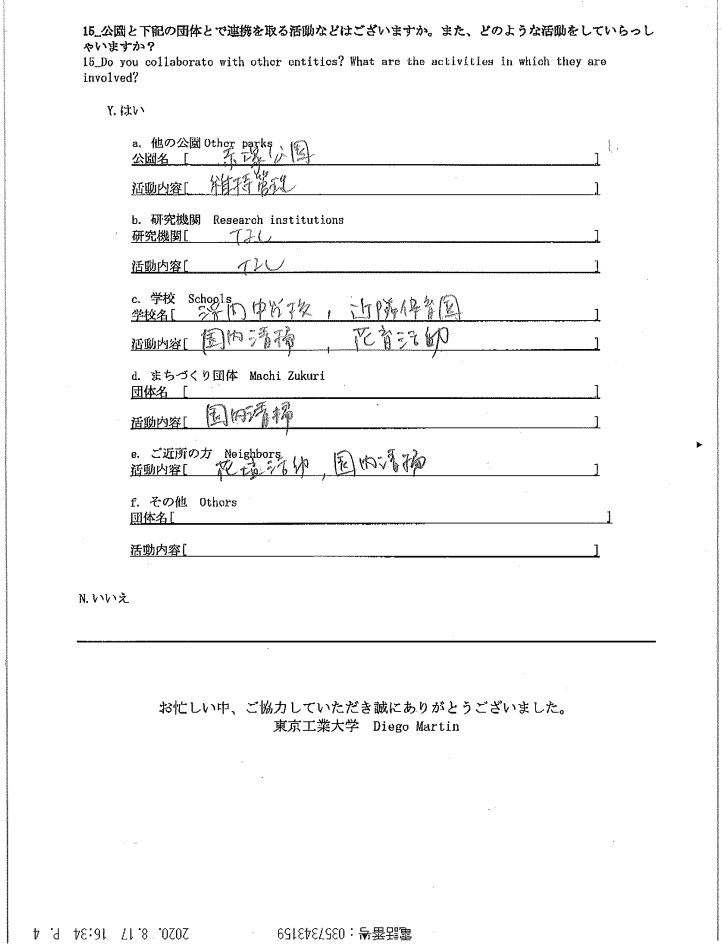

15_公園と下記の団体とで連携を取る活動などはございますか。また、どのような活動をしていらっしゃいますか？
15_Do you collaborate with other entities? What are the activities in which they are involved?

Y. はい

a. 他の公園 Other parks
公園名 [来護公園]
活動内容[維持管理]

b. 研究機関 Research institutions
研究機関[なし]
活動内容[なし]

c. 学校 Schools
学校名[深川中学校，近隣体育園]
活動内容[園内清掃，花苗活動]

d. まちづくり団体 Machi Zukuri
団体名 [ ]
活動内容[園内清掃]

e. ご近所の方 Neighbors
活動内容[花苗活動，園内清掃]

f. その他 Others
団体名[ ]
活動内容[ ]

N. いいえ

お忙しい中、ご協力していただき誠にありがとうございました。
東京工業大学　Diego Martin

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Fig. 3.2b
Questionnaire Sample

In all the case studies, organic matter resulting from tree maintenance work is thrown away as “industrial waste” through the disposal of bio-debris in off-site dumping facilities. But it is also noted that almost all of them use at least one type of resource. The most common is woodchips, with more than half of the parks spreading them on the ground. For the rest of the resources, the number of cases that present utilization is similar. Leaves for making compost and logs for crafting urban furniture appears in 8 of the parks, branches are used mainly for enhancing the habitat of living beings in 7 parks, while fruits and seeds are collected in 6 of the cases.

The number of regular park workers is usually between 5 and 15, except in very large parks that have more personnel. In 16 cases, they externalized urban forestry duties to other companies. The most commonly outsourced works are pruning and cleaning the leftovers, with 13 and 14 cases respectively. Other tasks such as mowing or repairing the equipment needed for tree maintenance are carried out in collaboration with subcontracted employees in 11 and 10 cases. This shows that there is a system already in operation for external agents, professionals belonging to companies, to deal with resources in a public-private partnership model. As for the collaboration of non-professional entities, comprised of individual citizens such as neighborhood associations, schools or NGOs, there is participation in 14 of the cases. These are mainly groups of volunteers who carry out cleaning activities in 5 cases, being the most frequent involvement community gardening in 10 cases, or educational programs to learn about the different plant and animal species that inhabit the park in 11 cases. It is also observed, that the absence of outsourced work results also in a lack of citizen participation.

No.	Name	resources						members							
			use						out workers				citizens		
		industrial waste	woodchip	compost	logs	branches	fruits, seeds	park workers	cleaning	pruning	mowing	repairing	gardening	cleaning	learning
30	Tokyo Port Wild Bird Park	○	○	○	○	○	○	16	○	○	–	○	–	–	○
36	Rinshinomori	○	○	○	○	–	○	8	–	○	–	○	○	○	–
34	Nakagawa	○	○	○	–	○	–	8	○	○	○	–	○	–	○
39	Ojima Komatsugawa Park	○	○	○	–	–	○	15	○	–	–	–	○	–	–
18	Toyama Park	○	○	–	–	○	○	10	○	○	○	○	○	–	–
37	Jonanjima Seaside	○	–	–	○	○	○	10	–	–	–	–	–	–	–
32	Kameido-Chuo	○	–	–	○	○	○	15	–	–	○	○	○	○	○
20	Kinuta	○	○	–	○	–	–	13	–	–	–	–	–	–	–
4	Hibiya	○	○	–	○	–	–	16	○	○	○	○	–	–	–
23	Mizumoto	○	○	–	○	–	–	50	–	–	–	–	–	–	–
26	Ukima	○	○	–	–	○	–	6	○	–	○	–	○	○	○
24	Higashi-Ayase	○	–	○	○	–	–	15	○	○	–	–	○	–	○
3	Koishikawa Botanical	○	–	○	–	–	○	11	–	–	–	–	–	–	○
38	Kiba	○	○	–	–	–	–	12	–	–	–	–	–	–	–
28	Akatsuka	○	○	–	–	–	–	12	○	○	○	○	–	–	–
19	Kyu-Furukawa Gardens	○	○	–	–	–	–	11	○	○	○	○	○	–	○
21	Zenpukujigawa/Wadabori	○	○	–	–	–	–	15	–	–	–	–	–	–	–
16	Kitanaomaru / Kokyo	○	–	○	–	–	–	18	○	○	○	○	–	–	–
17	Institute for Nature Study	○	–	○	–	–	–	10	–	–	–	–	–	–	–
13	Mukojima-Hyakkaen	○	–	–	–	○	–	10	○	○	○	–	○	○	○
6	Kyu-Shiba-rikyu	○	–	–	–	–	–	13	○	○	○	○	–	○	○
7	Meiji Jingu Gaien	○	–	–	–	–	–	10	–	–	–	–	–	–	–
29	Odaiba Marine + Daiba	○	–	–	–	–	–	9	○	○	–	○	–	–	○
9	Sarue	○	–	–	–	–	–	12	○	○	○	–	○	–	○

Table. 3.3
Comprenhensive Table
from the answers of the
Questionnaire

3.7 Conclusion: parks holding latent commons in the city

After conducting field visits in 39 Tokyo Metropolitan Parks, specific places related to urban forestry resources were found, being named in this study as Urban Forestry Elements (UFE) and catalogued as: Device, Biodebris, Field, Attractor and Sanctuary. When comparing the relevant characteristics of all the parks, they showed a wide diversity of sizes, shapes and urban forest compositions. In terms of temporality, these facilities display a capacity to adapt by absorbing new uses or by being reconfigured throughout history. This suggests that the park typology could continue to evolve in the future, adapting to a value-based approach that includes the perspective of commons through a novel understanding of the interaction with non-humans in the city.

By observing the set of cases as a whole, different tendencies were revealed according to the existence and combinations of UFE. Device elements were present in all the case studies, constituting the fundamental component in tree maintenance. Although Sanctuary and Field can appear independently with Device, it is noteworthy that in the vast majority UFE do so in combination with other elements. In this sense, Biodebris has a critical role, since it displays a chain of correlations, always appearing together with Field, as well as Attractor elements that only exist when Biodebris is present. At the same time, Atelier only appears together with Sanctuary, showing a direct link to parks that have protected areas and where research has been in place, either in the present or in previous stages. On the other hand, Field elements tend to emerge in parks larger than 10 ha with flowing water bodies.

As for the collection of UFE in each park, denominated Urban Forestry Assemblage (UFA), they were examined considering the different degrees of resource accessibility allowed by each UFE, revealing five UFA characters, which organized from restrictive to inclusive accessibility are: Professional Care, Self-maintained Patch, Disconnected Cooperation, Resourceful Interaction, and Diverse Participation. By crossing these patterns with other morphological characteristics of the parks, critical thresholds were discovered in the ones that present broader accessibility. In terms of size, the parks with the greatest diversity have more than 10 Ha of surface area, as far as urban forest composition is concerned, more than 5000 trees and a canopy density of more than 200 trees per hectare ensures the appearance of certain UFE which help diversify the participants in urban forestry.

After carrying out a questionnaire with the personnel of the park, it has been verified that leftovers from tree maintenance are always dismissed as industrial waste. But also, that almost all the parks are already utilizing some forestry resources. Moreover, there are existing collaborations to undertake urban forestry work by outsource companies, but this assistance is exclusively professional and without social links. Although currently disconnected from the direct care of the trees, there is citizen participation within the parks, and therefore, there is the potential to connect it through the use of the various resources generated by this activity.

The degree of accessibility within city parklands means that diverse users could participate more actively in their care, helping to strengthen mutual relations with the non-human territory. The organic matter that is now perceived as waste is precisely the one that connects several members, however, this kind of relation remains untapped. All the above tendencies reveal Tokyo Metropolitan Parks as Urban Forestry Assemblages that allow the conjoint action in the use of urban forestry resources, holding the latency of constructing more-than-human commons in the city.

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4
Possibilities of urban forestry practices

4.1 Guidelines for fostering Urban Forestry

4.1.1 Introduction: Learning from Networks and Assemblages

This chapter seeks to discuss the application possibilities within urban forestry through the synthesis and comparison of Chapter 2: "Emergent Urban Forestry networks" and chapter 3: "Tokyo Metropolitan Parks as Urban Forestry Assemblages". To carry out this understanding, Tokyo's current situation is examined through the lessons extracted from innovative urban forestry practices in the global context. Revealing what is already attained and what is still latent, with the intention of elaborating a set of guidelines that can help foster "more-than-human commons" in the city.

Chapter 2 investigates urban forestry networks by looking at the relationships between resources and members. In this framework, the unchangeable aspects of urban forestry are identified as: its geographical location; the sequence of forestry with its stages of sourcing, extraction and transformation; and its urban forest origin: parks, streets, forests, private gardens and even the construction of wooden buildings. The combination of network diversification discovered that: networks in which citizens access directly to forestry sources, diversify the resources extraction; networks with greater accessibility to extracted resources by a wide range of members trigger diverse member partnerships at the stage of transformation; and networks in which transformation of urban timber is found, citizen participation and diverse partnerships originate.

In Chapter 3 the current state of urban forestry in Tokyo's metropolitan parks was investigated. Identifying as relevant but unchangeable characteristics: the temporality of the park in its origin and later phases; and the composition of its urban forest. Then, according to the resource accessibility afforded by the different urban forestry elements UFE, the following assemblages were identified: assemblages where workers center exclusively in tree and gardening care; assemblages where the forest regenerates without human intervention; assemblages that could trigger citizen participation through the utilization of disregarded resources; assemblages where resources are already being transformed but could be further utilized through citizen participation; and assemblages that foster care interdependencies between workers, trees, citizens and resources.

4.1.2 Methodology: combining limitations and characteristics

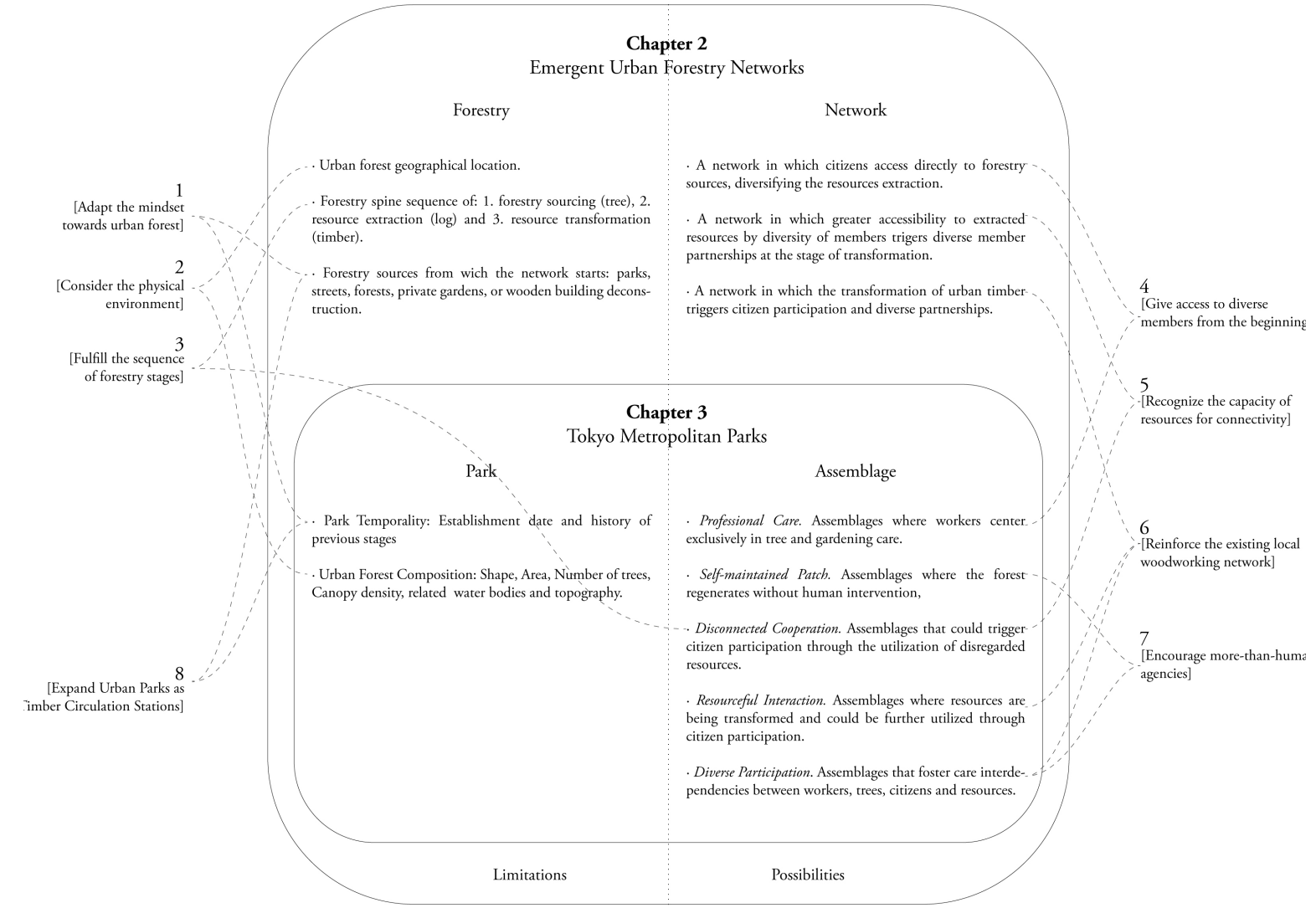
Thus, chapters 2 and 3 showed that there are means of involving more agents through the practice of urban forestry by examining its innovative networks and the current assemblages in Tokyo. The issue of resource accessibility in the context of urban forestry is then developed into a broader discussion on more-than-human commons by extracting guidelines that are based on the cross-examination of Chapters 2 and 3, illustrating these arguments with concrete examples from the study cases reviewed in both chapters.

By combining the limitations in forestry from chapter 2 with the given characteristics of the parks from chapter 3, it is possible to extract guidelines that allow us to operate within the areas than cannot be directly controlled by humans but that need to be taken into consideration:

1. [Adapt the mindset towards urban forest]
2. [Consider the physical environment]
3. [Fulfill the sequence of forestry stages]

Furthermore, by coupling the desirable factors of the networks with different assemblage characters, further guidelines can be drawn in the scope of the design possibilities of an urban forestry network:

4. [Give access to diverse members from the beginning]
5. [Recognize the capacity of urban resources for connectivity]
6. [Reinforce the existing local woodworking network]
7. [Encourage more-than-human agencies]
8. [Expand urban parks as Timber Circulation Centers]



4.1.3
Discussion on the potential applications

1. Adapt the mindset towards urban forest

Trees in cities are seen as aesthetic objects, while in the rural context they are seen as productive entities. A paradigm shift is needed in the perception of urban forests, and it is being represented by the cases analized in Chapter 2. This change of conception is taken even further in networks such as Kobe no Mori no Ki, where salvaged timber coming from deconstruction of wooden buildings is also regarded as part of the urban forest. In Tokyo there is the possibility of orienting urban parks towards urban forestry. It has been shown that the activities they enclose have changed several times in their location, demonstrating their adaptability to social perception over time.

Fig. 4.2
Treecycle America Charlotte transforming fallen urban trees into timber (Left)
Rinshinomori Park. Tokyo Metropolitan Parks as Disaster Preparedness facilities (Right)

2. Consider the physical environment and the cultural background

The study of different international cases reveals that the climate is not a determining factor for the existence of urban forestry practices, finding interesting examples in cities of such different geographical contexts as Baltimore or Abu Dhabi. Naturally, the existence of a favorable environment for tree growth is desirable. In this sense, Tokyo is an ideal case to investigate, but through chapter 3, certain physical parameters of: area, number of trees and canopy density, were discovered as factors that facilitate the appearance of Urban Forestry.

Fig. 4.3
Abu Dabi 2030 Vision. Use of local species: date palm trees (Left)
Meguro Institute for Nature Study Dense Forest Canopy (Right)

3. Fulfill the sequence of forestry stages

Chapter 2 established the unalterable sequence of forestry, with three clear stages of sourcing, extraction and transformation. Even in the simplest networks, such as that of urban Madeira in Brazil, we find this process. The fulfillment of this sequence is a clear guideline applicable to Tokyo parks such as Nakagawa, where there is sourcing and transformation of resources, but since there is no extraction, the commons remain untapped

Fig. 4.4
Connecticut Urban Forestry. From sourcing to extraction and transformation(Left)
Nakagawa Park Untapped use of forestry resources for existing farming activity (Right)

4. Give access to diverse members from the beginning

An important finding regarding accessibility within urban forestry is the ability of various entities to access to forest resources in the first stage of sorucing. Like the citizens collecting and selling fruits from street trees in New Delhi or designers transforming fallen trees in public furniture directly in the park grounds of Sao Paulo. Considering that, even in very professionalized parks with closed accessibility like Meiji Jingu Gaien, there is already a framework of collaboration with private entities in the maintenance of trees in the parks, we could imagine a neighborhood network of access to fruit trees such as plums or gynkos within metropolitan parks, or the use of trunks fallen by seasonal typhoons at the hands of local workshops.

Fig. 4.5
Lutyen's Dehli citizens collecting and selling fruits from street jamun trees (Left)
Koishikawa Korakuen Current unaccessible plum groves (Right)

5. Recognize the capacity of urban resources for connectivity

A common feature of the most complex networks is the diversity of members accessing extracted resources. As in the case of Connecticut where the municipality is collaborating with local mulch producers, warehouses, residents and schools through the use of logs, branches, leaves and seeds. As demonstrated in the questionnaire sent to the Tokyo parks maintenance staff, there are existing collaborations to carry out urban forestry work by subcontracted companies, but this assistance is exclusively professional and without social links. Furthermore, although currently disconnected from direct tree care, there is citizen participation within the parks in the form of community gardening and urban agriculture as in Koishikawa Korakuen, and therefore, there is the possibility of connecting it through the use of the various resources generated by this activity.

Fig. 4.6
Toshiringyou Tokyo
Extracting bark for dying fabric in one of the workshops with citizens (Left)
Sarue Park
farming grounds within the park premises cared by the nearby school (Right)

6. Reinforce the existing local woodworking network

One lesson from chapter 2 is that timber is the resource with the greatest capacity to bring together different partnerships. For example, Charlotte's Treecycle is an initiative run by local sawmills, carpenters, and designers that collect fallen trees from urban forest maintenance, sends them to be transformed into wood for multiple commercial purposes. Tokyo is uniquely situated because of its strong network of logging facilities throughout the city. Just a few minutes from Rinshi no mori park there are several small wood warehouses as well as carpentry workshops and specialty stores.

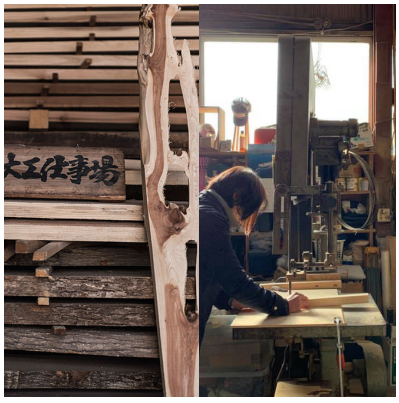


Fig. 4.7
Kobe no Mori no Ki
timber from forest and deconstruction with neighbor workshops (Left)
Rinshinomori Park
Diregarded logs and timber warehouse in the vicinity (Right)

7. Encourage more-than-human agencies

A particular case of more-than-human partnership is Karura Forest Reserve Nairobi, where citizens use the wood from invasive tree species like eucalyptus, while monkeys help spread the seeds of native species working conjointly on the recovery of the primitive forest. It is relevant that in numerous parks in Tokyo such as the Tokyo Port Wild Bird Park, it is possible to find areas where access to humans is restricted, creating sanctuaries where forest resources are metabolized by the natural ecosystem. In the future it is imaginable that these would become grounds for more-than-human collaboration.

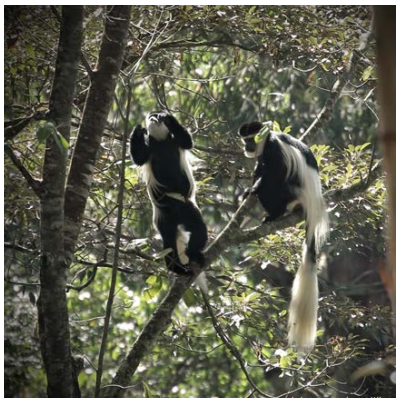


Fig. 4.8
Karura Forest in Nairobi. Colubus monckeys are introduced for propagation of endemic species (Left)
Tokyo Wildbird Park. The appereance of wild birds helped to keep this landfill as forest park (Right)

8. Expand Urban Parks as Stations for Timber Circulation

Learning from international cases where urban forestry programs use wood from trees as well as deconstruction of wooden buildings, we can imagine how urban parks, as unbuildable spaces in the city, can become a gathering place for gathering any kind of wood. Especially in Tokyo, since most buildings are wooden structures, it is possible to expand metropolitan parks as reconstruction centers for collecting recycled wood, and recirculating it for neighbors to utilize.

Fig. 4.9
Baltimore Wood Project. timber salvation from deconstruction (Left)
Kiyosumi Park Shed for storing planks, stakes and log sections(Right)

4.1.4
Conclusion: Urban Forestry Network Based Architecture

One conclusion that can be drawn from this chapter when comparing networks and parks is that for architecture to play a role in urban forestry, it must appear in the middle of the network. A park is an open space, where you can build whatever you choose, but this possibility does not make the urban forestry active. For doing so it is necessary to understand the network.

In the case that there is not enough network established, then the devices discovered in Chapter 3 can help to connect resources and people. However, Chapter 3 reveals that the metropolitan park as public facility is located in a highly professionalized institutional network. It is here that it is possible to learn from the Chapter 2 local networks, and then to apply the guidelines drawn in this chapter to design the network.

The architecture within the network can then play a role in two ways: the first is to reinforce an existing network; and the second is to make it visible, to make it potentially more understandable by having this physical entity as architecture. These roles are explored in the following Chapter 4.2 with the figure of the pavilions.

To illustrate how to apply the subtracted guidelines into architectural design, two pavilions in two consecutive editions of the Shenzhen Architecture Biennale are selected as prototypes. Having been directly involved in both projects, I have the oportunity to know the brief, the proposal, and its final resolution in detail. This in-depth knowledge makes them determining examples in the choice, as it is possible to assess the application of the guidelines and learn from the process.

4.2 Pavilions revealing the possibilities of urban forestry

4.2.1
Introduction: the chance of architectural design in Biennials

Since the 19th century, trees have been lined up along city streets and parks following values of hygiene and aesthetics, under the assumption that the natural realm is at the service of the built environment.1 Tree ecosystems appear as key actors in the complex urban network, but they are usually understood as passive entities rather than active agents when designing a project. Green resources also provide a layer of commons — generally referring to the resources shared by a group of people — because of their ability to enhance social interactions. However, little attention is paid to how these environmental conditions and social functions intersect.2

This report aims to provide a design methodology that addresses the intersection between green resources and the urban environment by enhancing existing livelihoods and commons. It examines two pavilions — in the context of Shenzhen Biennial for Urbanism and Architecture (UABB)— as the means to reveal the possibility of transforming green waste into resources for reconstructing urban commons. Shenzhen is one of the first cities in China to experience the "special economic zone" following a similar pattern to other metropolises dominated by the capitalist system.3 In these circumstances, the public and private realm present an apparent dichotomy, while the commons realm is widely ignored or even prohibited. Simultaneously, it has a vigorous urban forest thanks to its subtropical climate. (Fig. 5.1.)

As Garret Hardin points out in "The tragedy of commons" (1968), this situation is due to the difficulty of quantifying them, and as Elinor Ostrom refutes in "Governing the Commons" (1990) the social empowerment of the community is crucial. The notion of commons has been rediscovered in recent literature, addressing how its understanding must be reinvented. 4

In the last decade, climate emergency has pushed architecture to commit both to sociology and ecology.5 A growing number of publications are rethinking the urban environment together with green resources in a symbiotic manner. Like Mohsen Mostafavi advocating for "Ecological Urbanism" as the basis for a speculative design method that fosters innovative spatial practices.6 Alternatively, the "Capital Agricole" exhibition imagines Paris as a hybrid metropolis where the circular management of natural resources is embedded in its urban fabric.7 Also, Cyntia Santos Malaguti recently investigates the use of urban wood in São Paulo, a city with a similar climate, concluding the need for a systemic design approach towards this untapped resource.8

The advancement presented by the pavilions designed by Atelier Bow-Wow + Tsukamoto Laboratory, during 2017 and 2019, is the figure of the club, a fictional framework in the city where people share skills around natural resources.9 They provide an architectural critique with an environmental and social dimension and are built on an existing network that was never considered to be linked. Both deconstruct normative narratives, awakening the imagination about the possible connections that lie dormant in the city. It is relevant to give an account of these design exercises, as they present urgent issues for debate and recognize barriers in society. Furthermore, by identifying architectural intervention concerning resources, however small, the possibilities of the profession are expanded, fostering creativity, and generating knowledge.

Fig. 5.1.
Shenzhen Urban Forest, dense trees and highrise residential buildings

4.2.2 Background: Shenzhen and UABB

Shenzhen is almost an instant metropolis, with a fast speed growth in the last forty years, reaching a population of twenty million.10 The newly built city, settled between Hong Kong and continental China, has developed since the 1980s. The mass of skyscrapers and abundant vegetation grew in the Pearl River estuary, where fishing villages and rice fields used to exist. 11 Today is widely recognized as the "Asian Silicon Valley" for its relation with investment and technology. Despite its success in attracting capital, it fails in the environmental challenge that a 21st-century city faces, still responding to the modern approach of the previous industrial era. The dramatic urbanization embraced an already exhausted Fordist model, emphasizing car mobility, with a built form similar to Le Corbusier's Radiant City. (Fig. 5.2.)

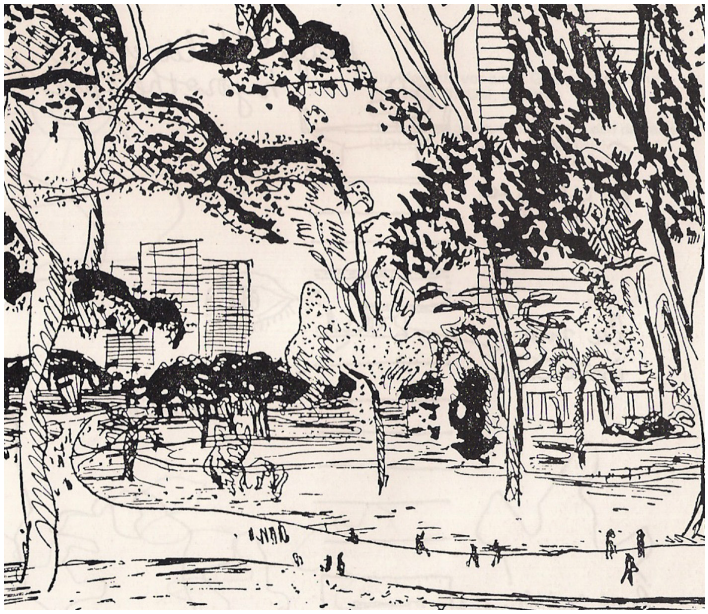


Fig. 5.2.
Le Corbusier sketches for The Radiant City, depicting dense parks and vegetation.
Le Ville Radieuse, 1924

The environmental degradation since the seventies brought dust haze and pollution as characteristics of Shenzhen's air.12 The elevated levels of CO2 and particulate matter lead to regulations in search of controlling the emissions in the atmosphere without tackling the problem from its roots. The ecological understanding of how a city operates requires a radical mind-shift that conceives the urban as a vast ecosystem requiring attention to both humans and non-humans. In that sense, Shenzen's large green surface presents a symbiotic opportunity for citizens and trees. Rethinking the park management and its potentialities gives a chance to imagine different ways to deal with resources inside the city, exploring how the contemporary metropolis should be sustained.

UABB started in 2005 with the aim to reflect on significant projects revolving around urbanism and urbanization encompasing Shenzen's growth. This new metropolitan setting, presented an opportunity to reflect on contemporary conditions. The biennial is curated independently, combining different organizations, and since its foundation has had seven editions. The present report focuses on the last two biennials: "Cities, Grow in Difference, 2017" and "Urban Interactions, 2019", with Hou Hanru and Carlo Ratti as main curators respectively.
The commission of Atelier Bow-Wow + Tsukamoto Lab related to their background of critical practice through interventions in public spaces in other contexts. As for example, “Lake Side Dancers Club”, in the Horst Festival, explores the figure of the interest club as a methodology for de-institutionalizing architecture.13 In this case, the temporal structure enables the practice of common behaviors independently from the institutional framework. Similarly, the pavilions reported here, recognize spatial design as a catalyzer for social empowerment.

However, in UABB, the commons emerge from the political appropriation of untapped urban resources, and they are carefully positioned regarding the specificities of Shenzhen's network. A pavilion in an architectural biennial is an opportunity to think about the relations in the city. The pavilions themselves are a provocation to question the living environment and the way we manage the resources at our disposal, looking beyond the limitations presented by industrial and consumer society.

4.2.3 Methodology: pavilions as materials of the study

The two projects are presented as a methodological strategy in itself, to put the focus on unnoticed processes, underlining the value of green management in its frictions with the urban. Also, the pavilion typology in the context of an international Biennial is relevant for blurring the boundaries between practice, context, and research in architectural practice. Without a precise brief but a thematic call, the commission does not mainly aim to a tangible result. Instead, it is asking a critical question through the means of architecture.

The pavilions present an opportunity to question fixed models usually adopted for their effectiveness and validity towards industrial standards, but which have flaws in their environmental dimension. This report makes a detailed record of each project by highlighting the concept and unveiling the design process, in section 4.1 for Fire Foodies Club, and section 4.2 for Urban Foresters Club. Section 5 compares both projects, and section 6 draws the conclusions. Both projects are explained following the differences between the given, the proposed, and the realized. Table 1 organizes the pavilions according to this agency gradient in the project process. The report attends this table for constructing the narrative, considering that the given physical site is as important as the network in which the project is situated. Firstly, it describes the theme and location proposed by the biennial; secondly, the actors involved, then the proposal and the architectural strategies, and, finally, it comments on the outcomes.

UABB offers a great opportunity to develop a critical thought on contemporary urban processes, and further developing the issue of commons as in the pavilions examined in this report. Both are based on the idea of reconstructing the commons by improving the access to local resources by people. The first step for achieving this is to find the barrier between the people and the resource. The second action is to address this barrier, and here the architectural project can contribute to its dissolution, creating better accessibility. Thirdly, a new program is also proposed as a consequence of improving accessibility to local resources. These three steps are expressed in the form of a pavilion in a specific context.

		Fire Foodies Club	Urban Foresters Club
Given	Edition. Duration	7th edition. Dec'17 - Mar'18 2017	8th edition. Dec'19 - Mar'20 2019
	Theme	Cities, Grow in Difference. Art making city	Urban Interactions. Eyes of the city
	Location	Nantou historic town	Futian station and park.
	Urban Fabric	Urban village. High density of residential bldgs.	Corporate center. Parks, Highways and skyscrapers
	Urban Forest	Site as hinge between park and urban village	Pavilion inside the Park
Proposed	Driving Behavior	Lively activities around food vendors	Park trees maintenance by city management
	Intended Actrors	Local food vendors, biennial attendants, neighbors	Park management staff, biennial attendants, citizens, trees
	Resource	Biomass produced by urban forest management	Biomass produced by urban forest management
	Transformation	Storing, burning	Storing, cutting, chipping, composting, nursing, crafting
	Product	Fire, smoke (C02 + PM)	Timber, firewood, woodchips, fertilizer, saplings (O2)
	Skills	Cooking	Forestry, wood crafting
	Human Commons	Eating and gathering around open fire	Making wood crafts, participating in forestry processes
	Non-human Commons	-	Reproducing, feeding Trees
	Design team	Atelier Bow-Wow, TokyoTech Tsukamoto Lab, Kanebako Eng.	Atelier Bow-Wow, TokyoTech Tsukamoto Lab, NODE
	Contruction team	Urbanus + construction workers	-
	Structure	Chimeneys hanging from steel frame	Open ring inside the park
	Materiality	Steel profiles, steel plates, steel wire, bolted joints	Wood, steel post and beam + wire
	Furniture	Chairs and tables. Flexible arrangement	Made during the exhibiiton.
	Materiality	Wood board, plastic mesh and aluminium sink	Workshopped timber from urban forest
	Other	Water and electricity air	-
Realized	Barrier	Fire cancelled due to pollution in the city	Local authorities cancelled Futian Master Plan
	Resource	Water, electricity, light, cover, shade and rest	-
	Commons	Caring, resting, gathering	-
	Dissemination	Academic Committee Award. Online media	Exhibition of Drawings and model. Exhibition catalog
	Afterlife	Parking space. Materials storage. Drying shoes	-

4.2.4 Fire Foodies Club

Fire Foodies Club (FFC) was commissioned under the theme "Cities, grow in difference: Art making city". The Nantou historic town was the neighborhood selected for the 7th edition of UABB, a unique fabric in Shenzhen with a high density of old residences. The specific site behaves as a hinge between Zhongshan park and the urban village, occupying a residual space between an apartment building and a former factory . (Fig. 5.3) One of the most remarkable urban qualities of the surroundings is the food vendors in the town. Multiple cooking fires and eating behaviors appear along the streets, forming an energetic urban scene.

The project understands this activity as a collective resource and proposes bringing it to the Biennial. To encourage locals and visitors to enjoy food together, three big chimneys were proposed. Under them, people will meet, cook, and eat around an open fire. The pavilion adapts to the height and volume of the adjacent constructions, with the large hoods hanging from pink-colored steel frames. This structure is constructed using standardized steel profiles, 200mm square hollow section for the pillars, and HEB200 for the beams.

Fig. 5.3.
Left: Aerial view of the site of the Biennial, 2017. Zhongshan park and Nantou old urban village.
Bottom: Site plan

The same steel rope section that is utilized for bracing the slim steel members is also employed for hanging the chimneys, which are assembled by bolting folded steel plates together. Similarly, the whole pavilion was designed as a Meccano, considering the construction process as well as opening the possibility of dismantling and relocating the structure in the future (Fig. 5.4).

Modular tables and chairs were designed especially for the Biennial to allow flexible arrangements, from an intimate dinner to a group feast. These movable furniture admits different programs and adapts to unforeseen situations, allowing visitors and residents to watch movies or attend conferences with local food. The material used were regular construction wood boards, and the design was optimized for minimizing the amount of resulting waste. Furthermore, water and electricity outlets were incorporated, by installing aluminum sinks and lighting. Still, a crucial issue for the pavilion design was also to reveal an untapped resource: the natural debris resulting of park management. Tree branches and logs from Shenzhen's abundant vegetation are reclaimed as fuel for the cookers' fire during the Biennial. The use of this biomass produced by the urban forest was a call to rethink the resources available in the city, as well as the unnoticed processes concerning them.

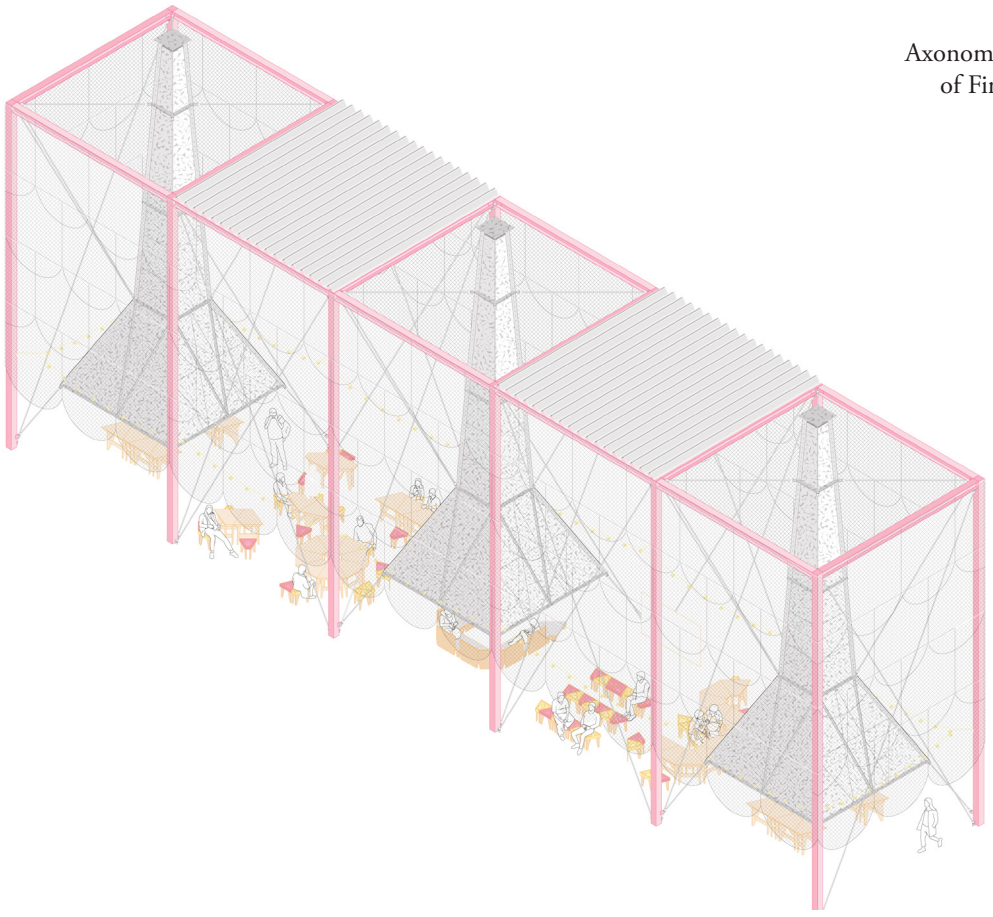


Fig. 5.4
Axonometric view
of Fire Foodies
Club

Due to existing high levels of air pollution in Shenzhen, regulations prohibited the release of any smoke into the atmosphere just one month before the project was built. Contradictorily, a city with a considerable amount of car traffic banned the burning of a single branch. Electric heaters and IC cookers replaced real fire. As the pavilion incorporated water, elec-tricity, shelter, and seating space, it was a successful public space during the exhibition days, especially for children and caretakers. (Fig. 5.5) And although the structure was designed for being dismantled after the biennial, it has remained on site. The furniture has disappeared, and water and electricity are no longer available, evidencing that self-management is needed for keeping a successful commons. Nevertheless, during the past two years FFC has functioned for several unexpected activities: from storing materials of a nearby construction site, to drying clothes, and currently being used as a parking lot.

Fig. 5.5
Fire Foodies Club
during the Biennial
©UABB

4.2.5
Urban Foresters Club

The 8th edition of UABB, "Urban Interactions", was divided into two venues. The section titled "Eyes of the city", curated by Carlo Ratti, took place in Futian Railway station, one of the busiest transportation hubs of the corporate center of Shenzhen. NODE architects were in charge of the area master plan that would connect the station to the neighborhood park bypassing the highway that isolates them from each other. Urban Foresters Club (UFC) is positioned at the core of this massive park. A pavilion that displays existing maintenance activities performed by city park staff as if they were forestry behaviors aiming to change the perception of urban parks from passive agents into productive forests. (Fig. 5.4)

Taking again the use of disregarded biomass that results from park management as a resource, a sequence of wood transformation processes is proposed, involving the park staff as well as the biennial attendants. The untreated logs, branches, leaves, and seeds, will gradually become timber for furniture, firewood, wood chips, compost and seedlings to further urban afforestation (Fig. 5.5). Forestry and wood crafting workshops would take place during the extent of the exhibition, fostering a community of members that share urban forestry commons in the form of a club. Furthermore, the intervention is also thought to remain active after the biennial conclusion. This is achieved by building specifically in the existing network, implicating human and non-human actors of Shenzhen.

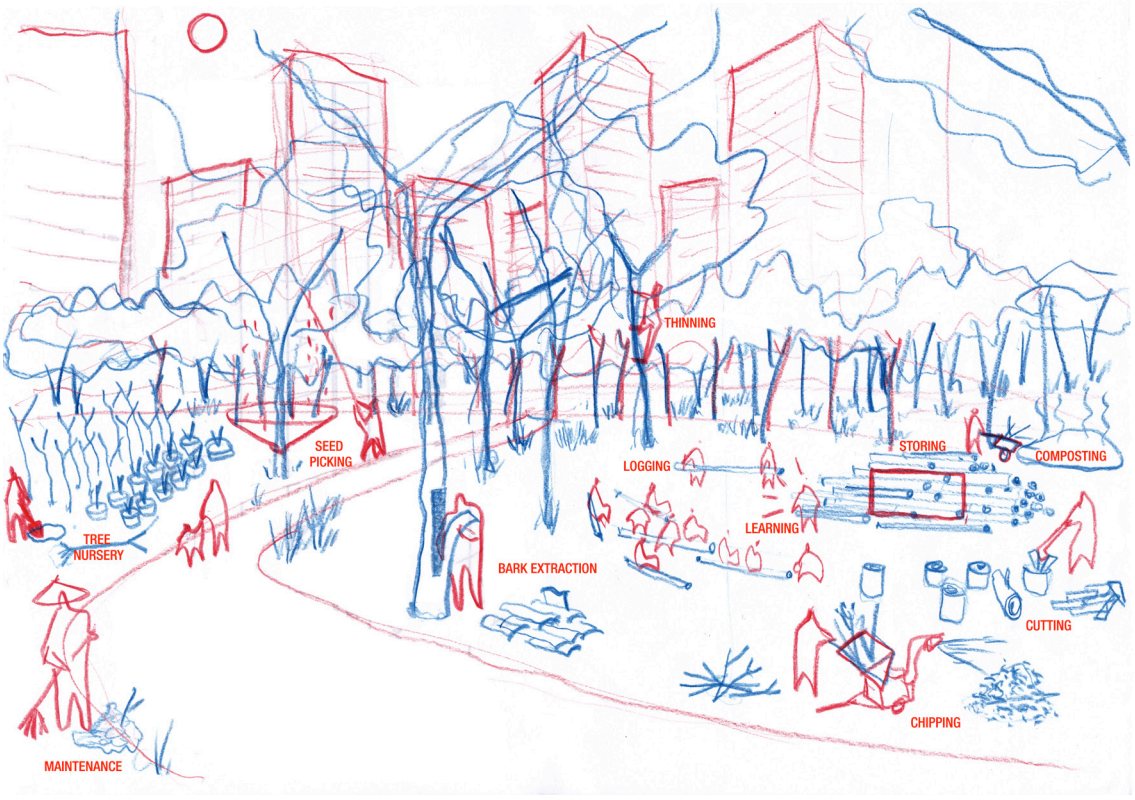
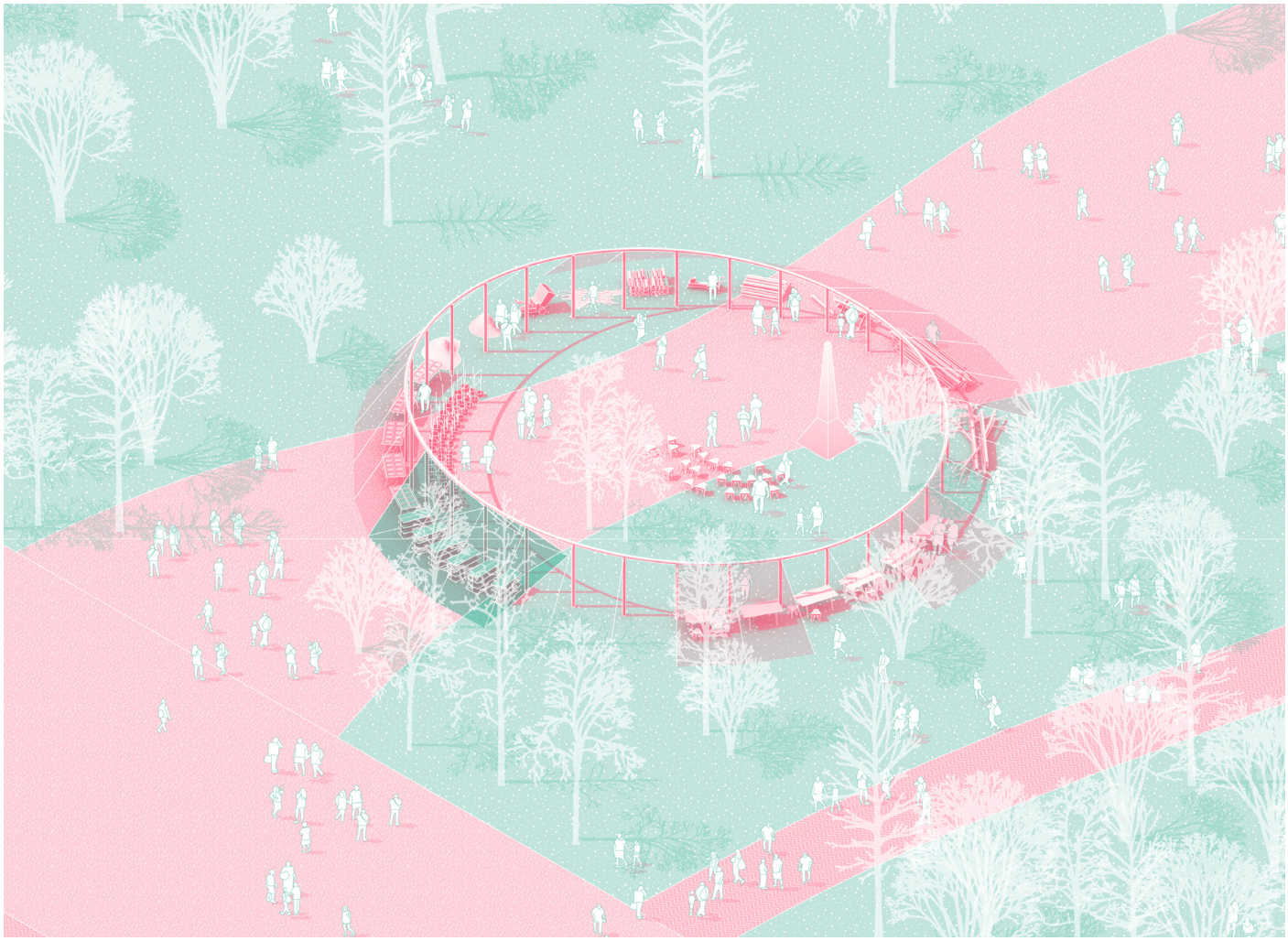


Fig. 5.6
Sketch of the different urban forestry practices that could-happen during the Biennial

The structure emerges from natural soil, in a clearing between a dense community of trees. The connection to the main park circulation is achieved by a woodchips trail produced at the pavilion. In this manner, the intense smell of wood anticipates the encounter with the forestry processes. UFC is materialized by thirty-two steel posts distributed radially in a 24m diameter circumference. These columns are then tied together by a continuous ring beam that is diagonally braced to the ground by cables. (Fig. 5.7) Apart from stabilizing the structure, these steel wires support a soft envelope when needed, and also allow the inclusion of creeper plants as building material, adding a layer of temporality to the project. Two sections of the loop are enclosed, one for storing the tools needed for woodwork, and a second for the tree nursery. The woodwork workshops generate the furniture necessary for the biennial events and for appropriating the surrounding public space.

Fig. 5.7
Axonometric view
Urban Foresters Club



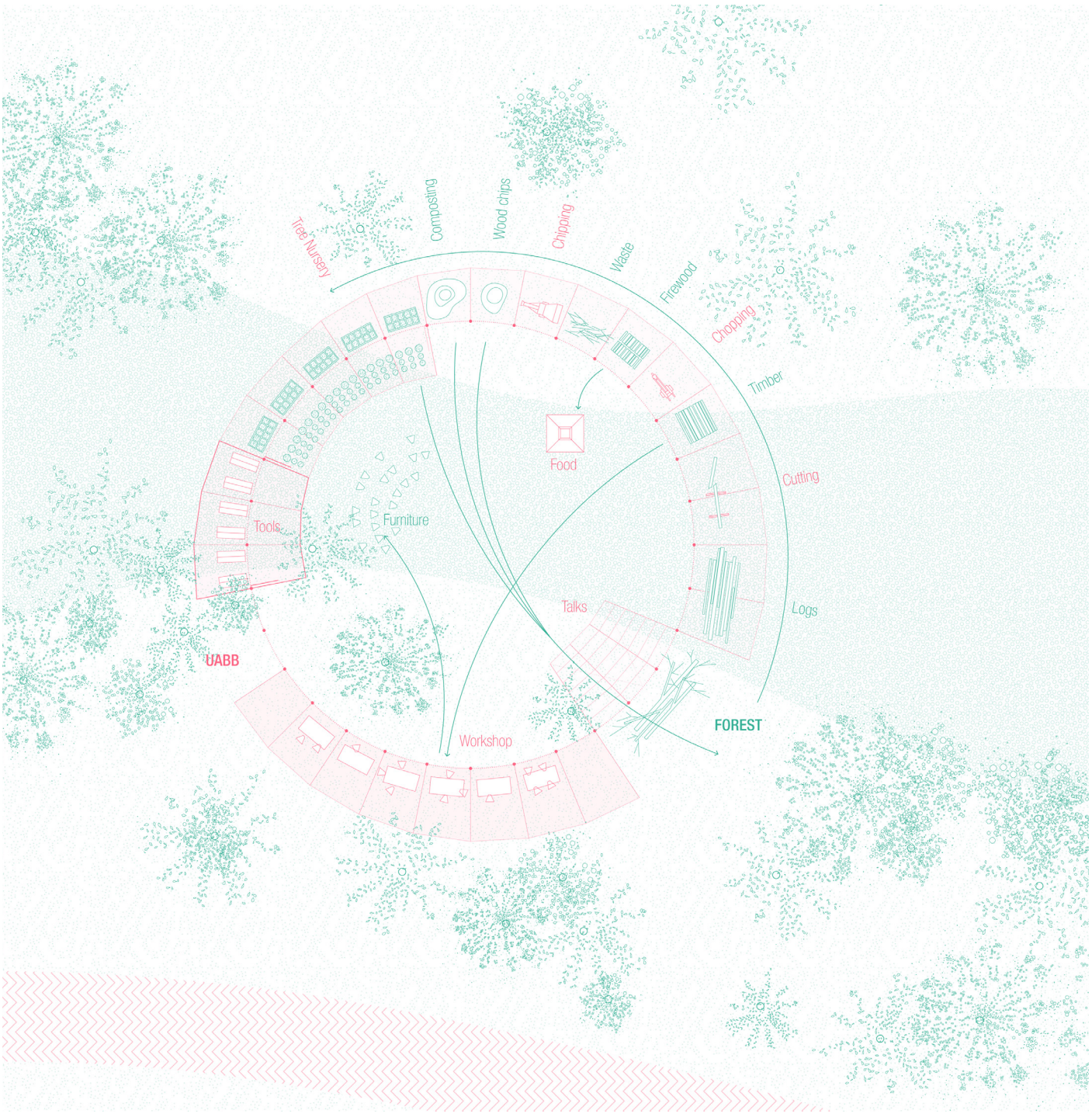


Fig. 5.8
Plan UFC
Wood Transformation Process in Fire Foodies Club

Unfortunately, due to financial and bureaucratic constraints, the local authorities didn't approve the whole master plan which meant that several interventions, including UFC, never made it to the construction stage. Nevertheless, the drawings, diagrams and models have been exhibited in the biennial and are part of the final catalog. Therefore spreading the concepts of Urban Forestry through the platform that UABB provides, for being the most visited architecture-related event in the world.

4.2.6 Comparison of the pavilions

From site-specific to network-specific

The first relevant factor that both pavilions have in common is the subtropical climate of Shenzhen, which is favorable for urban forestry. And the most significant difference between both UABB editions is the particular physical context where they take place inside Shenzhen. While "Cities, Grow in Difference" (2017) was located in a walled urban village, that is dense in history, and human livelihood; the more recent "Eyes of the City" (2019) occurs around one of the busiest train stations of the young business center of the city. Consequently, their relation to the urban forest is different as well. FFC is positioned strategically articulating the residential fabric and the public park; while UFC is directly embedded within the vegetation mass, rooted in the natural soil, and surrounded by the trees. (Fig.5.9)

Both projects recognize the same untapped resource in the city: the biomass produced by the city parks management. However, the network of transformation processes, actors involved and behaviors performed, is specific to each case and determine the intervention impact. In FFC, the local food vendors act as the drivers of liveliness. Cooks provide their skills, and the visitors would share the food and the heat provided by burning the reclaimed debris. UFC positions the resource itself as the main protagonist of the intervention. Shifting the focus towards urban forestry and thus highlighting the existing network around this resource. The degree of involvement of the actors is widened in UFC with respect to FFC. In UFC, the debris is treated by park management staff in collaboration with visitors. The skills can be learned, and with the assistance of specific tools, anyone can participate in the process of forestry and wood crafting.

From linear to circular narrative

FFC operates within a conventional linear narrative by which natural resources are exploited for human benefit. What is meaningful for architectural practice is that it is placed strategically in the existing network, reusing disregarded natural debris for potentiating the local behavior of food vendors, appreciating its social gathering capacity. However, as a by-product of this practice, CO2 is released to the atmosphere. The design did not account for the wider global network of international health organizations that recently limited CO2 emissions in Shenzhen, because of its high levels of air pollution. The benefits of recycling, an otherwise lost urban natural resource, where canceled by the polluted context created by the same industrial society that restricts its use.

Learning from this tragedy of commons, UFC proposes a circular narrative, incorporating the forest not only as of the provider of natural resources but also as one of the beneficiaries of the process, expanding the objective from the creation of human commons to multispecies commons. The debris is transformed in different products through a sequence of multiple forestry-related behaviors, ultimately being converted in compost that feed the same trees that produced the biomass in the beginning. The pavilion could even incorporate the open fire cooking behavior that was canceled in FFC, arguing that the carbon emitted would be offset by the trees that are grown in the nursery.

After the design process was finished, unexpected narratives emerged in both cases due to the specific site and network. Even though FFC never fulfilled the purpose of providing open fire by burning debris, it still provided needed urban resources such as shade, cover from the rain, water, electricity, and resting spaces. This inherent architectural qualities made it a thriving public space during and after the biennial, having been appropriated by the neighbors for different behaviors during the past two years. The informal and organic qualities of the urban village and its inhabitants made possible this afterlife. Meanwhile, UFC was never materialized. It was part of a series of interventions proposed by UABB to the city of Shenzhen for rethinking the area around Futian Station. In the end, the whole masterplan was disregarded due to bureaucratic concerns. In this case, the institutional network and the more formal physical context were less flexible and receptive to change.

4.2.7
Evaluation of applied Guidelines

After reporting, comparing, and analyzing the pavilions, we evaluate the application of the guidelines extracted at the beginning of this chapter, assessing the evolution between the two proposals:

1- Adapt mindset towards urban forest. Both FFC and UFC start by changing the urban forest's perception as the project's premise, taking advantage of the critical framework of the architecture biennial to develop innovative proposals.

2- Consider physical environment. Both projects take into account the climatic and social context of Shenzhen. Its humid subtropical climate is favorable to tree growth, presenting an urbanism of scattered skyscrapers between highways and a dense urban forest. The pavilions consider this physical environment for the reuse of the bio-debris from street trees or parks.

3- Fulfill the sequence of forestry stages. FFC is placed at the end of the sequence, at the stage of transformation of those resources that are currently being extracted by the municipality, creating a clear division between stages. UFC is also situated at this transformation stage but evolves if compare with FFC by involving the municipal foresters as the main actors in the project.

4- Give access to diverse members from the beginning. Both projects fail to involve diverse actors in the sourcing stage, with municipal professionals being the only ones having direct access to the urban forest. However, creating an urban forestry network within the Biennial of Architecture can be seen as diversifying its access.

5- Recognize the capacity of urban forestry resources for connectivity. In FFC, only branches are used as a resource. Still, existing actors and behaviors are mixed with new ones coming from the biennial, promoting new partnerships through the fire generated by their combustion. On the other hand, UFC evolves by fostering greater diversity in the resources extracted and the actors accessing them, triggering diverse partnerships at the resource transformation stage.

6- Reinforce the existing local woodworking network. FFC does not include timber as a resource. However, UFC positions the use of timber as central in the pavilion, proposing a work area with wood extracted from the park, incorporating in the biennial program, workshop classes given by local craftsmen.

7- Encourage more-than-human agencies. FFC does not take into account any non-humans as agents, following a linear narrative, in which forest resources are used exclusively for human benefit. In contrast, UFC incorporates the urban forest as an active member in designing the urban forestry network.

8- Expand Urban Parks as Timber Circulation Systems. Unfortunately, neither of the two pavilions incorporates this option. UFC could easily incorporate it considering the critical role wood plays in its program. Unexpectedly, in FFC's afterlife after the biennale, it ended up functioning as a temporary storage facility for salvaged timber during the renovation of the adjacent buildings.

4.2.8
Conclusion: design as catalyzer for commoning

This report presents the specificity of Shenzhen's rapid urban development in a subtropical climate as an opportunity towards rethinking green resources in the city. Within this context, UABB is identified as a driver of innovation, which provides an open critical framework that has enabled the creation of FFC and UFC. These two pavilions act as critical tools, providing a design method that tackles the intersection of green resources and the city, suggesting new ways of thinking about commons and urban livelihood.

First, each case is described following the same structure: starting from the given conditions, then the proposed architecture solution, and finally, its materialization and impact. The fact that both projects arose from similar conditions and were developed in consecutive biennial editions allows for their comparison in search of the potentialities and deficiencies learned during the process. After contrasting the two experiences, it is revealed how both pavilions are site-specific as well as network-specific instances. These strategies are evaluated as a vector for generating rooted architectural solutions that will be able to adapt in time.

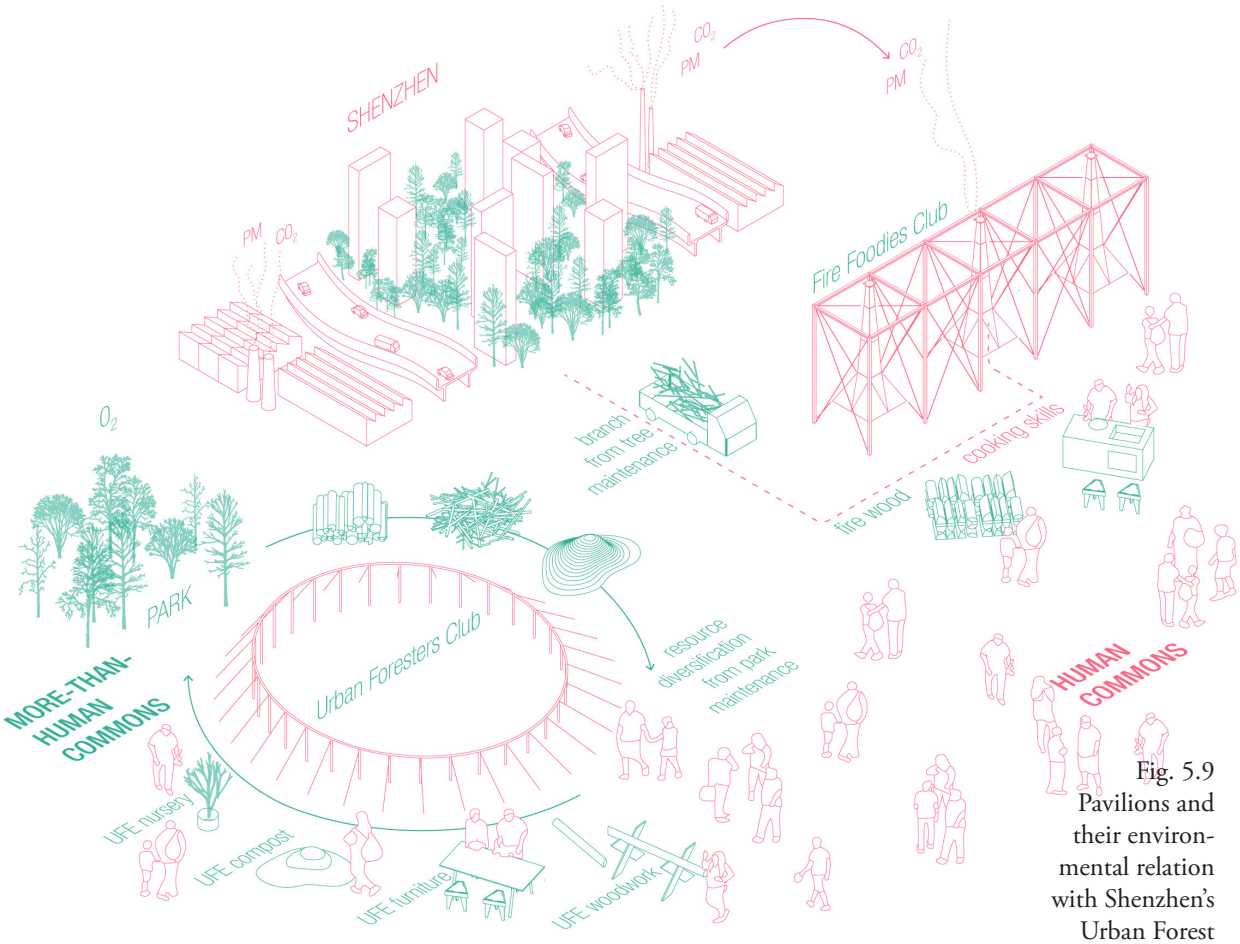


Fig. 5.9
Pavilions and their environmental relation with Shenzhen's Urban Forest

Even though both entities use biomass as an available urban resource, an evolution is observed regarding their process of transformation. FCC follows a more conventional linear narrative, where the resource is exploited for creating human commons, disregarding the by-products generated in the process. While in UCF, the narrative is changed into a circular one, aiming to create an interspecies-commons between humans and trees. The existence of parallel narratives is also unveiled, like the current spontaneous urban behaviors that appeared unexpectedly in FFC the past two years.

Both projects understand architecture as means to challenge modern urban paradigms, fostering innovative relationships with trees in the city. Understanding human-nature interactions as a symbiotic relationship in which both sides benefit, helps reframing urban facilities as a threshold, blurring the dichotomy between the natural and urban realms. Consequently, the two case studies are proved to function as critical design tools for changing the current mindset towards green resources in the city, from passive aesthetically pleasing objects, into active agents in a productive urban forest. And by reporting their narratives, it is possible to imagine other unexplored resources and processes in the city.

The contemporary city is usually perceived as a robust system, but it is masking the weakness that entails its high dependency on regulations detached from the livelihood of the streets. When looking for the potentiality of rethinking green resources, the pavilions have revealed this fragility through a minimum change: using the available bio-debris. Something simple, such as having a barbecue in a public space, becomes impossible due to environmental pollution. FFC thus became the materialization of a contradiction: the particles that are emitted into the air by burning recycled branches are banned following WHO warnings. In paralell, the city continues to grow based on a highly contaminating automobile infrastructure.

The amount of existing green waste produced by public management is a surplus that has not yet been recognized as a useful resource. Especially in cities with abundant vegetation that experience increasingly stronger typhoons, like the case of Hagibis in Tokyo. When these disasters occur, numerous trees break down, evidencing the need for professional foresters. Until now, the greenery of cities was considered a contemplative and beautifying element, but with the examples reported the point of view is shifted. Urban forestry has the potential to address green public management, improving our relationships with resources in our daily routine, and meeting a need in extraordinary circumstances.

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6
Conclusions

The industrial foundations on which cities have been developed have proved to be dubious, revealing the problematic way in which humanity relates to natural resources. This thesis has given a vigorous response to this concern, through the observation of a particular practice, that of urban forestry, exploring the mutual relations and interdependencies between the social and natural environments. The thesis demonstrates how urban forestry complicates the conventional city model, deploying a wider range of options that differs from the dominant discourse that separates natural and urban, as antagonists.

The case studies are confluent milieus of humans and non-humans, where different urban forestry practices encompass the construction of commons. It begins analyzing emerging practices around the world, to understand their networks through resource and member interactions. It also studies the conditions within the urban parks of Tokyo, as potential sites for enhancing latent commons, deploying the different physical elements where current urban forestry occurs and studying their combinations as assemblages. Finally, it addresses how examples of experimental architecture can be prototypes to further the encounter between citizens and natural resources by providing a physical space. These case studies not only unfold the urban forestry landscape, but also provide design tools and guidelines for constructing more-than-human commons in the city.

6.1 Conclusions from the Networks

The first chapter questions the industrial assumption that frames rural forests as a productive lands to be exploited, in contrast to urban forests that are kept mainly for their aesthetic qualities. Emerging urban forestry practices in various geographies contradicts this stereotype, transcending the mere maintenance by professional workers and enabling other members to access resources resoulted from tree care in the city. The methodology takes fifteen cases collected from different publications and articles, and employs the notion of network to reveal the resource-member relations. In this manner, the “spine of urban forestry” - the conventional sequence of transformation from tree to timber - is identified, revealing the diversification at the different stages of sourcing, extraction and transformation. Four different types are discovered: single source spine, double source spine, soft spine and spineless. Comparing the different networks it is shown that urban timber behaves as a critical resource for developing rich connections involving diverse partnership. However, it was also found that diversification of resources implies diversification of the members involved, expanding the possibilities for the creation of more-than-human commons in the city.

6.2 Conclusions from the Assemblages

The second chapter identifies urban parks as the place where there is the highest concentration of trees within the city. The park is a facility that has been framed as leisure grounds or manicured landscape for the enjoyment of citizens throughout modernity, but without reaching a deeper consideration of a dynamic interaction with tree care or the use of resources by non-professionals. Tokyo has been selected as a case study, analyzing thirty-nine metropolitan parks by carrying out a qualitative and quantitative analysis, gathering information from govermental sources as well as in-depth site visits. In this explorations it has been found different Urban Forestry Elements (UFE) related with the use of resources coming from tree mainteinance within the park, these are: Device, Biodebris, Field, Attractor and Sanctuary. By the comparison of the collection of UFE in each park, termed as Urban Forestry Assemblage (UFA), and considering the degree of accesibility five characters have been found: Professional Care, Self-maintained Patch, Disconnected Cooperation, Resourceful Interaction, and Diverse Participation. The questionnaire with the park staff has revealed that resources are always discarded as industrial waste. Although some of them are used the participation in tree maiteinance is highly professionalized. All these tendencies revealed parks as urban forestry assemblages that hold latent potential for enhancing more-than-human commons in the city.

6.3 Conclusions from the Prototypes

Crossreferencing and comparing the conclusions drawn from the networks and assemblages, a series of guidelines were substracted for further application: adapt the mindset towards urban forest, consider the physicalenvironment, fulfill the sequence of forestry stages, give access to diverse members from the beginning, recognize the capacity of resources for connectivity, reinforce the existing local woodworking network and ecourage more-than human agencies. Conceiving the city as a fertil ground with tree resources and diverse members with various skill sets, the lessons from the urban forestry framework are tested through architectural prototypes. The case studies are two architectural pavilions design by Tsukamoto Laboratory for the Shenzhen Biennial of 2017 and 2019. Both projects reveal the necessity to build not only considering a specific site, but also to build *in* a specific network in order to construct more-than-human commons in the city. The urban forestry framework is here a driving force for creativity, demonstrating dynamic properties that genuinely integrate tree resources with citizen interaction.

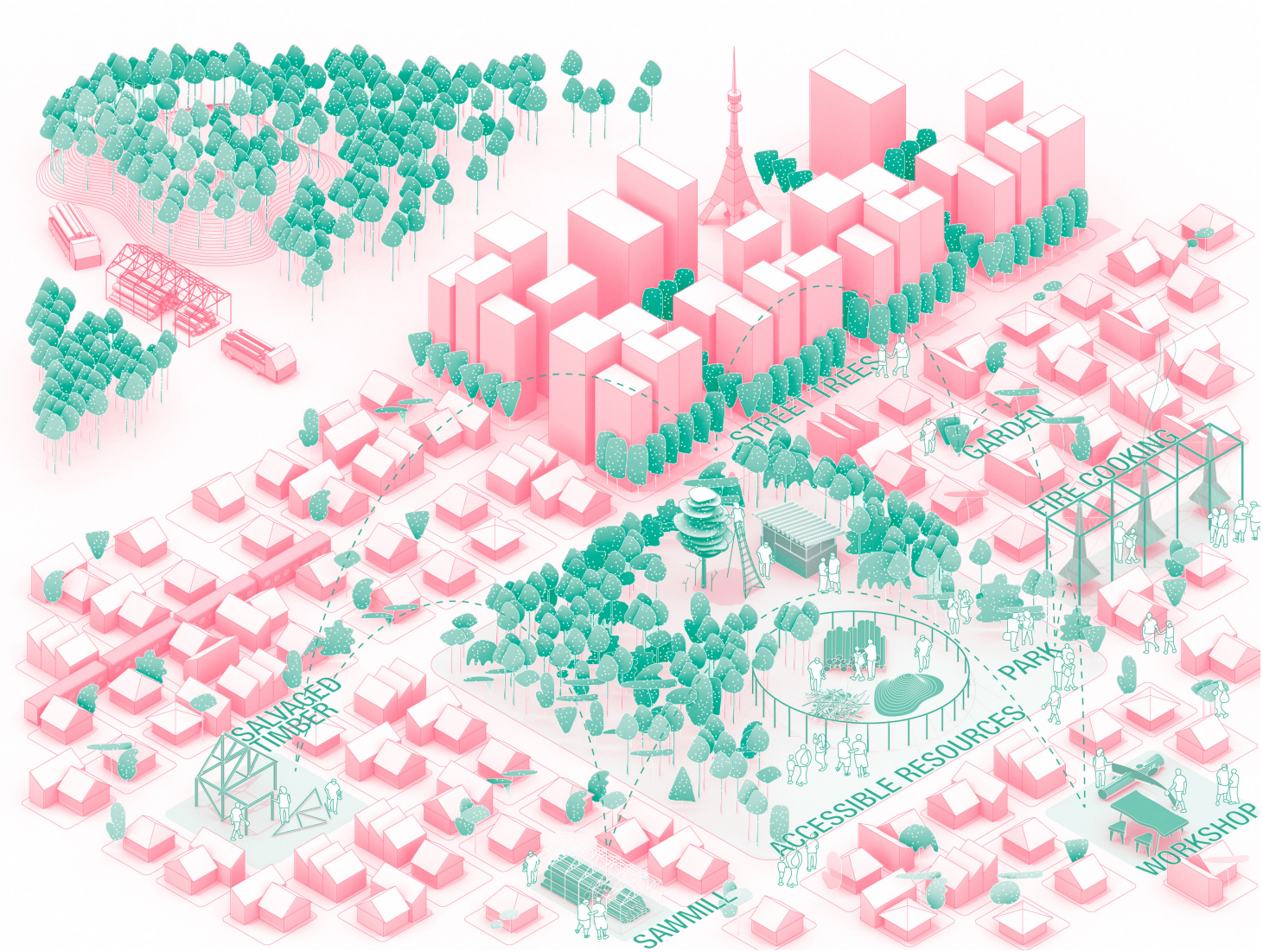


Fig. 6.01
Urban forestry constructing More-than-human Commons

Future studies and considerations

The concepts and propositions of urban forestry that are brought together in this study go beyond the simplistic rhetoric of just 'planting trees', and register ecological interdependencies. Hence, through the suggestions and opportunities provided in this story, designers can be helped to think from furniture to urban planning, not following a problem-solving tagline, but in a relational, entangled understanding of the implications of wood use. For this reason, not only the field of architecture or urban planning would benefit from this analysis, but also landscape, arboriculture sciences, as well as policy makers and citizens' organizations.

This research has challenged the city as a place capable of weaving non-capitalist relationships with non-humans, so it could be applied to other productive networks of cultivation or makers, where the circular economy and recycling are central to their practice. If the urban forestry mindset proposed in this research were incorporated into the design of parks, and applied to case studies in other geographies, these could be reconfigured, thinking from the perspective of care and considering how they can be regenerated through the inclusive participation of diverse agents. In Japan, it could be also extended to dissolving the barrier between the rural and the urban from the urban forestry with the surplus of people that can move to peri-urban areas to recover the *iriai* commons of *satoyama*. In the case of Tokyo, we can continue to deepen the networks that exist in the wood craftsmanship. This vision could also deepen the use of savage timber, helping with the problem of *akiyas* -abandoned houses-, reformulating their material value and recognizing the wood that builds the houses as a reusable urban forest.

In addition, it would be possible to continue investigating the practices presented in relation to the elimination and accumulation in the use of wood according to the species of trees, as well as the possible treatments to refine the techniques of fabrication, besides unraveling the sequences of growth of the different species and understanding how it could be bound to the production of energy by biomass. Developing the methodology through networks and assemblages, triggers extensive discussions in the remodeling of the city, and can be further crossed with the consequences it would have on the net of CO2 emissions, allowing the exploration of other materials from their trans-scalar character, from the behavioral properties at construction site to the vast territorial consequences. Furthermore, it is possible to explore further how management reflects different backgrounds and contexts, discussing cultural differences in resource use. To investigate also the impact that indigenous religions may have on the nature-society relationship in urban forestry and the relevance of climate and tree species.

Finally, a mind-set in which more-than-human interests are brought jointly may lead to the creation of future types of works, integrating knowledge from the intersection of various disciplines. Considering the city as a series of more-than-human interdependencies, revealing what transforms into what, and which is the agent that makes it possible, new urban forms and new architectural typologies based on a different material culture are possible. It is worthy to further develop the behavior of wild vegetation in the city and how it appropriates urban territories, expanding the range of more-than-human according to the focus. Following the geographers Cooke and Lane (2018) about how plants in exurban landscapes challenge notions of private property. This would easily apply for example to the Tokyo Wild Bird Park, where the emergence of a wild ecosystem was decisive in creating a park in the face of industrial expansion. In this sense, one could imagine an architecture or urban planning that foresees areas that can be appropriated by the city's wild vegetation.

Appendix

Appendix

Interview with Yoshiyuki Yuguchi Toshiringyou

Machimono Office (teleconference)
May 27, 2020.

Interviewers.
Diego Martin Sanchez,
Kai Wen Yeo,
Masamichi Tamura
Tokyo Institute of Technology, Tsukamoto Laboratory

1. Background

First of all, how did you get started with the Urban Forest Project (Machimono Urban Forest Co.) Did you originally study architecture or forestry-related subjects at university?
I majored in history at university. I didn't think about architecture until I graduated from university. While I was thinking about building something, I found architecture interesting and after graduation I started working in an architectural design office.

What kind of work did you do in your architecture firm?
I worked for several design firms and also designed houses and other structures on a freelance basis. Can you imagine what it is like to work in a design office? For example, you receive a materials catalog in your office and you look at it and think, "Let's try this new material. Where the materials come from doesn't matter so much. As I got involved in the design process in this way, I began to think about the theme of "how to make a building with what we have now," and I began to think about where to get the materials. I began to think about where to find materials. I even collected materials from the demolition sites of wooden buildings.

Have you been trying to incorporate urban trees into your designs since you were in the design office?
There are so many different species of trees in Tokyo, it's actually more diverse than the mountains. Since there are so many trees in the city, there must be a considerable amount of wood in the city. However, we were not insistent on using dozens of tree species in a single space then, and we are not insistent on using dozens of tree species in itself. We used common building materials like cypress and cedar in the design of wooden buildings. If you put them together using a single type of wood, you can create a harmonious and quiet space in its own right. If you try to force the space to use a variety of wood species, the harmony will break down, and it is difficult to put them all together. Also, it is impossible to make a building from the trees you are familiar with in an urban area. It takes a lot of time and money. The only way to solve this problem is with money, but that's not a natural thing to do. That's when I felt we were at an impasse. That's why I was interested in the situation of the craftsmen who make the materials.

Is that the reason why you trained at the Gifu Family Takayama City?
I had already been to those sites before I went to Takayama City to do my training. In Takayama City, I was able to come in contact with many hardwoods.

2. Development of the Urban Forest Project

What was the impetus for the launch of the Machimono project?
For example, let's say you decide to cut down a tree in a park. Then the park will be temporarily closed for six months or so. The only thing residents can do is to request that the trees not be cut down. Even if there are volunteers, groups, etc., they can't be involved in this process. On the other hand, the contractor's only job is to cut down the trees. Even if they wanted to give the tree they cut down to their neighbors, they can't do that kind of extra work because they are contracted to do it professionally. It doesn't mean that someone else has to pay for the labor to do that. But I think there is a disconnect here. Somehow, I thought, the public who come to the park could be involved in it, too, and not just as a job. So we created Machimono, a non-profit corporation, as a link to create a route to involve people who don't have to turn their time into money.

What is the relationship between Machimono and the Urban Forest Corporation, which is a separate organization?
Machimono engages non-professionals in order to broaden the base and make it easier for people to participate. On the other hand, the Urban Forest Corporation is a professional contractor for the work.

What was the reaction of the people around you when you started Machimono?
I started Machimono, including its predecessor organization, in 2012, but I didn't have a job at the time. People in Tokyo and Takayama said it was impossible. In the beginning, Machimono was not a corporation, but we would jump into construction sites and pull up lumber. At that time, we didn't have a company that was contracted to cut down trees for us and take them back like we do now. Gradually, our activities became more and more radicalized, and we became the Machimono we are today.

Eight years later, have you seen a change in social attitudes?
Have I changed? I don't think things have changed that much (laughs).

Have you ever been approached by the government to make use of trees in your community?
That's almost never the case. These new things are an unprecedented challenge for the government. There are no categories in the specifications that the government puts out, such as reusing the trees that have been cut down or involving the residents in the process.
It's hard to get in touch with that process, especially with parks and street trees, because they were like sanctuaries. It is the kind of work that can only be completed when there is a certificate that proves that the trees have been cut down and disposed of at a designated disposal site. Companies and NPOs were not allowed to get involved, and it was difficult for the government to get involved. Nevertheless, the private sector has made a number of achievements, and over the past few years we have begun to receive orders from the government.

So you're slowly setting a precedent in the field of public administration.
When a person in the administration approaches you with this kind of talk, he or she is taking a risk. It's extra work, so to speak. That is why it is important to be considered as a partner who can take on challenges with ease. The fact that Urban Forest Co., Ltd. undertakes the work as a business separate from the material is a way of showing that we can certainly produce results as professionals.

It's very tempting to allow residents to participate in urban greenery, but is it profitable?
It is true that this is difficult to do on its own. For example, when we make woodwork, we need to expand the range of products to be competitive in terms of price. To begin with, all the trees in the city are not normally used as lumber, and if you think of them as lumber, they are not very good materials. If it's valuable, it will be sold on the market, but it's not so much in the city, or even in the mountains. That is why we basically do this as an added bonus. For example, as we take on planting and design work, we manage to get these activities done. Because it doesn't cost that much money to do these things. But it makes things more interesting.

So you're creating new added value.
It can be a good thing for the government. There are often situations where it is difficult for the government to cut down trees. For example, even if the trees are in danger because of a typhoon, there are often complaints that they do not want to cut down the trees in the city.However, if there are opportunities to deepen the understanding of and involvement with those trees, it will be easier to build a consensus between residents and the government, and residents will be able to participate in the creation of a better green space.In this way, through the activities of Machimono, we are conveying the message that we can do more for the same cost, and that if we do this, people will be happier.

3. The use of urban trees

What challenges do you see in utilizing the diversity of trees in the city?
In order to talk about it, I want you to understand the basic situation first.
Do you know how many hardwoods are cut down in the mountains and turned into wood? It's only about 5%. The rest is chips and paper. It is true that the price is higher if we can sell them wholesale as lumber, but there are so few of them that can make a business.
The reason why hardwoods don't sell is not a problem of price, but because there are few good trees in terms of market value. And the quality is not uniform. That's why profitable companies don't deal in such trees even if they have one or two trees, but go to small companies as a hobby demand. We have seen this situation in the high mountains. Unless it's a species like walnut or maple or oak, which are catalogued, they don't get searched for as a commodity. For example, no one is going to search for wood by its bark. The same is true for mountain trees, and even more so for city trees. When I talked about the idea of Machimono to people in the forest industry in the high mountains, they said "it's impossible" because they know very well that unique wood is not good wood in the sense of its market value.

So it's hard to use urban trees as a wood resource. To begin with, just utilizing urban trees is not a great thing in itself. In fact, many companies have been doing it for a long time if you just want to recycle them. However, I think it's dangerous to assume that "using trees is a good thing". I don't think it's a good idea to institutionalize this by setting unreasonable goals, such as the SDGs or assuming that it's good for society. The important thing is to "be natural". And by "natural" I mean "natural" in the sense of "unreasonable".

Where do you think the unique value of urban tree reuse lies?
As long as the value of wood is straight and grainy, it's hard to profit from the city's trees as lumber. But I think it's not unreasonable, reasonable and natural to "do what's in front of you". We are still searching for ways to achieve this, and the problem is how to link it to value. The important thing is to never say, "We're great because we use Japanese wood, right? It's not about the subject matter of "how can I make my customers happy? It's about creating a nice life with wood that tells a story, like a connection with the city, and furniture with a story to tell that leads to a thriving store, which also brings a financial return.

What do you mean when you use the term "urban forestry"? It's a "let's manage our city trees like a forest service". Trees in the city are a liability for the city that owns them. So, we should capitalize on the idea of forestry. Here, the term "forestry" means thinking 20 or 30 years in the future. If a local tree grows, the local people get involved, and eventually the tree is converted into lumber, then that's natural and interesting, isn't it? It's not so much about using urban space for timber production as it is about fostering greenery with a story in the community. What I mean by "urban forestry" is caring for trees with the image of a cycle from the beginning. However, if we set a goal of producing this much wood by a certain date and make it into a system, it would be unreasonable. I think Machimono's uniqueness is that we aim to utilize urban trees in a reasonable manner.

4. Structure of activities

I'm going to ask you in detail about the reality of your activities. First, what kind of organization does Machimono operate as?
As for the organization, I'm alone. Depending on the project, I may ask a friend to work for me as needed.

Do you ever work with architects and designers? Or would you like to?
It's hardly ever. When we talk about money, it's more of a burden on the client when there are two of you. If I were to do it, it's important that it comes naturally. I'm a licensed architect, but I'm not registered as a design firm, so I can help out when needed.

Do you ask for an arborist or other professional to determine the condition of the tree?
This is also basically a decision based on your own empirical knowledge. The government and individuals don't have the extra money to hire an arborist to do it. This means that the burden and risk of making it into wood is borne by the individual. You look at it yourself, decide if it's usable, and if you need it, you pay to get a truck and take it to the sawmill!

How do you handle lumber?
I also saw the wood myself. Often only one tree is cut down, so I cut the tree into small pieces and carry it out by car. I can cut down trees with a diameter of about one meter by myself.

Where do you collect the trees you cut down?
We rent a sawmill as a warehouse. I have a few in Takayama, Izu, Ome, and a few others. Now we are looking for a place to put all our warehouses together near Ome. The biggest costs are storage and transportation. It's cheaper in the mountains because there is still a market for lumber, but if we try to do it in the center of the city, the costs here go up.

What is the average size of the trees you handle? Do you also utilize branches and bark for chipping, composting, etc.?
It's all over the place. Most of the time we don't utilize anything too small or at the branch drop level. But even if it is very small, we use it if we want to use the tree species. We do not use the bark as a chip or compost.

Is there a difference in the particulars of the tree species you work with and how you handle them?
The basic idea is to use the tree species that are there. Each species has its own characteristics, so we have to handle them in different ways. The company is a one-man operation, and we do the drying process by ourselves in a rented warehouse. In the past, we outsourced some of the work, but in the end we had to do it ourselves because it would have been improperly managed. Forestry is a slow-moving industry, and it's all about inertia. There is also the problem that we don't have the know-how to handle a wide variety of tree species and they are managed in the same way as common building materials such as cypress and cedar trees.

Where did you learn your skills and techniques? Also, do you have your own tools and equipment?
I learned the skills I needed to learn by buying my own tools and doing it myself.
You have most of the tools you need with you. The tools that a carpenter would use, like chainsaws, sanders, circular saws, and other tools that can be carried around, I carry them in my car. I don't like to drive a car like the Hiace, so I use a sedan. In addition, freshly cut down trees are heavy, so even if the car has a large volume, I can't carry them. When we have to carry a large amount of wood, we call a truck with a crane. I don't handle the heavy equipment by myself.

Do you mainly work in the Setagaya area, where your office is located?
We don't have a specific area of activity, but sometimes we go to Kanagawa or Saitama, for example. Basically, people who are interested in our activities come to us from various places. We receive requests from both the private sector and the government. Like a foundation that manages green space, we need to manage trees on donated private green space.

Do you often get involved with community-based organizations like schools?
Not so much. Basically, it's more about dealing directly with the land owner.

How many projects do you do in a year and how many trees do you work on?
It's hard to say in general. Last year (2019), for example, we mended and utilized dozens of trees from hundreds of trees in the redevelopment of South Machida. As for how long a project takes, even if the client is an individual, it takes roughly six months to a year at most.

Are you also involved in planting trees, growing seeds and seedlings, reforestation, etc.?
We believe that the main thing to do is to create green space with even the idea of cutting down trees.In a project in Minami-Machida City, which we began to get involved in in 2017 from the aspect of community development, we found baby trees sprouting up at a construction site, so we were able to dig them up, store them, and replant them later. We also held a tree planting festival and worked with citizens to create a city forest. At that time, we consciously planted trees that could be used every year in the community for plant dyeing workshops, etc. We also told the staff members involved that in 20 to 30 years, the trees we planted could be used as wood for the facility.

Have you also drawn up a plan for the next 30 years using that wood?
We didn't get that far, and it was only to the point of showing our vision.
This begs the question, "Does competitive bidding really help? It also leads to the question. Park management, if it's true, has to have continuity in the organization to realize the concept of green space in the long term. But it's difficult to carry on the vision in a practical sense. There are changes within the government, and even the contractors who are contracted to do the work change through competitive bidding. Is this really a useful system for the citizens? Nevertheless, if the long-term vision of urban forestry, which is to use locally grown trees in the community, becomes the norm, it can be passed on. In fact, the only way to achieve it is to get to the point where it becomes the norm. Privately owned green spaces are probably easier to achieve. It would be easy to have that kind of long-term vision and leave it to the contractors who can do it for a long time. That would be very reasonable, wouldn't it?

5. About the workshop.

I'm very interested in the Machimono workshop activities in terms of creating a framework for accessing trees in the city across the gap between professionals and the general public. Are the participants generally from the area?
That's not always the case. For example, it could be that half of the participants are from the local community and the other half are fans of Machimono's activities. Those participants from outside the community are learning for the first time about what kind of trees grow in the area by participating in the workshop.

What are some of the goals you are aware of for the workshop?
The workshops are meant to increase residents' knowledge and understanding of trees.
For example, trees are often a part of a community's identity. First of all, I don't think that such feelings should be taken lightly. On the other hand, there are real problems, such as trees that look like they are going to fall over or are dangerous to manage. So when it comes to rebuilding a square, there is often a lot of opposition and conflict within the community. As a result, some decisions are made that are not rational from the point of view of safety, such as reforcing the damaged trees in front of the station. Of course, maintaining a large tree in a community is a luxury. It can be difficult, though. But if there is a good flow of local residents' knowledge and understanding of trees, there will naturally be more trees in the city and a richer variety of trees, right?

I know how you feel about not wanting to cut down a tree.
A large tree is often a symbol of a community, isn't it? It would be a bad thing if that tree suddenly disappeared one day. How would you feel if a temporary fence was suddenly built around the place where you've been spinning memories? But, you know, the government is surprisingly well informed about it. In many cases, they simply weren't noticed or recognized. However, by the time local people notice it for some reason or another, the situation may be so urgent that it may develop into a kind of opposition movement. If we were more involved with the trees in the community on a daily basis, if it was more natural for us to think about the trees around us in our daily lives, we might have avoided that situation. I think we can do something by being involved in that process.

Is there any change in the community through the workshop?
When you actually hold a workshop for a day, your understanding of the trees in the area increases, which is something you usually see in a casual way, and a mood is created that you are the ones who are going to build the town. What we are trying to do with Machimono is to nurture a "Machimono sensibility". It's the kind of sensibility that tells you that there are so many trees in this town, or that these trees can be used for this or that purpose. If this kind of sensibility becomes commonplace, then there will be less of a strange movement against logging after the decision is made to cut down the trees.

So knowing leads to new relationships.
The important thing is not to learn, but to play and deepen your knowledge. You do something because it's fun. If they enjoy it, they will prepare tools and places for themselves. I think that kind of spontaneous attitude is important. That's why I don't like arguments like "because a great man says so" or "because of the SDGs". I just think it's necessary for such things to be established naturally.

It's not a system, it's just a culture and sensitivity.
Sometimes people worry about the trees in the park, like, "We're going to get into a fruit fight," and so on, and there are some rules that are put in place to manage them. I don't think that's actually going to happen. That kind of thing should really just be good manners. If they make more and more rules, you won't be able to do anything. It's really better to do things in a loose manner. Rules can be made because of a lack of manners, or because people think you have no manners. I think it's important to have a sense that being banned by rules is something to be ashamed of.

Do these sensitivities connect with the concerns about institutionalization that you mentioned earlier?
So the idea of institutionalizing and protecting an activity is so because it's not a business, right? But "what does it mean to not be a business? I think you have to think about it. If it's really great for society, it's not going to go down as a business. But it's not a good idea to force money into something that can't be made into a business. The "urban forestry" that I am referring to does not mean that I want to promote the use of urban trees, even if it is forcibly, because a system has been established and subsidies have been given. I think it's a good thing that the government puts money on projects for the greening of the city. But we need to compete properly among the contractors and improve the quality of our services. I don't think we should lose this effort.
It's a scary thing to be in a shaky industry. When the money comes from subsidies, like the forestry industry, it's hard to get rid of them. Forestry workers, sawmill workers and others involved in the mountain industry seem to be working hard, but in fact, they are doing things the same way they always have. They don't invest and they don't study, whether it's IT or construction, but people in industries that are making good profits are studying and working hard to improve their services.

I was curious about the word "investment" in your profile, but do you mean investment in the broader sense of enhancing such services and increasing returns?
I think "investment" is a feeling that every person in the business should have. Buying a service is equal to an investment. A profitable industry is an investment that pays off for the people who pay for it. Is the forestry industry able to do that now? You want to give something back to your investors in any way you can, and that's a normal feeling in the business. If you only want to do it yourself, no one will be happy. A return can be in the form of money or some other form. If a proper investment relationship is established in this way, the activity should expand naturally. However, if it's considered a good thing and subsidies are given out, there is no longer any need to build up an honest effort. Trial and error is treated as an afterthought. When it is institutionalized with this kind of authority, it becomes unreasonable. I think that's a dangerous thing.
Fostering a culture of community engagement with greenery through workshops also helps to

avoid the imposition of institutions and rules! Machimono is trying to increase the number of areas that the public can get involved in through workshops and other activities. We prune every year anyway, so it would be better if citizens could get more involved in this process. This kind of thing is easier to do when it's within the scope of the community's playground. What we need to do to achieve this is to develop manners that do not betray the trust of the people and to think about how we can aim for management in the community.

6. About the City

This is a big question, but I'd like to ask you what you think about contemporary architecture and the city from your perspective as an architect.

How shall I answer that... Well, I wonder what architects think of as a problem when they conceive of architecture. I wonder what the architects of today are thinking about when they create architecture. For example, when they say, "Okay, let's choose a material," the design office has catalogues and samples, and some buildings are made with the intention of trying out new building materials when they come along. In some cases, a building is built with the intention of trying out new building materials when they become available. This is the way lumber is chosen and used. I don't find this to be very convincing. Why did you choose that material? The only reason I can come up with is "because it looks cool" or "because it's cheap. So where else should we look for reasons? When I wanted to create something great, I decided to imitate what was really cool and essential to me, rather than just letting my sense of style dictate what I wanted to create. So I looked around Japan and the rest of the world, and the one thing that I found compelling was that they all had one thing in common: they weren't trying to do too much. For example, architecture is made from what to do with the materials in front of you, just as a stone city is made of the stones of the land. Even the wonderful old Japanese buildings that are still standing today are made from the materials that were used to build them, because they had trees in Japan, and the methods and tools came from there. I think this perspective is important.

What about modern cities?

I'm not sure there really is such a thing in Tokyo's buildings. There is still an awareness of the problem of architecture where you can order materials from a catalogue and they will be delivered to you. How can we create architecture that is persuasive, and how can we create something that will become part of the identity of the region? When I thought about this, I chose the method I learned in the history department: "Just look and analyze. When I actually looked at the site and made a report, I was able to get a vague picture of many things. I realized the persuasive power of buildings and settlements in the past. Maybe, but nowadays, heavy machinery and distribution systems have developed and what was impossible in the past is no longer impossible, and today's architecture may be a rational design for that era. Thanks to air conditioning and other facilities, it is possible to do things that are unreasonable in terms of design even though the climate is different. But I think it's strange to see the same façade of a building standing in a row in the same direction. If it's true, the direction of the building should correspond to the orientation of the building. It's like the Gothic churches, where there's a lot of work that goes into it, but it's not overpowering. I think it's something that's natural for people of the time. I'm always thinking about how to create buildings and products that are not detached from the climate and the times.

What do you think about people involved in architecture and cities, including students?

You feel like you don't have enough vocabularies. What's a good city? There's not much we can talk about when it comes to "how much space". That's all there is to it, like "lots of squares" or "lots of greenery". I'm a historian, so it's all the more reason for people who are involved with architecture and cities to ask me, "Why don't you study more examples of this kind of work? I feel that this is a good thing. If you survey all the great things in the world, you'll find something that you can see. Even so, you may be able to make something that looks good in a photograph, but you have to think about whether or not you're making something that is essentially good. I

think we need to look at those essentials more carefully. I don't think we should do a workshop that says, "We've listened to everyone's requests. If you're a professional, you study these things more than anyone else, right? You can confidently claim that you know these things. Why do you ask for everyone's opinion? This goes back to the investment I mentioned earlier, but I can't give real professional money to those people. It's fine if people are trying to copy a pattern to devise something, but it seems to me that we are being driven by a bad design principle, where the design is regulated by someone who doesn't learn enough. For example, if you want to create a green space in a city, the experts must first really know what it means. That's why, when I was asked to give a lecture on the creation of squares, I told them not to plant trees in squares. I showed them pictures of wonderful squares in different countries and said, "There aren't any trees growing in those squares, are there? That's why I explain to them that a square can be a space with nothing in it. A square can be a space because there is nothing in it, but if you infill it with trees, it's not a space at all. If we plant trees and build a greenbelt, it will make the town look longer, but I wonder if this is really urban development suited to an aging society. And if you know what you're talking about, you can have those discussions.

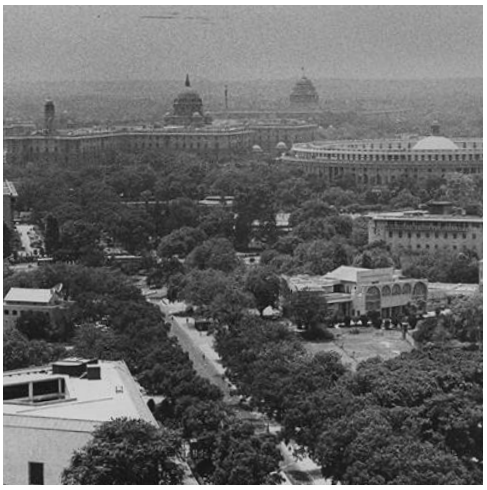
The simple values of a bright city and lush greenery are shared from top to bottom, so it's easy to build consensus on those simple things. So, for example, "green is good" is a default value. So then it's inevitable that the naive theory will win out.Everyone is overwhelmingly unlearned. But that's normal. When I was doing architecture, very few people could tell the difference between wood species. Even woodworkers could tell the difference between wood and wood, but they couldn't tell a standing tree apart. That's because you can touch wood from the stage when it's wood. In that sense, everyone is an amateur. That's why I think it's important to study them. What is lacking in architecture, squares and green spaces is an honest criticism from the users. But it's hard to say "this is not good". Everyone is not very literate when it comes to architecture, and architects are in a very high position, so I think it's particularly difficult for them to speak out. Right now I'm very excited about the potential of the internet to raise the literacy of society as a whole. I think we're gaining surprising knowledge from watching videos of this and that. Then you'll be able to raise your knowledge base and you'll be able to compare things. Once you can see things, you can tinker with them yourself. Then you can plant a tree and not think of it as something a priori wonderful. Even after a building or an open space or something has been built, later on, when you want to make repairs or whatever, you can think of things like, "Let's fix this place up a bit. But I get the feeling that even among people who are involved in architecture, cities and green spaces, there are people who don't see these things at all. I think those people should take in a lot of input before they go down the path of naive theory.

Finally, is there anything you think is important about this right now?
Well I think you should use your body. Get your physicality back. For example, touch a tree, or do something that seems futile. If we don't think in terms of that kind of reality, we won't know what's behind the numbers, and the numbers will really just be numbers.
Also, I think the fundamental problem is that you should first try to do whatever you can do on your own. It's because you think within the bounds of what you can do now that a lot of things go wrong. I think you're building a wall somewhere. Even if it can be done in a little bit, I think we think of it as something from a different world. And when there is a wall, you don't buy a single tool. They think it's right to ask someone who is a professional to do it for them. But the division of labor is getting more and more costly, and there are more and more things you can't do. But, surprisingly, it's something you can do if you learn, and there are even tools you can buy yourself. So I think it's important to try to do what you need to do without building walls.

Appendix

Emergent Local Urban Forestry Practices

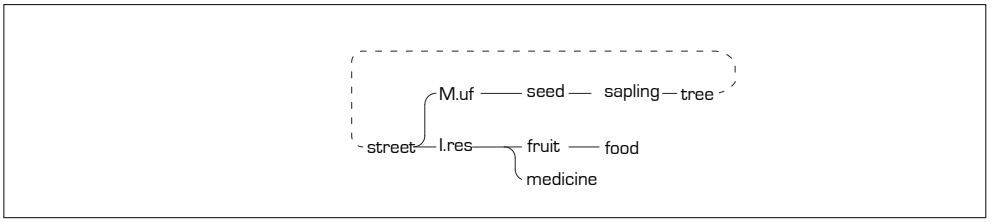
[1] Lutyen's Delhi



Location : New Delhi, INDIA
Year of Establishment : 1912
Type : spineless
Background : In 1912, Edwin Lutyens, Herbert Baker and George Swinton were appointed the task of creating the new capital city in British India, Delhi. 13 species of avenue trees indigenous to India were panted to purify and perfume the air, while jamun trees were selected for their fruit-bearing properties as well as to play host to resident birds.

Forestry sources	Extracted Resources	Transformed Resources		Members	
				Personel	Facilities
street	seed fruit	sapling tree	medicine food	M.**ur**ban **f**orester I.**res**idents	

Network diagram



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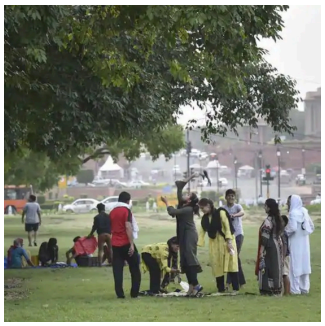


residents are harvesting jamun frutis from Lutyen's Delhi for daily consumption or reselling for income.

NEW DELHI: An income of Rs 45,000 from 500 trees in the Central Vista area of Lutyens Delhi. The golden fruit? Believe it or not, is the humble jamun (Black berry). Every year the NDMC auctions the fruit off its 500 Black berry trees in the Central Vista area, during the monsoons.

The variety here is a smaller and tangier variant of the â€˜commonâ€™â€™ jamun, which is large and bland. This year the entire lot went under the hammer for Rs 45,000 to an Azadpur trader. â€˜â€˜The auction was held last weekâ€™â€™, said Madan Thapliyal, spokesperson for the NDMC. Fruit from the trees on the right and left side of Rajpath only were auctioned. Main roads such as Ashoka Road were strictly off limits. So are the jamuns worth all the money? According to Thapliyal, the person buying the whole lot sub-contracts it to smaller players.

â€˜â€˜This is how he recovers his money,â€™â€™ says he. These sub-contractors in turn go and pluck the fruit of the trees. Five years ago it was found that the sub-contractors set up tents on Ashoka Road to pluck the berries from the trees.
â€˜â€˜This created a traffic hazard, after which it was decided that only trees in the inner lanes of the Central Vista would be auctioned,â€™â€™ he said.

The reserve price for the auction is decided on the strength of the monsoon. â€˜â€˜This year the reserve price was high, nearly Rs 20,000,â€™â€™ said Thapliyal. Last year, due to the drought, the entire auction peaked at Rs 30,000. The tradition of auctioning berries is about two decades old. According to legend, after a bad storm one year most of the berries carpeted the roads.

Article about the auctioning the fruits from the avenue, and article about the daily harvest happens around the trees

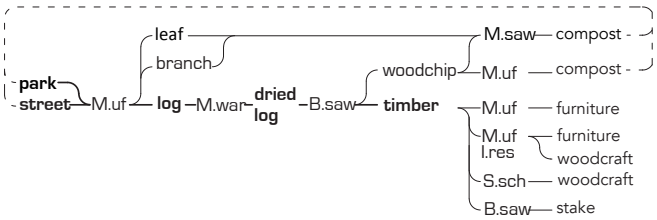
Sources :
1. http://delhimagic.blogspot.com/2010/08/i-learn-about-trees-of-delhi.html
2. https://timesofindia.indiatimes.com/city/delhi/Humble-jamun-is-the-NDMCs-golden-fruit/articleshow/88387.cms
3. https://scroll.in/article/809099/jamun-the-humble-fruit-that-holds-a-special-place-in-indias-history-and-mythology

[2] Midori no Recycle

Location : Koto city, Tokyo
Year of Establishment :1990
Type : one-source spine
Background: Through the economic growth in the 1980s, cities in Japan needed to reduce the amount of waste and improve urban soil quality. Koto city started the project in 1990, tried to establish a circulation system in which bringing branches, leaves, and weeds out of parks, roads, and schools back to soil in the city through producing compost from them. Also, the town holds woodcraft workshops in which cut logs are used.

Forestry sources	Extracted Resources	Transformed Resources		Members	
				Personel	Facilities
park street	log branch leaf	dried log timber furniture woodcraft	stake compost	M.**u**rban **f**orester I.**res**idents	B.**war**ehouse M.**saw**mill B.**saw**mill S.**sch**ool

Network diagram



References

Diagram showing the scheme of the programme

Park furniture made from logs

Smaller logs and branchez are utilised for park stakes

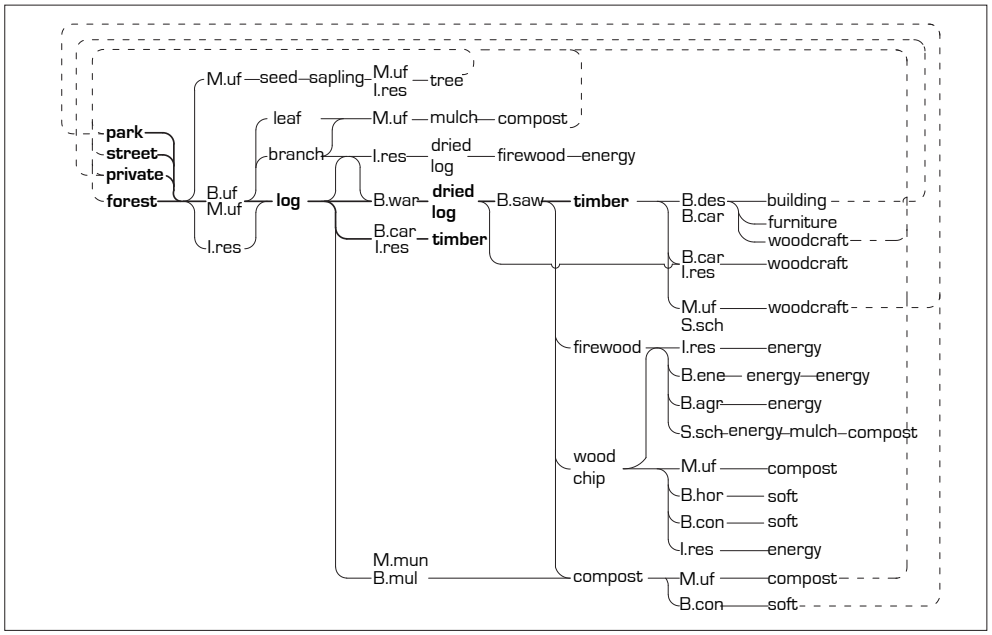
Sources :
1. http://www.jpgreen.or.jp/kyoukyu_jyouhou/gijyutsu/recycle/pdf/200208_05mito.pdf
2. http://edoyasai.sakura.ne.jp/sblo_files/edoyasai/ima-ge/4-1-4f62d.pdf

[3] CT Urban Forestry Program

Location : Connecticut, USA
Year of Establishment :1992
Type : one-source spine
Background : Urban trees in Connecticut was part of a 150 years re-growth program leftover of and the abandoned agricultural land during industrialization. In 1918, Connecticut Legislature appointed each local municipality to empower a local tree warden, who manages over public trees. In 1992, a group of tree wardens came together and suggested how this wood could be better used.

Forestry sources	Extracted Resources	Transformed Resources			Members		
					Personel		Facilities
park street private forest	log branch leaf seed	dried log timber building furniture woodcraft	firewood energy mulch compost soft	sapling tree	M.**u**rban **f**orester B.**u**rban **f**orester M.**mun**icipal B.**des**igner B.**car**penter I.**res**earcher	B.**agr**iculturalist B.**hor**sekeeper B.**con**tractor I.**res**idents	B.**war**ehouse B.**saw**mill S.**sch**ool B.**ene**rgy plant

Network diagram



References

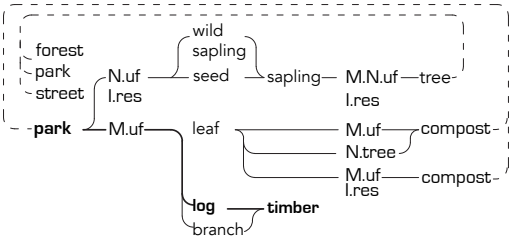
Sources:
1. The Use of Wood from Urban and Municipal Trees, C. Donnelly and G.Doria, CT DEEP Division of Forestry,2014
2. https://cturbanforestcouncil.org/
3. https://portal.ct.gov/
4. https://www.cthousegop.com/
5. https://cturbanforestcouncil.org/

[4] Meiji Jingu no Mori

Location : Tokyo,JP
Year of Establishment : 2001
Type : soft spine
Background: Meiji Jingu no Mori is an artificial forest dedicated to Emperor Meiji and Empress Shoken that was planted to grow into a primitive forest that generates on its own. In the present day, it is a renowned forest park within Tokyo. In the year 2001, a group of NPO members came together to extend further the legacy of the now matured primitive forest with its seeds and saplings.

Forestry sources	Extracted Resources	Transformed Resources	Members	
			Personel	Facilities
park forest street	wild sapling seed leaf log branch	sapling timber tree compost	N.**u**rban **f**orester I.**res**idents M.**u**rban **f**orester M.N.**u**rban **f**orester N.**tree**	

Network diagram



References

Children are involved in collecting acorns from the forest of Meiji Jingu through Hibiki

They are then grown in the nursery within Meiji Jingu grounds

Tree-planting festival run by NPO Hibiki with residents in the area of Tohoku which was struck by the tsunami.

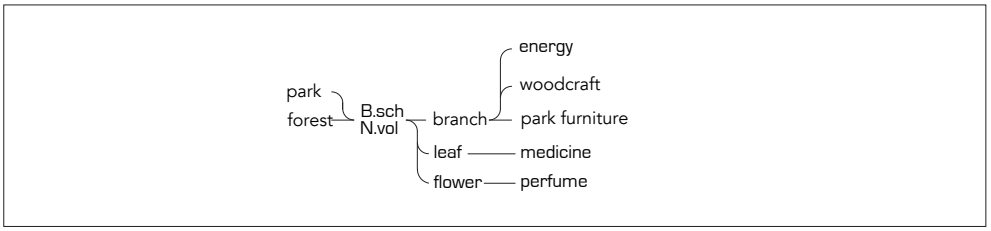
Sources :
1. https://www.meijijingu.or.jp
2. https://www.npohibiki.com
3.https://colocal.jp/topics/rebirth-project/earthradio/20120511_7158.html

[5] Robin Hood Kindergarten

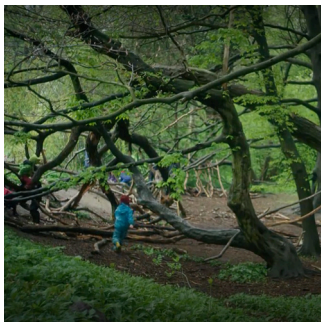
Location : Berlin,DE
Year of Establishment : 2005
Type : Spineless
Background : The English-German Forest Kindergarten is run by the Non-Profit Organization Robin Hood e.V. Its main objective is to operate the Kindergarten focussing on environmental education. Providing a supportive framework in which children and their parents can learn to build stable and reliable relationships with each other, nature, and the Kindergarten.

Forestry sources	Extracted Resources	Transformed Resources	Members	
			Personel	Facilities
park forest	branch leaf flower	energy woodcraft park furniture medicine perfume	N.**vol**unteer	B.**sch**ool

Network diagram



References



Children make their own playground with forestry by products from park

Children are taught to carry and use a knife to carve their own toys from branches from parks they visit

Featherstick, collected and used to make fire

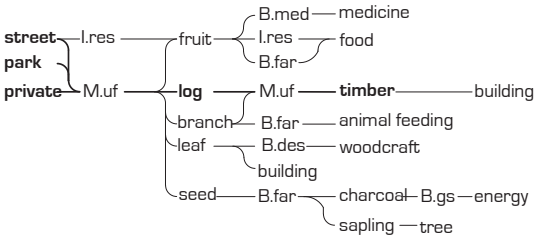
Sources :
1. http://www.robinhoodwald.de/en/
2. https://www.nytimes.com/2017/05/18/t-magazine/germany-forest-kindergarten-outdoor-preschool-waldkitas.html

[6] Abu Dhabi Vision 2030

Location : Abu Dhabi,AE
Year of Establishment : 2008
Initiator : one-source spine
Background: This program is part of a strategic plan undertaken by the Abu Dhabi Urban Planning Council (UPC). Guided by innovative environmental, economic, social, and cultural principles, this plan sets out a pathway for a sustainable Abu Dhabi that protects resources for current and future generations.

Forestry sources	Extracted Resources	Transformed Resources		Members	
				Personel	Facilities
street park private	fruit log branch leaf seed	medicine food timber building animal feeding	woodcraft charcoal energy sapling tree	I.**res**idents M.**u**rban **f**orester B.**med**ical staff B.**far**mer B.**des**igner B.**g**old **s**mith	

Network diagram



References

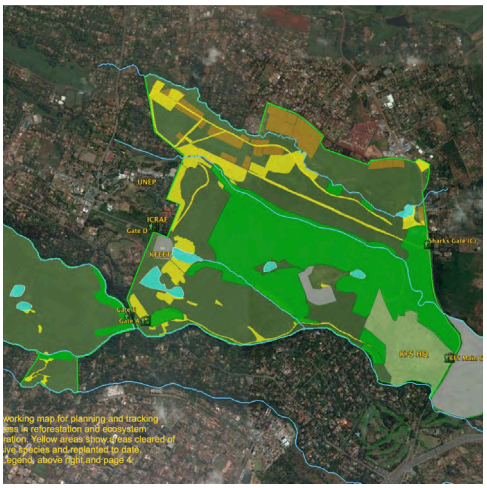
Dates palm plantation in Liwa Oasis

Liwa dates festival held yearly as dates are the main fruits of consumption in Abu Dhabi

Date palm leaf house with external palm panels, using rope made of palm hair from the top of the palm's trunk

Sources :
1. http://www.fao.org/3/a-bp822e.pdf
2. http://www.fao.org/fao-stories/article/en/c/1106849/?fbclid=IwAR3CdEgqGFvnrfy8_b4JgBTrCE2abBxLxiOrQp-dRWWCGUBDJSENYmmOuMWY
3. https://smccudubai.wordpress.com/2014/09/01/the-importance-of-dates-in-the-uae/

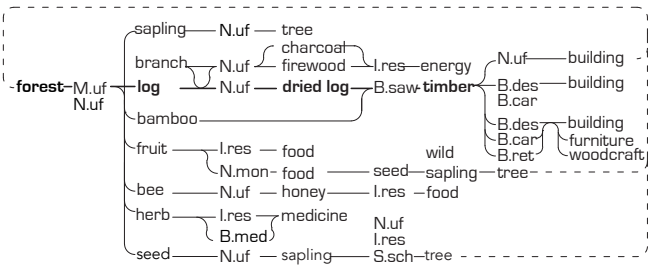
[7] Karura Forest Reserve



Location : Nairobi,KE
Year of Establishment : 2009
Type : one-source spine
Background: Karura Forest is an urban forest in Nairobi, the capital of Kenya. The forest was made public in 1932 and is currently managed by the Kenya Forest Service in conjunction with the Friends of Karura Forest Community Forest Association. This association is formed by hiring residents from nearby the forest and ex-poachers.

Forestry sources	Extracted Resources	Transformed Resources		Members	
				Personel	Facilities
forest	sapling branch log bamboo fruit bee herb seed	tree carcoarl firewood dried log food honey medicine sapling	seed energy timber wild sapling building furniture woodcraft	M.**ur**ban **f**orester N.**ur**ban **f**orester I.**res**idents N.**mon**key B.**med**ical staff B.**des**igner B.**car**penter	B.**saw**mill S.**sch**ool B.**ret**ailer

Network diagram



References


Seeds are collected from the primitive forest and nursed


Eucalyptus trees are intrusive species, removed and utilised for maintenance


A watch tower is built with the timber from eucalyptus trees.

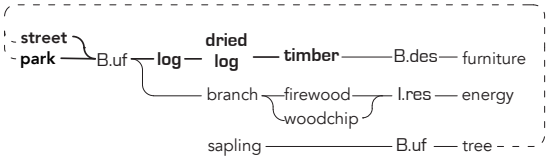
Sources :
1. Karura Forest Strategic Management Plan 2016-2020
2. https://www.friendsofkarura.org
3. https://www.facebook.com/KaruraFriends
4. http://www.kenyaforestservice.org
5. https://vimeo.com/33014377

[8] Madeira Urbana

Location: Campinas,BR
Year of Establishment: 2010
Type: one-source spine
Background: MadeiraUrbana is a certification company of wood from pruning and cutting city trees, supported by a digital tracking platform. The program also validates tree replacement plantations in urban afforestation. Carpentry and design studios market their finished products through the network.

Forestry sources	Extracted Resources	Transformed Resources		Members	
				Personel	Facilities
street park	log branch	dried log sapling timber firewood woodchip	furniture energy tree	B.**u**rban **f**orester B.**des**igner I.residents	

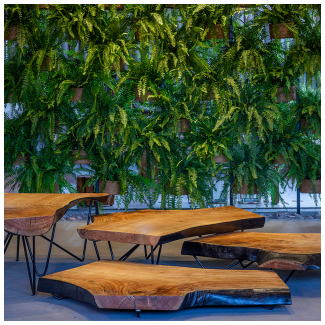
Network diagram



References

The company does logging under authorised project

Madeira Urbana also do plantation input



All sorts of furniture and wooden products under Madeira Urbana

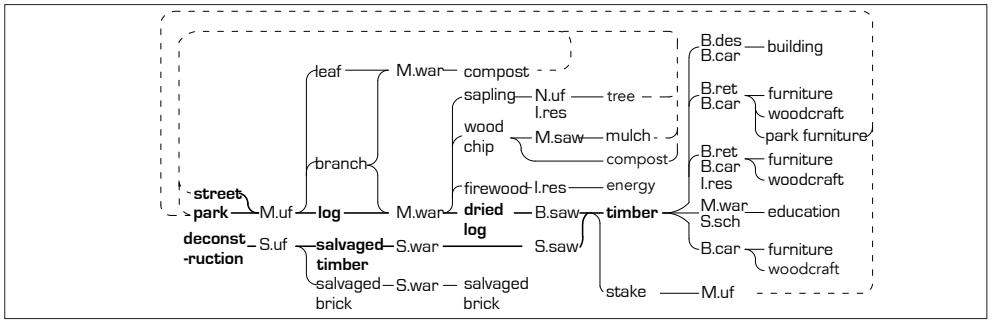
Sources :
1. https://www.madeiraurbana.com.br
2. http://www.cbft.com.br/madeiraurbana/
3. https://www.tecpodas.com.br/

[9] Baltimore Wood Project

Location: Baltimore,US
Year of Establishment: 2012
Type: double-source spine
Background: The Baltimore Wood Project is a collaborative effort among the USDA Forest Service, Humanim (Details Deconstruction; Brick + Board), to support a diversified regional wood economy that promotes sustainability and creates jobs, especially for people with barriers to employment. They divert wood that is often wasted and capture its value. They also salvage wood from the deconstruction of abandoned rowhomes.

Forestry sources	Extracted Resources	Transformed Resources			Members	
					Personel	Facilities
street park decon- struction	leaf branch log salvaged timber salvaged brick	compost sapling woodchip firewood dried log salvaged- brick	tree mulch energy timber stake building furniture	woodcraft park furniture education	M.**ur**ban **f**orester S.**ur**ban **f**orester N.**ur**ban **f**orester I.**res**idents B.**des**igner B.**car**penter	M.**war**ehouse S.**war**ehouse M.**saw**mill B.**saw**mill S.**saw**mill B.**ret**ailer S.**sch**ool

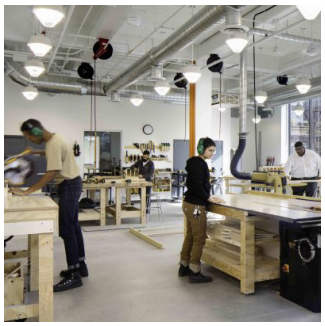
Network diagram



References

salvaged timber are collected through Details Deconstruction and refurbished for timber

Camp Small is a municipal warehouse to store logged trees and transforming them into usable resources.



OpenWork is an open maker's space for locals which sources material from Details and CampSmall.

Sources :
1. USDA, The Urban Wood Workbook A Framework for the Baltimore Wood Project, April 2020
2. https://www.learngala.com/cases/urbanwood/1
3. http://baltimorewoodproject.org
4. https://parksandpeople.org
5. brickandboard.com/
6. https://humanim.org/

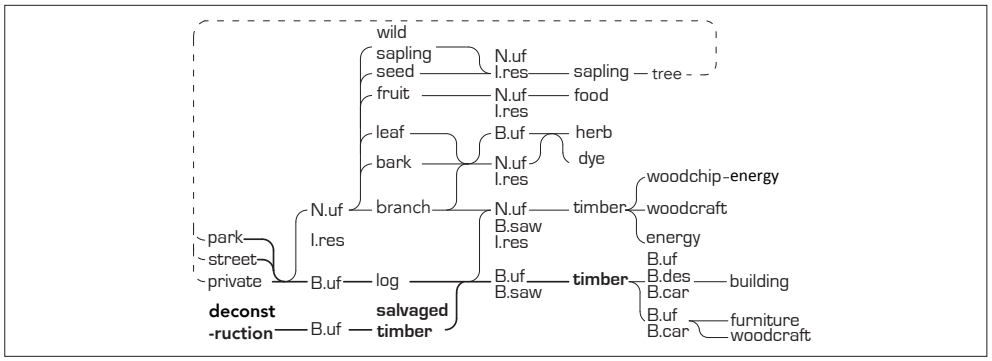
[10] Toshiringyou

Location: Tokyo,JP
Year of Establishment: 2012
Type: double-source spine
Background: Toshiringyou is a business company run by an architect that also established an NPO called Machimono. Machimono involves residents in accessing resources from urban sites through timber workshops. On the other hand, Toshiringyou requires professional skills to access. Yuguchi-san often collaborates with other carpenters and designers in utilizing urban wood from urban sources.

Forestry sources	Extracted Resources	Transformed Resources	
park street private decon- struction	wild sapling seed fruit leaf bark branch log salvaged timber	sapling food herb dye timber tree woodchip woodcraft energy	building furniture woodcraft

Members	
Personel	Facilities
N.**u**rban **f**orester I.**res**idents B.**u**rban **f**orester B.**des**igner B.**car**penter	B.**saw**mill

Network diagram



References

NPO Machimono allow residents to access urban forestry resources

After felling a tree, new trees are planted in the same location

Children are extracting barks which used to make dye

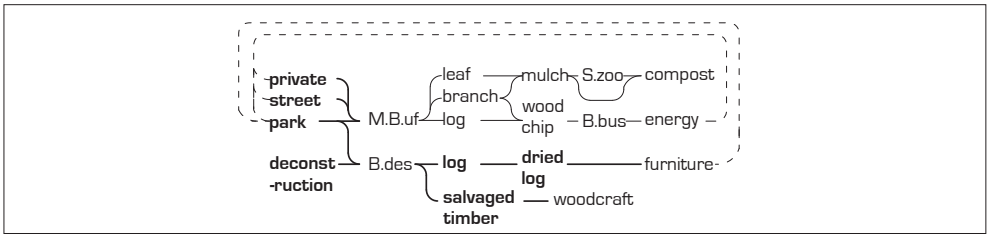
Sources :
1. https://www.toshiringyou.com/
2. http://machimono.web.fc2.com/
3. 製材ワークショップ都市森林プロジェクト, 2019年2月, by Machi Mono Inc, Urban Forest Co.ltd
4. Interview with Yoshiyuki Yuguchi, 27 May 2020.

[11] Sao Paulo Forestry Program

Location : Sao Paulo,BR
Year of Establishment : 2013
Type : double-source spine
Background: Two parallel programs form this network. First, a collaboration between the municipality and a private powerplant for dealing with those trees that interrupt electrical cables. And independent artists also access urban wood for wooden resources for making art pieces.

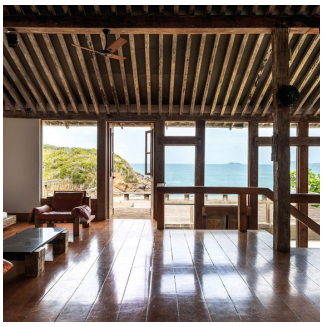
Forestry sources	Extracted Resources	Transformed Resources	Members	
			Personel	Facilities
private street park decon- struction	leaf branch log salvaged timber	mulch woodchip dried log woodcraft compost energy furniture	M.B.**u**rban **f**orester B.**des**igner	S.**zoo** B.**bus**iness

Network diagram



References

Artist Hugo Franca and his work on a fallen a park tree.



Interior project by Zanine Caldas with wood collected from maintenance

Artist Pedro Petry also utilise these resources to make other woodcrafts

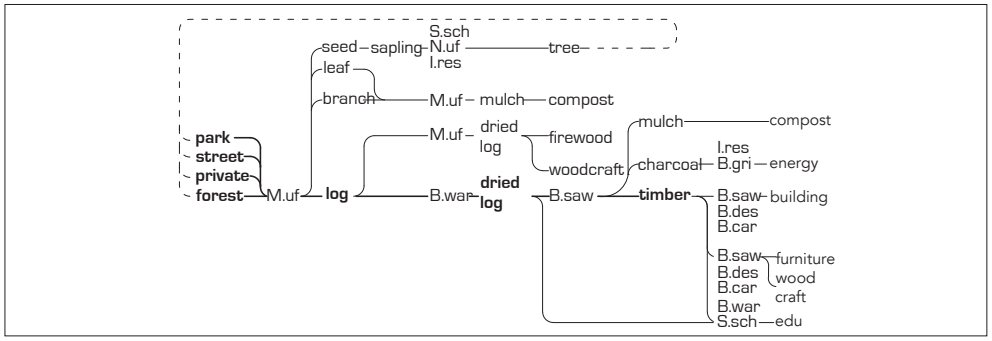
Sources :
1.Malaguti de Sousa, C.: Waste valuing from wood management through design: Ideas from the case of São Paulo. AGATHÓN, International Journal of Architecture, Art and Design, no. 06, p. 228-239, Dec., 2019
2. https://www.vancouverbiennale.com/artworks/public-furniture-urban-trees-howe-sound-secondary-school/

[12] Tree Cycle America

Location : Charlotte,US
Year of Establishment : 2013
Type : one-source spine
Background : Treecycle America is a network of wood processors that includes several local sawmills around the region that can accept fallen trees. They help customers to find the closest location that can receive the type of trunks that need disposal.

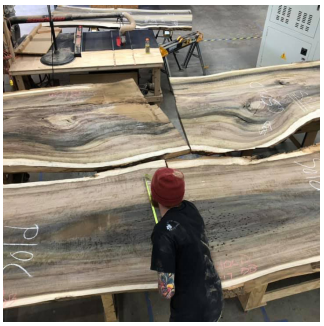
Forestry sources	Extracted Resources	Transformed Resources			Members	
					Personel	Facilities
park street private forest	seed leaf branch log	sapling tree mulch compost gried log firewood	woodcraft charcoal energy timber building furniture	woodcraft education	M.**u**rban **f**orester N.**u**rban **f**orester I.**res**idents B.**des**igner B.**car**penter	S.**sch**ool B.**war**ehouse B.**saw**mill B.cook

Network diagram



References

Warehouse where they collect and process logs from municipal urban forest



Wood processing and measured in the workshop

Furniture made from logs collected from maintenance

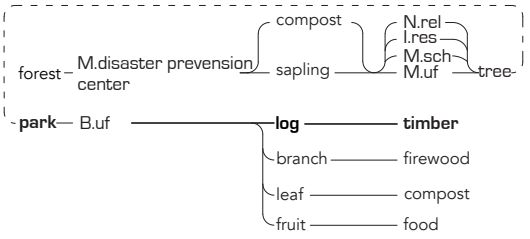
Sources :
1. https://treecycleamerica.com/
2. https://carolinaurbanlumber.com/
3. https://treescharlotte.org
4. https://carolinaurbanlumber.com
5. https://illinoisurbanwood.org/treecycle-america-entrepreneur-forges-an-urban-wood-network/

[13] Boca de Sapo

Location : Independencia,PE
Year of Establishment : 2015
Type: soft spine
Background: The Municipal Disaster Prevention Center started this initiative to create a productive forest on these barren slopes to prevent landslides. They provide seedlings of native species from local forests to plant them in a collaborative effort with the neighborhood community and different local entities such as religious NPOs, or universities. The forest has been planned so that once it is fully developed, resources such as logs, branches, leaves, fruits, and herbs can be extracted and used.

Forestry sources	Extracted Resources	Transformed Resources	Members	
			Personel	Facilities
forest park	compost sapling log branch leaf fruit	tree timber firewood compost food	M.disaster preven- sion center B.**u**rban **f**orester I.**res**idents M.**u**rban **f**orester	N.**rel**igions M.**sch**ool

Network diagram



References

Municipality prepares and provides saplings for plantation.

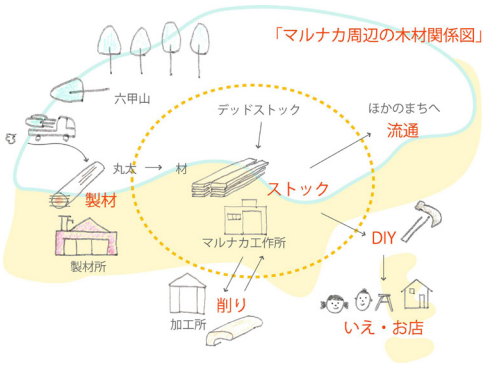
Residents and volunteers carry the saplings and prepare the plantation

The plantation efforts also secure the safety of the residents at the hillside.

Sources :
1. http://www.predes.org.pe/comienzan-con-procesos-de-siembra-en-parque-forestal-boca-de-sapo/
2. Forest and sustainable City

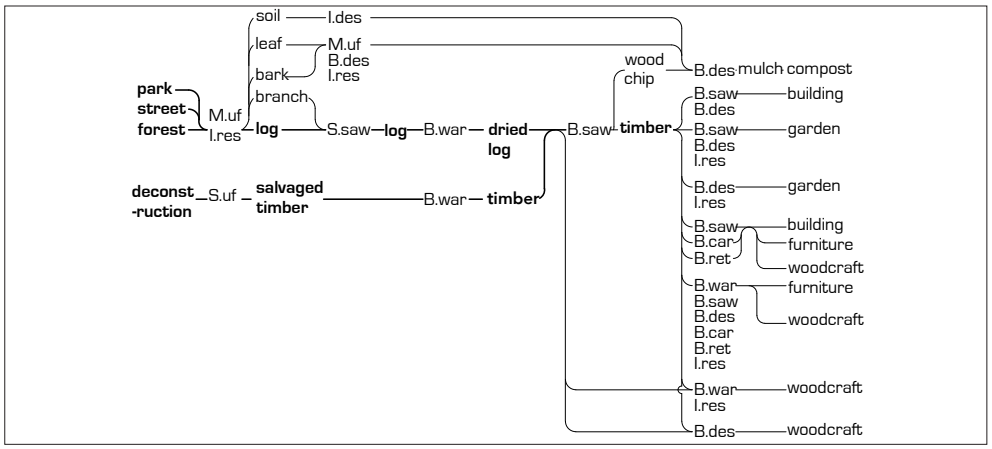
[14] Kobe Mori no Ki

Location : Kobe,JP
Year of Establishment : 2015
Style : double-source spine
Background: "Kobe no mori no ki" is a collaborative effort with Kobe Parks and Greenery Association to effectively utilize the trees generated by the maintenance of the local mountain Rokkosan. Forestry in this manner is not limited to mountains, but it is also extended to towns.



Forestry sources	Extracted Resources	Transformed Resources		Members	
				Personel	Facilities
park street forest decon- struction	soil leaf bark branch log salvaged timber	log dried log timber woodchip mulch compost building	garden furniture woodcraft	M.**u**rban **f**orester I.**res**idents S.**u**rban **f**orester I.**des**igner B.**des**igner B.**car**penter	S.**saw**mill B.**war**ehouse B.**saw**mill B.**ret**ailer

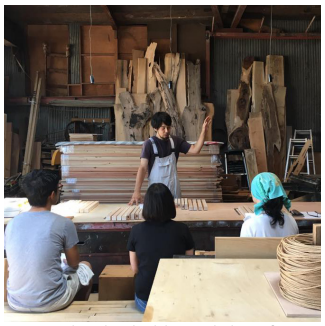
Network diagram



References


Community meeting to discuss the utilization of trees from Rokkosan


Marunaka warehouse and workshop collects logs and salvaged timber


Marunaka also holds workshop for residents participation

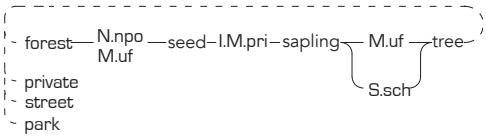
Sources :
1. http://www.share-woods.jp/
2. https://www.kobe-park.or.jp/
3. https://kobesmilepj.com/
4. https://www.facebook.com/woodsshare/
5. https://www.facebook.com/kobemorinoki
6. https://www.isshikimayumi.com/rokkosan-grand
7. https://note.com/woodymasa/m/mf44dbf127c55

[15] Sembrando Paz, Reforestando Vidas

Location : Lajoyita,PA
Year of Establishment : 2016
Type: spineless
Background: This network was born as a spin-off from another municipal program that promotes the reuse of urban solid waste. In this instance, a group of prisoners spontaneously started to grow local plants in a nursery inside the prison. These are special native species that are disappearing from cultivation as they are not commercially viable. The final planting sites are urban parks, streets, schools, and even native forest plantations outside the city

Forestry sources	Extracted Resources	Transformed Resources	Members	
			Personel	Facilities
forest private street park	seed	sapling tree	N.**npo** M.**u**rban **f**orester I.M.**pri**soner	S.**sch**ool

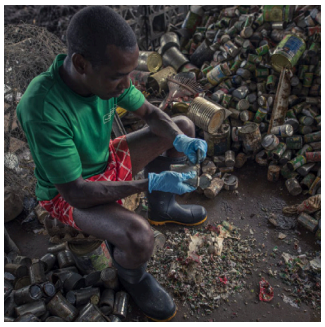
Network diagram



References

NPO ICRC provides seeds and later utilizes the saplings for reforestation.

Prisoners' daily activity in nursing native seedlings.



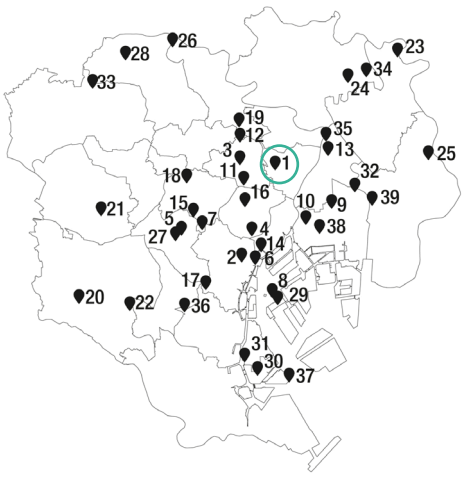
prisoners also make tools from recycled material to use in plantation

Sources :

1. https://www.icrc.org/es/document/sembrando-paz-el-vivero-que-esta-reforestando-vidas-en-la-carcel-de-la-joyita-en-panama
2. http://www.mingob.gob.pa/sistemapenitenciario/programa-sembrando-paz-llego-para-aportar-al-medio-ambiente-en-bocas-del-toro/
3.https://www.europapress.es/internacional/noticia-sembrando-paz-vivero-ayuda-reforestar-panama-reinsecion-presos-20181013094234
4. https://elpais.com/elpais/2019/02/25/planeta_futuro/1551108569_640809.html

Tokyo Metropolitan Parks

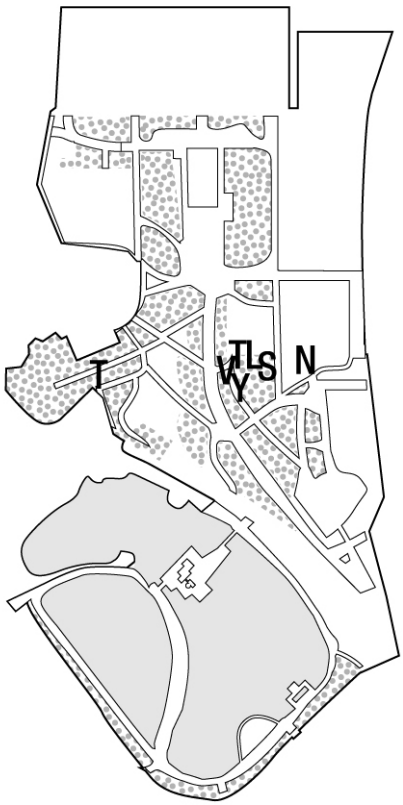
[01] Ueno



Comprehensive Table

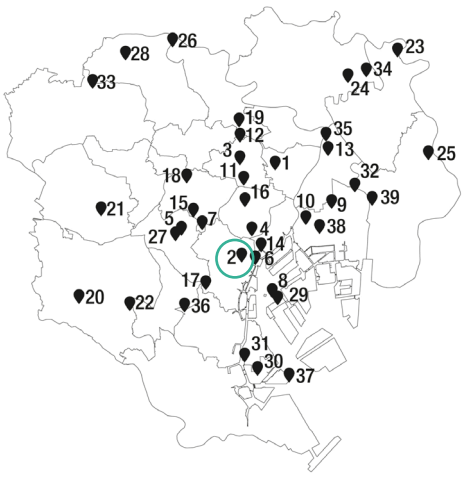
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field			San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
1	Ueno Park	1873	Rg	El	53,85	8.800	163	PdL	Nt	○	○	○	○	○	·	·	·	·	○	·	·	·	·	·	·

Urban Forestry Assemblage



0 100 500

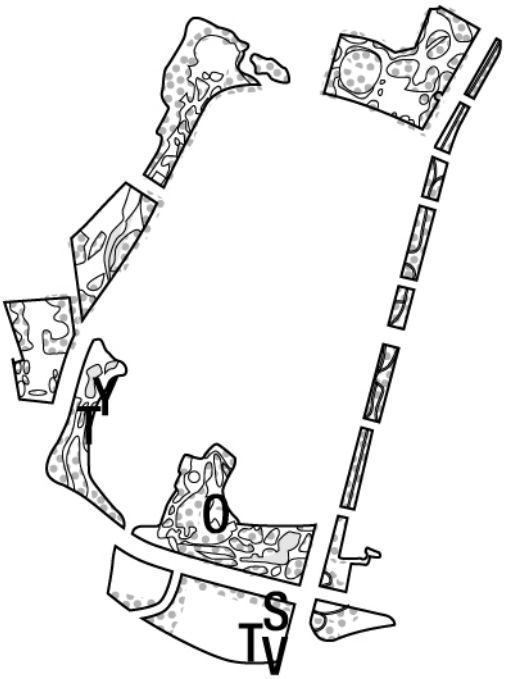
[02] Shiba



Comprehensive Table

No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
2	Shiba Park	1873	Rg	Fr	12,25	4.200	343	St	Nt	○	○	·	○	○	·	·	·	·	·	·	○	·	·	·	·

Urban Forestry Assemblage



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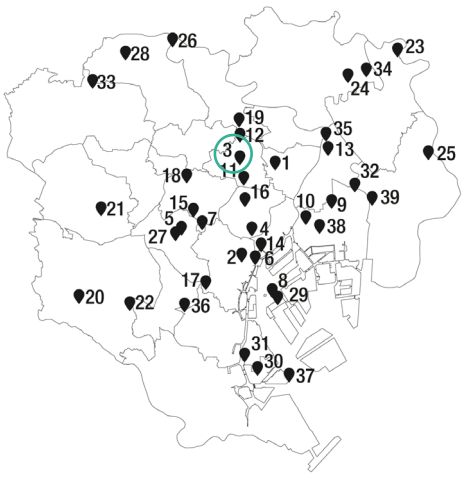
[03] Koishikawa Botanical Garden



Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements										
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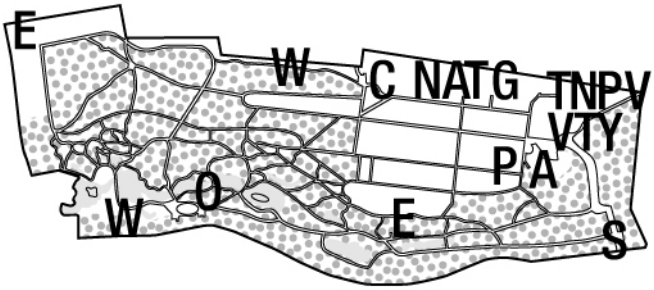
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
3	Koishikawa Botanical Garden	1877	Rd/Rs	El	16,15	9.000	557	Sp, St	Nt	○	○	·	○	○	○	○	○	·	○	○	○	·	○	○	·

Urban Forestry Assemblage



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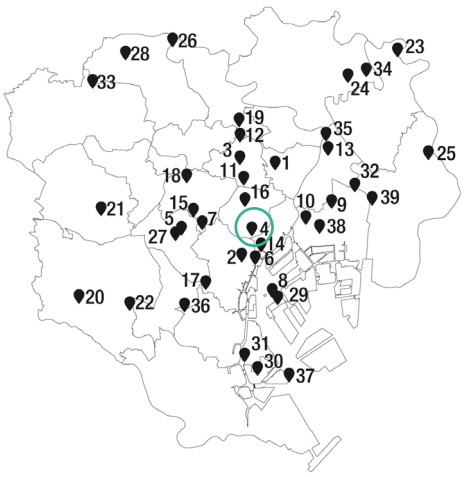
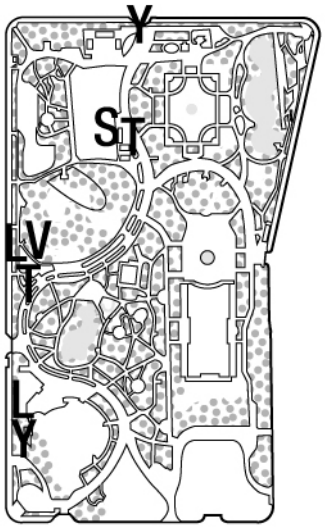
[04] Hibiya Park



Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements								
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr		San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
4	Hibiya Park	1903	Rd/Mi	Co	16,16	3.100	192	Pd	Fl	○	○	○	○	○	·	·	·	·	·	·	·	·	·	·	·

Urban Forestry Assemblage



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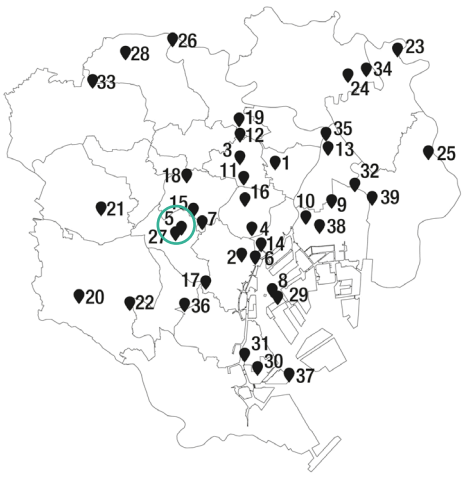
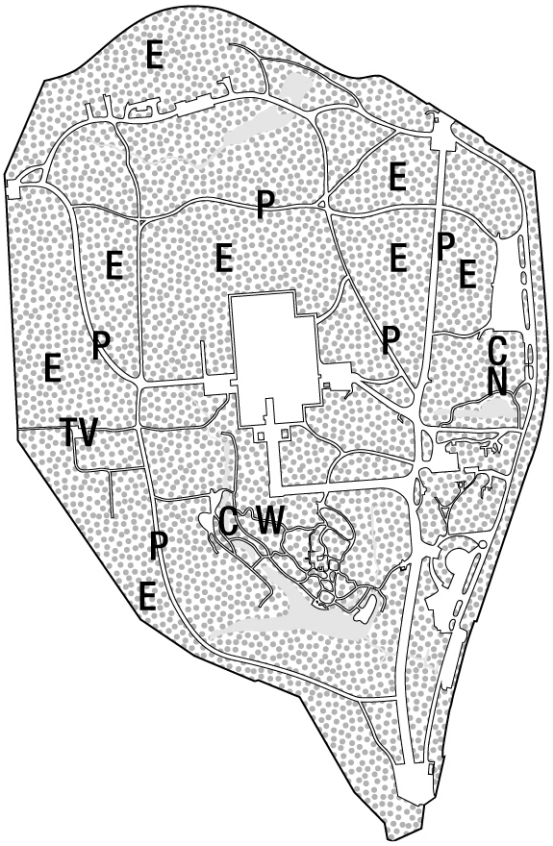
[05] Meiji Jingu



Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements												
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field			Attr		San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
5	Meiji Jingu	1920	Rd/Im/Rg	Co	70,00	36.000	514	Pd,Sp,St	Af	-	○	-	○	-	-	○	○	-	○	○	-	-	-	○	-

Urban Forestry Assemblage



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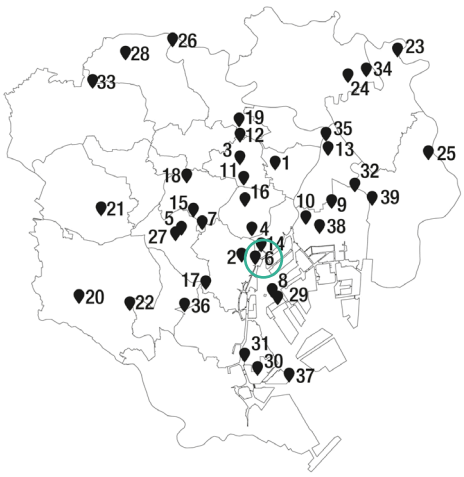
[06] Kyu Shiba Rikyu



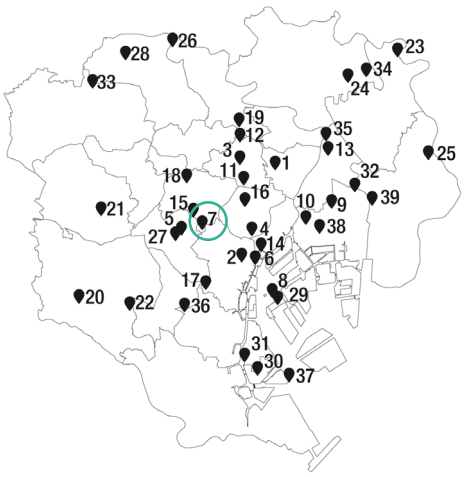
Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
6	Kyu-Shiba-rikyu Gardens	1924	Rd/Im	Co	4,31	1.900	441	PdL	Af	○	○	○	○	○	·	·	·	·	·	·	·	·	·	·	·

Urban Forestry Assemblage

0 100 500

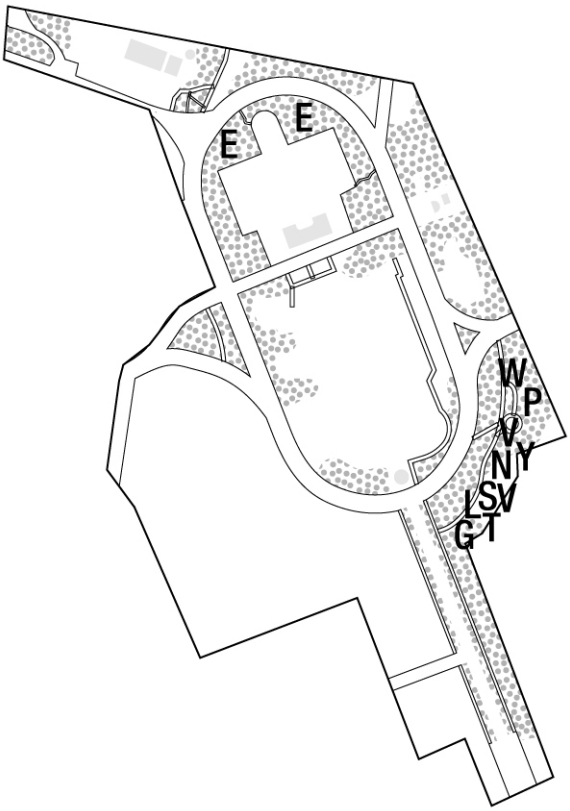
[07] Meiji Jingu Gaien



Comprehensive Table

No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements					
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices S T L V Y G	Biodeb P W B	Field N C O	Attr F	San A E I
7	Meiji Jingu Gaien	1926	Rd/Mi	El	48,00	5.000	104	Ft	Fl	○○○○○○	○○ ·	○ · ·	· ·	○ ·

Urban Forestry Assemblage



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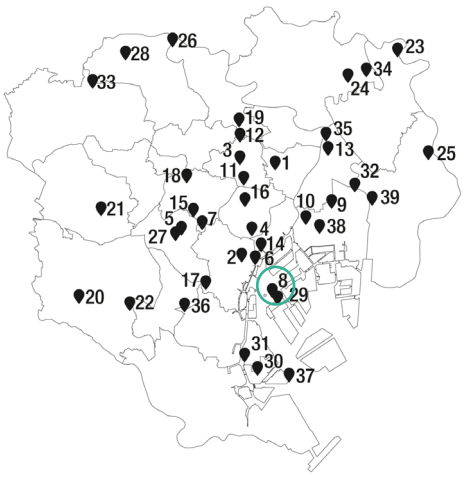
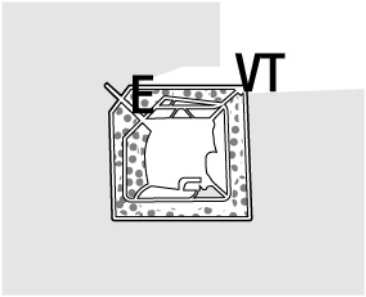
[08] Daiba



Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
8	Daiba Park	1928	Mi	Co	2,99	590	197	Oc	Lf	-	○	-	○	-	-	-	-	-	-	-	-	-	-	○	-

Urban Forestry Assemblage



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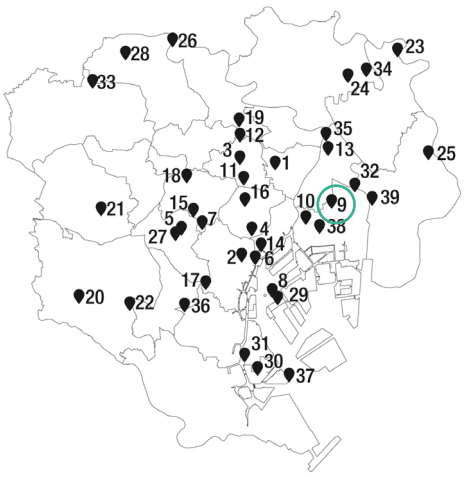
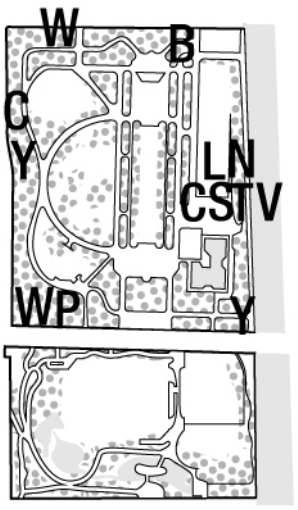
[09] Sarue



Comprehensive Table

No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements					
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices	Biodeb	Field	Attr	San
										S T L V Y G	P W B	N C O	F A	E I
9	Sarue Park	1932	Str/Im	Fr	14,50	5.500	379	St,Rv	Fl	○○○○○·	○○ ○	○○·	· ·	· ·

Urban Forestry Assemblage



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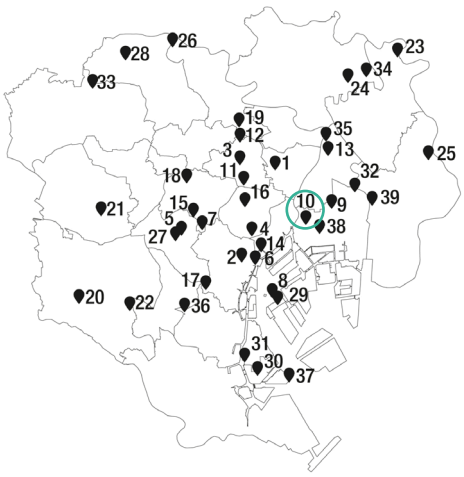
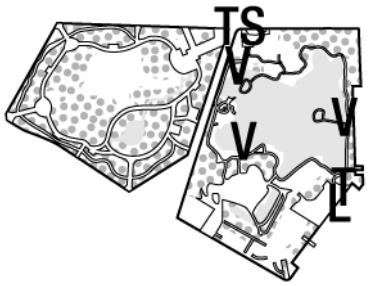
[10] Kiyosumi



Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr		San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
10	Kiyosumi Gardens	1932	Rd	Fr	8,10	4.100	506	PdL	Af	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-	-

Urban Forestry Assemblage



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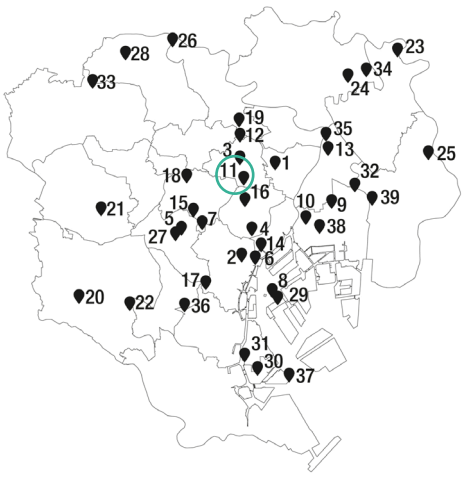
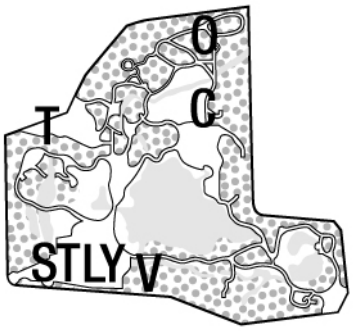
[11] Koishikawa Korakuen



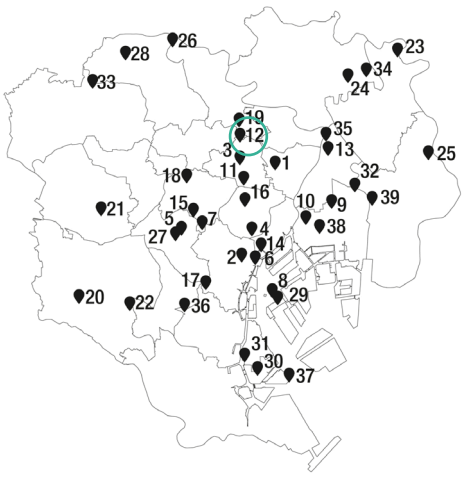
Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements								
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr		San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
11	Koishikawa Korakuen	1938	Rd	Co	7,08	3.000	424	PdL	Af	○	○	○	○	○	-	-	-	-	○	○	-	-	-	-	-

Urban Forestry Assemblage



[12] Rikugien



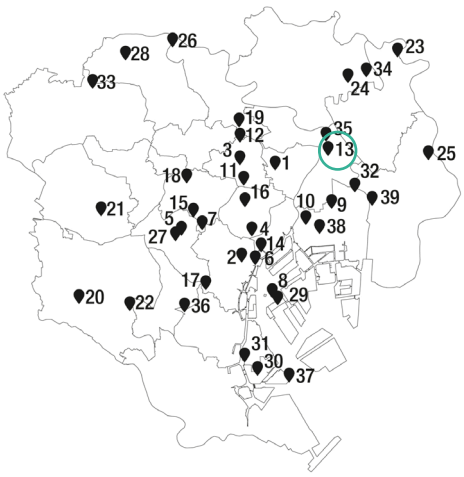
Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb			Field			Attr		San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
12	Rikugien Gardens	1938	Rd	Co	8,78	5.600	638	PdL	Af	○	○	○	○	○	·	-	-	-	-	-	-	-	-	○	·

Urban Forestry Assemblage

0 100 500

[13] Mukojima-Hyakkaen



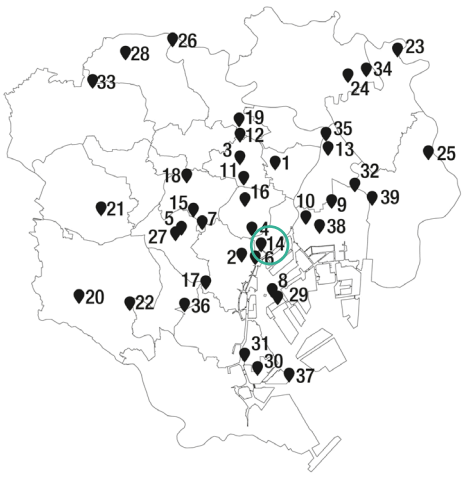
Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
13	Mukojima-Hyakkaen Gardens	1939	Rd	Co	1,08	870	806	Pd	Fl	○	○	○	○	○	○	-	-	-	○	-	-	-	-	-	-

Urban Forestry Assemblage

0 100 500

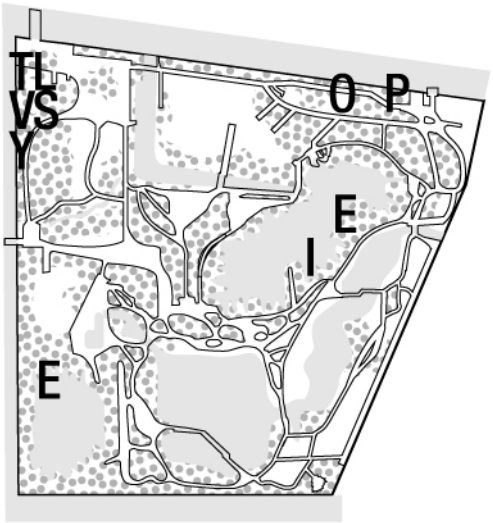
[14] Hama Rikyu



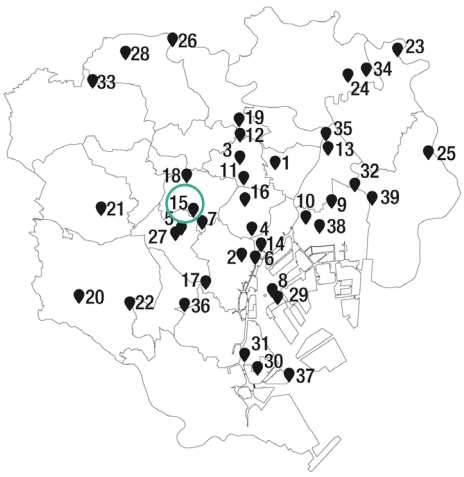
Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
14	Hama-rikyu Gardens	1946	Rd/Im	Co	25,02	6.100	244	Oc,PdL	Lf	○	○	○	○	○	·	○	·	·	·	○	·	·	○	○	

Urban Forestry Assemblage



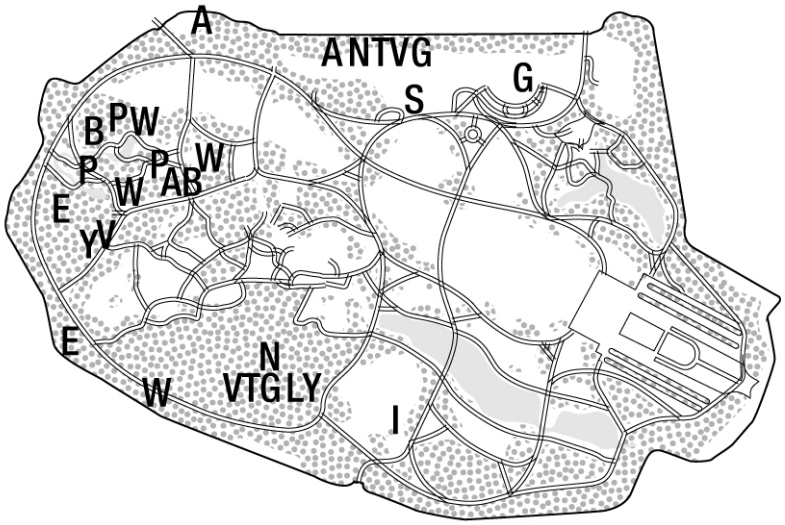
[15] Shinjuku Gyoen



Comprehensive Table

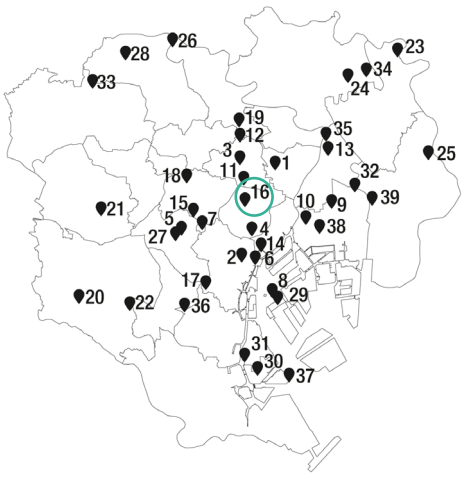
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
15	Shinjuku Gyoen	1949	Rd/Rs/Im	Co	58,30	20.000	343	PdL	Fl	○	○	○	○	○	○	○	○	○	○	-	-	-	○	○	○

Urban Forestry Assemblage



0 100 500

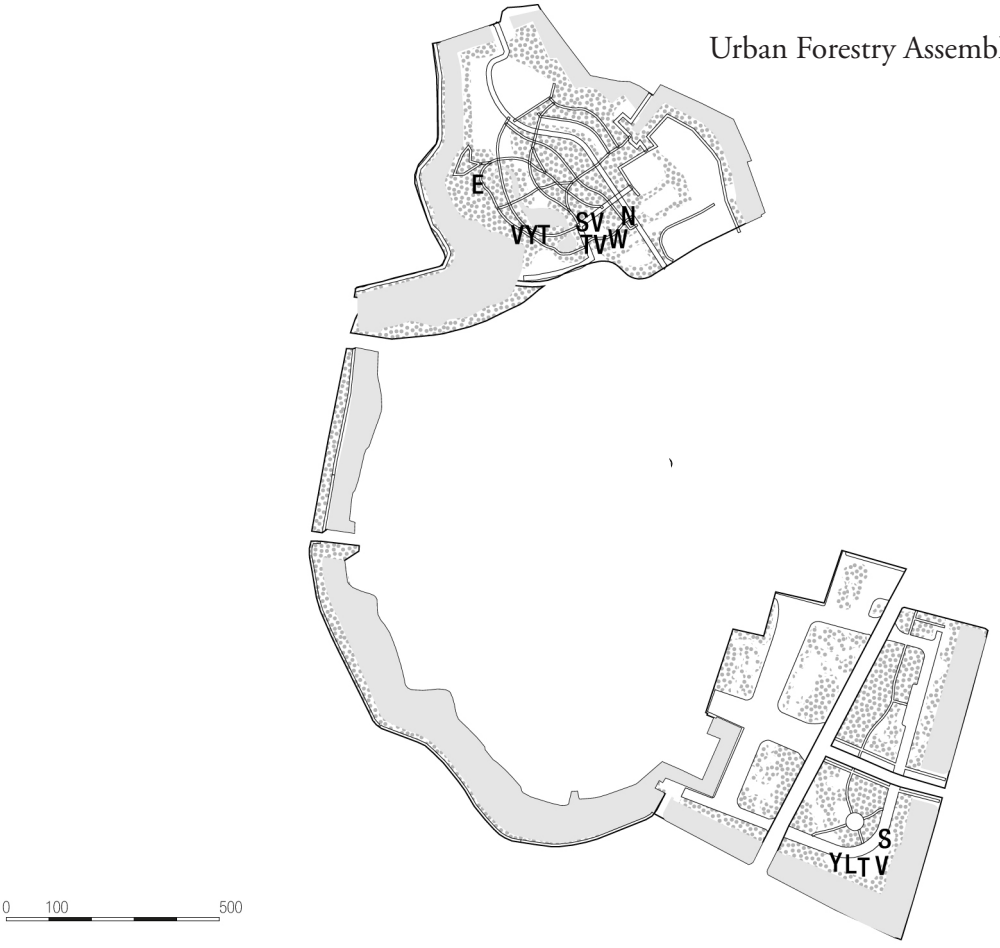
[16] Kitanomaru + Kokyo Gaien



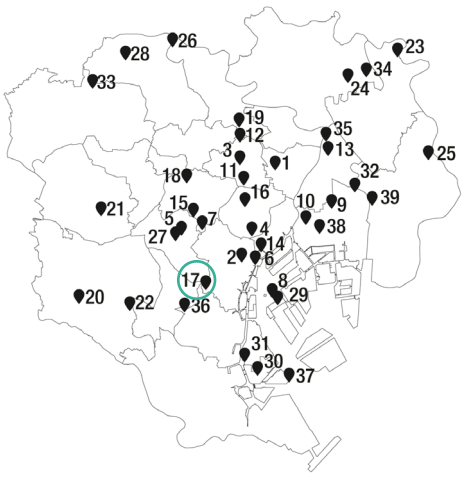
Comprehensive Table

No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
16	Kitanomaru+Kokyo	1949	Im/Rd	Fr	64,50	18.400	285	Mt,PdL	Af	○	○	○	○	○	·	·	○	·	○	·	·	·	·	○	·

Urban Forestry Assemblage



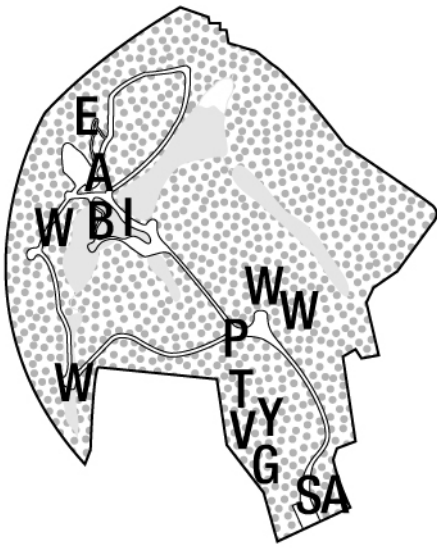
[17] Institute for Nature Study



Comprehensive Table

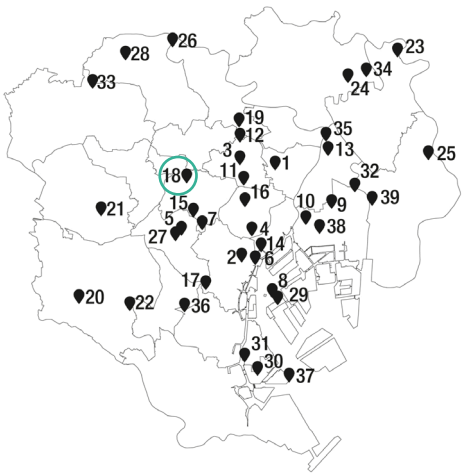
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
17	Institute for Nature Study	1949	Os/Rd/Mi/Di/Im/Rs	Co	20,00	15.380	769	Pd	Af	○	○	·	○	○	○	○	○	○	·	·	·	·	○	○	○

Urban Forestry Assemblage



0 100 500

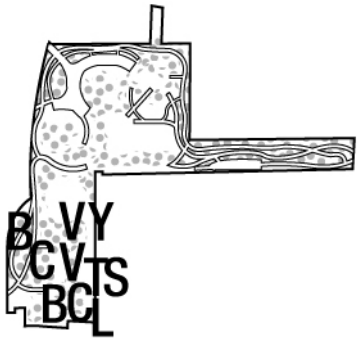
[18] Toyama

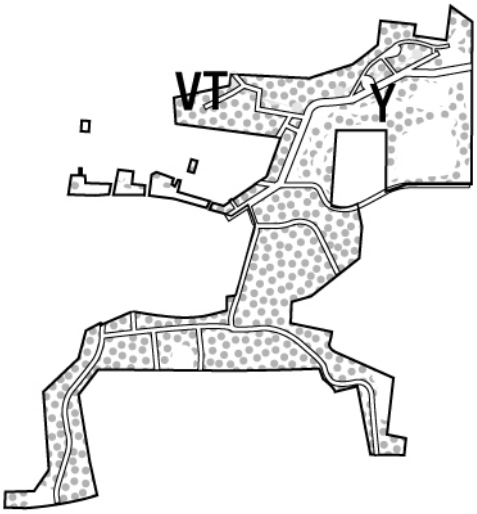


Comprehensive Table

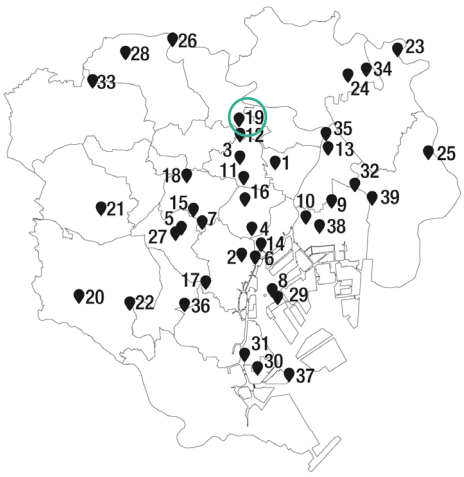
No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements								
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb	Field		Attr		San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
18	Toyama Park	1954	Rd/Mi,Hs	Fr	18,64	5.200	279	Jb,St	Af	○	○	○	○	○	·	·	·	○	·	○	·	·	·	·	·

Urban Forestry Assemblage





[19] Kyu-Furukawa

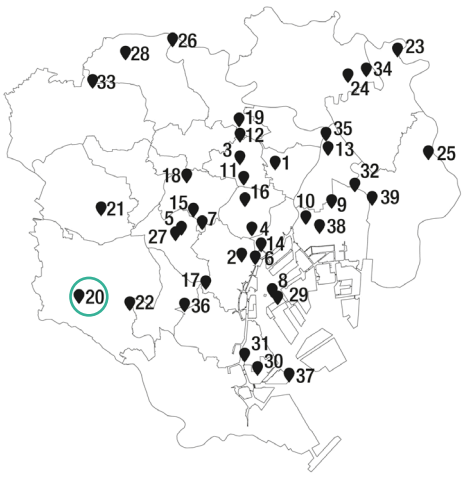


Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb			Field			Attr		San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
19	Kyu-Furukawa Gardens	1956	Rd	Co	3,07	2.600	847	Pd	Af	○	○	○	○	○	-	-	-	-	-	-	-	-	-	-	-

Urban Forestry Assemblage

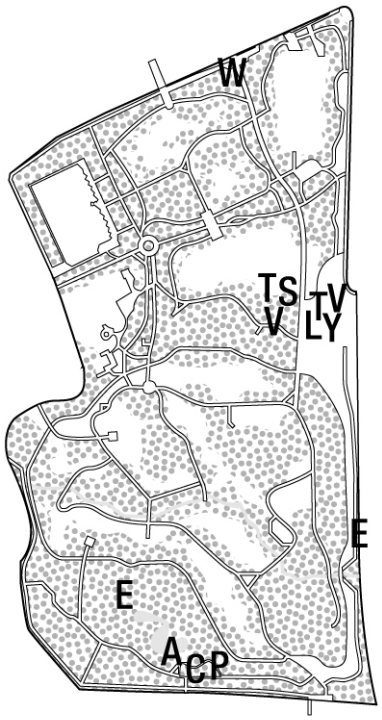
[20] Kinuta



Comprehensive Table

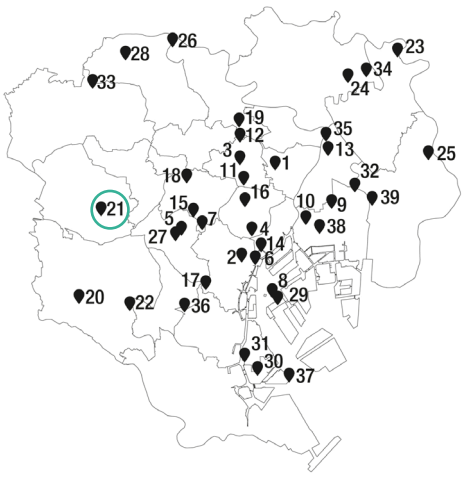
No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements					
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices S T L V Y G	Biodeb P W B	Field N C O	Attr F	San A E I	
20	Kinuta Park	1957	Di/Spt	Co	39,17	11.000	281	Pd,St	Nt	○○○○○·	○○ · ·	· ○ ·	· ·	○ ·	

Urban Forestry Assemblage



0 100 500

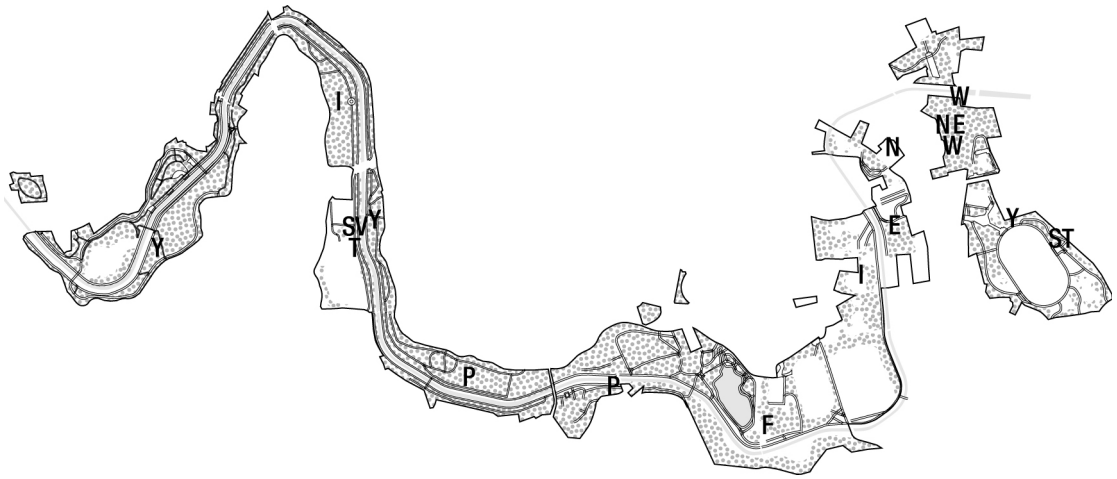
[21] Zenpukujigawa & Wadabori



Comprehensive Table

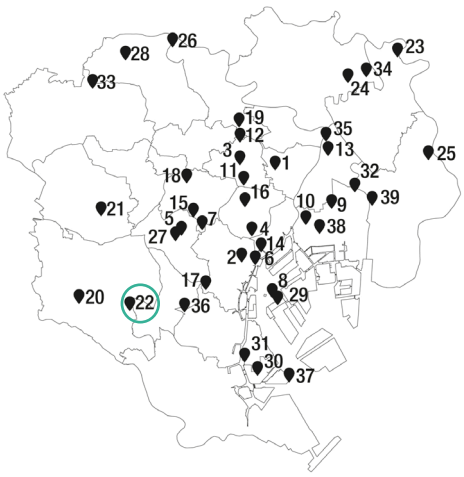
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
21	Zenpukujigawa+Wadabori	1964	Os/If	El	43,92	10.700	244	PdL,Rv	Fl	○	○	·	○	○	·	○	○	·	○	·	·	○	·	○	○

Urban Forestry Assemblage



0 100 500

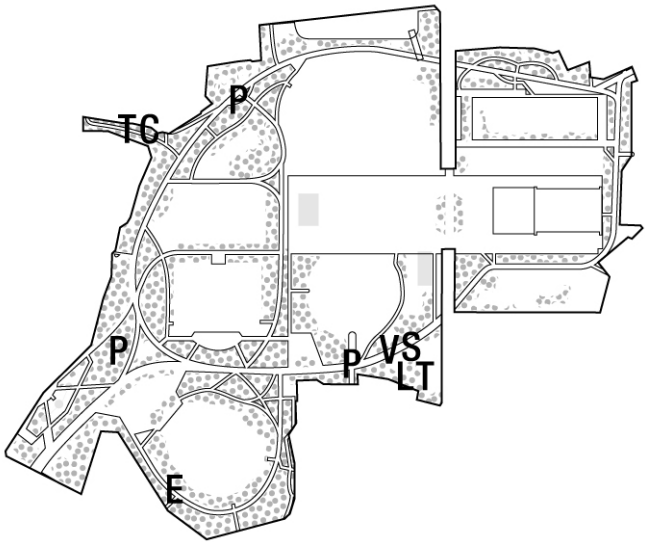
[22] Komazawa



Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field			San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
22	Komazawa Olympic Park	1964	Spt/Ag,Di/Spt	Co	41,35	7.300	177	Jb	Fl	○	○	○	○	·	·	○	·	·	○	·	·	·	·	○	·

Urban Forestry Assemblage



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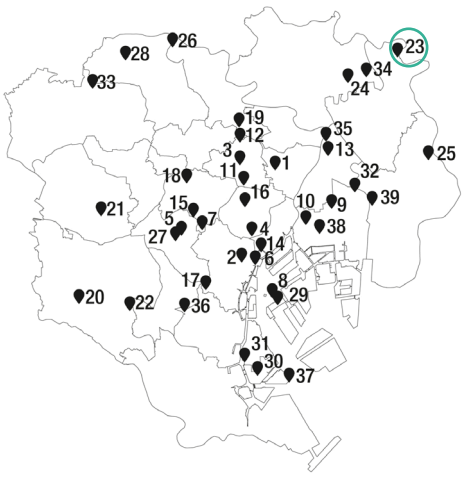
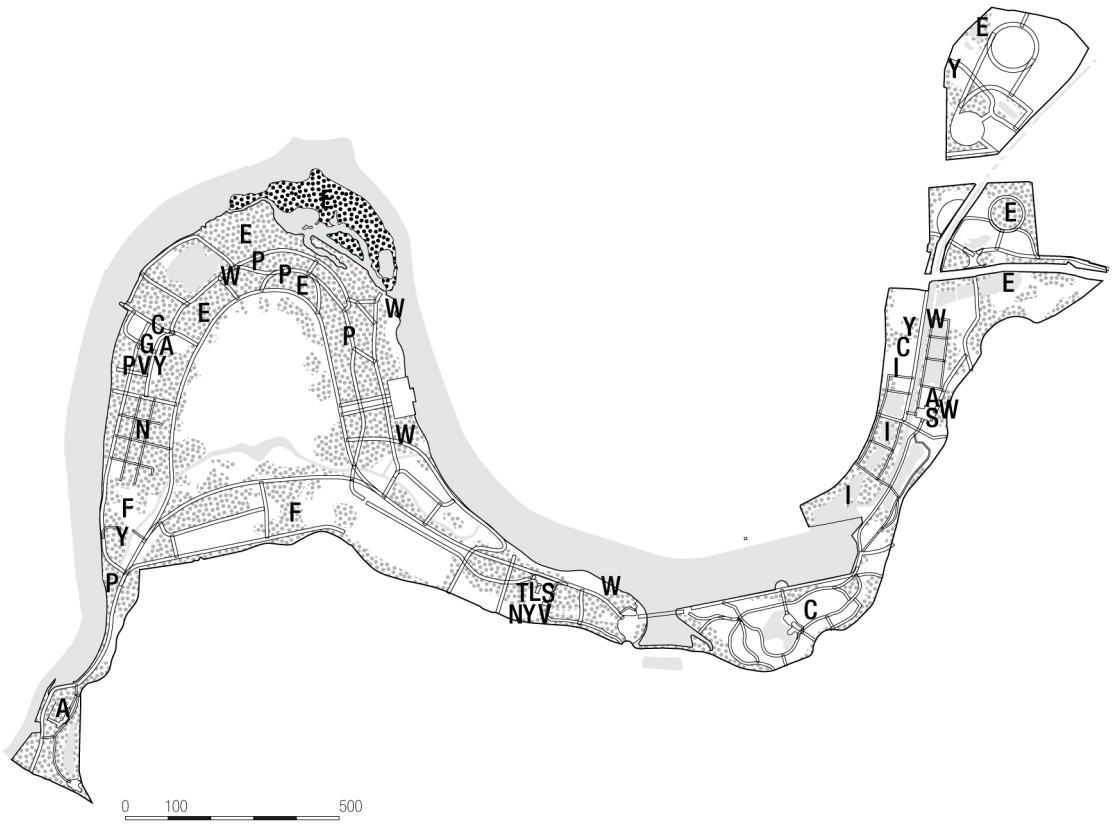
[23] Mizumoto



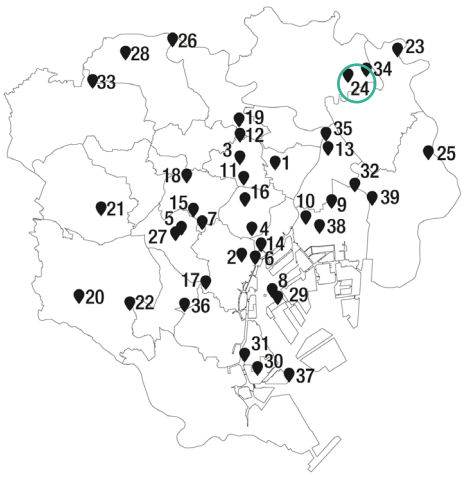
Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices						Biodeb		Field			Attr		San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
23	Mizumoto Park	1965	If/Ag	El	96,30	18.900	196	PdL,Rv,St	Fl	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Urban Forestry Assemblage



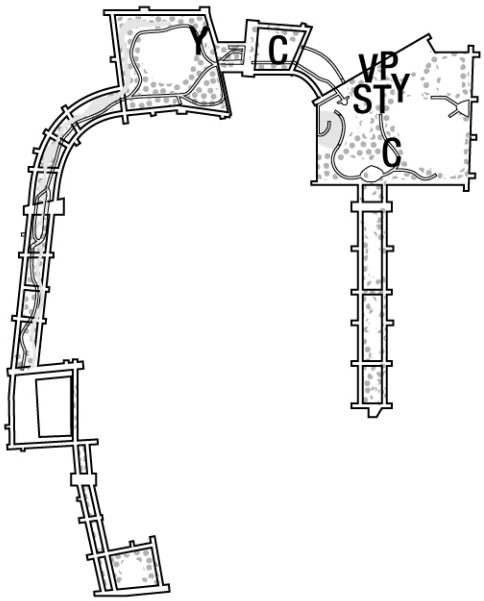
[24] Higashi-Ayase



Comprehensive Table

No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
24	Higashi-Ayase Park	1966	Ag	El	15,89	6.900	434	Sp,St	Fl	○	○	-	○	○	-	○	-	-	-	○	-	-	-	-	-

Urban Forestry Assemblage



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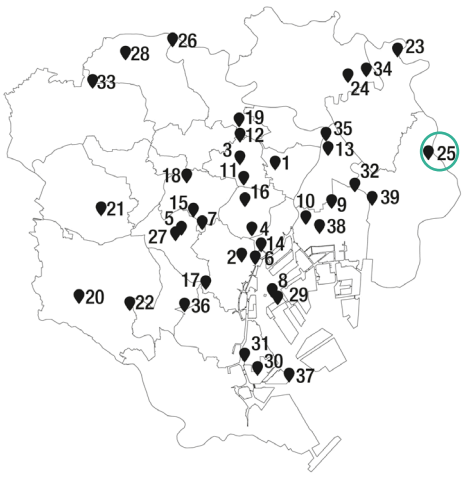
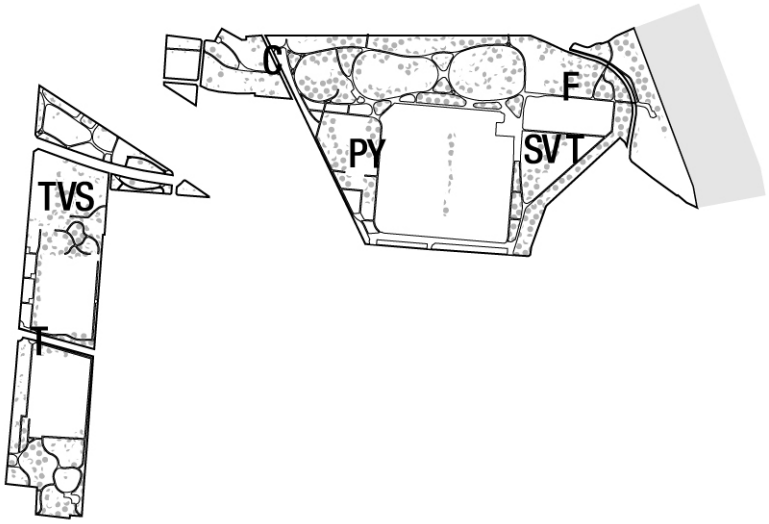
[25] Shinozaki



Comprehensive Table

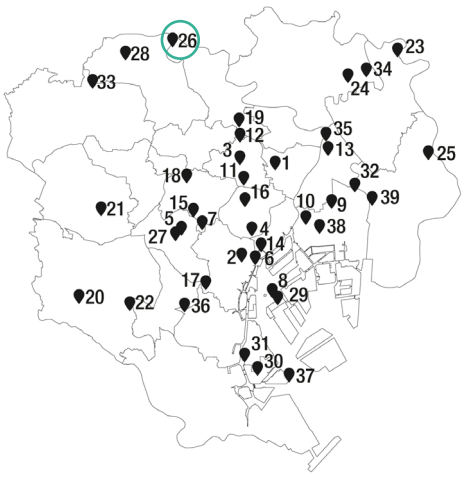
No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements											
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr		San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
25	Shinozaki Park	1967	Ag,Str	Fr	30,26	6.500	215	Rv	Fl	○	○	·	○	○	·	○	·	·	·	·	○	·	·	·	·

Urban Forestry Assemblage



0 100 500

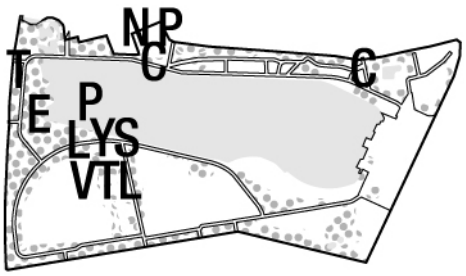
[26] Ukima



Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
26	Ukima Park	1967	If	El	11,73	3.400	290	Jb,PdL	Fl	○	○	○	○	○	·	○	·	·	○	○	·	·	·	○	·

Urban Forestry Assemblage



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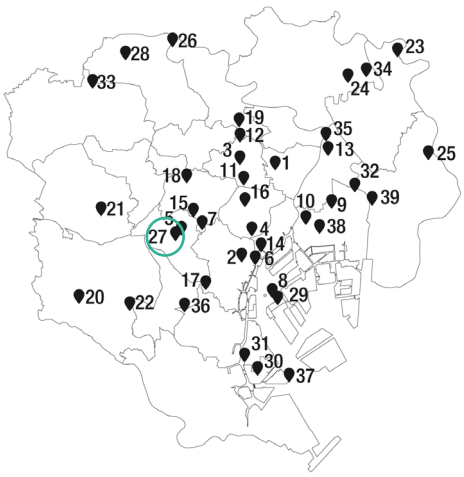
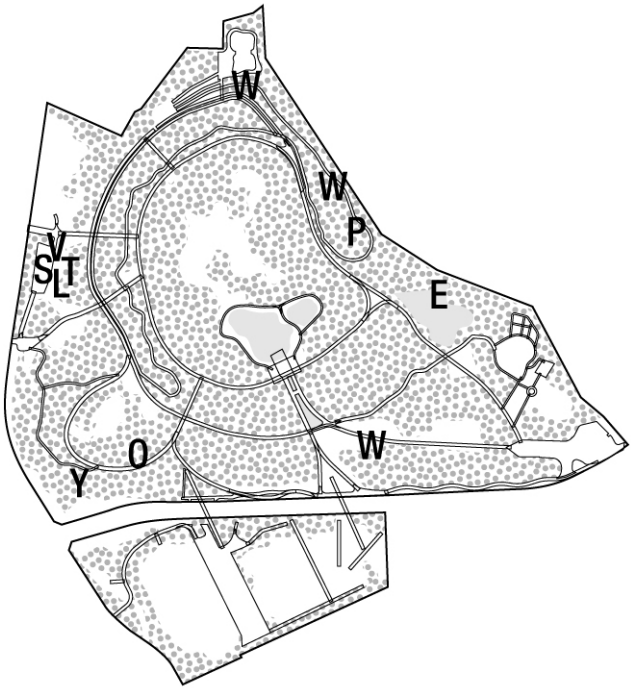
[27] Yoyogi



Comprehensive Table

No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
27	Yoyogi Park	1967	Mi/Hs,Spt	Co	54,05	10.400	192	Pd	Fl	○	○	○	○	○	-	○	○	-	-	-	○	-	-	-	-

Urban Forestry Assemblage



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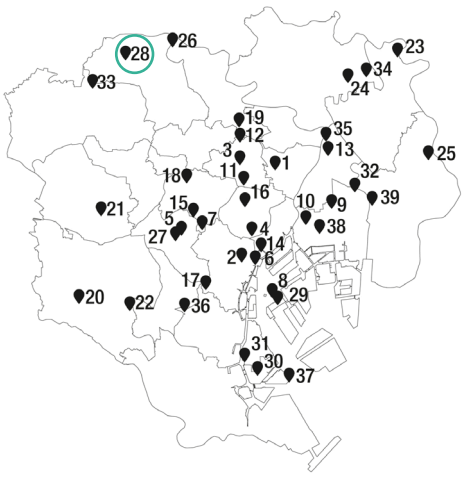
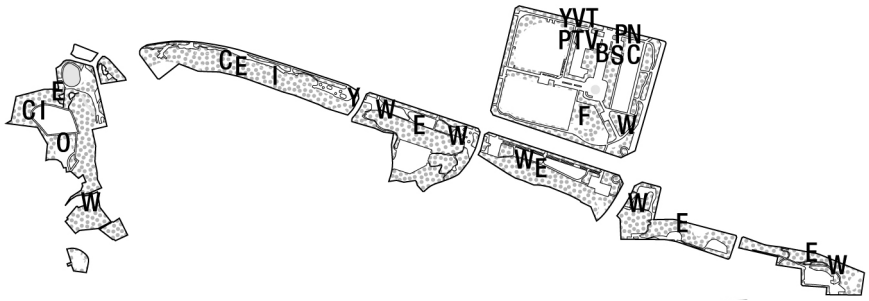
[28] Akatsuka



Comprehensive Table

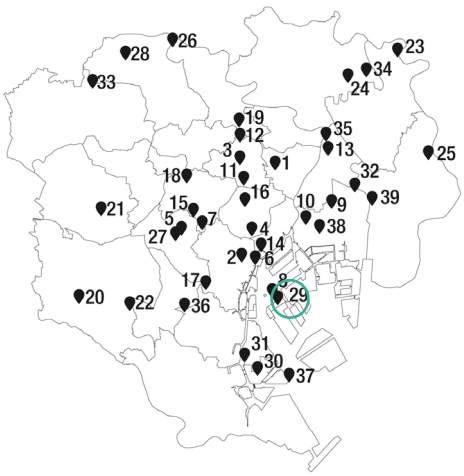
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field			San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
28	Akatsuka Park	1974	Fo/Os/Ag	El	25,54	7.650	300	Ft	Nt	○	○	·	○	○	·	○	○	○	○	○	○	○	·	○	○

Urban Forestry Assemblage



0 100 500

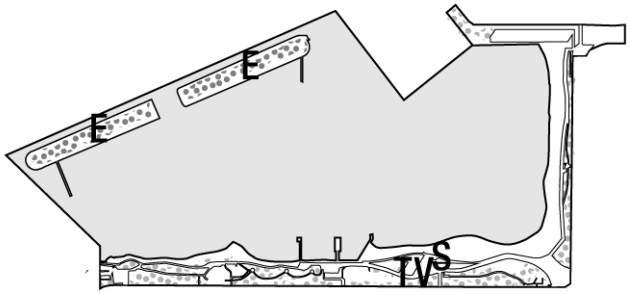
[29] Odaiba Marine



Comprehensive Table

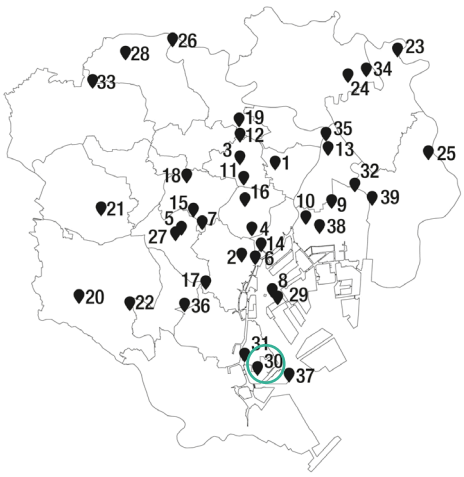
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
29	Odaiba Marine Park	1975	Mi/Str/Lf	Fr	13,40	1.900	142	Bc,Oc	Lf	○	○	-	○	-	-	-	-	-	-	-	-	-	-	○	-

Urban Forestry Assemblage



0 100 500

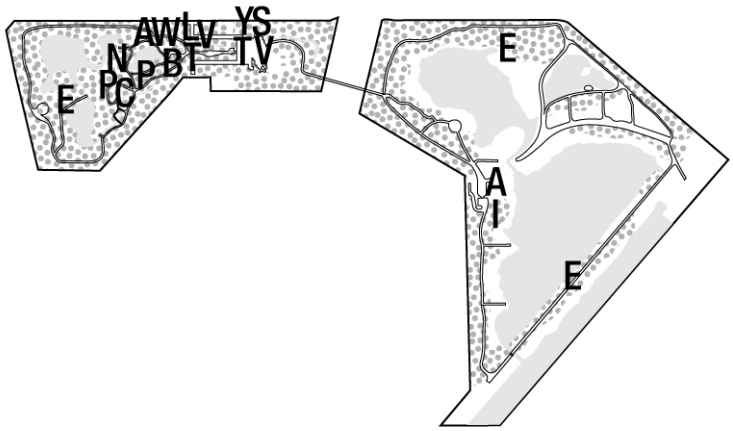
[30] Tokyo Port Wild Bird



Comprehensive Table

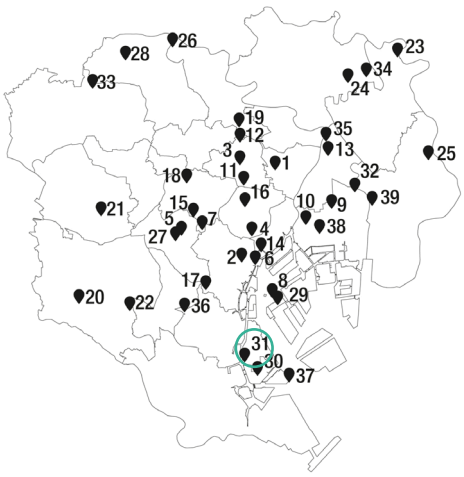
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
30	Tokyo Port Wild Bird Park	1978	Fo/Lf/Nt	El	36,00	11.050	307	Oc,PdL,Tf	Lf	○	○	○	○	○	·	○	○	○	·	○	·		○	○	○

Urban Forestry Assemblage



0 100 500

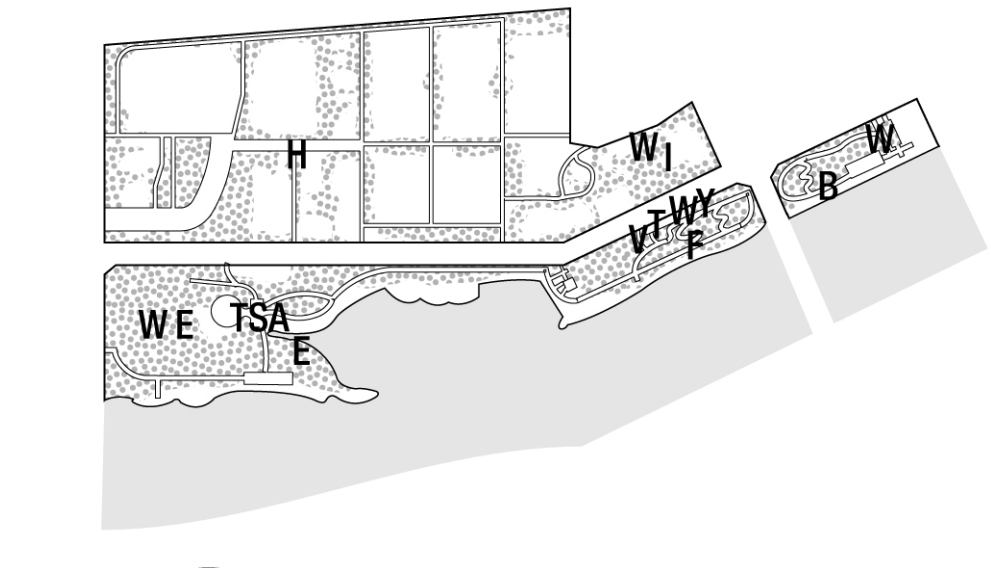
[31] Oi Central



Comprehensive Table

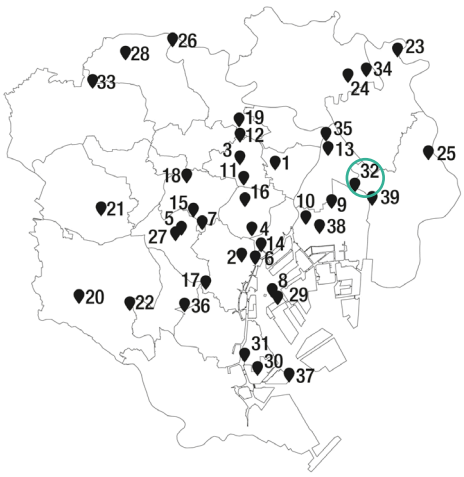
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
31	Oi Central Seaside Park	1978	Lf	Fr	41,30	13.600	329	Oc,Bc	Lf	○	○	-	○	○	-	-	○	○	-	-	-	○	○	○	○

Urban Forestry Assemblage



0 100 500

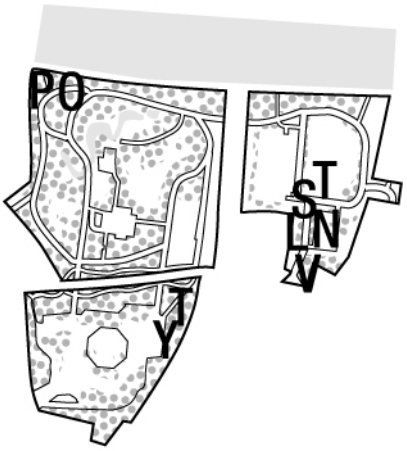
[32] Kameido-Chuo



Comprehensive Table

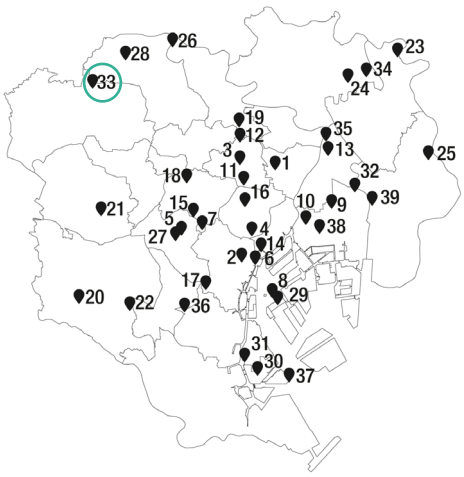
No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr		San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
32	Kameido-Chuo Park	1980	Id	Fr	10,32	3.000	291	Rv	Fl	○	○	○	○	○	-	○	-	-	○	-	○	-	-	-	-

Urban Forestry Assemblage



0 100 500

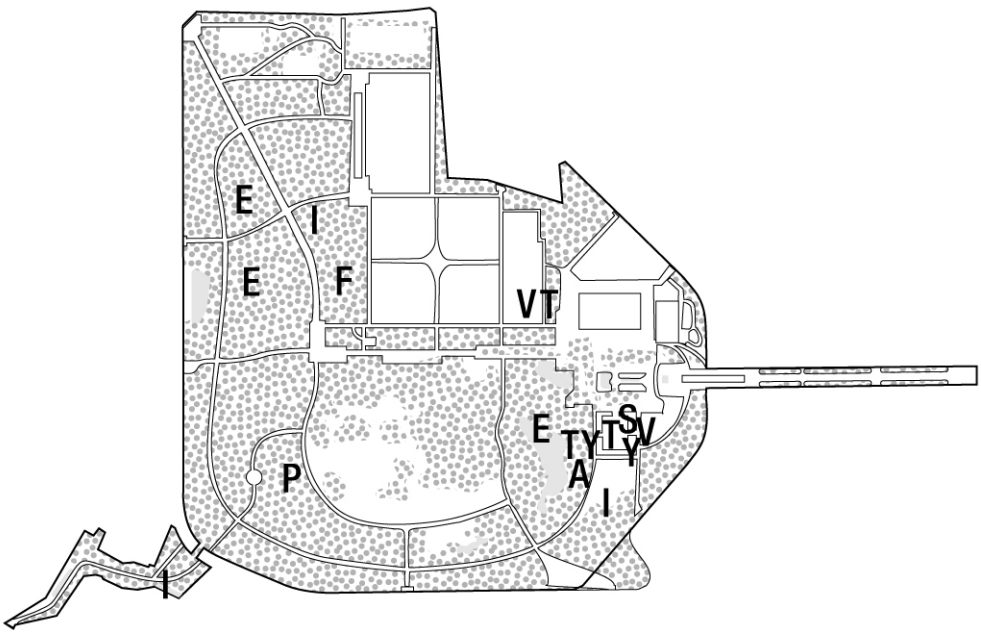
[33] Hikarigaoka



Comprehensive Table

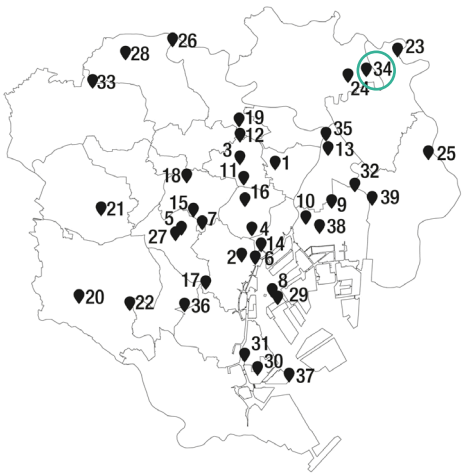
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
33	Hikarigaoka Park	1981	Ag/Mi/Mi,Hs	Co	60,78	16.300	268	Pd	Fl	○	○	-	○	○	-	○	-	-	-	-	-	○	○	○	○

Urban Forestry Assemblage



0 100 500

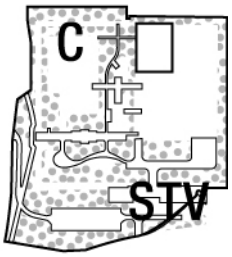
[34] Nakagawa

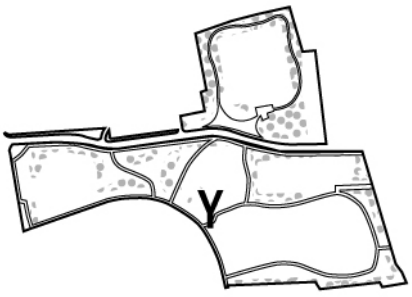


Comprehensive Table

No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb			Field		Attr		San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
34	Nakagawa Park	1986	Ag/ld/lf	Fr	12,06	2.400	199	Rv,Sw	Af	○	○	-	○	○		-	-	-	-	-	○	-	-	-	-

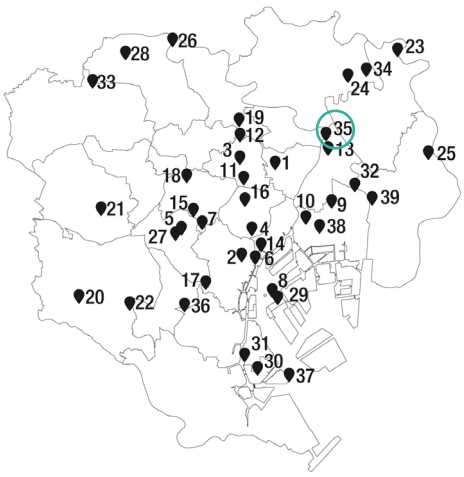
Urban Forestry Assemblage





0 100 500

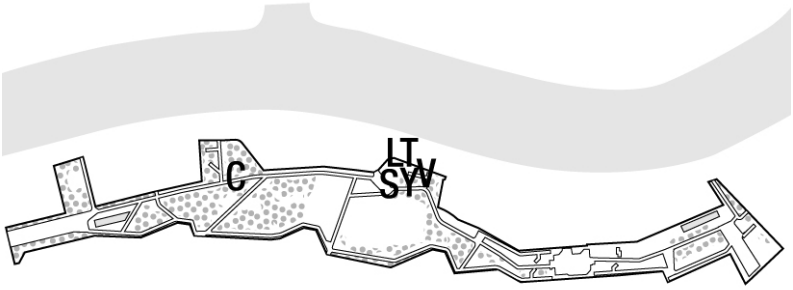
[35] Higashi-Shirahige



Comprehensive Table

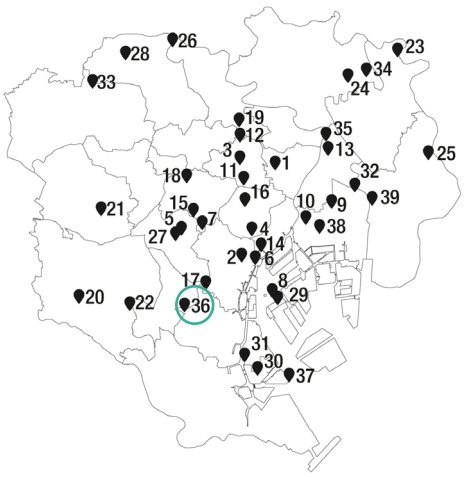
No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements								
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb			Field		Attr		San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
35	Higashi-Shirahige Park	1986	Ag/ld,Hs	El	10,31	2.700	262	Rv	Fl	○	○	○	○	○	·	-	-	-	·	○	·	-	-	-	-

Urban Forestry Assemblage



0 100 500

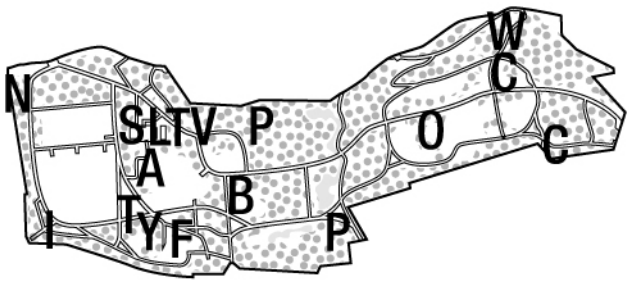
[36] Rinshinomori



Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements									
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr		San
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
36	Rinshi no mori	1989	Ag/Rs/Rs,Hs/Rs	El	12,08	6.100	505	Jb,Pd,Sp	Nt	○	○	○	○	○	·	○	○	·	·	○	·	○	○	·	○

Urban Forestry Assemblage



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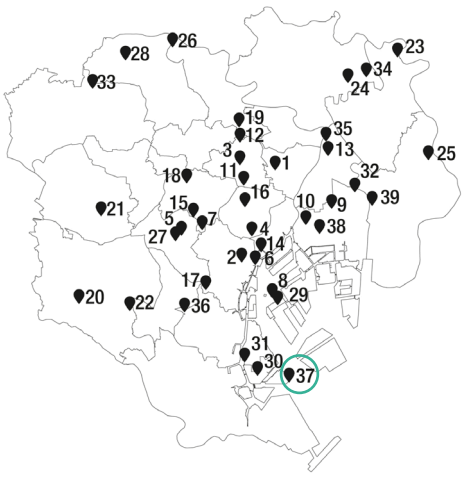
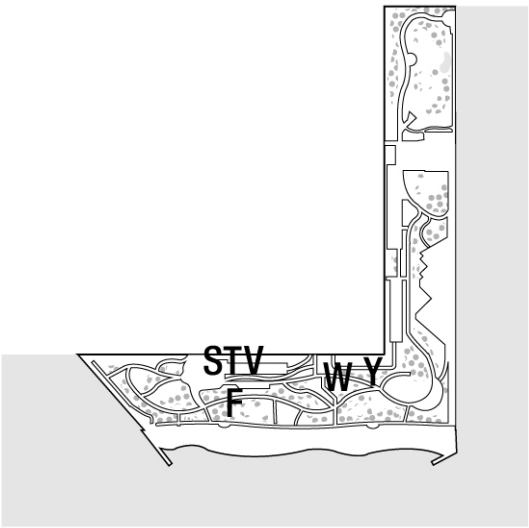
[37] Jonanjima



Comprehensive Table

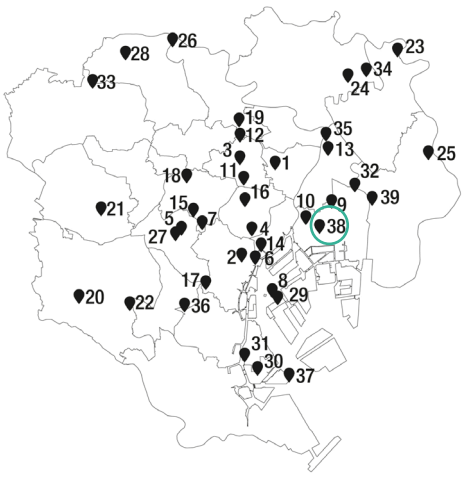
No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements													
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr		San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
37	Jonanjima Seaside Park	1991	Lf	El	14,11	1.000	50	Bc,Oc	Lf	○	○	-	○	○	-	-	○	-	-	-	○	-	-	-	-

Urban Forestry Assemblage



0 100 500

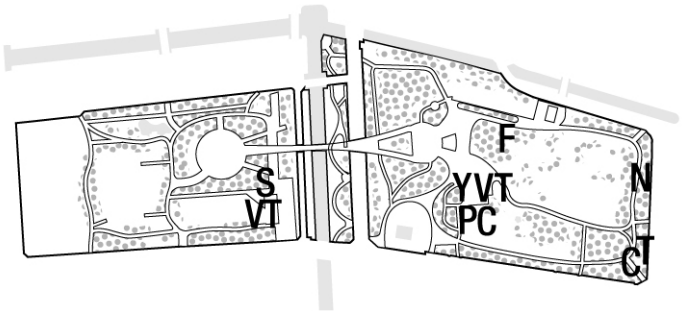
[38] Kiba



Comprehensive Table

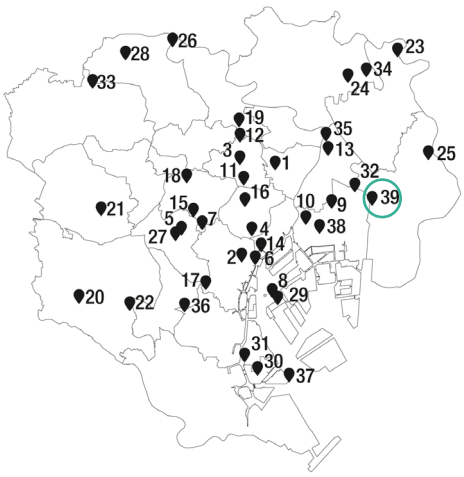
No	Name	Temporality		Urban Forest Composition					Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb		Field		Attr	San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
38	Kiba Park	1992	Str/lf	Fr	23,87	17.000	712	Jb,Rv	Lf	○	○	·	○	○	·	○	·	·	○	○	·	○	·	·	·

Urban Forestry Assemblage



0 100 500

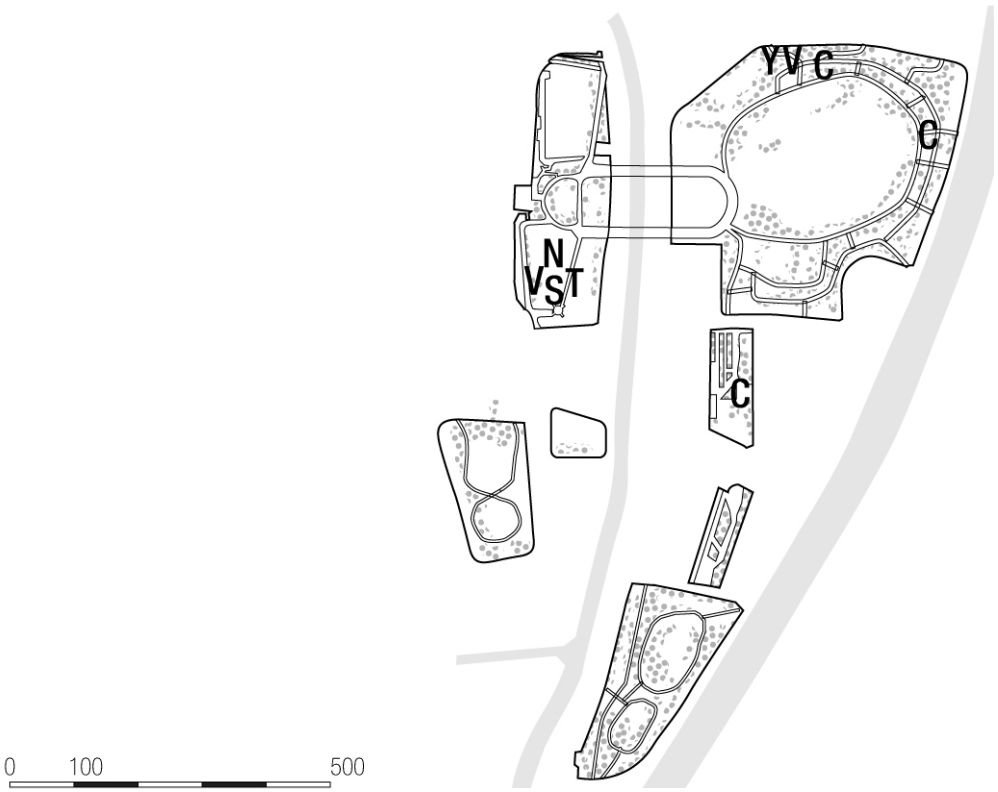
[39] Ojima Komastsugawa



Comprehensive Table

No	Name	Temporality		Urban Forest Composition						Urban Forestry Elements										
		Est	Previous Stages	Shape	Area (Ha)	Trees	Tree /Ha	Water	Ground	Devices					Biodeb			Field		Attr		San	
										S	T	L	V	Y	G	P	W	B	N	C	O	F	A	E	I
39	Ojima Komatsugawa Park	1997	Rd/Id/If	Fr	24,93	4.700	189	Rv	Af	○	○	-	○	○	-	-	-	-	○	○	-	-	-	-	-

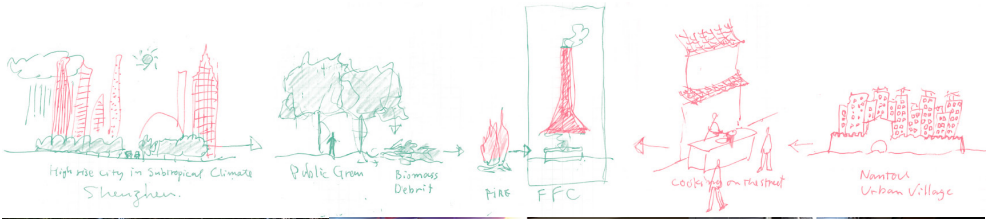
Urban Forestry Assemblage



UABB Pavilions

Fire Foodies Club

Biomass meets cooking



Pavilion during exhibition

Current use as UFE

Urban Foresters Club

Existing park management

Site Location

Exhibition Model

Treeness - Productive Arboleda

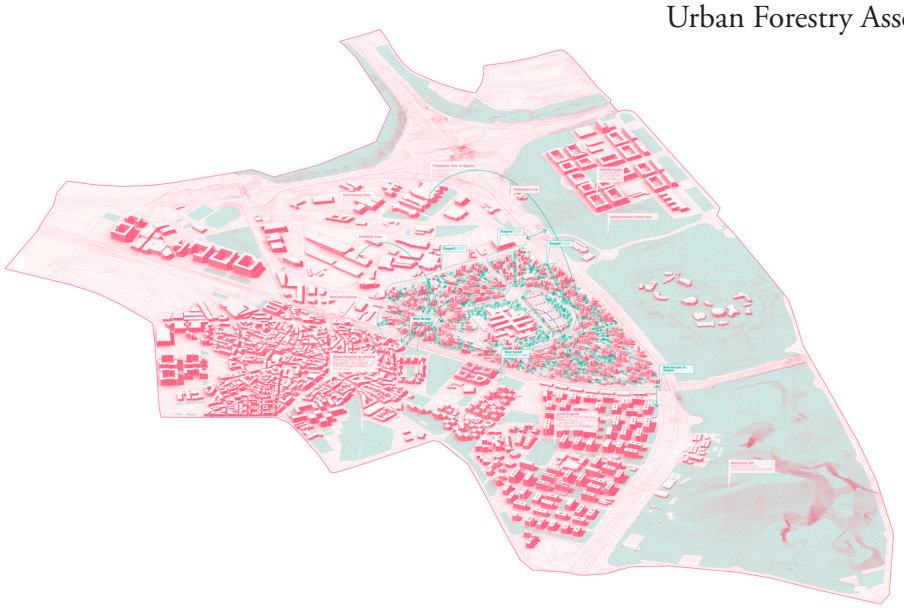
Location : Madrid, Spain
Year of Establishment :2019
Type : Europan 15 Competition. Special Mention
Author: furii studio. Noemí Gómez Lobo+ Diego Martín Sánchez

Background : There was a time when a squirrel could travel across the Iberian Peninsula without touching the ground. Treeness proposes the creation of a new kind of industry that will make this possible today. A recent study published in Science Magazine has shown the availability of 900 million hectares of potential forest surface in the world. If that area were to be occupied by trees, two-thirds of the total carbon emitted to the atmosphere by humanity would be captured. Only in Spain, there are 3 million hectares free of human activity or agriculture that can accommodate this new forest, adding up to a total of 14 million hectares of continuous canopy.

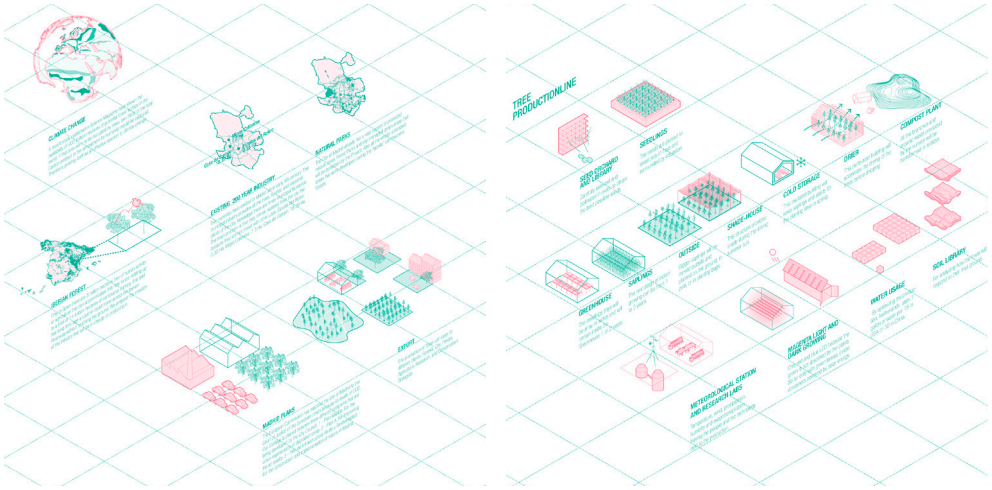
Tree nurseries have existed in Madrid since the early XIX century, providing all the trees, bushes and seasonal plants of the city. This municipal production could be one more strategy to cope with the European Union request, which has reported the city of Madrid to the Court of Justice because of its levels of CO2. Additionally the City of Madrid already has a vast system of protected natural areas, forest parks, and city-managed green areas that will be benefited from this implementation. According to the data provided by the City Council, the tree population of Madrid produces an economic value of 30.820.811 € ever year.

Treeness considers that this production could be catering to a broader array of clients: forestry industry, other cities, agriculture, research, conservation biologists, etc. Finally, every deserted urbanized area that was developed during the "ladrillo" era will flourish as newly planted forests. Nowadays there are three municipal Nurseries, that they remain isolated from the city because of their lack of mix with other uses. Instead of enforcing the obsolete horizontal zoning, the site will become a test example for hybridization. The tree production industry is mixed with offices, residences, commercial. Learning from the traditional urban tissue of the historic town of Vallecas, the uses will be intertwined organically in a dense fabric that will remain human in scale. Against the "tabula rasa" developments carried out in the periphery of Madrid, thought for the car. The new development will grow as needed with time and developed in stages, adapting itself to the social and physical context.

Urban Forestry Assemblage



Urban Forestry Assemblage



Urban Forestry Assemblage

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