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The Urban Forest in the age of urbanization è una riflessione e un aggiornamento sul concetto di forestazione urbana, in linea con il riaffermarsi recente delle teorie olistiche. Oggi si discute di urbanizzazione planetaria e di economie della città globale; in ecologia si descrivono le connessioni della biodiversità a scala planetaria e i cambiamenti climatici superano le barriere provocando crisi a scala globale. Concentrarsi sulle forme di approccio alla forestazione nei diversi luoghi dell'urbanità, può apparire riduzionista. Ma se la città è ovunque, e tutto è città, se il mondo urbanizzato di oggi è una concatenazione di aree metropolitane collegate da luoghi e corridoi di comunicazione, allora cos'è che non è urbano? E soprattutto, quali foreste?

Partendo dal dualismo città - foresta e dalle evoluzioni delle idee olistiche, la ricerca cerca di ricostruire il quadro di questa dialettica. I casi di studi permettono una visione dei diversi processi di urbanizzazione, per ricomporre un quadro delle pratiche di forestazione, in linea con le sfide emergenti, con uno sguardo tra discipline diverse, sotto la pressione dei cambiamenti climatici e attraverso i filtri delle dinamiche di crescita della popolazione, dell'alternanza tra implosioni ed esplosioni dell'urbanizzazione, della scarsità di suolo coltivabile e di cibo, di equità globale.

The Urban Forest in the age of Urbanization seeks to reflect on the connotation of urban forestry, in line with related emergent holistic theories. Today, all planet is urbanized and planners debate "Planetary Urbanization", economists discuss "Global City", ecologists describe planet's biodiversity hotspots connections, and climate changes warns "global" crisis; in such scenario, focusing on the forestation approaches in urban and peri-urban "edges", might be reductionist. If the city is everywhere, and everything is city, if the urbanized world now is a chain of metropolitan areas connected by places and corridors of communication, then what is not urban? And above all, which forests are not urban forests?

Starting from the dualism between city and forest and its evolution towards holism, the research seeks to recreate a framework of dialectical approaches. The case studies analyze a wide range of urbanization "processes", to review the practical approach of urban forestry, in line with the global crisis of the era of globalization, when the climate change, population growth, implosions and explosions of urbanization, lack of arable land and food are unavoidable.



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The Urban Forest in the age of urbanization



DOTTORATO IN
PAESAGGIO E AMBIENTE

SAPIENZA
UNIVERSITÀ DI ROMA

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To my grandmother, Sharifeh, who taught me the value of nature

&

To my parents, for all their supports

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Navigazione nel testo

« Quando noi cerchiamo di staccare qualcosa da se stessa, scopriamo che è collegata a qualsiasi altra cosa nell'universo. »

John Muir, 1991

The Urban Forest in the age of urbanization è una riflessione e un aggiornamento sul concetto di forestazione urbana, in linea con il riaffermarsi recente delle teorie olistiche. Oggi si discute di urbanizzazione e di economie della città globale; in ecologia si descrivono le connessioni della biodiversità a scala planetaria e i cambiamenti climatici superano le barriere provocando crisi a scala globale.

Concentrarsi sulle forme di approccio alla forestazione nei diversi luoghi dell'urbanità, può apparire riduzionista. Ma se la città è ovunque, e tutto è città, se il mondo urbanizzato di oggi è una concatenazione di aree metropolitane collegate da luoghi e corridoi di comunicazione, allora cos'è che non è urbano? E soprattutto, quali foreste?

Nell'era in cui l'avidità dell'umanità ha portato a pregiudicare il suo stesso futuro e ai cambiamenti climatici¹, alla scarsità di

¹ Intervista con Vandana Shiva. *I Nove Semi - L'india di Vandana Shiva* di Maurizio Zaccaro disponibile a:

<https://www.youtube.com/watch?v=5oz8q1nfvSY>

suolo coltivabile e di cibo, la ricerca riflette sulle “forme” che il progetto di forestazione urbana potrà assumere nell’ottica di consapevolezza che il mondo è “come un sistema di sistemi, in cui ogni sistema singolo condiziona gli altri e ne è condizionato”². In tale ottica, il lavoro analizza i *feedback* delle diverse discipline per lasciare il passo a riflessioni olistiche nei progetti di forestazione urbana.

Partendo dal dualismo città - foresta e dalle evoluzioni delle idee olistiche e del progetto di paesaggio, la ricerca ha come obiettivo la ricostruzione di un quadro dialettico. Tale riflessione coincide con la prima parte, *Dualism: cities versus forests*, frutto di una ricerca teorica, svolta in ambito filosofico, ambientale e urbanistico, accompagnata da un supporto di narrazione storica, per poi seguire con una seconda parte, *Holism: forests in cities/Cities in forest*, che ripercorre le teorie olistiche emerse principalmente dalla scuola di pensiero nordamericana, dove l’etica ambientale costruisce il corpo centrale e narrativo. L’uomo si distacca dalla sua precedente posizione antropocentrica e assume l’impegno di salvaguardare l’ecosistema (*Stewardship*), per proteggerlo e risanarlo³.

La ricerca si interroga su quali forme le città potranno assumere in relazione alla necessità crescente di foreste e dei loro benefici indotti. Tale spostamento di sguardo permette di riconsiderare quantità e qualità del progetto di forestazione in forma non

² Calvino, I. (1988). *Lezioni americane. Sei proposte per il terzo millennio*. ed. del 2009, Milano Mondadori. p. 116

³ McHarg (1992) nel suo capolavoro *Design with nature*, riferisce costantemente nel ruolo dell’umanità come “good steward” per risanare e proteggere il pianeta.

disgiunta dallo sviluppo urbano, ma bensì in una sorta di trasformazione congiunta, di coevoluzione, dei due processi di crescita. Si cerca di indagare tra cause e effetti - metodo definito dagli scienziati attraverso la locuzione tecnica “effetto farfalla” - per comprendere come le variazioni prodotte dalle traiettorie politiche, economiche e sociali possano determinare il cambiamento dell’approccio e della definizione del progetto di forestazione in contesti culturali e geografici diversi.

Tale riflessione viene analizzata attraverso i casi studio del capitolo successivo per comporre un quadro delle pratiche di forestazione, mirate alle nuove sfide dell’era dell’antropocene. Vengono affrontate tre tipi di tendenza delle città contemporanee: i casi di ambiti metropolitani o di città-regione in sviluppo (*Developed cities*), le aree urbane in contrazione (*Shrinking cities*) e le megalopoli auto-costruite (*Self-constructed cities*), per verificare tendenze e opportunità di sviluppo.

Viene attribuito un ruolo chiave al “paesaggista come urbanista della nostra epoca”⁴ affinché la foresta – con la sua dimensione e struttura – sia in grado di affrontare i processi dell’immanente urbanizzazione.

La ricerca, in definitiva, si propone di spostare la centralità delle riflessioni settoriali e locali alle questioni olistiche su scala globale, dove il profondo iato tra azioni locali e la loro ricaduta globale giunga a un compromesso.

⁴ Waldheim, C. (2016). *Landscape as Urbanism: A General Theory*. New Jersey: Princeton university press.

Per concludere, alcune parole sul titolo di questa ricerca. Per riassumere i contenuti di questo studio in un titolo sintetico, è stato scelto *The urban forests in the age of urbanization*. Tale scelta vorrebbe focalizzare l'attenzione sulla dimensione planetaria dell'urbanizzazione e sulla sua influenza al progetto della forestazione.

Per esprimere la proposta principale di questa ricerca e sottolineare lo spostamento di attenzione per le foreste dal confine urbano, “edge”, verso l'era delle visioni planetarie, “age”, il titolo è stato parafrasato in:

The Urban Forest ⁱ on the ^A _{ED}ge of Urbanization

The Urban Forest i on the **A** ED ge of
Urbanization
Introduction

1.1. Urban Forest(ry) in the era of globalization

Research background

« The most successful scientist thinks like a poet—wide-ranging, sometimes fantastical—and works like a bookkeeper. It is the latter role that the world sees. »

Edward O. Wilson, *The Meaning of Human Existence*

The research seeks to reflect on the connotation of urban forest(ry)¹, as the central theme of landscape architecture, in line with related emergent holistic theories.

In the era of globalization, when all planet is urbanized and planners debate “Planetary Urbanization”, economists discuss “Global City”, ecologists describe planet’s biodiversity hotspots connections, and climate changes warns “global” crisis, it might be reductionist focusing on forests “in” urban and peri-urban edges.

The inception of urban forest(ry) is rooted in the traditional interpretation of the city where there was a distinct separation between cities and forests. The trees in the city were classified as “urban” forests, and the trees outside of the cities were labelled as wild woodlands. Today, the cities have a planetary scale of influence and as geographers, Amin and Thrift (2001), affirm “cities are everywhere and everything and the footprint of cities are all over”. In this new scenario of city, it might be necessary to shift the paradigm of “urban” forest(ry) from traditional “local” perception to a planetary vision.

¹ Urban forestry refers to the management of forests in urban area, while urban forest refers to the trees in urbanized area.

1.2. Indian parable of blind men and an elephant

Problem statement

It has been widely stated that trees in urbanized area are necessary for our survival- environmentally, economically and, no less, socially². There are many aspects and approaches towards urban forestry, and experts with different orientation have addressed the urban forestry from multiple perspectives and skills. Urban forestry overlaps with managerial discourse (like Ecosystem services, Biodiversity and Green Infrastructure) and “yet no consensus exists on the precise meaning of the terms ‘urban forests’ and ‘urban forestry’” (Krajter Ostoić & Konijnendijk, 2015; Randrup et al., 2005).

It seems to be like the “famous Indian fable about seven blind men who went to see the elephant. The one who touched the body thought the elephant looked like a wall, another touched the ear and thought the elephant looked like a fan, another touched the tail and thought it looked like a rope, and so on; all were correct in their partial perception of the part but what elephant really looked like necessitate a holistic vision”.³

The holistic approach assembles the potential of other drivers (like economic trajectories, political decisions and social influences), which force the transformation of territory, and consequently, has an impact on forestation in urbanized area. It

² See also Russo, D. (2017). *Town forest. Una foresta urbana abitabile, attraversabile, usabile*. PhD's thesis. Sapienza, Università di Roma.

³ Cited by Sajed Kamal (2011). *The Renewable Revolution: How We Can Fight Climate Change, Prevent Energy Wars, Revitalize the Economy and Transition to a Sustainable Future*. London: Routledge; 1 edition p.124

is not the matter “what” is urban forest or its function, it digs into “why” the trees should be planted in a certain place, as the result of specific spatial and contextual pressure.

1.3. Towards holistic approach in Urban Forestry

Theoretical Background

Theoretically, this study builds upon concepts from theories on environmental ethics, Landscape urbanism and urbanization theories.

The auspices of sages who see the integrity and interconnection of the issues, like Howard Odum, Frederick Law Olmsted, Aldo Starker Leopold, Vandana Shiva, Ian McHarg, Richard Forman, Henri Lefebvre, Neil Brenner and Richard Weller, become the central concerns that guide this research. It has placed emphasis on the role of “Landscape Architect as urbanist of our age” (Waldheim, 2017) to address the dimension and structure of trees according to the upcoming urbanization.

One of the main criteria that drives the research, aims to reverse the concept from “the impacts of forestation on urban area” to “the impacts of the urban area on forestation”, not in terms of ecological impacts but in terms of design and spatial configurations of forests. Such choice is rooted in the “potential transformation of context”, which is a central issue in landscape architecture.

Each urban area creates specific “context”, which is dynamic and is open to further articulation and could change over time, as conditions change. Our planet in a broad-scale, and our cities in a finer-scale are transforming steadily and without a dialectical

reasoning between contextual transformation and forestation, any efforts to design the urban forest could result fruitless and fragile in its implementation.

In short, the research tends to highlight holistic approach of landscape architecture in urban forest(ry), as an interacting and flexible method, which become the driver and “unique way of designing and perceiving territorial transformations, replacing the previous idea of landscape as a balance to urban growth” (Di Carlo, 2015).

1.4. Paradigm shift towards new edge of Urban Forestry

Research objective and research question

Today, most of the scientists and experts discuss global rather than local issues. If we accept that all planet is urbanized, and “we share this planet, our home, with millions of species”⁴, and “we all breath the same air”⁵; If we admit the global growth of urban population in next coming years, affirming more soil consumption for urbanization and food production, generating more footprints, and asserting that “climate change does not respect national borders”⁶; If so, in such global urbanized context, defining what is “not” urban forest(ry) and where is its “border line”, is meaningless. Most of the school of thoughts have moved towards planetary visions to resolve global

⁴ Shiva, V. (2005). *Earth Democracy: Justice, Sustainability and Peace*. Berkeley: North Atlantic Books, p.50

⁵ John F. Kennedy’s speech on Peace at the American University, Washington D.C., 10 June 1963.

⁶ Ban Ki-moon’s speech on Climate change, *Momentum for Change*, at The United Nations, 6 December 2011.

environmental issues. The era of holistic approaches, necessitate a review in the theory of urban forest(ry).

Through historical studies, the research moves from dualistic visions of city and wilderness towards holistic theories of cities and natural environments, in modern age. Therefore, in line with the aforementioned paradigm shift, the purpose of this study is:

To explain why, in the era of “planetary” observations, it is needed to scale up the forest(ry) from the “urban” to “planetary” implication.

According to this statement, the research aims to find a practical answer, that drives the local forestation in urban contexts in line with global framework. To cover the gap between holistic theories and local implication, the research attempts:

To illustrate, how an intermediate scale could be defined, basing on urbanization “process” and not urban or peri-urban “edges”, to address forestation process instead of urban or peri-urban forests.

In prospect for the future of planet, with the burgeoning of next billion people, under the pressure of climate change and *implosion/explosion* of planetary urbanization, the research seeks:

To foresee, new prospects that forestation in urbanized area could/should face, in line with upcoming challenges.

1.5. From Dualism to Holism

Research Design

In order to address the research question and fulfil the research objective, this research mainly adopts American school of thoughts. Such choice is embedded in two main reasons: Firstly, the central body of this research were set up on holistic approaches in different fields of study, most of such discussed theories had inception in American academic studies. Secondly, the opportunity to conduct a research placement in Landscape Architecture department at University of Pennsylvania, provided assistance (for the author of this research) to deepen knowledge on emergent global issues. Based on such theoretical framework, the research comprises five phases.

The research begins with a literature study on global “scientific” discourses on Urban forestry, to delineate principally the scientific approach of foresters, who coined the term of urban forest(ry).

In the third part of research *Dualism: cities versus forests*, the theme of city and its relation to the forests, is deepened by addressing philosophical, cultural and functional bond. In terms of methodology, the first part, is based on historical background and its roots in environmental philosophy.

The forth part of research *Holism: forest in cities/cities in forests*, trends and developments of new method of “city making”, in the era of modernity, are reviewed to outline the continues updates of disciplines that engage the system of forests and urbanization process. In terms of methodology, environmental ethics become the background of this part, that goes through practical approaches including ecology, urbanization and

landscape theories. This section passes through different scales from local to global, highlighting the necessity of new “planetary” prospects for making forests in urbanized areas. This part attempts to answer to the first question research.

The theoretical and practical backgrounds of aforementioned parts, is tested in fifth section of research *Urbanization and Forestation*. The case study method is adopted for establishing an intermediate scale between global frameworks and local projects, proving as answer to the second question of research. To do so, based on the trends of urbanization (Developed cities, Shrinking cities and Self-constructed cities), the proposition of forestation in each context is discussed. Different scales, locations and urbanization process are taken into the consideration to verify the reliability of the approach in divergent contexts. Furthermore, the replication of expected results, is applied in other two cases of Rome and Tehran to demonstrate the applicability in other contexts.

The comprehensions of environmental issues and landscape in *self-constructed cities* of Latin America, is acquired from interviews with Professor David Gouverneur and Maria Altagracia Villalobos, who conducted many academic studies in this field at the University of Pennsylvania. A collection of students works assemble central body of the section *self-constructed cities*. Moreover, an in-depth understanding of practical domain was derived from several interviews with specialists and professionals working as consultants, executive managers or researchers in institutes like FAO Urban Forestry section (Simone Borelli), Forest Service-Northern Research Station (Sarah Low, Michelle Kondo and Lara Roman).

Last section of the research, define a paradigm shift in urban forest(ry), in keeping with emerging global issues of upcoming century. The aforesaid relevance assumes theoretical and practical references to propose new prospects and practices in the field of urban forest(ry). This part is explicated the new hypothesis of forestation in urbanized area, that could address the arising global challenges.

1.6. From local to global visions

Thesis structure

This section outlines the reminder of the thesis. Chapter 3 includes historical background underlying this research. It provides an overview of the relation between cities and forests. It aims to identify the dualistic approaches that existed between city making and forests management. Furthermore, the chapter highlights the philosophy of anthropocentrism, as the hidden driver of dualistic choices, which led to the separation of trees from the environment of *civis*. It has been opted to refer to the theory of Max Oelschlaeger on philosophical argumentation, to Robert Pogue Harrison for the mythological studies of trees, to Michael Williams and Robert W. Miller for functional use of trees; and historical narration of Henry W. Lawrence defines cultural framework of this chapter. The chapter closes with some reflections on the inception of urban forestry as the result of interdisciplinary collaboration of Olmsted with other experts.

Chapter 4 presents trends and development of holistic theories in contemporary era, when the emergent of ecocentrism and environmental ethics tied up the concept of city and nature together, and physical boundaries were vanished. Under new

philosophy of holism, new approaches in ecology, landscape and urbanization turned up. Landscape urbanism is the central body of this chapter, addressing the forestation issues from regional to global scale. The chapter closes by providing an overview of involved actors and sectors that could or should guide forestation in urbanized area. Holistic ecological theories of Howard Odum and Richard Forman, Ecological advocacy of Vandana Shiva and McHarg with advanced hypothesis of planetary urbanization by Henri Lefebvre, bring together the necessity of holistic thinking as teleological approach in the era of global linkage.

In Chapter 5, the case study methodology and the results of case studies are presented. This chapter aims to place emphasis on designer's perspective providing an intermediate scale between global issues and local implication. To imagine a global city, this chapter includes a wide range of cities, with different types of urban tendency. It can be paraphrased as collection of "puzzle pieces" that fit together to make a global picture. According to the three types of urban tendency, the chapter discusses the propositions of forestation in each context. Urbanization broadly follows growing trends or shrinking trends; and it can be planned by formal or informal initiatives. The discussed categories of urbanizations include Developed cities, Shrinking cities and Self-constructed cities. In each classification, the hypothesis of forestation is discussed, in accordance with the set of circumstances, that drive the urbanization process and the practical methods for forestation are proposed.

In short, this chapter debates how the urbanization tendency defines the structure and spatial composition of forests. It offers a dynamic process of forestation that interacts with urbanization

“process” (and not urbanization “boundaries”). The practical theories from George Hargreaves, James Corner, Michel Corajoud, Gilles Clement and David Gouverneur intertwine with forestry issues of Claude Guinaudeau, Ingo Kowarik and Cecil Konijnendijk.

On the grounds of above considerations Chapter 6 deliberates on a possible paradigm shift in theoretical contributions and implication for forestation in urban area in a global framework. The thesis concludes with discussing limitation of the research as well as exploring avenues for future studies in line with new challenges.

To conclude, I would like to express few words about the title of this research. To wrap up the contents of this research in a short and precise title it has been opted for *The urban forests in the age of urbanization*, to draw attentions on planetary dimension of urbanization and its influence on forestation. To express the main proposal of this research, shifting the paradigm of urban forests from “urban edge” to “planetary edge”, this chapter has been paraphrase as The Urban Forest ⁱ on the _{ED}ge of Urbanization .

“Exploring global scientific discourses on Urban forestry”

Literature review

“Exploring global scientific discourses on Urban forestry”¹

« If I have seen a little farther than others, it is because I have stood on the shoulders of giants. »

Isaac Newton

At the University of Toronto, seeking for an appropriate title of a graduate student's thesis, in 1965 Prof. Erik Jorgensen proposed the unusual juxtaposition of “urban” and “forestry” (Gerhold, 2007). The term was coined as a branch of forestry that deals with “cultivation and management of trees for their present and potential contributions to the physiological, sociological, and economic well-being of urban society” (Jorgensen, 1970). Furthermore, Prof. Jorgensen believed that “urban forestry not only dealt with city trees or with single tree management, but also with tree management in the entire area influenced by and utilized by the urban population” (Jorgensen, 1970; Konijnendijk et al, 2005).

Later, the plantation of trees in urban areas has introduced other concepts. For instance, Guinaudeau (1987) in France introduced the concept of *Préverdissement*. This concept based on the planting *prior to* urbanization development, as an approach

¹ Refers to the title of Krajer Ostoić, S., Konijnendijk, C.C. (2015). Exploring global scientific discourses on urban forestry. *Urban Forestry & Urban Greening* 14 (2015) p.129–138

to arrange the plants with planned structures or the process of construction (plant today, built tomorrow). It is considered as a combination of design and protection, to reach the desired size of plants and guarantee the aesthetic quality of spaces (Craul, 1999). In the middle of 1990's the terms Green infrastructure has emerged on the base of urban forestry.

Beyond the inception of urban forestry and its evolution, it has been widely stated that forests in urbanized areas can address wide range of concerns, such as environmental, economic and social issues. Environmental issues deal with air pollution and Carbone sequestration, wildlife habitat, water quality and climate change; the economic concerns are related to food and timber production; the social issues refer to human health and individual or collective well-being, besides to other set of semantic and intangible values. In this sense, urban forests are central concern of ecosystem services, providing complex services to humankind.

According to the main challenges in each context, in terms of forms of urban expansion, history, social and economic trends, urban forests aim at specific targets.

The central issues that will come up in this research, is based on understanding of the most predominant urban forestry approaches in the world. In order to assemble such global framework of theories, this section reviews the main literature of each continent.

2.1. From urban forest to woodland

North America and Europe

The main research in urban forestry has been conducted by North American and followed by European scientists² (Krajter Ostoić and Konijnendijk, 2015), encompassing multiple benefits of urban forestry. European dominantly drew attention on woodlands, while studies in North America focused on trees and “urban forest”; such divergence is rooted in historical background of urban forestry in Europe and North America; (Konijnendijk, 2006). In Europe, the aesthetic and recreational benefits were considered as central issues of trees plantation (like parks, gardens), while in North America environmental services have been prioritized and the inception of urban forestry rooted in environmental issues.

North America mainly places emphasis on: quantification of urban forests benefits³ (Rowntree and Nowak, 1991; Dwyer et al., 1992; Nowak et al., 2010), and connectivity of Green Infrastructure (Ahern, 2007; Benedict & McMahon, 2006). Recently, the research has been developed on urban forest vulnerability assessment and its adaptation to the climate change and the arduous growing conditions of urban forests open new debates among experts (Brandt et al., 2016; Calfapietra et al., 2015). Nonetheless, it is a perceptible lack of discussion on climate change mitigation and adaptation (Krajter Ostoić and

² It is stated that in the period of 1988-2014, 317 publications have been published by American and Canadian researcher and 104 publications by European scientists. For details of countries and numbers see Krajter Ostoić and Konijnendijk. (2015).

³ For instance, i-Tree program was developed by United States Forest Service to quantify the ecosystem services provided by trees.

Konijnendijk, 2015). In Europe, productivity of urban forests ⁴ (Tyrväinen, 2001; Rydberg and Flack, 2000; Sæbø et al., 2003), social issues and recreational use (Konijnendijk et al., 2007; Arnberger, 2006) have been chiefly argued.

Since the exact domain of urban forestry is not well-defined, the managerial discourse like Ecosystem Services, biodiversity conservation, and green infrastructure overlap with urban forestry (Krajter Ostoić and Konijnendijk, 2015).

Recently, Urban forestry has been adopted in Nature-Based Solution⁵ (NBS) projects to enhance climate and water resilience in urban areas. NBS proposes interdisciplinary techniques, from macroscale (global) to mesoscale (national) and microscale (local) to address the gap between science, policy and society (Raymond et al., 2017). Even though NBS is still in its infancy, the list of knowledge provided by practitioners offer a combination of different existing approach as a framework to guarantee the achievement of the expected objectives and solves the targeted problem under different uncertain future situations.

⁴ The productivity can include recreational profits, silvicultural or timber production (timber production is often of lower importance).

⁵ “Nature-Based Solutions (NBS) are solutions to societal challenges that are inspired and supported by nature, which are cost-effective, provide simultaneous environmental, social and economic benefits, and help build resilience” (Raymond et al., 2017); they provide benefits for both biodiversity and human well-being (Cohen-Shacham et al., 2016).

See EKLIPSE project funded by European commission under the Horizon 2020. Available at: http://www.eklipse-mechanism.eu/about_eklipse

2.2. Pollution

Asia

Most of the largest cities in the world are situated in Asia⁶, hosting 60% of the world's population⁷, and it has only 17% of global forests (WWF Report, 2012). With the expansion of the cities, the gap between Ecological Footprint and the biocapacity is widening⁸.

What is the main challenge that the forestation should face in Asian cities? Asia accommodates not only the largest cities, but also the most polluted cities⁹ in the world. The afforestation in urbanized area, mainly attempts to compensate the pollution. For instance, China is a pivotal contributor of CO₂ emission (Chen et al., 2007; Global Carbon Project, 2008), so it became one of the most diligent countries to enhance the carbon sequestration by forestation. In fact, most of the research in China debates the impacts of urban forests on offsetting carbon emissions in different cities around China (Yang et al, 2005; Liu and Li, 2012; Zhao et al. 2010; Zhao et al, 2010; Chen, 2015).

⁶ We can mention Shanghai, Beijing, Karachi, Istanbul, Dhaka, Tokyo, Manila, Tianjin, Mumbai, Shenzhen, Guangzhou, Delhi, Wuhan, Lahore, Seoul, Chengdu are among the first 20 largest cities in the world.

See <http://www.citymayors.com/statistics/largest-cities-mayors-1.html>

⁷ See <http://www.worldometers.info/world-population/asia-population/>

⁸ According to Global Footprint Network, the Ecological Footprint is an accounting framework to measure the amount of biologically productive land and sea area that humanity needs to produce the resources it consumes, provide room for its infrastructure, and absorb its waste. The biocapacity is the environment's ability to restore the resources; in Asia, there is a shortfall of 0.8 global hectares per person (WWF Report, 2012).

⁹ According to WHO (World Health Organization, 2016) the most polluted cities in the world are Zabol (Iran), Gwalior, Allahabad, Patna, Raipur (India), Riyadh, Al Jabail (Saudi Arabia), Xingtai, Baoding (China).

Due to the lack of techniques for mixed plantation, and to facilitate operations in silviculture, the urban forests in China are mainly monocultures (Liu, et al, 2004). Similar researches regarding carbon sequestration have been conducted in Korea (Jo, 2001), Iran (Faryadi et al., 2009), Pakistan (Kazi, 2016; Akbar et al, 2014), India (Avni and Chaudhry, 2016), Malaysia and the Philippines (Kuchelmeister, 1998). Urban forestry in Asia concerns with other issues like as poverty alleviation conducted in Bangladesh (Uddin, 2006; Sohel et al. 2014) and human well-being (*Shinrin-yoko* or forest bathing) in Japan (Park et al., 2010).

Nonetheless, urban forestry remains a neglected area of research in many Asian countries, and “multipurpose urban forestry is even more in its infancy” (Kuchelmeister,1998). To wrap up, by virtue of environmental health hazards, carbon sequestration is the main issue in many Asian countries.

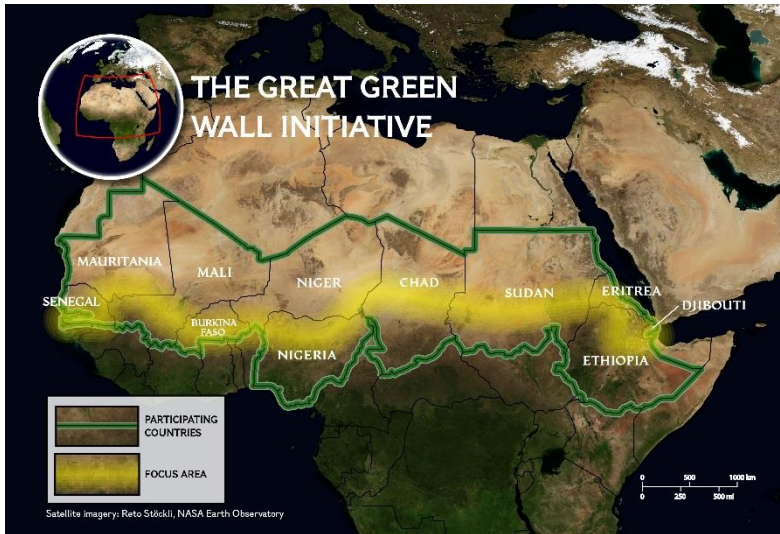
2.3. From woodfuel to luxury gradient and desertification Africa

In African contexts, more than 80 percent of all domestic fuel is provided by wood, main study proposes the complex relation between towns and forests, focusing on the woodfuel issue¹⁰ (FAO, 2012; Drigo and Salbitano, 2008). For instance, the Maamore forest in Morocco, the gallery forests of the Batékés highlands in the Republic of the Congo (Schur et al., 2014), the eucalyptus plantations of the Malagasy highlands in Madagascar, the dry forests and agroforestry systems of Mali and the riparian forests of South Africa, all play important roles in supplying Africa's urban areas with woodfuel (FAO, 2012).

Other important issue in Africa is desertification. *The Great Green Wall of the Sahara and the Sahel initiative*, aims to stop the southern advance of Sahara¹¹. Such broad-scale approach has been adopted also in a fine-scale, like the city of Ouarzazate in Morocco, where the plantation of green belt, called “the door of the desert”, has been adopted to stop the desertification and land degradation, protecting cities from winds and dust of desert (UNEP, 2015).

¹⁰ See also “WISDOM for Cities” (Woodfuel Integrated Supply/Demand Overview Mapping), a tool for mapping sustainable resource and potential area for woodfuel in east Africa and Southeast Asia (Drigo and Salbitano, 2008).

¹¹ It is stated that the Green wall has been proposed for the first time by Richard St. Barbe Baker (1889-1982) in 1952 calling for a thirty mile wide “Green Front”. See <http://wilmetteinstitute.org/the-man-of-the-trees-and-the-great-green-wall-a-bahais-environmental-legacy-for-the-ages/>



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Being the second most populated (16.3% of world's population) and the poorest continent in the world, the food and nutrition security turn into one of the issues in urban forestry. To tackle with poverty and inequality, the report of FAO (2016) proposed a novel method of urban forestry called *“luxury” gradient*. Such proposal based on the choice of species, “ranging from purely aesthetic considerations” (for wealthier neighbourhood) to the more “pragmatic provision of goods and services” (for poorer neighbourhood). For instance, there is an unequal distribution of trees between wealthy northern and poorer southern districts of Johannesburg (Schäffler and Swilling, 2013). Through the implementation of “luxury gradient” approach in poor district of Johannesburg, not only trees can contribute to the mitigation of poverty, but also, they can enhance the tree canopy in southern district. Furthermore, in southern Africa the use of traditional medicinal as an alternative healing practice, is

common among communities (Geldenhuys, 2007), so access to the indigenous trees in urban forest can support traditional curative method.

To wrap up, in African context, the desertification, alleviation of poverty and woodfuel are the main concerns in urban forestry.

2.4. Economic extraction

Latin America

Half of the tropical forests, and one fourth of the world’s total forests lie in Latin America region, providing important global and national environmental services¹². Due to the economic extraction and urbanization near/in natural forests (like Favelas), the dramatic change has been occurred in land use and natural resource. As the vicinity and the influence of urbanized areas on natural forests cannot be ignored, the priority to the “peri-urban”, rather than “urban” forestry in Latin America is mainly stated (FAO, 2016).

The main effort in Latin American contexts is concentrated on the “conservation” of natural resources from urbanization effects, providing economic opportunities for the urban dwellers¹³. For instance, National Park of Tijuca in Rio de Janeiro is considered the largest urban forest in the world, which has been frequently damaged by fire¹⁴; to decrease the fire frequency it has been planted less-flammable plants in the forests (Silva Matos et al., 2002). Other issues like inequality distribution of trees and Ecosystem Services in Latin American cities (which leads to environmental injustice) is discussed by experts (Escobedo et al., 2015).

¹² See <http://www.fao.org/docrep/006/J2459E/j2459e12.htm>

¹³ Two proposals for urban forestry in Latin America are debated in the Chapter of case study: Chamanga and Cartagena.

¹⁴ It is reported that the main cause of fire included rubbish burning, hot air balloons, intentional and religious practices (Silva Matos et al., 2002).

Apart from few case of “urban” forestry in Latin America¹⁵, the main researches aim at peri-urban forestry and conservation of natural forests, providing job opportunities also for young generation. For instance, in Niterói (one of the municipality of Rio de Janeiro), it has been launched the social integration program of “*Nem-Nem*”: *Nem estuddam, nem trabalham* ¹⁶ to provide job opportunities and income for young unemployed generation, who contribute to the recovering of environment.

To wrap up, each context necessitates specific target for urban forestry, in the planetary vision of forestation, it is essential taking into the consideration the most predominate drivers of each context.

¹⁵ For instance, São Paulo’s public–private partnerships for tree-planting; by planting trees the company receives an advertising spot (Zulauf, 1996; Coleman et al., 2013) or the city of Curitiba (Brazil) has adopted the BioCity Program to integrated the biodiversity in urban planning (FAO, 2016; UNEP, 2008) or reduction of air pollution in Santiago by urban forestry (Escobedo et al, 2008)

¹⁶ See <http://www.fao.org/forestry/urbanforestry/86956/en/>
Presentation n.32 by Axel Grael: Programa NITER.

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Dualism

Cities versus forests

Cities versus forests

« Much of unconscious life of the individual is rooted in interaction with otherness that goes beyond our own kind, interacting with it very early in personal growth, not as an alternative to human socialization, but as an adjunct to it [...] Identity formation grows from the subjective separation of self from non-self, living from non-living, human from nonhuman, and proceeds in speech to employ plant and animal taxonomy as a means of conceptual thought and as a model of relatedness. »¹

Paul Shepard

During the history of civilization, the human species acquire triumph over the inhospitable environment and such human supremacy leads to the idea of dualism between “civilized” and “wilderness” (Oelschlaeger, 1991). Civilized world or cities became natural habitat of *civis*², and wilderness³ became the resource for *civis*.

For many centuries, the dualism between human and nature had echoes in assertion of many intellectuals like as Francis Bacon, who in 1620, argued that, “the world is made for man, not man

¹ Shepard. P. (1982). *Nature and Madness*. San Francisco: Sierra Club Books, p.125.

² Latin word of *civis* – means city-dweller and the word of ‘civilization’ refers to it.

³ Wood may have a common root with wild, and the word *savage* is derived from *sylva* – “a wood” (Williams, 2006).

for the world”; or Sigmund Freud who expressed that “the principal task of civilization, its actual *raison d’être*, is to defend us against nature”.

This distinction between civilized world and wilderness, places the human at the center of universe, human becomes the most significant entity in the universe and the reality is assessed through an exclusively human perspective, this is what Dave Forman⁴ (1991) called Anthropocentrism⁵. Anthropocentrism is dualist in origin: humanity controls the nature for its own benefits or purpose. Anthropocentrism has been the main reason of extraction and alternation of many natural resources like forests.

Based on historical background, this chapter argues that, the idea of forestation in and around cities has reflected the concept of anthropocentrism from early civilization to the present day. According to the historical circumstance, the character of human has evolved and human achieved new knowledge over the nature. The planting of trees has reflected the evolving character of human existence from early civilization to the present day. To illustrate, in prehistoric societies the forests become invested with sacredness, and with the evolution of agriculture, the forests were perceived as resource, and with the birth of gardens, trees were planted for embellishment.

All these historical sequences are studied to highlight how anthropocentrism manipulate the presence of trees in our cities.

⁴ Dave Forman is co-founder of Earth First, which is a radical environmental advocacy; founded in 1980 with the goal to draw attention upon environmental conservation.

⁵ It is also known as human exceptionalism (Catton and Dunlap, 1978).

3.1. Sacredness

« God is the Light of the heavens and the earth; The likeness of His Light is as a niche wherein is a lamp kindled from the Blessed Tree, an olive that is neither of the East nor of the West, whose well night would shine, even if no fire touched it; Light upon Light. »

Quran, 24:35

In many cultures forests and trees have represented “special spiritual significance to peoples and communities” (Oviedo and Jeanrenaud, 2007) and are associated with secrecy and initiation rites. For many reasons trees and forests have been considered sacred; in some cultures, the trees were correlated to birth, marriage, death, fertility⁶, tradition or religious; in others, they have been the residence of spirits; or have been identified as national monuments⁷ (Barrow, 2010).

Sacredness is rooted in religious. Such religious view of trees is deeply rooted in the image that human beings have of self and

⁶ Because of the shape of trees – a central trunk with branches like arms and fingers, bark like skin – trees lend themselves to identification with the human form, and have frequently been endowed symbolically with anthropomorphic characteristics, leading to a link with fertility symbols in some cultures.

⁷ “Certain trees are national monuments and appear on the national flags, for example in Lebanon it is the Cedar of Lebanon (*Cedrus libani*), Canada the Maple (*Acer saccharum*) and for Chile the Monkey Puzzle tree (*Araucaria araucana*)”. (Barrow, 2010, p.44)

nature (Nasr, 1998). Such imagination of self can be based on anthropocentrism or ecocentrism.⁸

Eastern religions (Buddhism, Hinduism, Shintoism and Taoism) and the cosmovision of most indigenous and traditional peoples correlate to nature in more ecocentric terms, whereas Abrahamic religions (Islam, Judaism and Christianity), perceive nature in more anthropocentric terms (Harmon and Putney, 2003). Abrahamic religious, in particular Judeo-Christian, have ambivalent and antithetical messages. On one hand, they emphasize on stewardship toward nature, on the other hand, they accentuate domination over the nature. (Williams, 2006) Sacred groves are the example of stewardship, while deforestations⁹ are examples of domination over the forests (Williams, 2006; Barrow, 2010).

Harrison's *Forest: the shadow of civilization* mentions that in the early Mediterranean civilizations, early deforestation was "religious actions" to permit primitive people to see the sky better in order to read the divine signs sent down to humans from an abstract "above". In Greek and early Christians, the Earth was "an abode designed for humankind" and "*mankind* was created to rule over God's earthly creation" (Oelschlaeger, 1991), where the nature must be conquered through pain and suffering, this is what Thomas Aquinas described as "punishment of original sin".

⁸ Refers to Environmental Ethics that studies the moral relationship of human beings to, the environment and its non-human contents.

⁹ "The link between Western Christian piety and land reclamation was a leitmotif running through medieval clearing". (Williams, 2006, p.96)

The dominant idea, and clearing the forest was due to the idea that the forest was associated with pagan gods and devils¹⁰ and make a clearing in forest was a means of purifying the faith and it became sanctuary against evil (Williams, 2006). Forests were a palace to draw nearer to God; humans were blessed and they assisted both God and themselves in the improvement of an earthly home.¹¹

In other vision that focuses on stewardship, Sacred groves as the abode of the gods, have been venerated and protected for millennia. Even though scared groves exist in most part of the world, they are more associated with India than any other country, where the concept of sacred groves predates the Vedic age (Ramakrishnan, 1996). Sacred groves are also connected to Buddhism in China and Japan, where the trees were planted near temples. Persian gardens were equivalent to sacred groves, where fundamental elements of universe come together (Grimal, 1974).

The importance of sacred groves could be also attested in many sacred texts; the Date palm is mentioned in the Bible, Qur'an, and Thalmud (Hareuveni, 1980; Waisel and Alon, 1980). One hadith¹² states: "When doomsday comes, if someone has a palm shoot in his hand, he should plant it". This implies that, even when all hope is lost, such planting is good in itself (Khan, 1999).

¹⁰ In popular folk cultures, the forests were the residents of demons, monsters, witches, werewolves.

¹¹ In Christian view of thing, the earth was merely "a sojourner's way station"

¹² Saying of the Prophet Mohammed

To wrap up, under the idea of sacredness, human had applied two different approaches to control the forests. One led to the deforestation (Williams, 2006) and the other attends the stewardship of forests (Barrow, 2010). In such anthropocentrism, woods and forests were located outside of habitat of *civis*, because forests provoked secrecy and fear and as humans were not able to explain them, they associated the forests to the place for divinities.¹³ Under the idea of sacredness, humans set up boundaries between self and “others”.

¹³ For instance, in the beliefs of prehistoric societies, the trees struck by lightning and consumed in the resulting fire, have associated with divinities who dwelled the heavens as well as the earth (Brosse, 1989).

3.2. Resourcism

« I marvel at how our God has given so many uses for wood for all men in the whole wide world: building timber, firewood, joiner's, cartwright's and shipbuilder's wood, wood for rooms, wood for wheelbarrows, paddles, gutters, barrels. In short, wood is one of the greatest and most necessary things in the world, which people need and cannot do without. »

Martin Luther ¹⁴

Forests have been considered as resources for many purposes. In anthropocentrism, “nonhuman world, which is all external to man and his structures”, are considered “as raw material [...] to the human purpose” (Livingstone, 1985). Neil Evernden (1984) says that “Resourcism is a kind of modern religious which casts all of creation into categories of utility” and Oelschlaeger (1991) explains it as “transformation of modern people from Homo religious to *Homo economicus*.”¹⁵

Although the resourcism is a contemporary idea, its inception returns back to the Neolithic revolution and agricultural developments. Resourcism has led to the deforestation and cultivation of domesticated trees¹⁶. Since the first permanent settlement and domestication of plants, the trees were cultivated

¹⁴ Martin Luther *Table Talk* of 30 August 1532, cited in *Wood, A history* by Joachim Radkau (2011).

¹⁵ See also, Caruso, S. (2012). *Homo oeconomicus. Paradigma, critiche, revisioni*. Firenze: Firenze University Press.

¹⁶ The forests burned down to improve hunting ground, increase yield of the gathered fruits, harvest shoots from coppiced woods for better building and weaving material, to gain open land for farming and for energy production. Animal husbandry and the need for fodder and grazing of livestock and pollarding have also influenced on forests (Ghiggi, 2010; Williams, 2006)

for food, medicine and shadow in the cities. Drawings and descriptions of pre-Columbian America suggest many native American tribes developed extensive agricultural communities, which included extensive gardens with planted trees (Miller et al., 2015). In China, Kublai khan necessitated tree planting along all public roads in and around Beijing for shade (Profous, 1992). The early Egyptians described the journey of trees with balls of soil to be transplanted in cities more than 4000 years ago (Chadwick, 1971).

New necessities regarding the management of trees, as resources, have emerged. The history of professions has followed the path of resourcism (Noss and Cooperrider, 1994) and new professions like forester, arboriculture, gardener, plant hunters and botanist have appeared¹⁷. Arboriculture as we know today has risen between 1400 and 1800; James Lyte's book *Doden* (1578) used the term of arborist and William Lawson's *A New Orchard and Garden* (1597) discussed the methods of planting, pruning, fertilizing and wound treatment (Gerhold and Frank, 2002).

Resourcism is closely linked to the great voyages of discovery of plant hunters, to find new source for food, seeds and medicine all around the globe¹⁸.

¹⁷ See also the concept of *Homo reciprocans*, which refers to the human, who improves the environment and also achieves his needs and wants.

¹⁸ See also: Bobby J. Ward. (2004). *The Plant Hunter's Garden. The New Explorers and Their Discoveries*. Portland: Timberpress; Tyler Whittel, M. (1997). *The Plant Hunters: Tales of the Botanist-Explorers Who Enriched Our Gardens (Horticulture Garden Classic)*. Guilford: Lyons Press; 1st edition (translated by B. Bini in Italian) and in Italian version: Zanazzi, L. (2013). *Uomini e piante. Le passioni dei collezionisti del verde*. Roma: Deriveapprodi.

Resourcism, in its anthropocentric vision, was lacked any awareness of global responsibility and “heroic exploits” of plant hunters traded endangered species shamelessly. Stefen Schneckenburger (2001) in his writing about plant collector Albert Purpuse (1851-1941) expressed that:

« It is doubtless a good thing that the age is now past in which plant hunters and botanists collected in great quantities. A range of laws and regulations relating to nature conservancy, the Washington Convention on International Trade in Endangered species (CITES) and biodiversity conventions are, on the one hand, providing urgently needed protection for natural environments and individual species and, on the other, protecting the interests of countries in the use of their own natural resources. Just as it would be a mistake to condemn past collectors from present day perspective, we would also be in error if we were to cite their behavior as a standard for the twenty-first century at a time when nature is being wantonly sold off on a worldwide scale. Rather than regarding these plant hunters as a paradigm, we should see them as children of their day and age, when they collected the bounties of a seemingly inexhaustible natural environment, at times under extremely harsh conditions and economic constraints. »

Albeit, from present day perspective, the Resourcism is mainly considered cruel against environment, it had played an important role in the history of urban tree planting. Under Resourcism, the first trees were planted within the wall of the city, in the private gardens of ruling classes for utilitarian purposes (fruit, woods) rather than ornament (Lawrence, 2008).

3.3. Embellishment ¹⁹

« Beauty will save the world. »

Fëdor Dostoevskij

« Wildness is the preservation of the World. »

Henry David Thoreau

Since the early garden, trees were planted to provide perceptual experience of beauty and pleasure. The sense of beauty was defined as the result of rational order of planting, which provide harmony and symmetry with aesthetic values. If we consider that “chaos is the law of nature [and] order is the dream of man” -as Henry Adam said- the idea of embellishment is essentially anthropocentric. *Homo aestheticus* ²⁰ imposed his idea of beauty to the nature, shaping trees, designing gardens as a geometrical abstraction of nature.

In Europe, from 16th to 17th century, there was a steady increase in the number of *Homo aestheticus* in research of beauty in the places planted by trees. Lawrence (2008) explains that during this period, nationally distinct way of using trees have risen: Renaissance gardens developed among the landscape of Rome, Paris and The Hague, trees in Renaissance and Baroque garden were kept small, only the *bosco* outside of the walls could have

¹⁹ Embellishment derives from the French term of *embellissement* which expresses an idea that is more complex than simple niceties. It refers also to the quality of urban environment, for instance, in the essay of Voltaire (1749) “*Des Embellissemens de Paris*” it is mentioned the need for public buildings, bridge, market, fountains.

²⁰ Title of the book Ellen Dissanayake (1992) *Homo Aestheticus: Where Art Comes from and Why?*

their full size; French brought further use of rows of trees in the form of the *allées*, *malls*, *cours* and *Boulevards*; Dutch created the tree-lined canal and *Lange Voorhout*.²¹ Such aesthetic approach opened new criticism. For instance, Camillo Sitte, who was the most vocal opponent of the Haussmann- Stübgen opposed that:

« [...] All tree-lined streets are tedious but no cities can do without them [and boulevards] thousands of trees would have been more usefully planted in two or three new parks [...] The motif of the *Allée* is in itself a burning indictment of our taste [...] One literally gets a headache from such oppressive boredom. And this is the major “art form” of our city planners of the geometric persuasion [...] faults of modern arrangements derive solely from the fact that all tree-lined alleys have been planned on the drafting board according to the principals of symmetry, without consideration for the well-being of the vegetation, light and sun, or the consequent effect on cityscape and traffic. »

Albeit, Embellishment expressed a new quality of urban environment, it set arbitrary form of design and the cities became “procrustean bed”²² of trees.

In 18th century, new style of embellishment and aesthetic has emerged, British expanded cities over the walls of Middle Age, including trees within open areas of new districts and an

²¹ The front gardens in The Hague that unified to create a L shape broad avenue.

²² In the book *The Purloined Letter*, Edgar Allan Poe (1844) used the metaphor of “Procrustean bed” to describe rigid method of Parisian police. (Procrustean bed refers to Prokoptas or Damastes in Greek myth, who put travellers in his bed, stretched or lopped off their limbs to adapt them to its length. Tripp, Edward, T. (1970). *The Meridian Handbook of Classical Mythology*. Meridian, p. 498.)

imitation of natural landscape became common in the design of parks, squares and residential properties (Lawrence, 2008). *Homo aestheticus* experimented new vision of aesthetic based on “natural beauty *per se*”. The concepts of picturesque²³ and *Genius loci*²⁴ drew attention to the beauty that was hidden in spirit of the place and wilderness (Selman and Paul, 2010).

Under embellishment and aesthetic, the “wilderness” returned back to the world of *civis*. Not only trees were not pruned for aesthetic purpose, but also “wilderness” became beauty. Common historical roots for modern idea of *Wild Urban Woodlands*²⁵ can be drawn to aesthetic idea of wilderness in 18th century (Lawrence, 1993).

²³ See also Wordsworth, W. (1810). *Guide to the Lakes*, it reflects on picturesque sentiments of natural features.

²⁴ See also Bell, S. (2012). *Landscape: Pattern, Perception and Process*. 2nd Edition. Abington, New York: Routledge, it mentions to the contributions of Schopenhauer and natural beauty relates to *Genius loci*. In Italian version, Norberg-Schulz, C., Norberg-Schulz A.M. (1992). *Genius Loci. Paesaggio, ambiente, architettura, Documenti di architettura*. Milano: Electa.

²⁵ Title of the book: Kowarik, I. and Körner, S.(eds.) (2005). *Wild Urban Woodlands. New Perspectives for Urban Forestry*. Berlin: Springer

3.4. Power and Luxury

People with social and political power expressed their supremacy by planting trees in or around their houses. In fact, from Chinese gardens to European gardens, small number of prosperous people enjoyed the aesthetic of nature in their private residences. The access to these private gardens were permitted to the minority of wealthy people with high social status. For instance, in Europe in 16th century some private garden were open to the public through the gate on which were posted *Lex Hortorum* (the law of gardens) to specify necessary manner to frequent the garden (Coffin, 1982), Chinese garden was opened to well-dressed foreigners and Chinese were refused to enter (Zimmerli, 2010)

This segregation was gradually eased and some gardens of monarchs and kings were opened to the public and a wider range of social classes. Among them we can mention Tuileries, Tiergarten, and Hyde Parks that later become first large parks in urban context. Other new public spaces like the *London Pleasure garden* and *Jardis spectacles*²⁶ of Paris have appeared for people with money and time to enjoy *locus amoenus*. Such theatrical entertainment of public space has been described by the *flâneur*'s²⁷ vision of the city. Such discrimination finally abandoned when the sense of *noblesse oblige*, raised among

²⁶ See also: Panzini, F. (1993). *Per I piaceri del popolo. L'evoluzione del giardino pubblico in Europa dalle origini al XX secolo* ; Langlois G.A.(1991). *Folies Tivolis et attractions. Les premiers parcs de loisirs parisiens*, Délégation à l'action artistique de la ville de Paris; Isherwood, R.M. (1986). *Farce and fantasy. Popular entertainment in eighteenth-century Paris*.

²⁷ *Flâneur* is the urban adventurer who enjoyed walking the streets for the pleasure received by the city life, invented by Charles Baudelaire (1857) *Les Fleurs du mal*.

wealthy commoners who used their private fund to create public space, and planting trees for benefit of public.

Nonetheless, the presence of trees near residence expressed the sense of luxury, and even today, the posh vicinities of cities benefit from more green space than poverty-stricken neighborhoods. The historical roots of this phenomenon can be drawn to the estate developers and landlords, who included trees in their development schemes as “profit-oriented civic philanthropy” (Lawrence, 2008). The creation of large parks of 19th century followed the same logic; increasing the value of properties and generating tax profit were the base of these parks, which led to the imbalanced distribution of trees in urban contexts. For instance, the terrain of Central Park of New York, was chosen to evict the Afro-America squatters of rocky, swampy area. Since this terrain was not suitable for construction, it has been adopted by planners as park for wealthy people of uptown (Rosenzweig and Blackmar, 1992).

To wrap up, the history of trees in cities, is anthropocentric expression of power, which has led to the social segregation, widening the gap between poor and rich.

From present perspective, the power on nature²⁸ has generated a “global” discrimination and segregated poor societies from rich countries. Regarding such discrimination Vandana Shiva (2005) writes:

« If we are serious about ending poverty, we have to be serious about ending the systems for wealth creation which

²⁸ See Joachim Radkau (2008) *Nature and Power: A Global History of the Environment*. New York: Cambridge University Press

create poverty by robbing the poor of their resources, livelihoods and incomes. Before we can make poverty history, we need to get the history of poverty right. It's not about how much more we can give, so much as how much less we can take »

The system of wealth accumulation, is based on riches taken from poor, which not only caused poverty and inequity but also resulted the environmental crisis of our era. For instance, deforestation due to the export of beef, palm oil, soy, and wood products including timber and paper has resulted in environmental disaster in countries like Brazil, Indonesia, Malaysia, the Democratic Republic of the Congo, Papua New Guinea, Bolivia, Argentina, and Paraguay (Persson et al. 2014).

3.5. Towards the age of Enlightenment

« The more you think about the services of the forest, the more you understand them, the more essential they appear. It is true indeed that the forest, rightly handled – given the chance – is, next to the earth itself, the most useful servant of man. » ²⁹

Gifford Pinchot

With the burgeoning population and city expansion, a new idea of optimal city has emerged and superficial idea of embellishment and aesthetic shifted to Enlightenment. Furthermore, the modern conservation movement³⁰ opened vision toward ecological awareness and protection of natural resources.

“Enlightened Homo” perceived trees not only as a resource of beauty (English garden) but also as prosperity to improve cleanliness of urban space, purify polluted air and setting public space for individual health (Lawrence, 2008). The idea of garden city movement³¹ and open urban design initiated with enlightenment. Patrick Geddes was the first and most influential

²⁹ Pinchot. (1998). *Breaking New Ground*. Washington, D.C.: Island Press, p. 32. Pinchot was the founder and first chief of the Forest Service 1905-1910 in USA.

³⁰ The first conservation movement returned back to 1662, when John Evelyn's treatise, *Sylva* proposed the idea of conservation of forests by controlling the rate of depletion and plantation. (Nisbet, 2007) [online] Available at: <http://www.gutenberg.org/files/20778/20778-h/20778-h.htm> [Accessed 13 August 2017]

³¹ The Garden City concept proposed by Ebenezer Howard (1898), he intertwined social and economic concerns with physical environment and advocated more open urban design.

on construction of city in a regional vision with an advocacy toward the nature. He discussed “how the residents’ use of a city influenced its form”, moreover he introduced the “Geddes garden”, where the production food and plants was aimed for educational purpose (Günter Voss, 2008).

Cities expanded to the far suburban landscape, and new suburban houses arose in several places as the anti-urban aesthetic. The first emergent difference seems the large size of trees and the use of exotic plants. In the United State, people personalized the space in front of their house by the individuals’ planting. Most of them planted exotic trees as a memory of their homelands. The new use of trees in United States developed new form of green space and large city parks have planned. Fredrick Law Olmsted, H.W.S. Cleveland³², Charles Eliot³³ designed parks to incorporate the trees to the city.

The history of actual urban forestry, as interdisciplinary approach, initiated with the collaboration of Olmsted and Gifford Pinchot ³⁴ who linked traditional forestry to urban park disciplines. Roxi Thoren (2014) explains that “Where most Americans saw a conflict between forest conservation and timber extraction, Olmsted and Pinchot saw the two as

³² Cleveland worked mainly in shaping the park system and waterfront of Minneapolis and St. Paul

³³ Charles Eliot had a main role for the park system of Boston. He is the writer of *Garden and Forest* (1897), illustrating the need to manage forests and not simply protect and preserve them.

³⁴ He was (at the time) only US-born, trained forester who educated in Europe (France, Germany, Swiss) in the scientific practice of forest management, although young, he was one of the nation’s leading experts on forestry (Thoren, 2014).

coexisting — healthy forests could produce useful timber [...] Biltmore forests [as an arboriculture laboratory followed three goals:] to generate profit; be self-sustaining; and improve the health of the forest [...] materially, economically, and ecologically productive”.

The collaboration of Olmsted and Pinchot is an example of “Enlightened” anthropocentrism³⁵ based on full comprehension of the problems involved. They interlaced the utilitarian philosophy with conservation and protection of natural resources. They illustrate a novel vision of use of forest in which previous pure anthropocentric idea of utility shifted toward the environmental conservation in which there is a “state of harmony between men and land” (Leopold, 1949).

Enlightened anthropocentrism brought forests in cities and “adopted principals of forestry [...] to achieve and maintain a balanced age structure within urban locality to ensure continuous tree cover, and hence sustained provision of goods and services” (Konijnendijk, 2003). The efforts of Olmsted for a scientific land management has essentially contributed to new paradigm, ecocentrism, a turning point for overcoming the duality between city and nature. He was “a great pre-professional, synthetic designer who knew no professional

³⁵ Enlightened Anthropocentrism in philosophy explains that “humans do have ethical obligations toward the environment, but they can be justified in terms of obligations toward other humans”, “it is viewed as immoral, because it deprives future generations of those resources”. Sustainable development has common roots in Enlightened anthropocentrism. See Anthropocentrism, by Sarah E. Boslaugh [online] *Encyclopedia Britannica*. Available at:

<https://www.britannica.com/topic/anthropocentrism#ref1187034>
[Accessed 14 August 2017]

boundaries and whose projects hybridized aesthetics, infrastructure, ecology, social justice³⁶, and economic productivity” (Thoren, 2014). His legacy goes far beyond his masterworks and has bequeathed a set of principles that have served as a blueprint for sustainable design and environmental conservation³⁷.

³⁶ It is readable from his writing that he was democratizing nature. Best voiced by Olmsted in his writings about Central Park is written that “It is one great purpose of the Park to supply to the hundreds of thousands of tired workers, who have no opportunity to spend their summers in the country, a specimen of God’s handiwork that shall be to them, inexpensively, what a month of two in the White Mountains or the Adirondacks is, at great cost, to those in easier circumstances.”

³⁷ See National Association for Olmsted Parks, Available at: <http://www.olmsted.org/the-olmsted-legacy/olmsted-theory-and-design-principles/design-principles> [Accessed 30 December 2017]

Colonized forests

Conclusions

To wrap up, this chapter reviewed the duality between city and forest, with a historical background. Such duality arose because of anthropocentric vision, in which civilized human as “Ego” above the nature, planted trees in the cities to express its “supremacy” and to satisfy its sense of “ego”.

First, the forests were separated from cities and depleted due to the sacredness. Then, the forests were exploited and extracted as resources. Later trees were imported to the city, isolated in the gardens, sacrificed for utility, decoration and expression of power, provoking pleasure and aesthetic. Finally, enlightenment introduced a prosperous idea of city that was based on the benefits of trees.

Nonetheless, the cities are found on anthropocentrism and the forests are caged in cities. Urban forests such as Golden Gate Park and Central Park have emerged in relation to the development of city and the strong figural forms of them, reveals the imposed organizational system of city (Czerniak, 2007). Such antithetical archetypes have been enforced to coexist context, and as Misharina and Chung (2014) accentuate:

«The forest caged in the city is swallowed by it, digested. It can never remain the same. It has to live by the rules set in the city, it has to survive and adapt. It has to wear masks that are for the city embedded faces. It has to hide, it has to suffer. It is colonized. »

If we see our cities in another vision, which is not anthropocentric...If we see human not above the nature but as a part of it...If we study the influence of our cities in a broader scale ... Then, how will be urban forests? Next chapter discusses these questions.

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Holism

Forests in cities/Cities in forests

Forests in cities/ Cities in forests

« A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise. »

Aldo Starker Leopold ¹

In the face of environmental awareness, the integrity of ecosystems and the survival of all species became central debates of new era. The previous dualistic and reductionist vision of the world, shifted to holistic view. Interdisciplinary approaches have emerged to resolve complexity of environmental issues.

The city as the necrotic result of anthropocentrism and in the crisis of urban age draws attention of all scientist, ecologists, philosophers, planners, geologist, architects and Landscape planners. The school of thoughts of Olmsted has played a crucial role, widening debates toward novel humanity, as the driver agent to hybridize aesthetics, ecology and well-being to the whole system. This chapter goes through different holistic approach, from local to regional and global scale to figure out in what extension the urban forests can operate, in line with the emergence of “Global City”.

The section evaluates the hypothesis of “Global Forest” basing on urbanization process in a holistic vision of global issues.

¹ Aldo Leopold introduced the concept of Ecocentrism in the book *A Sand County Almanac* (1949); his report of Yellowstone national park, is officially known for ecosystem management.

4.1. From Anthropocentrism to Ecocentrism

From the middle of twentieth century onwards, in the face of ecological apocalypse, the humanity's vision of the world shifted “*from Ego to Eco*”². Ego refers to well-being of self - anthropocentrism-, while eco (or “*oikos*” in Greek means “whole house”) indicates holism- well-being of whole system. Scharmer and Käusefer (2013) make a clear description about this paradigm shift:

« It is shift from an *ego*-system awareness that cares about the well-being of oneself to an *eco*-system awareness that cares about the well-being of all, including oneself. When operating with ego-system awareness, we are driven by the concerns and intentions of our small ego self. When operating with eco-system awareness, we are driven by the concerns and intentions of our emerging or essential self—that is, by a concern that is informed by the well-being of the whole. »

According to this paradigm shift, modern environmental ethics³ and conservation movements have risen. Eugene Odum, one of

² “*from Ego to Eco economy*” is a research program conducted by Presencing Institute (PI) and supervised by Scharmer and Käusefer. It has been published the book in 2013, in which they discuss socioeconomic challenges, proposing methods for transforming capitalism.

³ Environmental ethics based on nature-centered; under this paradigm new theories like ecocentrism, biocentrism, environmental design, human ecology and sustainability have emerged. For the history of environmental ethics see Cramer, P.F. (1998). *Deep Environmental Politics: The Role of Radical Environmentalism in Crafting American Environmental Policy*. Westport: Praeger; Nash, R. (1990). *The Rights of Nature: History of Environmental Ethics (History of American Thought & Culture)*. Madison: University of Wisconsin Press.

the most pioneering idealist of holism, drew attention on the integrity of ecosystem ecology, emphasizing on the well-being and stability of planetary ecosystem as “the basic unit of structure and function”⁴. Holistic vision has led to interdisciplinary perspectives and George Bateson (1979), as one of the promoters of such perspective, called attention to the interaction of systems:

«We have been trained to think of patterns, with the exception of those of music, as fixed affairs. It is easier and lazier that way but, of course, all nonsense. In truth, the right way to begin to think about the pattern which connects is to think of it as primarily (whatever that means) a dance of interacting parts and only secondarily pegged down by various sorts of physical limits and by those limits which organisms characteristically impose.»

In the era of ecocentrism, as the opposite of anthropocentrism, novel forms of utopia have been planned to reduce the impact of “habitat” of *civic* on planet and designated the role of “stewardship”⁵ to *civic* (McHarg, 1992). The forests became an astute tool for creating such green utopias, that “is sustainable only if the well-being of the world’s ecology is a part of plan” (Marshall, 2016).

In terms of ecocentrism, the cities are not created just for human well-being, but they contribute to the well-being of

⁴ See also Noer Lie, S.A. (2016). *Philosophy of Nature: Rethinking Naturalness*. p.193

⁵ McHarg emphasized on the role of human as Steward for conservation of ecosystem. See Richard Weller (2014) Stewardship Now? Reflections on Landscape Architecture’s Raison d’être in the 21st Century. *Landscape Journal*, 33:2, p. 1-24

whole system, cities forest, human, plants become a whole and if “we try to pick out anything by itself we find it hitched to everything else in the Universe”⁶ (Muir, 1911). Cities are not systems *per se* but, “offer arenas for enormous opportunities ⁷ [...] with room for humans and other species to thrive” (Elmqvist et al., 2013).

The idea of *Biophilic* ⁸ city is a prevalent prototype, which based on ecocentrism. A Biophilic city recognize “the innately emotional affiliating of human beings to other living organisms” (Wilson, 1984) and “puts nature first in its design, planning and management” (Beatley, 2016). If Biophilic city is a good example of ecotopia, what shape do the “utopian forests” have, to include human and biodiversity? How do they influence on whole system? To answer, to these questions, this section follows with different holistic approaches of forestation and urbanization which have roots in landscape ecology development as one of the approach of conservation movement (Forman, 2015).

⁶ Cited by Giffor, T. (2006). *Reconnecting with John Muir: Essays in Post-Pastoral Practice*. Georgia: University of Georgia, p. 25

⁷ Global Assessment of Urbanization, Biodiversity and Ecosystems Services report accentuates that due to the urbanization and expansion of cities, cities include wide range of biodiversity, thus, they are also increasingly recognized for their role in conserving biodiversity.

⁸ The concept of *biophilia* originally was coined by German social psychologist Erich Fromm. Cited by Beatly, T. (2015)

4.2. Optimal form of forests

During the 20th century, the holism gives birth to novel precursors of greening; Green Belt of London, Green infrastructure, Ecological Network in northern EU countries, Green System in Balkan area, Green Way in North America, Biodiversity Corridors in Philippines and Urban Greening in Singapore (Fábos & Ryan, 2004), are heterogeneous terminology to define integrity and connection of these green structure which create a whole, in which the urban forests are a part. The evolution of Greenbelt, Greenway, Green Infrastructure and ecological network, is the main concern of this section, to point out the main directive and challenge that these holistic approaches have encountered.

In 1935 Green belt of London prevented urban sprawl of city. This purpose was obtained by openness of land in surrounding areas of the city. Main disadvantages attributed to Green Belt are: lack of protection of high biodiversity land (for instance, suburban gardens are not incorporated to Green Belt) (Davidson & Wibberley, 1977); green belt policy led to higher densities and fewer gardens in suburban areas (Williams, 2000), social justice is another shortfall; restricting supply and raising land values within constrained urban areas led to a shortage of affordable housing (Amati & Taylor, 2010). Without forests, green belt is not *de facto* green and productive (Konijnendijk, 2010).

Later in 1987, Green way in North America has been proposed to create networks of linear elements for multiple purposes,

based on the policy of sustainable land use⁹. The opponents of Greenways remark the ecological aspects such as, ineffectual use of corridors for many species which disperse across the landscape without corridors or the spread of invasive species into protected areas (Daniels, 1988). Furthermore, Ahern (1995) mentions that “imposing greenway corridors in a landscape may lead to greater uniformity, and a loss of cultural landscape identity. In open landscapes, forested corridors are unnatural and inappropriate introduction, which can radically change the landscape physically, culturally and visually.”

In line with the development of concepts in North America, in Europe French landscape designers like Jaques Simon and Michel Corajoud blurred boundaries between disciplines; ecological design has been adopted as the part of plans in urban and suburban areas and other concerns like *préverdissement* (or forestation prior to the urbanization), has been introduced by Guinaudeau. Others like Michel Desvigne and Christine Dalnoky proposed the rediscovery of wider scale of territory to face ecological challenges, conceiving new type of relationship between urban and the surrounding countryside. Several projects like Thomason Factory at Guyancourt¹⁰ and the TGV station at Avignon reveal novel prototypes of forestation in relation with wider scales and issues. Gilles Clément in Parc Henri Matisse in Lille advocates the metaphoric forest of L'île Derborence, as a myth of nature, as a manifest to overcome the dualism between natural world and urban areas (Metta, 2008).

⁹ Based on literature review of greenways in landscape planning (President's Commission on Americans Outdoors, 1987; Little, 1990; Flink and Seams, 1993; Smith and Hellmund, 1993).

¹⁰ Commissioned by Renzo Piano.

In 1994 Green Infrastructure has been proposed as a land conservation strategy with the notion that natural systems are equally, if not more important, components of our “infrastructure”, (Firehock, 2010) providing an adequate ecosystem which maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life (Benedict& McMahon, 2006; LIFE, 2010). The main debates against GI refers to the grey infrastructures, which are highly clogged with traffic and beneficial effects of GI would be faded away (Socco et al., 2007).

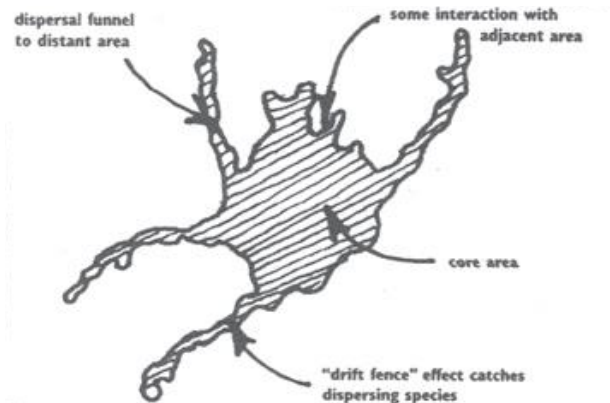
To wrap up, the main aim of these holistic strategies is to tackle with the fragmentation in landscape, as the result of urbanization. Spatial connectivity is fundamental for the long-term survival of many species¹¹, albeit some species are better to be left in isolation.¹²

Creating connectivity out site of urbanized area is more achievable, but in urban area, is connectivity the “correct” and “possible” answer? what is the optimum shape? Can we embody an ideological form? Thinking holistically, implies a considerable amount of vision and commitment. Diversity and complexity of ecology, and regular urban form pose challenges for defining sustainable design for urban forests. Lister (2007) stresses that we cannot define a “correct” state in ecological design, the habitat of some species could create conflicting habitat for the other species, both habitats are valid, but not at

¹¹ European Program of LIFE is based on GI to connect the habitats of endangered species to assist genetic exchange, including stopover areas (for instance, migrating birds) and corridors linking habitats. Since 1992, LIFE has co-financed some 4306 projects of conservations.

¹² See also debates regarding SLOSS: protecting single-large-or-several-small patches or ecosystems.

once¹³. So, we can define an “adaptive ecological design” which has capacity for resilience, and have ability to recover from disturbance. However, in terms of ecological function, Richard Forman (1996) suggests “spaceship shaped” as an optimal form for a patch (which can be imagined as an urban forest), with rounded core for protection of resources, plus some curvilinear boundaries and a few fingers for species dispersal.



Ideal patch shape¹⁴

The “connectivity” of mentioned green infrastructure, the “optimum ecological form” of patch, and “adaptive ecological

¹³ She refers to this example to explain the correctness in ecology: “Fast flowing streams that support trout spawning may eventually become stagnant warm-water ponds if beavers are allowed to do their work. The trout will die out while the beaver flourish.”

There are similar debates according to Odum theory of stability of system. See the influence of wolves in Yellowstone National Park on forests: Peter Wohlleben. (2015). *The hidden life of trees*.

¹⁴ See Dramstad E.W., Olson, J.D., Forman, R.R. (1996). *Landscape Ecology Principals in Landscape Architecture and Land-use Planning*. p. 32

design” should be the main concerns for designing a sustainable urban forest, which can contribute to the stability of whole entity over time as Odum suggested¹⁵.

In holistic approach, which is the base of ecotopia, the design of urban forest doesn't emerge from regular imposed forms of city, but come up as the result of ecological function and evolution, implying an “open-ended process [where] final evolving form is not defined” (Hargreaves, 2007) and the forest is *en mouvement* (Clément, 1997). Such ecological design helps to overcome dualism between urban and forests (nature and culture) and as Clément stresses it aims “to redefine the theory about the place of man in nature”.

This is the novel theory of holism, in which the human power over the nature is reversed and the idea of resourcesim is comparable to “ecosystem services”¹⁶, the issues of embellishment is assimilated to “wilderness”¹⁷ and its *beau désordre... cause notre admiration* (Clement,1998)¹⁸. The previous

¹⁵ Refers to « nature is as a whole in a steady state or is in the most stable form possible and constitutes one big entity [...] a system which has stability with time will exist longer than a system without stability ». Odum, H.T. (1950). Some Biological Aspects of the Strontium Cycle Introducing a new Tool of Paleoecology. In U.S. Science holds its biggest powwow - Reports on some of the year's big discoveries. *Life Magazine*, Jan. 9, 1950, pp. 8-9.

¹⁶ It has been recognized the “natural capital” of forests by economists, in different reports like Millennium Assessment Reports, The Economics of Ecosystems and Biodiversity (TEEB) and Earth Economics.

¹⁷ See Kowarik, I. and Körner, S.(eds.) (2005). *Wild Urban Woodlands. New Perspectives for Urban Forestry*. Berlin: Springer.

¹⁸ From original text: *Cette expérience (dans le jardin de la Vallée) a duré huit ans, au terme desquels j'ai réalisé qu'il s'agissait d'une nouvelle forme de jardinage mais aussi d'une théorie visant à redéfinir la place de l'homme dans la nature*. Gilles Clément, « Libérez les jardins », *Le Nouvel Observateur*, 1998, cited by Danielle Langeais,

regular form of forest shifts to an endless irregular forest that passes through the cities linking with other entity; such new ecological vision of forestation brings to mind Calvino's evocative image of the forest in which "the monkey who had left Rome, skipped from tree to tree, till it reached Spain, without ever touching the ground".¹⁹

The optimal ecological form of forests is clear, but how is applicable to the cities? What is the city? What is "the boundary" of urban forests? Is it just the matter of connectivity?

« The garden in movement: ecological rhetoric in support of gardening practice », *Studies in the History of Gardens & Designed Landscapes*, vol. XXIV, n° 4, 2004, p. 313-340, ici p. 336, note 29.

¹⁹ Calvino, I. (1977). *The Baron in the trees*. Mariner Books. See also Di Carlo, F. (2013). *Paesaggi di Calvino*. Melfi: Libria.

4.3. Forest and cities in avant-garde planning approach

« The ecological crisis is doing what no other crisis in history has ever done - challenging us to a realization of a new humanity. »

Jean Houston

In the era of Anthropocene²⁰, humanity and nature became one and embedded²¹, as the result the survival of “new humanity” is rooted in the durability of “new nature”. The era of Anthropocene called a paradigm shift in science asking new model of management. If just “three years left to save the planet”²², how humanity can stop “the end of the world?”²³

Amidst the crisis, landscape as “the result of action and interaction of natural and/or human factors”²⁴, assumes an important duty. Holistic theory of landscape found on hierarchal systems view of the world, being rooted in interdisciplinary approaches, is able to solve the complexity and

²⁰ Formulated by Paul Crutzen and Eugene Stoermer in 2000: the biosphere and geological time has been fundamentally transformed by human activity.

²¹ From the text of: “Nature as we know it is a concept that belongs to the past. No longer a force separates from and ambivalent to human activity, nature is neither an obstacle nor a harmonious other. Humanity forms nature. Humanity finds itself embedded within the recent geological record”. Haus der Kulturen der Welt. (2013). [online]. *The Anthropocene Project: An opening (10-13 January 2013)*. Available at: www.hkw.de.

²² Referring to the letter of scientist published in journal of Nature (July 2017) about the importance of next three years to stop the global warning.

²³ See ATLAS for the END of the WORLD, conservation of endangered bioregion on Earth and status of land use and urbanization, by Richard J. Weller, Claire Hoch, and Chieh Huang. *Atlas for the End of the World* (2017), Available at: <http://atlas-for-the-end-of-the-world.com>.

²⁴ Definition of landscape, European Landscape Convention, Florence, 2000

duality between nature and culture (forest and city) (Naveh, 2001). Maybe we cannot act on the sky and the light, but on the rest of the landscape we have all the direct responsibilities that derive from our acts and omissions²⁵ (Di Carlo, 2016). The management of city as human ecosystems (Steiner, 2011) and its relation to other systems have become the main responsibility of landscape architecture during last decades. This section goes through the history of planning approaches, to figure out whether the method of prior proposals were/are efficient and productive for 21th century.

In the holistic vision of city, experts attempted to intertwine urbanism with landscape and ecology to overcome the gap between city and nature. Ecological advocacy of McHarg became the base of these planning methods. Charles Waldheim (2006) coined the term of Landscape Urbanism integrating landscape to urban design, stressing on the role of “Landscape Architects as urbanists of our age” (Waldheim, 2017); his concern deals with urban scale-landscape as the “building block for urban design” (Steiner, 2011).

Forman and Gordon (1981,1986) identified the field of Landscape Ecology to illustrate its promising potentiality for regional planning. Steiner (2011) makes a synthesis of all proposals, stating Landscape Ecological Urbanism with the “goal to design and plan cities to increase, rather than to decrease, ecosystem services.”

As stated, the necessity of interdisciplinarity approach with interconnection scales, from urban to regional, is accentuated by

²⁵ Original Italian passage: “Se sul cielo e la sua luce possiamo agire poco, sul resto del paesaggio abbiamo tutti delle responsabilità dirette, che derivano dai nostri atti e omissioni.” (Di Carlo, 2016, p. 15)

all experts. Similarly, Franco Zagari highlights (2013) that among the various dimensions there is always a mutual contamination and a logical continuity; for instance, the garden as a laboratory of ways of being and living behaviours, prompts new forms of organization for the territory and the city ²⁶.

Nonetheless, such statement is largely theoretical and highly discarded from projects. For instance, planning pursues ecological network and mainly is focused on the areas outside of cities, vice versa, designing emphasizes on parks, gardens and public urban spaces in cities. This segregation between large and small scales, between planning and designing is readable in most of greening projects.

Foresters make a similar separation between forests according to geographical limits, putting adjectives like “urban”, “suburban” and “rural”. Cecil Konijnendijk et al. (2006) attempted to define an international terminology for urban forestry ²⁷, as the result it has been highlighted that since the “traditional dichotomy between city and countryside is no longer very real, defining geographical limits” are hard to draw. Nonetheless, it has been expressed support for “a broad and holistic definition that incorporates ecological, economic, and sociological elements of ‘urban forest’ and is inclusive of people from cities to suburbs to rural communities.” Today, this notion

²⁶ Original Italian passage: “Fra le varie dimensioni vi è sempre una contaminazione reciproca e una continuità logica, che vede ad esempio il giardino come laboratorio di modi di essere e comportamenti dell’abitare che sperimentano nuove forme di organizzazione del territorio e della città” (Zagari, 2013, p. 47).

²⁷ Note that *Urban forestry* is management of urban forests.

is mainly debated as ecosystem services, to balance the broader definition with managerial approaches.

The historian, Henry Lawrence (2008), at the end of the book, *City Trees*, highlighted that:

« [...] the most important difference today is the enormous physical scale of cities. The term “city” has lost much of its meaning. They are metropolitan areas, even metropolitan regions... The zone of their influence spreads perceptibly... How does one speak on New York City when its metropolitan influence extends from central Connecticut to the Poconos in Pennsylvania? Is the mayor of New York City more responsible for what happens to trees in this area than the governor of New Jersey? »

Who is the responsible and in what extension? Who must plan and design the “urban” forests and in what extension? Which method is required? Designing or planning? Local scale, regional scale or global scale?



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4.4. Novel boundaries for forests and cities in a global vision

«The city is everywhere and everything. If the urbanized world now is a chain of metropolitan areas connected by places/corridors of communication (airports and airways, stations and railways, parking lots and motorways, teleports and information highways), then what is not urban?

Is it the town, the village, the countryside? Maybe, but not to limited degree. The footprints of the city are all over these places, in the form of city commuters, tourists, teleworking, the media, and the urbanization of lifestyles. The traditional divide between the city and the countryside has been perforated. »

Amin & Thrift, 2001

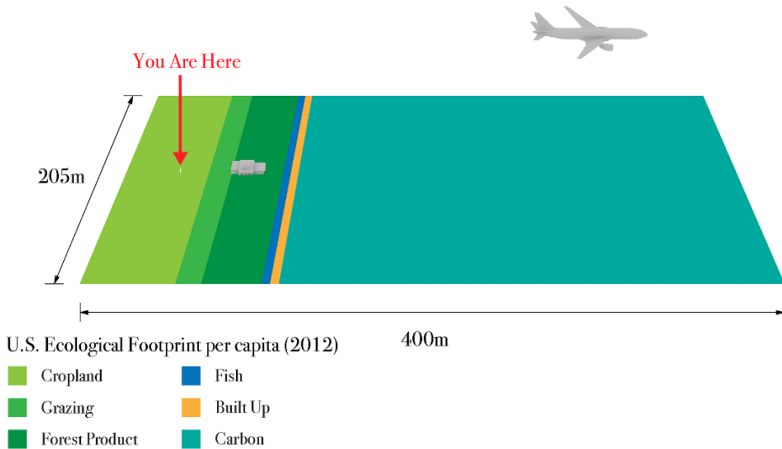
In the era of Anthropocene, humanity should also encounter the Urban Age²⁸. The steady growth of population, more than any previous time, of which over half lives in cities²⁹, hovers over humankind new challenges. Outside of some portions of inhospitable land, much of the globe has been urbanized, “visible ‘urban tsunami’ sweeps swiftly and powerfully across the land” (Forman, 2008). The advanced hypothesis of Henri Lefebvre in 1970, “the complete urbanization of society”, expressed that the process of urbanization creates the conditions for capitalism and this is the reason of *implosion and*

²⁸ London School of Economics program “Urban Age” <http://lsecities.net/ua/> This research analyses the performance of cities, based on a comparative data on spatial, social, economic and environmental drivers.

²⁹ See Population Reference Bureau; By 2030, 60 percent of population will live in urban area. <http://www.prb.org/Multimedia/Video/2012/distilled-demographics-urbanization.aspx>

*explosion*³⁰ of capitalist urbanization. It has also emerged the question of *Anthropocene or Capitalocene?*³¹ (Moore, 2016)

The expansion of cities, not only generates ecological footprint but also leads to land consumption³², deteriorating the environment.



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³⁰ Title of the book Neil Brenner. (2014). *Implosions/Explosions: Towards a Study of Planetary Urbanization*, that reviewed the Lefebvre's hypothesis, stopping privileging cities in urban studies and start thinking critically about planetary urbanization.

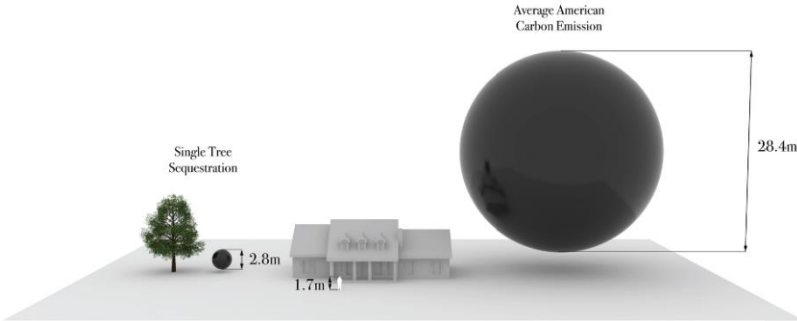
³¹ Capitalocene signifies capitalism as a way of organizing nature-as a multispecies, situated, capitalist world- ecology. There have been many other wordplays-Anthrobscene (Parikka 2014), econocene (Norgaard 2013), technocene (Hornborg 2015), misanthropocene (Patel 2013), and perhaps most delightfully, manthropocene (Raworth 2014)

³² There are many heterogenous terminology to explain the erosion of soil due to human activities: Soil sealing, soil consumption, land consumption. See the soil thematic strategies:

http://ec.europa.eu/environment/soil/three_en.htm

and for soil consumption in Italy (2017) ISPRA:

<http://www.isprambiente.gov.it/files2017/area-stampa/dossier/consumo-di-suolo-2017/Consumodisuolosintesi2.pdf>



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* These two diagrams show the ecological foot print of single individual in proportion to single tree sequestration.

Although, all these crises necessitate to put a halt to the further urbanization, the question of “*Where to put the next billion people*”³³ calls an answer. The endless edge of cities has compelled the experts to make effort to set global policy to secure and conserve hotspots biodiversity³⁴ and to control soil consumption.

The experts sought to find some arbitrary agreements. For instance, in the dissertation of “*A Global Assessment of the Links between Urbanization, Biodiversity, and Ecosystem Services*”³⁵ the experts pointed out the chance of conservation in urban areas. They state that since many of the world’s cities are in biodiversity-rich areas, cities have a vital role to play in the

³³ Title of the article Forman and Wu. (2016). *Where to put the next billion people*.

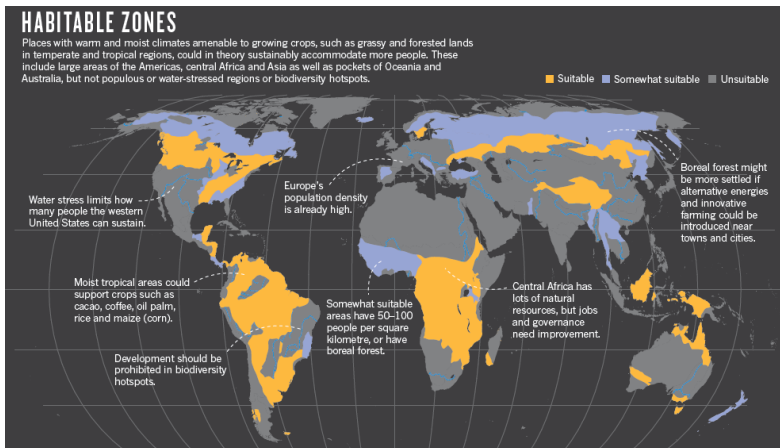
³⁴ Among steering committee on conservation of biodiversity we can mention: CBD (Aichi targets for 2020), EEA (Natura 2000, LIFE), IUCN, UNEP, CITES, CMS, GEF.

³⁵ See Convention on Biological Diversity (2012) *Cities and Biodiversity Outlook*. <http://www.cbd.int/en/subnational/partners-and-initiatives/cbo>.

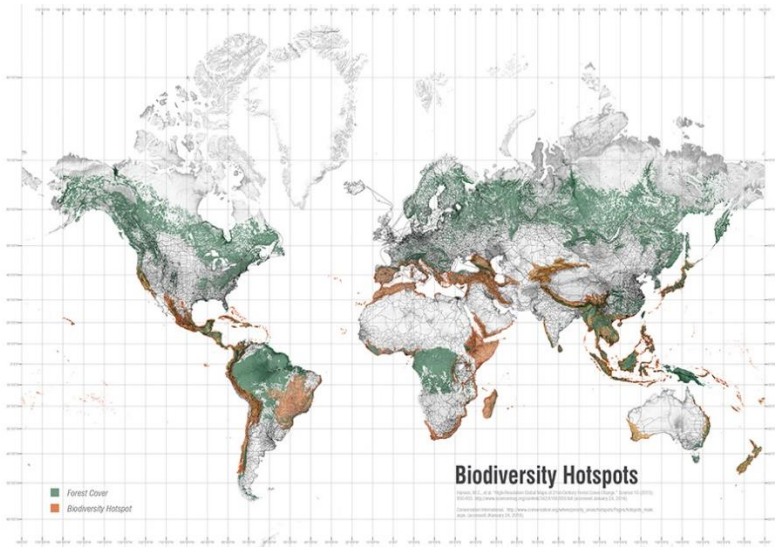
conservation of these critically threatened ecosystem (Elmqvist et al., 2013).

Moreover, Forman and Wu (2016) suggest an appealing proposal to concentrate the growth in four places in a global scale: “the outer suburbs; existing low-density sprawl areas just beyond the suburbs; satellite cities; and towns and villages within adjoining farmland”. The overlapping of following maps demonstrates holistic effort of Forman and Wu to tackle with global crises in line with urbanization process. They identified habitable zones on a global scale, where the coexistence of human and nature can be feasible without endangering biodiversity hotspots.

To wrap up, due to the unavoidable process of urbanization, the ecosystems are changing from local scale to the global scales (Barnosky et al., 2012) and experts pursue “novel ecosystems” on a scale commensurate with the global crises (Hobbs et al., 2013).



© Nature - Forman and Wu



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If the urbanization in China, causes flooding in South Africa³⁶; If the wealthy countries are responsible of deforestation of tropical rainforests for the services they provide the rest of the world; If Developing countries should pay for saving rainforests³⁷; If tropical rain forests contribute to carbon storage and climate regulation of the globe; If the trees immigrate as well as human³⁸; so, where are the boundaries between people and

³⁶ Planetary-scale changes in the Earth System

³⁷ See Coalition for Rainforest Nations (CfRN), “Developing countries: pay us to save rainforests”.

³⁸ See Wohlleben, P. (2015). *The hidden life of trees*. Trans. Billinghamurst, J. Vancouver Greystone Books.p.186/211. Wohlleben sustains that: “Trees are among the slowest-moving beings with which we share our world” (p.186) “Seeds, they are free. The moment they fall from the tree, the journey can begin” (p. 211).

nature or cities and forests? Which is the scale of acting? In the era of Anthropocene, we are all embedded.

If the urbanization is boundless, so the equivalent forestation should be too. Weller and Hands (2014) state that:

« If we accept that ‘the city’ is now a continuous system of global exploitation and not merely the morphology of various residential and commercial densities, then any discussion of the ‘urban forest’ means that we should also scale up our thinking and discuss the ‘global city’ and its relationship to the ‘global forest’. »

If so, how can we proceed? If linking between designing and planning has already been challenging, how can we create linking between local, regional and global scale? Shall we move through the boundaries of each scale? According to which criteria should we act? Top-down approach? Or Bottom-up approach? Is it just the matter of connectivity like green infrastructure? Shall we follow the form and geographical limits of cities?

4.5. “Puzzle doer” of forests and cities in global scale

Last sections stressed on “holistic thinking” including many different types of relationships in a complex system. In order to create a “Global forest” in broad-scale, we should proceed through the “forestation” in finer-scale.

Technically, the quality and management of a forest in urbanized area is different than a forest in a natural reserve. Furthermore, geographical limits (urban and non-urban), as mentioned, do not make sense when we talk about ecology³⁹ and urbanization (due to the expanded operating area). Therefore, to manage more effectively the relation between forestation and urbanization, it might be stressed on the characteristics of context rather than geographical edge. Each context poses different needs and wants. For instance, invasive species are rejected for creating forest in most part of the world, but in Shanghai due to the saline soil, nonnative plants assume an interest from an economic perspective; they require less care and they are fast growing, further they enhance the quality of soil (Zimmerli, 2010). Even though “sustainability is a global issue, its implementation is, to a high degree local” (Schmeing, 2010).

The importance of context could be explained by the concept of landscape. Creating forests means creating landscapes and “landscapes do not exist in isolation. Landscapes are nested within larger landscapes, that are nested within larger

³⁹ Eugene Odum (1993), specifies that the existence of two or more ecosystems and their interactions, “results in new properties that do not exist in either of them”.

landscapes, and so on. In other words, each landscape has a context or regional setting, regardless of scale and how the landscape is defined. The landscape context may constrain processes operating within the landscape. 'The broad-scale processes act to constrain or influence finer-scale phenomena' (McGarigal, 2015). If we consider that the urban forests are imbedded in another context which is "city" and this whole is also embedded in another whole which is "global city". Therefore, our initial forest is shifted, alternated, modified and created according to the driving forces and actors of our initial city, and our initial city is forced and driven by the forces of Global City.

This action and interaction of driving forces between city and landscape, is explained by Richard Weller (2017), basing on the city form of Cedric Price (1982) "The City as an Egg", he poses the question of What is the form of city today? Ironically, he writes, "perhaps the much vaunted compact, transit-oriented city would be an Italian frittata; instant cities such Dubai and Shanghai's Pudong might be egg-white soufflés; Andrés Duany's Seaside in Florida would surely be pavlova; and Detroit... a broken eggshell?" He explains that the missing point in Price's egg cities is lack of "reference to the various natural and cultural environments in which the eggs exist. Price's cities are all egg and no chicken". There is no matter what the form of city is, but "where the egg comes from and where it is going."

According to economic trajectories, political decisions and social influences⁴⁰, statistics can foresee "where the egg is

⁴⁰ One example of this statistic can be seen in research work of "Urban Age"
<http://lsecities.net/ua/>

going”. Franco Zagari (2013) connotes that the related dynamics between causes and effects of political, economic and social issues, are sometimes determined by factors very far from each other; like as famous chaos theory of “butterfly effects” that the beat of its wings in the Amazon can produce who knows what effects, in who knows what time and who knows where. The map of institutions and power is changed⁴¹.

If the cities are the result of set of chaotic causes and effects, therefore, it is essential to shift from urban geographical limits (urban, suburban, rural, city, megacity) to urbanization process (where population moves why and how). Such deviation can generate a paradigm shift in “urban” forestation.

The trends and process of urbanization can be guessed. Some cities are growing, others are shrinking. Some are formal and planned, others are informal. Some cities develop in vertical, others in horizontal. Each city interfaces with nature in different way. The “essence” of each city is different. In keeping with urbanization process, adequate forests can be adopted. For instance, the forests in shrinking cities, assume the characteristics which are dissimilar to the forests in high density centres. The former city could have a “wild woodland” while the later due to lack of space and security of public space, probably could have a regular design park.

⁴¹ Original Italian passage: “Il gioco fra cause e effetti politici, economici e sociali presenta dinamiche determinate da fattori a volte lontanissimi gli uni dagli altri, e il famoso battito delle ali di farfalla in Amazzonia può produrre chi sa quali effetti, in chi sa che tempi, chi sa dove. Cambia la mappa delle istituzioni e del potere.”(Zagari, 2013, p. 47)

This proposal aims to operate by dialectical reasoning, understanding the process of urbanization and acting adequately in the field of forestation. It tends to give broad attention to context, relationships and background of forests rather than the benefits of forests *per se*. Creating forests are “ecologically” and “ethically”⁴² correct, but paying attention to the global forces of urban age is essential to delineate an accurate forests for each urbanized area.

This is neither planning nor designing. This is interacting. Planning is “what might be” (theory), designing is “what it is” (output). Even though interacting rooted in both, it is flexible and based on challenging inputs. It is holistic thinking which “is teleological; it promotes integration and denies the quest for rigor when that rigor is achieved by partitioning our terrain. The defining characteristic of this tradition is its recognition of the epistemological necessity of comprehensiveness” (Verma, 1998).

A global city is constructed by local cities. Local cities broadly follow three processes of urbanization:

Growth; in population and/or distension of cities- *Boom town*⁴³. Shrinking; loss of inhabitants and breakup of urban structure (Beyer et Al., 2006)

Informal; the result of culturally driven individual and communal initiatives (Gouverneur, 2014).

⁴² Refers to “Land ethic” and the role of human as the steward of soils, waters plants and animals, broadening the boundaries of the community.

⁴³ Weller, R. (2009). *Boomtown 2050: Scenarios for a rapidly Growing City*. London: UWA Publishing.

It is not mechanistic thinking about “what” are city and forest, it is holistic thinking, which digs into “Why” is growing, shrinking or self-constructing?⁴⁴ If we perceive the main reason then we can propose the right forest for each context, as Forman (2008) suggests we can construct the big picture (global forest) by fitting small pieces (small forests):

«I’d select from existing known good and bad urban patterns, and create others. I’m a puzzle doer. Puzzle pieces can be fit together based only on local compatibilities, but if you want faster progress, then also view the big picture for context. The spatial arrangement of important and compatible land uses would be my centrepiece for the sandbox, so everyone could see the big picture for the future. Spatial arrangement is a handle for wise planning a tangible flexible approach usable anywhere and at any scale, it offers promise for achieving a positive trajectory or even a successful result. »

⁴⁴ Refers to “Mechanistic thinking focuses on ‘what’ and holistic thinking digs into ‘why.’” Pearl Zhu. (2016). *Thinkinggair: 100 Game changing digital Mindsets to Compete for the future*. The book discusses the role of talented digital leaders and their holistic thinking.

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Urbanization and Forestation

Case studies

Urbanization tendency and its relation to forests

« God made the country and man made the town. »

William Cowper

In this chapter, the aforementioned three main propositions of forestation based on urbanization process, are validated and redefined through case studies.

The spatial and physical structure of forests in urban areas are the results of urbanization tendencies. The economic trajectory, historical, cultural and social drivers generate the urban forms. Consequently, understanding where these urban forms are going, is crucial to propose the most adequate type of forest. The forestation scenarios that are developed here, are all related to and are directed by the scale, tendency and forms of urbanization process.

To offer a broad and deep understanding of forestation in urban areas, case studies combine a patchwork of urban processes, with different scales, in dissimilar locations with contrasting problems.

The tendency of urbanization has been broadly classified in three main types: Developed cities, Shrinking cities, Self-constructed cities. Each category opts for complex cases, where the challenges of urbanization could be perceived as an opportunity for forestation.

Through an accurate interaction between urbanization process and forestation, this section tends to develop the scenarios for upcoming century. To be able to tackle with challenges, that hover over humankind in forthcoming century, we should plan the future of our planet. To do so, it is necessary to approach the city holistically. The environmental disaster, land take, urbanization and food shortage are all embedded.

The result of case studies tends to indicate that how the deep comprehension of future transformation in urban areas, can address the role of forestation for future challenges.

In the chapter of *Developed cities*, the case studies aim to demonstrate how the application of Landscape Urbanism, where the forestation became the driver of territory transformation, has led to the superb prototype of city making. In the urban age, where the scarcity of land is a one of the main issues, the chapter of *Shrinking cities*, highlight how vacant lands can provide opportunity for food production, reducing the soil consumption, acting as the Green Stormwater Infrastructure.

In the chapter of *Self-constructed cities*, it has been drawn attention to the social and cultural role of forests as a part of communal initiatives. In a context, where the lack of planning causes environmental and social disasters, the forestation could construct the “urban armature” for further urbanization.

Last part of this section, evaluate the application of case studies in other contexts. The global forest could be created through the reunion of discussed scenarios in a global framework

Developed cities

5.1. Developed cities

Before the ground-breaking work of Indian economist Amartya Sen in the 1980's, the development was traditionally evaluated by economic criteria. Sen has drawn attention to human well-being as the new index for development (Human development index)¹. Further assessment like Quality of life (QOL) has outlined to measure the well-being of individuals and societies. Even though “there is no established convention for the designation of ‘developed’ and ‘developing’ countries” (UN, 2004)², this chapter refers to human well-being as the indicator of development. There is an implicit assumption that the nature in cities promotes health and well-being of inhabitants (Rohde and Kendle, 1994). According to UN habitat (2013) the well-being of the population is associated with environmental sustainability of cities.

The main concern in this chapter involves the process of urbanization and its integration to forestation in “developed” cities, where prosperity and well-being of dwellers are preeminent. The expansion and densification are two main tendency of urbanization for satisfying the demands of housing. In “developed” cities, such trends have been affiliated with green policy. However, the green policy has been mainly adopted as a subsequent plan, its holistic integration to urban plan has led to a “prosperous” model of city and nature. The spatial configuration, adopted policy, benefits and limitation of each model will be discussed in this section.

¹ According to Human Developments Reports of United Nations Development Programme (UNDP): The idea of human development focuses on criteria of fair opportunities for people to satisfy their desires.

² See <https://unstats.un.org/unsd/mi/worldmillennium.htm>



© Bill Ray - Inside the World of a New York City 13-Year-Old in 1972 - The LIFE Picture Collection/Getty Images



© Sam Erickson, 2005 - Trey Anastasio, Central Park

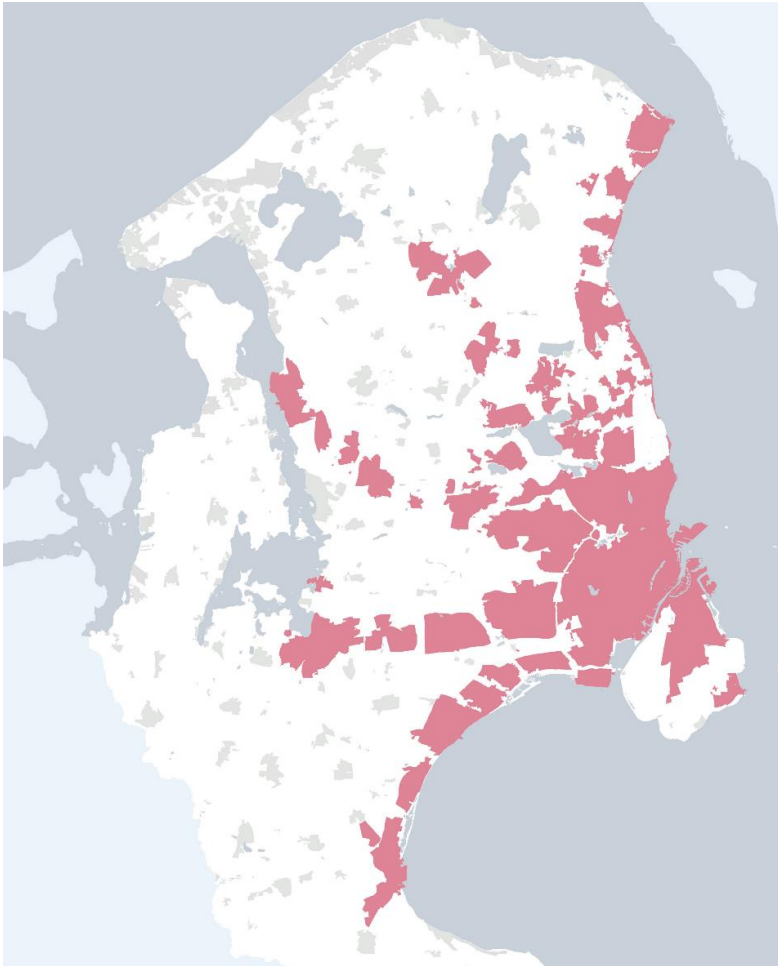
Densification, from green wedge to pocket forests: Copenhagen

Copenhagen has been awarded as the European Green Capital in 2014. The root of its success returns back to the late 1940's when the guiding plan of the city was published to limit the urban growth of Greater Copenhagen, called Fingerplan (*Egnsplan*). This plan was inspired from Abercrombie's Greater London Plan (1944). The planners sought to organize the urban development on the base of an overall regional structure where urban development concentrated along five radial corridors (finger city) linked by railway system to the core of Copenhagen (the palm of hand) and the areas between the city fingers were separated by "green wedges" which has been kept exempt from development (Knowles, 2012; Andersen, 2008; The Finger Plan, 2015). The concept of green wedge policy is similar to green belt, but the green wedge is considered more flexible because it does not limit urban growth in an absolute way.

Although, the Fingerplan faced some challenges and limitations³, it is considered a "flourishing" plan for two main reasons: its Transit Oriented Development (TOD) and the system of Green wedges. TOD has been codified later, in 1993 by Peter Calthorpe to limit the sprawl of American cities,

³ Upon the implementation of The Finger Plan in the late 1940's and 50's, making the housing along the designated corridors was very desirable due to their proximity to rail lines and nature (Knowles 2012). Nonetheless, with the development of private cars, during 1960's– the plan met some serious challenges, competition arose between public and private transportation, and traffic began to increase around the city. Later, in 1989, service facilities were constructed near railway corridors and this decreased the amount of commuter traffic into Copenhagen (Vuk, 2005, Næss et al. 2011).

encouraging “people to live near transit services and to decrease their dependence on driving”.⁴



© Ministry of the Environment - The finger plan, 2015

⁴ Peter Calthorpe. (1993). *The Next American Metropolis: Ecology, Community, and the American Dream*. New York: Princeton Architectural Press. See also <http://www.tod.org/>. TOD has been applied in Washington, Brisbane, Denver, Tokyo and many other cities around the world (Curtis et al., 2009).

The system of Green wedges has been adopted by other Nordic countries for the city of Helsinki and Stockholm⁵ (Ståhle and Caballero, 2010). Recently, Fabiano Lemes de Oliveira (2017) has published the *Green Wedge Urbanism*, examining the global diffusion of green wedge and its potential for sustainable cities⁶.

The original version of Fingerplan was purely an “urban” model; an “anthropocentric” design lack of any notion regarding ecology and landscape (Vejre et al., 2007). The railway systems constituted the network, upon which the sprawl would have occurred, near the most appealing forests, lakes and coastlines. The 1936 Green Network Plan of Copenhagen focused on aesthetic quality of landscape for its conservation (Vejre et al., 2007).

Many tends to recognize the Fingerplan for its foresightedness, *de facto* it is “more by accident than by design”. Transit Oriented Development and the green wedge of Copenhagen has been introduced as “sustainable” model of planning, while all of these were beyond the imagination of Bredsdorff and Rasmussen at that time (Vejre et al., 2007).

In the face of environmental awareness and ecological dispersal considerations in cities⁷, the void wedges (as the consequence of Fingerplan) have become part of the agenda for a “sustainable”

⁵ Since the Green wedges allow the expansion in double directions it has been adopted for the program of “Building the city inwards” (1970) as sustainable regeneration of brownfield for growing population of Stockholm.

⁶ One of the case of green wedge that is discussed in this book is the *Raggi Verdi* of Milano.

⁷ For instance, the idea of Greenway in USA, *Landscape Ecological Urbanism* by Forman and Godron, and *Design with nature* by McHarg.

planning and afforestation has implemented to create dense ecological corridor (Vejre et al., 2007). The inner green wedges have transformed from farmland to forests and gardens, creating new “rurban landscapes”⁸ (Gullinck, 2004) to host the recreational amenities for the population. Several afforestation initiatives have launched by State Forest Services in the western fringe of Copenhagen.

During last century, the old structure of Fingerplan has associated with new ecological functions. With the urban densification in Copenhagen, new plans have been implemented to increase the forests and parks in Copenhagen. For instance, the “pocket” parks (*Lomme park*) or small public urban green spaces (SPUGS) have actualized to guarantee an urban green space within 400 meters for at least 90 percent of the population in 2015 (Public Health Office Copenhagen, 2006). Small Green parks are compliment to large green wedge and to some extent fill the daily needs of being in contact with nature. Furthermore, the Green roofs program (2010) enforces that “new buildings with flat roofs (less than 30-degree slope) must have green roofs”⁹. The mentioned programs played important roles to entitle Copenhagen as biophilic city (Beatley, 2016). In fact, the whole city can be walked or cycled through its forests, parks and gardens.

⁸ *Rurban landscape*, refers to the emergence of new landscape which is lack of identity of both urban and rural landscape.

⁹ See: <https://stateofgreen.com/en/profiles/city-of-copenhagen/solutions/green-roofs-in-copenhagen>.

According to the i-Tree¹⁰ Canopy (2015), 16.5% of the city is covered by trees¹¹, which is not high in comparison with other European cities (e.g. Turin 16.2%, Geneva 21.4%¹²). From a regional scale, there is an unequal distribution of forests in Copenhagen, most of the forests are placed in north (Ex haunting area of monarch, Jaegersborg Deer Park) and west (afforestation in 1970's of Vestskoven) of the green wedges while the trees canopy in central areas are mainly developed thanks to botanic gardens (Botanisk Have) and zoological gardens, which were founded for scientific purposes (Konijnendijk et al., 2005) and parks and gardens (like Vestre cemetery and Fælledparken).

Copenhagen is literately classified among the greenest city¹³ in Europe, this fact is not just relied on the amount of tree canopy of the city, but it is embedded the in holist understanding of urbanization process and its integration to pre-existence forests and lakes. Initially, it occurred unconsciously but later it created the framework for the city and more afforestation has implemented into inner city. It is not the matter how many trees and forests are planted in the city but its spatial configuration with urbanization process, label Copenhagen as one of the greenest city of Europe.

¹⁰ i-Tree is a software suite from USDA Forest Service that provides urban forestry analysis, quantifying the structure of community trees and environmental services that trees provide.

¹¹ Available at: <http://www.urbantreecover.org/location/copenhagen/>

¹² See Treepedia: <http://senseable.mit.edu/treepedia>

¹³ This fact relies also on other factors, like the water management, air quality, transport, waste and land management, energy consumption, which all together define the sustainability of city.

One the most prominent example of such avant-garde urbanization and its implementation to ecosystem services, is the district of Ørestad. The outer expansion and the inner densification of Copenhagen have been compensated by Pocket forests (parks and garden) in dense areas, and with large forests in wedges (as barrier to urbanization). The lessons learnt from Copenhagen ingrained in its holistic policy of afforestation in accordance with the form of urbanization. In the future, planners who want to see the city properly, must keep themselves at a necessary distance from it, to perceive urbanization and afforestation in a holistic framework.¹⁴



© Ole Malling - photo by og Havn - Nature Park of Amager, ten times the size of Central Park of New York

¹⁴ Refers to “anyone who wants to see the earth properly must keep himself at a necessary distance from it” by Italo Calvino (1957), *The baron in the trees*. See also Fabio Di Carlo (2013). *Paesaggi di Calvino*. Melfi: Libria.



© Iwan Baan - The integration of Pocket parks (Superkilen) and Green Wedge

Expansion/Suburbanization and Large Forests: Paris

Since the early 19th century many communities have developed around Paris, as place both employment and residence. A large working-class population, who could not afford housing in Paris, accommodated in the outskirts. During last century, millions of people continued to migrate to the suburbs of Paris, the *grands ensembles* are the result of population explosion along the Parisian periphery (Teaford, 2011). The royal hunting grounds of Bois de Boulogne (west) and Bois de Vincennes (east) became incorporated into the expansion plan of the city; such integration is perfectly legible from night map of Paris. Similarly, many other European royal hunting grounds have been embedded into the expansion network of the city. For instance, we can mention Hyde Park of London, Tiergarten in Berlin and Casa de Campo in Madrid (Berrizbeitia, 2007).



© NASA- Caption: M. Justin Wilkinson, Texas State University,
Jacobs Contract at NASA-JSC

Further expansions in north of Paris, has led to the construction of Parc Départemental du Sausset in rural fringe areas. The presence of tree-lined streets and other large parks like Parc Georges-Valbon, Parc de la Villette in Paris' dense infrastructure, has led to an equal distribution of trees in urbanized context.

Bois de Boulogne and Bois de Vincennes preserve the history of their sites, as the remnant of ancient forests, and arise from juxtaposition of roadways to connect the dispersed activities within the forests to its external context; they have been modified during the century and present as “palimpsest”. By contrast, Parc Départemental du Sausset has been constructed on a large tract of open land to prevent encroaching development and restoring the rural landscape of region (Di Carlo, 2015; Hargreaves, 2007). Even though the origins and the processes of design for mentioned parks are absolutely varied, they have common character of large¹⁵ scale.

Today, as affirms George Hargreaves (2007), “it will be rare for a designer to come across the great park sites of yesterday” (like Bois de Boulogne and Bois de Vincennes), and designers mainly “are making parks from landscape that range from the artificial to landscape from blighted industrial areas to extremely toxic landscapes.” If large forests (as parks) are not well-embedded into the context, they risk becoming “dispirited border vacuums” (Jacobs, 1961), and can “imply a break with context” (Czerniak, 2007).

¹⁵ According to *Large Parks* by Julia Czerniak and George Hargreaves (2007), the scale of Large has been defined as being greater than 500 acres (200 ha).

The example of Parc Départemental du Sausset, represents an accurate understanding of urban growth, whereas large system of forests “preempt the city”¹⁶ (Koolhaas, 1995) and sustain the urban development. Fabio Di Carlo (2015) explicitly points out that Corajoud reconsidered “the disciplinary position of landscape design as neither opposed to, nor derived from, other related disciplines, such as architecture and planning”, but instead landscape as the driver and “unique way of designing and perceiving territorial transformations, and thereby ultimately determined the existence of humanity on the planet”, this is what later Landscape Urbanism explicated as “the notion that landscape can be the primary determinant of urban transformation, replacing the previous idea of landscape as a balance to urban growth”.

With burgeoning of next billion urban dwellers in the future, the suburban expansion will be unavoidable. In such scenarios, the examples like Parc Départemental du Sausset, as preemptive process to urban growth (*préverdissement*), can play an important role to transform the territory into a successful model of city making for forthcoming suburban. As Cranz (1982) writes “Whatever is decided about the function of parks will largely derive from some vision of the city”, large urban forests create “places for imagination to extend new relationships and sets of possibility”.

¹⁶ The problem of bigness as a polemic in architecture by Koolhaas, has been adopted as a theorem in design of large parks, to generate a set of provocative questions like Does the large park “need the city”, does it “represent the city”, “pre-empt the city”, or “is it the city?” by Czerniak and Hargreaves (2007). *Large Parks*. p. 26.

The expansion of Paris, consciously or/and unconsciously contribute to the construction of large forests in its context. Large forests are associated with issues like ecology, ecosystem services, cultural meaning and urbanization. If in “the past they succeed ingeniously in fulfilling these various equations”, today they should deal with “issues of stewardship, maintenance, cost, security, programming and ad hoc populist politics” (Corner, 2007). However, “a dynamic master plan with flexible trajectories over time” (Hargreaves, 2007), which understands the demands of new development, can lead to newly constructed districts, where resilience is durable.



© J.B. Leroux
Atelier Corajourd Parc Départemental du Sausset

Megaregions and Mega Forests: Northeast USA

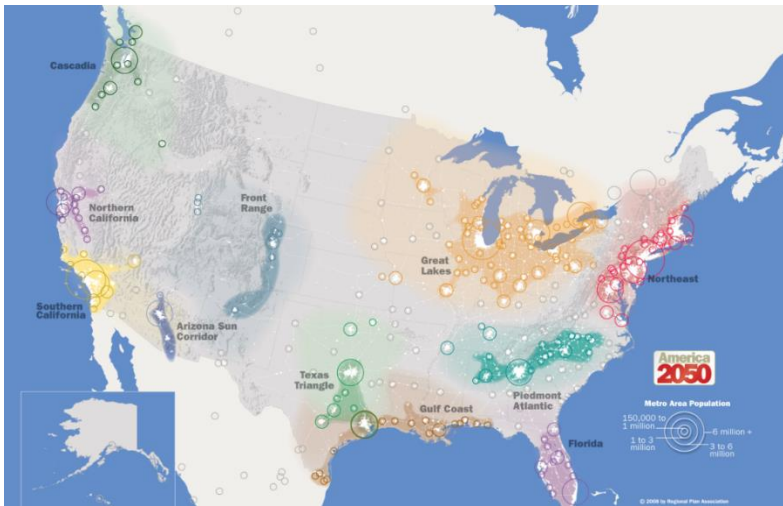
Take a glance at night satellite images of NASA, makes it clear that the “urban” limits of the most cities around the world has been blurred. The zone of their influence expands perceptively. The expansion of cities, have generated a new scale of urbanization, called megaregions. Megaregions are economic actors that derive from Regionalism policy, where political and financial forces are concentrated in specific regions¹⁷, creating large networks of metropolitan areas where governance, infrastructure, and land use are planned at a regional urban scale (America 2050, 2012).



© NASA Goddard - Northeast region of USA

¹⁷ For instance, the European Union, as an example of Regionalism, derives from the efforts to deconceptualize European economic and political space, making national boundaries more permeable and fostering the functioning of the single European market (Deas and Lord, 2006).

Such enormous physical scale of urbanization in which cities are just one form (Brenner, 2014), implies a new scale of afforestation. An analogous forest scale is required to compensate the effect of such “giant monsters”. Megaregions necessitate new comprehension of afforestation in urbanized area. America 2050 is a national planning initiative, which focuses on the emergence of eleven megaregions in United State. A developmental framework which conducts the necessary infrastructure for upcoming population in the 21st century. A part of this plan regards the conservation of landscape. The adopted landscape policy in Northeast megaregion¹⁸ is the main concern of this section.



© America 2050 - Eleven emerging megaregions of USA

¹⁸ The Northeast is a densely developed economic powerhouse of United State, with approximately 19 million urban acres in the 13 states, which will upsurge to 22 million urban acres by 2040. The main cities of Northeast megaregions are Boston, New York, Philadelphia, Baltimore, Washington D.C. (Regional Plan Association of America 2050, Northeast Landscape conservation, 2012).

By constructing a high-speed railway in Northeast megaregion, the planners tend to construct a Transit-Oriented Development model, where the next urbanization will occur, providing housing and services for additional 15 million residences (America 2050).

Megaregions not only reflect the interlocking economic systems, but also share natural resources and ecosystems, which require coordinated and broad-scale actions in a holistic framework (Regional Plan Association and America 2050, 2012). The lists of actions in Northeast Landscape Conservation include Green Infrastructure, biodiversity conservation, land consumption, climate change and water management.

In holistic scale, the main concerns that practitioners have adopted for forests management, are based on biodiversity conservation (GI), watershed management and timber production¹⁹. On a smaller scale, a wide range of programs such as Green Infrastructure Stormwater (GIS) in Philadelphia²⁰, Million Trees NYC initiative,²¹ and water storm management in Brooklyn²² have been conducted by public and private actors. Nonetheless, many practitioners affirmed that there is a gap between small scale projects and large landscape conservation

¹⁹ For instance, the New Jersey Highlands Water Protection and Planning Council is employing ecosystem services produced by protected forests to keep water quality safe for people living in northern New Jersey (Regional Plan Association and America 2050, 2012).

See <http://www.state.nj.us/njhighlands/>

²⁰ See next chapter, Shrinking cities.

²¹ See <http://www.milliontreesnyc.org/>

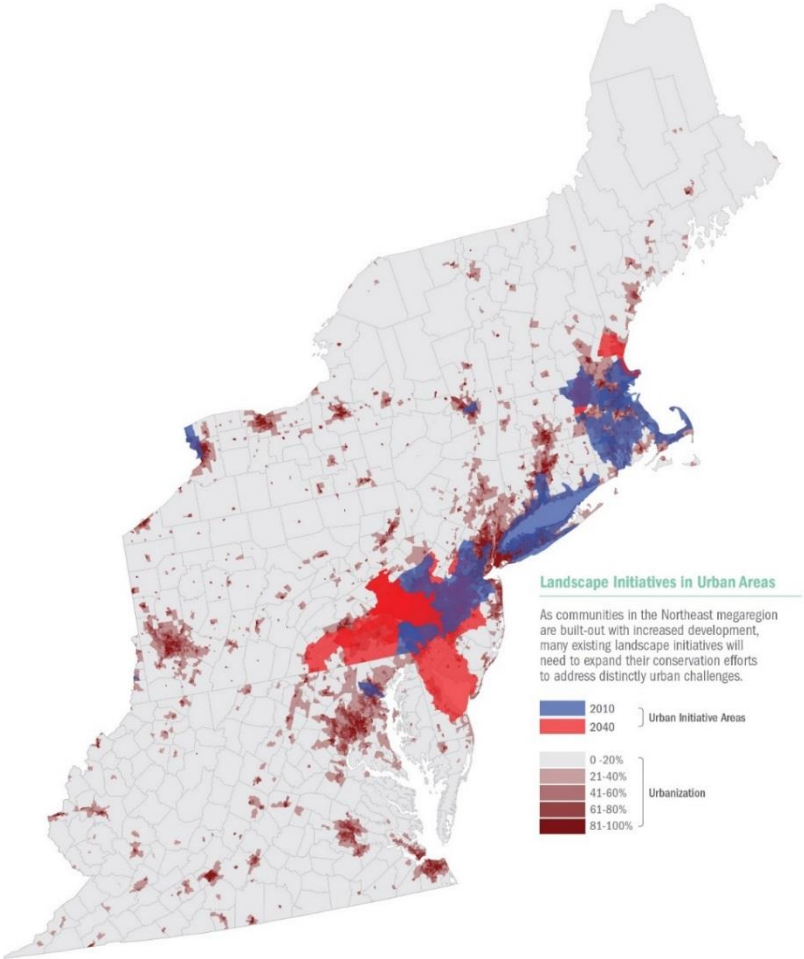
²² Brooklyn Greenway Initiative, Waterfront project of Brooklyn. See: <http://www.brooklyngreenway.org/> and WEDesign for West Street in Greenpoint, Brooklyn, a resilience plan for storm water management. See: <http://wedesign-nyc.com/portfolio/greenpoint-west-street-watershed-phases-i-ii/>

program (Low and Roman, interview, 21 June 2017; Kondo, interview, 27 June 2017). The main limits for coordinated collaborations are due to: “multistakeholder— they include public, private, and nongovernmental actors, multipurpose— they address a mix of related issues”, (water management, wood production, biodiversity conservation); “multijurisdictional— the issues being addressed cut across political and jurisdictional boundaries” (Mc Kinney et al., 2010).

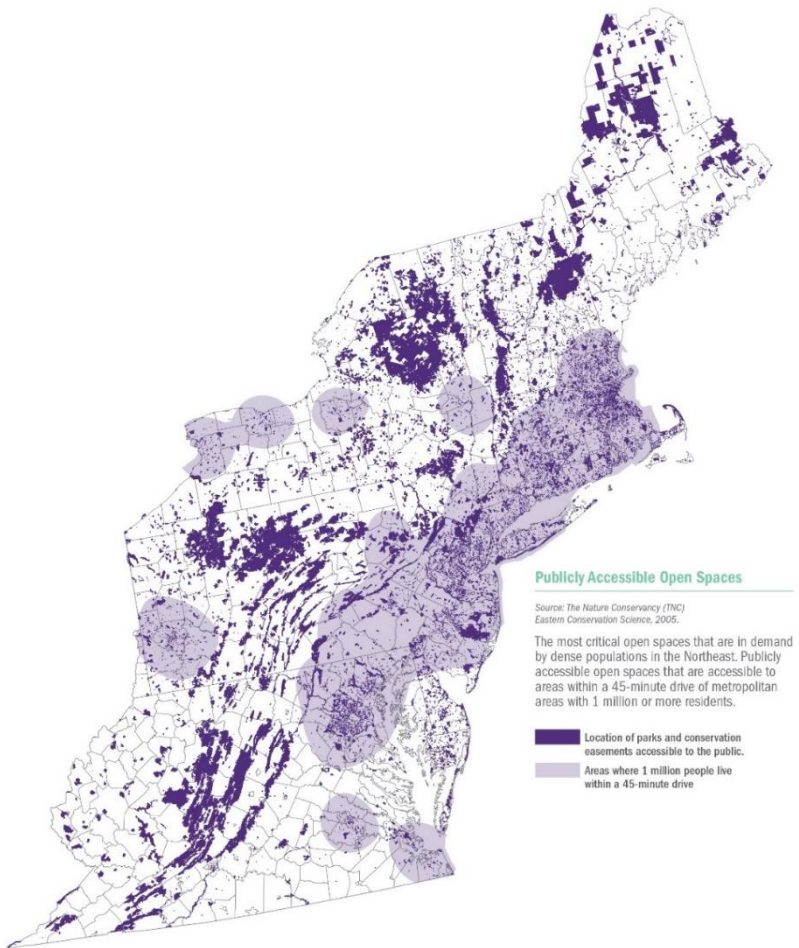
Regardless of the current complication between large and small programs, the lesson learnt from Northeast Regional Plan is its holistic vision of urbanization and landscape conservation in a new scale which is “mega”. The following maps, have been extracted from Landscape Conservation Report to present how a comprehensive vision of problems, can address the small issues in local scale adequately.

According to the urbanization framework, the first map suggests the expansion area of existing landscape initiatives to address distinctly urban challenges. The second map highlights demanded open spaces in dense populated area. Based on these maps, the “mega forest” of Northeast megaregion, should be planted in the area within light purple to satisfy the accessibility to green areas.

To conclude, the new megaregion of northeast operates across the traditional boundaries of cities. To address issues at a large scale and to fit the solution in local scale (Porter and Wallis 2002), it is necessary to coordinate different actions basing on an integrated framework. To be able to compensate the footprint of additional 15 million people within 30 years, the “mega forests” of Northeast megaregion should be planted “now”.



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“Forests as the driver of territory transformation”

Conclusions

Matthew Gandy (2014) puts forward the question *Where does the city end?* In the past, different terms have emerged to describe the new forms of centrality in the peripheral areas: *edge city* (Garraeu, 1991), *technoburb* (Fisher, 1987) or *in - between cities* (Sieverts, 2002), or Anglo-American concept of “suburb” and French concept of *la banlieue*; later other terms like “city-regions, urban regions, metropolitan regions, mega cities represented a particular type of territory that was qualitatively specific, and thus different from the putatively non-urban spaces that lay beyond their boundaries”. (Schmid, 2016).

Regardless of the terms, as Gandy pinpoints, we should “focus on the urban process as a socioenvironmental dynamic that transcends the often-arbitrary distinction between the city and the “non-city”.

The prominent examples of afforestation, like pocket forest and green edge of Copenhagen, Large Parks of Paris and Mega forests of Northeast megaregion, descend from a profound understanding of urban process. In the past, the form of Green wedge and Large Parks (Bois de Boulogne and Bois de Vincennes), came out “unconsciously”, but Parc Départemental du Sausset was the result of deep comprehension of urban transformation, where the project of forest became driver of the territory transformation (Di Carlo, 2015).

If Northeast Megaregion of America tents to transform the territory through an adequate approach, it is necessary to focus on “mega” afforestation in a holistic framework, as the driver of territory transformation and it should be done “now” to be able

to compensate the footprint of next 15 million people within 30 years.

All around the globe, the rapid urbanization is shifting towards novel forms and dimension of urbanized area. Extrapolating this shift to its consequences reveals a conclusion where the efficiency of forestation is approved, only if the process of forestation exceeds the process of urbanization. The mentioned case studies achieved such favourable outcome, just due to their capacity to be amended in line with urbanization process.



Dancers in Central Park, 1961.

© Leonard McCombe - The LIFE Picture Collection/Getty Images

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Shrinking cities

5.2. Shrinking cities

«... obsolete places in which only a few residual values seem to ménage to survive, despite their total disaffection from the activity of the city. They are, in short, external placet, strange placet left outside the city ... lacking any effective incorporation; they are interior islands voided of activity; they are forgotten, oversights and leftovers ...

In short, these are places that are foreign to the urban system, mentally exterior in the physical interior of the city, appearing as its negative image as much in the sense of criticism as in that of possible alternative. »

de Solà Morales, I. ¹

During the history, many cities around the world have lost significant number of inhabitant. Such phenomenon is described as “shrinking city” or “perforated cities” which illustrate the breakup of urban structure.

In *Atlas of shrinking cities* (Beyer et al., 2006), it has been mentioned four main reasons for shrinkage:

Destruction due to war, fire, natural disaster and epidemics.

Loss of resources, like as water supply, oil, mineral extraction.

Shifting the locations of settlements or offshoring.

Changes in economic, political and demographic conditions.

According to McKinsey report (2016), it is expected that from 2015 to 2025, population decline in 17 percent of large cities in

¹ de Solà Morales, I. (1996). *Terrain Vague . Quaderns 212*, Barcelona: Actar. p. 34-42.

developed regions and in 8 percent of all large cities across the world.²

Urban shrinkage is a “turning point” for architects and urban planners who are accustomed to plan the growth and now they must deal with demolition and deconstruction (Dettmar, 2005). Many experts have focused their studies on such “in-between” terrains, coining diverse terms and functions like “non-place”³ (Augé, 1992), “The Third Generation City”⁴ (Casagrande, 2008), “terrain vague”⁵ (de Solà Morales, 1996), “City of Nothing”⁶ (Fabio Di Carlo, 2013) or “exaptation” (Gould, Vrba, 1982)⁷.

Sociological problems like as migration, aging population, decline in fertility (Kabisch et al., 2012) and new challenges for requalification of land (brownfield) and conservation of biodiversity are main debates of shrinking cities (Haase, 2013). Nonetheless, it is believed that shrinkage provides opportunities

² Available at:

<http://www.mckinsey.com/global-themes/urbanization/urban-world-meeting-the-demographic-challenge-in-cities>

Cities in Spain, Greece Russia are set to shrink fast. Most of the cities in Western Europe, United State and Japan seem to shrink.

³ Augé refers more to the buildings rather than open spaces (The perception of a place where human beings remain anonymous).

⁴ See Casagrande, Taipei project in Taiwan. He proposes to step in nature in the ruins of industrial city, “recognizing its local knowledge and allows itself to be part of nature”.

⁵ Title of the movie Marcel Carné (1960) “*Terrain vague*”, depicts emblematic context of *banlieue* of Paris, later de Solà Morales (1996) held to be true this term rather than any other term to explain the urban quality of abandoned areas.

⁶ Di Carlo refers to *Invisible Cities* of celebrated author Italo Calvino, talking about the consequences of modern urbanization and its residues.

⁷ Exaptation is used by biologist to express the evolution and adaption process of organism; architectural use of this term represents the potential of vacant land.

to make cities greener (Schetke et al., 2010). The green management of shrinking cities, has broadly studied in European countries, such results can be adopted in other contexts, where due to the conflict (like African, middle east countries) or “hollowing out”⁸ (like China) (Long et al., 2010) shrinkage is going to be the outcome. What is an adequate approach in such *terrain vague*?

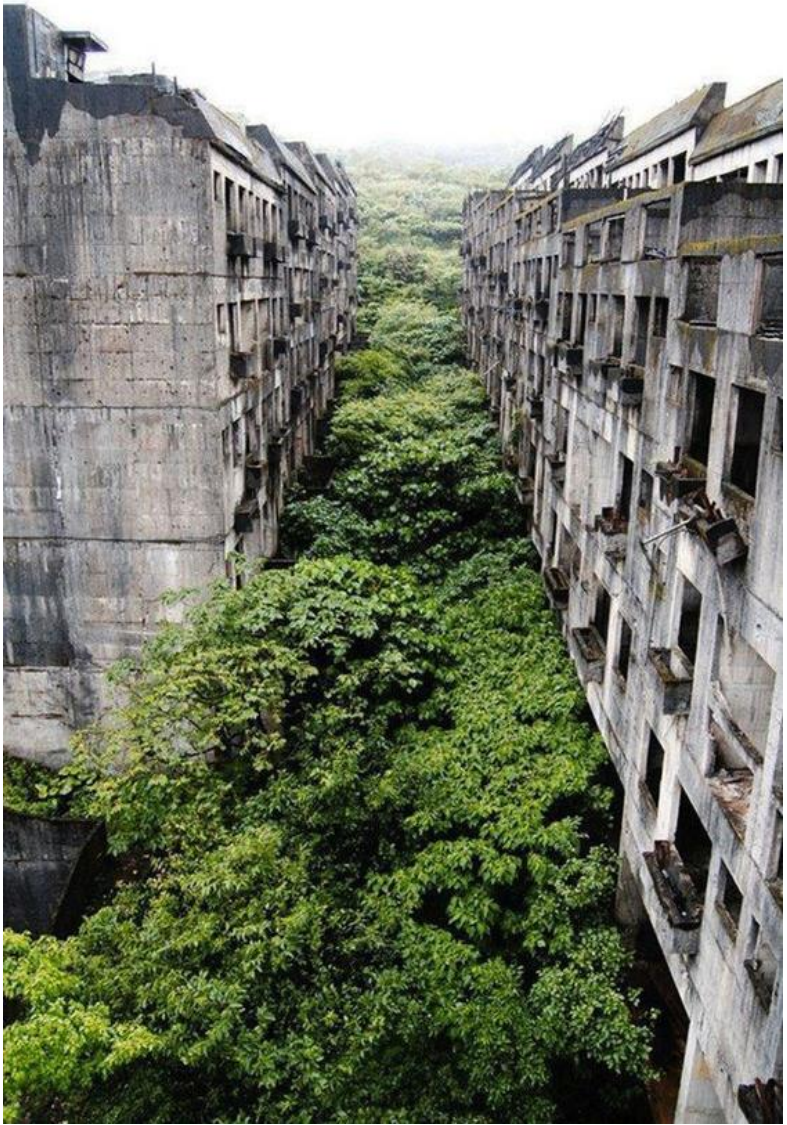
Two main scenarios of green management can be considered; they both deal with “placemaking”⁹ strategy. The first is guided by nature and manifests the supremacy of natural evolution. The second is driven by human, which founds on human needs and wants, the result is artificial.

⁸ Referring to rural communities where villagers move to new cities for jobs.

⁹ Placemaking provides new perception of a place and contributes to the well-being of communities. See also Fleming, L. (2007). *The Art of Placemaking: Interpreting Community Through Public Art and Urban Design*. London and New York: Merrell Publishers.



© Rosanne de Lange, Châtillon Car Graveyard, Saint-Léger, Belgium



© 'cock_a_doodle_do' - Abandoned city of Keelung, Taiwan

Délaissé and friche: German experience

For many wastelands (like coal and steel industrial sites) the most ecologically, financially and aesthetically appealing solution is to allow vegetation to grow on its own (Grosse-Bächle, 2005).

American journalist Alan Weisman (2007) in his book *The World Without Us*¹⁰ foresees the future of planet without human. He predicts that the forests would substitute the residential areas after 500 years. Even though it seems a speculative fiction, represents the power of nature to vanish the human traces in abandoned lands.

Gilles Clément (2004), French gardener affirms the power of nature in an “unattended” area, where the diversity turns up by its evolution. The *délaissé* (neglected land) and *friche* (wasteland) are the spaces which give birth to the *Third Landscape*- “an undetermined fragment of the Plantary Garden - designates the sum of the space left over by man to landscape evolution - to nature alone”.

The wild woodlands as a significant natural evolution of forests is widely debated in abandoned contexts. The contributions of the conference *Wild Forests in the City – Post-industrial Urban Landscapes of Tomorrow*¹¹, which has been published in the book

¹⁰ This book is an expansion of the article “Earth without people” by Weisman, A. (2005) in *Discover Magazine*, 26(2). p.60-65. He applies more ecological view to *Earth Abides* of George R. Stewart (1949), that tells the history of the death and rebirth of civilization.

¹¹ It has been organized by the Institute of Ecology at the Technical University Berlin in cooperation with the *Projekt Industriewald Ruhrgebiet* (Industrial and took place From 16–18 October 2003 in Dortmund, Germany.

Wild Urban Woodlands, New Perspectives for Urban Forestry, draw attentions to the role of wild woodlands in altered urban-industrial areas: “[...] Wild urban woodlands resulting from natural succession on man-made sites have created a new component in the urban forest mix whose significance will grow in areas that are subjected to great structural transformation. These include many former industrial areas, but also, more generally, ‘shrinking cities’” (Kowarik et al., 2005).

Many European post-industrial countries have adopted wild woodlands as a strategy to enhance the biodiversity¹² and ecosystem services (Kowarik et al., 2005) in their shrinking cities. The most prominent examples are in Germany: abandoned Rail Yards like Natur-Park Südgelände - in Berlin designed by Odius landscape group, Park am Gleisdreieck by atelier LOIDL, Industrial area of the Ruhr projected by Latz and Partner, lignite mining areas of eastern Germany like as Leipzig and Lusatia that are transformed into navigable lakes surrounded by forests designed by Stefan Giers.

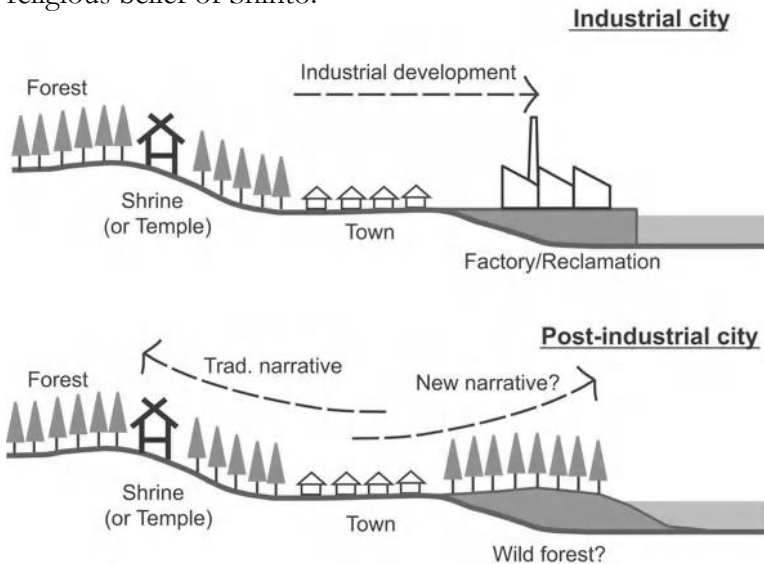
Regardless the origin of shrinking (ex-industrial area or large abandoned cities) the main argument is that “the newly created open spaces must give a new organizational pattern to the whole” (Dettmar, 2005). Wild woodlands fade away ruined structure and form new edge of space. Such space can be open landscape for recreational purposes. One of the recent recommended activity, is *Forest Bathing (shinrin-yoku)*¹³, that potentially relieve disease and is considered an alternative

¹² The biodiversity is greater in the earlier and middle stages of succession than in later woodland stages (Kowarik and Langer, 2005).

¹³ “Shinrin-yoku” is “Therapeutic Effects of Forests” which received attention in Japan.

health-promotion approach (Yu et al., 2017; Tsunetsugu et al., 2010). Although, opening site to the public endangers the biodiversity, the concept of zoned spaces could apply to control partial access to the site with higher biodiversity (Kowarik and Langer, 2005).

Even though wild woodlands are widely proposed in industrial areas, Ryohei Ono (2005) considered cultural aspect of this “new” landscape. He mentions that in Japan the forests are mainly located on the hill or mountain, and have roots in religious belief of Shinto.



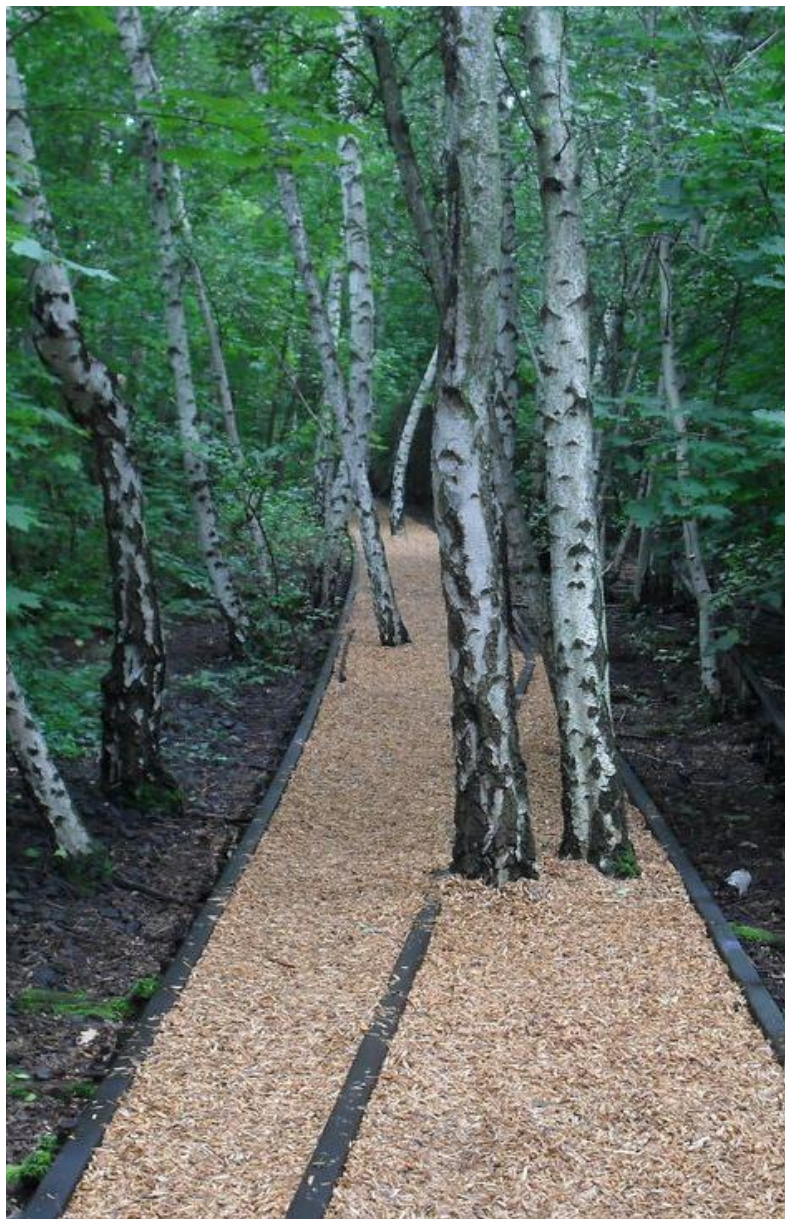
* Diagrams of industrial development (above) and the different narratives in the post-industrial city (below)

This configuration has created a “cultural image” of the hill, which is analogous to the ancient religious belief and had a great narrative. The brownfields of industrial development are located near the sea; planting forests in post-industrial site will be against

bygone memory of landscape. “Even if we could build forests in the cities using ecological technology without any cultural context, we cannot be sure that the forests would be accepted by people and built into the new narratives of the cities”.

This example has been mentioned to specify that not always incorporating such woodlands to the green development are feasible, and sometimes few conditions are required.

To wrap up, ecologically talking wild woodlands are an astute method for shrinking land and can express the desire of Gilles Clément: *Je voudrais montrer la diversité extrême de ce qui existe sur la planète*. They assume the role “as the genetic reservoir of the planet, the space of the future”.



© Kätti Rob- Natur - Park Südgelände

From “Food deserts” to Trees canopy: Detroit

« If you lived next to a vacant house and now all of a sudden
you live next to a forest, you’re in better shape. »

Joseph van Dyk

Gary’s director of planning and redevelopment

Detroit as other shrinking cities of the North American Rust Belt, has suffered severely the deindustrialization after 1950. Racial conflict and mobility of car-driven society, caused the inner city shrank while the suburbs continued to sprawl¹⁴. The inner city, populated by African American impoverished, while the boroughs of white middle-class prospered (Beyer et al., 2006).

The unequal distribution of services in perforated city of Detroit, influenced the food access issues. Disregarded by supermarkets, the poor dwellers of inner areas have to go far to shop in a food store (Gallagher, 2007). Detroit was coined as *food deserts* (Zenk et al., 2005). The initiatives by residents go against ongoing depreciation and dereliction of vacant lots. They convey urban agriculture movement into the vacant lots; Detroit became the prominence example in the United States for the management of abandoned lands (Morgan, 2015). Vacant lots contribute to “green” uses of land like as reforestation, installation of parks, community gardens and food production. The trees planation plays the role as ecosystem services and contributes to the economy of the city.

¹⁴ Such phenomenon is called “doughnut effect”: an appealing suburban area with post-industrial wastelands in the middle.

The city has engaged in the project of Recovery Park¹⁵, which aim to put back the vacant lots into productive use, revitalizing neighborhoods, improving the environment through sustainable management.

Nonetheless, Paddeu (2017) explains that the economic benefits come first in comparison with equity and ecology; urban agriculture is the last strategy in shrinkage city. The legal access to the vacant lands become bothersome. Farming on brownfields with contaminated soils, use of chemicals or Genetically Modified Organisms, discredit environmental benefits of urban agriculture. Furthermore, some experts believe that urban agriculture has been adopted as an approach to evict African American from planned context (Rhodes & Russo, 2013).

However, the “greening” issues found a haven on all shrinking cities of Rust Belt (Paddeu, 2017). The idea of “Creative Shrinkage” (The New York Times Magazine’s, 2006)¹⁶ “Smart decline” (Hollander & Németh, 2011) draws attentions of politician and planners in depopulated Rust Belt cities, to transform vacant lots into pocket parks and forests (Schwarz and Rugare, 2008). Many research has focused on cities like Cleveland, Youngstown, Gary to re-conceive cities, seeking for nontraditional approaches for restoring these *terrains vagues* (Aepfel, 2007; Bird, 2016).

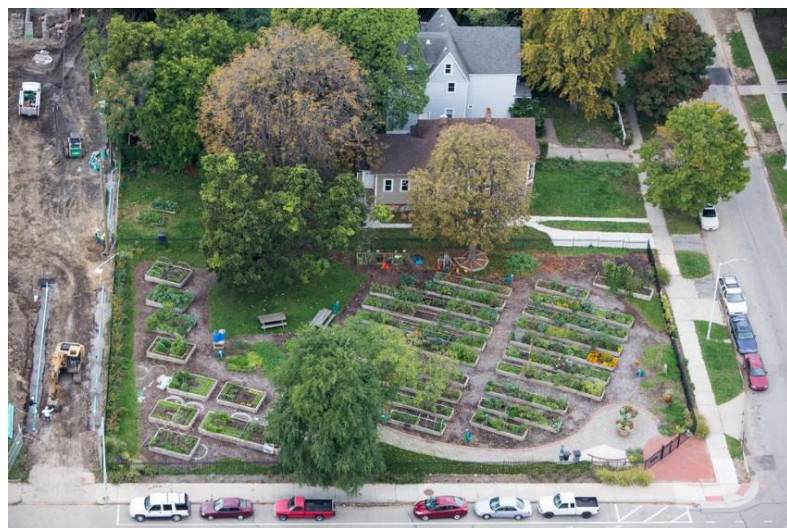
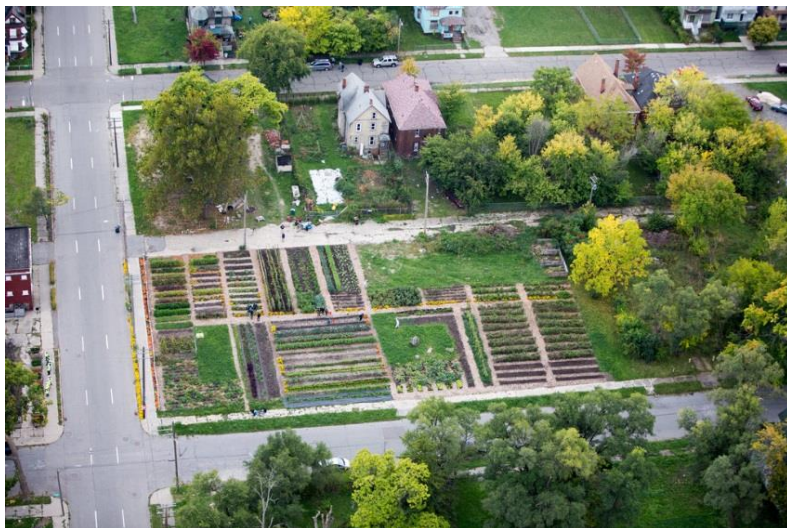
¹⁵ See <http://www.recoverypark.org/>

¹⁶ Available at:

<http://www.nytimes.com/2006/12/10/magazine/10section1B.t3.html?mcubz=0>

The Rust Belt shrinking cities are located in “habitable zone” defined by Forman and Wu (2016). If the fragmented lands of Rust Belt might be planned in a holistic vision, the mega regional infrastructure of forests (Schilling and Logan, 2008), farms and parks would become more adequate for upcoming *next billion people* without further land consumption for housing¹⁷.

¹⁷ See chapter of Holism, Forman R.T.T. and Wu, J. (2016). Where to put the next billion people. *Macmillan Publishers Limited part of Springer Nature*, 537, p. 608-611.



© Alex S. MacLean - The New York Times, Detroit by air - Urban Farming and garden community.

Illicit activities and GSI: Philadelphia

All around the world, apprehension exists about potential crime associated with wild and dense vegetation in green areas. For instance, Golden Gate Park were set up by homeless and sex workers and just after the huge fire by arsonists the camps were ceased by mayor (Harnik, 2000). Prostitution in Bois de Boulogne and Casa de Campo, presence of racist in Landschaftspard Duisburg-Nord, all depict the social unrest in overgrown vegetated areas (Beardsley, 2007). Illustrated examples, clarify that not always wild woodlands are the most appropriate answer, particularly when vacant lots are near other inhabited areas in a shrinkage city.

It has been estimated 40,000 vacant lots in the post-industrial city of Philadelphia¹⁸. Properties values in vacant lots plunge while crime rates (overgrown vegetated lots have created an excellent place for hiding drugs and guns) and vandalism (trash, fear) increase (Kondo, 2015; Garvin et al., 2013). Tax delinquents are applied to the citizens. These issues heighten with an irreversible vicious cycle (Huang, 2014).

The city of Philadelphia has adopted innovative and untested programs to abate vandalism. One program regards the vacant-lot greening, single trees are planted in lots and weeds are removed to increase the surveillance of each lots, such method not only reduced gun assaults and vandalism but also improved the health outcomes (Branas et al, 2011). Other program is the construction of Green Stormwater infrastructure(GSI) (such as forests, rain gardens, bioswales and wetlands) in vacant lots to

¹⁸ According to Redevelopment Authority of the City of Philadelphia and Philadelphia Association of Community Development Corporations 2010.

capture the stormwater runoff¹⁹ (Low, 2014, Kondo et al., 2015; FAO, 2016).



© Daniel Traub - Westminster Avenue, West Philadelphia

¹⁹ See Philadelphia Water Department 2011 *Green City, Clean Waters*. Runoff is a main issue in Philadelphia, since the city is located near major water ways at downstream points in water shed, it receives end of stormwater runoff produced by neighbouring communities. Even though there are other sewage treatment plant, during high stormwater, these systems exceed their capacity.

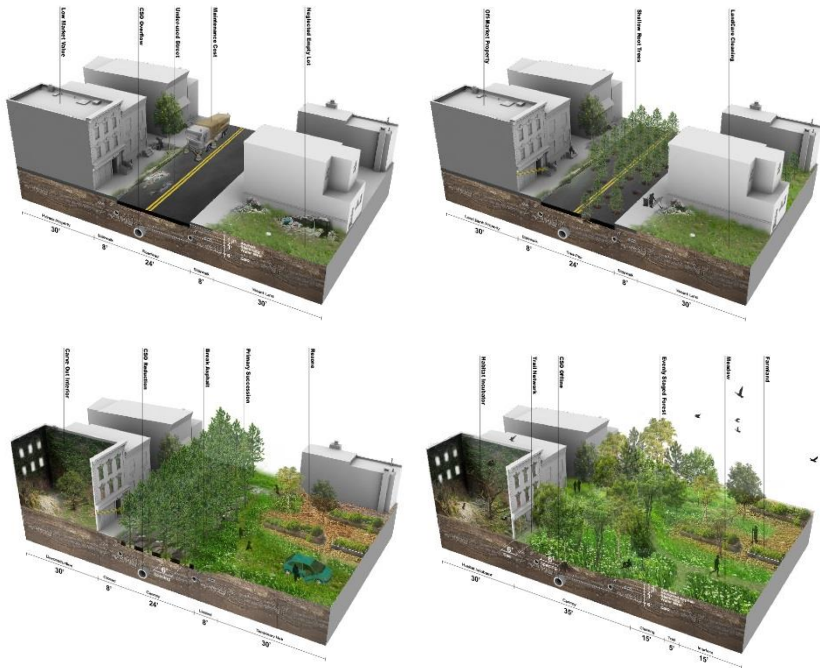


© Pennsylvania Horticultural Society

Nonetheless, most of vacant lots are private properties, and it can be a challenge for government agency to spend money for forest implementation on private lands. Two methods have been adopted to provide a solution: in Philadelphia, a separate stormwater fee is charged to the properties, based on impervious surfaces. It has been offered a cost savings to owners who install green infrastructure in their lots (Low, 2014). Furthermore, Philadelphia Land Bank (2015) opened a new mandate with the strategy “to quicken the pace of returning vacant and tax delinquent property to productive use by centralizing ownership of these parcels”. The lots which are not desirable to for-profit real estate, “work best as small community gardens, side yards or open space until the neighbourhood recovers” (Smith, 2017).

To wrap up, trees are planted in vacant lots of shrinkage city of Philadelphia to tackle with illicit activities and stormwater runoff. Even though some of them are not the most appealing

forests, they demonstrate “The Power of a Green Lot”²⁰. Philadelphia is a rigorous example of holistic approach in which forestation is associated with other significant social issues in a shrinkage city²¹.



© Chieh Huang (2014)

Urban Regeneration: Foresting Vacancy in Philadelphia²²

²⁰ The online journal of the *hidden city of Philadelphia*, entitled this project as *The Power of a Green Lot*.

²¹ The contribution of this project to health and safety of inhabitants becomes the topic in Medicine faculty of University of Pennsylvania. See *MoreGreen, Less Crime: Rehabilitating Vacant Lots Improves Urban Health and Safety, Penn Study Finds*. Available at:

<https://www.pennmedicine.org/news/news-releases/2011/november/more-green-less-crime-rehabil>

²² For details of this proposal see:

From non-place to placemaking

Conclusions

To conclude, *placemaking* in shrinking cities are deeply connected to the size, location and usefulness of lots (Rink, 2005). The wild woodlands are ecologically, financially and aesthetically the most acceptable answer. Although, they are the most preeminent solution in sizable land (like ex-industrial areas), woodlands in small-scale lots (among residential area) can provoke vandalism (Beardsley, 2007; Davies, 2005). Small lots can be associated with other social amenities like Green Stormwater Infrastructure (like as rain gardens), urban farm, orchard or park. The surveillance and legislation are required to ensure the environmental benefits of these lots.

Shrinkage not only provides opportunity for incrementing green space, but also with an adequate policy of land reclamation, it would decrease soil consumption. Such cities can accommodate the upcoming next billion people of our planet.

«...is unfinished or because it has been demolished, whether the cause is some enchantment or only a whim, I do not know. The fact remains that it has no walls, no ceilings, no Boors: it has nothing that makes it seem a city. »

Italo Calvino-Invisible cities - Armilla



© Maria Iorillo - Abandoned city of Ancient Galeria, Lazio

“When he enters the territory of which Eutropia is the capital, the traveler sees not one city but many, of equal size and not unlike one another, scattered over

a vast, rolling plateau. Eutropia is not one, but all these cities together; only one is inhabited at a time, the others are empty; and this process is carried out

in rotation. Now I shall tell you how. On the day when Eutropia's inhabitants feel the grip of weariness and no one can bear any longer his job, his relatives, his house and his life, debts, the people he must greet or who greet him, then the whole citizenry decides to move to the next city, which is there waiting for them, empty and good as new; there each will take up a new job, a different wife, will see another landscape on opening his window, and will spend his time with different pastimes, friends, gossip.

So, their life is renewed from move to move, among cities whose exposure or declivity or streams or winds make each site somehow different from the others. Since their society is ordered without great distinctions of wealth or authority, the passage from one function to another takes place almost without jolts; variety is guaranteed by the multiple assignments, so that in the span of a lifetime a man rarely returns to a job that has already been his.

Thus, the city repeats its life, identical, shifting up and down on its empty chessboard. The inhabitants repeat the same scenes, with the actors changed; they repeat the same speeches with variously combined accents; they open alternate mouths in identical yawns. Alone, among all the cities of the empire, Eutropia remains always the same. Mercury, god of the fickle, to whom the city is sacred, worked this ambiguous miracle.”

Italo Calvino-Invisible cities- Eutropia
Translated by William Weaver

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<http://www.groundedinphilly.org/>

Vacant lot Detroit:

<https://www.motorcitymapping.org/#t=overview&s=detroit&f=all&c=boarding>

Self-constructed cities

5.3. Self-constructed cities ¹

« Close under the Abbey of Westminster there lie concealed labyrinths of lanes and potty and alleys and slums, nests of ignorance, vice, depravity, and crime, as well as of squalor, wretchedness, and disease; whose atmosphere is typhus, whose ventilation is cholera; in which swarms of huge and almost countless population, nominally at least, Catholic; haunts of filth, which no sewage committee can reach – dark corners, which no lighting board can brighten. »

Wilfrid Philip Ward, 1897 ²

Self-constructed cities are “the result of culturally driven individual and communal initiatives” (Gouverneur, 2014). In the near future, such phenomenon will be the main form of urbanization in many parts of the world (Zárate, 2016). Although shelter is considered a fundamental human right, one third of the global urban population suffers from inadequate

¹ Other terms used to refer to such impoverished neighborhoods:

Squatter settlements or Shanty town or Shacks (Daniel Carter Beard, *Shelters, shacks, and shanties*, 1914), Favelas (refers to *Favela*, hill outside Rio de Janeiro) Villas miseria (Bernardo Verbitsky, *Villa Miseria también es América*, 1957) Slum (Wilfrid Philip Ward, *The life and times of Cardinal Wiseman*, 1897)

Bidonvilles, rookery, gecekondu, skid row, barrio, ghetto, taudis, bandas de miseria, barrio marginal, morro, loteamento, barraca, musseque, tugurio, solares, mudun safi, karyan, medina achouaia, brarek, ishash, galoos, tanake, baladi, hrushabi, chalis, katras, zopadpattis, bustee, estero, looban, dagatan, umjondolo, watta, udukku, and chereka bete (UN-Habitat, 2003, page 30)

² This quotation was widely cited in the national press, to popularize the word slum to describe bad housing. Cited by Dyos, H.J., Cannadine, D., Reeder, D. (1982). *Exploring the urban past: essays in urban history*. Cambridge: Cambridge University Press. p. 240 and Wohl, A.S. (2002). *The eternal slum: housing and social policy in Victorian London*. New Jersey: Transaction Publishers. p. 5

living conditions (Habitat, 2015). Dwellers of these areas are often denied natural amenities, infrastructure, and services by stakeholders and planners. They mainly suffer from lack of basic services, health hazards, insecure tenure, overcrowding, poverty, social segregation and ineffective governance (UN-Habitat, 2003; Gouverneur, 2014; Zárata, 2016). Even though they may locate within administrative boundary of a town or city, “officially, they do not exist” (UN-Habitat, 2010).

Self-constructed cities mainly are in Latin America, Sub-Saharan Africa and Southeast Asia (UN- Habitat, 2013) and represent a significant portion of the world’s poor (World Bank, 2008). These communities are mainly located near endangered bioregions on the Earth. Due to the poverty, many of these communities are forest-dependent; with an additional 400–500 million people estimated to be directly dependent (White and Martin 2002). The inhabitants of these settlements use the forest to hunt animals, and harvest fruit, seeds and woods (Vanda, 1993; IBDF, 1981; Oberndorf et al. 2007; FAO, 2003).

The continual growth of self-constructed cities will inevitably aggravate the human impact on our planet. Such settlements are encroached onto environmentally sensitive areas, populating unstable territories with geological and physiological limitations. If self-constructed cities are appropriately guided, they can make significant contribution to the reduction of poverty, environmental degradation and disaster vulnerability (Parker et.al, 1995).

This chapter aims to evaluate the role of urban forestry in self-constructed cities of Cartagena in Colombia and San José de Chamanga in Ecuador. Each of these cases tackles with

different issues, which are profoundly connected to the rapid urbanisation and its consequences.

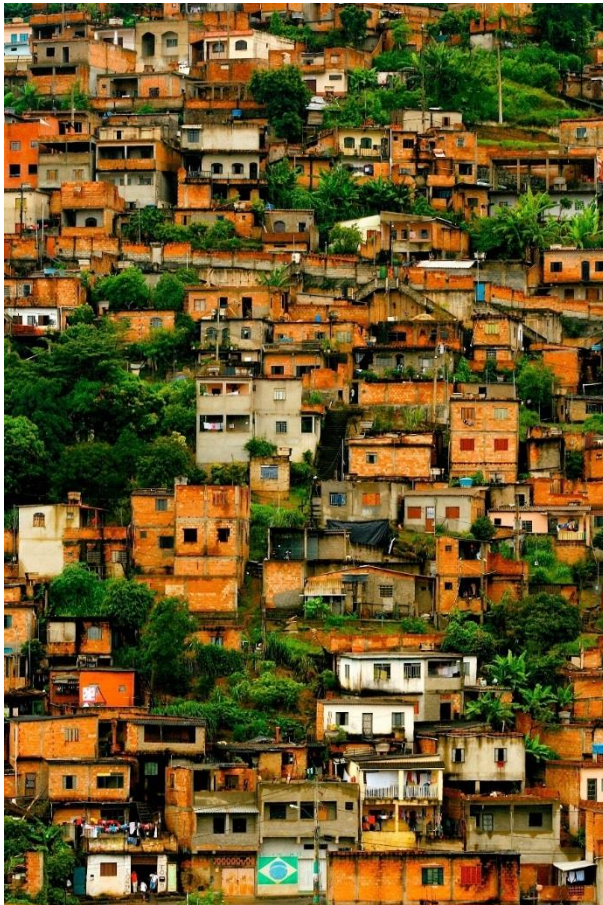
Although the proposals emerge from academic studies, they illustrate the diversity of conditions that urban forestry can address in informal settlements. Two mentioned case studies conducted in the landscape architecture department at the University of Pennsylvania in 2017, supervised by David Gouverneur and Maria Altagracia Villalobos.

The goals of such approach encompass two main issues: identification of an adequate method for urbanisation and poverty reduction. The former has been applied through the plantation of the Dry forest in Cartagena as “Informal Armature”³ (Gouverneur, 2014), to define the direction and location of forthcoming settlements; this novel strategy of planning allows citizens to be able to shape their environment in an adequate manner, where nature isn’t considered an impediment or afterthought, but integrated into the process of self-organization. The latter has been examined through the role of Mangroves as economic resource in poor settlements of San José de Chamanga in Ecuador.

Albeit, it is stated that self-constructed cities devastate natural resources, David Gouverneur (2014) elucidates that in comparison with large cities of the developing world “[...]the

³ The “Informal Armature” is proposed by Gouverneur as a novel strategy that takes into the consideration the vitality of informality, and attempts to couple flexible design with management issues and supports the efficient use of resources for the inhabitants of informal settlements, who will have the capacity to shape their own habitat. It is not based on rigid model of planning, albeit, it provides a structure for informal developments.

informal city is compact, pedestrian friendly, and socially cohesive. It can incorporate mixed uses at a neighbourhood scale. It consumes little energy and produces relatively low quantities of solid waste[...]These positive attributes facilitate the task of creating a sustainable future for cities [...]”. Based on this statement, the case studies examine the role of urban forestation as an approach towards the sustainability of informal contexts.



© Adam Thompson - Cafezal favela, Belo Horizonte

Dry Forest (Dryfo) Urbanism: Cartagena⁴

Since colonial times, the thriving ports of Spanish Colony were located on the Caribbean coast (Moya Pons, 2007). Cartagena was a main port for trade and exports of products from countries located in the Pacific basin of South America (Grahn, 1996). Today 72% of total population of Caribbean coast is concentrated in commercial and touristic cities of Cartagena, Barranquilla, and Santa Marta (DANE, 2013).

The Caribbean coast is beloved destination for national and foreign visitors for “Sun, Sea and Sand”, Cartagena, San Andres and Santa Marta are the most visited cities (Rangel-Buitrago et al, 2015) and tourism represents significant economic activity in these areas.⁵

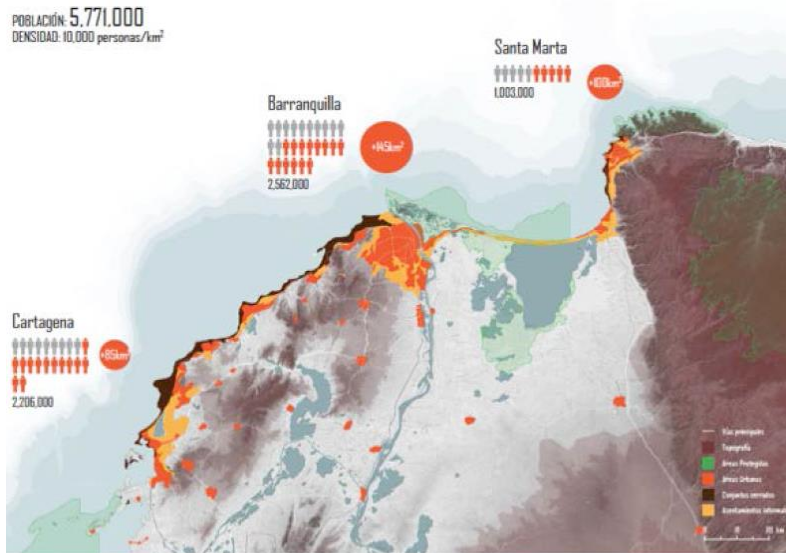
These rapidly urbanizing centers are contiguous to diverse systems of protected as well as endangered natural areas such as Mangroves and Dry forest and Tropical rainforest (Barreda-Bautista et al, 2011; Rangel-Buitrago et al, 2015).

Tourism activities and enlargement of existing coastal towns and villages, aggravated the coastal erosion and destruction of mangroves (Rangel-Buitrago et al., 2015) with associated impacts on landscape scenery (Rangel-Buitrago et al., 2013). It is expected that by 2050, if the growth trends continue,

⁴ All rights reserve to Ishaan Kumar, who kindly shared his proposal entitled as “Dryfo Urbanism” for the purpose of this research. The result of the collaboration has been presented in World Design Summit in October of 2017 in Montreal, Canada; Entitled as *Dryfo Urbanism Urbanization Through Forestation - Holistic Design Solutions* by Ishaan Kumar and Samaneh Nickayin.

⁵ PROEXPORT- Ministerio de Comercio, Industria y Turismo, (2013) reported that during last 6 years 1,906,909 international and close to 6,000,000 domestic tourism have arrived in Colombia.

Cartagena and Barranquilla will become a unified linear city along the coast. Historically, rapid urbanization process was characterized by a dramatic shift from a rural/agricultural-based economy to one supported by industry, technology, and services⁶.



© Diego Bermúdez, Chieh Huang (May 2015), urbanization trends from Cartagena to Santa Marta. Landscape Department, University of Pennsylvania. Instructors Richard Weller, David Gouverneur.

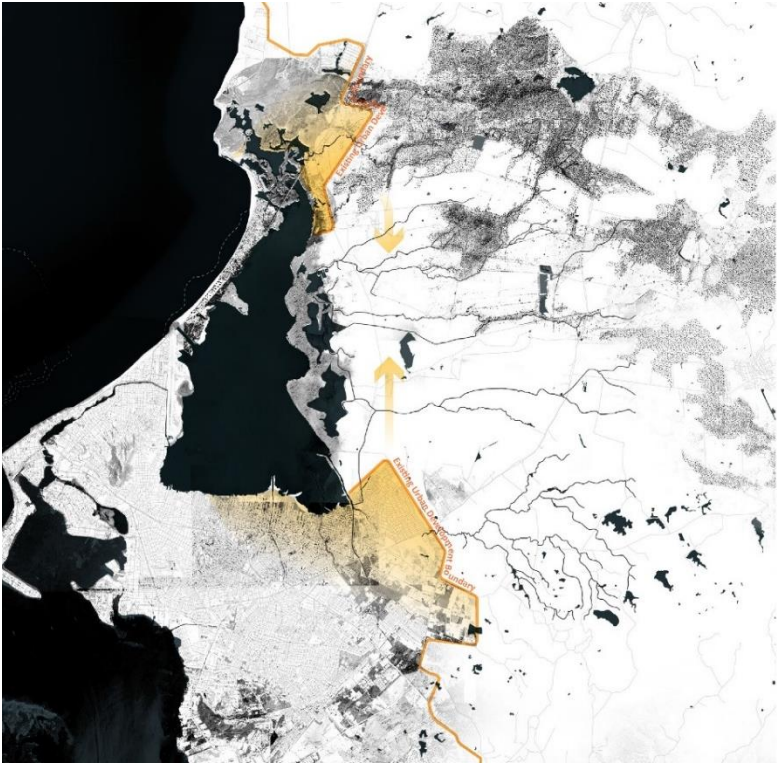
⁶ These migratory trends were also enhanced by high levels of violence, derived from historical social inequalities, exacerbated by the assassination of the Presidency in 1948: Jorge Eliécer Gaitán. This event led to the rise of guerrilla movements and over time it embarked in the production and commercialization of drugs. The clandestine laboratories were located in remote areas and high levels of violence in such areas, forced massive displacements and migration to the larger cities (Angrist and Kugler, 2008)

Due to the disparities of wealth, population who migrated to these cities and towns self-constructed their urban habitats. With a steady population growth rate composed of 70% informal settlements, Cartagena epitomizes the global force of self-constructed cities lacking any semblance of natural amenities. Such urbanization, has historically not only encroached on fragile and valuable ecosystems such as the dry forest and mangroves but also lacked any semblance of intentionally defining the public realm and using landscape as amenity to moderate harsh environmental and social conditions.

The ecological function of tropical Dry forest ecosystem and mangroves ecosystems are deeply connected. During the dry season, which has a length of 7 to 8 months, tropical Dry forest vegetation shed their leaves (Rzedowsky, 1978), to increase vegetation's hydric and mineral nutrients deficit (Bullock et al., 1995). The mangroves (characterized by sandy soils), are negatively affected by the droughts, which cause higher soil salinity due to its low water and nutrient retention capacity (Jaramillo, 2014). Furthermore, major precipitation could cause the diminution in mangrove extensions and alters their floristic composition (Bernal et al. 2016). Therefore, the seasonality that the tropical dry forest presents becomes a dominant ecological force to protect the seasonal streams soils and nutrients that feed the marshes where the mangroves grow (Galeano et al., 2017).



© Boyang Li, Xinyi Ye, Tianjiao Zhang, Dry forest ecosystem and mangroves ecosystems. Landscape Department, University of Pennsylvania, Instructors David Gouverneur, May 2017.



© Boyang Li, Xinyi Ye, Tianjiao Zhang, Urbanization trends of Cartagena. Landscape Department, University of Pennsylvania, Instructors David Gouverneur, May 2017.

Along the coast, the growth of informal settlements, has gradually infilled the marshes, eliminating the mangroves (Rangel-Buitrago et al., 2015), while in hinterlands, it encroached on ecosystem of dry forest, mainly due to the fires and conversion to agriculture and urbanized area (Miles et al, 2006). Currently, 66% of Dry forests have been converted into the land uses through the Americas (Trejo & Dirzo, 2000).

This part represents a novel strategy of planning for self-constructed city of Cartagena, which identifies land adequate for development and incorporates urban forestry, as green infrastructure. ‘Dry Forest (Dryfo) Urbanism’ proposes an orchestrated planting of the dry forest as the “Informal Armature” and departure point for future growth. Leveraging the existing vegetation of the grazing land, Dryfo Urbanism extends these lines throughout the expansion zone of Cartagena incorporating a process of forestation to reserve future mobility corridors and provide severely needed public space.

This proposal imagines a future for Cartagena where the dry forest not only provides space for communal interaction in such a segregated society, but also increases tree canopy and biodiversity in a self-constructed context where citizens can enjoy their contextual ecosystem as a component of their daily lives. David Gouverneur (2014) expresses that “throughout history, unplanned and informal processes have played an important role in shaping cities. It is when this informal mode of city making increases in scale that it causes health hazards, social segregation, social unrest, and ineffective governance” Dryfo Urbanism provides a framework for informal and formal infill, where landscape is an integral part of the public realm, and

establishes the “informal armature” for citizens to shape their own habitat and enjoy the benefits of shade and undeniable beauty.

The proposal emphasises the role of “landscape as protagonist”, which seeks to recover the tree canopy of Dry Forest, attempts to restore the ecological loss of trees in hot Caribbean environment and integrate novel types of public space in informal contexts.

Colombia is the second most biodiverse country in the world (Rodríguez Becerra, 2001; Cortés et al., 2015). Such Biodiversity does not consist of just flora and fauna, but encompass migratory people as the population of internally displaced person (IDP) ⁷ (UNHCR, 2016). With an adequate education, participation and planning such population, who benefit from skills ranging from agriculture, forestry and even artisanal craftwork, could be considered as good “steward” (McHarg, 1992)⁸ of landscape and Dry forest.

Dryfo Urbanism proposes a selection of three families to strengthen and extend the existing lines of vegetation from the grazing territory. It establishes the urban framework for upcoming urbanization between defined corridors.

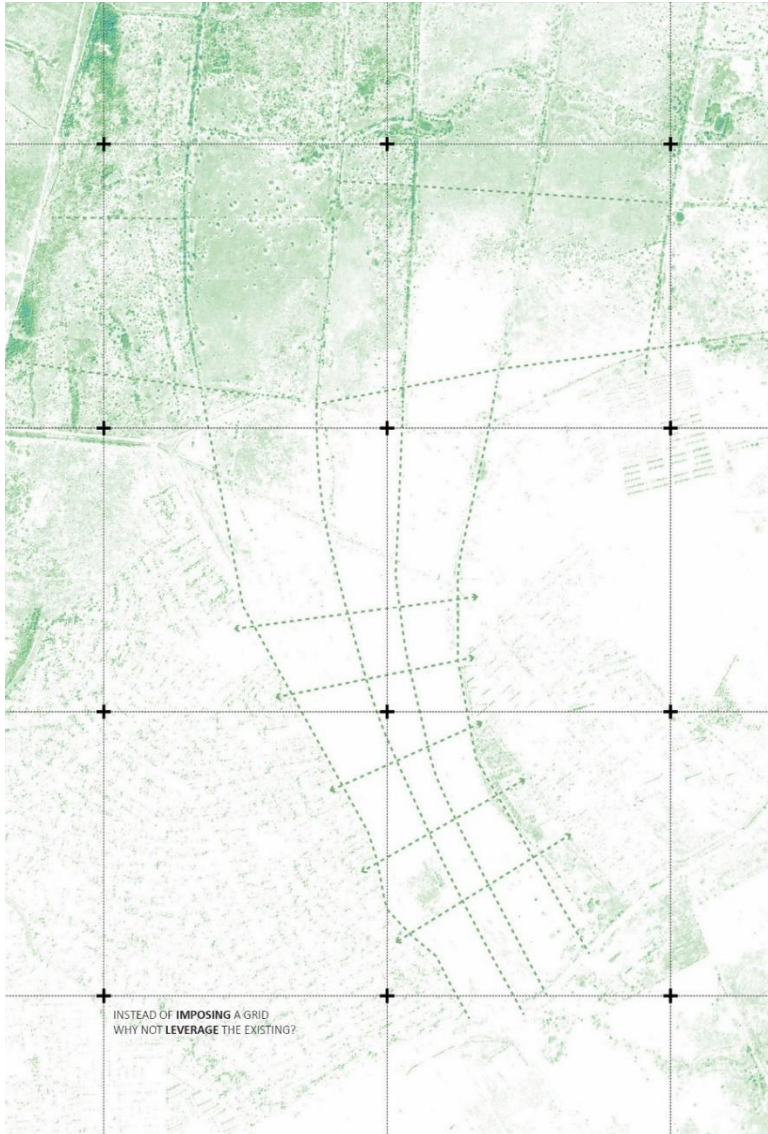
Such proposal not only installs a botanical education among citizen, but also provides food, fruit, medicine and wood to mitigate poverty among the inhabitants. Flanking each corridor could be a series of plazas acting as dense islands of each family.

⁷ “Internally displaced people (IDPs) have not crossed a border to find safety. Unlike refugees, they are on the run at home, IDPs stay within their own country and remain under the protection of its government, even if that government is the reason for their displacement. As a result, these people are among the most vulnerable in the world”.

⁸ See also Stewardship Now? Reflections on Landscape Architecture’s Raison d’être in the 21st Century by Richard Weller, *Landscape Journal* 33:2, p.1-24



© Ishaan Kumar. Cartagena contrasts. Existing community of informal settlement and social housing projects are in complete isolation.



© Ishaan Kumar. Dryfo Urbanism leverages the exiting vegetation of the grazing land to establish the urban framework and stretches the two communities together.

With a diminishing degree of design and control approaching the arroyos and bodies of water, the evolution of these spaces could integrate government and local needs and skill sets. To reserve the land for these amenities, the government could work with local leaders to plant wood trees as a land bank system, chopping them down for future construction and furniture material as the city expands. Replacing these patches could be a network community centres, schools and agricultural fields generating urban nodes while serving as stewards over these invaluable assets of plazas and parks.

With the necessary North-South corridors established, the dry forest families could be threaded together by a selection of shade and fruit trees providing pedestrian corridors with invaluable shade. Intersecting pedestrian streets could have small pocket plazas highlighting a distinct colour of the Fabaceae family. Instead of honouring individuals and conquistadores such as Simon Bolivar, these plazas could be named after the tree itself instilling a botanically educated city where local appropriation and sense of place is generated through the humble planting of trees. To achieve a higher degree of resolution on the character of the corridors, the Bombacaceae family is selected for the cultural association of the Macondo tree. Globally recognized as Colombia's most distinguished author, Gabriel Garcia Marquez named Macondo the location of his fictional city in the infamous 100 Years of Solitude. Unfortunately, without the knowledge that Macondo was a tree, the tree has since become inevitably tied to solitude.

Dryfo Urbanism hopes to reverse this reality by featuring the Macondo in the Bombacaceae corridors. By integrating

Macondo trees into the daily lives of commuters, the 50-meter tree becomes emblematic of flows, movement and most importantly, unwavering unity. Raised platforms could even elevate the Macondo to not only be placed on a symbolic and poetic pedestal, but feature its elephant like base at eye level. Pairing it with the undulating base of the Ceiba, the design of the plazas and parks could be seamlessly integrated, responding to the varying characteristics of the individual trees.

Dryfo Urbanism isn't the traditional urban design of imposition over a territory, but a "Landscape narrative" (Potteiger & Purinton, 1998)⁹ that simply highlights what is already there, expressing inherent social, cultural, ecological, historical, and political voices of Cartagena. By guaranteeing mobility corridors and public space, Dryfo Urbanism blend forestation and urbanization, where "Landscape [acts] as Urbanism" (Waldheim, 2016) and transform the informality of self-constructed city to respect the ecosystem of Dry forest, restoring and balancing the fragile ecosystem and go beyond the short-term, market- driven needs, looking from a broader-scale to response to the emergency and disaster of deforestation caused by unplanned informality.

⁹ "Narratives [...] intersect with sites, accumulate as layers of history, organize sequences, and inhere in the very materials and processes of the landscape. In various ways, stories 'take place'." Potteiger, M., Purinton, J. (1998). *Landscape Narratives: Design Practices for Telling Stories*. New Jersey: John Wiley & Sons. p.5.



© Ishaan Kumar, Masterplan of Dryfo Urbanism.





© Ishaan Kumar. Detail plan and section on of Macondo Plaza along the Bombacaceae corridor with intersecting Fabaceae plazas and surrounding commercial node.



© Ishaan Kumar. Detail plan and section of larger plaza along the Bombacaceae corridor providing urban relief integrating the intricacies of the individual trees.



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Eco-poverty¹⁰ in Mangroves: San José de Chamanga¹¹

The main concern in self-constructed cities is poverty. Even though there is no unique way to define poverty, it is commonly defined as deprivation in well-being in terms of monetary, powerlessness, social exclusion, vulnerability and lack of opportunity and resources (Ruggeri Laderchi, et al., 2003).

According to Brundtland Report “[...] Poor people are forced to overuse environmental resources to survive from day to day, and their impoverishment of their environment further impoverishes them, making their survival ever more difficult and uncertain” (WCED, 1987)¹². Since the rise of idea sustainable development, environmental degradation and poverty have been considered as reciprocative process (Coward et al., 1999; Scherr, 2000; Gray and Moseley, 2005).

The goals encompassed in this essay relates to the contribution of mangroves to reduce poverty among the poor residents of self-constructed city of San José de Chamanga in Ecuador.

Mangroves provide essential areas of hatching for brackish and open water fish, and contribute to the economy of poor dwellers of coastal areas which often rely on fishing and other economies

¹⁰ See also Nofroni, L. (2017). *Paesaggi delle eco-povertà nel mediterraneo. Il paesaggio come strumento di osservazione e di proiezione strategica per il superamento delle iniquità eco-sociali*. PhD's thesis. Sapienza, Università di Roma.

¹¹ It is based on academic proposal of Aubrey Jahelka and Shuwen Ye, entitled as “San Jose de Chamanga, Rebuilding for Resilient Landscapes”, conducted in the Landscape Architecture Department at the University of Pennsylvania in 2017, who kindly shared their proposal for the purpose of this research.

¹² Report of Brundtland well-known also as our common future, p. 27.

based on the natural environment. The destruction of fragile ecosystem of Mangroves (due to the urbanization, industrialization, and deforestation), has further impoverished the community of Chamanga.



© Aubrey Jahelka - San José de Chamanga



© Shuwen Ye -San José de Chamanga

Mangroves are among the most valuable and productive ecosystems of coastlines (Bao et al., 2013). For instance, due to their demands for nutrients, they play important roles in removing pollutants, heavy metals, and pesticides (Kristensen et al., 2008; Reef et al., 2010; Adame and Lovelock, 2011; Bayen, 2012), and are considered as tolerant plants for wastewater affluent (Yang et al., 2008; Huang et al., 2012). Furthermore, mangroves deter the advancement of sea water onto sweet water bodies, preserving biomes, diminishing the impact of sea-level-rise, storms, tsunamis and erosion (Tanner et al. 1991; Alongi 2008; Zhang et al. 2012; Aung et al. 2013). The devastation of mangroves has exacerbated the landslide and erosion along the coastline of Chamanga.

San José de Chamanga experiences a 2.5-meter fluctuation in tides. Moreover, natural disasters (earthquake, flooding and landslide) hit frequently this area. The government suggests that the community relocated further upland to remove them from risk. Nevertheless, 80% of the residents rely on access to the water for their livelihood not to mention the storage of boats, nets, motors etc. This new location completely disregards the development and heart of Chamanga which is a fishing community along the waterfront. Without the prevalence of a fishing based community it is unclear what economic opportunities exist for the residents. Furthermore, there is no reasonable enforcement mechanism to prevent people from rebuilding the original informal fabric along the coastline.

If the mangroves were to be restored, the trees themselves would act as a natural amplitude dampener to tsunami and sea-level-rise; simultaneously, it preserves economic opportunities for the residents.

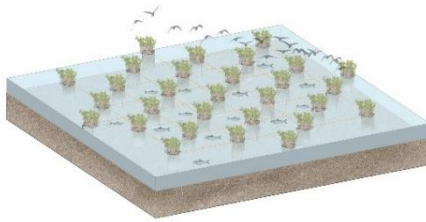


© UNHCR. Earthquake survivors shelter under a tent in Chamanga, Ecuador (2016).

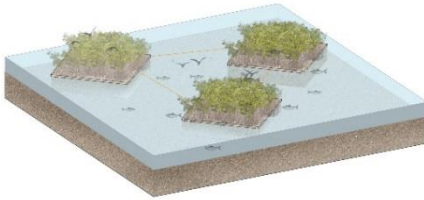
Many countries are pursuing various forms of silvo-aquaculture, as a win-win strategy to conservation of mangroves and fostering economy and employment among low-income dwellers of coastal community. (Sukardjo 1989; Primavera 2000; Oswin & Ali-Hussain 2001).

The proposal of Jahelka and Ye, is based on Silvofishery technique, which integrate mangroves with brackish aquaculture. They proposed Chinampa technique, as the restoration strategy for mangroves. The system of chinampas is a traditional Mexican agrarian technique, which includes a series of agronomic, fishery, and forestry activities. The chinampas are raised beds soils that are constructed by sediments of excavated place, creating a system of islands separated by channels. (Romaos Bello et al., 2011, Merlín-Uribe et al., 2012)

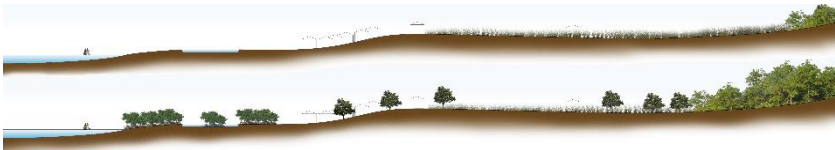
Urbanization and Forestation – Self-constructed cities



1M*1M CHINAMPAS



10M*10M CHINAMPAS



© Aubrey Jahelka, Shuwen Ye- Department of Landscape Architecture, Department of City Planning, A Cross- Disciplinary Studio Fall 2016 & Spring 2017, Instructors David Gouverneur, María Altagracia Villalobos May 2017

Furthermore, their proposal creates a commercial corridor along the waterfront, which conserve the role of waterfront as the spine of the town and the center of social life, without a drastic alternation in the life of inhabitants. This proposal, is a holistic vision that intertwines the restoration of mangroves, economic and cultural aspects with the process of informality.

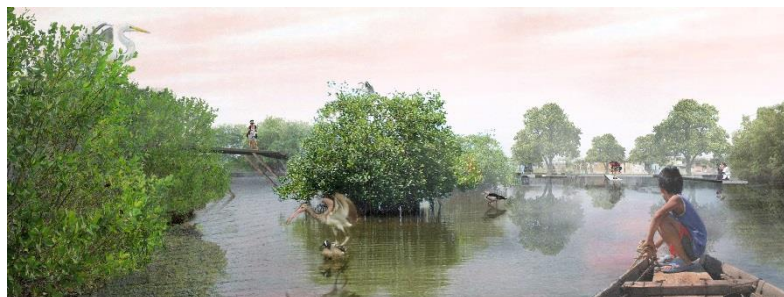
It is an efficient example of forestry that, Vandana Shiva (1993) calls “Life-enhancing” forestry. In her book *Monocultures of the Mind, Perspectives on Biodiversity and Biotechnology*, she specifies that:

« [...] The survival of [...] forests depends on the survival of human societies modelled on the principals of the forest [...], hidden in the lives and beliefs of the forest peoples of the world [...] The life-enhancing [forestry] emerges from the forest and forest communities [and] creates a sustainable, renewable forest system, supporting and renewing food and water systems. The maintenance of conditions for renewability is the primary management objective [...] ».



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5.4. Points of view for Tehran and Rome

This section tends to recommend how the previous observation and findings, could be applied in other circumstances, with similarity and dissimilarity characteristics of mentioned case studies.

It has been selected Tehran and Rome as the locations, where the author of this research has dwelled most part of her life and supervised two graduation theses regarding forestation in mentioned context. The present and future scenarios of urbanization tendency, became the main framework of the proposed suggestions.



© Fariba Nazi - Tehran and Alborz mountains in Background

From expansion to shrinkage: Tehran

In the forty years since Iranian revolution the city of Tehran has grown from a population of 4.5 million to more than 15 million¹, generating an ultra-dense mega city with high rise buildings and freeways at the foot of Alborz mountains.

Historically, Tehran had many gardens with varieties of fruit (Ensafpour, 1994). Due to the sloping plain, perennial rivers and intermittent streams flew into the area of modern city, along which the presence of plane trees (*Platanus*) was noted by many travellers, who admired the shade and fresh air of small village². Still today, the tree-lined canals along most of the avenues, are considered as main feature of urban forest in Tehran, creating appealing sidewalks for pedestrians (McBride and Mossadegh, 2000).

In 1789, Tehran became the capital of Ghajars Dynasty and first palaces and royal gardens were constructed. Before Ghaajar dynasty about two third of the inner city was covered by urban gardens and farms (Kariman, 1976). By a coup d'état of Reza Pahlavi in 1921, the new dynasty has established and the modernization of country initiated. The first avenues and boulevards with trees and canals³ were constructed through the

¹ See City statistics: <http://www.citymayors.com/statistics/largest-cities-mayors-1.html>

² Muslim geographer Idn Howqal in 942 A.D., Yaqut Hamavi in 1223 A.D., Pietro de Lavall in 1618 A.D. and Sir Thomas Hurburt in 1627 A.D., all wrote about the presence of plane trees, vineyards and gardens in Tehran (For details of their descriptions see: McBride and Mossadegh, 2000).

³ The system of canals and gutters in Tehran were set up to carry water for domestic purpose. This system was based on gravity flow and still is used to supply water for irrigation.

city. Since 1935, the forest plantation was primarily done to reduce air pollution, control dust and soil erosion and timber production (McBride and Mossadegh, 2000).

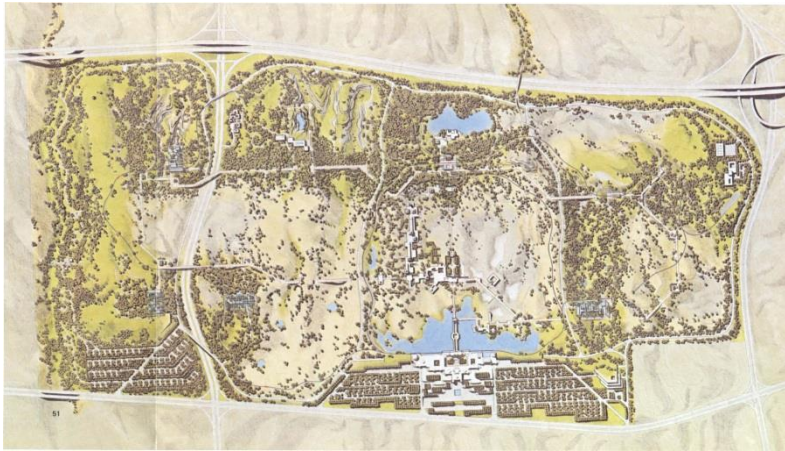
In 1966, the American firm Gruen Associates was invited by Iranian government to draw the master plan of the modern Tehran⁴. Historian of architecture Wouter Vanstiphout (2006) mentions that “One of the most impressive features of the New Tehran is the immense landscape park Pardisan in North Tehran [...] It was designed by the famous American ecologist Ian McHarg; [...] a huge park that contained micro ecologies representing the five major climate zones in the world [...] Tehran wanted to recreate the ecological richness of the whole world in one park. The project was finished against gargantuan costs, relying as it was on the counterintuitive idea of realizing the northern European climate and the desert in one limited space”. As McHarg (1975) writes, Pardisan wanted to be “one of great imagination and audacity which reverses the traditional separatism and reductionism of the science and proposes a reintegration of knowledge for human use”.

⁴ “Gruens diagram of the ideal metropolis from 1964 was a straight descendant of the diagrams of Ebenezer Howard: an enormous flowerlike structure, repeating itself inwardly as you come closer” (Vanstiphout, 2006).



Images Source: McHarg, Ian L, et al. (1975). *Pardisan: Plan for an Environmental Park in Tehran.*





Images Source: McHarg, Ian L, et al. (1975). *Pardisan: Plan for an Environmental Park in Tehran*.

After the revolution, many public parks have constructed and trees were planted in vacant lots to avoid illegal constructions (McBride and Mossadegh, 2000).

In brief, the main feature of urban forests in Tehran is composed of Tree-lined Canals, royal gardens of Dynasties, large area of cemetery in the southern part of city (Behesht Zahra), private gardens and few large forests (like Chitgar forest Parks, Kuhsar Forest Parks, Jamshidiyeh park, Taleghani Park and Pardisan). Nevertheless, there is an uneven distribution of trees canopy, where the north part of city is greener than the south (Faryadi and Taheri, 2009).

Two main reasons have caused such inequality: firstly, the vast extension of the city, has created diverse micro climates that change from north to south, where north is clearly colder than south; Secondly, the poor people of Tehran live in the southern part of city, where the houses are lack of private gardens (McBride and Mossadegh, 2000). Rapid urbanization has substitute most of the gardens with buildings, causing air pollution, acid rain, water pollution and soil pollution.

The deterioration of urban environments becomes the main crisis, on which the major studies of urban forestry have focused. Different plans have been adopted to increment the trees canopy around the city. Nonetheless, the overwhelming urbanization has left few vacant lots for trees plantation, besides, the lack of water supplement for domestic demands competes with the irrigation of forests.

According to the present scenarios, it is recommended to set up efforts on roof gardens, as the strategy to tackle with air

pollution. Such proposal is embedded in traditional Persian residential architecture, that contained central structure of *Hayāt* (Garden). As it has been mentioned the *Hayāt* of traditional houses in Tehran, has been constructed to boost real estate profits. This has led to the phenomena of *seachange* and *treechange*⁵ among the dwellers of Tehran, who move to the Caspian Sea and green area of Lavasan⁶ to reconstruct their missing and “beloved” *Hayāt*. The proposal of roof garden or “pocket” forests should be ratified to encourage the greening actions around the city. On one hand, this plan can compensate the air pollution, and on the other hand it can return back to the residences the missed element of Iranian architecture in a modern configuration.

Furthermore, the presence of some sizable vacant lots like as ex-industrial area or ex-airport, in the middle of urban agglomeration create the opportunities to implant large urban forests. For instance, the feasibility study of a large afforestation in the site of ex-military airport of Ghale Morghi, has been conducted in a master’s thesis, that was supervised by the author of this research⁷.

⁵ Seachange and treechange are Australian terms to describe the change of lifestyle of city dwellers, who move to the coast or inland rural landscape with the desire of owning a small holiday home. Cited by Weller, R. (2009). *Boomtown 2050: Scenarios for a Rapidly Growing City*. London: UWA Publishing, p. 305.

The seachange in Tehran caused further urbanization in coastline, which reduced the biodiversity and caused environmental damage.

⁶ Lavasan is a green area, located in northern part of Tehran.

⁷ Referred to the thesis of Rozhin Abedi (January 2017). *Riqualificazione paesaggistica di aree urbane dismesse a Teheran*, master’s thesis. Promotors: F. Di Carlo, S. Nickayin



© Rozhin Abedi - Masterplan - 300 Hectare of large afforestation



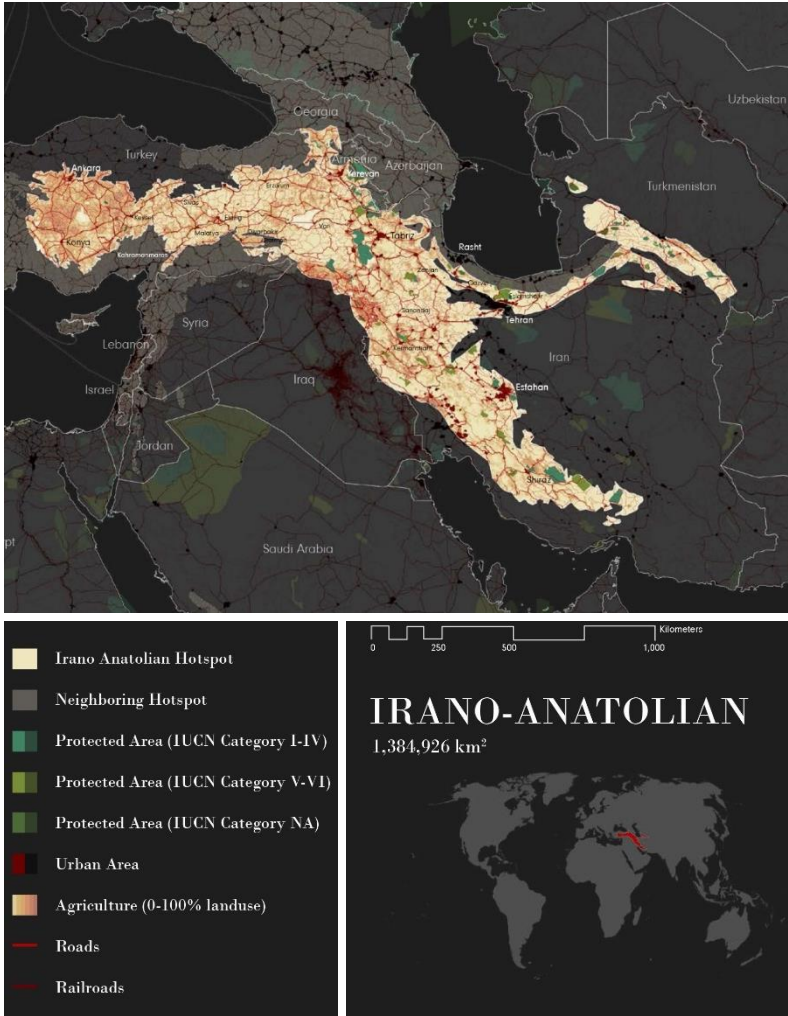
High urban density of Tehran and its relation to the vacant lot of ex-military airport of Ghale Morghi.

The second hypothesis of this section regards the future of Tehran. Due to the sever environmental issues, like air pollution, lack of water supplement and seismic hazards⁸, the government declared a plan to move the capital from Tehran “for security and administrative reasons” (Ahmadi, 2010). Even though, this proposal hasn’t accomplished till today, it might be actualized in the near future. If the seismic hazards or the shortage of natural resources (water, clean air), cause the evacuation of the city, Tehran will become a “ghost city” like Detroit; shrinkage is a common phenomenon when environmental conditions declines. If so, it is believed that some opportunities can appear to protect the wildlife of Tehran, which currently is severely disturbed or lost⁹. Tehran is located right bellow Alborz mountains which separate the city from Caspian Sea and forests on north of Iran, this area is considered as the hotspots region of Irano-Anatolian¹⁰. The *terrain vague* of Tehran as the outcome of shrinkage, would host the bygone gardens and forests. These lands could assume the role “as the genetic reservoir” (Gilles Clément, 2004) of northern hotspots region, as buffer and corridor for species. Although, such hypothesis would seem distant and idealistic, it tends to broaden the prospects toward an imaginable scenario of shrinkage.

⁸ Tehran is located on two major fault lines and it has been recorded that Tehran has been destroyed by major earthquakes, with a 150-year recurrence time. See: Ambraseys, N. N., and Melville, C. P. (1982). *A history of Persian earthquakes*. New York: Cambridge university press.

⁹ For example, due to the high level of pollution, population of crow, nightingales and pigeons have fled in large numbers; many plants also lost their smell and colour (Tait, 2009).

¹⁰ See <http://www.cepf.net/resources/hotspots/Europe-and-Central-Asia/Pages/Irano-Anatolian.aspx>



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Urban fringe - Archaeology - Large parks: Rome

More than seventy percent of Rome is covered by farmlands and green areas, providing 13.78 square meters of green per inhabitant¹¹ (ISPRA, 2015). The forests in the central part of the city are mainly formed by historic villas, gardens and parks, while the green wedges (like Riserva di Castelporziano, Appia Antica, Riserva del litorale Romano, Riserva Naturale della Nomentana, Parco Regionale di Veio and Castel di Guido) penetrate the urbanized areas.

The urban forestry in Rome is principally focused on climate change effects (Linee guide di forestazione urbana sostenibile per Roma Capitale, 2015). Following the accession of the United Nations Plant for Planet, “Billion Tree Campaign”¹², it has been initiated the plantation of 500,000 trees in 5 years. Other programs like LIFE project “Roma per Kyoto”¹³ and “Project 1000 Trees”¹⁴, aim for Carbone sequestration and wildlife corridors.

Even though the growth of population stayed stable¹⁵ and it seems to be on track to shrink¹⁶, the urbanized area expanded (this might be due to the migration flux). It is reported by ISPRA

¹¹ With a total area of approximately 129,000 hectares, there are about 43,000 hectares of green areas and about 50,000 hectares of farmland. See Linee guide di forestazione urbana sostenibile per Roma Capitale, 2015.

¹² <https://www.plant-for-the-planet.org/en/treecounter/our-target>

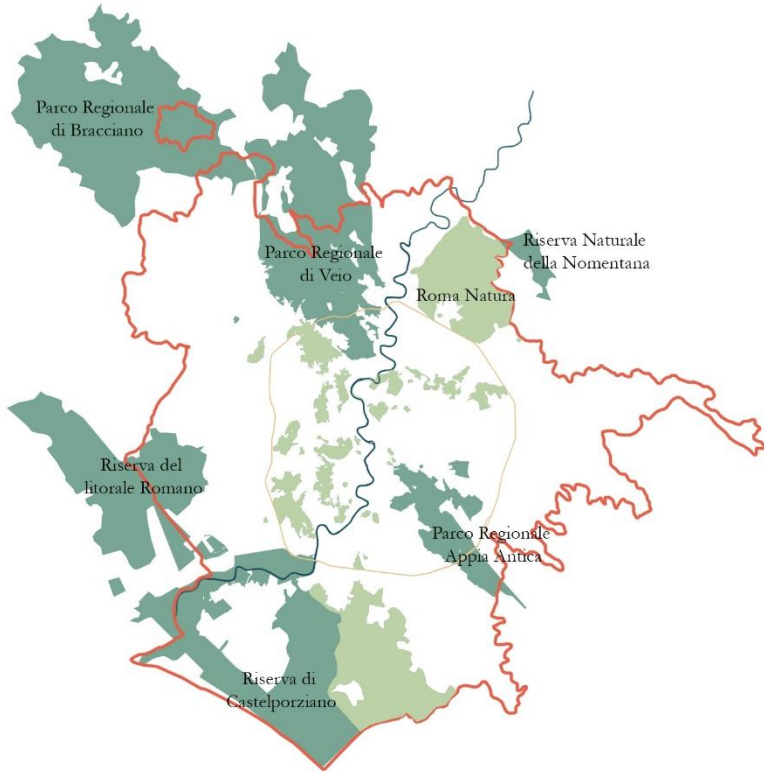
¹³ It is foreseen the reforestation of a 12-hectare within the area of Riserva Naturale della Valle dei Casali and 3 hectares in Ponte di Nona.

¹⁴ Forestation in the Pratone delle Valli.

¹⁵ See dati.istat.it/Index.aspx?DataSetCode=DCIS_RICPOPRES2001

¹⁶ According to UN Report (2012) Rome is on track to shrink between 1990 and 2025. See <http://www.businessinsider.com/cities-that-are-shrinking-2012-10?IR=T>

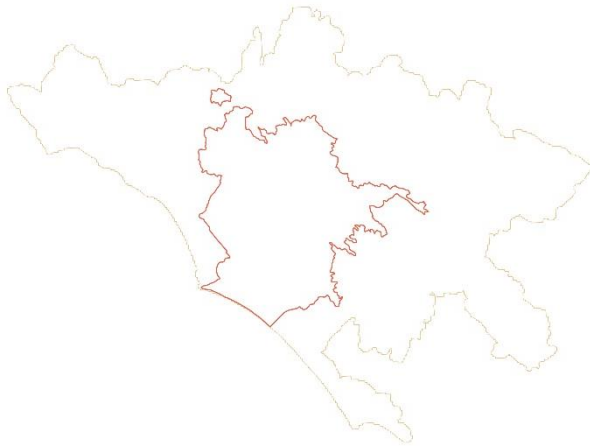
(2016) that the marginal parts of Rome are considered as one of the most densely constructed in Italy¹⁷.



Nature reserve and green areas of Rome by the author

¹⁷ Edge density of Rome is calculated as 700 m/ha. Edge Density is defined as (the ratio between the total sum of perimeters of the polygons of the constructed areas (expressed in meters) and their surface (expressed in hectares)) see Munafò et al. (2016). *Consumo di suolo, dinamiche territoriali e servizi ecosistemici*. Edizione 2016, Rapporti, 248/16, ISPRA, Roma.

Since first January of 2015, Metropolitan city of Rome (Città Metropolitana di Roma Capitale), has replaced the Province of Rome and comprises the city of Rome and other 121 municipalities, including more fringe areas as the part of new Metropolitan.



Metropolitan city of Rome by the author

It is noteworthy that for many years experts have studied fringe areas of Rome. One of the foremost theorists of such fringe areas is Franco Zagari, whose proposal regarding the “Great Ring Junction” (GRA) has broadened the vision towards the quality of fringe areas, infrastructure and forestation¹⁸ (Di Carlo,

¹⁸ His proposal assumed ten new service stations on the Great Ring Junction (GRA), which manages to free these places from the strict logic of the functionality of a service. Novel quality and modality of use have been defined to change the characteristics of such typical stations, converting them to open, usable systems, with quality of relaxation and comfort, without interfering with the functioning and smoothness of the flows. The forestation is used to limit the area, creating new skyline or in some case replicating part of landscape.

1990). Other studies have conducted on the role of Roman urban fringe by the department of architecture of Sapienza (DiAP). The integration and interaction of urbanization with archaeology, agriculture, forestation and water management have been highlighted by experts. For instance, *La coda della Cometa*¹⁹ and *Roma 20-25*²⁰ are among the most significant research that attempted to provide balanced between urban structure and landscape. The former research examined the urban sprawl in the fringe of Ostia (Southwest of Rome towards the coastline) and the later scales up the dimension of the city (larger than Metropolitan city of Rome), to reflect on the issues generated by metropolitan area of Rome (Ostilio Rossi et al., 2015).

Moreover, the management of archaeological sites, and their relation to the contemporary society has been debated by other researches. Alessandra Capuano (2014) explains that the urban transformations, mainly focused on functional or legislative requirements and less attention has been drawn to the spatial relations with the archaeological sites. She points out that archaeological space can be integrated to the contemporary city, the archaeological project and urban design could support each other, interacting in the heart of transformative processes.

According to the present scenario (new administration limit and urban expansion in fringe areas), the future tendency of urbanization might be tracked in urban fringe. Therefore, it is

¹⁹ *La coda della cometa* is long term project that has been conducted for 5 years (2010-2015). Further research like *RE-CYCLE ITALY* and *Roma 2025* are the continuation of this research. See <http://www.codadellacometa.it/>

²⁰ It has been engaged 25 universities around the world in a workshop. It has been set up 25 squares, large as 50 X 50 Km and each university has come up with a proposal for each square.

recommended to set up efforts on green wedges, to arrange next afforestation.

In Rome, most of the forestation take place in reserved areas, where the trees have been already existed²¹. The lack of Landscape Urbanism in planning approach is palpable; the profound gap between forestation and urbanization has led to weak achievement in both fields. It is required to implement the afforestation²² *a priori* to the new urbanization in fringe land. The example of afforestation, like Parc Départemental du Sausset, could be applied as a “pilot project” in expansion areas for territorial transformations.

To illustrate, the feasibility study of a large afforestation has been conducted in Tor Vergata area (Southeast of Rome) in a master’s thesis, that was supervised by the author of this research²³. The proposal tends to integrate a large afforestation process, as a supplementary operation to the general urban development plan (PRG).

Tor Vergata is one the Roman’s fringe areas, which is designated to further urbanization in future. Currently, the sprawl of urbanization has “consumed” the land, isolating people in a

²¹ For instance, half of the area of Tenuta di Castel di Guido (an area around 2000 ha, in north-west) is planted for timber production during 1980’s. (Scarascia-Mugnozza et al., 2016)

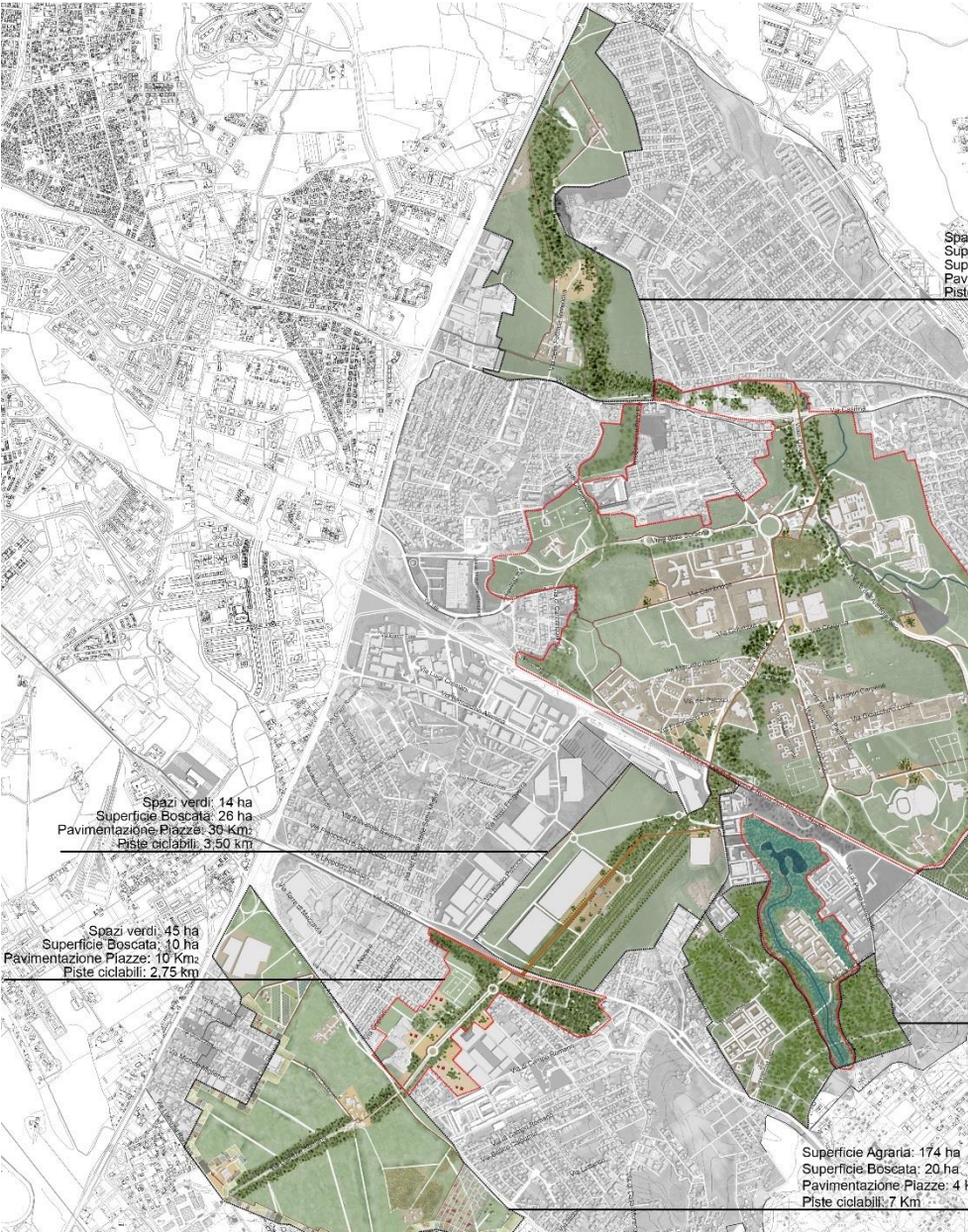
²² Afforestation refers to the creation of new forest plantations in non-forest land. It is mentioned in AFFOREST Project, sponsored by Spain, Poland, Ireland and the United Kingdom, to reduce the greenhouse gases by increasing the forest area through new plantations in abandoned and farmed areas.

²³ Referred to the thesis of Elisa Lumaca (January 2017). *Parco di Tor Vergata-Large Park Per L’Agro Romano*, master’s thesis. Promotors: F. Di Carlo, S. Nickayin

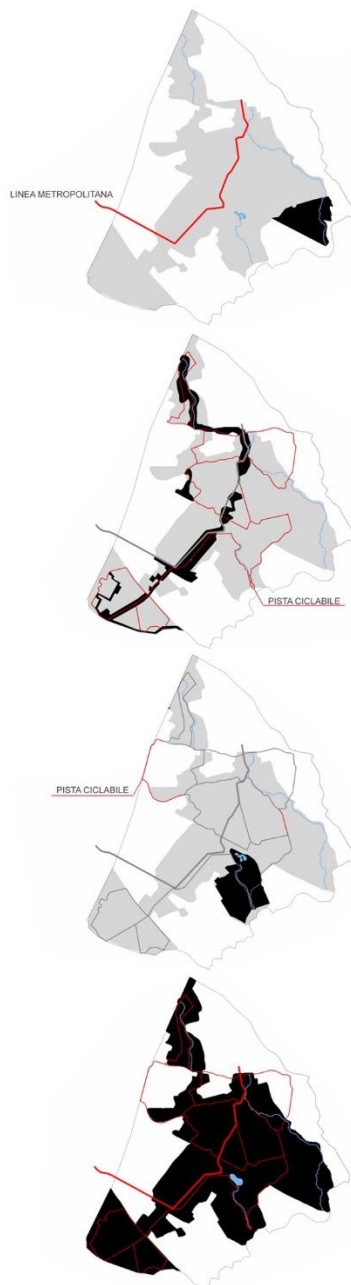
patchwork of landscape. The proposition attempted to recover the “lost” ²⁴ land, by planting a large forest. Furthermore, *le préverdissement* (Guinaudeau, 1987), as a preplanting²⁵ approach is suggested in those portion of land undergoing development.

²⁴ Adam Rome, Professor of History at Pennsylvania state University, defines the sprawl as “lost” land for development. Rome, A. (2001). *The bulldozer in the countryside: Suburban Sprawl and the Rise of American Environmentalism*. New York: Cambridge University Press, p. 264.

²⁵ Refers to the concept of preplanting or “Plant today, build tomorrow” (Craul, P.J. (1999). *Urban Soils: Applications and Practices*. NY: Wiley& Sons, p. 243)



© Elisa Lumaca - Masterplan - 832 Hectare of large afforestation



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Towards a planetary vision

Conclusions

Towards a planetary vision

« Action has meaning only in relationship, and without understanding relationship, action on any level will only breed conflict. The understanding of relationship is infinitely more important than the search for any plan of action. »

Jiddu Krishnamurti

This research set out to identify frameworks, methods and tools that can help decision-makers and experts to be more effective in making and managing forests in/near *civis* habitats. Basing on holistic approach, the research has sought to define new paradigm of forestation as a sort of driver of urban development and not as a balance to its negative effects.

The findings affirm that the efficiency of urban forestry can be guaranteed, if and only if, the traditional limits between urban, peri-urban and rural forest shift to a holistic framework. Digging into different theories, reveals that “Limit exists only in the mind”¹! If we mark a circle around an ant, it goes into a loop inside the circle, because it perceives the line as a limit, albeit it doesn’t exist physically.

Fortunately, we are not ant, we are human and our collective habits of thoughts and actions helped us to overcome the limits

¹ Alan Cohen writes “All limits exist only in the mind, and it is only in the mind that they can be overcome”.

and boundaries, as Hunt (2012) affirms the margins have vanished² and in such embodied system, designing cities means, even inventing agriculture (Zagari, 2013); everything “is hitched to everything else in the Universe”³ (Muir, 1911).

Humanity went beyond the duality between city and nature, and as Richard Forman says, “you can have a small positive impact in a city centre, but if you want to have a big impact, go out into this dynamic urban edge where solutions really matter for both nature and people. Antoni Gaudí designed the magical Parque Güell out on the edge of Barcelona, and Frederick Olmsted’s Emerald Necklace was created on the dynamic edge of Boston”⁴.

In the era of globalization, when the “urban” edge doesn’t exist anymore, this research seeks to point out, through different holistic theories, the reasons why it is unavoidable to shift the paradigm of “urban” forest(ry) towards a planetary vision.

² Hunt, D.J. (2012). *Sette lezioni sul paesaggio*. Trans. Morabito, V. Melfi: Libria, p. 19.

³ Cited by Gifford, T. (2006). *Reconnecting with John Muir: Essays in Post-Pastoral Practice*. Georgia: University of Georgia, p. 25.

⁴ See “In conversation with Richard T.T. Froman” in *LA+ Interdisciplinary Journal of Landscape Architecture* 1. p. 114 -116.

6.1. “If God is now ‘Green’”

Theoretical recommendation for today

In the era of Anthropocene, with its endless “ecological hell”, Richard Weller (2015) writes that:

« If God is now “green” and if Adam were to be evicted from Paradise again, then his punishment would not to be convert wilderness into farms, but farms back into wilderness. Eve, renowned for her scientific curiosity, would lead the way ».

In the face of environmental apocalypse, greening became “universal moral imperative” (Wilson, 2006) of many scientists, governments and citizens; even Pope Francis has written the encyclical letter *Laudato Si* on care of our common home. All around the world, the physical and social quality of our necrotic habitats, have turned into preeminent call. The wide range of greening concepts and set of practices have been produced, reproduced, and transformed, to the point that confusions have arisen. The only palpable fact is that, tree plantation is our “divine punishment”, in the era of “Sixth Extinction”⁵.

The affirmation that all planet is urbanized, implies new paradigm of the “edge” of urban area. Therefore, as the first paradigm, the edge of urban or peri urban forest(ry) should shift to planetary threshold.

⁵ See Elisabeth Kolbert. (2014). *The sixth Extinction: An Unnatural History*. New York: Henry Holt & Company.

The research proposal of “planetary” forest(ry), not only tends to *reimagine* new physical and geographical edge of urban forest(ry), but also it attempts to broad the visions toward the role that is assumes to shape the context in which it takes part. The holistic theories and approaches, have broaden the horizons of our knowledge. Richard Forman and Wu (2016), by their holistic suggestion on a global scale, have already defined the “habitable zone” “where to put next billion people”, likewise, it means “where to put next billion trees” for the emerging urban areas. The global trends of urbanization are predictable; thus, we should just interweave the trends of forestation. Thinking holistically and acting locally, and as Richard Tarnas (2006) remarks:

« [...] we must go not only high and far but down and deep. Our world view and cosmology, which defines the context for everything else, is profoundly affected by the degree to which all out faculties – intellectual, imaginative, aesthetic, moral, emotional, somatic, spiritual, relational – enter the process of knowing. How we approach "the other," and how we approach each other, will shape everything, including our own evolving self and the cosmos in which we participate⁶ ».

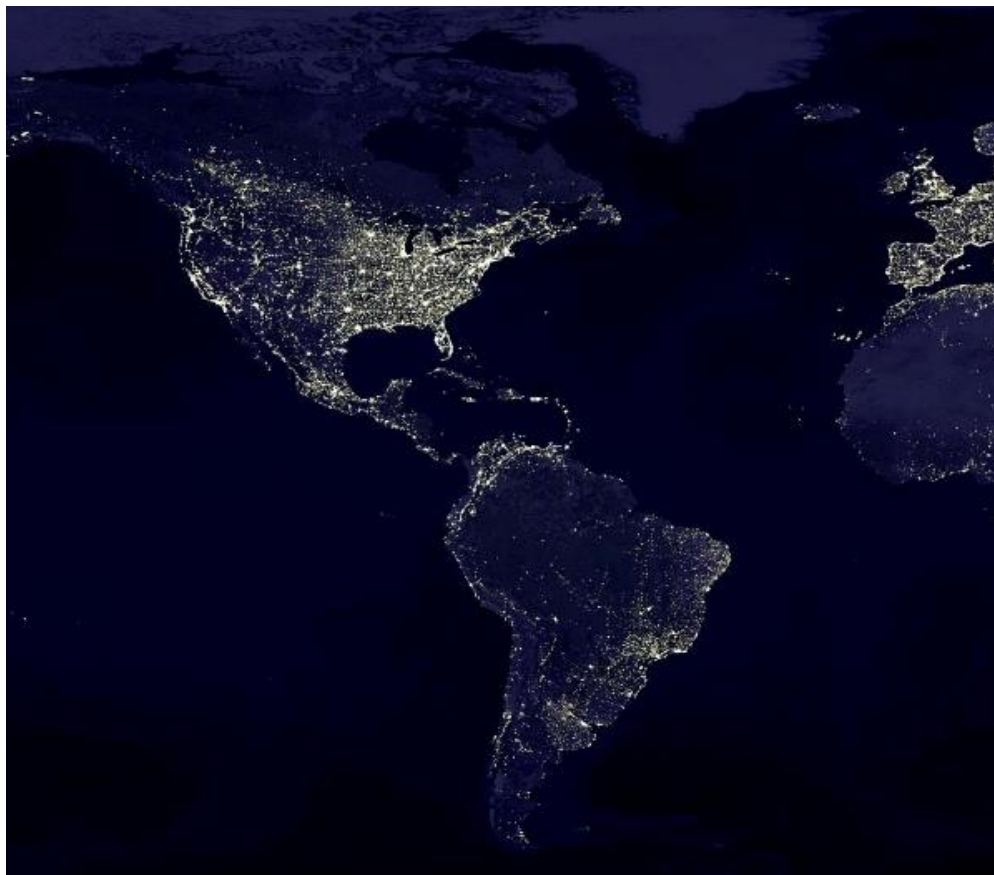
Today, the scale of cities is changed, satellite images reveals a continues chain of metropolitan areas connected by transport links, the management of such patchworks should be done holistically. Thinking holistically, reveals the best arrangement of land systems for human and nature.

⁶ Tarnas R. (2006). *Cosmos and Psyche: Intimations of a New World View*. New York: Viking.

As discussed, the trends of urbanization are detectable, in line with such trends we can define the role that forests can assume. For instance, mangroves or dry forests are not typically considered as urban forests, but the way they are influenced by urban areas and people, incites new understanding of their role in urban areas. Ishaan Kumar in his holistic proposal intertwined the expansion trends of informal settlements with the conservation of dry forests, where the dry forests built the “informal armature” for upcoming urbanization.

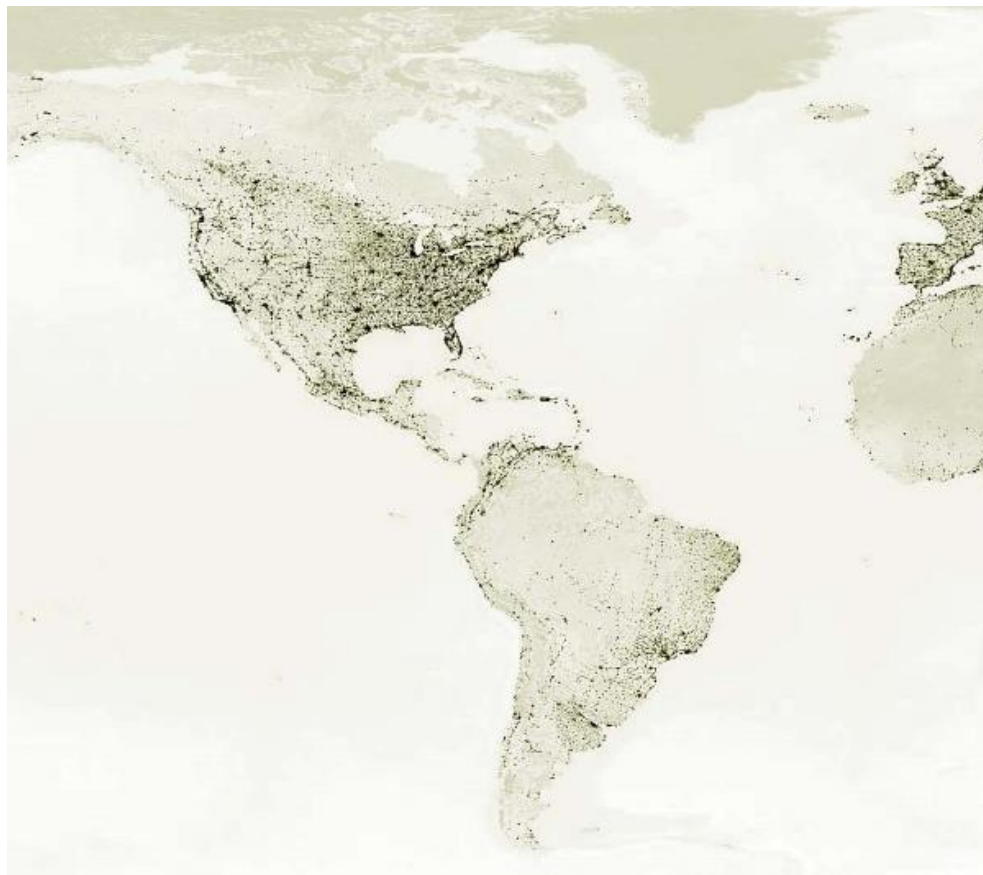
Today, innovative approaches that embraces the dynamic transformation of urban areas (like expansion or shrinkage) and nature conservation are sorely needed. Fueled by burgeoning population and economic tendency, the process of urbanization shapes the territories, creating enmeshed systems of cities and nature. In such scenarios, the big challenge is the interaction of these two systems, which creates a “whole” one system, where physical boundaries don’t make sense.

Designing with the “process” (and not “boundaries”) of urbanization “invites improvisation and chance, [...] opening up a host of other completely unexpected relationships and outcomes” (Corner, 2016).



© NASA Earth Observatory images by Joshua Stevens,
using Suomi NPP VIIRS data from Miguel Román, NASA's
Goddard Space Flight Center





From global cities to global urban forests by the author



6.2. Rethinking the urban forests for the 21st Century Practices

Albert Einstein writes “we cannot solve our problems with the same thinking we used when we create them”. Architect and planner Dilip da Cunha⁷, explains similar concept, talking about flooding; he argues that the flooding is a definition of human, when we design a line and the river overcomes that line, it is considered as “flooding”.

Similarly, in the new era of urbanization, the concept of urban forest(ry), cannot follow the previous arbitrary definition and function. Today, the role of urban forestry is mainly debated for air pollution, but its effectiveness in the future is debatable. Next billion people need food, water and shelter. It means that more soil will be consumed only to provide the principal amenities, more ecological footprint will produce and “as this century unfolds there will not be enough land to utilize forestry as the single mechanism for carbon sequestration”; according to this statement, the Earth’s biological capacity of next billion people is calculated as 670% of the Earth’s current capacity ⁸(Weller et al., 2017).

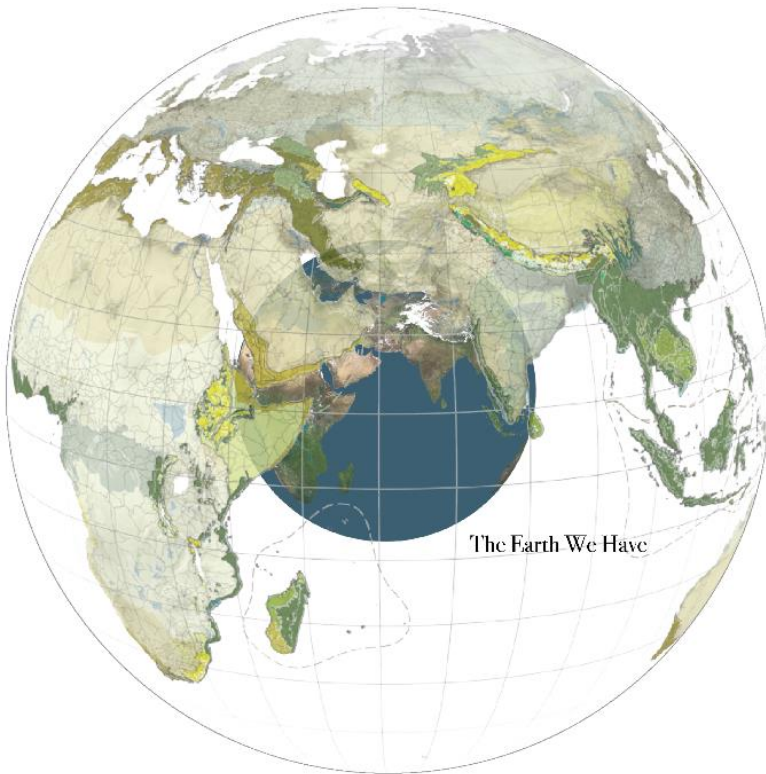
Not only the growth of population but also the climate change is the main threat in the next century. Global warming will lead to both desertification and flooding in north. In such scenario,

⁷ See Mathur, A., da Cunha, D. (2001). *Mississippi Floods: Designing a Shifting Landscape*. New Haven: Yale University Press.

⁸ The research of *Atlas for the End of the World* conducted at the Landscape department of University of Pennsylvania, Richard Weller (2017) and his group by visualizations design, illustrate the ecological footprint of 10 billion people and corresponding required forest in order to sequester the carbon emission. The details of this research are available at:

<http://atlas-for-the-end-of-the-world.com/datascape/biocapacity.html>

the role of urban forestry in the next century might not be merely Carbon sequestration or compensation to ecological footprint. It might contribute to create “habitable zone” where the new settlements could erect and humanity could survive.



The Earth We Need for 10 Billion

© 2017 Richard J. Weller, Claire Hoch, and Chieh Huang

To be clear, let's refer to the example of *Great Green Wall* of Africa. This colossal project of FAO, is not classified as urban forestry project, albeit, it is expected to be beneficial for pastoral and agricultural development. If so, within forty years, when the forest is grown, probably an addition "great wall of settlements" would rise on the edge of the green wall, for dwellers who contribute to and benefit from the services provided by the green wall. Then, why shouldn't it be conceived and designed in the perspective of an "urban" forest right now?

Similarly, all around the globe, various large-scale landscape connectivity projects seek to mitigate the habitats of species, reconnecting fragmented ecosystems, ensuring the migration of species. With the upcoming challenges in the next century, probably we might rethink these unprecedented scale of projects not only as the corridors for species, but also as livable areas for human species; reflecting on the possibility of new settlements on their borderline.

During the history, many human-planted forests have been realized in treeless areas, with different scales and purposes. One case in point is the Nebraska National Forest, which was an experimental project. Today, the effort of landscape architect Horace Cleveland appears as the largest human-planted forest in the United States. Other similar prototypes with smaller scales are the historical Persian gardens of Shazdeh Mahan in Kerman (Iran) and the Lost Paradise in Neyshabur, which thanks to the *qanat* system create suitable microclimates for the trees in a dry context of desert.

Even though these examples are not classified as forestation in urban area, their replication in other areas, could create new habitable zone for future urban settlements as a win-win strategy for nature and human.

In short, the concept of *préverdissement* of Guinaudeau (1987) might be newly adopted in a global scale, to convert the unliveable land to liveable land for next billion people. It is necessary to construct many Parc Départemental du Sausset and many landscape Architects like Corajoud are required to work “as Urbanist of Our Age” as “responsible for the integration of civil infrastructure, [...] and environmental improvement” (Waldheim, 2016). Furthermore, if the human being changes his sedentary habits to become nomadic one more time, as Maurizio Corrado (2012) asserts, then the path of architecture leads into the forests. Such statement could open new debates on the role of urban forestry, not as a method to compensate the human’s ecological footprint, but as the creation of novel territories where to inhabit.

Furthermore, desertification and flooding are two main challenges of unprecedented climate change in our habitats. The forestation is the resilience approach that can be adopted in such contexts. “When it comes to climate, and [its safeguard] timing is everything” (Figueres et al., 2017). The sense of time in afforestation is indispensable. It takes years to make a forest, planting today, will provide benefits within years. To avoid the catastrophic influence of climate change and the growth of population we should act in advance to be able to be effective. Moreover, the scale of food crisis opens debates on “Sustainable Food Planning”⁹, which will be one of the most compelling challenges for the upcoming century. Recently, it has been a call for proposals regarding Urban Food forests as a potential

⁹ “Sustainable Food Planning” has been launched for the 8th Annual conference of the AESOP, 2017.

See http://www.aesop-planning.eu/blogs/en_GB/sustainable-food-planning

contributor to liveability in urban areas¹⁰. Due to the multi-functional character of food crisis, experts from wide range of backgrounds bring together to define the food policy. For instance, in Italy, thanks to the project of *Città del Vino*, the food policy assumes new position in urban planning and land management (Marino, 2016).

Nonetheless, in many regions of rapid population growth, few lands are available for agriculture. Statistics represents that there is a shortfall in arable land for next populations at global scale¹¹. The example of Nemo's garden by Ocean Reef Group, who promotes the cultivation of food under the ocean, affirms the new challenges that humanity is facing to find the alternative solution to grow food in a responsible, small-footprint-on-earth kind of way¹².

Determining an accurate distribution between agricultural land and forest is a central dilemma for upcoming century. To illustrate, the advancement of forests in abandoned farmlands of mountains, is one of the most clamorous arguments among experts; Not only such phenomenon declined the arable land and agricultural production, but also it influences on biodiversity and landscape (MacDonald et al., 2000). Along with these challenges, an increment trend towards sustainable forest products could reduce the pressures on the intensification of crop production. Thus, the forestation in urban areas can play a

¹⁰ See <https://www.journals.elsevier.com/urban-forestry-and-urban-greening/call-for-papers/special-issue-on-urban-food-forests-a-potential-contributor>

¹¹ For details see:

<http://www.futuredirections.org.au/publication/the-future-prospects-for-global-arable-land/>

<https://data.worldbank.org/indicator/AG.LND.ARBL.HA.PC>

¹² See <http://www.nemosgarden.com/>

crucial role in overcoming the crisis of food. The proposal of Chef Sean Sherman, who reclaimed the indigenous culinary culture of North America,¹³ opens new panorama in food production. Such suggestion reduces the necessity of farmlands and aims at new food plan, with attention to the world around as sources of ingredients and re-educating the people's palate.

The production of food is one of the function that can be attributed to the forests in future urban areas, the discussed examples of Mangroves in San José de Chamanga and the proposal of “luxury gradient” by FAO, can optimize the performance of urban forests in line with food shortcoming.

To conclude, the triptych of urbanization, forestation and food production should be planned and perceived in a holistic correlation to be able to tackle with land shortage in the 21st century.



© Doc Searls - Nebraska National Forest

¹³ Sean Sherman. (2017). *The Sioux: Chef's Indigenous Kitchen*. Minneapolis: University of Minnesota Press.

For further information see <http://sioux-chef.com/>



© Mohsen Rajabpoor - Historical Shazdeh Mahan Garden, Kerman



© Georg Gerster - Lost Paradise, Neyshabur

6.3. “A good Anthropocene”

Prospects

« Humanity may destroy the possibilities for life on earth unless the freedom and power that we have acquired are channelled in new creative directions by a spiritual awareness and moral commitment that transcend nationalism, racism, sexism, religious sectarianism, anthropocentrism, and the dualism between human culture and nature. This is the great issue for the 1990s and the twenty-first century. »

Steven Clark Rockefeller

Urbanization. Growth of population. Ecological hell. Food scarcity. Climate change. The age of Anthropocene.

In the age in which the Earth is remade by human hands, Vandana Shiva states “today, the challenge we face is the challenge of defending the future. In the past, land was colonized, people were colonized, but today, by the recklessness of greed the future itself is being colonized [...] with climate change¹⁴ ”. The fear of future and global crisis has led to the organization of projects like *Svalbard Global Seeds vault*; a seed bank in the Arctic to ensure the preservation of seeds against global catastrophic risks, creating “[...] a hibernated Garden of

¹⁴ Interview with Vandana Shiva. Watch *I Nove Semi - L'india di Vandana Shiva* by Maurizio Zaccaro. Available at: <https://www.youtube.com/watch?v=5oz8q1nfvSY>

Eden. A place where life can be kept forever, whatever happens in the world ¹⁵”.

Even though in comparison with our ancestors, we have achieved the technologies and knowledge that permit us to support higher living standards with much lower per-capita impacts on the environment, the application of such knowledge does not seem to meet our expectations.

Nonetheless, a ray of hope still exists for our planet. It is foreseen that the size of population will reach the highest point in this century, then it will start to decline. Such statement ensures new opportunities for a better future. The sprawl might stop and the population will be stabilized. Hence, hopeful scenarios would open in management of lands.

A group of 18 environmental scientists, activists, and scholars, economists, co-authored *An Ecomodernist Manifesto* (Asafu-Adjaye et al., 2015), affirming optimistic vision for a future in which “humankind’s extraordinary powers in the service of creating a good Anthropocene [...] “de-couple” human development from environmental impacts [...] allowing more room for non-human species [and] for nature”.

If we overcome the actual crisis by wisdom of a good Anthropocene, we can save the Earth. From the interview of Vandana Shiva, is perceived the peculiarities of a good Anthropocene, who generates hopes for the future of human and all species on the earth, who thinks and invests in long-time scale.

¹⁵ The statement of EU President José Manuel Barroso, during the opening ceremony of Svalbard Bank. See <https://www.vg.no/nyheter/innenriks/en-frossen-edens-hage/a/518299/>

Our world needs good Anthropocenes with holistic approaches, who act for the benefits of the seventh generation into the future¹⁶.

Currently, the “elements of a Good Anthropocene” exist in our world. The project of *Seeds of Good Anthropocenes* (Bennett et al., 2016), collects such prototype initiatives into a database to expand the range ideas about environmental futures, among them we can mention Food Forest Ketelbroek, Vertical Forest by Boeri architecture firm in Milan, Tree of 40 fruits by New York-based artist Sam Van Aken,¹⁷.

McHarg placed great hope in the power of human as the “good Steward”, who “green the earth, restore the earth [and] heal the earth”. Landscape designers, the “incurable optimistic species” as Franco Zagari defines, are able to mitigate such ecological hell. Regarding such capacity, Richard Weller (2014), writes *Reflections on Landscape Architecture's Raison d'être in the 21st Century*, underlining the importance of Landscape urbanism at a global scale:

«Landscape urbanism's most powerful insight is that ‘the city’ is ecological and that it is not a discrete object but now a global system without edge. The greater potential for landscape urbanism therefore is to scale up to Brenner's ‘planetary urbanization’ and link the McHargian tradition of

¹⁶ Refers to the constitution of the Iroquois: “Look and listen for the welfare of the whole people and have always in view not only the present but also the coming generations, even those whose faces are yet beneath the surface of the ground -- the unborn of the future Nation.”

¹⁷ The projects of good Anthropocene are available at: <https://goodanthropocenes.net/map-of-seeds/>

large scale landscape planning with the global conservation and scientific community to help develop spatial plans that show how the ubiquitous forces of urbanization and its related industrial and agricultural infrastructure can be reconciled with biodiversity. »

Landscape architects are good Anthropocenes, who benefit from a multi scalar orientation with the ability to combine bottom-up and top-down approaches¹⁸, such abilities are crucial to address the forestation in line with other issues, like urbanization and food production.

Good Anthropocenes are able to provide answers to such antagonistic issues, because they “think globally and act locally”. As stated by the World Bank “Addressing the complex urban environmental problems, in order to improve urban liveability through Urban Environmental Strategies (UES), involves taking stock of the existing urban environmental problems, their comparative analysis and prioritization, setting out objectives and targets, and identification of various measures to meet these objectives”.¹⁹

If Patrick Geddes introduced the concept of “region” in architecture planning²⁰, today, the concept of “global” should be introduced to planners. The holistic theories have changed the

¹⁸ It has been mentioned that a Good Anthropocene would have: System orientation, multi scalar character, strong socio-cultural connotations-but also technology and intuition innovations embedded, high level of popular support and knowledge in the debate on the issues, combinations of bottom-up and top-down approaches (Bennett et al., 2016).

¹⁹ The world bank, Strategic Urban Environmental Planning available at: <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTURBANDEVELOPMENT/EXTUWM/0,,contentMDK:20184472~menuPK:404557~pagePK:148956~piPK:216618~theSitePK:341511,00.html>

²⁰ See Boardman, Philip. (1978). *The worlds of Patrick Geddes: Biologist, town planner, re-educator, peace-warrior*. London; Boston: Routledge.

scale of projects, and “humanity is beginning to appreciate and attempt to manage the planet as a garden” (Weller et al., 2017). Humankind as good Anthropocenes could manage its garden

« When the study of the household (ecology) and the management of the household (economics) can be merged, and when ethics can be extended to include environmental as well as human values, then we can be optimistic about the future of humankind. Accordingly, bringing together these three ‘E’s’ is the ultimate holism and the great challenge for our future. »

Eugene Odum

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