

# Cities after COVID-19: how trees and green infrastructures can help shaping a sustainable future

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## Abstract

There is no doubt that metropolitan areas are, and will increasingly be, the engines of economic growth and fertile grounds for the development of technology, creativity and innovation and this will need a shift in the future cities planning and management especially regarding the increase in green areas. This must be done through a regeneration process that should refer to the 17 objectives of sustainable development that are frequently neglected in regeneration programs and this is likely to result in unsustainable urban renewal in many cities. Three main challenges for sustainable urban regeneration can be identified: - environmental (climate change, carbon emissions and use of resources), - social (inequality, cohesion and health), - institutional (governance).

We need to promote the start of a real "green revolution", a revolution that, through the increase in plant cover, will make our cities a better place, doing it with an inclusive approach. The "green" city cannot therefore remain only a set of abstract, portable, stereotyped ideas because it must be the place that will constitute the territory of activity of our life.

## Keywords

Urban green, canopy cover, gentrification, SDGs, ecosystems.

## Introduction



Fig. 1. Parco delle Cascine in Florence (Italy); A gathering and meeting place for many Florentine citizens.

It has been repeatedly stated that cities face major challenges for the quality of life and for the range of opportunities that they can offer to their citizens. Indeed, there is no doubt that metropolitan areas are, and will increasingly be, the engines of economic growth and fertile grounds for the development of technology, creativity and innovation (Colenbrander, 2016). They can also foster enlightened, congenial multicultural living and the “knowledge-based economy”, an expression coined by Peter Drucker (1966) to describe the use of information and knowledge in all its forms to generate value, with particular attention to nature, creation, diffusion, transformation and transfer of skills and culture.

At the same time, cities are sources of a whole series of health hazards caused by pollution and by the urban heat islands and are also places where problems such as unemployment, segregation, poverty and unsafety are concentrated. In addition, urban populations have long been incubators and gateways for infectious diseases especially, but not only, in the poorest countries (McMichael, 2000).

Considering that by 2050 close to 70% of the world population will live in urban areas (UN, 2018), we clearly need to rethink our model of cities. In this sense, there is a clear need for urban planners to integrate health considerations fully into their work, both in political and technical terms. This is the so-called “healthy urban planning” (Barton et al., 2009), that means putting the needs of people and their health and well-being in the central position of the decision-making process. It also means finding the right balance between social, environmental and economic pressures and, therefore, planning for sustainable development. The concept is based on the core Healthy Cities principles of equity, intersectoral cooperation, community involvement and sustainability (Duhl and Sanchez, 2000).

In this regard, it seems like that the new “urban rhetoric” of some politicians, of the media and, unfortunately, also of a variety of specialized journals, fails to fully understand the reality of the innovative 'urban planning' (Da Cruz et al., 2019). This is rather worrying, since there is a lack of awareness that many cities are at a transition

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point of their “urban life cycle”, shifting from an industrial to a post-industrial economy, being beyond the stable maturity phase and entering into a state of decline. Therefore, unless particular policies are implemented, it’s probable that many older cities will continue their decline into becoming decaying centers of poverty (Glaeser, 1998).

This urban decline could be even more accentuated by the COVID-19 disease. The global pandemic outbreak has, in fact, made us face up to our mistakes. Thus, once the pandemic will be solved and the economy will begin to restart, we will also need to rebuild and regenerate urban areas. This must be considered as a priority, since we will have to cope with new waves of urban migration both national and international, not only in terms of housing offer, but also in terms of environmental offer (Duncan and Popp, 2017).

For decades we have built houses and urbanized huge areas, consuming soil as if it was an unlimited resource. The case is possibly more serious in Italy, in which results of a recent study indicated that a continuous increase of sealed areas occurred over the last seventy years, with the highest absolute and per-capita growth sealing rates being observed in the most recent period (1999–2006) (Munafò et al., 2013). These findings reflect that the urbanization processes observed after the World War II, especially in the last years, totally omitted the principle of sustainability, that is, by definition, to meet the needs of the present without compromising the ability of future generations to meet their own needs (Bruntland, 1987).

Now, we have a rare opportunity to fix our mistakes by rebuilding our cities in a more sustainable way, preventing further soil consumption and reducing air and water pollution. This urban regeneration process should follow the 17 objectives of sustainable development of UN (2019), which identifies three main challenges:

- environmental (climate change, carbon emissions and use of resources);
- social (inequality, cohesion and health);
- institutional (governance).

In this paper we will mainly focus on the social aspects of urban green regeneration and their connections with the other two challenges trying to provide information that will be useful for both planners and designers to take a proactive and collaborative approach at all stages of the planning process, from policy and plan formulation through to the determination of planning applications and the setting up of correct management plans.

### **Social impacts of urban green regeneration**

Above all, the reality of climate change poses and will pose many challenges for urban centers. Floods, heat waves, droughts and other extreme events have a physical impact on cities and urban infrastructures and, consequently, on the health and mortality of urban populations (think of the 4 million deaths a year worldwide directly or indirectly related to fine particulate matter – PM<sub>2.5</sub> pollution, 400.000 in Europe) (WHO, 2019). However, this number is just an estimation since the headlines about the human health effects of air pollution usually emphasize the large number of deaths or other adverse consequences associated with or blamed on (i.e., “attributed” to, in epidemiological parlance) pollutants such as fine particulate matter (PM<sub>2.5</sub>) and ozone (O<sub>3</sub>) (Cox, 2019). These events may also have an indirect impact on communities and urban economies through the deterioration of key resources and the creation of uncertainty about the future which, together, may affect confidence in investments in both social and financial capital, thus leading to socio-economic inequalities.

These latter should also be seen as a major challenge for sustainable urban regeneration since, in a global context, increasing competition for resources can be exacerbated by the effects of climate change, having a disproportionate impact on the most vulnerable social groups (Gasper et al., 2011).

We know that public spaces and especially green areas play an important role in shaping how individuals and families live their communities and neighborhoods (Markkanen and Anger-Kraavi, 2019). They are, therefore, the key elements of individual and social well-being that intertwine with the collective life of a community, highlighting what we call a “sense of identity” or a sense of belonging to a common natural and cultural wealth. In fact, communities interact with places in many ways, and this is activated through a community development tool called “placemaking”, defined as, “a multifaceted approach to planning, designing and managing public spaces in order to capitalize on assets, inspiration and the potential of a local community, with the intention of creating public spaces that promote people's health, happiness and well-being” (Anonymous, 2007; Nilsson et al., 2010).

This is because urban green spaces intended as a set of parks, urban forests, neighborhood gardens, playing fields, playgrounds and tree-lined streets are often not equally available to everyone. It happens frequently that the socially weaker classes do not always have access to green infrastructures that can improve the quality of life (De Sousa Silva et al., 2018; Staddon et al., 2018; Markkanen and Anger-Kraavi, 2019). This is why it is important to

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know the link among urban nature, social equity and health in relation to factors such as income, age, ethnicity and socio-economic status (Kabish, 2019).

Some projects have been created to understand who benefits most from the green spaces and, more importantly, who does not. And if green areas are lost, are the neighborhoods affected equally, or some are affected in a disproportionate negative way? To explore this topic, some studies have focused on emerging issues in urban ecology and linked different types of urban green spaces to human health (Barton and Pretty, 2010; Kabish and van den Bosch, 2017; Kondo et al., 2018). What emerges is that parks and other public green spaces are often less available and/or have a poorer design quality and maintenance conditions in neighborhoods with a lower economic status or with a high percentage of immigrants or, however, in more difficult social situations. In this regard, research shows a social inequality in access to good quality green areas and a lower amount of benefits for residents, so much so that inadequate access to green space can be related to disparities in cardiovascular disorders, to pathologies more or less directly related to extreme temperatures, obesity and psychological distress (Ulmer et al., 2016; Braubach et al., 2017; Twohig e Jones, 2018).

On the other hand, some research projects have found that the creation of new green spaces, increasing the property value and the cost of living, raises concerns about gentrification, that is the transformation of a popular neighborhood into a valuable residential area, resulting in changes of social composition and in an increase of house prices with all social problems that may arise (Gould and Lewis, 2017; Anguelovski et al., 2019a; Koprowska, 2019). These problems can also be worsened by the issues related to climate change (Anguelovski et al., 2019b). As a matter of fact, in modern cities, low-income communities, people of color, and migrant communities face different forms of climate injustice. As stated by Anguelovski et al. (2019b), these people have contributed the least to climate change progression, having had the least access to green spaces and infrastructures. At the same time, they are the most exposed to climate hazards and have the fewest resources to adapt to it. This is why it is called green "climate gentrification" (Leichenko and O'Brien, 2008).

We must, therefore, answer some questions, because if we know that "greening the city" is good for health, it can also result in gentrification and disparities in environmental justice (Cruz-Sandoval et al., 2020):

- Do new green areas really benefit everyone?

- Could the "green gentrification" process cause better health outcomes for some and worse for others?

A closer collaboration among the different professions involved in urban landscape planning and management, public health and social sciences is essential to better understand the complex interactions among health, social vulnerabilities, gentrification and creation of urban green spaces. These elements are interconnected and pooled to produce different configurations of environmental vulnerability in a specific city. Indeed, the institutional challenges to urban sustainability are necessarily linked to the tensions between the top-down technical and managerial approaches to urban regeneration and the bottom-up or grassroots environmental initiatives. Thus, urban regeneration processes in democratic societies should adopt governance approaches involving multiple stakeholders, including residents and other communities that may be involved. In this context, the term "governance" has become a mainstream concept, moving out of the realm of political science into other disciplines and into practical policy and delivery arenas. It is often used as a term to refer to the involvement of a range of actors in the process of governing, in a decentralized, networked and participatory manner (Buizer et al., 2015). However, too often we see unresolved conflicts between what local communities want for their neighborhoods on the one hand and city administration plans on the other. Furthermore, the interests of private investors and speculators (Anguelovski et al., 2018) are added to the mix and often create long-term Gordian knots in the decision-making process or win-lose situations which then generate discontent.

It should be stressed that urban regeneration is a way to reorganize and update existing places rather than plan a new urbanization. Therefore, it mainly concerns urban centers undergoing renewal of the former industrial areas or the neighborhoods more or less close to the center built in the post-war period and which are facing a decline due to the changed environmental and, above all, social conditions.

Factors underlying the adoption of urban regeneration project policies include pressures resulting from major short- or long-term economic problems, deindustrialization, demographic changes, under-investments, infrastructure obsolescence, structural or cyclical employment problems, political deprivations, ethnic or social tensions, physical deterioration, and physical changes in urban areas.

In general, urban regeneration actions involve measures of economic, social and physical/environmental improvement in the areas in which they operate and contribute to the realization of sustainable development through the "recycling" (meant in terms of recovery) of land and buildings, reducing the waste after the demolition and the need of new building materials, diminishing the demand for peripheral urban growth and facilitating the

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intensification and compactness of existing urban areas. Consequently, sustainable urban regeneration is a set of actions, policies and regeneration processes within a city, which address interconnected technical, spatial and socio-economic problems in order to reduce environmental impact, mitigate environmental risks and improve the quality of urban systems, lifestyles and resources.

In this context, it should be emphasized that, in order to be successful, environmental actions should be not only technically effective but they must also respond to a series of conditions connected with sustainability that address the aforementioned contextual factors on a local scale and are adjusted to obtain the necessary impacts on a global scale. Furthermore, we believe that this specificity must be taken into consideration to evaluate the relative successes of concrete actions in specific contexts, which depend largely on different starting points.



Fig. 2. High Line, New York. After the opening, the average rent for Chelsea apartments rose almost ten times faster than all of Manhattan. This forced many small businesses and middle-income residents out of the area. A typical example of green gentrification.

### Urban tree planting for a sustainable future

At this point it is legitimate to ask, what role do trees have and will have in the urban regeneration processes? Trees are important to people and the answer about what we should do to shape the cities of the future could simply be: "Plant more trees!". In addition, trees are important for politicians. Recent political posters often contain commitments to protect the quantity of trees in urban areas and increase their number where it is possible. Commitments that almost never translate into real actions, unfortunately, being just captivating proclamations aimed only at attracting voters.

Anyway, in the last few years, interest in urban planting is increasing rapidly and many initiatives have been successfully documented worldwide (such as: [www.milliontreesnyc.org](http://www.milliontreesnyc.org); Pincetl et al., 2010; Marchetti et al., 2019). Unfortunately, these projects sometimes are not always followed by adequate maintenance plans and after

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a few years the number of trees planted rapidly decreases. For example, New York City is now planting many fewer trees along its streets, slowing efforts to become more resilient in the face of climate change (Fig. 3)(Maniace, 2020).

There is no doubt that we must encourage an increase urban planting wherever and whenever possible to improve collective health and well-being and help achieve the environmental goals listed in ecosystem services regulations (Haines-Young and Potschin, 2018). In this sense, each tree can be important for achieving these objectives as part of a renewed common effort to increase the overall tree coverage of our individual cities and of the whole countries.

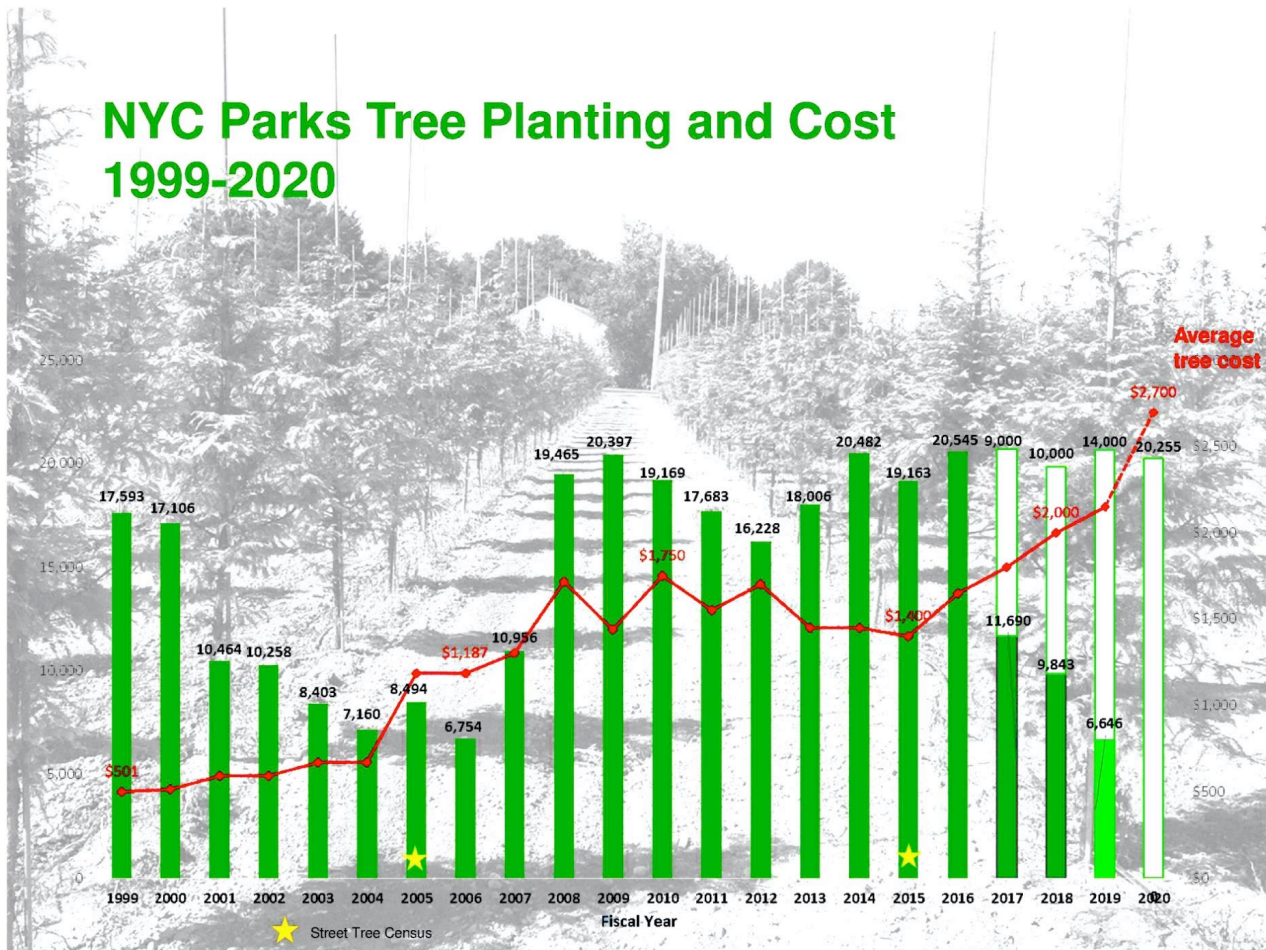


Fig. 3. Number of trees planted in New York City inside the MillionTreesNYC initiative is planting many fewer trees along its streets, slowing the efforts to become more resilient in the face of climate change (From Ienmanice, 2020 <https://planetnyc.wordpress.com/2020/01/20/more-trees-please/>)

Papers published on this topic are inspired by the factual reality and by the results of research combined with practical examples and they try to persuade all those involved in the urban planning development policies to think positively about trees - and to become their paladins and supporters (Salbitano et al., 2016).

The development and growth of the space in which we live and/or work represents an opportunity for change that cannot be postponed for many years. Making the right decisions in these crucial moments can influence the sense of place, the health and well-being of people for generations.

What emerges is that after the corona virus outbreak, we will have to “raise the bar” in sustainable urban regeneration and urban green must play a fundamental role. In fact, if the lockdown following the spread of COVID-19 has resulted in a sharp reduction in pollution, it is certain that this effect will not be long-lasting to face the problem in the long-term and would not help avoid severe air pollution especially when meteorology is unfavorable (Oxford Analytica, 2020; Wang et al., 2020).

World leaders must therefore trace a different and cleaner future and the choices must be made remembering that there are no absolute truths that define reality when it comes to cities where human beings, trees and buildings together contribute to the construction of the new and still not fully known "urban ecosystems". Consequently, there is not a single authority to decide whether an action, an intervention, a statement, is right or wrong, but it will be necessary to confront and listen to the different opinions.

Therefore, when this planetary emergency will be over, we will have to rethink how the cities of the future should be planned and also to understand that the model of urban development followed so far has produced "concrete jungles", that are certainly modern, but are also fiercely competitive, inhospitable and/or unsafe places. They are like ecological and social deserts that draw life from their surroundings.

Anyway, modern civilization, with cities at its peak, is not something that most people would be willing to eliminate. Thus, it is up to us to rethink the way in which they will have to be conceived, built and managed in order to guarantee a fair access to resources, social equity and widespread well-being.

We may be skeptical about the idea that parks and plants may really make a difference in our health and well-being, but research has provided evidence that they can enhance health by improving the immune system, encouraging physical activity and social interaction, mitigating air pollution and noise (Shengzhi et al., 2020). Especially this latter interferes with thinking and restoring a frenetic mind to a state of calm.

This is why we need to promote the start of a real "green revolution", a revolution that, through the increase in canopy cover, will make our cities a better place, doing it with an inclusive approach.

The "green" city cannot therefore remain only a set of abstract, portable, stereotyped ideas because it must be the place that will constitute the territory of activity of our life. Hence, after the planetary emergency, we must set higher standards in sustainable urban regeneration and trees must play a fundamental role in making the world better, one tree at a time (ISA, 2020).

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