

New approaches to existing green spaces and ambitious street reclamation transform Barcelona

Despite densities higher than Manhattan, the City of Barcelona is managing to find space to create a mosaic of new green spaces and reintroduce natural systems in its existing urban fabric. Some of the solutions identified are also found in other proactive metropolises using green infrastructure to combat growing public health and resilience challenges created by air pollution, lack of physical activity and climate change. Other solutions, such as the superblocks, have little equivalent elsewhere in the world, and yet offer ample potential for replication.

Barcelona today remains in the [top five cities](#) in Europe for population density. However, it was in the mid-1850s that issues associated with high density and liveability first peaked. At the time, the city was growing at a faster pace than the rest of Spain but was still contained within its medieval walls. Into this came Ildefons Cerdà, a visionary engineer who conceived a large-scale, grid-based expansion plan that would unite the old city with seven peripheral villages, which later became integral Barcelona neighbourhoods. The united area was almost four times the size of the old city (which was around two square kilometres) and would come to be known as Eixample. The grid of octagonal blocks (called *manzanas*) Cerdà designed was meant to equally distribute space between buildings, streets and green spaces. All major avenues and streets in the Eixample were going to be lined with large, shade providing trees, planted every eight metres. One of the four pavements delineating each block was meant to be twice as wide and would therefore have had a double line of trees. Each block would furthermore feature a central garden.

During the time it took to build the Eixample – about a century – the modifications made to Cerdà’s plan conflicted with the initial project and many of the original ideas were not systematically implemented (like the inner-block gardens), or never implemented at all (like the widened footpath enabling a double row of trees). As a result, while approximately a quarter of Barcelona’s municipal area consists of green space, most of it is concentrated in one large park, the park of Montjuïc, and the periurban forest area of Collserola.

“Today, with acute air pollution and water supply issues, we have come full circle from the situation we faced in the 19th century,” observes Gabino Carballo, Landscape Architect and Project Manager for the City of Barcelona’s Parks and Gardens Department. Popular demand for better living conditions and public spaces, including improved air quality and improved access to local green space is strong. Margarita Parès, who leads the City of Barcelona’s Parks and Gardens Department’s Biodiversity Programme, adds that *“support for green initiatives from the different parties in government has been running high, especially since 2015”*.

Launched in 2013, the [Green Infrastructure and Biodiversity Plan 2020](#) provides a good illustration of this cross-party support: ordered by a left-leaning government, the Plan was launched by a conservative-led local administration. The Plan identifies a wide range of actions to bring nature into the city with the long-term vision that this will ultimately bring environmental and social benefits for local people.

The Plan has had a significant impact on greenspace management and maintenance. The Parks and Gardens Department has introduced a “naturalisation” programme designed to ensure existing green public assets achieve a more complex vegetable structure that promote natural processes and the natural entry of flora and fauna thus optimising ecosystem services. Practical examples include the planting of trees surrounds with companion herbaceous species hosting beneficial insects to control the pests and diseases that affect street trees. Following a government ban, glyphosate is no longer used to control

weeds and the use of other forms of chemical herbicides has been significantly cut down. About 60% of the City's green spaces are now subject to ecological management regimes involving selective mowing and an increased presence of flowering Mediterranean meadows instead of water-and nutrients-hungry lawns.

Succeeding in shifting approaches to green space management and maintenance on such a wide scale required changing public perception of what constitutes good gardening. A close collaboration with the City's Communication services helped the Parks and Greenspace Department develop an educational campaign focused on public health (rather than biodiversity) benefits, which proved much more effective at winning the hearts and minds of Barcelona's residents. As Gabino Carballo explains: *"The argument that really worked with people was health: reducing the use of potentially harmful chemicals to manage weeds or pests and diseases was pitched in terms of improving residents' and gardeners' wellbeing"*.

The *Green Infrastructure and Biodiversity Plan 2020* has also proven a powerful vehicle to enhance cross-departmental coordination: *"We didn't know how to work with architects, urbanists, engineers... Many group sessions were held to discuss and explain the ambitions of the plan, and this has made a big difference. Now it is possible to work together"*. This knowledge sharing effort has helped improve green infrastructure provision within private development projects. The release of a guide on [Good Gardening Practices in Barcelona: Conserving and enhancing Biodiversity](#) proved a useful tool for this. The guide is divided into different chapters identifying both species and management practices that can be used to better support biodiversity and deliver a wider range of ecosystems services in different contexts. Each of the City's 500 in-house gardeners that tend the public green spaces and parks received a paperback copy. The City of Barcelona's plant procurement contracts were also reviewed and updated in order to increase the share of species that were identified in the guide.

The implementation of some of the ambitions laid out in the *Green Infrastructure and Biodiversity Plan 2020* experienced renewed momentum with the launch in May 2017 of a [Stimulus Programme for the City's Urban Green Infrastructure](#), which increased budget allocation towards capital investment. This renewed momentum was further accelerated by the publication of [Trees for Life: Master Plan for Barcelona's Trees 2017-2037](#). While the increase in tree canopy cover, the diversification of tree species so that no single species represent more than 15% of the total population and the adoption of more tree-and wildlife-friendly pruning regimes were objectives already spelled out in the *Green Infrastructure and Biodiversity Plan 2020*, City staff soon realised that considerable more dedicated strategic planning was needed to make progress with increasing the presence of trees. *"Trees have needs of their own, therefore they require a strategy of their own,"* explains Gabino Carballo. *"We realised that the understanding of trees in the city is very limited"* he adds, and as a result *"what was initially going to be an internally produced document turned into what is probably the most widely consulted plan in the history of the city's administration, we held 54 working sessions involving over 700 participants from wide ranging background including arboriculturists, tree suppliers, professional associations, citizen representatives and community groups, as well as other public institutions such as the public health authority, Barcelona Regional (the metropolitan agency), the agency that grants licences for outdoor terraces, people in charge on building works, the people that manage energy, the people in charge of urban design, the rubbish collection services, we really spoke to everybody. We also talked to the gardeners, the people who work on the ground, some of whom had probably never been consulted ever on the work. These people manage trees, manage lawns, but they were never asked: how do you think should trees be managed?"*

Both the *Stimulus Programme* and the *Tree Master Plan* have measurable targets, detailed workplans and robust monitoring provisions, with a requirement for the Parks and Green Space Department to report on progress on a monthly basis. This together with the

increased budget allocation mentioned reflect a growing awareness of the importance of trees and other green infrastructure as well as healthy natural ecosystem to Barcelona's ability to reduce the city's contribution to climate change while reducing its vulnerability to on-going inevitable changes. All key objectives of the *Green Infrastructure and Biodiversity Plan 2020*, and of the subsequent *Stimulus Programme* and the *Tree Master Plan* are prominently featured in the city's [Climate Plan 2018-2013](#).

For Barcelona's densest areas, such as the Eixample, success in increasing the presence of green infrastructure has primarily relied on four programmes – all of which have been promoted by the plans and investment framework mentioned above: the superblocks, the green corridors and the reclaiming of inner-blocks.

Both the superblocks and the green corridors programmes stem from a simple, mathematical observation: *“Barcelona dedicates 70% of public space to private-vehicle transport, which only accounts for 17% of the journeys made by its citizens. The overwhelming majority of journeys (83%) are made on public transport or bicycle. It's essential to reclaim public spaces for the majority (...). Urban greenery is a key part of the change of model towards a healthy, living city for walking in. It opens up a new perspective where it is pedestrians and greenery, rather than spaces for cars, that are the civic cornerstones of the city”* (opening statement of the *Stimulus Programme*).

The superblocks weren't a novel idea. Imagined and championed by Salvador Rueda (former director of Barcelona's Urban Ecology Agency) in the late 1980s, some first attempts were made in 1993 (Born) and 2003 (Gracià). However at the time, the focus of the street layout changes implemented were primarily pedestrianisation, rather than the creation of a multi-purpose community space. The first true implementation of the concept was in 2016, in Poblenou, outside of Barcelona's densest neighbourhood, with two additional pilots delivered in 2019 (Sant Antoni and Horta) and six more underway. Salvador Rueda is a proponent of the [need to look at cities as ecosystems](#). In many ways, Rueda's vision for the superblocks (or *superilles* as they are locally known) is the contemporary analogue of Ildefons Cerdà's plan for the city in the 19th century: reflecting the same holistic perspective and humanistic goals, as well as similar morphology and geometry. The basic idea behind the superblocks plan is to take urban space now devoted to one use (automobile traffic) and open it up to multiple uses (walking, cycling, playing, meeting others...). The idealised superblock is nine square city blocks, three by three. Within the superblock, streets are one-way, and none of them allow traffic to cross the superblock straight through. Cars are limited to about 10 kmph, not much more than walking speed, so they can mix safely with people. Parking for residents is mostly underground, so there's no surface area devoted to it. The space thus freed up can be repurposed to enhance resilience to climate change – through the integration of sustainable urban drainage and greater vegetation cover, and better meet the social needs of the population, based on local aspirations. [This video](#) provides good insight into the diverse range of uses and design approaches across the existing superblocks. Some are 'tactical', using planter boxes, easy to move urban furniture and paintwork on the ground to test ideas quickly and on a relatively low budget, others are 'structural', ie designed from onset for the long term, with curb realignments, creation of new planters directly into the grown etc. Such structural superblocks require much more capital investment. The current ambition, as articulated in Barcelona's *Climate Plan 2018-2030*, is to create 503 superblocks that will eventually connect to one another and create over 160 hectares of new green space by 2030. A [recent study](#) carried out by the Barcelona Institute for Global Health estimated that the city could prevent 667 premature deaths every year if all 503 superblocks envisaged were indeed created. 503 superblocks would reduce ambient levels of NO₂ by 24%, from the current level of 47 micrograms per cubic metre to 36 micrograms per cubic metre. A decrease on that scale would bring Barcelona's NO₂ levels into line with the World Health Organisation's recommendations. The life expectancy of the average Barcelona resident could increase by almost 200 days, saving the city €1.7bn a

year. The most notable health benefits would come from reductions in air pollution (preventing 291 premature deaths a year), followed by reduced traffic noise and heat island effects (preventing 163 and 117 premature deaths respectively).

The green corridors (*corredores verdes*) programme is an extension of the superblock idea. It focuses on the transformation of long avenues that cross through large extents of the city, and that are not so critical for motorised mobility. The ambition is for such corridors to link some of the superblocks to one another, and connect the mountains that are in some of the largest green spaces (the park of Montjuïc and the periurban forest area of Collserola) to the sea. Barcelona's avenues typically feature six lanes of traffic, three in each direction. In green corridors, the number of lanes dedicated to cars is brought down to two (one in each direction), and the remaining space is reallocated to dedicated bus lanes, cycle lanes and footpaths, as well as to extensive amounts of plantings. As an example, the transformation of Meridiana Avenue will add 58,000 sq.m. of green space to the city. As much as possible, surfaces are made permeable to facilitate water infiltration, thus providing a better growing environment for the vegetation. The new plantings incorporate large numbers of trees, combining multiple species, as well as shrubs and an herbaceous layer drawing from the wildlife-friendly and climate-adapted plant palette identified in the City's guide on *Good Gardening Practices*. Efforts to support biodiversity also translate into the inclusion of areas where water can pond in a natural fashion and the piles of dead wood left to decompose, two features that are usually rarely found outside parks.

The reclaiming of inner blocks (*interiors de manzanas*) further complements, in the private realm, the work underway in public spaces. As mentioned earlier, in Cerdà's vision, inner blocks were supposed to be gardens, however this provision was never made mandatory. As a result, most of the inner courtyards today are occupied by car parks, workshops, shopping centres or other commercial facilities. When the interior area of a block is vacated because a business moves away, or public underground parking space is created nearby, the City tries to reclaim the space working with neighbourhood associations and non-profit organisations to create community space on private land. "*The process is slow and expensive,*" comments Gabino Carballo. Designs tend to be simple, focusing on the needs of the local users, often elderly people and children. There are playgrounds with patches of grass, and sections for benches with trees to provide shade. Started in 1987, the Eixample inner block reclamation initiative has managed to transform [48 courtyards to date](#), thus providing close to 100,000 sq.m. of new public space to local residents. The goal is for all Eixample's inhabitants to have access to a public space within 200 metres (less than five-minute walk) of their home.

In addition to the inner block reclamation programme, the City has also targeted private owners to encourage the creation of more roof gardens using a combination of [grants and a yearly competition](#).

The implementation of the plans and programmes described above have heightened the need for knowledge sharing, to ensure understanding is spread throughout the city administration and beyond. Staff from the City's Parks and Gardens Department have dedicated time to take part in exchange sessions held three to four times a year, during which people are given a platform to explain their work to colleagues. The Department also holds training sessions for other City staff, as well as for professionals and members of the general public on various topics such as how to design a green roof (aimed at professionals), or how to prune a hedge (more intended for gardening enthusiasts). The positive impacts achieved with the release of the *Good Gardening Practices in Barcelona: Conserving and enhancing Biodiversity* has led to the publication in September 2020 of a companion good practice guide on sustainable urban drainage and the development of a *Green Charter* expected to be published next year. These two new guides provide detailed

explanations of the design approaches implemented in green corridors – which the City would like to see replicated elsewhere across the city, including within the private realm.

Managing good access to data has been found to be another important factor to succeed in delivering Barcelona's ambitious initiatives to enhance the presence of natural systems in the city and the amount of associated ecosystems services. This involves identifying relevant indicators as well as the systems best able to enable data collections as well as data analysis, for different users. As Gabino Carballo explains: "*Theoretically, we should be moving towards a data-led decision-making process, but this is proving quite difficult to organise because there is always a problem at the point of access.... There is actually a lot of preliminary work you need to do to organise the data in a coherent and cohesive way to use it later*". Enhancing data management to achieve better decision making has also meant developing site-specific management plans, allowing for knowledge to be held closer to the ground.

Whether in its approach to managing existing green space or creating new ones, the City of Barcelona has unarguably accomplished a transformative journey over the past two decades, in spite of a very dense urban fabric. Some of the solutions the City has developed, such as the green corridors, have also emerged in other metropolitan areas looking for effective means to alleviate overheating, public health and air pollutions issues. What makes Barcelona stand out however is the scale over which such solutions are currently being deployed. Other initiatives, such as the superblocks, are more unique, and offer [significant potential for replication](#). Other Spanish cities, such as [Vitoria-Gasteiz](#), have started to implement similar programmes. There is a proposal to introduce something akin to the Barcelona scheme in [a six-block area in Seattle](#) and in a [new-build scheme in Chicago](#) in the US.

Further information:

Delivery partner:

- Client (project sponsors): City of Barcelona

Funding mechanisms:

- City budget

Plants in numbers:

N/a

Further reading:

Best Gardening Practices in Barcelona: conserving and improving biodiversity
<https://ajuntament.barcelona.cat/ecologiaurbana/sites/default/files/Bones-practiques-jardineria-2016-ENG.pdf>

Green corridor in Passeig de Sant Joan

<https://oppla.eu/casestudy/18419>

2019 article, published as a five-part series in Vox, providing detailed insight in to the Superblocks project

www.vox.com/energy-and-environment/2019/4/9/18300797/barcelona-spain-superblocks-urban-plan

January 2020 study modelling the public health impacts of the full implementation of the superblock model

www.sciencedirect.com/science/article/pii/S0160412019315223

June 2019 presentation from representative of the City of Barcelona's Parks and Gardens Department

www.barchampro.co.uk/wp-content/uploads/2019/05/2-Montse-19th-June.pdf