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Dorottya Békési
BURA Urbanism Amsterdam, bekési.dorottya@gmail.com

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How can the impact of a world pandemic accelerate the desire to create more functional and ecological public spaces in urban environments?

Dorottya Bekesi ¹

BURA Urbanism Amsterdam,

53 KNSM-Laan, Amsterdam, 1019 LB, The Netherlands

1. Abstract

Planning a city has always reflected the cultural trends, the technological inventions as well as the world-wide crisis. For instance, new regulations were introduced during the Industrial Revolution for cleaner air, or urban hygiene systems were developed during the cholera epidemic of the 19th century.

Climate change is seen by many as the biggest challenge of the last decade, which is having a significant impact on urban landscapes. Since the spring of 2020, humanity must face a new global problem, the SARS-CoV-2, which greatly changed our way of living. Can the impact of the pandemic accelerate the desire to create better places for the residents while tackling climate change and biodiversity loss?

The research methods are exploratory and experimental, evaluated by a machine learning algorithm (logistic regression). The first part presents how the daily lifestyle has changed as a result of COVID-19. In relation to what are the new social needs for urban public spaces, parks, green- and waterways, and transport. The second part of the research explores the paradoxes that make it difficult for landscape architects to find the balance between current human needs and long-term climate change mitigation goals.

Through the evaluation, the Purmerend Waterlandkwartier masterplan – a Dutch redevelopment project in the urban realm – will be presented, which uses the opportunities explored in the research. The conclusion provides answers on how we can make public health needs and climate- and biodiversity emergency requirements equally important in the design process.

2. Introduction

The motivation is not necessarily success, but to show how – under the compelling pressure of an urgent solution to an acute problem – we can plan or redesign to achieve more resilient, environmentally, and human-friendly green spaces that meet future expectations.

3. Background and Literature Review

Throughout the history of Earth, many epidemics have reshaped our metropolises. Cities are complex organisms, if they are not properly planned and maintained, their potential growth could affect sensitive areas where diseases strike their heads that could escalate into pandemics.

The outbreak of the cholera virus in the 1850s killed tens of thousands of people in Britain's capital (García Márquez 1988). The main cause of the problem was untreated human sewage flowing through the streets into the drinking water system. London's response was the refurbishment – and design – of its sewerage systems, which brought to life one of the capital's iconic promenades, the Victoria Embankment (Johnson 2006). Designed by Sir Joseph William Bazalgette, a two-kilometer-long system of gardens interwoven with boulevards covers the piping system that drains sewage from drinking water sources. The unprecedented investment – approximately \$ 200,000,000 – has significantly reduced the incidence of the disease and started a new architectural phase for the city (<https://newseu.cgtn.com>).

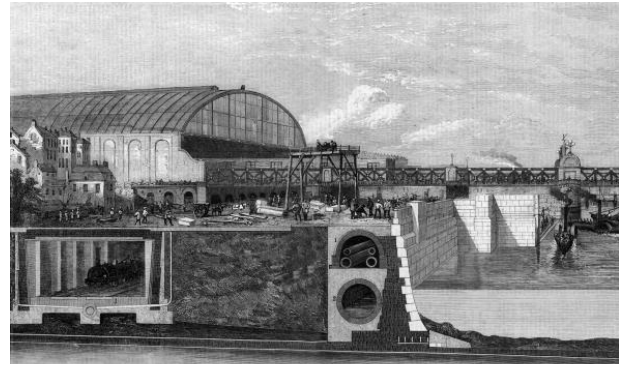


Figure 1 - Cross section of the Victoria Embankment, highlight the sewerage system from the “Illustrated London News” in 1867

Similar urban developments began in Paris at the initiative of Georges-Eugène Haussmann, in the French capital, which was repeatedly plagued by cholera in 1831, 1848-49 (Kirkland 2014). In the United States, the cholera epidemic that swept through the 1850s, sparked public health and town planning twinning agencies to plan and enforce health regulations. At the same time period, the New York Health Council designated a location for Central Park with the goal of improving the health of man and the environment (<https://theconversation.com/>).

The risk of an epidemic is still present today. COVID-19 is a respiratory disease that occurred in Wuhan, China in the late 2019s and early 2020s. Presumably, the problem did not arise here within the city – as in the case of cholera – but the occupation of land outside the city involved the exploration of sensitive areas where the virus had mutated and been passed from animal to human (Malm 2020). The short-term open space effects of the easily spreading virus were already experienced in the first weeks of the pandemic. The outbreak in Europe at the end of February 2020 triggered quarantine regulations, a curfew, and a safety distance (1.5m) in open spaces (Upmeyer et al. 2020). Indoor events were banned, companies switched to the home office system, and city dwellers were locked in their homes waiting for the pandemic to end. Urban loneliness was even more pronounced than before. The outside has become the new inside. As a result, urban open spaces have become significantly more valuable (Berdejo-Espinola et al. 2021). They became flexible in their function, serving as a meeting point, outdoor bootcamp venue, exhibition venue, etc. (El Khateeb et al.2022).

The Barcelona Super Block (Superille) concept is a program that was not necessarily driven by COVID-19, but by the need for climate change and healthier urban life. In the 2021 Economist ranking, Barcelona has moved up six places from its position last year to become the 16th most livable city in the world (<https://barcelona.tbs-education.com>). This is undeniably due to the Super Block concept's greening and public space rehabilitation efforts, which have served the needs of the city's residents during the pandemic.

What exactly is the Super Block concept? The scheme will re-divide streets over an area of around 100 hectares, freeing them from vehicular traffic and parking and making them accessible to

cyclists and pedestrians. These areas have been programmed as playgrounds, green spaces, or meeting places initially treated as flexible spaces - with mobile barriers, planters, street furniture - and have been scaled up and set up - a system that is now visible in its final elements on the street (Ajunament de Barcelona 2021).



Figure 3 - Barcelona temporary bicycle lane
(Floris van der Zee, 22nd April 2022)



Figure 2 - Barcelona outdoor café experiment
(Floris van der Zee, 22nd April 2022)

The question is how COVID-19 and its impact on open space can catalyze urban architecture - as has happened many times in history - will a similar program to the Barcelona Superblock Concept, which grew under COVID-19, be implemented in other countries to serve long-term climate adaptation in our cities?

4. Method and Data

Outdoor recreation plays a fundamental role in The Netherlands, bringing a wide range of benefits to the society such as community cohesion, environmental protection, health, and well-being. The questionnaire was undertaken between the 15th of March and the 15th of April to understand how the residents of The Netherlands interacted during the previous COVID-19 lockdown periods.

The survey investigated the following: accessibility to green areas from home, frequency of time outdoors, type of activities during the lockdowns, mental and physical benefits of spent time outdoors, participation in community activities (like lockdown challenges), furthermore problems that possibly occurred during the time spent outdoors. The last part of the questionnaire is reviewing the expectations of future behavior after restrictions are being eased and the appreciation of green spaces compared with the same period before 2019.

An online survey method was used with an open-source link shared by the writer. The questionnaire contained both English and Dutch language options – to receive larger input – and was filled by people – above 18 years – who are permanent residents of the Netherlands. A total of 70 responses were processed by logistic regression (machine learning algorithm).

5. Results

The hypothesis was the following because of the negative effect of the pandemic – lockdowns and curfews – people tend to spend more of their free time outdoors than before. In order to create the context for the questions regarding the lockdown experience, responders were asked to provide information about the environment they live in, what kind of outdoor amenities belong to their house and how close is a green area to their house by bicycle.

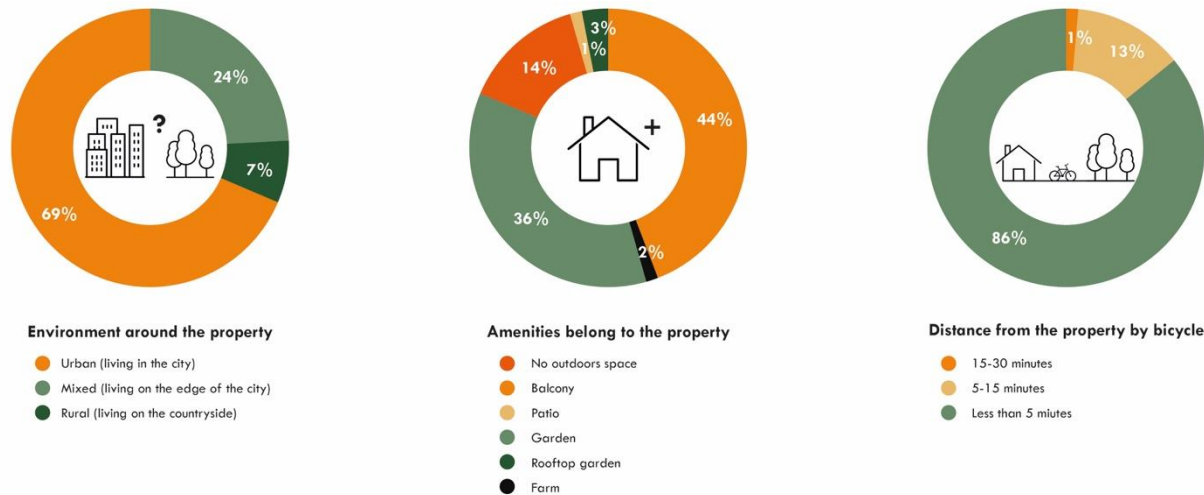


Figure 4 - Survey – General information

During the lockdowns, more than 80% of the responders spend more than one- or every day outside. Residents who live on the edge of the city are the most likely to spend more time outdoors than people in the city or rural areas. When it comes to the outdoor amenities that belong to the house dwellers with balconies (value 2.8) seek the most time outdoors in parks, mainly for walking, running on paved city paths, or meeting with family and friends. Residents with gardens have less urge (value 3.3) to escape from their property and happily spent time in their garden besides visiting parks and hiking trails. “Ik heb met een tuin en een hond en bos vlakbij geen echte problemen gehad tijdens de lockdown” - *I have had no real problems with a garden and a dog and forest nearby during the lockdown* (Survey response). Dwellers who have a garden must appreciate outdoor green spaces more in order to leave their property.

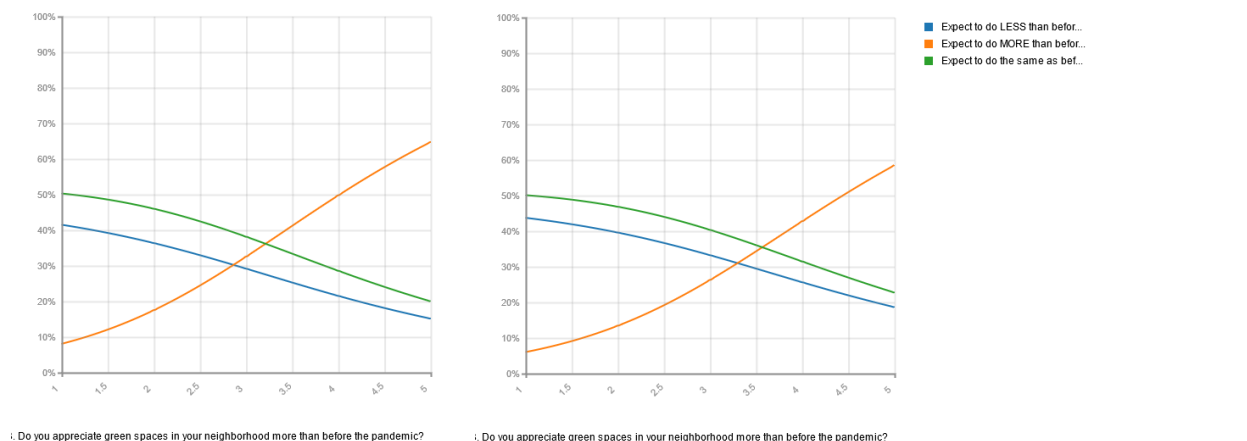


Figure 5 - Appreciation of outdoor green spaces: residents with balcony (left), residents with garden (right)

Those people who spent the most time in outdoor conditions reported the greatest benefits. Overall, 3 from 5 people reported benefits in every age group. The younger generation (18-30 years) marked “calm and relaxed” as a major benefit of being outside, while residents above 30 years pointed to physically fit and healthy as their primary benefit. People with “off-road activities” and wildlife photography reported more connections with nature than responders who have fewer opportunities to access natural areas.

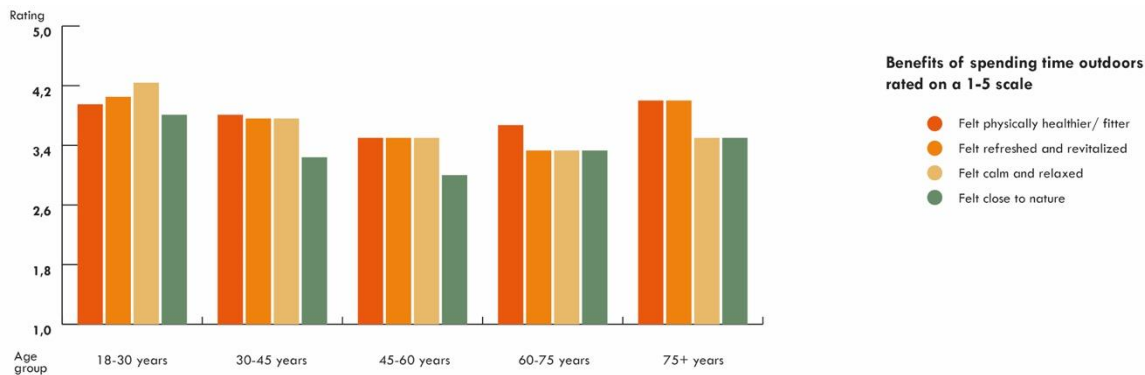


Figure 6 - Benefits of spending time outdoors

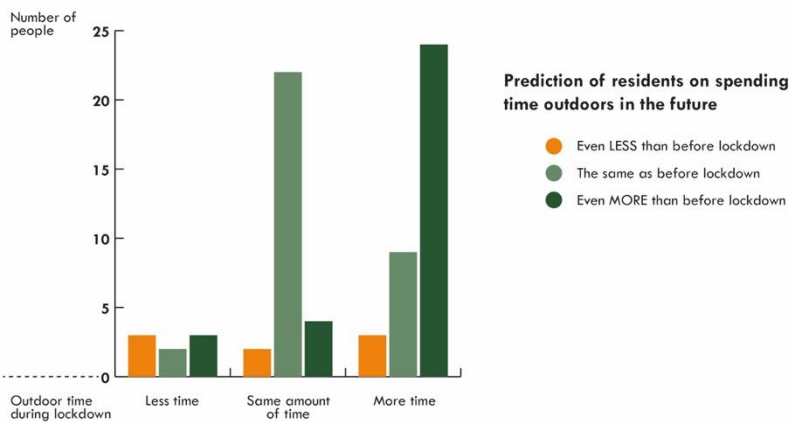


Figure 7 - Expected time spent outdoors after lockdown

Responders who generally spent more time in outdoor spaces and nature during the pandemic are expected to spend even more than before. *“During the lockdowns it became a conscious habit to leave the house through the weekends and participate in challenges, interact with old and new friends outdoors”* (Survey response).

As an example of Dutch Development projects Purmerend Waterlandkwartier Masterplan will be presented. Purmerend is located in the North of Amsterdam, known as a former Purmer polder area. The Masterplan was drawn up by BURA Urbanism, LOLA Landscape Architects, and the Municipality of Purmerend.

It is important to note the designers were working under COVID-19 times, hence some of the early lessons learnt during the pandemic are part of the design. However, the offices and the city focused on setting long-term goals to tackle climate change and create a healthy environment for the residents of Purmerend.

Purmerend is surrounded by three classic polder types: the Beemster, the Purmer, and the Wormer – land reclamations from the 1600s. During the 1970s the historical part of Purmerend received an extension to accommodate more people in the area. However, the “new town” Waterlandkwartier (a rebranded train station district) had no good connection with the historical center of Purmerend.

It was lacking services and good quality green spaces for its residents, therefore became a commuter neighborhood.

In the next 10-20 years Purmerend will go through a major transformation. Aiming to have a new linear center, a knot, where the old city meets the new city, where people meet with each other, work and live together, and a robust green space connects these functions into a “healthy heart”. A connection point to diminish urban loneliness. This physical node makes Purmerend more attractive for its dwellers who expected to spend more time in their city thus reducing the amount of emission and energy used for traveling daily. Considering the COVID-19 pandemic, these – green – community places have a vital role to help people feel more relaxed and revitalized, at the same time bringing more biodiversity to the city environment. The plan was centered around five principles that give the core of urban development:

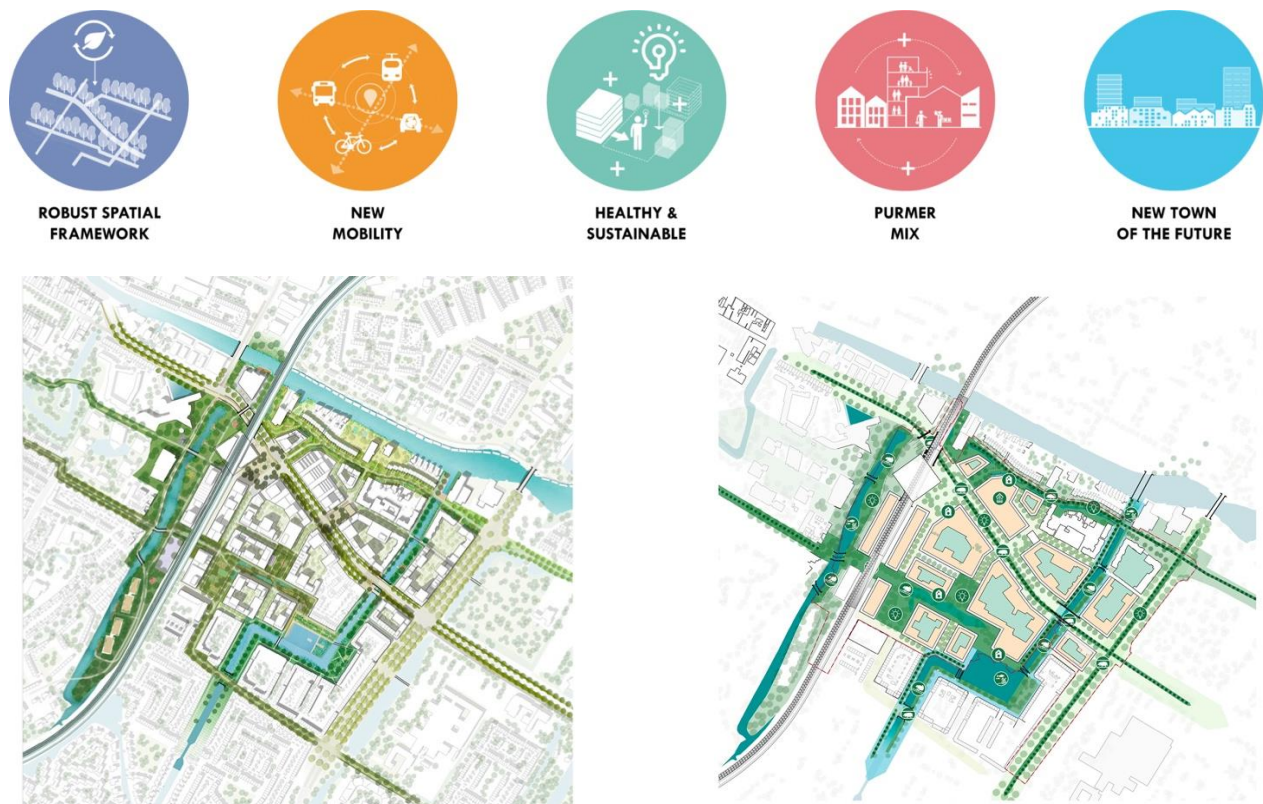


Figure 8 - Five ambition points, the masterplan and green connections of Purmerend (BURA, LOLA)

One of the principles was to enhance the existing landscape structure by adding quality to it, mainly focusing on waterways and green connections. The robust green structures contour a strong spatial framework for the area and ultimately lead outside of the settlement to the polders. By freeing up public space from cars and car parking there’s a substantial place for green, ecology with programs for people to re-discover and play with nature. The plan focuses on existing waterways that are substantially neglected and disused hence the main goal is to optimize water quality and create functions around or within it. Thus, opening a new way for the use of open spaces by the residents.



Figure 9 - Purmerend Wilhelminalaan-Geulenstraat, playing with nature (BURA, LOLA)

6. Discussion and Conclusion

Epidemics have accompanied the history of mankind, bringing many cities and landscapes development into life. Despite the improvements, the number of people is increasing – due to the multiplication of the population – they have and will have a greater need for green spaces in their environment. This need is being met by a growing demand for green, outdoor spaces during the closures due to the COVID 19 outbreak.

Responsible planning requires a multi-way approach, besides “serving the human needs” and creating new functions and meeting places for dwellers, we must establish places and conditions for nature. Continuous growth is not an option, so as designers we need to critically review our previous planning decisions and adapt them to current natural and human needs. The questionnaire provided insights into how human outdoor habits have changed in the wake of the COVID-19 pandemic. Dwellers who had no outdoor amenities attached to their property or had limited access to large green outdoor spaces experienced the lockdowns in a more negative way. It follows that city centers and denser urban areas will face more problems and require immediate action. To balance building densification more robust green structures are necessary for the urban fabric. Their location, size, and quality must follow ecological aspects combined with human accessibility.

According to the survey, utilization of green and public spaces depends to a large extent on their nearness and maintenance. Safe, flexible, and attractive places captivated residents and therefore led to overuse, which several respondents were concerned about during the pandemic. The requirement for accessible and well-maintained recreational areas has raised significantly.

This increased demand caused by the epidemic acts as a catalyst to promote the reclamation of urban outdoor spaces. To meet this demand, it is vital to keep sustainability in mind and practice climate-conscious planning and design ideas like the Waterlandkwartier Purmerend project:

including sustainable stormwater management, biodiversity enhancement, ecological corridors, systemic green infrastructure, and environmental education. In Waterlandkwartier the response to COVID-19 happened on multiple spatial levels. On a large scope, creating new green connections which lead outside of the city to the polders – like avenues to nature, inviting people out of their houses and gardens. On a smaller scale, a new type of public space has been introduced at the doorstep of dwellers to discover playing with nature in the urban environment itself.

The aim of this article is to raise awareness of a short-term pressing need that can serve as a long-term strategy, today when adaptation to our ever-changing environment is a key issue is becoming an essential factor.

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