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Discovering Arbol de la Vida from the perspective
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The idea of “Greenery Without Borders”. Discovering Arbol de la Vida from the perspective of Green Infrastructure development

PALABRAS CLAVE:

**infraestructura verde
urbana, Capital Verde
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KEYWORDS:

**urban green infrastructure,
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RESUMEN

En la primera parte del texto se presenta la “Estrategia Europea de Infraestructura Verde”, instaurada en Breslavia (Polonia), habitada por más de 600,000 personas. Este contexto urbano europeo se convierte en el punto de partida del análisis de dos tendencias complementarias en la configuración del sistema verde urbano: como una red de parches y corredores ecológicos que forman la columna vertebral (estructura/warp) del sistema; y como vegetación dispersa que acompaña a las urbanizaciones y otras zonas construidas, a veces en forma de los llamados “jardines de bolsillo”. La segunda parte es sobre el desarrollo de la segunda tendencia en dos parques de Breslavia que están en construcción, así como su posible adaptación en la Ciudad de México, donde las condiciones parecen favorecer formas de vegetación bastante dispersas. Al considerar el “Árbol de la Vida” símbolo de la cultura mexicana, la autora utiliza éste en la construcción de jardines en macetas verticales, y al colocarse en las paredes de patios y balcones, pueden convertirse en la respuesta local a la idea de jardines de bolsillo.

ABSTRACT

The article consists of two parts. The first presents the European Green Infrastructure Strategy from the perspective of Wrocław (Poland), which is currently inhabited by over 600 000 people. This fairly typical European urban context becomes the starting point for the analysis of two complementary trends in shaping the urban green system: as a network of patches and ecological corridors that form the backbone (structure/warp) of the system and as dispersed greenery that accompanies housing estates and other built-up areas, sometimes in the form of so-called “pocket gardens”. The second part of the article is devoted to the implementation of this idea in two Wrocław’s parks that are under construction, as well as its possible adaptation in Mexico City, where the conditions seem to favour rather scattered forms of greenery. Perceiving “Arbol de la Vida” as one of the distinctive symbols of Mexican culture, author proposes to use this form for the construction of the unique, vertical potted gardens. Placed on the walls of courtyards and balconies, they can become the local response to the idea of pocket gardens.

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Introduction

In 2017, a quarter of a century passes from the first Earth Summit (UN Conference on Environment and Development) held in Rio de Janeiro in 1992, which is recognised as the symbolic beginning of the era of sustainable development. Initially, “Promoting sustainable human settlement development” became one of the 38 goals of the 21st century action plan—Agenda 21 (United Nations, 1992: Section 1, Chapter 7). It is worth noting that the original text of this section focuses on the issue of “shelter for all” and the infrastructure for all with no mention of greenery as an integral part of human habitats. This topic started to become important at the beginning of the 2010–2020 decade, partly as a result of previous experiences and partly as an attempt to answer the progressive climate change (Mega, Voula, 2010: 29–58). A quarter century of the implementation of Agenda 21 in European urbanism seems to be a period long enough to distinguish at least three stages of the EU green policy.

The first one, covering the period 1992–2000, was dominated by the search for a formula related to the eco-settlement or eco-city. It was then that the first generation of sustainable neighbourhoods were constructed, like Kronsberg in Hanover (Germany), BedZED estate and the Millennium Village in London (UK), eco-districts Vastra Hamnen and Hammarby Sjöstad in Sweden, and several settlements in the VINEX program in the Netherlands. Some of them were built on brownfield sites, which together with revitalisation programmes across regions, such as IBA Emscher Park (1989–1999) influenced the direction of further exploration.

In this context, years 2001–2010 were governed by the European Landscape Convention, protection of natural and cultural heritage and the growing participation of local communities in shaping the living environment. At the end of this period the most representative types of natural landscapes (18% of the EU’s land territory and around 4% of marine waters within Member States’ jurisdiction) were covered by coherent conservation rules and measures within the Natura 2000 network (EU Commission, 2008).¹ At the same

time, “the Water Framework Directive – integrated river basins management in Europe” (European Parliament, 2000) significantly altered the concept of flood protection that was linked to the sustainable rainwater management. Referring to the priorities of the “Building the Future” policy from 2001, the model examples of this period include such redeveloped industrial sites (Loures, Luis, 2015) as Hamburg’s Hafencity or Messe Riem in Munich (Germany), the regeneration of east Manchester and Lee Valley in London (UK) or Madrid Río – a spectacular project of urban renewal along the Manzanares river (Spain), as well as many dispersed interventions in other countries. The problems of protecting nature, the quality of public spaces and the access to recreational areas acquired over time such importance that since 2010 these issues have become an important element in the environmental impact assessment of cities competing for the title of European Green Capital (EGCA). The Award’s motto “Green Cities-Fit for Life” suggests that in this case “green” is synonymous with “sustainable”. Two years in advance the qualification process is conducted, and the title is given to a city inhabited by more than 100 000 residents (or the biggest in the country) that:

- has a consistent record of achieving high environmental standards;
- is committed to ongoing and ambitious goals for further environmental improvement and sustainable development;
- can act as a role model to inspire other cities and promote best practices to all other European cities (European Commission, 2008).

The award is given by the European Commission on the basis of 12 precisely defined criteria of sustainable urban development. Previously (since 1992) they were checked in the framework of Local Agendas 21, in model urban audits and a numerous scientific study that identified the basic indicators of the green city (Wong, Tai-Chee & Yuen, Belinda, 2011). The growing need for access to data and processing capabilities resulted in the development of GIS technology and the revolutionary qualitative leap in the methods of planning and reporting, whose measurable effects appeared at

1. The Natura 2000 network was established under the Habitats (adopted in 1992) and Birds Directives (adopted in 1979 as the oldest European piece of legislation and amended in 2009 as Directive 2009/147/EC). Since 1992 the network has gradually been developed to conserve and protect key species and habitats across the EU, while delivering many ecosystem services to human society. The Natura 2000 sites are selected following strictly scientific criteria. In 2013 the network comprised circa 26 thousand of Special Protection Areas (SPAs) for birds and Special Areas of Conservation (SACs) as well as Sites of Community Importance (SCIs) designated for whole ecosystems. These sites may be adjacent to or penetrate the co-existing areas of protection, which are or have been established already on the basis of internal regulations of Member States. On the one hand this huge pancontinental system raises various controversies and attempts to liberalize the rules of protection, on the other it enjoys strong support from pro-environmental circles, which in 2016 managed to maintain the status quo.

the end of the discussed decade (Stevens, Daniel; Dragicevic, Suzana, & Rothley, Kristina, 2007). The idea of European Green Capital was born exactly at a time when more advanced cities had comparable material for analysis.

Thanks to the extensive network of digital connections, the data from the short list of candidates are presented to the public in the form of a comparative report. "It is anticipated that this report will be read not only in cities that are current, previous, and potential applicants for the Award, but throughout Europe. This will help to disseminate information, inspire cities to action, showcase tried and tested environmental practices, and promote new technologies for supporting urban resource efficiency" (European Commission, 2016: 13).

*The third, last period of research in this field, covering the years 2010–2017, is focused on the adaptation to climate change, where the energy policy plays a significant role on the one hand (European Commission, 2007), and green infrastructure strategy on the other.*² According to the Resolution of European Parliament, Green Infrastructure is considered as:

...a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services. It incorporates green spaces (or blue if aquatic ecosystems are concerned) and other physical features in terrestrial (including coastal) and marine areas. On land, GI is present in rural and urban settings (European Commission 2013, Point 1.2).

In Europe the backbone of this system is constituted by the Natura 2000 network. The resolution also underlines that: "Green Infrastructure is based on the principle that protecting and enhancing nature and natural processes, and the many benefits human society gets from nature, are consciously integrated into spatial planning and territorial development. Compared to single-purpose, grey infrastructure, GI has many benefits. (...) It can sometimes offer an alternative, or be complementary, to standard grey solutions" (European Commission 2013, Point 1.2).

Such a wide range of the concept is distinctly different from the one adopted by the US Environmental

Protection Agency, which is unambiguously associated with the rainwater management practices. While the EPA emphasizes the role of open spaces and large-area ecological corridors, it focuses its efforts on implementing a rigorous set of equipment and technical solutions to combine grey single purpose infrastructure (as capital-intensive underground storm sewer systems, water-impermeable pavements) with low-budget green approaches managing rainwater near where it falls (EPA, 2014). The basic set includes:

- "point" retention or bio-retention devices (barrels, cisterns, ponds, constructed wetlands, rain gardens, planter boxes, etc.),
- linear devices, lessening peak flows, reducing pollutants and enhancing biodiversity (bioswales, re-opened ditches)
- infiltration surfaces (permeable pavements, green roofs, green streets, green walls).

This type of blue or green-blue infrastructure has been used in many European countries for more than a quarter of a century as part of most of the eco-estate equipment. The eco-cities (in French: *EcoCites*) and eco-districts (in French: *EcoQuartiers*) that are currently undergoing environmental certification in France can be listed as representative of the period 2010–2017. The certification of public buildings within the systems of environmental impact assessment, such as LEED, BREEM and DGNB has become a fairly common practice. It would be difficult to overestimate the impact of the EU regulations and funds on improving the environment quality in the less affluent Member States as Poland.

At the same time, participation in large multi-sectoral *green* programmes is much more difficult for them than for their neighbours, which are more advanced technologically and organisationally (De Gregorio Hurtado Sonia, 2017: 402–414). For this reason, the case of Wroclaw (Poland)³ seems to be a noteworthy one for assessing the average state of green infrastructure development in central Europe. This is a typical lowland city: a well-developed but struggling with its past and problems of long-term investment negligence.

² Each strategy is supported by appropriate financial mechanisms, that favor innovative and international projects and facilitate sharing knowledge as well as good practices between the EU Members.

³ Wroclaw: one of the 5 largest Polish cities (over 300 km²) and the 11th one in terms of budget revenue/capita, the seat of 5 universities and two higher art schools.

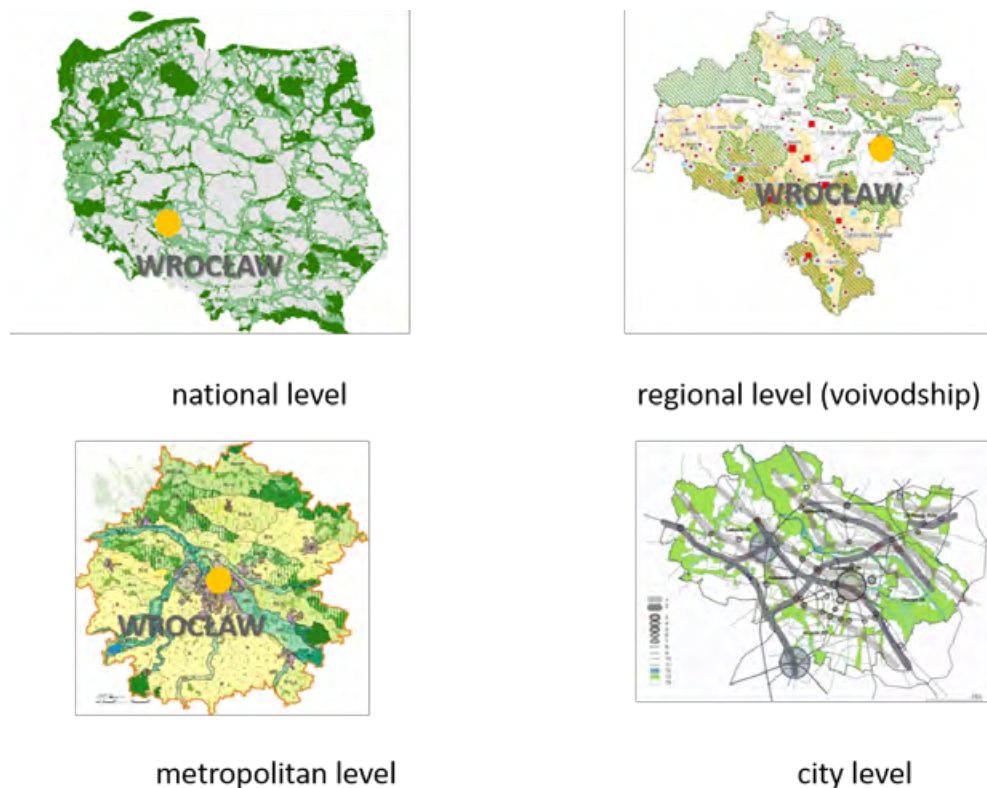


Figure 1. Wrocław. Coherent Policy of Spatial Planning. From the perspective of a Medium European City.

4. Polish name:

Study of Conditions and Directions of Spatial Development means the statutory development plan, which is comparable to the *British Local Plan*. In the official translations, the municipality of Wrocław uses the term: *Spatial Development Study* (http://geoportal.wroclaw.pl/en/development_study/).

5. Wrocław Forum of Greenery and Environment: *What (kind of greenery) needs the city?* 10th October 2015, Moderators: Alina Drapella-Hermansdorfer (Wrocław University of Science and Technology) and Tomasz Ossowicz (Wrocław Development Office).

6. Oslo has a total area of 454.03 km², and population of 647 676 inhabitants (2015). In this sense, the city about 1/3 bigger than Wrocław in terms of area and almost identical in terms of population. It is worth emphasizing that areas with limited opportunities for development (which is somewhat reminiscent of the British Green Belts) in Oslo occupy 300 km² (that is equal to the surface area of Wrocław).

Methodological approach

The idea of running for the title of the European Green Capital was born during the public debate related to the Study draft⁴ and development strategy “Wrocław 2030”.⁵ The discussion was focused on finding comprehensive and measurable steps towards sustainable development, which can lead the city to a significant improvement in a long-term perspective. The uniform evaluation framework used in the EGCA qualification system was recognised then as an interesting tool of internal monitoring. Each candidate city is assessed based on twelve environmental indicators, according to its current status, the projects completed in the past 5-10 years and plans in the given area. Each part of the application must be supported by documents confirming the data, creating the basis for the multilateral benchmarking and comparative analyses.

The starting point for the presented research is information derived from the EGCA 2019 application submitted by the authorities of Wrocław in November 2016 and specified further in the *Spatial Development Study* draft from July 2017. In this article only two factors were considered, namely: Sustainable Land Use and Nature and Biodiversity (Wrocław 2016: ind. 3-4). The remaining ten concern aspects such as Climate Change: Mitigation and Adaptation, Sustainable Urban Mobility, Air Quality, Noise, Waste, Water, Green Growth and Eco-innovation, Energy Performance and

Governance. A comparison of Wrocław data with analogical parts from the application of Oslo (Norway),⁶ a city that has been awarded the title of EGCA 2019, seems to well illustrate the role that European urban planning attributes to green infrastructure in the sustainable city concept (Oslo 2016) (Figure 1).

Greenery Without Borders

In Wrocław the new policy of seeking balance between the natural and built environment has been defined in the concept of Greenery Without Borders. As stated in the application for the title of EGC:

A new study, the City's strategic document, introduces the concept of Greenery Without Borders. City development planning in accordance with this concept is to eliminate the traditional borderline between urban structure and the natural environment and to define the relationship between them. Wrocław's mosaic of green areas and river valleys forms rings and wedges that are places for the residents' rest and recreation but above all migration routes for the local fauna (Wrocław 2016: ind. 3a: 3).

In fact, apart from the semicircle of the historical city moat surrounding the Old City core, the backbone of the urban greenery system has been defined by the Odra River, its channels and four tributaries. Nevertheless, it is



Figure 2. Concept for the Study of The Green Ring for Wrocław Functional Area. Biblioteka cyfrowa (www.dbc.wroc.pl/dlibra/doccontent?id=24303&from=FBC).



Figure 3. Study of the Green Ring for Wrocław Functional Area. Author: Łukasz Dworniczak, Wrut PWR, Faculty of Architecture, 2013 Biblioteka cyfrowa (www.dbc.wroc.pl/dlibra/doccontent?id=24303&from=FBC).

a well-developed system, as 21% of total population lives within 1 km from the rivers. The Natura 2000 protected sites (11.56% of total urban area), forests (7.6% of total city area)⁷ and parks form together:

- the *dominant greenery zone*, which “covers areas of key significance from the point of view of the protection of natural values, environmental corridors, and biodiversity”.
- Agricultural areas, especially the very popular allotment gardens, as well as the greenery that accompany the residential areas are part of
- the *equivalent greenery zone*, which “creates the possible coexistence of man and nature in built-up areas”.
- The other sites of greenery are located inside the *co-creating greenery zone* as “a green buffer with most industrialized areas”(Wrocław 2016, ind.3c:15).

Every single part of the city is thus assigned to one of the zones of saturation with greenery. According to *Spatial Development Study draft* in 2030 the percentage of people living within 300 m of green urban areas of any size should increase from the existing 78% to 91% and from 89% to 99% in the city centre (Table 1) (Figures 2, 3).

Juxtaposition of corresponding tables from Wrocław and Oslo applications indicates a slightly different way of aggregating data (Wrocław, 2016) (Oslo, 2016). The difference concerns not only the number of development zones (two in Wrocław and three in Oslo, where an additional area resembling British Green Belts from the late 1940s was created) but also the fact that there are no single function areas in the Norwegian capital as

a result of a long-term, consistent planning policy. As highlighted in the Norwegian proposal: Former industrial areas located at the margins of the inner city – such as Nydalen, Løren, Ensjø and Kværnerbyen– have been redeveloped with an emphasis on high residential density, high frequency transit services, and path improvements to encourage walking and cycling (Oslo 2016, ind.3: 4). At the same time, most brownfields in the city centre that remained after the shipyards and dry docks have been transformed into compact neighbourhoods combining the new dwellings with workplaces, shops, parks and public spaces. The proximity of places to live, work and recreate greatly reduces the transportation needs of residents thus becoming the key indicator of the sustainable land use. Despite many skeptical voices (Davoudi, Simin, & Madanipour, Ali, 2012: 459–468), this direction is generally recommended in many EU documents (ECPT 2003, 1998) and highly rated by the EGCA 2019 jury.

Another difference concerns private gardens in Oslo, which have been included in the category of residential areas, thus becoming part of mixed-use lands. If we consider that the “overall city” in Oslo has almost the same area as Wrocław, then the total share of public green areas is strikingly comparable in both cities. Nevertheless, behind each position in Table 1 lies completely different philosophy of shaping space—more diversified in Oslo, both in zones and within zones, and mosaic in Wrocław, but rather homogeneous within the units.

Among Wrocław’s big assets are large protected areas in the dominant greenery zone. The six sites, creating

⁷ Some of the forests are part of the six Natura 2000 sites.

Table 1: Land use in Wroclaw and Oslo municipality*.

| Forms and indicators of land use | Wroclaw | | Oslo | | | Units | |
|---|--------------------------------|--------------|------------|-------------------------|--------------|-------------------------|----|
| | Inner City | Overall City | Inner City | Urban Area ⁸ | Overall City | | |
| Public Green Area | 7.1 | 23 | 15 | 20 | 68 | % | |
| Private Green Area | 0.6 | 0.6 | - | - | - | | |
| Other green areas (inaccessible green areas or accessible for fee, e.g. allotments, zoological gardens, botanical gardens, cemeteries, farmlands, etc.) | 0.0 | 34.9 | - | - | - | | |
| Blue | 7.3 | 3.3 | 1 | 1 | 6 | | |
| Residential | 16.3 | 12.2 | - | - | - | | |
| Industrial/economic | 1.3 | 4.0 | - | - | - | | |
| Mixed | Residential | 29.6 | 6.4 | 27 | 36 | | 12 |
| | Industrial/economic | | | 13 | 8 | | 3 |
| | Cultural, social and religious | | | 7 | 4 | | 1 |
| Brownfield | 0.6 | 0.7 | - | - | - | | |
| Other ⁹ | 37.2 | 14.9 | 37 | 31 | 10 | | |
| Total | 100.0 | 100.0 | 100 | 100 | 100 | | |
| Percentage of people living within 300 m of green urban areas of any size | 89 | 78 | 98.2 | 98.4 | - | | |
| Population density in built-up areas (city area minus green and blue) | 80 | 54 | 133 | 60 | 57 | Inhabitants per hectare | |
| Population density for new developments | 306 | 134 | 154 | 148 | - | | |

*By the author.

part of the Natura 2000 European Network, and the others, as Szczytnicki Natural and Scenic Landscape or so-called ecological sites are situated along the rivers and water channels. In 2016, sites legally under conservation amounted to 11.56% of the city area and were expected to rise to about 12.1% after implementation of the Study principles. This can be achieved thanks to reserves of land in the form of brownfields, where the natural qualities of the former Irrigation Fields are to be maintained as one of the adopted solutions.

The allotment gardens, whose area in 2015 exceeded 1300 ha and the total number of plots was estimated at about 35 000, play an important role in shaping the local climate and organizing the leisure time. As a part of the equivalent greenery zone they are still the subject of dispute between the strong developer lobby and the social allotment gardener movement. Enclosed, semi-private character of these gardens greatly limits the possibility of their preservation near the city centre. Perhaps for these reasons, the city's potential in this area has not been adequately exposed, although the other EGCA candidates usually attach great importance

to such forms of urban agriculture (Moragues-Faus, Ana & Morgan Kevin, 2015: 1558-1573).

The Wroclaw Civic Budget seems to be the third strong point of the city as an efficient tool for building democratic society. Since 2013 many citizens' projects concerning green areas have been implemented after gaining approval and support in open voting of residents. The interest in this initiative is evidenced by the fact that in 2016 the number of people taking part in the vote exceeded 100 000. However, it is rare for people to apply for the planting of trees. Most initiatives deal with enhancing already existing green areas by adding playgrounds, open gyms and similar recreational facilities. The other small projects are financed from the micro-grants, intended for social inclusion, education or the promotion of green culture.

Participatory system that is guided by its own rules has become an indirect inspiration for the concept of Greenery Without Borders. Therefore, it should be noted that the city authorities continue their parallel programme of urban acupuncture in "Spaces Between Buildings". Intervention actions in 2007-2015 concerned rehabilitation

8. The built zone, without Marka – a kind of green belt limiting urban sprawl and providing opportunities for recreation.

of 66 courtyards in the most sensitive neighbourhoods, and for the next two years 1.75 million Euros have been allocated for this purpose. Compared to the prior state of the revitalized areas, the new investments resulted in a significant improvement in living conditions. At the same time the network of bicycle paths is dynamically developing as well as the plans of eco-modernization of 5 "green arteries" leading to the city centre. Nevertheless, the results are less comprehensive than in the current European Green Capitals, where similar renewals were additionally combined with the so-called sustainable drainage and rainwater management in green areas. Water sensitive urban design is one of the important aspects of climate change adaptation and is considered in the evaluation of city's environmental impact (Figures 4, 5).

An excellent plan to improve flood security during heavy rains was presented by Copenhagen as the EGCA 2014 (Gulsrud, Natalie M., Gooding, Saskia, & Konijnendijk van den Bosch, Cecil, 2013: 330-337). In Oslo scattered forms of green are expected to appear also on the roofs, supporting the blue-green infrastructure development. It is worth mentioning that beyond 500 existing green roofs within the city, the next 8 229 have been recommended as potential places for urban agriculture or roof gardens, and another 6 000 as suitable for more extensive green roofs of habitats for biodiversity. At the ground level this "under-sky"

system connects to the re-opened streams and other waterways, which have been hidden so far under the urban fabric. According to the cross-sectoral strategy of reducing the risk of flooding, the green areas along the streets, parks and public spaces are transformed into coherent multifunctional urban landscapes. They are facilitating infiltration into the ground, while the restored waterways and ditches are providing safe and quasi natural runoff to the retention basins. Although the numerous parts of urban landscape have already been constructed this way, the proposal emphasises the advanced blue-green network project for a large regeneration area inhabited by 40 000 residents. This concept of adaptation to climate change was highly estimated by the jury due to the close connection between the green economy, environmental improvements and social participation. Unfortunately, in Poland the blue infrastructure still faces many administrative and formal barriers, despite efforts undertaken by the academic community to promote the issue. Among numerous examples of such searches one should mention The Poznan Charter on Urban Water, 2011. According to Anna Januchta-Szostak, the authors of the Charter recommend eight key principles of sustainable urban water management:

- Respect for water resources (perceiving rainwater not as wastewater but as a valuable water resource),

9. Other consists of the technical infrastructure that supports the city (i.e. transportation, energy and wastewater), in addition to areas set aside for telecommunication.

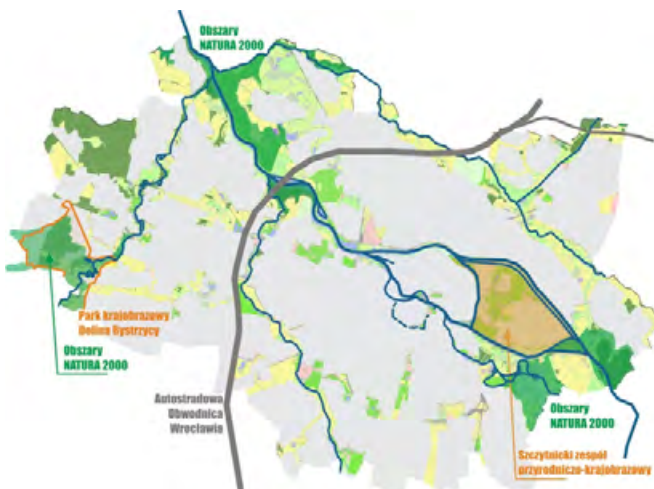


Figure 4. Main Ecological Axis of Blue-Green Infrastructure in Wrocław.

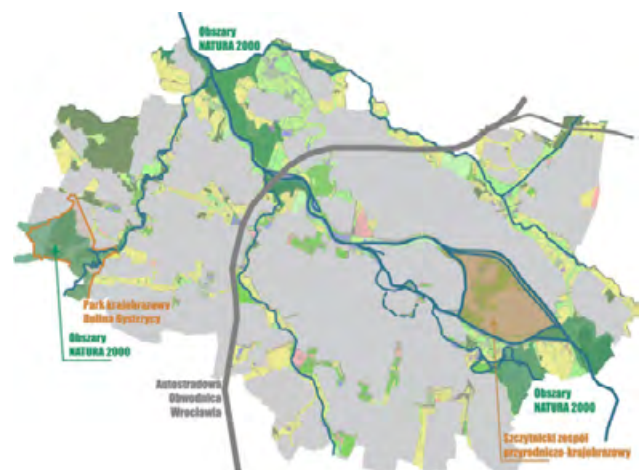


Figure 5. The Secondary System of Ecological Corridors.

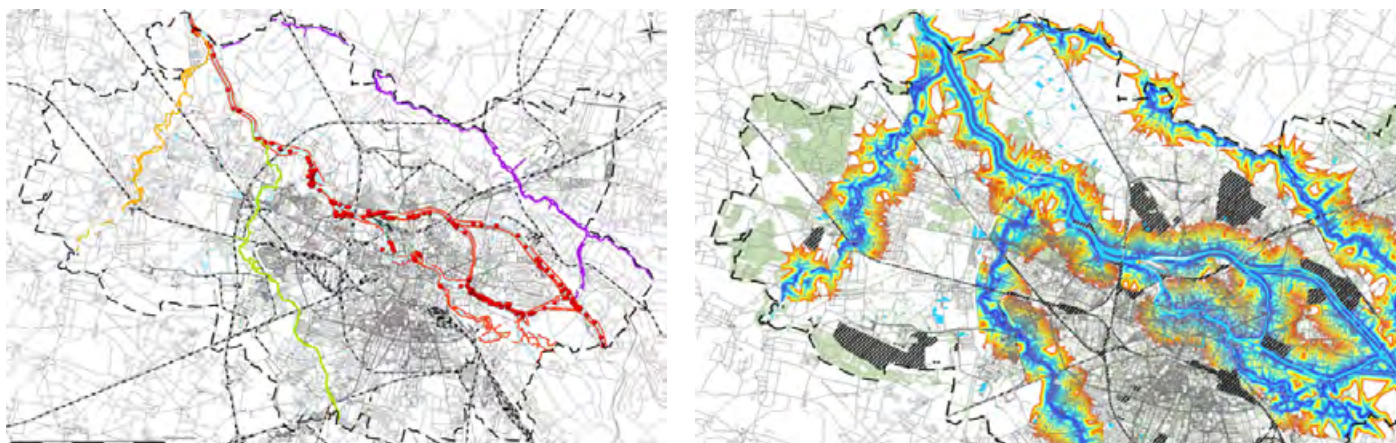


Figure 6, 7. Studies to the Blue strategy of Wrocław River Parks. (www.ciria.org/Resources/Free_publications/Water_sensitive_urban_design_in_the_UK_-_Ideas_book.aspx).

- Rainwater management on site, if possible, on the land surface (implementing decentralized semi-natural systems of rainwater and meltwater management, like Sustainable Urban Drainage Systems: SUDs),
- Use of “green infrastructure” (implementing green roofs, raingardens/bioswales, riverside buffer parks or natural/artificial marshlands as alternative or complementary to gray infrastructure),
- Urban drainage basin and river valley restoration (re-opening room for the rivers in the cityscapes, protecting natural flood risk areas against development, making the ecological net of river corridors more effective),
- Turning towns and cities towards rivers (restoring the riverfronts as outstanding elements of the cityscapes, in the richness of their social, economic and environmental values),
- Multifunctional management of public space (shaping “blue-green” buffer park networks, “green” boulevards, waterside educational paths, etc.),
- Raising social awareness (promoting bottom-up initiatives and good practices for water management, educating, learning through play at the riversides, etc.),
- Economic motivation (limiting the permissible size of the impermeable surface, introducing a system of incentive fees for rainwater collection and the similar motivating tools). (Januchta-Szostak, Anna, 2012: 108).

Similar concepts and declarations were included in Wrocław’s proposal. Despite the lack of success in this edition of the EGCA,¹⁰ the time spent on preparing the Wrocław’s application was not the wasted one. In the spring 2017 the municipal Department for Sustainable Development was created. It is to continue the work in

relation to the acquired experiences and lessons learned from the confrontation with the most advanced sustainable cities in Europe (Figures 6, 7).

Beyond the competition-ten principles of low-budget green infrastructure

So far the EGCA was given to 10 cities: Stockholm (Sweden 2010), Hamburg (2011), Vitoria Gasteiz (Spain 2012), Nantes (France 2013), Copenhagen (Denmark 2014), Bristol (UK 2015), Ljubljana (Slovenia 2016), Essen (Germany 2017), Nijmegen (the Netherlands 2018) and Oslo (2019). These cities usually have a well-developed management system and long-term experience in implementing multi-sectoral policies, skilfully supported by their scientific background. In this context, the standards defined by this avant-garde are rather difficult to replicate by less advanced communities. Smaller economic potential does not seem such a big obstacle as a lack of knowledge about more traditional ways of achieving the similar goals. A quarter of a century after the Rio Declaration for Sustainable Development, one can ask whether the high tech and high budget strategies should not be more effectively balanced by much modest and common solutions. Not so long ago a discussion around Alejandro Aravena’s “Reporting the Front” in 2016 clearly demonstrated that the subject of low tech and low budget did not arouse interest among the relevant bodies of European opinion formers.

In this context it should be mentioned that in terms of low-budget landscape planning Wrocław deserves much more attention than is apparent from the data contained in the application form. While in the sphere

¹⁰ In May 2017 the final shortlist included Ghent (Belgium), Lahti (Finland), Lisbon (Portugal), Oslo (Norway) and Tallinn (Estonia).

of geopolitical influence of Prague (Czech Republic), Vienna (Austria), Berlin (Germany) and Cracow (Poland) the city several times changed its state affiliation over the centuries. The last change was the result of the correction of borders after the 2nd World War, which explains the role of German naturalists in shaping the Wroclaw greenery until 1945. Of importance was the environmental movement in the garden art, supported by rich experience in hydrotechnics and water reclamation, which developed here in the second half of the 19th century. The pioneers of this movement were Peter Joseph Lenné (1789-1866) and Gustav Meyer (1816-1877), who created the manner referred to as Lenné-Meyer school, exerting a strong influence on the next two generations of Wroclaw landscape architects. Among them were such eminent botanists as Ferdinand Cohn (1828-1898), Adolf Engler (1844-1930) and later Paul Dannenberg (1863-?). They all developed a deeply environmental way of planning with the expression of "being rooted in" (German: *Bodenständigkeit*) (Cupers, Kenny, 2016: 1226-1252). The legacy of this period includes several solutions that meet the criteria currently set by the green infrastructure.

The reference to the naturalistic style might seem self-evident if not for the current trend to experiment with colours, exotic plants and the widely understood ornamentation. The need to promote new aesthetic criteria goes far beyond the borders of Wroclaw, becoming a challenge for landscape architects (Martínez, Alonso, 2015: 18-20). It seems, however, that the trend of "beautifying the city" deserves a revision due to the high cost of management, since it largely delays urban investments in greenery (Dunnett, Nigel & Hitchmough, James, 2006, 2004). The municipality of Wroclaw prefers rather never-ending improvements in existing parks than new projects, which would gain the desired proportions and appearance in a few years. The desire of fast effect explains the "architectural" character of public spaces: the widespread use of concrete, stone and durable elements, which generate costs and create another argument for limiting investment in greenery. At the same time, social pressure related to the protection and planting of new trees is increasing.

It is in this context that the development of the two Wroclaw parks has started. Their balanced spatial concept is rather unusual partly due to the extremely low budget. Paradoxically, the lack of financial resources has led to solutions that made designers, city authorities and the locals themselves creatively interpret a relatively poorly understood tradition of the place. The conclusions from these experiences can be summarized in the form of "Ten Wroclaw Rules" (Drapella-Hermansdorfer Alina, 2016: 107-120).

1. For most contemporary city inhabitants the city park as a relatively large and compact green area becomes a type of landscape that forms their understanding of nature and respect for the natural heritage of the region and country.
2. The creation or adaptation of the city park is always an opportunity to develop and strengthen the network of ecological links, increase the efficiency of services provided by new ecosystems (especially in terms of carbon accumulation), and protect biodiversity.
3. Land formation in both the park and its neighborhood can significantly affect the sustainable use of rainwater (providing retention and floodplains, uncovering waterways) and thus reduce the risk of flooding, improve plant vegetation and indirectly mitigate climate change. Therefore, it should be obligatory to create parks in new housing estates or other areas with a high proportion of water impermeable surfaces.
4. Addressing the specific habitat conditions of a site (biotope), not only leads to differentiation of park complexes (phytocoenosis), but also shows the richness of native landscapes in the broadest possible range. In park design, therefore, the starting point should be the potential of the place, understood in both natural and cultural terms.
5. Park landscapes are better remembered if they possess an element of narrative that is relevant to the local community. For this reason, it is necessary to strive for the separation of parts or paths of a thematic nature (thematization) by using art as a means of communication with the user.
6. Proper plant selection (phyto- and aromatherapy), water systems (cascades, fogs) and small

architectural elements (open-air gyms) can increase the park's therapeutic value by becoming a low-cost, yet sustainable investment in social health protection.

7. The park becomes one of the few spaces of freedom that remains at the disposal of modern city dwellers. Apart from providing security and facilities (toilets, gastronomy), it is necessary to avoid rigid dedication of space to certain forms of activity, leaving the so-called open plan and possibilities it offers for the residents' own initiative. For this reason, social participation is desirable not only when the project is consulted but above all during land use and upkeep of greenery.
8. Each park is a „public purpose investment” as part of the city's green infrastructure system, serving the protection of nature and the health of the population. Appropriate plant selection and water features can significantly increase the range of ecosystem services provided by a green area, including basic (habitat), supply, regulatory and cultural services.¹¹ This leads to a variety of plant care practices (intensively cultivated areas, dedicated to humans and extensively cultivated wilderness areas) and lowers maintenance costs.
9. Maintaining urban parks provides the opportunity to employ people endangered by social exclusion (the unemployed, the homeless) or immigrants in the first phase of adaptation to new conditions. At the same time, it is a means to return to some traditional forms of greenery maintenance, such as sheep grazing on the lawns, which is becoming more and more popular.
10. Parks can and should be designed as landscapes that are at least to some degree utilitarian (in the type of forest gardens), i.e. with fruit trees, mushrooms or other edible plants (berry bushes), also intended for animals. It is also desirable to join allotments with the park area, as this combination reduces the cost of maintaining green spaces and at the same time offers a wide range of services provided by ecosystems.

It is easy to see that the first rule is the starting point for all the others, pointing to a city park as a substitute for native nature, and therefore a quasi-natural ecosystem or ecosystems. It is intended to illustrate the

interdependence between the various elements of nature (especially their phytosociological relationships), as opposed to the concept of planting trees as single units, which can be arranged in any, mainly decorative way.

Depending on the location, the naturalistic park may incorporate, adapt or imitate the forest, water or agro-cultural landscapes (meadows, orchards), with respect to the identity of the place and the needs of the residents (communication, services, equipment). The following principles address three aspects of sustainable development: natural (principles 2-4), social (principles 5-7) and economic (principles 8-10). It has to be noted, however, that their application is limited in the case of an increasingly significant group of park-type landscapes established on roofs or in other artificially arranged habitats where experimenting with the selection of plants is sometimes necessary, at least in the initial stage of exploration.

Application and conclusions

The implementation of the principles in the Millennium Park and the Mammoth Park in Wrocław relates to the experimental process of creating green infrastructure both by designers, the Department for Urban Greenery and the local community. It is worth emphasizing that the inhabitants not only are eager to participate in the planting of plants but also take several initiatives themselves, obtaining different funds for correlated environmental projects. Both parks are being built on abandoned farmland located in the ecological corridor of the Slesza Valley – a river of great importance for the identity of Silesia as a region. Therefore, there are narrative references both to archeological excavations at Mammoth Park and ten centuries of city history at the Millennium Park (Drapella-Hermansdorfer, Alina, 2014a: 11-18).

The adopted method of patchwork landscape, consisting of typical natural habitat regions, enabled the incorporation of existing valuable natural elements into the concept of sustainable land development (Drapella-Hermansdorfer, Alina, 2014b: 1089-1096). In some areas natural succession has been accepted, while in

11. The concept of ecosystem services began to arouse attention of the scientific community at the turn of 1990/2000. Approximately 1,360 experts from 95 countries were involved as authors or reviewers of the Millennium (Ecosystem) Assessment (MA) reports, whose comprehensive summary was entitled: Ecosystems and Human Well-being: General Synthesis. Following this study, the ecosystem services can be understood as: "the benefits people obtain from ecosystems. These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil formation, photosynthesis, and nutrient cycling" (Millennium Ecosystem Assessment, 2005: V). See also: (Kronenberg, Jakub, 2012: 14-30).

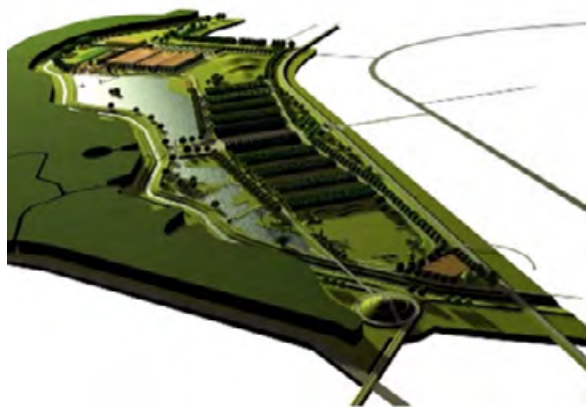


Figure 8. Millennium Park in Wrocław.

others forest-type trees with more efficient carbon sequestration have been planted and meadows / clearings for humans have been delineated. Care was also taken to preserve certain elements of agrarian culture, such as orchards and trees on the field roads, which are feeding places of specific species of native fauna.

Of significant importance to the biodiversity of the Millennium Park is the reconstruction of the Sleza riverbed, which has become a significant element of the natural retention system associated with drainage and flood protection strategies. Earthworks were reduced to a slight deepening and modeling of the banks along the trails of the old river corridor, which had been dampened in many places by agricultural use. The resulting „rain garden” arrangement differs in habitat conditions from adjacent areas. This is where hygrophytes are concentrated, while meadow glades can better serve people as places where they can walk and recreate (Figure 8).

Great importance has been attached to the creation of a refuge for animals, among other things by arranging logs of old cut-down trees in different places. The logs serve as „insect hotels” as well as seats because people are more likely to use them than benches. Some of the willow logs with new shoots have been planted as part of the experiment, whose aim is to combine the ecological value of old trees with new plantings. Another type of shelter for animals is provided by freely arranged groups of stone, which at the same time serves an ornamental and educational function in the naturalistic exposures of rock resources from the Lower Silesia (Drapella-Hermansdorfer, Alina, 2015: 543-550). The collection was built mainly thanks to quaternary sponsorship. Granite curbs from recycled materials and elements from the demolition of historic buildings were also used. The purpose of the designers was to create unique



Figure 9. Mammoth Park in Wrocław.

scenery showing the varied possibilities of this material –both in its processed and natural form.

Within a couple of years, the two parks have become authentic civic laboratories. Local communities have observed their gradual development and taken part in the process. A lot of work has been done as a result of volunteering, cooperation between the Department for Urban Greenery and non-governmental organizations or the involvement of prisoners. In this respect, Mammoth Park is especially noteworthy as it is an example of a park that is being created thanks to the initiative of residents within the Wrocław Civic Budget (Figure 9).

Instead of summarizing: “Arbol de la Vida” as model for vertical gardens

The principles of Wrocław refer to a specific social, economic and environmental situation, but their essence lies in the creative reading of the conditions of the place, i.e. the *Bodenständigkeit*, which interested Wrocław designers from the beginning of the 19th century. An attempt to apply this philosophy of action in an extremely different reality, for example in Mexico, would have to produce results in the form of a completely different concept of green infrastructure. It is noticeable that the lack of free space directs attention of the local designers towards green walls, which on a large scale can bring hard to quantify benefits (Collazo-Ortega, Margarita; Rosas, Ulises & Reyes-Santiago Jeronimo, 2017).

However, not everywhere new solutions withstand the test of time and due to high costs, most residents cannot afford them. At the same time, regardless of the problems with water supply, even in overcrowded districts outside trendy neighborhoods one can meet potted gardens on roofs, balconies or windowsills.

They show a strong need for decorating space (murals), taste for vivid colors and traditional symbols (e.g.

Xochimilco). Unfortunately, this huge human potential is neither properly utilized nor developed. It seems that a system of small grant competitions for the most attractive vertical potted gardens, combining the idea of the *Arbol de la vida* with wall painting, ceramics and the need for individual expression can significantly improve the quality of the environment and the urban landscape.

It is not about professional macro-scale actions like painted walls in Palmitas, but rather about supporting individual initiatives. Considering Wrocław's experience, both the financial incentive system and rooting in local culture and its creative continuity are essential for the involvement of the inhabitants in the development of urban green infrastructure.

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