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ADAPTATION TO CLIMATE CHANGE



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Adapting to urban heat and flooding with blue-green infrastructure in Wroclaw, Poland

Renaturing seven neglected courtyards and creating a green street to cope with extreme weather events

Wroclaw, located in southwestern Poland, is one of the most populous cities in the country. Lacking green infrastructure, like trees and green spaces, and impermeable surfaces increases urban heat and flood risks.

Key Learnings

- **Combining green and blue infrastructure addresses flood and heat risks:** A range of measures, such as planting different types of greenery, creating rain gardens and swales, and installing (semi-) permeable surfaces as footpaths, help to reduce flood and heat risks at the same time.
- **Building acceptance through community engagement:** Involving citizens in the design process helps build ownership and long-term care for blue-green infrastructure. Collaborating with the local councils is key to gaining resident support, highlighting the benefits of greening courtyards, and finding compromises, such as reducing parking spaces.
- **Monitoring and impact evaluation:** Monitoring before and after the installation of the interventions, combined with a questionnaire survey, demonstrates the environmental and social impact that greening the city can have on biodiversity, rainwater retention and resident well-being.

About the region

Wroclaw is the fourth most populous city in Poland, with over 642,700 inhabitants. It is the administrative capital of the Lower Silesia Province, lies on the Oder River and forms the core of a larger metropolitan area with a population exceeding one million. It is also an academic centre with about 30 public and private universities and more than 130,000 students. In Wroclaw's city centre, the Olbin district is a densely built-up area of approximately 0.8 km², where courtyards were long neglected, and streets lacked greenery.

Climate Hazards

Flooding, Extreme Heat, Storms

Sector

Water Management, Biodiversity protection, Urban

Key system

Water Management, Ecosystems and Nature Based Solutions

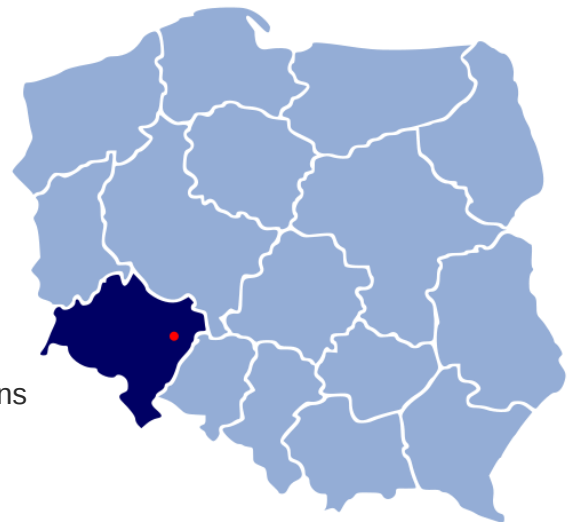


Figure 1: Map of Poland. Image Credit: [Wikimedia Commons](#).

Climate Threats

Wroclaw is located on the Oder River, and despite extensive flood protection works, up to 36% of the city is at risk of flooding. Among all Polish municipalities, the Wroclaw Metropolitan Area experienced the highest number of local flooding events between 2013 and 2017. Wroclaw typically experiences low levels of rainfall, but in recent years, extreme rain events have become more frequent. These have caused flooding, sewage overflows, traffic disruptions, and water pollution, aggravated by impermeable surfaces and a lack of green infrastructure such as trees, lawns and shrubs. Strong winds and storms, particularly from the west, north and southwest, have also become more frequent.

Additionally, the city is increasingly experiencing heat waves and droughts in summer. In the Olbin area, dense building developments with sealed surfaces and lacking green spaces are exacerbating hot temperatures. Droughts without rain for three to eight weeks have resulted in lower river and groundwater levels in recent summers, requiring measures to prevent rapid water run-off and store water.

Blue-green Courtyards Bounded by a Green Street

In response to Wroclaw's climate challenges, especially in the densely built-up Olbin district, the city decided to transform seven previously abandoned courtyards into pocket parks. These small green spaces represent a form of Nature-based Solution and were created as part of the [GrowGreen](#) project. The pocket parks should improve climate conditions, promote biodiversity, enhance air quality, reduce noise, and increase resident satisfaction with public spaces. They include rain and community gardens and are

located within 200 meters of a main street in the area, which the project team also converted into a green street featuring a green tram stop.

In 2017, participatory planning began for seven neglected courtyards, with each courtyard receiving a tailored combination of interventions based on resident needs and Wroclaw University of Environmental and Life Sciences' climate analysis report. Community input and local climate parameters, air circulation, spatial constraints, and property ownership determined location selection. This approach ensured that residents' needs were addressed from the beginning and encouraged them to take care of the pocket parks even after the project ended. All blue-green courtyards included key elements such as:

- Planting a variety of shrubs, beds, climbing plants, and trees, along with the installation of birdhouses and pollinator habitats to enhance greenery and biodiversity,
- rain barrels, swales, and rain gardens to promote rainwater retention.
- Building semi-permeable and permeable walking paths, enabling the collection and redirection of rainwater from the sidewalk towards the trees.

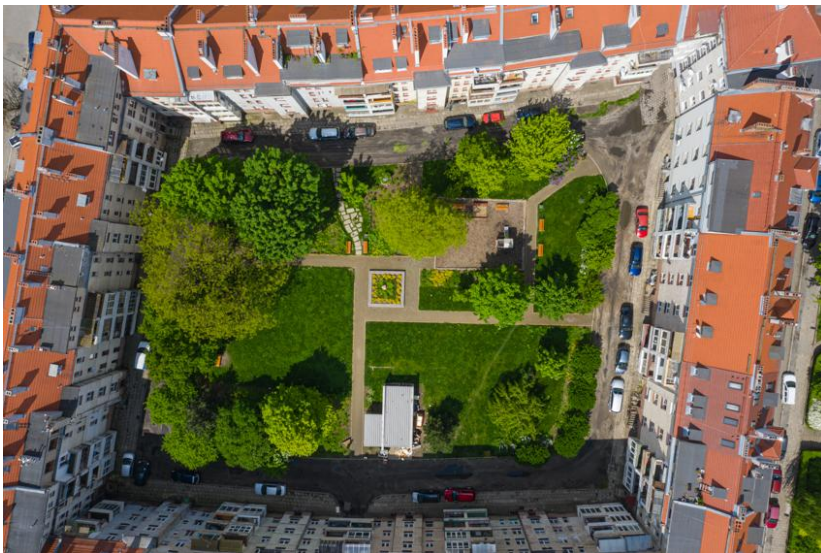


Figure 2: Courtyard with flower meadow and semi-permeable walking paths, Wroclaw. Image Credit: Municipality of Wroclaw.



Figure 3: Raingarden, Wroclaw. Image Credit: Municipality of Wroclaw.

Integrating green infrastructure, such as trees, shrubs and climbing plants, increases biodiversity and reduces heat stress. Meanwhile, blue infrastructure, including rain gardens, swales and rain barrels, helps manage water effectively and reduce flooding.

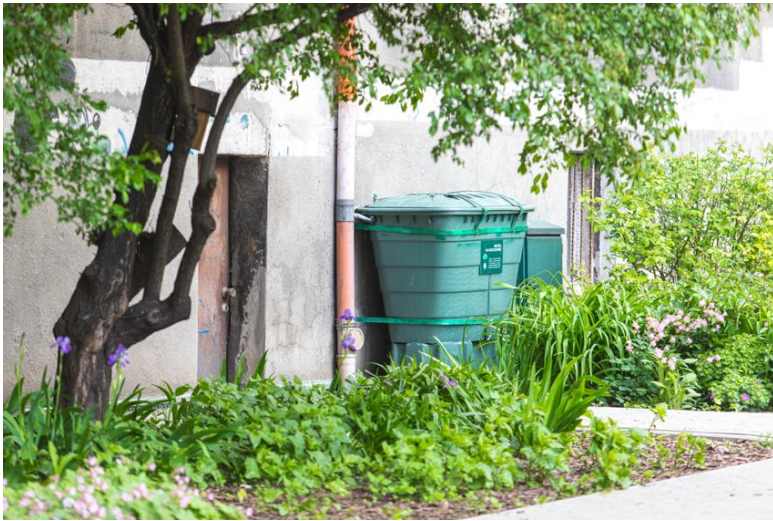


Figure 4: Rain barrels, Wroclaw; Source: Municipality of Wroclaw.

Rain gardens are small holes in the ground planted with vegetation that can withstand drought and flooding, helping to control water flow and support resilient plant growth. The pocket parks, as Nature-based Solutions, also incorporate permeable surfaces, such as a concrete grid that allows rainwater to soak into the ground.

A central design element is shaded areas for residents and to create spaces for people to socialise. Each courtyard includes a relaxation area; one features a recreational space, a children's playground, and a designated dog play area. Additionally, two courtyards have community gardens for growing vegetables and herbs.



Figure 5: A community garden at Jaracza street courtyard, Wroclaw. Image Credit: Municipality of Wroclaw.

The project team also transformed one of Olbin's main streets and its intersections into a green street and green squares, featuring a green tram waiting area. A variety of trees and greenery help cool the street, while three birdhouses provide nesting spaces for birds. Plants in green modules along the sidewalk and

in parklets – pavement extensions providing more space and amenities for street users – increase water retention capacity. The interventions in the green street focus on the following principles:

- Creating meeting places and new functions at intersections.
- Prioritising pedestrians, with access to shade and resting areas.
- Slowing down traffic to restore the street's local function in serving the community and making the street more pedestrian-friendly.
- Engaging residents, involving local businesses, and stimulating service development.

Creating the green street involved the challenge of reducing parking spaces to make room for greenery along the pavement. Through discussions with residents and support from the Council, a paid parking zone was implemented. The addition of parklets helped reclaim the street and reinforced the 30 km/h speed limit. Starting in 2022, GrowGreen's second phase introduced playgrounds, benches, pollinator houses, new greenery, and space for residents to create their own gardens in some courtyards. The City of Wroclaw invested 1.6 million euros to build seven pocket parks and a green street, funded by the GrowGreen project.

Participatory Planning and Community Engagement

Engaging residents from the start was crucial. In the first meeting, residents identified their green space needs. The [City of Wroclaw](#) worked with the [Wroclaw Agglomeration Development Agency](#) and the [Wroclaw University of Environmental and Life Sciences](#) to form a co-design team. Further meetings with district councils and residents discussed project goals and Nature-based Solutions.

The [Yellow Umbrella and Partners Association](#) held two co-design workshops, with input from residents, local authorities, and the design team. Topics like parking, waste shelters, green waste solutions, and community gardens were discussed. The design team then tailored concepts for each courtyard based on these discussions. Resident input played a key role in selecting the sites, as community members shared their needs and priorities. Their feedback, together with insights from the climate analysis report, facilitated implementing the adaptation measures. To consult residents, Fundacja EkoRozwoju – a sustainable development foundation in Wroclaw – held multiple workshops in the area and informed citizens via Facebook and the City of Wroclaw's official website.

The process was documented in the [EcoDevelopment Foundation report](#), which was displayed at the public library for two weeks. Throughout the project, additional workshops and meetings were held to answer questions from residents, designers, and officials. The project culminated in a joint planting event with the local residents. Follow-up workshops taught residents how to care for their green spaces, and community events like outdoor screenings and picnics strengthened local connections.

Successful Integration of Nature-based Solutions for Water and Heat Resilience

The Wroclaw University of Environmental and Life Sciences evaluated the environmental and social benefits of greening interventions before (2018–2019) and after (2020–2022) implementation. Key outcomes include:

- Reduced water runoff from impermeable surfaces, boosting local water retention.
- Nearly 15,000 m² of biologically active surfaces and 2,500 m² of semi-permeable surfaces added, helping to prevent groundwater depletion and reduce flooding.
- 112 trees, over 6,800 shrubs, and 19,400 herbaceous plants planted, with mature trees preserved.
- Increased biodiversity thanks to careful plant species selection.
- Approximately 1 hectare of new green space created.

A resident survey showed that active participation built social trust and increased confidence in the transparency of the decision-making process. More residents reported feeling safe in their neighbourhood, while many expressed pride in the changes and a greater appreciation for the Nature-based Solutions introduced.

Inspiring Future Nature-based Solution Projects in Wroclaw

Nature-based Solutions are embedded in Wroclaw City's strategic and urban planning documents. The 2019 [Urban Climate Change Adaptation Plan](#) places a strong emphasis on Nature-based Solutions. The [Blue-Green Infrastructure Action Plan](#) developed as part of the GrowGreen project, is closely linked to this plan. As a result, the city has adopted a policy that requires Nature-based Solutions to be included in all city investments, making them a standard consideration in public tenders.

Incorporating Nature-based Solutions into long-term city planning, development, and management has led to a shift in how Wroclaw approaches urban projects. New initiatives now regularly include green features – green tram tracks have become standard, and the “[Grey into Green](#)” programme is bringing nature into school and kindergarten surroundings. The courtyards have become living labs, providing a model for future developments across the city. Small vegetable gardens are growing in popularity as educational tools for healthy eating, while the success of the Green Street initiative has inspired the district council to plan more green streets.

"Seven courtyards and Daszyńskiego Street have changed beyond recognition. In addition, green solutions have been introduced that should help in the fight against climate change. We want them to support the lives of the residents of Olbin."

Paweł Wikiński, chairman of the board of the Olbin estate

Summary

The seven blue-green courtyards, connected by a green street, show how combining various Nature-based Solutions can deliver social benefits for residents while strengthening water and heat resilience. Integrating green and blue infrastructure increases biodiversity, improves rainwater retention, and creates shaded spaces for community interaction. Involving citizens from the early planning stages is essential for building trust in the changes and helps ensure the long-term care and use of the green spaces. Funded by the [GrowGreen](#) project, these seven pocket parks and the green street now serve as a model and inspiration for future Nature-based Solutions in Wrocław.

Further information

The work presented in this adaptation story is part of the [GrowGreen](#) project and written as part of the [Invest4Nature](#) project.

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The total cost for the Wrocław demonstrator amounted to 1.6 million Euro, while the overall budget for the GrowGreen project was 11.5 million Euro.

- <https://growgreenproject.eu/city-actions/wroclaw/>
- <https://growgreenproject.eu/wp-content/uploads/2022/12/D1.6-Intervention-conclusions-Wroclaw.pdf>
- <https://www.wroclaw.pl/zielony-wroclaw/grow-green-fnal-projektu-brest-konferencja-listopad-2022>
- <https://www.wroclaw.pl/growgreen/z-podworek-na-olbinie-znikna-klepiska>
- <https://www.wroclaw.pl/growgreen/pierwsza-faza-konsultacji-zakonczona-raporty>
- <https://networknature.eu/casestudy/28829>
- <https://doi.org/10.3390/w14162453>

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