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ADAPTATION TO CLIMATE CHANGE

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Adapting Heritage Gardens to Climate Change in Oldenburg, Germany

Developing best practice models for increasing climate resilience of urban green spaces

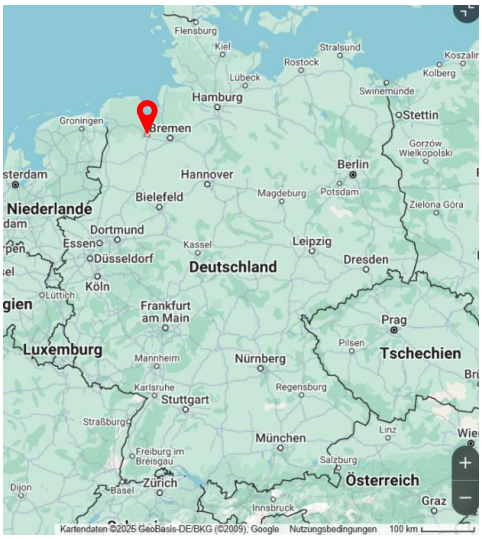
Implementing structural climate adaptation measures in two heritage-listed public parks, while addressing the urgent social need to promote sustainable thinking among the population.

Key Learnings

- **Climate Adaptation Requires Structure and Awareness**: Adapting historic parks to climate change requires a combination of ecological, technical, and social approaches. Beyond structural measures, mental climate adaptation is crucial: through education, experience and active engagement, the project nurtures a sustainable mindset that extends far beyond its immediate scope.
- **Communication as a Success Factor**: When implementing visible changes in historic and beloved green spaces continuous and transparent communication is essential. A well-planned Public Relations and engagement strategy fosters acceptance, creates understanding and actively involves the community in the transformation process.
- **Participation as Key to Sustainable Development**: Involving citizens from the beginning enables long-term and viable solutions. The project demonstrates that participation strengthens the connection to urban green spaces and serves as a learning process for societal change – both for those initiating it and those participating.

About the region

Oldenburg, located in northern Germany's Lower Saxony, is home to about 176,000 inhabitants (2024) and covers an area of about 103 km². The public parks Schlossgarten and Eversten Holz are valuable, highly frequented local green areas near the city centre and provide essential habitats for flora and fauna. They significantly influence the city's climate, producing oxygen, storing CO_2, purifying the air, and helping cool the urban environment. Beyond their ecological importance, these historic gardens offer high recreational value, enhancing visitors' well-being. They provide a tranquil escape from urban life, fostering relaxation in urban natural spaces, water and wildlife.



Climate Hazards

Droughts, Extreme Heat, Flooding, Water Scarcity,

Storms

Sector

Biodiversity protection, Cultural Heritage, Forestry, Urban,

Water Management

Key system

Ecosystem and Nature Based Solutions, Water Management, Health and Wellbeing

Climate Threats

From 1881 to now, the average annual temperature in Lower Saxony has increased by 1.5°C. Additionally, weather patterns are shifting, with more summer days reaching temperatures above 25°C and fewer frosty days with temperatures below 0°C. Extreme weather events such as storms, heatwaves, and heavy rains that cause floods are becoming more frequent and visible in the heritage gardens. Inadequate water circulation and insufficient water retention capacity in Oldenburg's parks are causing plants to suffer from excess or lacking water supply. Lately, increasing storm damage has posed a significant threat to ageing trees. These changes particularly affect trees in both green spaces, Schlossgarten and Eversten Holz. Therefore, rainwater retention and groundwater recharge play a crucial role in climate adaptation.

"Climate adaptation is more than just structural measures – it requires an awareness shift. Through participation, science, and collective action, we preserve historic green spaces and transform them into learning hubs for a sustainable future.",

Saskia Benthack, Project Manager and Curator Klimaoasen Oldenburg

Climate Adaptation in Urban Green Spaces: The Klimaoasen Oldenburg Project on Garden Monument Resilience

In response to the climate threats facing Oldenburg's inner-city green spaces, the project Klimaoasen Oldenburg (Climate Oases Oldenburg) enhances their climate resilience. An interdisciplinary collaboration between science, city administration, and society safeguards these valuable heritage gardens.

Targeted climate adaptation measures, such as improving water distribution and retention, as well as replanting with climate-resilient species, make Oldenburg's historical green spaces Schlossgarten and Eversten Holz more resilient to the consequences of climate change in the long term. Biodiversity promotion also plays a central role: renaturation measures, habitat improvements and the creation of new ecological niches help to preserve and promote biodiversity.

Figure 1: The first climate adaptation measure implemented was desilting this pond and installing vegetated islands to reduce excess nutrients. Image Credit: Klimaoasen Oldenburg.

On-site Climate Adaptation Measures

The measures include renaturing and revitalising the watercourses and ditches in the Schlossgarten and the Eversten Holz to improve habitats and water retention, absorbing vast amounts of precipitation. Partially renewing the paths with permeable surfaces enhances infiltration capacity, contributes to groundwater formation and fulfils a cooling function.

Many trees suffering from the effects of climate change are severely weakened and infested with pests. As part of a climate-adapted replanting and new maintenance concept, alternative solutions are improving the biodiversity and durability of both green spaces. The new approach nurtures the water- and carbon-storing humus layer and preserves the heritage gardens.

Adaptation measures expand and upgrade habitats to increase the biodiversity of green spaces. Adaptive management strategies ensure future maintenance, species-rich flowering meadows, optimised nesting aids, and more.

Structural climate adaptation measures

- Removing sludge from the pond and creating vegetated islands reduces excess nutrients and purifies the water

- Rehabilitating the ditch system improves water management
- Renaturing the stream improves water retention and biodiversity
- Path renewal with water-permeable surfaces improves retention capacity
- Creating a tree register facilitates maintenance measures
- Creating a climate-adapted replanting concept supports resilient greenery
- Expanding and improving habitats improves biodiversity

In partnership with the City of Oldenburg and the University of Oldenburg, the Landesmuseum Natur und Mensch Oldenburg (State Museum of Nature and Human Oldenburg) coordinates the project‘s scientific and practical implementation. With a total budget of five million euros, the project is funded by the German federal programme “Adaptation of Urban Areas to Climate Change” and the City of Oldenburg.

The project focuses on two heritage gardens, both state-owned properties of the Niedersächsische Landesmuseen Oldenburg (State Museums of Lower Saxony in Oldenburg). To carry out the initiative, the Landesmuseum partnered with the City of Oldenburg, which is eligible and applied for the federal funding. The project received a grant of 4.5 million euros, with the city contributing 500,000 euros.

Participation & Knowledge Transfer: A Unique Approach

Klimaoasen Oldenburg features a strong social anchor, rather than purely structural measures, such as water management and replanting. Urban greenery is a natural space and a social meeting place that strengthens environmental awareness and promotes community involvement. Therefore, the project focused on citizen participation right from the beginning: Open dialogue formats, workshops, and scientifically supported participation processes opened an exchange about the importance of these places for citizens. The aim is to link human use of the natural area more closely with raising awareness of ecological processes and the importance of urban greenery. Combining scientific research, practical action and social dialogue promotes climate awareness, creates knowledge and strengthens community involvement.

To support cultural research, the Landesmuseum Natur und Mensch Oldenburg has collected qualitative data about Oldenburg’s population’s wishes for use of the parks through surveys and events. Combined with research data from the University of Oldenburg on environmental science and regional climate change, this data forms the basis for interactive hands-on facilities and a new guidance system in the Eversten Holz city forest. The hands-on facilities are experience stations or recreational concepts that invite visitors to engage in activities, relax, play or enjoy while consciously encountering the forest and its inhabitants at eye level. This meeting space provides information about the needs of urban forest ecology, raises awareness about natural processes and climate change, and enhances visitors' interest and relevance in these topics.

Diverse interactive elements for environmental education, such as a climate tour, citizen science formats and experience-oriented hands-on stations, combine learning, experience and action. This mental climate adaptation – referring to the psychological and emotional process of adjusting to the realities and impacts of climate change – campaign raises awareness for climate change and sustainable urban development, forming a key component of this participation format. Sharing knowledge in different places is a key part of the project, helping to build greater understanding and awareness of nature and its needs.

Figure 2: Guided tours through the parks make climate change issues tangible on site. Image Credit: Klimaoasen Oldenburg.

Figure 3: The laboratories enable collecting research data on the use and perception of heritage gardens. Image Credit: Klimaoasen Oldenburg.

Governance

The Carl von Ossietzky University of Oldenburg supports the project through scientific research on environmental education and on-site measures, while the Landesmuseum Natur und Mensch Oldenburg leads conceptual design and project management. Due to the sites' popularity, strong community interest in preservation, and high visitor numbers, the project team focused on early public engagement and

communication. To ensure effective coordination, the team created a dedicated press and public relations role and formed an interdisciplinary steering committee, which meets regularly to guide the project. The committee oversees the State Museums of Lower Saxony, as well as the management of Schlossgarten and Eversten Holz, and includes representatives from the University of Oldenburg, the City's Office for Environmental Protection, the Lower Nature Conservation Authority, the State Office for Monument Preservation, and advisory bodies such as State Construction Management and the State Office for Construction and Real Estate, along with other experts as needed.

Model Project for Other Cities

Klimaoasen Oldenburg provides a model of how cities can respond to climate change. Besides making the physical environment climate-resilient through structural measures, mental climate adaptation, enabling citizens to better cope with the expected climate-related changes, plays a vital role in perpetuating sustainable thinking and societal approaches. Innovative local solutions make climate change tangible – at the interface of activity, nature awareness and mindfulness. Combining climate adaptation, citizen participation, and scientific support makes the project a best-practice example of sustainable urban development for other cities and municipalities to learn from and implement similar measures.

Summary

Klimaoasen Oldenburg implements structural climate adaptation measures in historic gardens. Through a participatory museum setting, the project engages the public with regional climate change and adaptation strategies. At the same time, it explores how mental climate adaptation, meaning the understanding and emotional response to climate challenges, can be supported by recognising human needs. This helps build long-term awareness, promotes climate and nature education, and encourages a constructive social mindset. The initiative combines two key areas: practical climate adaptation in urban green spaces and the museum's cultural and educational mission, creating a transformative space for sustainable societal change.

Further information

- Website (in German): www.klimaoasen-oldenburg.de
- Instagram (in German): www.instagram.com/klimaoasen.oldenburg
- Project proposal (in German): https://klimaoasen-oldenburg.de/media/pages/ueber-faq/126eba445c-1680163053/antrag-klimaoasen.pdf

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