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Case Study

Berlin, Germany: Sponge City- Preparing for a hotter climate

Problem to resolve: Global warming will cause water shortages in many cities which in the past did not experience any shortage.

Primary Tools:

Secondary Tools: Urban public and private greening

Background.

Heat waves and rainstorms will become common in northern Germany as climate change deepens. Experts envision heat- and flood-proofing the city of Berlin by making it into an "urban sponge," with green roofs and wetlands. More trees and sidewalk awnings to provide shade; living rooftops covered in moss and grasses; light-coloured buildings that reflect rather than absorb heat; special heat-resistant road surfaces to prevent tarmac melting on very hot days; urban wetlands and more permeable surfaces to absorb and store water during heavy rainfall.

Backyard greening and gardening in Berlin

Precautions against water shortages are some of the specific climate adaptation interventions a consortium of experts has recommended in a new report. The measures are meant to make the city of Berlin more resilient and livable in the face of climate changes expected in coming years and decades. The experts' urban design ideas were solicited by the Senate of Berlin, the city's governing body, and published this week under the unwieldy moniker "StEP Klima KONKRET." The city has, since 2007, gradually developed substantial expertise in modelling how Berlin's city-scape will be affected by climate change. Now, it's pushing for tangibles moves towards long-term adaptation.

Climate changes will hit some countries much harder than Germany, but northern Europe won't be exempt from tough impacts. In 2003, an extreme heat-wave lasting weeks caused numerous deaths in Germany. In years since, devastating floods were caused by days of unusually heavy rain in various parts of the country. Such events were highly unusual during the 20th century, but by the mid-20th century, as global warming gathers pace, they're expected to be commonplace.

Berlin, a European sponge city[1]

Berlin Sancoussi Parc (Photo: K. Mathey)

The cityscape as a water-sponge.[2]

Water management has ben defined to become the key to mitigating the effects of climate change on the urban environment. According to the 'sponge-city' concept, sealing up too much of the ground surface with concrete or tarmac must be avoided. For example, parking areas and median strips can be resurfaced to allow water absorption into the ground.

Building owners are encouraged to "re-green" the inner courtyards typical of Berlin apartment buildings. Rooftops planted with mosses or grasses can also absorb water, and then release it through evaporation later on. That results in an evaporative cooling effect, in the same way that sweat evaporating from the skin cools an overheating athlete. Other features like ponds, ditches and urban wetlands, as well as parks and green-spaces are envisaged - including inner courtyard gardens and green strips along roads, capable of absorbing a lot of water during heavy rainfall events. The goal is to retain rainwater within the cityscape, so that part of it evaporates and the rest of it releases gradually, rather than in an abrupt rush, into Berlin's rivers and lakes. This will prevent flooding of basements and sewer systems, and it also protects water quality in the capital's many lakes and rivers. Rapid runoff causes all kinds of urban dirt to get swept into surface waters. Even natural materials like pollen and flower buds dropped from urban trees can cause fish kills when they're swept into lakes, by overloading them with nutrients and using up the oxygen in the water, Stock explained.

Will real estate developers implement the recommendations?

The city administration will use its powers to negotiate agreements with real estate developers over the details of projects subject to planning permissions to encourage climate-adaptive features like green rooftops etc. New buildings should be adapted to a hotter climate, but without the need to installing electricity-hungry air-conditioning units during summers in future. Such buildings can be promoted, for example, through green building design competitions, citizen engagement strategies such as the city's existing, very successful tree-planting sponsorship programs, and various subsidy programs.

Retrofitting will be a key effort. Although Berlin's population is in a period of sustained growth, the city wants to prevent urban sprawl. That means further increasing the density of residents per square kilometer, even as the city strives to maintain or improve livability as well as resilience in the face of climate change. We do have, of course, to deal with the problem that putting a planted garden on top of a building is significantly more expensive than a conventional roof. One answer could be a case where a building's roof is getting tired and needs to be replaced anyway; it can be a smart business move to replace it with a combination of solar panels, planted green surfaces, and a deck accessible to the residents. That enhances the value of the property and makes it more attractive to renters or buyers.

Green roof over a clinic in Berlin[3]

Green roof an solar collectors in Berlin[4]

Credentials:

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Sources and Further Reading

For more case studies on **Green Urbanism and Ecological Infrastructure see:**
http://courses.umass.edu/greenurb/2006/

References

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[2] Source: Sponge City: Berlin plans for a hotter climate. *Deutsche Welle* 22 July 2016. http://m.dw.com/en/sponge-city-berlin-plans-for-a-hotter-climate/a-19420517
[3] http://www.greenroofs.com/blog/wp-content/uploads/2017/04/WGIC2017-Wiegmann-Klinik-Berlin.jpg
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