Nature-based solutions generate greener urban renewal

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Green wall at a homeless shelter in the proGIreg Living Lab in Turin. Credit: © proGIreg / Nea Pakarinen, 2022

Nature-based solutions are being adopted into urban renewal projects to mitigate the effects of climate change and create healthier communities.

Long lockdowns during the coronavirus pandemic offered a reminder of the restorative power of nature for the body and mind. Yet, reconnecting people with nature, particularly in cities, has been the focus of several European research projects since well before the outbreak of COVID-19 almost three years ago.

These projects are using solutions from nature to tackle fundamental economic, environmental, health and social challenges in a bid to improve urban living conditions in general. They bring together European cities to chart paths toward a more sustainable socio-economic system and improve well-being.

Take Dortmund in Germany, Turin in Italy and Zagreb in Croatia. They are part of a project to add biodiversity-rich greenery to urban areas and to create economically beneficial environmental resources.

"It's not just planting a tree," said Dr. Axel Timpe at RWTH Aachen University in Germany. "It's building a living system that creates a productive output."

He is coordinating the proGIreg project, which is tackling the challenge of post-industrial regeneration by creating living labs in urban areas.

Dortmund, in the Rhine-Ruhr industrial heartland of Germany, was once a steelmaking hub. Turin, in the shadow of the Alps, is home to the one-time world's largest car factory at Lingotto, now largely disused. Zagreb, the capital of Croatia, used to have the world's largest pig farm and a vast sausage-making factory—both now defunct.

While their appearances, geographies and histories differ, the three cities

face some similar challenges. Lacking high-quality green spaces, these areas suffer from social and economic disadvantages.

Urban cultivation

In that context, one of the project's goals has been to turn a landfill in Dortmund into a park. This area is being cleaned up and planted with trees, while solar panels are used to generate energy and wildflower meadows are cultivated.

The project is also fostering urban farming with a particular emphasis on fish and plants—a food production system known as aquaponics. This combination of fish farming (aquaculture) and cultivating plants without soil (hydroponics) uses less land than traditional agriculture.

Nutrient rich aquaculture water is fed to the plants in an ancient form of food production that has found a new role to play in urban areas. Working with local citizens, the project's aquaponics systems make local food production more economically viable.

Turin has given over land to volunteers to open an urban farm in a post-industrial neighborhood, where a range of activities takes place, according to Dr. Timpe.

The volunteers rent out plots for people to use as gardens and aquaponics are used to grow high-quality herbs for local restaurants. There's a garden for people with special needs. Cooking and gardening classes are offered there too.

"The whole thing is also a business," said Dr. Timpe. "The volunteers who run this now make their living from it, and they have a small shop on site as well."

Enlisting nature

Floating aquaponics beds for herb and salad production in the proGIreg Living Lab in Turin. Credit: © proGIreg / Nea Pakarinen, 2022

The overall goal of such projects is to make our cities better places to live through "nature-based solutions"—or NBS (see box below). That means enlisting nature to tackle the biggest threats of our age—including threats to food, water, biodiversity, human health, the economy and the climate.

The classic example of using NBS is the planting of tropical trees known as mangroves along coasts in Papua New Guinea to defend them from

erosion. Another example is, the installation in Malmö, Sweden of green roofs, which are used to cool buildings in summer and prevent heat loss in winter, and a system of open soil drainage, biodiversity-rich ponds and overflow areas, which helps to improve drainage mitigating the risk of flooding.

The researchers are looking beyond technical solutions, getting to grips with tricky questions such as the role of local communities in designing and implementing NBS and the best way to combine multiple nature-based solutions.

Along with Dortmund, Turin and Zagreb in their front-runner roles, proGIreg is working with several follower cities to build on lessons learned so far. These are Cascais in Portugal, Cluj-Napoca in Romania, Piraeus in Greece and Zenica in Bosnia and Herzegovina.

Dr. Timpe and his team are producing a catalog of business models that can help local people keep the activities running sustainably.

Social focus

Another project developing nature-based solutions is called URBiNAT, which is working initially with three cities including Sofia (Bulgaria), Nantes (France) and Porto (Portugal).

URBiNAT has a particularly strong social focus. At a later stage, Brussels in Belgium, Siena in Italy, Høje-Taastrup in Denmark, Nova Gorica in Slovenia and other places are due to join. People living on the outskirts of these places frequently lack good jobs and feature high rates of school absenteeism.

"Often, they also feel very disconnected from the city they live in," said Dr. Gonçalo Canto Moniz at the Center for Social Studies of the

University of Coimbra in Portugal, speaking of community residents. He is coordinating URBiNAT with Isabel Ferreira, Nathalie Nunes and Beatriz Caitana.

"There is no sense of belonging."

Their project seeks to expand on the concept of NBS so that it also takes account of human nature. Concretely, this means the development of things like local markets, where the focus is not so much on growing trees and plants as on fostering a sense of community. They also find ways to blend the natural and the social, like a winter garden that also functions as an outdoor classroom.

URBiNAT creates NBS in concert with locals but it stands out for the way it clusters NBS in groups. The thinking here is that, by linking up NBS in a particular area, it magnifies the positive effects.

Health corridors

Dr. Canto Moniz and his team took inspiration from the concept of "green corridors" which are areas of land given back to nature so that animals and insects can move around unhindered. They wanted to explore what they called a "healthy corridor" to connect disadvantaged neighborhoods. So far, the project has set up a whole catalog of wide-ranging NBS—from community gardens to green walls—in the front-runner cities.

Aerial technology is used to collect evidence of the results. Drones fitted with thermal imaging cameras will be deployed to determine how much newly planted trees and other greenery have reduced street-level temperatures. Surveys conducted with locals will compare their socio-economic well-being before and after the NBS are put in place.

The projects of Dr. Canto Moniz and Dr. Timpe both began in 2018 and will conclude next year although their NBS have no end dates.

"They're here to stay," said Dr. Timpe.

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