



Tiny Forests like this one in the Netherlands, are becoming more common around the world.

PHOTOGRAPH BY IVN NATUUREDUCTIE

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Why 'tiny forests' are popping up in big cities

Community forests the size of a basketball court can make an outsized difference, providing shade, attracting plants and animals, and even storing a bit of carbon.

By Elizabeth Hewitt

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It's a warm June afternoon, and in a thicket of elm and willow trees, a magpie chatters. A beetle crawls over a leaf. The forest, next to an 18-story building and a train line, is about the size of a nearby basketball court; before it was planted in 2018, the area was a parking lot.

year, according to IVN Nature Education, the organization leading the country's initiative, there will be 200.

In Europe, India, and other countries, communities are creating small-footprint, native forests as hyperlocal responses to large-scale environmental challenges. The forests attract biodiversity, including insects and new plant species, data released in April shows. And while even proponents say they won't solve climate change by themselves, research shows these small patches of nature can contribute to carbon sequestration and help cities adapt to rising temperatures.

Since the first forest was planted in the Netherlands in 2015, the concept has become popular among both municipalities and private landowners. Daan Bleichrodt, who launched IVN's Tiny Forest initiative with the goal of making nature more accessible to children, said he thinks they are popular because people are becoming more aware of major environmental challenges.

"We basically made a mess of the world and a lot of people want to do something, but they don't know: 'What can I do?'" he said. The forests can be built in under a year. "It's a very practical way to do something positive in light of climate change and loss of biodiversity."

The Miyawaki Method

The small-footprint projects are based on the work of Japanese botanist Akira Miyawaki, who, beginning in the 1970s, pioneered a method of planting young indigenous species close together to quickly regenerate

Forest sites for a mixture of their main species. “The planting should center on the primary trees of the location, and following the laws of the natural forest,” he wrote in a 2006 [essay](#) upon accepting the Blue Planet award.

Competing for light, the saplings grow quickly, explained Miyawaki’s collaborator Kazue Fujiwara. According to Fujiwara, the method can work anywhere, even in plots as small as one meter wide, though she said a minimum of three meters is easier to plant a mix of species. “Where people want natural forest for protecting life, people can use the Miyawaki method.”

The method was popularized by Shubhendu Sharma, who learned about Miyawaki’s forest creation technique when, in 2009, the botanist created a forest at the Toyota factory in India where Sharma worked as an engineer.

Inspired by the forest’s rapid growth, Sharma started a company to create similar forests, researching the method and trying it in his own backyard. He described his work in a 2014 [TED Talk](#), and released his version of the [instructions](#) so anyone could learn how to create their own small native forest.

similar forests in Belgium, France, and the United Kingdom. Cities in Asia are embracing Miyawaki-style urban forests, with politicians in Pakistan and India outlining ambitions to plant many more In February, Pakistani Prime Minister Imran Khan announced plans for 50 Miyawaki forests in Lahore, and in Chennai, India, officials set a target to plant 1,000.



This Tiny Forest was planted in Zaandam, The Netherlands, in 2015.

PHOTOGRAPH BY AFFORESTT



The same Tiny Forest in 2017

PHOTOGRAPH BY AFFORESTT

Making a forest

Under Sharma's guidance, IVN planted the first Dutch Tiny Forest in Zaanstad in 2015, and released its own [handbook](#). Each forest begins with a survey of nearby trees to determine natural species in the area. Dutch tree species include beech, oak, and birch. Forests also include lower-growing species, such as guelder rose or hazel. A Tiny Forest typically includes between 20 and 40 different tree and shrub species, according to Bleichrodt, and saplings are planted three per square meter.

Public projects, which IVN coordinates with a local school, community members and a municipality, usually range between 200 and 250 square meters—roughly equivalent to a tennis court. The forests can be any shape, but per IVN's instructions, must be at least four meters wide. IVN and municipalities split the total cost—including training teachers to hold lessons in the forest—which averages between 20,000-22,000 euros, Bleichrodt said.

backyard forests in the Netherlands, Bleichrodt said. In 2019, for enthusiasts with limited space, IVN launched Tuiny Forest (a pun—tuin means garden), which can be ordered online for about \$150 (124.95 euros) and will fit into just six square meters.

Jeroen Schenkels, a senior advisor for the city of Utrecht on green planning, said he sees the mini forests as nature-based solutions that can help the city weather heat waves and improve water retention. But one of the biggest values is social.

“One of the most important things is that you give people the opportunity to be involved in nature in the neighborhood,” Schenkels said.



A year-round study of Tiny Forests in 2017 revealed an increase in their biodiversity.

Data released by Wageningen University researchers in April shows that the forests host a range of animal and plant species. Across the 11 Tiny Forests in the study, volunteers observed 636 animal species. They also identified 298 plant species in addition to the original species planted in the plots. Maintenance of the forests occasionally involves thinning out aggressive weeds, but in general new plant species, such as wildflowers that appear, are allowed to grow, according to Bleichrodt.

Suzanne Valkman, head of the Netherlands forests unit at the World Wide Fund for Nature (WWF), said she was amazed to see how many total species were identified.

“It was not something I expected,” Valkman said. “I guess it's a sign how successful it is and how good it is also to plant those different trees.”

A WWF report in 2020 found that wildlife populations in the Netherlands decreased by half over the last three decades; butterflies, bird, and reptile species were particularly hard hit. Valkman said the Tiny Forest data show that the small projects can boost that biodiversity in cities.

Between 2018 and 2020, volunteers observed 40 different plant and animal groups, including bees, snails, spiders, and earthworms—and 121 total animal species—at the Muziekplein forest in Utrecht alone, according to the recently released data.

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Wageningen University researcher Fabrice Ottburg, who is leading the studies of Dutch Tiny Forests, said the forests can make a difference as part of a broader strategy to introduce more green spaces into urban areas.

Ottburg said he is often asked if he finds rare species in the forests, which is very unlikely in urban areas. But the presence of common species is important.

“The ordinary species, such as beetles and bees, make it special and that makes me enthusiastic,” he said, “because they are an important link in the food chain.”

Carbon and climate change

Preliminary carbon sequestration data shows that the Tiny Forest planting method is on par with other forms of reforestation in the Netherlands. Wageningen researchers found, on average, that each sequestered about 127.5 kilograms of carbon in 2020. That works out to match the rate researchers found for other young forests less than 10 years old in the Netherlands, adjusting for the smaller size.

Carbon sequestration varied across the Tiny Forests, according to the study. One of the oldest, a 245.7-square-meter forest in Zaanstad, sequestered 631.2 kilograms in 2020, according to the study. Meanwhile, one of the youngest, a 231.6-square-meter forest planted in Almere in 2018, sequestered just 4.3 kilograms; researchers wrote that vandalism—trees had been broken—also likely contributed.

Based on other research, including the sequestration rates of the same tree species in other locations, Ottburg said, researchers predict that as the small forests mature, an average 250-square-meter forest will eventually sequester 250 kilograms of carbon annually. That is similar to the average rate for Dutch forests between 10 and 50 years old, which works out to about 227.5 kilograms annually for an area comparable to a Tiny Forest.

emissions will do that, he said.

“The main goal of the project is to connect kids and people to nature,” he said. “It’s a great effect that they sequester carbon, but we’re not going to set a target for that.”

Cécile Girardin, of Oxford University’s Nature-Based Solutions Initiative, recently published a finding that if large-scale nature-based solutions are implemented globally, they could contribute to reducing warming by 0.1 degree Celsius in a scenario that assumes peak warming of 2.7°F (1.5°C) in 2055. Though nature-based solutions can have an impact, she said, they can’t substitute decarbonizing the economy.

But instead of measuring the mini forests based on carbon sequestration, she said, it’s better to gauge them on impacts like urban cooling, water regulation, biodiversity, and more.

Using native species, which are adapted to the local environment, helps to create ecosystems that can survive over time, she said. She cautioned against removing a natural meadow or a resource, like a community garden, that people rely on, in order to plant a forest.

Also, she said, the projects shouldn’t be limited to forests, if, for instance, the area would naturally be a grassland. Instead of “tiny forest,” she suggested, they could be called “tiny ecosystems.”

More research and refining

Fujiwara, who worked with Miyawaki, said some forests planted in India and the Netherlands do not truly follow Miyawaki’s method to create natural forests because of the species selection. Some used fast-growing species such as willow or alder; some had too many different species.

Sharma acknowledged that Afforestt had planted forests without surveying natural species. After Fujiwara raised concerns in 2016, Afforestt adjusted its approach to prioritize the forest survey, and they are still learning, he said. The company is preparing to launch an institute to teach aspiring forest-makers.

Bleichrodt is also aware of Fujiwara's concerns. Fujiwara plans to host users of the Miyawaki method in Japan to teach them more about the process.

Meanwhile, the popularity of miniature forests continues to grow.

In the U.K., the first was planted in March 2020. Victor Beumer, an ecologist running the program for Earthwatch, said the organization plans to train volunteers to collect data, including on biodiversity and carbon sequestration, so the environmental impacts of the forests can be tracked over time.

Already, there are 17 forests in the U.K., and Beumer said 21 will be planted in the next year.

By 2026, Bleichrodt said he hopes to see a small-footprint forest in every country in the European Union.

Editor's note: The correct name for the WWF is the World Wide Fund for Nature.

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