Science & Technology

The Incredible Environmental Benefits of NYC Trees

A new Columbia study reveals how urban green spaces absorb carbon dioxide and combat global warming.

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Amanda Ahn / Alamy

Studies have shown that public parks, community gardens, and landscaped boulevards in inner cities can be life-altering, improving residents' mental health, cooling off their neighborhoods in the summer, and filtering the air they breathe.

But urban green spaces also play an underappreciated role in absorbing atmospheric CO2 and in combating global warming, according to a new Columbia study of vegetation in New York City. On a typical summer afternoon, the researchers discovered, the trees, shrubs, flowers, herbs, and grasses in New York's five boroughs collectively absorb more than 40 percent of the city's total CO2 emissions.

"That's a much larger impact than we expected to see," says atmospheric chemist Róisín Commane, who led the research team at the Columbia Climate School's Lamont-Doherty Earth Observatory.

Until now, Commane says, scientists have lacked reliable estimates of the amount of CO2 absorbed by urban vegetation because they did not know how much plant life exists in cities. "Researchers who study the role of trees in the carbon cycle have traditionally focused on assessing the absorption and storage capacity of large forests," she says. "Looking at satellite images of the northeastern US, for example, they'd see New York City as a gray box and largely disregard it. They wouldn't consider the contributions of the individual trees that line city streets, the little lawns behind row houses, and the rooftop gardens."

In the study, Commane, postdoctoral researcher Dandan Wei, and several colleagues used a new type of ultra-high-resolution map that breaks down New York City into a grid of six-inch squares to help them to identify tiny patches of carbon-capturing vegetation that previous surveys had missed. This led the scientists to conclude that approximately one-third of the city's total surface area is covered by vegetation, more than twice as much as past studies had assumed.

"There's a tremendous amount of photosynthesis and CO2 absorption taking place that we weren't aware of," says Wei, who is the paper's lead author.

The new findings do not invalidate previous estimates of New York City's total carbon footprint, which are based largely on CO2 measurements gathered at power plants, buildings, roadways, and other sources of pollution. But Commane says that her team's discovery highlights the incalculable importance of urban greenery.

"We already knew that street trees had this great benefit of cooling and providing shade," she says. "That they're also inhaling enormous amounts of CO2 is an added bonus."

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