

Can a city store as much carbon as a forest?

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As cities expand into forests and agricultural land, what can be done to maintain the area's carbon storage capacity? Credit: Mikko Raskinen / Aalto University

A team of researchers at Aalto University has developed a new tool to help urban planners keep urban developments in line with climate goals. The tool provides a metric that planners can use to improve carbon-neutral planning of urban growth, which is essential for meeting carbon

emission targets.

Urban growth commonly encroaches on forested areas and agricultural land. This means that cities consume carbon sinks as they grow, which makes it harder for municipalities and countries to reach the net-zero emissions targets that are vital to avoid a climate catastrophe. The new metric, called the [carbon storage](#) (CS) factor, reflects how much carbon can be captured in planned urban developments. It is described in a paper published in *Environmental Research Letters*.

The CS factor enables [urban planners](#) to evaluate how a new development will affect the city's carbon balance. By comparing the amount of storage capacity lost (for example, from deforestation) with the CS factor of development plans that use different approaches and technologies, planners can ensure that [urban development](#) maintains or even restores the region's natural carbon storage capacity.

"There are many tools available to increase the CS factor. Increasing wooden construction is a good option in some regions, but it's also possible to store carbon in the soil using biochar and other tools, or to include new fast-growing plants in the landscape, or even through direct carbon capture and storage technologies. We hope planners will adopt this mindset and use the CS factor to help them plan sustainable urban growth," says Aalto Professor Seppo Junnila, who led the study.

The researchers used the CS factor to evaluate how wooden construction in Finland's capital region could compensate for deforestation from [urban growth](#). They found that using the right kind of wooden construction technologies would mean that as much as 70% of future construction could preserve the lost forest's carbon storage capacity. This would require using methods that store significant amounts of carbon, such as log or cross-laminated timber.

The study also showed that similar results could be obtained using wooden construction elsewhere in Europe, Asia and Oceania. However, the researchers stress that increased wooden construction is only a sustainable choice if forests are sustainably managed.

"Our goal isn't to encourage cities to expand into new areas but to provide planners with tools to mitigate the impact of development on [carbon](#) storage when forest clearing is unavoidable," says Junnila.

More information: Ilmari Talvitie et al, Can future cities grow a carbon storage equal to forests?, *Environmental Research Letters* (2023). [DOI: 10.1088/1748-9326/acc677](https://doi.org/10.1088/1748-9326/acc677)

Provided by Aalto University

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