

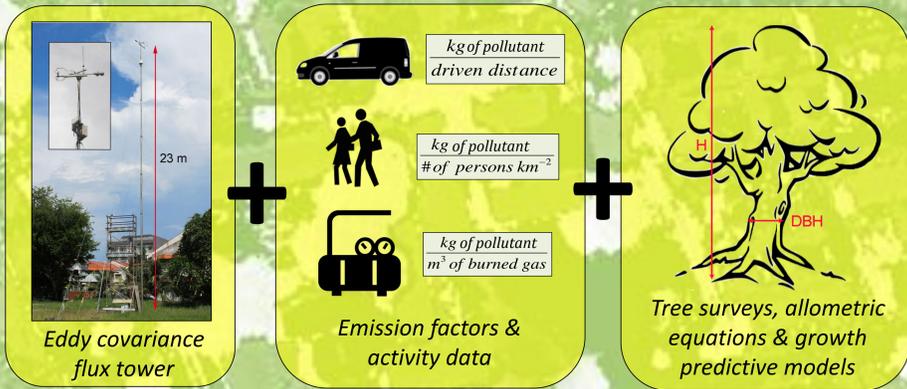
Does urban vegetation enhance carbon sequestration?

Erik Velasco^{1*}
 Matthias Roth²
 Leslie Norford¹
 Luisa T. Molina³

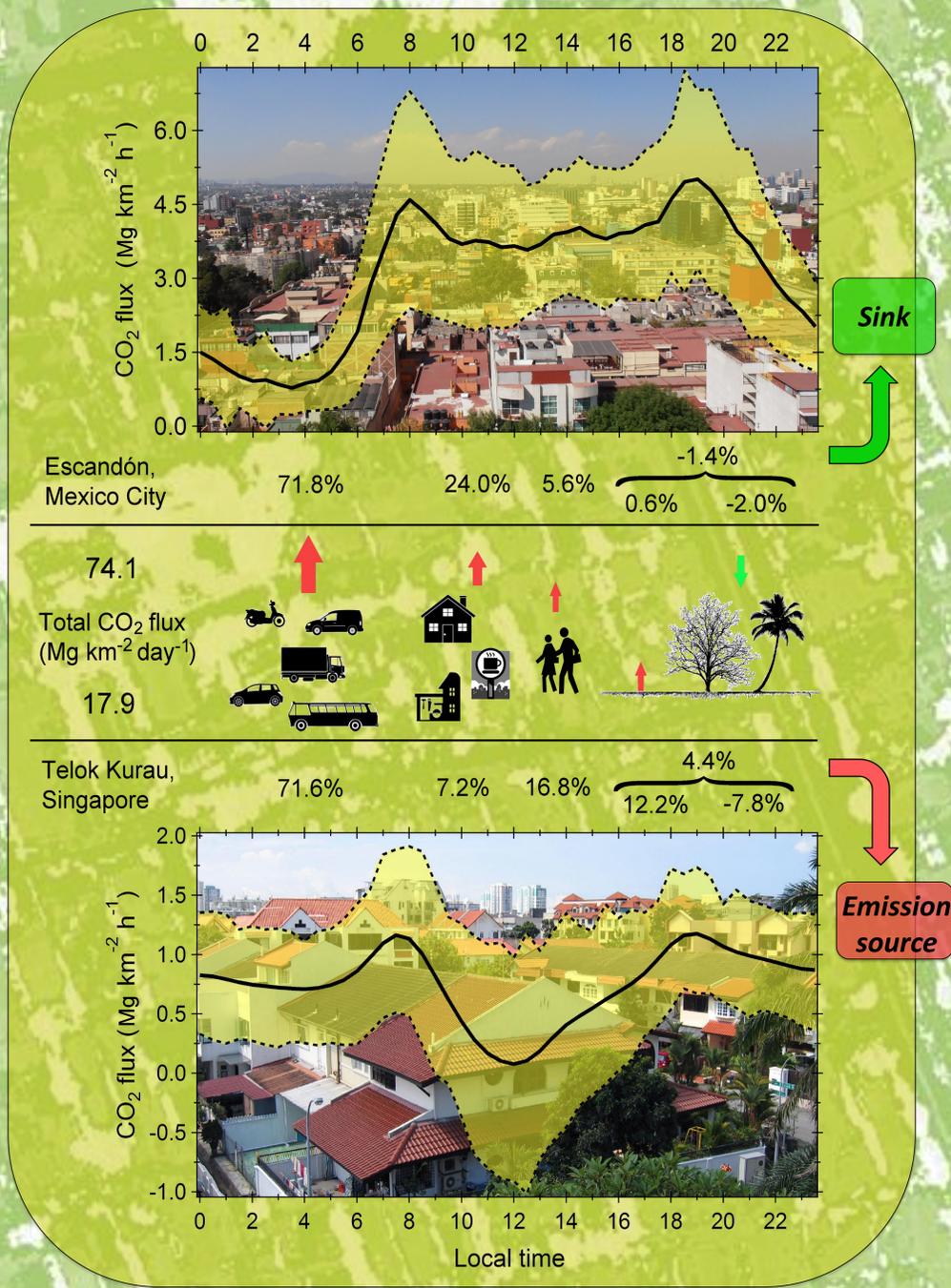
Many cities are developing policies to promote greenery as a measure to reduce their greenhouse gas emissions. However, the potential to directly remove CO₂ from the atmosphere by urban vegetation is still poorly supported by scientific evidence.

Current assessments consider only the carbon accumulated by trees and usually neglect the contribution from soil respiration and the emissions associated with greenery management. Studies in mid-latitude cities suggest that the carbon uptake by urban vegetation is small compared to the magnitude of the anthropogenic emissions.

The usually evergreen vegetation in (sub)tropical cities may have the potential for a larger carbon sequestration. To investigate this, the CO₂ flux data from two sites in Singapore and Mexico City were analyzed (Velasco et al., 2013; 2014). Results suggest that (sub)tropical vegetation may act as either an emission source or sink depending on the species and characteristics of the trees and the amount of pervious surfaces for soil respiration.



	Escandón, Mexico City	Telok Kurau, Singapore
Climate (Köppen classification)	Subtropical highland (Cwb)	Tropical rainforest (Af)
Temperature (°C) min. - mean - max.	10 - 16 - 24	25 - 27 - 32
Annual rainfall (mm)	820	2340
Population density (inhabitants km ⁻²)	8038	7491
Surface covered by buildings, roads & sidewalks, and vegetation	57%, 37%, 6%	39%, 46%, 15%
Buildings height (m)	9.7 ± 4.6	9.9 ± 4.0
Albedo	0.112 ± 0.007	0.158 ± 0.003
Number of trees (trees km ⁻²)	5276	5856
Tree height (m)	10.4 ± 6.0	7.3 ± 3.7
Fraction of large trees (DBH ≥ 20 cm)	64%	37%
Species	97.2% woody trees 2.4% yuccas 0.4% palms	60.6% woody trees 34.1% palms 5.3% banana plants
CO ₂ (carbon) storage (Mg km ⁻²)	6330 (1725)	6337 (1727)



Urban planning decisions and reforestation programs should give priority to large and mature trees. Carbon sequestration depends on the biomass available and not on the extension of green areas.

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Key points

A complete assessment needs to consider both the carbon accumulated by trees and the soil respiration, as well as the emissions associated with greenery management.

Although there are many environmental and social benefits to urban greenery, current research points to a limited role as an effective measure to enhance carbon sequestration.

¹ Singapore-MIT Alliance for Research and Technology.
² Dept. of Geography, National University of Singapore.
³ Molina Center for Energy and the Environment
 * evelasco@smart.mit.edu