

Title:

The efficacy of trees in improving urban environmental quality: The pros and cons.

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Abstract:

Much of the existing literature on urban green spaces promote and advocate the benefits of urban trees in improving environmental quality and sustainability in cities. In general, there is a normative assumption that trees are good and will mitigate most urban environmental problems. However, the unprecedented rate of urbanization, the lack or prioritization of tree preservation by city governments and decision makers, and recent literature characterizing the “ecosystem disservices” and costs of urban trees and green spaces often brings into question the assumption that the net effect of trees on environmental quality is positive. To objectively assess the role of trees in urban environmental quality improvement, I will discuss the literature on the ecosystem services and disservices of urban trees. I will then compare quantified estimates of urban trees effects on carbon dioxide sequestration and air quality improvement with existing environmental quality improvement policies and technologies. Tree effects on climate change will be assessed using research results from Hangzhou, China and two different sized urban areas in Florida in the United States. The role of trees in improving air quality will be assessed using a cost-effective analysis study from Santiago, Chile. Other research on tree effects on energy use and mitigation of hurricane forced winds will also be presented. These analyses indicate that in general: 1. “Efficacy” depends on the context of the city, pollutant, and policies being analyzed, 2. Disadvantages or costs of trees are little studied and rarely reported, 3. Increased urban density decreases the effect that trees have on environment quality, and 4. Commonly quantified environmental benefits of trees are often outweighed by other site-specific and more relevant social, economic, and environmental functions and ecosystem services.