Air pollutant removal and carbon sequestration by urban trees in Medellin, Colombia

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ABSTRACT

Urban forests perform different functions that result in the improvement of environmental quality and the well-being of the population. The assessment of urban forest ecosystem serves as a tool for the management of urban green areas, and as a scientific support for the formulation of environmental regulations. The objectives of the project was to estimate tree cover, and quantify the removal of air pollutants and carbon by trees in Medellin and its metropolitan area, and to recommend strategies for optimizing those services. The software i-Tree Canopy and i-Tree Eco, developed by the USDA Forest Service, were used to assess the structure of the urban forest and quantify ecosystem services. Results reveal: 23% tree cover, removal of pollutants of 228 tons/year, carbon sequestration of 4,700 ton/year, both accounting for a total of 2 million dollars/year. Based on the results, we proposed strategies to optimize ecosystem services of the urban forest and to create mechanisms of compensation for tree cover loss. The results obtained can be taken into account in regulations related to urban forest management in Medellin. Finally, we show the results obtained from a search on urban tree species and air quality and weather data of different cities in Colombia. This information will be included in the i-Tree Database, in order to make the software applications available to different users in the country. Similar studies can be developed in other cities of Colombia and Latin America.

BIOGRAPHY

Maria Arroyave graduated with a bachelor´s degree in Forest Engineering from the National University of Colombia. She has a Master of Science in Ecosystems. Maria works as an associate professor and a researcher at the Universidad EIA (Colombia), where she teaches courses on Biodiversity, Ecology, and Urban Forestry. Her main topics of research are urban forest ecosystem services, economic value of trees, and tree health. She is the academic director of Continuing Education courses on Urban Forestry, since 2008. Maria is the co-author of several publications related to biodiversity, urban ecology, ecosystem services, and urban forest management. She has been the co-organizer of several urban forestry academic events in Colombia. One of the most significant projects she has worked on is the assessment of urban forest ecosystem services in Medellin city and the Aburrá Valley, Colombia. During the project, the software i-Tree Eco was used to analyze the structure of the urban forest and quantify ecosystem services. Maria was the recipient of an award in 2018 given by the Colombian Association of Arboriculture, in recognition for her worthy work on urban forestry in Colombia.