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Counting Brazil's urban trees will help make Brazil's urban trees count

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In their paper *US Urban Forest Statistics, Values, and Projections*, David Nowak and Eric Greenfield provided an impressive summary of the urban forests of the continental United States. The authors provided updated data on the ecosystem services provided by urban forests and their monetary valuation, and new estimates of urban forest structure (number of trees, leaf biomass, etc.). Their analysis can be used to inform managers about the value and magnitude of their urban forests, a key step in the development of best practice management.

The authors highlight factors that justify the importance of developing a better understanding of urban forests. Most important, more than 80% of Americans live in cities, and urban tree cover brings a number of human health benefits, and urban forests can mitigate some impacts of urbanization and reduce their effects on contiguous rural forests. However, they acknowledge that at the political level, current understanding of this resource is limited, and that there is a need for better management and public policies for urban forests.

Nowak & Greenfield allows us to draw some parallels with the situation with Brazilian urban forests. In Brazil, 84.4% of the population lives in cities. Brazilian urbanization has caused a wide range of negative social and environmental impacts, mainly due to the low levels of planning and environmental management. In this sense, understanding Brazilian urban forest resources, as proposed by Nowak and Greenfield, has a strategic character.

Unfortunately, our understanding of the status of Brazilian urban forests is much more limited than that of their North American counterparts. Data, mainly on the species used in roadside tree planting, are scattered in scientific articles, and do not cover all 5570 cities in Brazil. The Brazilian Institute of Geography and Statistics (IBGE), an agency of the Brazilian federal government, compiles on its website "IBGE Cidades" the percentages of afforestation of public roads in Brazilian cities. For example, in the city of Rio de Janeiro, 70.5% of its urban households have at least one tree on the portion of sidewalk adjoining their home. Of course, these statistics say very little about the ability of Brazilian cities' trees to provide the ecosystem services quantified by Nowak & Greenfield.

Despite the paucity of data on urban trees in Brazil, it is evident that there is a marked inequality in access to urban tree cover and its benefits. Mirroring the immense income differences between poor neighborhoods and more wealthy neighborhoods, poor neighborhoods commonly lack parks or tree-lined squares, and tree-planting is precarious (ANGEOLETTO et al. 2017). Furthermore, urban afforestation in Brazil is typified by the low diversity of species used for road tree planting. The example of the city of Rondonópolis is instructive. Rondonopolis is located in the Cerrado Biome, a tropical savannah with hundreds of tree species that could be used for afforestation and support local biodiversity. However, 92% of the trees planted on its sidewalks are of a

single species, *Licania tomentosa*, a tree originating from another Brazilian biome, the Atlantic Forest (DUARTE, 2016).

Nowak & Greenfield note that in North American cities, land use with the highest percentage of tree cover is residential. In Brazilian cities, backyards are a very common type of residential land use, regardless of neighborhood socioeconomic status. Typically, 30% or more of urban land in Brazilian cities is in the form of backyards, whose potential for increasing tree cover is remarkable. In the city of Maringá (South Brazil), in only one of its 268 neighborhoods, there is soil available in backyards for the planting of 12,000 trees - 9% of the approximately 130,000 trees present in road tree planting (ANGEOLETTO et al 2017). Unfortunately, as in the case of urban forests, Brazilian municipalities have little data on their backyards. What tree species exist in these spaces? How much area is available for introducing other trees? How do families manage the trees and shrubs in their yards? What is the inclination of villagers to increase tree cover in backyards? As the authors state, "even though much of the forest is privately managed, urban governments can influence private management via incentives, education, and regulations." However, the creation and application of these mechanisms of influence can only be successful if they are based on a careful prior evaluation of the trees in backyards and other private spaces, and of the sociological aspects of those who manage them. In poor neighborhoods in Brazilian cities, backyards are usually the only option for the introduction and increase of tree cover. But in these neighborhoods, families may be unwilling to plant new trees even though they represent a food resource (fruit trees), because there is a competition among these plantations, and the residents' desire to increase the built-up area of their houses (ANGEOLETTO et al. to 2017).

Urban forestry provides the best hope for improving the physical, ecological and psychological qualities of our urban areas, and Brazil is a country which would benefit enormously from a coherent policy on urban afforestation. As an immediate start, we argue that tree selection should reflect local biodiversity, and that support is particularly provided to harder to reach socioeconomic areas, where the benefits of urban forestry will be greatest. However, for successful urban planning we must first know what is there. We therefore call for an urgent census of what trees are present, the condition they are in, and how they are managed. This will provide the basis for helping ensure that Brazil is able to utilise the tremendous opportunity provided by urban planting to both mitigate the negatives of urbanisation, while enhancing the positives that attract people to urban areas.

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