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Building a global earth observatory through a network of large-scale census forest plots

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During the past three decades, a network of large-scale permanent inventory plots (average = 29 ha) have been established in tropical and temperate forest formations worldwide to 1) document and study tree diversity; 2) monitor their long-term dynamics and identify the drivers of forest change; 3) develop sustainable management tools for tropical and temperate forests; and 4) build capacity in forest science and management. The network is coordinated by Center for Tropical Forest Science of the Smithsonian Tropical Research Institute. All sites use a standardized methodology to assure that the results are comparable among sites and broad-reaching hypotheses are tested. The methods include tagging, measuring the diameter at breast height, mapping and identifying all trees and saplings down to 1 cm, and recensus is done every five years. To date the network covers a total area of 1,200 ha where about 4 million living tree individuals in 12,400 morphospecies are monitored. During the past few years, the network has moved from its original focus to include carbon flux measurements, soil nutrient surveys, plant functional traits, seed fall and seedling monitoring, DNA barcoding and also vertebrate monitoring.