The importance of studying tropical dry forests

Tropi---Dry: Enhancing knowledge exchange for conservation and management of tropical dry forests in the Americas

Budget: US$ 882,500
Lead agency: University of Alberta
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Countries: Brazil, Canada, Chile, Costa Rica, United States

Summary:

Because of the importance of tropical dry forests, and the little information that can be found in scientific literature, the Inter -American Institute for Global Change Research (IAI) has supported the Tropi- Dry network to fill this information gap and propose options for the implementation of public policies.

Tropical dry forests have been globally under-studied: for every 300 scientific papers on tropical rainforest, only one was related to tropical dry forests, says researcher Arturo Sanchez-Azofeifa, director of Tropi-Dry, a collaborative research network supported by the Inter- American Institute for Global Change Research (IAI) that has been working since 2005 to improve the understanding of these ecosystems.

Their balmy climate and fertile soils make tropical dry forests one of the most preferred ecosystems for human settlement, agricultural and livestock activities, and urban development. This is precisely why tropical dry forests are one of the most threatened ecosystems in the world, and subject of enquiry to Sánchez-Azofeifa and researchers in the Americas, mainly Brazil, Canada, Chile, and the United States of America.

With over one hundred papers published in prestigious scientific journals and two books, Tropi- Dry researchers' results have been used by decision makers in Costa

Rica and Brazil to understand these ecosystems and propose conservation and land use strategies.

Focusing on three major components - ecology, remote sensors and the human dimension-Tropi-Dry developed a tool to predict drought in Guanacaste, Costa Rica. The province receives many visits from national and foreign tourists not only for its beautiful beaches on the Pacific Ocean but also because it hosts the Santa Rosa National Park, home to a large tropical dry forest. Additionally, wireless network technology developed by Tropi-Dry is used throughout the world. At present, wireless technology to measure environmental variables is used in Germany, the United Kingdom, Brazil, Costa Rica, Canada, Singapore, and Australia.

From the ecological perspective, studying young (less than 10 years), middle-aged (10 - 50 years) and mature (older than 50 years) tropical dry forests, Tropi-Dry has developed a protocol that provides information on the evolution of forest composition and the way it defends from and recovers from extreme events such as drought and hurricanes. For instance, the network found that one of the impacts of climate change is the increase in the amount of lianas, which by strangling host trees contribute largely to forest destruction.

Besides Costa Rica, the network has detected this kind of deforestation on the Pacific coast, Yucatan peninsula, northwest Guatemala, Honduras and around the Nicaragua Lake.

Scientists have also been able to establish the benefits of what they call secondary tropical dry forests, i.e., those that are able to re-grow after being used for cattle ranching or agriculture for some time. Ecosystem services provided by tropical dry forests include carbon sequestration, the conservation of biodiversity, nutrient cycle regulation and water production.

Using modern satellite monitoring techniques, such as hyperspectral and laser (LiDAR) sensors, Tropi-Dry researchers conclude that the evolution of dry forests depends on the ecological conditions of the environment, soil composition and use, the origin of seeds (brought by wind or vertebrate dispersal), and meteorological characteristics.

Tropical dry forests cover about 40 percent of the tropical ecosystems worldwide; large part is being monitored using satellite imagery periodically to determine deforestation rates and the degree of fragmentation due to human activity. The group supported by the Inter-American Institute for Global Change Research (IAI) has advanced field-trip observations, as for instance in Minas Gerais, Brazil, where they measured the diameter of trees in young, intermediate and mature forests, confirming that tree growth depends of the forest species and the biophysical factors that regulate forest development and structure.

Tropi-Dry has also had major participation in two meetings of the UN Climate Change Convention (Lima and Morocco) where some of the researchers of the network actively worked during the UN Research Dialogues.

Aware of the close relationship between tropical dry forests and human settlements, Tropi-Dry has included in its research the social component in support of management and conservation policies for these ecosystems. “The challenge”, says Sánchez -

Azofeifa, “is to develop reference frameworks [in human and ecological systems], to help maintain ecosystem health while recognizing and improving human well-being”.