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## Inga tree points to way out of slash-and-burn for Central American farmers

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Like many rural families in Central America, Martín García and his sons devoted part of every growing season to slashing and burning a new strip of their land, knowing that it was the only way to make it fertile enough to yield food for everyone.

They couldn't grow on the land they had used in years past, since slash-and-burn techniques exhaust the soil. Each season, they were using up more and more of their property.

"We were setting our properties on fire," García told Mongabay, "thinking we were improving the land when actually we were ruining it. And the harvest was small, minimal. The animals left."

Combined with increasing droughts and tropical storms due to climate change — both with the potential to decimate an entire season's crops — García said many members of their community outside La Ceibo, Honduras, were suffering from food insecurity, forcing them to consider a hazardous trip to the United States.

It wasn't until 2014 that García started transitioning to a new way of farming being pitched to the community by the Inga Foundation, a U.K.-based agriculture project with innovative ideas about how to farm sustainably. It involved a lesser-known tree called inga (*Inga edulis*) and a planting strategy known as alley cropping, an agroforestry technique (combining woody perennials like trees and annual crops together in a system where the plants benefit each other, and which provides homes for wildlife like birds and bees) in which trees are grown in rows with companion crops.



Farmers in Honduras prune their inga trees, providing firewood. Image via the Inga Foundation.

Some community members were skeptical about investing their livelihoods in a tree they had never seen before. In the past, many had bought into other conservation projects introduced by foreign companies, some of which had since pulled out of Honduras without having made any visible impact.



García said some of his neighbors watched him planting the inga trees for years before coming around to the program. Today, he said he has nearly 3 hectares (7 acres) of land that consistently yields cacao, rambutan and other crops, as well as firewood from annual pruning — all without his having to burn or clear the land.

Inga is an extremely fast-growing tree, native to the Americas, that tends to reach about 9 meters (30 feet) even in low-quality soil. Its large leaves provide excellent shade, which prevents weeds and competing grasses from moving in on crops.

The shedding leaves also blanket the ground in a thick layer of mulch. Slow decomposition at the trees' base creates a physical shield for roots growing near the surface of the soil, while also restoring organic matter and holding onto moisture. As a result, small springs have returned to areas that were once extremely dry.

García said a small creek has appeared on his property. With the creek came the animals that had been driven away by the fires.

"It could be any hot summer day," he said. "The ground is always going to be moist. The plants never suffer from drought."

Mike Hands, founder of the Inga Foundation, spent the better part of the 1980s and '90s researching the ecology of slash-and-burn agriculture in Central America with the University of Cambridge, trying to better understand why and how soil degraded.

Slash-and-burn has had a devastating impact on the environment. The practice, as well as other forestry and land use changes, are responsible for approximately 23% of greenhouse gas emissions, according to the Intergovernmental Panel on Climate Change (IPCC).



Alley cropping on a hill that once had extremely degraded soil. Image via the Inga Foundation.

Hands and many other scientists had believed that the availability of phosphorus was the deciding factor in the success of a crop yield. But his research eventually showed that it was a certain form, rock phosphate, that needed to be added to the soil if alternatives to slash-and-burn were going to work.

His research also showed that only inga alley cropping supplemented with the rock phosphate, as well as a mixture of potassium and magnesium sulphates, provided a long-term, sustainable agricultural system. Inga alley cropping was the most efficient at retrieving and retaining the phosphorous.

“That’s really the key to food security,” Hands said, “and the end of poverty in Central America, in my opinion.”

The Inga Foundation’s Land for Life Project near Honduras’s Pico Bonito National Park provides families with a mixture of 1-2 hectares (2.5-5 acres) of inga alleys and at least 2 hectares of fruit trees or other cash crops.

So far, the plots have withstood erosion and tropical storms. During hurricanes Eta and Iota in 2020, many crops were blown away from neighboring properties, but the inga trees stood firm.

The foundation is now working with more than 400 families in Honduras, some of them in their second decade of alley cropping inga trees. This year, the organization expects to reach the landmark of 450,000 tons of CO2 sequestration and the restoration of 1,052 hectares (2,600 acres) of degraded land.

But despite the apparent success of the system, funding and growth have been hard to come by. Hands said he thinks it’s because the project sidesteps some of the usual things that attract international investors, such as profit, and that would allow his innovative system to be expanded to the rest of Central America and beyond.

“Nobody involved in this makes money except for the small farmers,” he said. “They get food security and they sell things and lift themselves out of poverty. They do all the managing. They do all of the work. It’s their system and nobody outside makes money.”

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