# The Intriguing Inga Tree Model

## What is Slash and Burn?

Slash and burn is a subsistence farming method used by millions of families in the tropics in which families cut down and burn an patch of forest in order to create an area of fertile soil on which they can grow their food. However, the soil fertility doesn't last. Once cleared of trees and exposed to the strong tropical climate, the bare soil is rapidly stripped of nutrients. The first year slash and burn generally gives a good crop, the next year less so and, by the 3rd year, crops often fail completely. This forces families who depend on slash and burn to keep clearing fresh areas of rainforest every few years, just to survive.

## What is Inga Alley Cropping?

Inga Alley Cropping is the revolutionary alternative to slash and burn developed by Inga Foundation's Director, Mike Hands, based on the insights gained through over a decade of research into slash and burn in partnership with Cambridge University. Of the different potential alternatives investigated by Mike Hands, the only truly sustainable system to emerge from years of scientific research was alley cropping using nitrogen-fixing tree species from the genus Inga. Inga Alley Cropping is capable of maintaining soil fertility and good harvests year after year, thereby breaking the cycle of slash and burn and allowing families to gain long term food security on one piece of land.

## A year in Inga alley cropping:

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Once the Inga alleys have developed, the Inga trees are pruned at chest height. They have, at this stage, dominated the site and shaded out the terrible weeds. The branches are stripped of leaves

and used as mulch, thus protecting the soil and preventing further weed growth. Larger branches are used as firewood, allowing families to obtain all the wood they need for cooking from the Inga plots and thereby tackling another important cause of deforestation. The crop is then planted through the mulch within the pruned alleys. As it grows the Inga also recovers and regrows, providing the crop with some shade and protection from the sun. Once fully matured the crop is harvested. The Inga is then left to grow until the next planting season arrives, by which time they have fully recovered and the whole cycle is ready to be repeated, starting with pruning the Inga alleys once more.

This system delivers huge benefits through ensuring a reliable harvest year after year from the same plot of land with minimal labor required. By recreating the conditions naturally found on the forest floor, Inga out-competes the aggressive invasive grasses which normally dominate the farmers' plots. This biological weed control is hugely important as without it securing a harvest can require a huge amount of labor in terms of weeding per ha. per year. In fact, it is often the combination of this takeover by weeds, as well as the loss of fertility, that forces farmers to abandon their plots and clear new areas of forest.

PROCESS/BACKGROUND:
Inga tree seedlings (a total of 4000-5000 in a 1-hectare plot to secure a family's basic grain alley at an inclusive total cost of $2500) are planted 20 inches apart in rows/contours on steep slopes with rows 12 feet apart, and require no chemical fertilizers, herbicides, or pesticides.
A corn or bean crop is planted when the seedlings are planted. After 18-24 months, the trees are pruned, from 20 feet to 5 feet with the branches supplying a year's worth of firewood and the stripped leaves a soil-protecting mulch. Crops are again planted between the rows in the mulch and shaded as the trees regrow. After the crops have matured, they are harvested and the cycle repeats.

Established in 2007 and based on over 20 years of research, the Inga Foundation pioneers the revolutionary agricultural system of Inga Alley Cropping (the Inga Tree Model) to address environmentally destructive slash and burn agriculture and food insecurity problems. Since 2012, the Inga Foundation's simple agroforestry system of Inga Alley Cropping in Honduras has resulted in over 300+ families planting over 4 million trees and dramatically transforming their lives of subsistence farming with more than 2600 participating. The ability of the resilient Inga tree to anchor, enrich, and regenerate depleted soil provides food security with 100% success for families with 2-year-old alleys. These fast-growing, native Inga species which fix nitrogen in the soil, provide organic cash crops as well as reduce global carbon emissions, protect wildlife and marine habitats, preserve water sources, and yield a year's worth of renewable firewood. The basic grains/cash crops are grown without herbicides, pesticides, chemical fertilizers, or heavy equipment. The Inga alleys survive 7 months of drought, stop all erosion and mudslides, and protect watersheds. This low-input, debt-free, and bottom-up program is available

now and gives families the means to achieve “land for life,” farming their plots with truly sustainable agricultural practices.
Inga Alley Cropping is not just an alternative to the cutting/ burning of tropical rainforests, it is a nature-based solution to stopping it altogether while regenerating highly degraded land in the tropics.
We have trained 20 government technicians from the Honduran Mi Ambiente environmental department and they have shown interest in the grassroots program. Since the November 2020 back-to back hurricanes, which hit northern Honduras especially hard, the country is still in a devastated state. The Inga alleys are the only plantings known in northern Honduras to have emerged unscathed from the combined violence of two recent back-to-back Central American hurricanes (Eta and Iota. November 2020). The relevance of, and need for, agroforest in subsistence farming in the present day is an urgent priority especially in the equatorial regions predicted to receive the worst climate shocks of heat, drought, and hurricanes.

A global challenge--the sustainable use of natural resources is essential for agriculture to become less consumptive, more environmentally protective & economically efficient, to achieve near-and long-term goals for food security, economic viability and quality of life. Our goal for the tropics is to use the plots and experiences of families eager to participate & pay the system forward, together with our own demonstration/teaching facilities as models of sustainable best practice in rural livelihoods that protects the wider environment, stops slash and burn, and re-creates agroforest cover in a short time. Our program is unmatched with no known negatives and we are overwhelmed with demand from farming families.
We are self-funded (grants and donations) with no government funding and many funders have committed to the pandemic and are not considering supporting a program for Central America. We need visibility and access to decision makers as the results of the program speak for themselves. We show that improving livelihoods with training/seeds/support for a year can achieve life-changing results for the rural poor which does not require technology, loans, & industrial agriculture. We have the collaborations, experience, but most importantly, relationships built on trust in the region to expand & create training hubs for scaling the inexpensive program to regenerate land, save rainforests, sequester/avoid carbon, stop mudslides/erosion & protect water sources. Our impact, at landscape scale, to convince other farmer groups and, more particularly, decision-makers at policy level that the model can, and should, be dispersed more widely; both in Honduras itself and in the entire humid zones of Central America at regional level.

Since the pandemic and the horrific damage from the Nov. 2020 hurricanes, the Honduran government has focused on the cities that received so much damage, so rural programs will go without support.
Inga Foundation has implemented the Program at such a scale that the technologies comprising the Inga Tree Model we believe will convince decision-makers at all levels. This could be at the level of community leaders, government ministers, or countries considering aid to Honduras.

Benefits of Inga Alley Cropping:

- **Food Security:** Within two years, 100% of the families with established Inga alleys achieve total food security.
- **Carbon Sequestration:** From 2012-2019, over 284,000 tons of CO2 have been sequestered/avoided./This will be 450,000 tons by the end of 2021. Slash and burn stops immediately when a family plants their Inga alley and their holdings may be

planted with a wide variety of cash crops with the Inga as nurse trees (for cacao, citrus, avocado, fine hardwoods).

- **Land Regeneration**: From 2012-2019, more than 2,600 acres of degraded land have been regenerated.
- **Nutrition Improvement**: Families are able to grow more basic food crops per hectare as well as cash crops (e.g. black pepper, turmeric, pineapple, allspice, Rambutan, citrus, cacao, vanilla)—all organically without the need for herbicides, pesticides, chemical fertilizers, GMO seeds or heavy equipment.
- **Erosion Prevention**: Inga alley-cropping stabilizes and anchors the soil effectively preventing all erosion and mudslides. Most notably, Inga tree alleys survived eight inches of rain falling in eighteen hours and the Nov., 2020 back-to-back hurricanes (the only known established plantings to withstand this unprecedented flooding).
- **Watershed Protection:** By stopping erosion, Inga alley-cropping protects watersheds such as rivers, oceans, and coral reefs. Creeks and springs have returned to land where they had not flowed for many years or not at all.
- **Firewood:** Inga alley-cropping provides families a renewable source of firewood for cooking or selling from the yearly pruning without harvesting forest trees.
- **Migration Reduction:** Inga alley-cropping provides families with "land for life," anchoring them to their land and not forcing them to migrate to cities or other countries in order to find work.
- **Improved Livelihoods**: Food security allows rural subsistence farming families to grow and sell cash crops, which, in turn, improves their livelihoods, all with no debt or loans.
- **Climate Shock Resilience**: Inga alley-cropping allows families to grow basic food crops even in the harshest climatic conditions. Inga alleys have survived seven months of drought and still produced basic food crops of corn or beans without irrigation or a drop of rain because the thick mulch from the pruning process keeps the ground cool and retains water. The recovering Inga trees also shade the ground from extreme heat.
- **Family Empowerment**: Inga alley-cropping has empowered over three hundred local families enabling them to all work together for a common goal, stay close to home, and keep their land, all without the use of complex technology, high inputs, or machinery.
- **Biodiversity Protection:** By completely eliminating families' need for slash-and-burn, Inga alley-cropping protects rainforest plant and animal biodiversity. The alleys provide flowers, shade, insects are abundant which attracts small mammals and birds.
- **UN SDGs**: Inga alley cropping positively addresses 11 of the 17 United Nations SDGs with no negative impact whatsoever on the remaining 6.