



# YOUR ENVIRONMENTAL BRIGADE

GLOBAL BRIGADES PANAMA



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# INTRODUCTION

Dear Environmental Brigader,

Welcome to **Your Environmental Brigade** in Panama! This document will introduce you to the Environmental Brigades methodology and is intended to provide an overview of what to expect during your brigade, as well as help you to prepare you for your upcoming Brigade. As you read through this document, you will gain a better understanding of not only your Environmental Brigade, but rural environmental situation in Panama.

Environmental Brigades seek to empower rural communities in Panama to reverse degradation and preserve their environment through sustainable agriculture, waste management, and education programs. We advance this goal by utilizing university students and young professional volunteers to implement sustainable agriculture projects through constructing a farm to be used as an education tool and model for community members to replicate themselves.

We look forward to meeting you soon!

Saludos cordiales,

**The Environmental Brigades Team in Panama**

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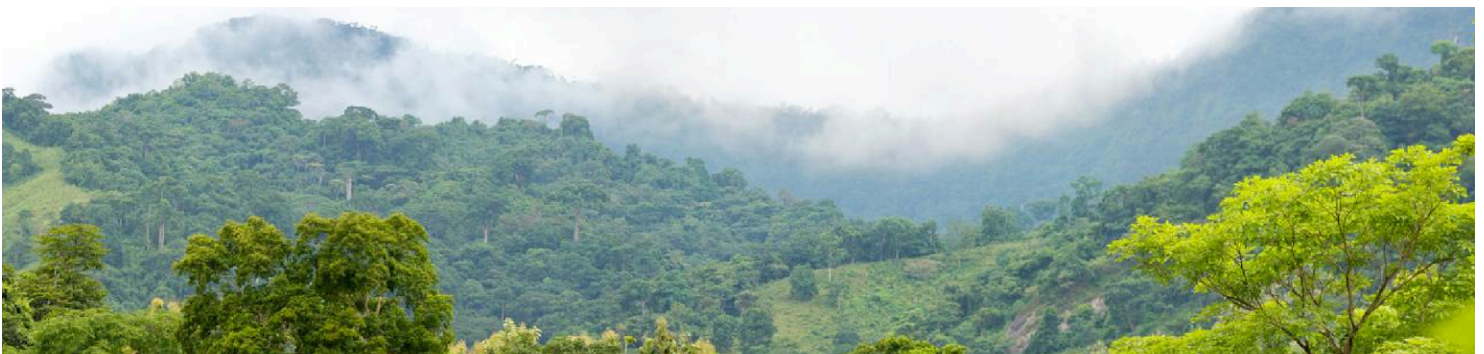
# INTRODUCTION

Since the program's inception in 2009, Environmental Brigades has worked alongside community members in four rural Panamanian communities to provide physical deliverables such as a photovoltaic system, composting latrines, eco-stoves, slow-sand water filters, tree planting, and sustainable agriculture infrastructures. Additionally, educational workshops about why these projects are important and how to maintain them have been taught to community members. This education provides the sustainability component of the program—creating the ability to apply knowledge gained and adopt an environmentally-friendly lifestyle, even after brigades are no longer present. Each brigade spends a certain amount of time each day conversing with families in the community to build the capacity for long-term behavioral change. This education guide serves to assist volunteers preparing for their upcoming brigade to become familiar with relevant global environmental issues in addition to the main focuses of the Environmental Brigades program:



sustainable farming,  
waste management, and education.

In addition, this guide encourages volunteers to apply such knowledge in order to create and implement creative solutions for individual community members/families as well as the community at large while maintaining cultural sensitivity. The better prepared volunteers are before the week-long brigade, the better they will understand and appreciate the social-environmental issues at hand, in addition to the magnitude of positive impact they can leave behind.



# BACKGROUND

## ENVIRONMENTAL CHALLENGES IN EASTERN PANAMIAN COMMUNITIES

- Conventional Agriculture
  1. Slash-and-burn techniques
  2. Monoculture
  3. Chemical fertilizers, pesticides, herbicides
  - All of these techniques result in soil degradation, loss of biodiversity and limited harvest yields
- No existing system of waste management; current methods affect public and environmental health. Research and evaluation and being done

## LAND USE

Panama's land area totals about 7.7 million hectares (1 hectare is approximately the space inside an athletic track): 4.1 million hectares of forest, 1.2 million hectares of pasture land, and 52,000 hectares of permanently cultivated fields. Almost all of the cultivated and pasture land was originally forested, and due to the construction of the Pan-American highway, a very large amount of virgin land is now being deforested and becoming more and more cultivated.

Agriculture in Panama is subject to its mountainous geology, rainy climate, and somewhat fickle soils, all of which have hindered the mass-development of this sector of the economy. Topsoil in Panama is very thin in most areas, and erosion is a serious issue.



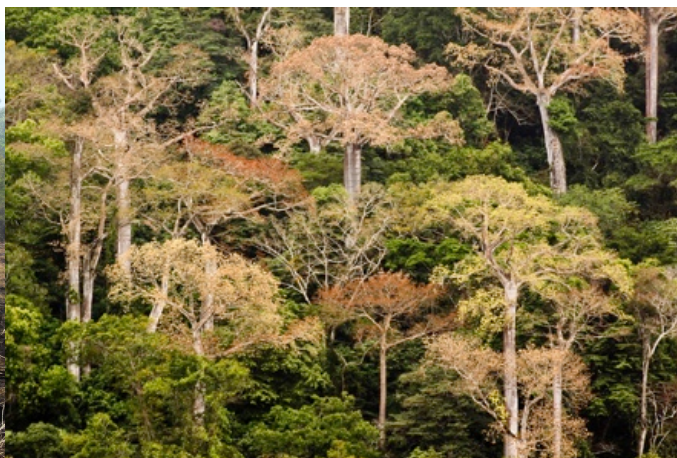
Typically, farmers will cultivate the land for only two years, then move to another plot of land to allow for the first area's soil to recover. Unfortunately, the soil has been heavily depleted and now requires up to 10 years recovery before it usable again. The wide practice of slash-and-burn agriculture and cultivation, in which trees, brush, and weeds are cut and subsequently burned on areas designated for cultivation, presents another environmental and public health hazard.

At the end of the dry season, between March and April, 3-5 hectares of land are slashed (depending on how many people are in the family). This selected area is allowed to burn, with the ash of the burnt plant material providing the soil with nutrients for the next crop's yield. When the rains begin, around April, the soil will absorb both the water and the nutrients on the surface from the ash. Come May, the family will plant their first group of seeds for an approximate harvest in October/November. This method only allows for two years back-to-back of productive soil life for the crops, due to the fact that monoculture depletes valuable nutrients in the soil. After the two years of continuous cropping, a new area of land will be selected, and the cycle continues—a perpetuation of unsustainable practices.

# BACKGROUND

## LAND USE CONT'D.

This destructive practice of slash-and-burn in conjunction with cattle ranching and the increasing reliance on chemicals for fertilizers, pesticides, and herbicides, are destroying the ecosystems once rich in biodiversity, and disrupting water and nutrient cycles. These environmentally unsustainable practices are also biodiversity, environmental leading and to soil and increased infertility.



## PERMACULTURE

By designing and controlling an environment, such as with a green house or agriculture, and modeling them after natural ecosystems, we are able to maximize function and output, while minimizing waste and input. Permaculture is a holistic design philosophy that entails that the complete system, rather than each separate element, is greater than the sum of its parts. Focusing on the utility of each part, provision, and aspect enables the builder to imitate and exploit the natural tendency for an environment to thrive, and thrive sustainably. Permaculture design therefore seeks to minimize waste, human labor, and energy input by building systems with maximal benefits between elements to achieve a high level of synergy. The Environmental Brigades use this system as a model for our projects across multiple communities in order to empower community members by creating and maintaining their own sustainable practices.



# YOUR PROJECT

## THE MODEL FARM

You will be participating in building a Sustainable Agriculture Model Farm on communal land within the community using sustainable and environmentally friendly practices, techniques, and products. The end goal of this project is to show other families in the community that they can do this too. The Sustainable Agriculture Farm consists of different sections. On the left side, we have various crops and vegetables and on the right side, we have different types of livestock. We will also focus on waste management techniques.

The Sustainable Agriculture Farm is the overall end goal and each brigade will focus on a specific portion of that goal! **It is important to remember that brigades work on certain portions of the farm at a time and not the entire farm at once.**

The Sustainable Agriculture Farm is an education tool and even when brigades are gone, our Environmental Team meets with the Environmental Committee and community members to ensure that the project is being properly cared for, well maintained, and growing.



# YOUR PROJECT

## COMPONENTS OF THE SUSTAINABLE AGRICULTURE FARM



### CHICKEN COOP

Chicken meat and chicken eggs are a great source of protein for rural communities. They are easier and cheaper to raise than larger animals, such as pigs and cows. Building a chicken coop requires construction of the coop and understanding safe and healthy measures of raising chickens.



### TILAPIA POOL

Tilapia is a popular and easy fish to raise in a backyard fish farm. It is a great resource for small, rural communities to give community members access to more protein and a healthy diet. Building a Tilapia pool requires construction of the pool and understanding safe and healthy measures of raising tilapia.



### IGUANAS

Iguanas are currently an endangered species in Panama. Yet, consumption continues and proliferates in areas where there is not adequate protection for the species. Therefore, we are working closely with AMAM, an NGO, to raise iguanas in a healthy and safe manner. After the iguanas become adults, 75% will be sold to the community as food and 25% will be released into the wild.



### CASSAVA (YUCA)

Cassava grows well and commonly in this region. Cassava has evolved to become resistant to the climate of the area, making it an ideal crop for subsistence and sale. Growing and producing quickly (in 8 months), cassava is a staple in the Emberá diet. The plant will produce one harvest per year, for two years.



### PLANTAIN (PLATANO)

Plantains grow and produce quickly (within 8 months), and are native to the region. Combined with its output and ubiquity in local markets, plantains enable communities to produce funds quickly and reliably. Plantains further by absorbing extra water from the soil during the rainy season, while retaining it during the dry season.



### CORN (MAIZ)

Another crop that is a staple in the local diet, corn provides for both economic and dietary needs of communities. Many aspects of traditional Panamanian and Indigenous meals rely upon the use of corn.



### RICE (ARROZ)

In sections of land for rice paddies, we see many benefits of this technique: fewer seeds are required, better control of weeds, better ability to survey plant health, encourages greater tillering (the growth of multiple stems, producing more rice), and produces a greater yield because it allows for continuous production throughout the year on the same plot of land.



# YOUR PROJECT

## SUSTAINABLE AGRICULTURE FARM TIMELINE

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
RICE			RICE			RICE			RICE			RI
YUCA						YUCA						
PLANTAIN						PLANTAIN						
CHICKEN		CHICKEN		CHICKEN		CHICKEN		CHICKEN		CHICKEN		CHI
TILAPIA										BEANS		
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## PROGRAM METHODOLOGY

Unsustainable farming techniques degrade the health of the soil. When the soil becomes contaminated, whether through harmful farming practices or improper waste management, the well-being of those who depend on the soil is at risk. Global Brigades’ focus on fighting the degradation of soil promotes environmental sustainability, which affects food security and financial sustainability.



Source: World Economic Forum

# BACKGROUND

## EMBERÁ HISTORY

The Emberá culture of eastern Panama has ancient cultural and spiritual roots based deeply around the association with and connection to nature, in particular water. This indigenous group has traditionally lived and worked alongside bodies of water, and have used this rich and diverse ecosystem as a source of food, transportation, and recreation for centuries. For the Emberá, along with most other indigenous cultures local to the Panama region, nature is an essential aspect of their way of life, as their survival depends heavily on the way they are able to utilize and work in accordance with their natural surroundings.

In the 1970's, the Panamanian government completed the construction of the Bayano Dam, which forcibly displaced thousands of indigenous peoples, and also drowned a significant portion of that area's tropical forest. Thus, many groups, including the community of Piriati Emberá, who had previously depended on rivers for survival, were forced to move into areas void of that natural resource and into one that was much dryer and mountainous. Needing to adjust to their new surroundings, the Emberá culture explored new options for food production, and began utilizing a slash-and-burn form of sustenance agriculture to grow crops such as corn, yucca, and rice. This practice is one of the most prevalent forms of agriculture in the East Panama region, as lack of education, resources, or government support leaves the area with little options for alternatives.

Additionally, modern Emberá history has been influenced by other geographical and political changes, the most recent also being the most significant: the construction of the Pan-American highway. This dirt road was built through the jungle towards the border of Columbia in 1979, and has provided an easy opening for cars, trucks, and poor 'campesinos' (people living in the countryside) in search of untouched jungle land to clear cut and begin slash-and-burn farming techniques or to graze cattle. Today, cattle farms and plantations border the road, with no jungle visible for miles on each side. The road has offered Emberá communities access to the modern world, but has simultaneously destroyed the surrounding forests and effectively ended their former lifestyle, which was primarily based on hunting and gathering. The result is that indigenous communities now must rely almost entirely on agriculture for survival, and the only method known to them is slash-and-burn. In addition, the farming in this region is based largely around the use of expensive and harmful pesticides and herbicides, both of which are not only detrimental to the environment, but harmful for human consumption as well.



# YOUR PROJECT

## CHARLAS

The educational workshop, or “charla” in Spanish, is one of the most important aspects of the brigade. Charlas provide both the volunteer and community members a learning environment where they can highlight, demonstrate, and educate on the practical steps for improving and maintaining environmental sustainability. Using the “Project Information” of the different components of the Model Farm, brigaders will interactively create dialogue with community members focusing on how to maintain the Model Farm after brigades leave. This creates a foundation of knowledge that community members can use to understand the environmental issues around them and how to deal with them.



Charlas are a critical aspect of empowerment – empowering communities to drive their own development through providing knowledge.

### How It Works

- Volunteers must review the “Project Information” on specific Model Farm components before arriving in country – this is a great topic to cover during one of the groups weekly meetings at their university. Start brainstorming techniques for presenting environmental workshops, most of the planning will be developed in country alongside the Environmental Team.
- Every brigade group must bring their own materials, such as poster boards and markers, to Panama – Global Brigades will not provide materials!
- Once the group arrives in country, the material will be reviewed by the Coordinator and the group can work together to adapt their plan based on the Environmental Team’s feedback.

### Tips on Giving a Charla:

- Begin with an icebreaker
- Find out what they already know. Don’t assume they don’t know! There will be different levels of education within the group of community members that the charla is given to.
- Adapt the teaching methods to your audience. Some community members may not know how to read or write – visual aids are very important.