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# TerGo Agroforestry Manual

It pays to go green.


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It pays to go green.

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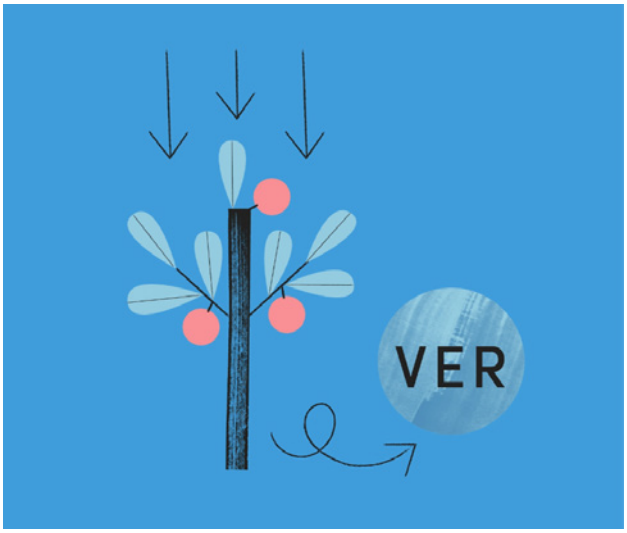
**It pays to go green.**

# Foreword

**TerGo** strives to make the world a better place, one carbon footprint at a time. This is realized in many areas, from measuring and reporting greenhouse gas emissions to certifying products as carbon neutral. However, perhaps most importantly, **TerGo** works to both reduce and avoid emissions from entering the atmosphere through TERs (True Emissions Reductions) and VERs (Verified Emissions Reductions). While the TerGo app empowers people to generate TERs, VERs are created through verified projects that generate measurable carbon credits that equate to a corresponding amount of carbon being captured and stored, usually through renewable power procurement or nature-based solutions. One TER is equal to 1kg of $CO_2$ – and 1 VER is equal to one metric ton of $CO_2$.


We at **TerGo** believe that nature-based solutions are the core of addressing environmental issues – and when we can include farmers and local community members, partnering with them to capture carbon emissions while improving the environment and providing economic benefits, we are 100% on board. That is why we have developed this manual that highlights our approach and methodology to generating VER carbon credits through agroforestry and reforestation of previously cleared land in **Belize**.

The information below highlights how we selectively plant trees in a polyculture arrangement that is beneficial for soil, wildlife, and natural pest resistance, as well as how our Belizean partners can earn income from the fruit bearing trees that are planting among this newly generated forest. All in all, our partnership with farmers and planters ensures community development, income opportunities, and improved environmental spaces, all while capturing and storing carbon through nature-based solutions that can be utilized by individuals and businesses looking to offset their carbon footprints.

# Our Planting Base: Inga and Timber Alley Cropping

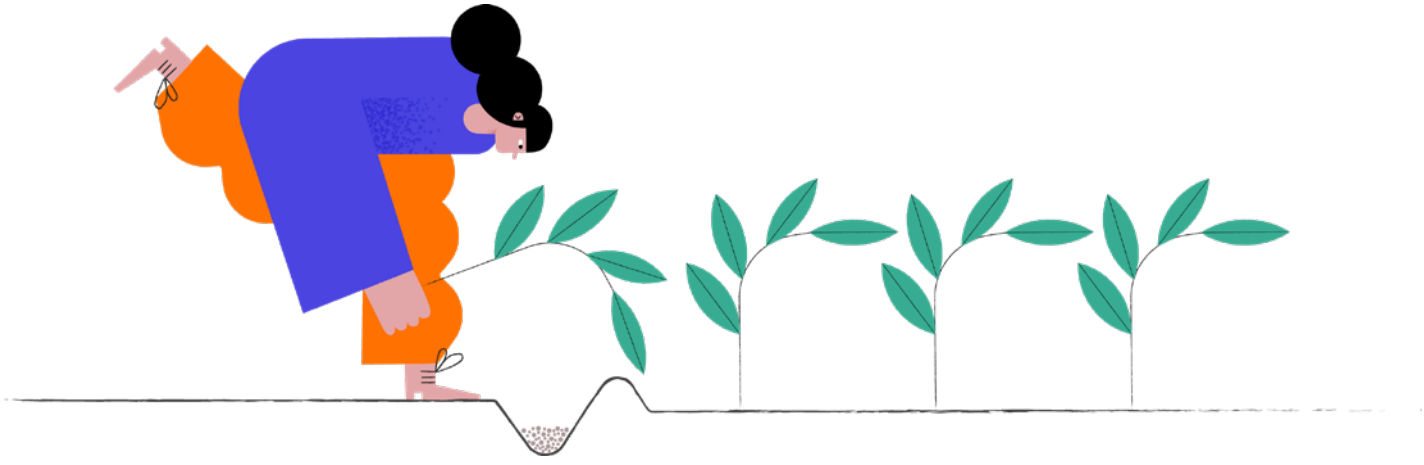
When planting a forest to capture and store carbon, it is essential to ensure you are planting the right trees to optimize not only $CO_2$ intake, but also optimize soil conditions for growth and greater carbon storage below ground.

The tree that forms the base for our planted forest is the inga, a leguminous tree that utilizes gaseous nitrogen from the air by forming a symbiotic relationship with nitrogen-fixing bacteria. Its scientific name is Inga edulis, and it is also known by many other names in the three main languages spoken in **Belize** besides English: bri-bri or bitz in Kreyol, chochokl in k'ekchi Maya, and guamo in Spanish. It is a very beneficial tree to use as a base for planting, especially when using alley cropping.

Alley cropping is ideal because it helps increase fruit yield from trees planted around the base species, and it improves soil fertility, reduces weed growth, and allows more trees to be planted overall on less land. All of these are important for several reasons:

- Increase in soil fertility eliminates need for inorganic fertilizers
- Less weeds eliminates need for pesticides
- Less land use allows for more forests to be planted on other plots, with the associated increase in $CO_2$ uptake and storage

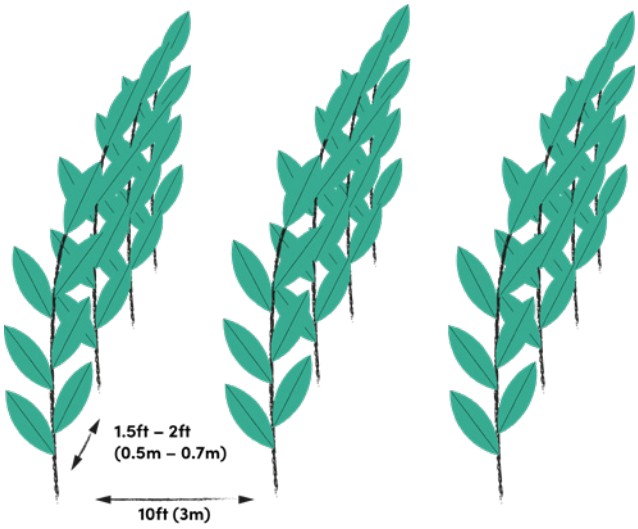
Altogether, the methodology that we employ ensures that trees will be healthier and soil will be intact to better hold and store carbon.



# Our Planting Approach: How we plant

**Step 1:** Plant inga trees in rows, leaving space for other timber trees that will be interspersed with the inga. Trees should be planted about 1.5ft – 2ft (0.5m – 0.7m) apart along the row, with rows spaced 10ft (3m) apart and staggered.

photo: Inga tree



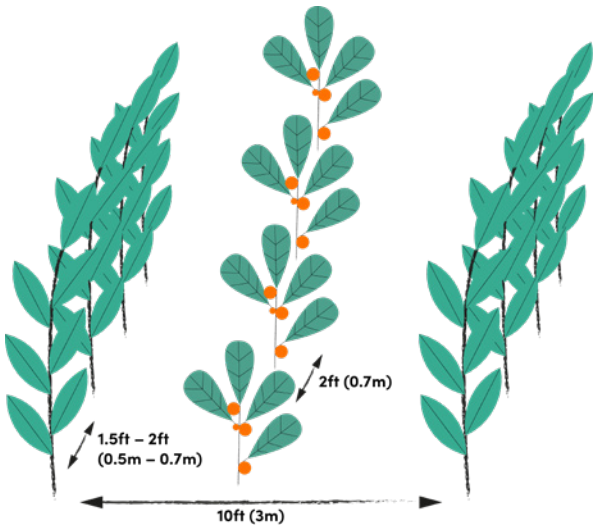

**Step 2:** Plant fruit-bearing trees in staggered rows in between the staggered timber tree rows. Seedlings should be separated by 2ft from each other, similar to the timber trees.

photo: Avocado tree

photo: Mango tree

photo: Soursop tree

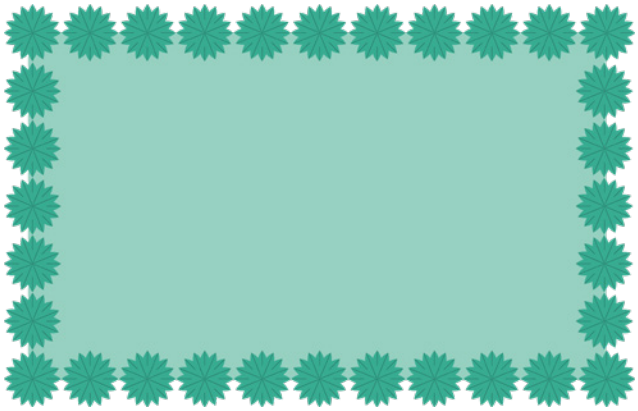
photo: Coconut tree



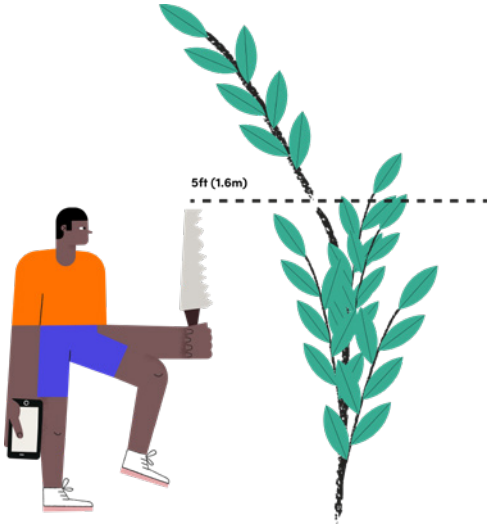
# Our Planting Approach: How we plant

**Step 3:** Plant madre-de-cacao on the edges the plot to act as wind breakers and protection borders.

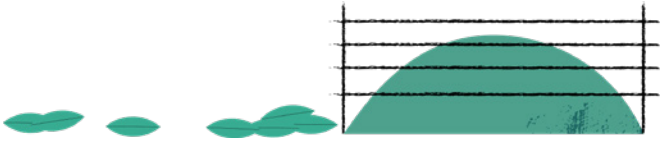
photo: Madre-de-cacao trees



**Step 4:** When inga trees reach around 12ft – 15ft (4m – 5m) high (which typically takes two years) and its canopy is shading the whole field, cut the tree trunk at around 5ft (1.6m) from the ground. This releases the nitrogen accumulated in the tree's roots into the soil, making it available for the surrounding trees without killing the inga - nitrogen is a key nutrient and acts as a natural fertilizer. The tree will start re-growing from the cut.

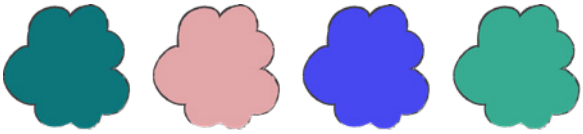



**Step 5:** Leave the leaves on the soil, they will help improve soil quality and will prevent weed growth. Use the wood from the inga cuts to make biochar.



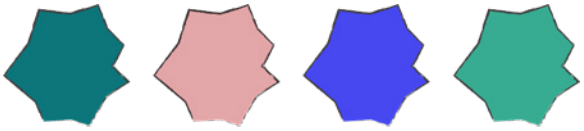
# Our Planting Approach: How we plant

a. Fruit trees:



avocado mango soursop coconut

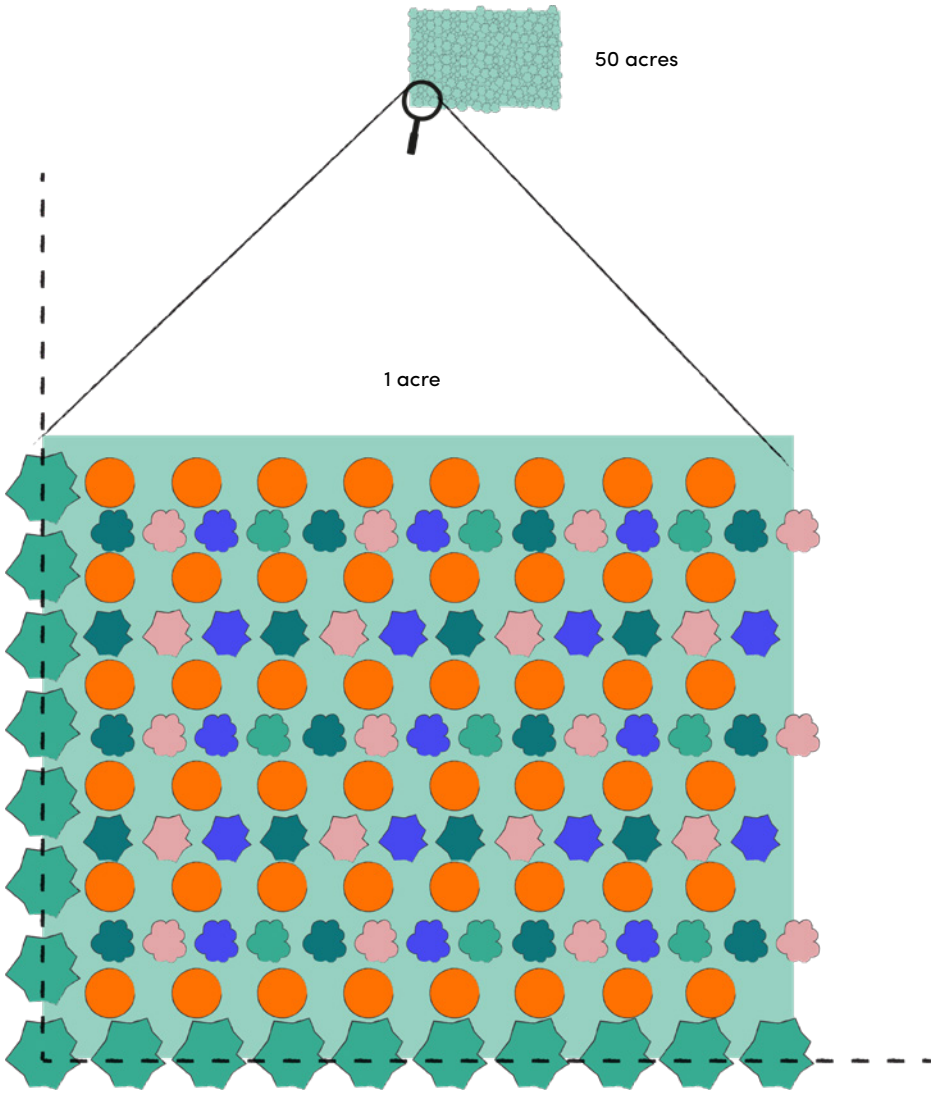
b. Timber trees:



mahogany cedar rosewood madre-de-cacao

c. Leguminous trees:

inga




It pays to go green.

# Our Planting Methodology: Agroforestry in previously deforested farmland

photo: Field with mahogany and cedar

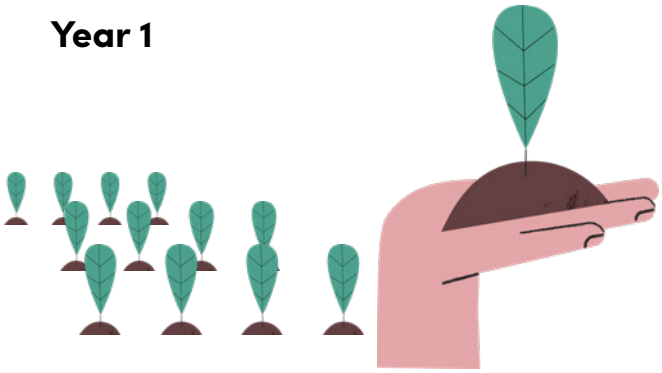
The areas that TerGo uses to plant carbon-storing forests are all previously deforested areas, used either for cane, cattle, or citrus, the latter of which has been devastated by citrus greening disease. On these lands there is often areas of small underbrush that needs to be cleared, but any existing vegetation is left standing and incorporated into the planted forest (though there tends to be very little of this on the land that TerGo uses).

Below are the trees that we plant at different stages of our forest development:

photo: Cecropia tree

# Our Planting Methodology: Agroforestry in previously deforested farmland

## Year 1



1. Pioneer species: cecropia. These will set the base for the planted forest, as well as to create mulch and enrich the soil.

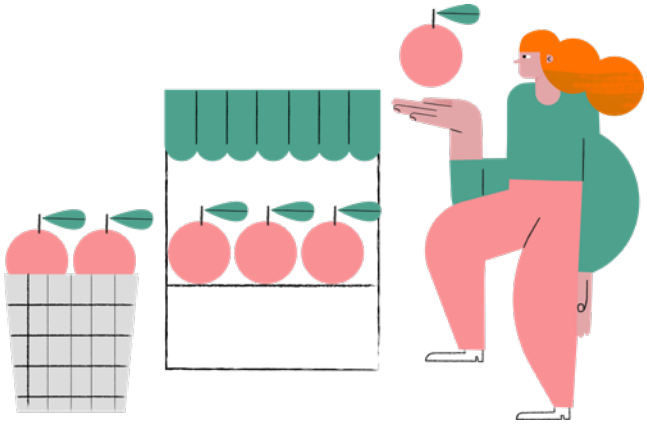
2. Permanent shade trees. These are essential the base or main component of the planted forest and include many different types of trees. For our purposes we use the following:

a. Fruit trees: avocado, mango, soursop, coconut. These will provide food and income from fruit production as well as the shade that some species need, such as cacao. (Note that cacao is not able to be planted in all areas as it is a very geographically-dependent crop, therefore, if it is not included in this manual it is not suitable to be planted in the plot location).

b. Timber trees: mahogany, cedar, rosewood, madre-de-cacao.

c. Leguminous trees: inga. These are the underlying base for the planted forest and will provide bring nutrients into the soil in addition to providing shade for the cacao.

## Year 3-5



Most (if not all) fruit trees will begin producing during this time; the forest will begin to enter a more mature stage and increase carbon uptake from this point forward.

photo: Fruit market stall in Belize

# Additional Environmental Benefit #1: Composting

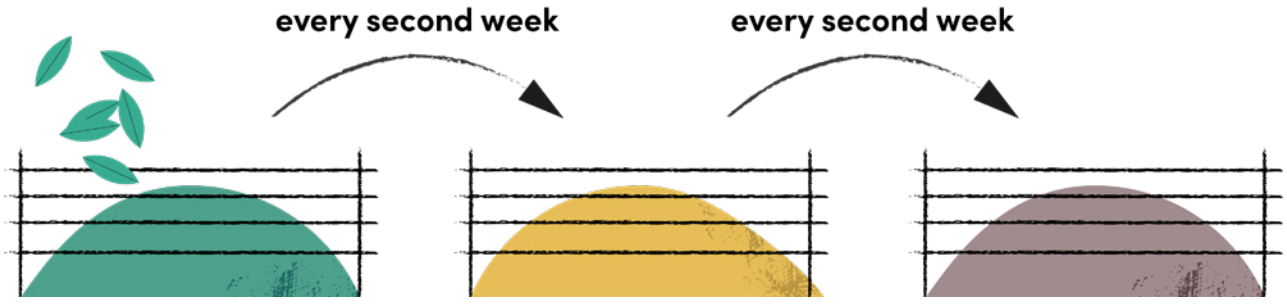
## Why composting?

Composting is ideal for increasing crop yields. You will have higher production and the trees will be healthier and stronger. In the soil, there are various microorganisms, with the two most important kinds for forest health being bacteria and fungi, which break down organic material and make nutrients available to plants.

Compost helps soil microorganisms by providing more nutrients to help plants grow better and produce more fruit. It consists of accumulating and gathering different kinds of leftover organic matter, including branches, leaves, fruit peels, food remains, and even animal excrements, among many others. The materials making up the compost collection then decompose and transform into more "earthy" material that can be put in the soil for the plants to absorb through their roots.

The most effective composting method is known as the "three bin-method," which consists of having three different compartments that each accumulate organic matter at different stages of decomposition. This can also be done in three holes dug in the ground. This method is outlined below:

You first start accumulating organic matter in the first bin/hole. You must stir it after the first week. After the second week, you move it to the next bin/hole and start filling the first bin/hole again. You stir both bins every week. After two weeks in the second bin, you move the initial batch to the third bin/hole, and you move the content of the first bin to the second (and start filling the first again). After two more weeks in the third bin (six weeks in total), the compost will be ready to be used. Trees prefer compost made by leaves, leftover rice, and corn waste, all of which are called "dry materials," This makes compost that is dominated by fungi which helps trees grow stronger and healthier. Trees can also benefit from bacteria-rich compost, which is typically composed of branches, coffee grounds, and manure, among other materials.



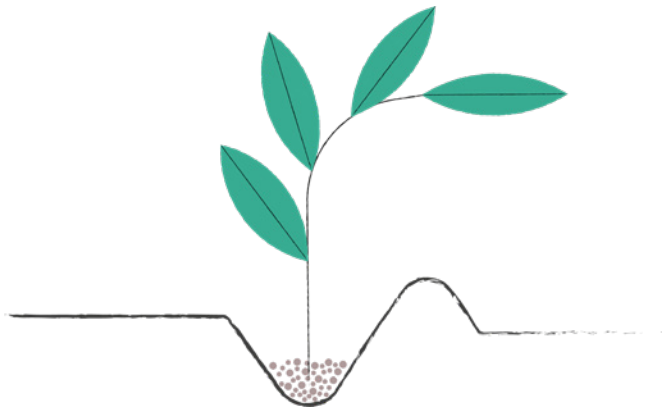

Tree litter, leaves, and stalks piled together | Composting process | Ready-to-use compost

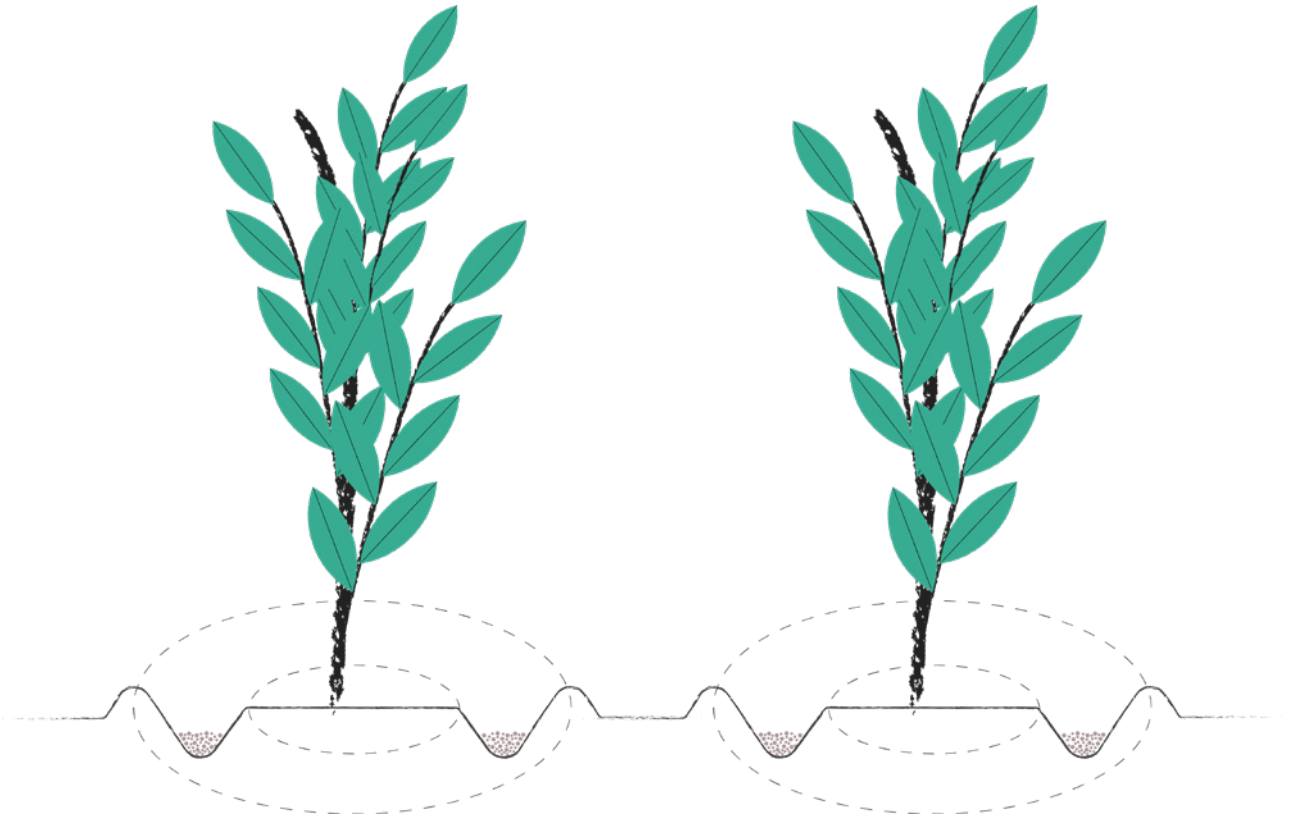
# Additional Environmental Benefit #1: Composting

## How to apply compost

For trees:  when planting: →
dig a whole with a post-hole digger, put two handfuls of compost and plant the tree, fill the rest of the hole with regular soil.

For a grown tree: ↓
dig a trench where the drip line is in a circle, and bury the compost covering it with regular soil. If it is in a slope you want to put barriers at the bottom so it does not fall down.





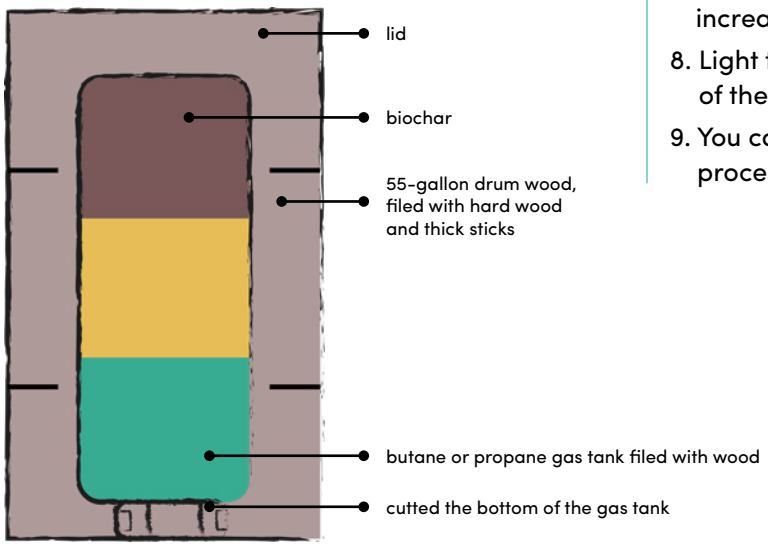
# Additional Environmental Benefit #2: Biochar

## What is Biochar?

Biochar is a kind of charcoal. Wood is burned in such a way – without oxygen – that it creates extremely small holes in the resulting biochar, which is a perfect home for fungi and bacteria that make the soil healthier and more productive.

## Why use Biochar?

Biochar is ideal for increasing crop yield, improving soil conditions, and optimizing soil health. Biochar is most effective when applied to soil that is already mixed with organic matter and compost.




## How to make biochar

The most efficient way to make biochar requires a 55-gallon drum and a regular butane or propane gas tank. The process is as follows:

1. Cut the bottom of the gas tank and find a metallic piece that fits on the tank.
2. With the original valve open, fill the hole with wood (sticks, branches, cohune seeds, bamboo, etc).
3. Put the lid back on the gas tank and set up the gas tank in the 55-gallon drum.
4. Fill the space between them very densely with wood, preferably hard
5. Wood and thick sticks.
6. Make two holes along each side of the drum; one will be used to light up the wood in the 55-gallon drum and the other one will allow for better burning.
7. Put on the drum lid, which you will require a six-inch diameter hole to induce the stack effect and increase oxygen levels at the bottom.
8. Light the wood in the bigger drum through one of the holes and let the biochar commence.
9. You can also use the heat generated in this process to cook food on the drum.

# Final Result

photo: Village in Belize

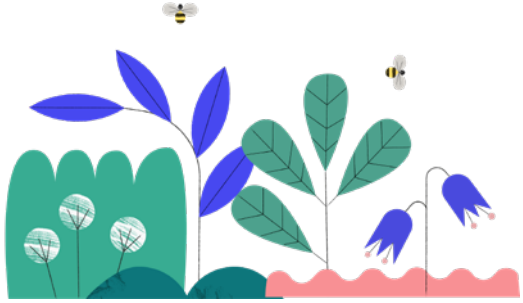
The final result of our planted forests in Belize is a multifaceted positive impact on the environment and community: $CO_2$ is captured from the air and stored in a nature-based solution, local communities are able to reap economic benefits from employment and fruit production, and the land is restored to a forested state, with improved soil health, biodiversity, and land use impacts.

We would like to thank all of our partners in Belize and the people around the world who contributed to making this initiative possible.

We will continue to strive in all areas of making the environment better, from $CO_2$ avoidance and reduction to improving biodiversity in regions that we care deeply about.

**With TerGo, it really does pay to go green!**

**business@tergo.io**



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ul. Piastowska 7, 80-332 Gdańsk
Oliwa Business Park

Entered by the District Court Gdańsk-Północ in Gdańsk
VIII Commercial Division of the National Court Register to the register of
entrepreneurs KRS under the number 0000857732, share capital amounting to PLN 500,000.00.

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