



**LET'S INVERT CLIMATE CHANGE BY GROWING FOOD. HOW? THANKS TO MORINGA AND A REVOLUTIONARY APPROACH**

**FOOD FOREST**



## **INTRODUCTION AND CONTEXT**

Since 2012 Mazao NGO is engaged in the field of rural development with Congolese small-scale farmers in the area of Tanganyika (Katanga Region), precisely in Kalemie.

Mazao has modified and adapted its approach according to the socio-cultural needs of different communities and implemented local solutions to increase the very little quantity of food produced by each family farmer.

Malnutrition affects 20% of Katanga's population, that means 9 million people that are in a state of food insecurity. Arable land is available, yet often farmers lack resources, access to local markets, or the techniques for a better ecological land management that would allow to grow more food while using limited resources.

## **WHO IS MAZAO NGO**

Mazao is an international NGO focused on rural development and food security, using the approaches of social business, agro-ecology and participatory education as tools to support and encourage the long-term self-development of different Congolese groups.

Mazao works with family farmers strengthening local technical capacity and establishing agro-ecological value chains.

The ultimate objective is the emergence of organised and autonomous groups able to become actors of their own change while respecting the needs and differences of individuals and their environment.



# FOOD FOREST

## WHAT IS THE FOOD FOREST PROGRAM?

An innovative reforestation program co-sponsored by the Japanese Academy of Agriculture Philosophy. Mazao supports family farmers in developing techniques of ecological intensification and permaculture and accompany each individual farmer to the establishment of food forests.

These are man-made forests' ecosystems where fruits, trees, medical plants and a variety of local crops combine in the same field. Each plant has a nutritional, commercial or medical value. Each farmer is responsible for its mini-forest which offers food during dry season and provides a regular revenue throughout the year.

**Food forests have one of the higher potential of carbon sequestration amongst all carbon farming systems.**

Contrary to common reforestation practices, food forest systems have the advantage of been managed in a decentralised way, by hundreds of farmers. This increases tree survival rates and assures the planting of new trees. Each farmer benefits from the forest and is committed to its survival and thriving - perpetuating conservation gains.

## TREES OF THE PROGRAMME IN NUMBERS (2017-2020):

The project expects to establish 200 food forests counting 977.800 trees/perennial shrubs the first year (2017-2018). In addition, other 900.000 trees/shrub will be planted in the initial regenerative phase and will die between 0 to 1.5 years. These leguminous shrubs are used to increase root level soil organic matter and topsoil mulch cover, they also sequester and fix nitrogen to feed productive plants. Moreover, the process of establishing a food forest entails planting in successions many other trees/shrubs year after years.

Between 2018-2020 another 2800 Food Forests will be established.



## THE ADVANTAGES OF AGRO-ECOLOGY

It is scientifically proven that agro-ecology has the potential to invert climate change and at the same time feed a growing world population. In fact, if every nation would increase soil carbon of only 0.4% each year, we could sequester 75% of all global emissions.

It is quite a recent discovery and, as with all new things, needs a radical change of vision. Furthermore it is a set of approaches that work well only if applied in small scale, by family farmers with little or no mechanization.

The positive side is that 80% of food consumed in the world is produced by small-scale farmers – therefore the potential to spread does exist and farmers are the key to the future of humanity, food and environment.

Good practices in agro-ecology include minimum or 0 tillage of soils, keeping soil cover with plants, crop rotation and composting. Perennial trees and crops sequester atmospheric carbon and through photosynthesis convert it into soil carbon. Carbon rich soils make the land much more productive, absorb water during floods and provide it to plants during drought

In tropical climate carbon sequestration happens all year round and therefore has a much higher impact on climate change and on the environment.

Agro-ecology and permaculture are approaches that allow farmers to build climate resilience, generate knowledge, produce nutritious food, promote social justice, cultivate identity and strengthen vital economy in rural areas.



The final objective by 2020 is:

**3000**

Food Forests

**14.667.000**

Productive trees planted

**240**

Hectares reforested

Food Forests are about 800sqm in size and they are all different from one another. Farmers decide which seeds suit the most their environment and vision.

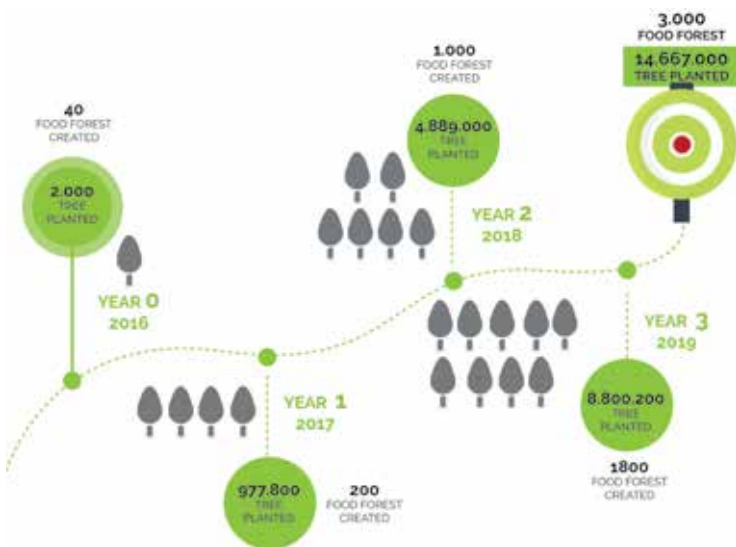
### MULTIPURPOSE RESULTS:

All species are chosen because they are native, multipurpose and mostly resilient trees/ shrubs. They require little inputs and easily adapt to climate change. However the key to resilience lays in people.

Our participatory program aims at empowering communities to develop knowledge and behaviours ready to adapt to change as well as to introduce innovations.

Food forests' systems are multifunctional: they reduce pressure on natural forests for firewood and land clearing, are drought resistant and provide a diversified diet. Perennial crops improve soil structure, reduce compaction, improve water cycling and capture and boost plant growth. This carbon farming system restores loss of carbon while producing more food with less resources (water, seeds etc.) and meeting human needs.

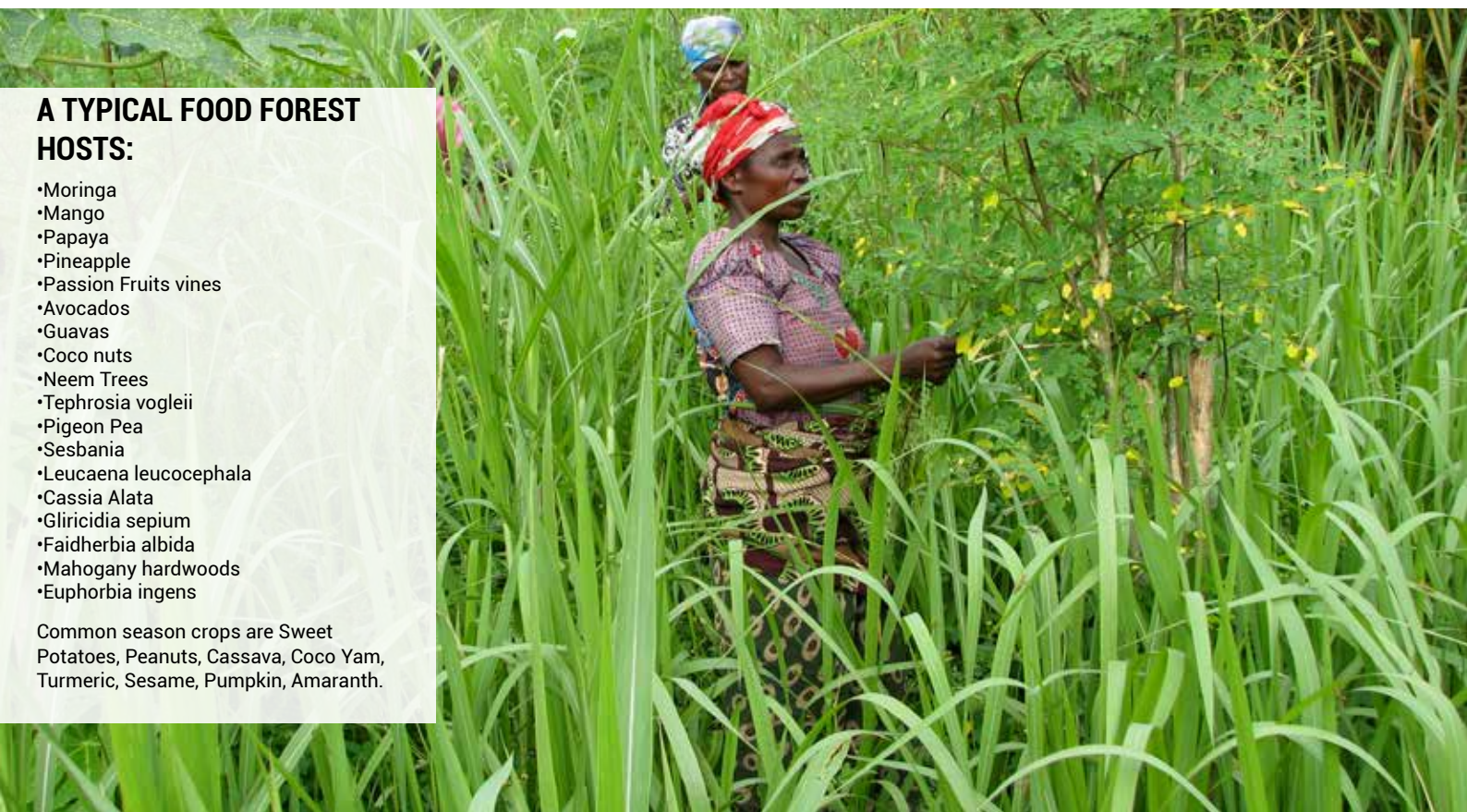
To enhance biodiversity (plant and animal life) is an important aspect of food forest systems which also bonds farmers to their natural environment.



### A TYPICAL FOOD FOREST HOSTS:

- Moringa
- Mango
- Papaya
- Pineapple
- Passion Fruits vines
- Avocados
- Guavas
- Coco nuts
- Neem Trees
- Tephrosia vogleii
- Pigeon Pea
- Sesbania
- Leucaena leucocephala
- Cassia Alata
- Gliricidia sepium
- Faidherbia albida
- Mahogany hardwoods
- Euphorbia ingens

Common season crops are Sweet Potatoes, Peanuts, Cassava, Coco Yam, Turmeric, Sesame, Pumpkin, Amaranth.







**3.000**  
Family farmers involved

**100**  
Villages affected

in the Tanganyika Region  
by 2020

**200 FAMILIES - YEAR 1**  
**1000 FAMILIES - YEAR 2**  
**1800 FAMILIES - YEAR 3**

## **THE KEY PLAYERS: PRODUCERS' COMMITTEES**

Producers' committees are farmers groups composed by 15 to 30 people per village. Each committee counts a Group Leader (President), a local technical advisor (field monitor) and a treasurer (key person in the product purchase process ensuring the regularity of all selling activities).

The role of the field monitor is to facilitate the flow of information, to monitor any problems that may arise during the process and to keep the group compacted.

Theoretical and practical training in permaculture food forest design is provided to each group. Each farmer is coached to research and design her/his own design according to contingent needs and objectives. Training focuses

on food forest principles, applications, design practices and resource management .

The training program is implemented always through participatory cycles. These activities enable groups to synergistically get aware of one another needs, problematics and objectives – and to put straight away the training in context.

Knowledge exchange from farmer to farmer represents the key to actively finding solutions and to develop innovative ideas regarding food forest management. Participatory management of watersheds is undertaken in order to avoid water conflicts and provide regular supplying of water to everyone.

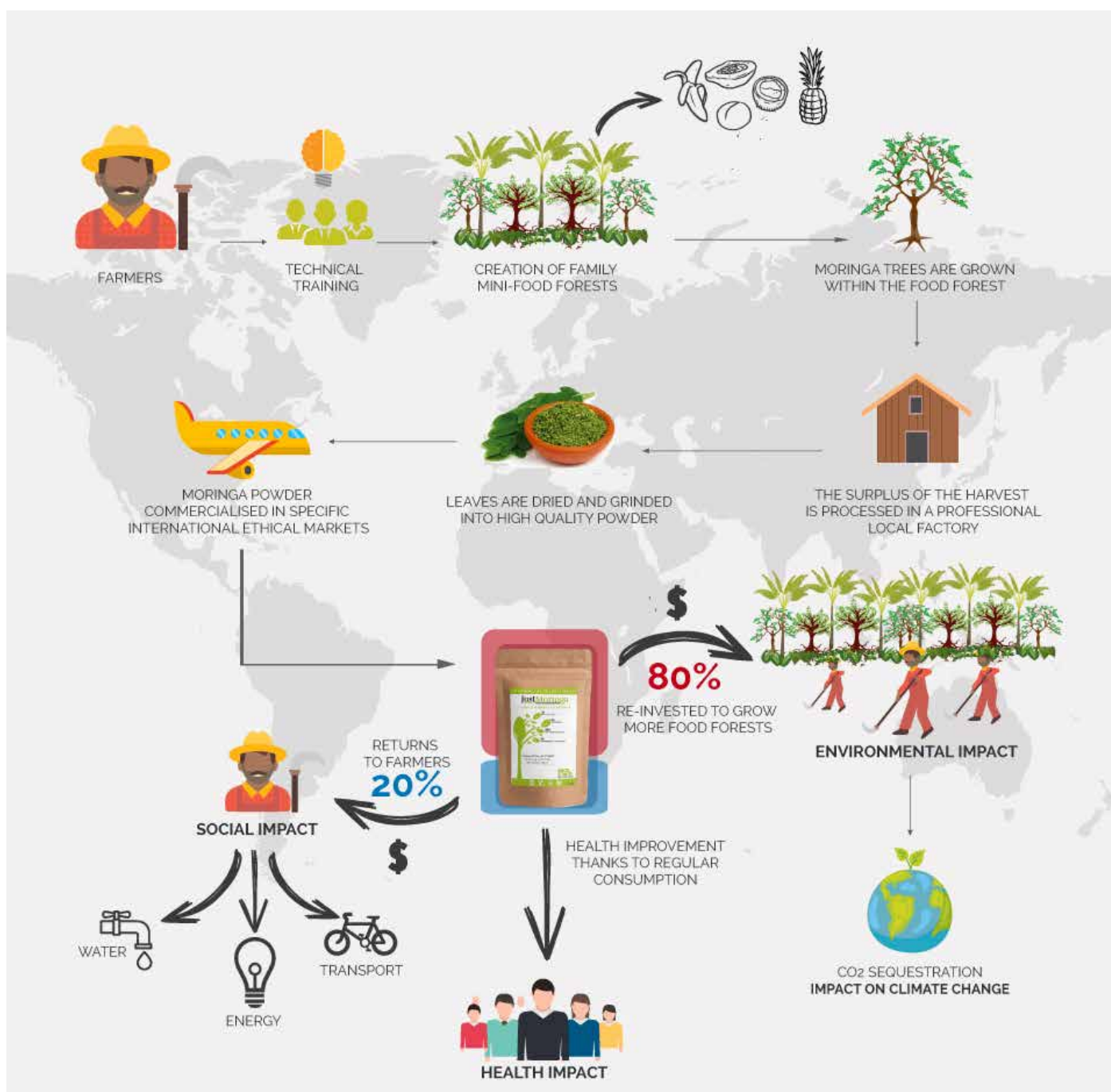
## HOW TO MULTIPLY FOOD FORESTS?

Among the plants that grow in the Food Forests there is the Moringa Oleifera, called Tree of Miracles for its highly nutritious properties. The leaves of Moringa are purchased from family farmers and processed into high-quality Moringa powder.

The final product is sold in international markets (Europe and Asia), through a highly sustainable trade model called "Part-Ecology" that consent the multiplication of Food Forests.

Mazao developed an ethical and sustainable brand called FOOD FOREST and its first product called JustMoringa.

**"We invert climate change by growing food through Edible Forests!"**





## WHAT IS PART-ECOLOGY?

It is the Food Forest company frame of reference that defines the functioning and quality standards of value chains:

- A fair price is paid to family farmers + a part of the earned profits from sales of final product (e.g sale of Moringa powder) is employed for actions chosen by farmers in the following fields: water, energy, transport or rotating savings (Likilimba)
- A part of the earned profits are re-invested to grow new Food Forests - triggering a positive feedback loop.
- Products are grown following the principle of Agro-ecology and Carbon Farming: approaches that increase soil carbon and biodiversity, mitigate climate change, increase / restore soil fertility, build healthy soils that hold much more water, making crops more resilient on the face of drought.
- The use of participatory learning tools and the endless sharing of knowledge with/between farmers' groups. These approaches are used at all stages of the training and in the value chain decision making process. The long-term objective is to trigger **self-organisation and the emergence of innovations across food forest corridors.**

The core objective of part-ecology is to enhance the resilience of all eco-systems involved.

### Some benefits of the Part-Ecology value chain:

1. It reduces the "externalities" associated with "long" value chains (e.g shipments of goods from a continent to another). In fact Part-ecology secures the benefits of a "short" value chain (zero environmental impact or carbon negative, increases resilience of producers, increases local governance, etc.).
2. Part-ecology makes sure that the amount of time employed for the production of Moringa leaves remains marginal to the core activities of each family farmer; this in order to avoid dependence on international demand. Instead the focus is put on the development of diverse and resilient local value chains.

Central are therefore the harvests of the other crops/trees that grow in the food forests (Papaya, Banana plantain, Beans, Avocado, cassava, etc. ).



# IMPACT OF THE PROGRAM:

## ENVIRONMENTAL

1. Carbon-Negative-value-chain: the overall carbon emissions released into the atmosphere (transport, packaging, energy consumption, calories employed etc.) are lower than the overall amount carbon sequestered into the soil (through more photosynthesis, biochar, etc.).
2. Reforestation, increase of biodiversity, increase of the degree of resilience of eco-systems (water availability, drought resistance etc.).

## SOCIAL & NUTRITIONAL

1. Increase of the degree of resilience of humans involved (food availability in dry season, diversification of income generating activities, land-grabbing resistance etc.).
2. Knowledge sharing: more exchange of agro-ecological knowledge among farmers.
3. Reinforcement and diversification of diet. More than 10 different foods are grown in the forests + the Moringa leaves.

## ECONOMIC

1. Microeconomics: increase of the purchasing power of farmers and a regular revenue throughout the year.
2. Macroeconomics: development of local economies (local food systems). Increase of the value of land of each small-holder (a deterrent for land-grabbing)



TIMES THE CALCIUM OF MILK

TIMES THE POTASSIUM OF BANANAS

TIMES THE VITAMIN A OF CARROTS

TIMES MORE IRON THAN SPINACH

TIMES THE YOGURT PROTEINS

TIMES THE VITAMIN C OF ORANGES

# LONG -TERM IMPACT:

## HEALTH IMPACT



**3.000 Congolese'** families will improve their health thanks to a varied diet

Each year **24.000 consumers** will improve their health by using Moringa regularly

**3.000 FOOD FORESTS** create  
**14.667.000**  
Trees Planted



## ENVIRONMENTAL IMPACT

## SOCIAL IMPACT



**3.000 Family Farmers** involved

**100 Villages** involved

# FOOD FOREST

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Mazao developed a food system model that holds the potential to reverse climate change while growing food and enhancing the economic well-being of family farmers.

The key to this positive feedback loop is Moringa, the dominant tree of the man-made Food Forests. The valuable Moringa powder is sold in international markets through a value chain that goes "beyond fair trade".

This in turn generates a regular revenue to family farmers and the proliferation of Food Forests in a relentless cycle.