21ª CONFERENCIA INTERNACIONAL SOBRE PALMA DE ACEITE

21st International Oil Palm Conference

What is Regenerative Agriculture?

fedepalma | cenipalma

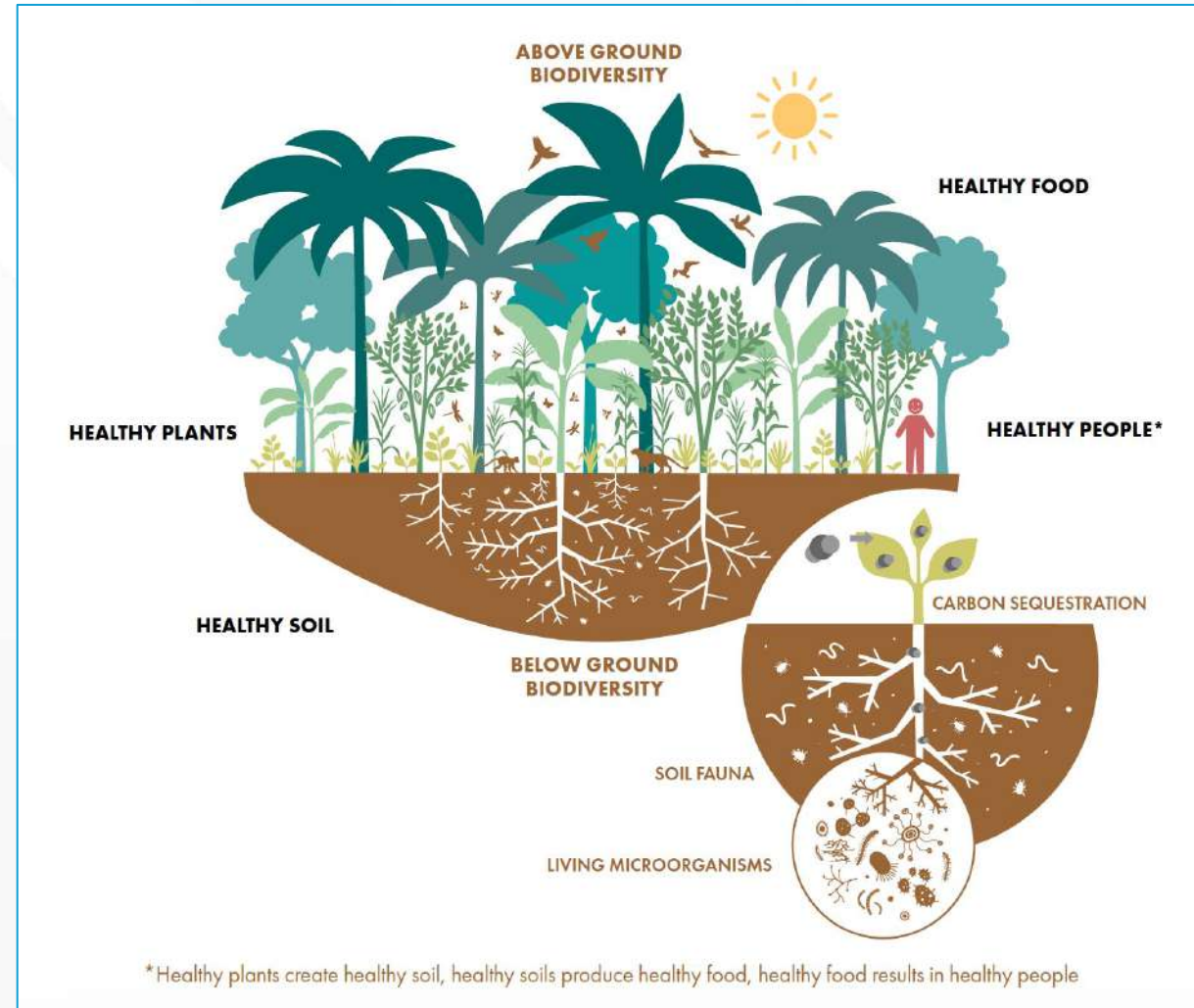# Defining RegAg

Since the 2010s, publications use the term regenerative agriculture to describe farming systems going beyond sustainability, capable of actively restoring soil fertility, water cycles, and biodiversity.

Regenerative Agriculture describes farming and grazing practices that, among other benefits, **reverse climate change** by **rebuilding soil organic matter** and **restoring degraded soil biodiversity** – resulting in both **carbon drawdown** and improving the **water cycle**."

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ABOVE GROUND BIODIVERSITY

HEALTHY FOOD

HEALTHY PLANTS

HEALTHY PEOPLE*

HEALTHY SOIL

BELOW GROUND BIODIVERSITY

CARBON SEQUESTRATION

SOIL FAUNA

LIVING MICROORGANISMS

*Healthy plants create healthy soil, healthy soils produce healthy food, healthy food results in healthy people

Integrating Agroforestry into Regenerative Practices

Diversifying Plant Species: Integrating a variety of crops and trees to enhance biodiversity and resilience.

Implementing Sustainable Land Management: Adopting practices that maintain or improve soil health, such as reduced tillage and organic amendments.

Enhancing Water Conservation: Designing systems that optimize water use and reduce runoff.

Promoting Social Equity: Ensuring that agroforestry initiatives benefit all community members, including marginalized groups.

The Optipalmex project in Mexico

- Enhancing agroecological transition in Oil Palm Cultivation: Building Innovative Agroforestry Systems in Southeastern Mexico

- The Optipalmex project aims to **support agroecological transition** by creating a network of oil palm plantations involving **38 farmers** in the states of Campeche and Tabasco.

- The farmers have established **57 experimental plots** where oil palm (one single genetic) is combined with **various fruit trees (citrus, cacao, banana) and timber species (acacia, teak, mahogany, cedar)** in alternating rows or borders, together with **cattle grazing**.

Social dialogue and serious games

- Providing **oil palm seeds from selected progenies** to farmers to implement innovative systems, including **intercropping and agroforestry**.

- Developing a **serious game** to **understand the system**, stakeholders, technologies, impacts and challenges.

- Facilitate the design of innovative production systems by **sharing knowledge**, **defining interests and constraints, and identifying opportunities**.

- Providing **technical training** and support for plantation renewal and pasture conversion.
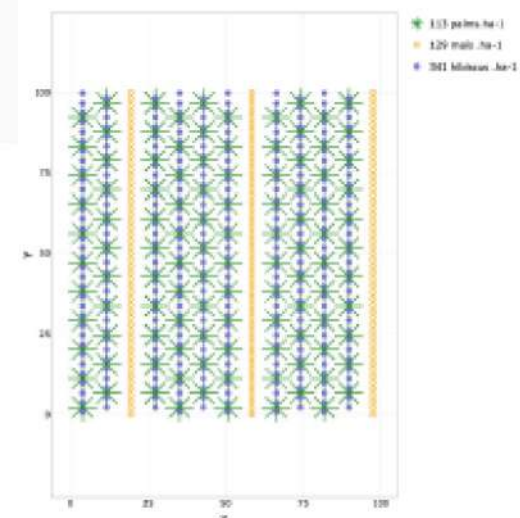
The EFForTS Project in Indonesia

A Biodiversity Enrichment Experiment

The EFForTS project is for **Ecological and Socioeconomic Functions of Tropical Lowland Rainforest Transformation Systems** (Sumatra, Indonesia).

More than **160 researchers** from the University of Göttingen in Germany and the Indonesian universities IPB University (Bogor), UNTAD (Tadulako University, Palu) and UNJA (University of Jambi) worked for 12 years in close cooperation.

A wide range of disciplines including **ecology, forestry, agriculture, remote sensing, economics, human geography, and cultural anthropology.**

EFForTS-BEE is part of the global network of 323 tree diversity experiments *TreeDivNet* - https://treedivnet.ugent.be/.

UNIVERSITÄT GÖTTINGEN

UNIVERSITAS JAMBI

INSTITUT PERTANIAN BOGOR

UNIVERSITAS TADULAKO

The EFForTS Project

In December **2013, 52 experimental plots (i.e. tree islands)** were established in a conventional 140 ha oil palm plantation.

Experimental design followed a **random partition plot area** (25, 100, 400 and 1600 m2) and **tree species diversity (0, 1, 2, 3 and 6 species).**

Six different tree species were planted:

Archidendron jiringa (Fabaceae) **fruits**

Parkia speciosa (Fabaceae) **fruits**

Durio zibethinus (Malvaceae) **fruits**

Dyera polyphylla (Apocynaceae) **fruits**

Shorea leprosula (Dipterocarpaceae) **timber**

Peronema canescens (Lamiaceae) **timber**

The EFForTS Project

This experimental design tests the restoration outcomes of **tree island** establishment in **oil palm dominated** landscapes.

Tree islands **vary in area (25 - 1600 m2) and planted tree diversity (0 - 6 species)**, with a total of **52 tree islands** established in an industrial oil palm plantation in Sumatra, Indonesia.

Control plots represent **conventionally managed** oil palm monocultures.
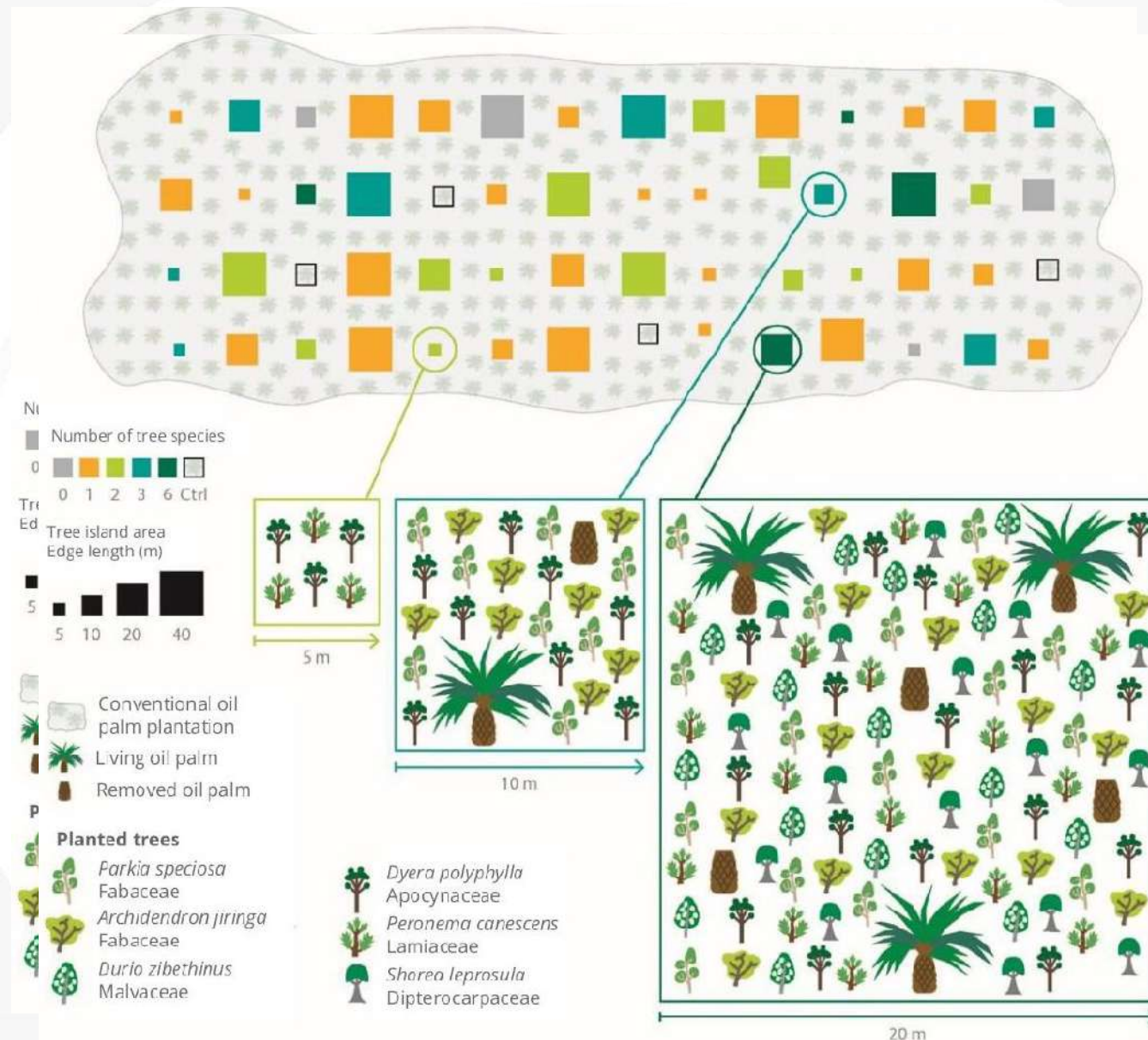
The EFForTS Project

A large-scale, **five-year ecosystem restoration** experiment in an oil palm landscape enriched with 52 tree islands, encompassing assessments of **ten indicators of biodiversity and 19 indicators of ecosystem functioning.**

Tree enrichment **enhanced multiversity by 250% and ecosystem multifunctionality by 75%** compared to conventional monocultures.

Therein, larger tree islands led to **higher multidiversity and multifunctionality gains via changes in vegetation structure**.

Tree enrichment did not significantly decrease landscape-scale oil palm yield.

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The SAF DENDE Project in Brazil

SAF DENDÊ
innovation and sustainability

The SAF DENDE Palm oil project, a **partnership** between Natura, the Brazilian Agricultural Research Corporation (Embrapa) and the Tomé-Açu Mixed Agricultural Cooperative (Camta),

SAF DENDE aims to make palm oil production viable in the northern region of Brazil.

The project aims to **reforest degraded areas** and has already been tested in three demonstration units in the municipality of Tomé-Açu, in the state of Pará.
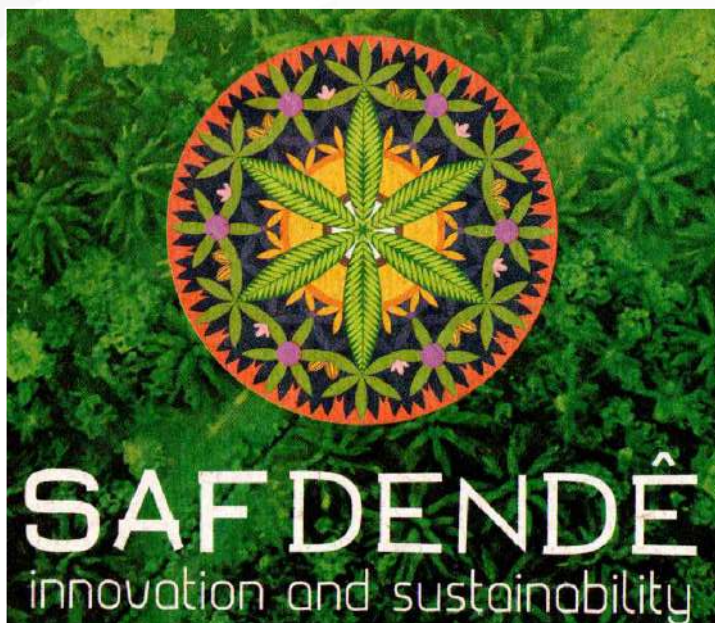
SAF Dendê is an agroforestry production system where oil palm is grown together with other plants, which can be used food or even wood production. Cassava, banana, passion fruit, black pepper, rice, jack bean, pigeon pea, tree marigold, inga, gliricidia, achiote, cocoa, açaí, bacaba, carapa, ipe, mahogany, pracaxi, yellow mombin and ucuuba were part of these systems with oil palm.

In partnership with local farmers, this participatory study showed that the cultivation of oil palm in agroforestry systems (SAF Dendê), with high biodiversity, presents good growth and productivity, generates different products, increases income and benefits for families without harming the environment, being an example for the world.

The SAF DENDE Project in Brazil

Lessons of SAF Dendê

- Oil palm shows good development and productivity in agroforestry systems;
- Cocoa adapts well to the understory of oil palm;
- Higher demand for labor are for harvesting, pruning and mowing activities;
- Low incidence of nutritional problems, pests and diseases (<2%);
- Use of machines is important in the handling of organic matter and harvest;
- Productivity of oil palm, cocoa, açaí and carapa increase over time;
- In agroforestry the average temperature is 5 degrees lower than the external environment;
- Agroecological practices contribute to the resilience of the system;
- Product diversity favors the economic viability of the systems;
- Food security, biological control, carbon sink, soil quality, water and biodiversity conservation are the main ecosystem services;
- SAF Dendê generates several economic and socio-environmental benefits.

USAID • C.A.M.T.A • Embrapa • Centro Internacional de Pesquisa Agroforestal ICRAF • natura

First plantation in 2008
81 to 99 palms/ha

2008: 6 different agroforestry systems amounting **18ha in total**

2019: 18 demonstration units on **61 ha**

SAF DENDE generates **3 X more environmental services** than monoculture

The TRACTION Project
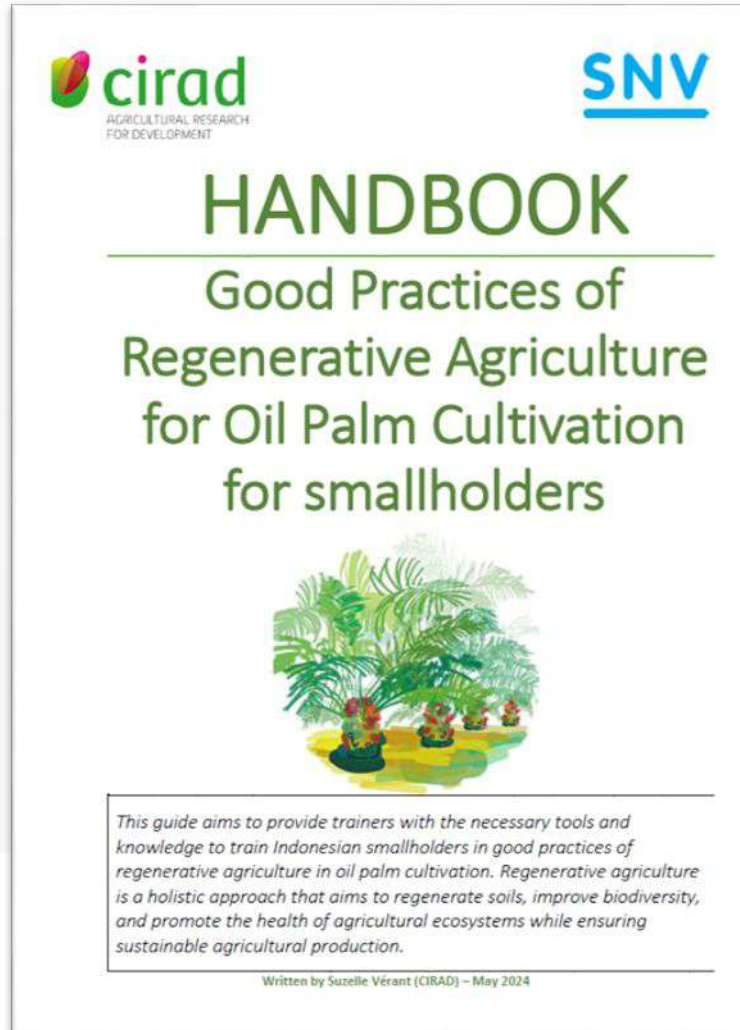
An international collaborative project on **_Traceable Sustainable Palm Oil Production._**

Generating scientific content on regenerative agriculture through the **training of smallholder farmers**

Production of a **training module on regenerative agricultural practices** as applied to oil palm cultivation

Organisation of **specific training of trainers**
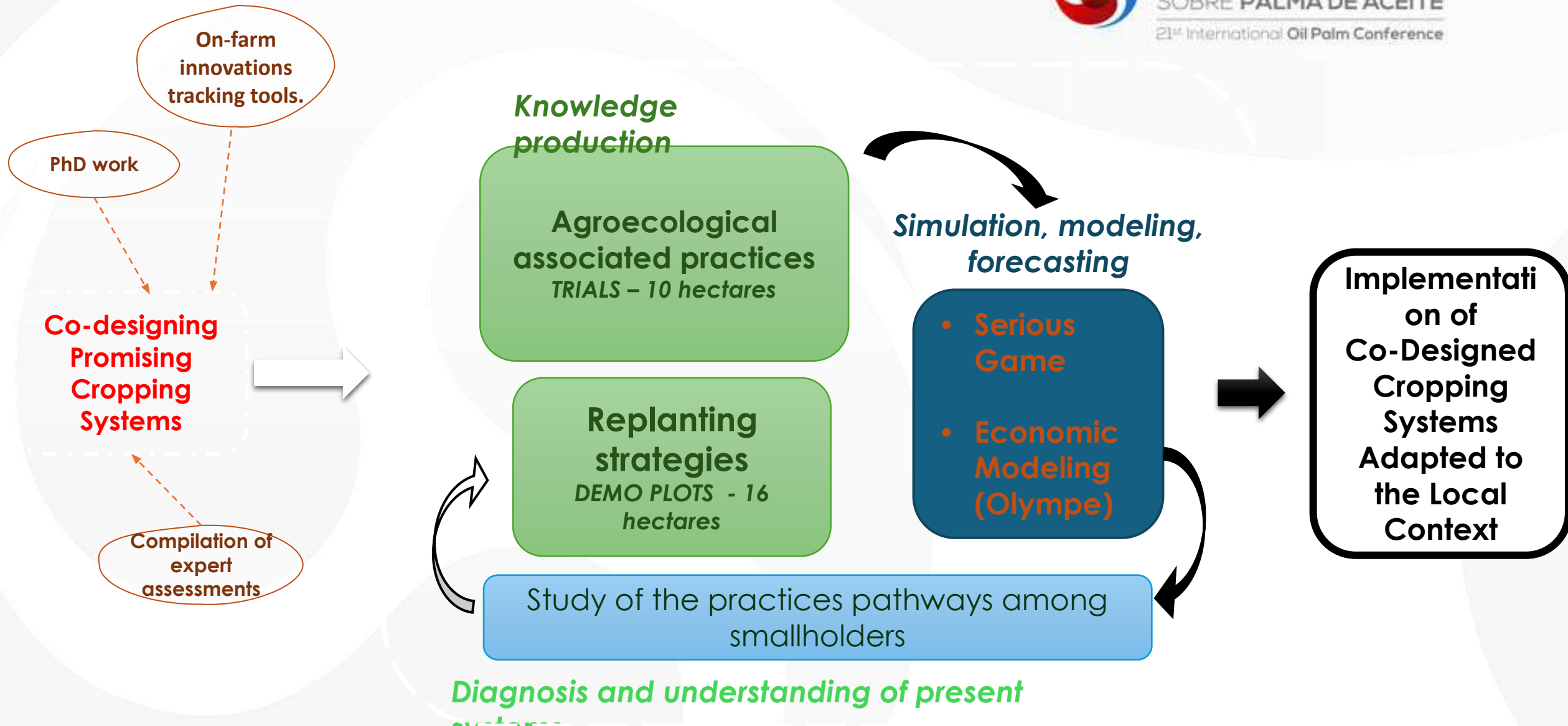
The TRACTION Project

Global Objective

- To support oil palm smallholders and ensure they do not contribute to deforestation by helping them adopt better **agricultural practices**.
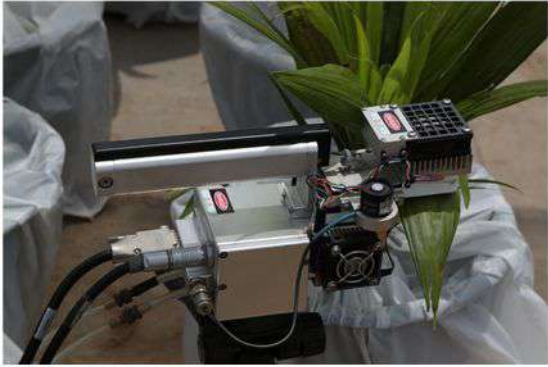- Approach: "Best Management Practices" (BMP)

Specific Objectives

- To produce accessible and easily **actionable knowledge for smallholders** on replanting and associated practices.
- To combine bottom-up and participatory approaches to encourage the **adaptation and adoption** of these practices among small-scale farmers.
- To analyse and evaluate the adoption mechanisms of the "BMP" approach.

The TRACTION Project

On-farm innovations tracking tools.

PhD work

Co-designing Promising Cropping Systems

Compilation of expert assessments

Knowledge production

Agroecological associated practices
TRIALS – 10 hectares

Replanting strategies
DEMO PLOTS - 16 hectares

Simulation, modeling, forecasting

- **Serious Game**

- **Economic Modeling (Olympe)**

Implementation of Co-Designed Cropping Systems Adapted to the Local Context

Study of the practices pathways among smallholders

Diagnosis and understanding of present

The TRAILS Project, Malaysia (Sabah)

TRAILS project builds on a **complementary partnership**.

TRAILS links academics, NGO, private and public stakeholders.

TRAILS relies on long term expertise and **multidisciplinary approaches** from various science fields.

TRAILS deals with **agronomy, forestry and conservation sciences.**

The TRAILS Project

To install oil-palm based agroforestry **inside the oil palm plantation**

To undertake mixed planting in **real-life conditions**, using selected oil palm seedlings and **15 different native forest species**

To monitor the dynamics of **regeneration of biodiversity** in specific areas: agroforestry plantings, riparian corridors, and oil palm plantations in comparison with native forest.

To comparatively **study oil palm performance** in different systems: growth and development, phenology, fruit yields and bunch characteristics.

TRAILS in numbers

- Allocated land bank : 100 ha

- Present planted area : 37 ha

- Planted forest species : 15

- Planted trees : 3,000

- Specific planting designs : 3

TRAILS   cirad

Agroforestry designs
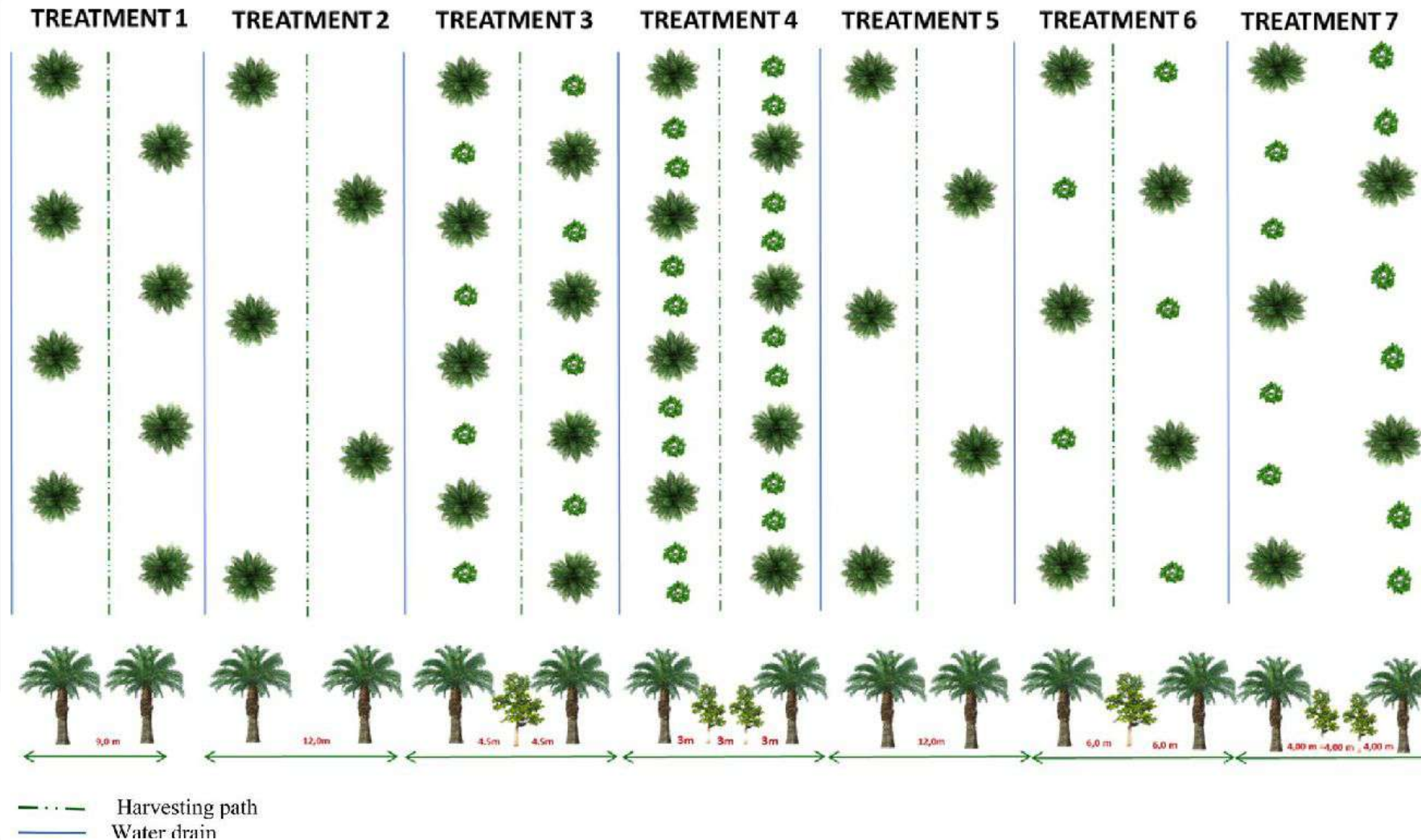
Interplanted rows

2 forest tree are planted between 2 palms
on the line (128 Trees)
Palms spacing is 3m

Mixed tree plantation
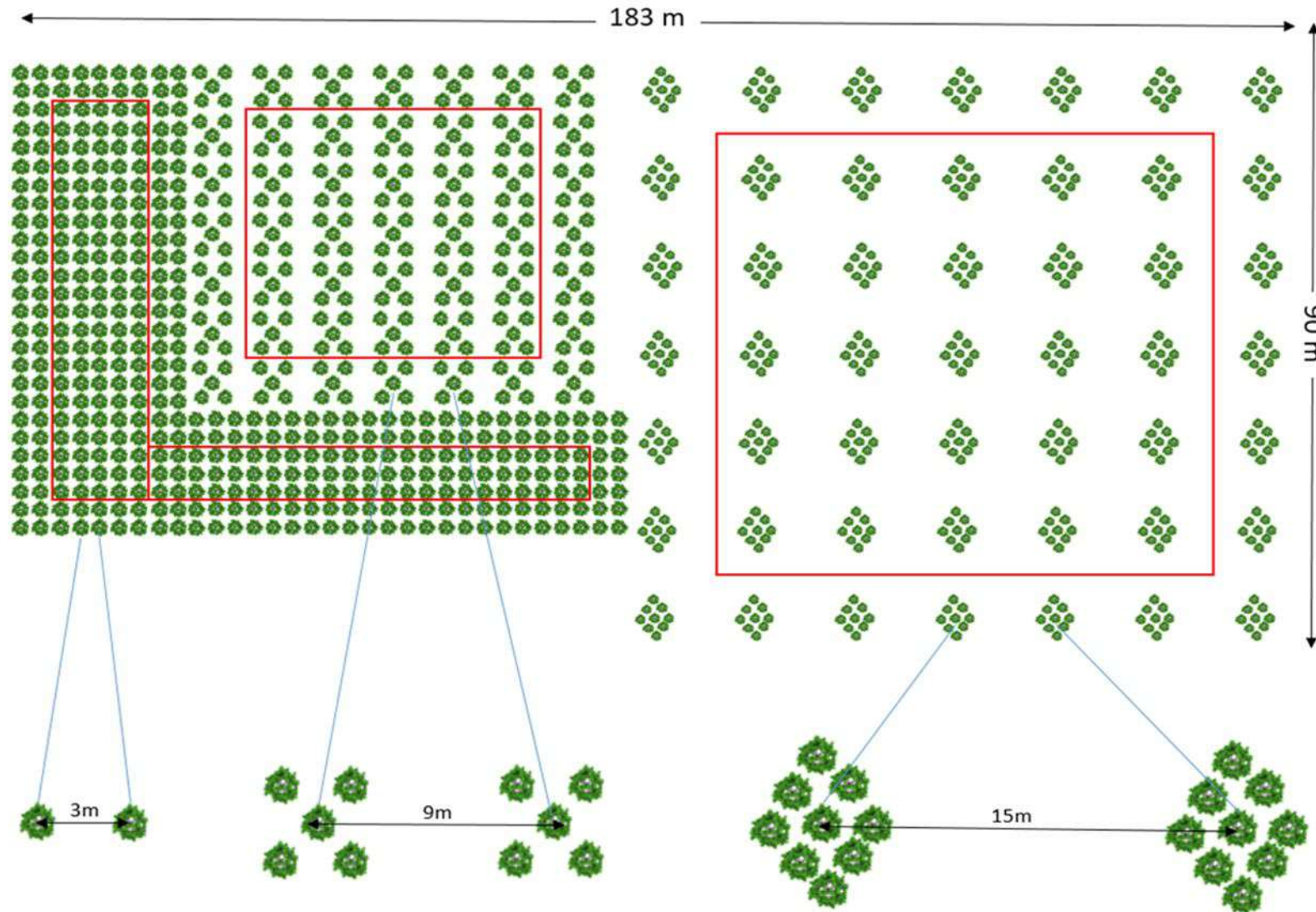
- 3 treatments
- Treatment 1 : 10 species 3 X 3 m, comparison of species 25 trees per species.
- Treatment 2 : Group of 5 trees per planted at 1 X 1 m spacing between groups is 9 m.
- Treatment 3 : 9 trees per nucleus 1 X 1 m, spacing between groups of 9 trees is 15 m.

Mixed tree plantation

	FICUS SEPTICA	35
4	PTEROSPERMUM JAVANICUM	42
7	EUGENIA CERASSIFORMIS	40
11	EUGENIA SP	35
12	KOODERSIODENDRON PINNATUM	35
14	MICROCOS CRASSIFOLIA	43
19	TOONA SURENI	35
22	MALLOTUS MUTICUS	41
26	EXCOECARIA INDICA	35
27	EUGENIA CERASIFORMIS	47

- Qualifying & quantifying:
- Cooperation / competition between species
- Capacity for generating homogenous forests

Mixed tree plantation

- The present trial was planted with **forest trees only**, aiming at assessing the **ability for agroforestry** plantation of ten different selected species of native forest trees.

- Three **different planting densities** and three types of trees associations (individual trees, group of 5, group of 9) were tested.

- We will **improve our knowledge** on growth and development characteristics of 10 forest species, natives of the Kinabatangan Basin.

- We will assessed the **suitability of native forest species** to be successful in agroforestry plantations

Tree islands
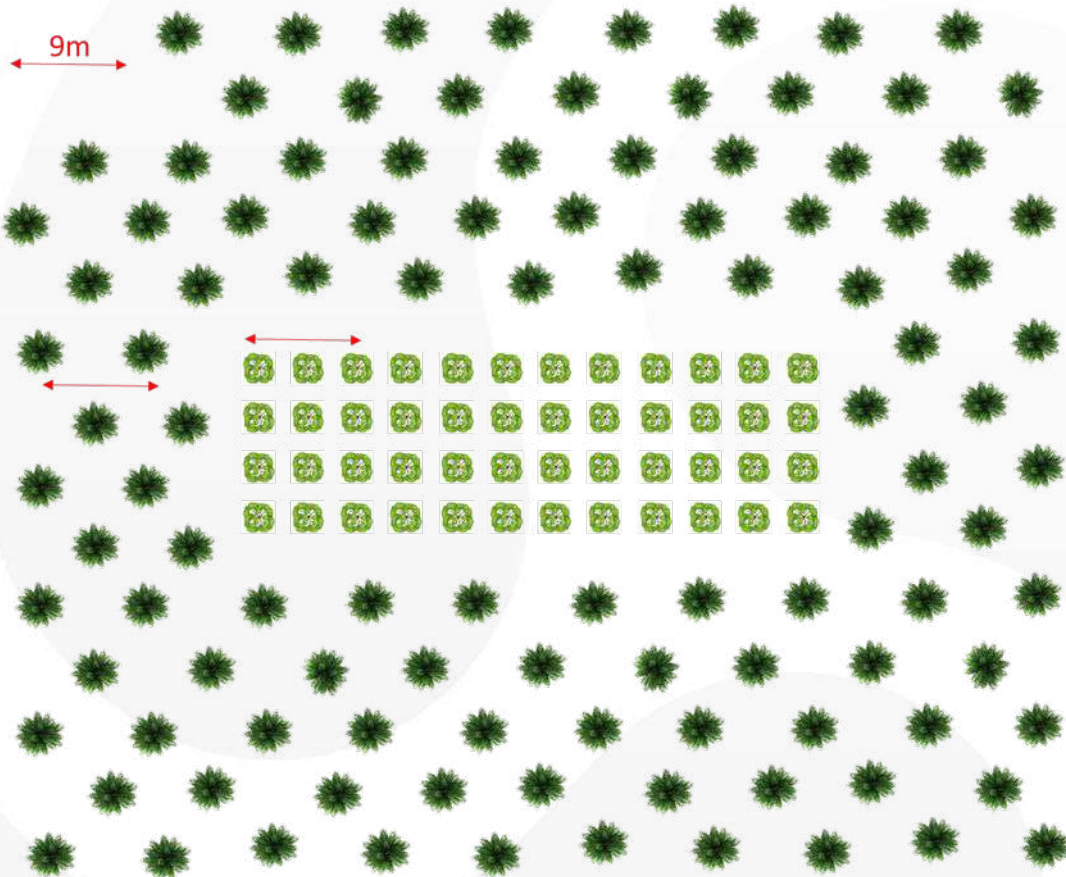
Goal
To document the interactions between palms and specific tree species

Experimental design:
- 5 replicates x 48 trees = 240 trees per species
- First set of 4 species: *Nauclea subdita, Microcos crassifolia, Meiogine sp, Mallatus muticus*

Specific objectives
- To assess the productivity of palms around forest trees islands
- To assess the changes in microclimate inside and around the islands
- To assess possible contamination or symbiosis through the microflora (*Ganoderma*)

Planting and hoping

Planting and hoping

The TRAILS Project

https://www.trails-project.org/

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MUCHAS GRACIAS

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