Oil palm-based agroforestry systems

Innovative planting designs for biodiversity, climate and livelihood

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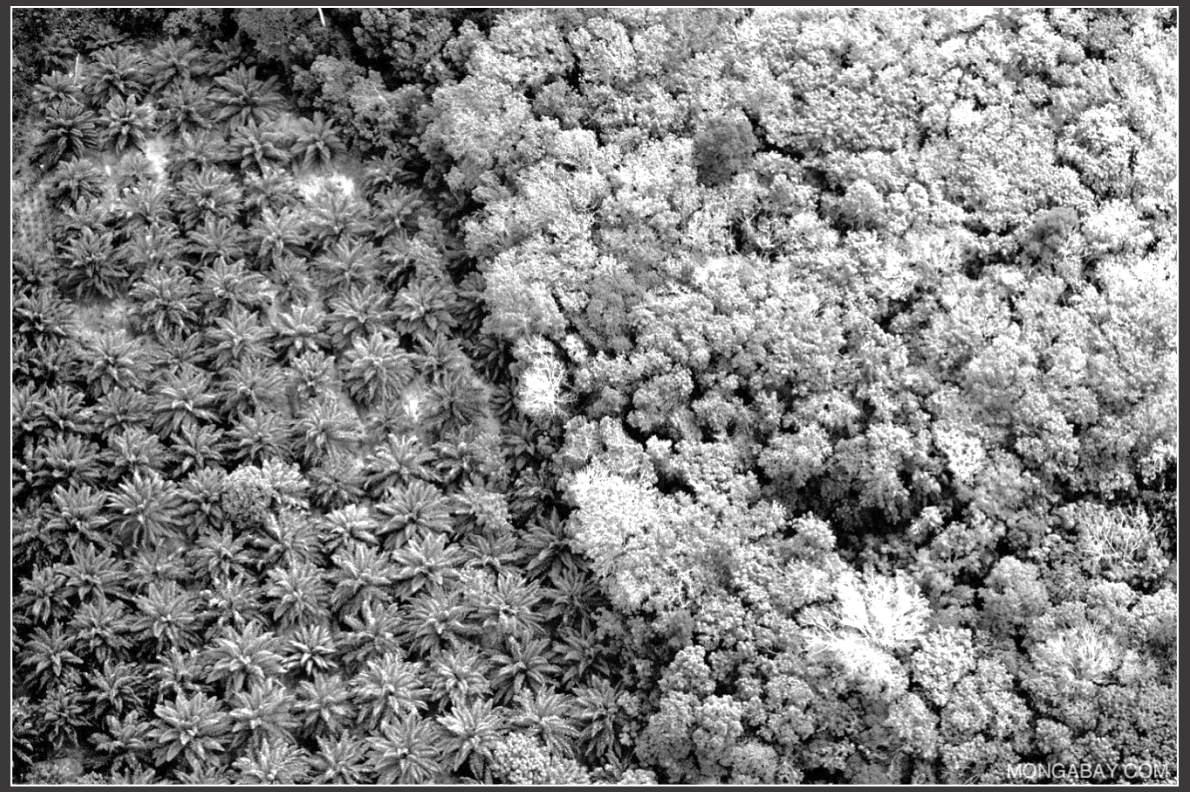
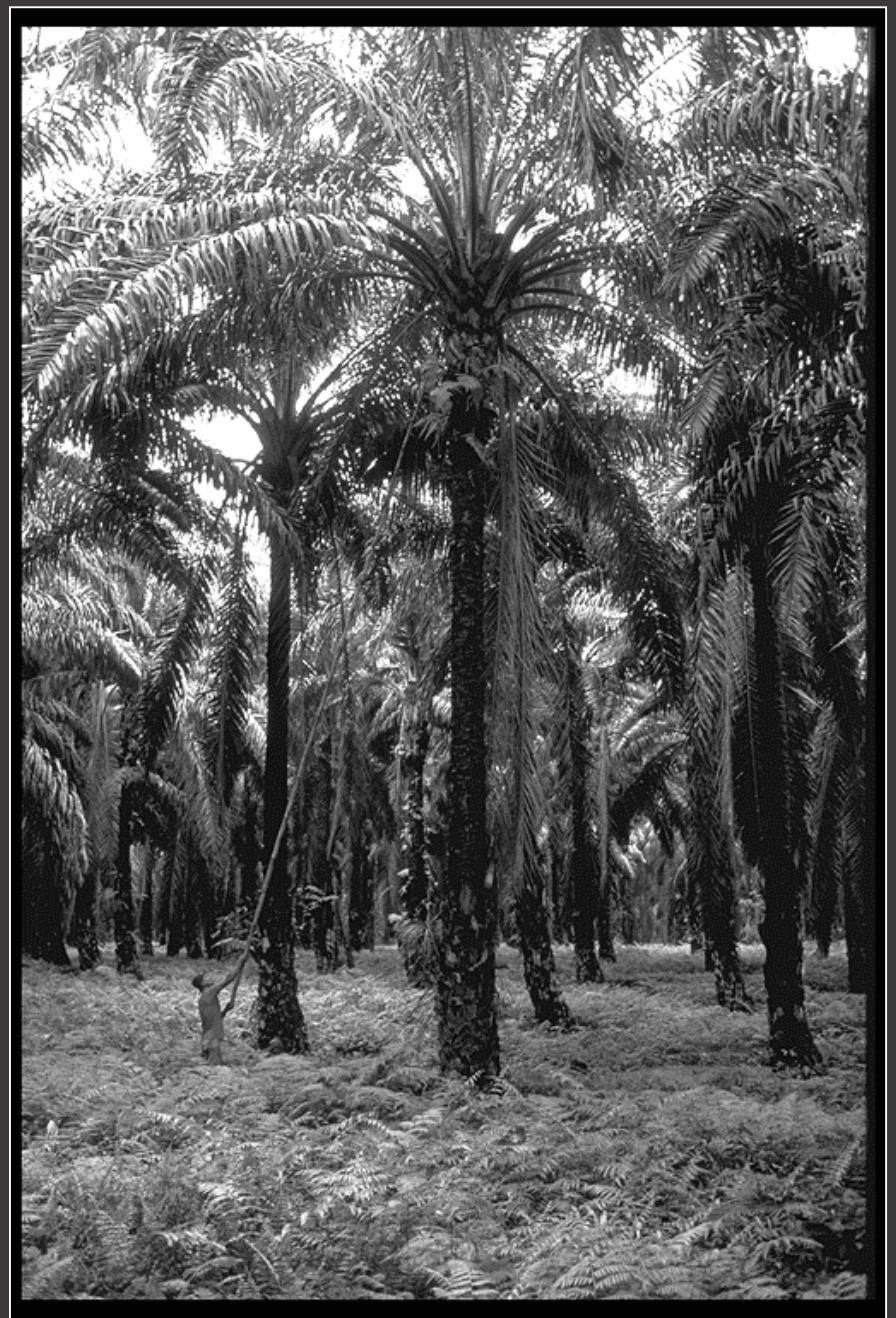
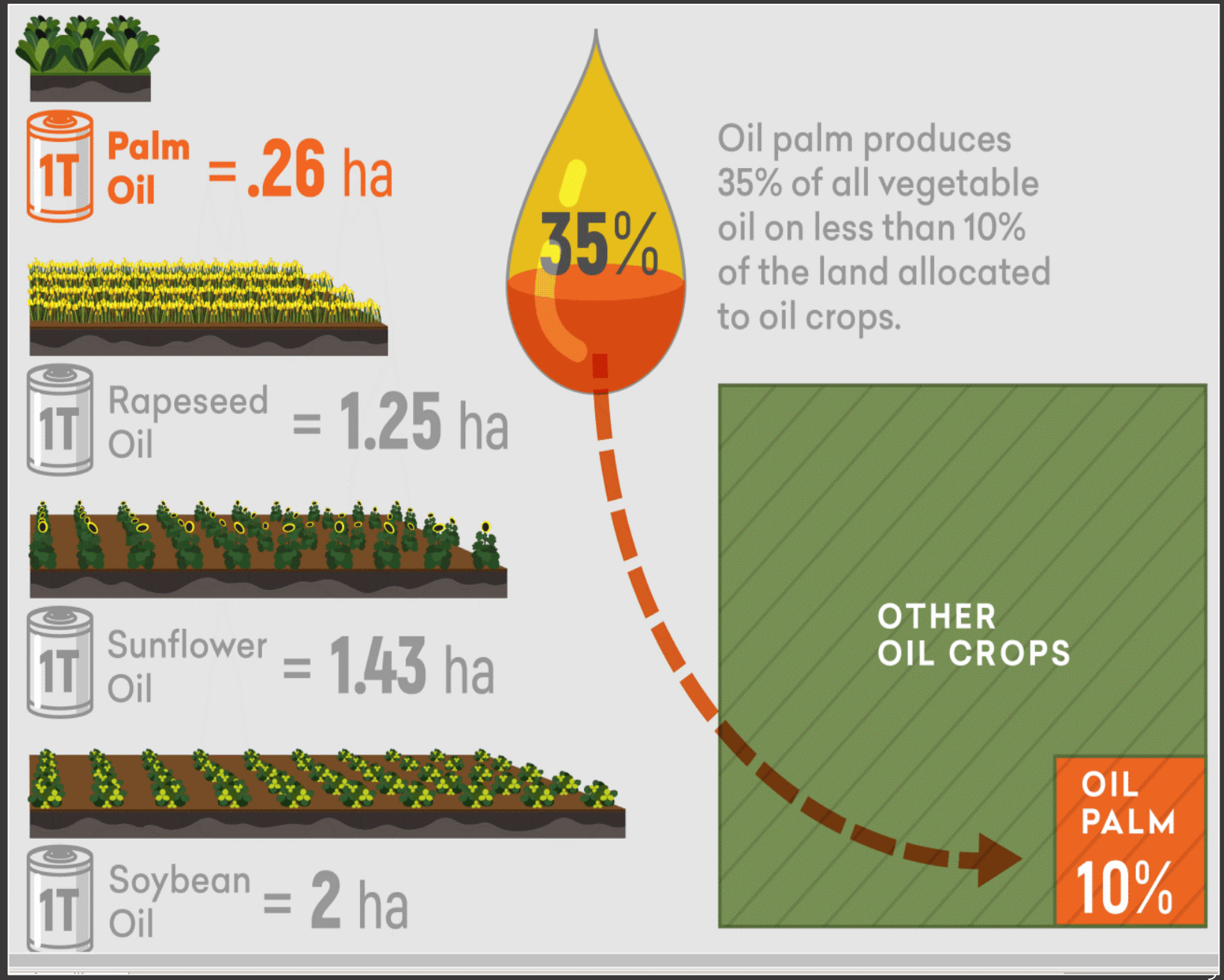
Oil palm is in the public debate



Key factors of attractivity (1)





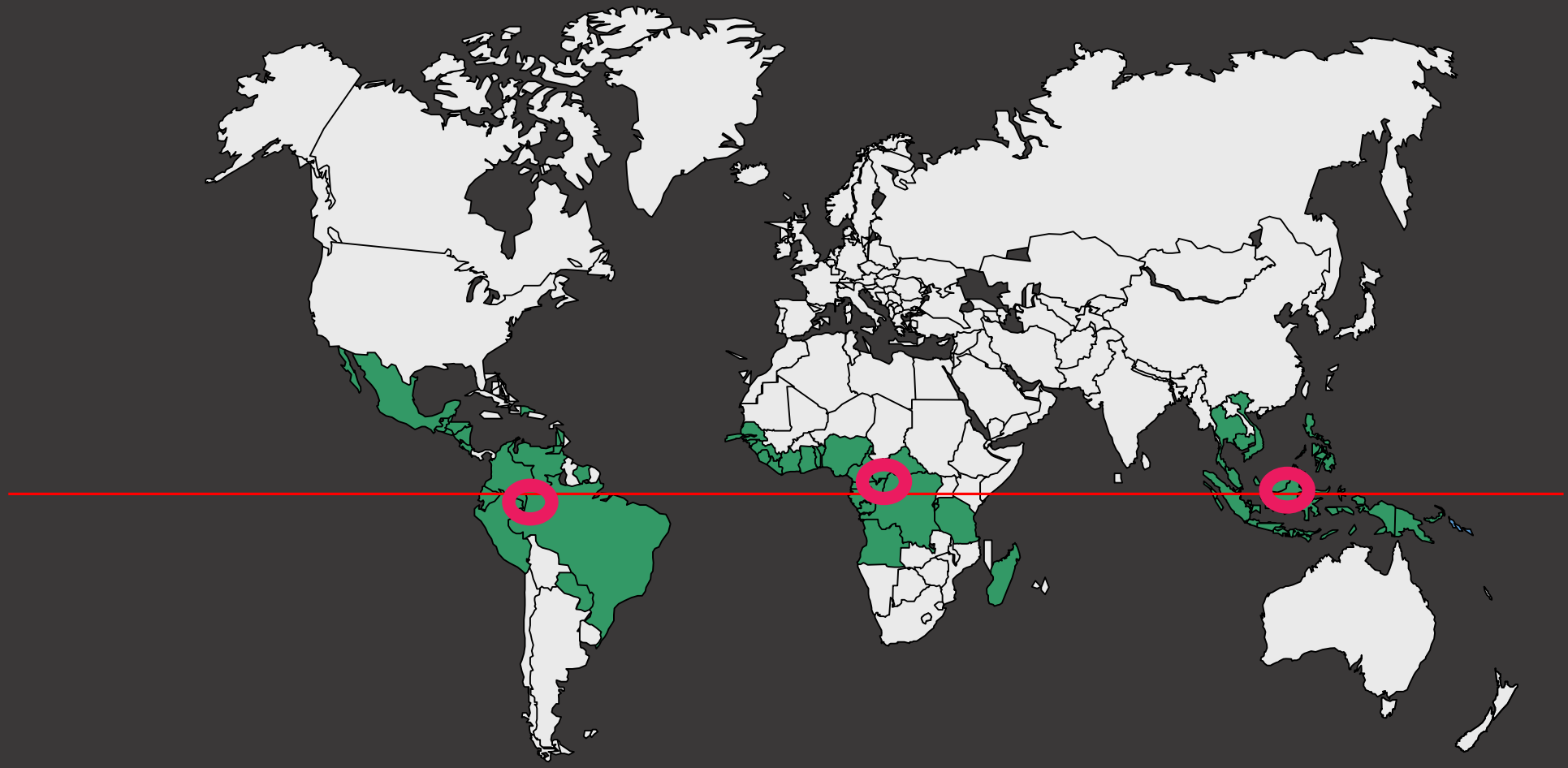
Key factors of attractivity (2)

Crop	Land productivity (€/cultivated hectare)	Work productivity (€/man.day)
Oil palm	2,100	36
Rubber (clonal plantation)	1,600	17
Rubber (agroforestry)	1,300	21
Cultivated rice	200	1.7





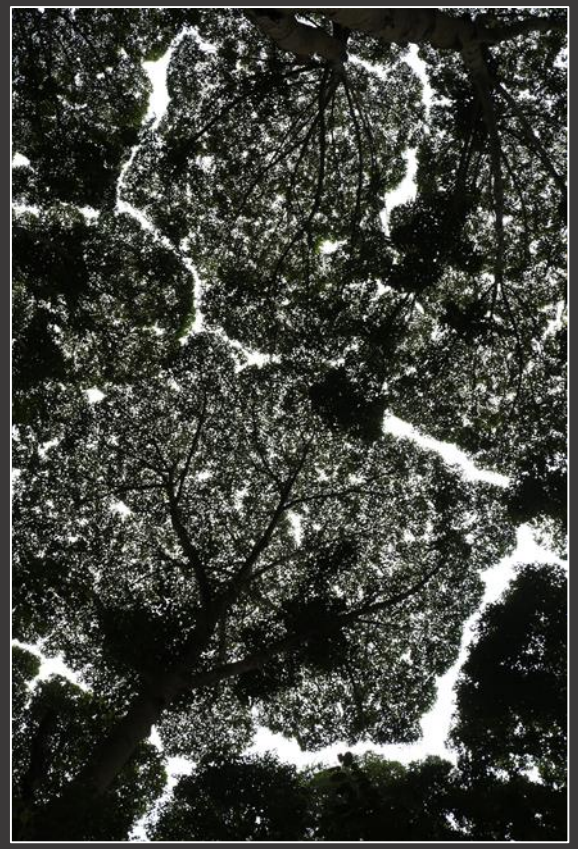
A strictly intertropical distribution



Why oil palm-based agroforestry?

- The mono-cropping plantation model is showing its limits.
- A one-century old cropping system, relying on abundant arable land and docile work force.
- The 2015 El Nino episode demonstrated the poor climatic resilience of intensive monocrop systems.
- The CoVid pandemics has revealed other weaknesses (reliance on imported manpower, poor wages, arduous work).
- Diversified systems are more able to attract young farmers (stable income from multiple activities).

Expectations



- To establish diverse oil palm-based agroforestry plots of various designs and composition, under multiple agroecological conditions.
- To precisely document changes in climatic, ecologic and agronomic characteristics from baseline assessments.
- To characterize both the performance and the resilience of mixed agroforestry systems compared to traditional planting designs.
- To monitor the induced changes in flora and fauna diversity and abundance.
- To quantify the impact of these new system in terms of palm oil yield yield and farmers' income.
- To provide solid evidence-based information to document the necessary change of paradigm and convince stakeholders.

Objectives

- To install oil-palm-based agroforestry systems in areas ready for replanting: mixed planting using selected oil palm seedlings and plant species of interest for timber, NTFPs, reforestation…
- To analyse the socioeconomic impact of the transition from oil palm monospecific plantation to agroforestry systems.
- To monitor the dynamics of changes in biodiversity (abundance, diversity, and mobility) in agroforestry areas.
- To study oil palm performance comparatively in these different systems: growth and development of palms , fruit yields and bunch characteristics.
- To understand key characters of climatic resilience through the monitoring of bioclimatic parameters and the ability AFS to provide environmental services, (photosynthetic capacity, soil health, quality of water, abundance of pollinators, …).

Uncertainties

- Knowledge gaps
  - Plant pathology
  - Organisation of work/cropping system
  - Organic palm oil production
  - Architectural/physiological plasticity of the oil palm
  - Partnership: readiness to embrace changes and risks
- Partnership gaps
  - Private plantation sector has long been the driver of innovation : is it ready?
  - Financial incentives (governments, agencies, carbon market)
- *"So far so good"* is not an option

Innovative planting designs

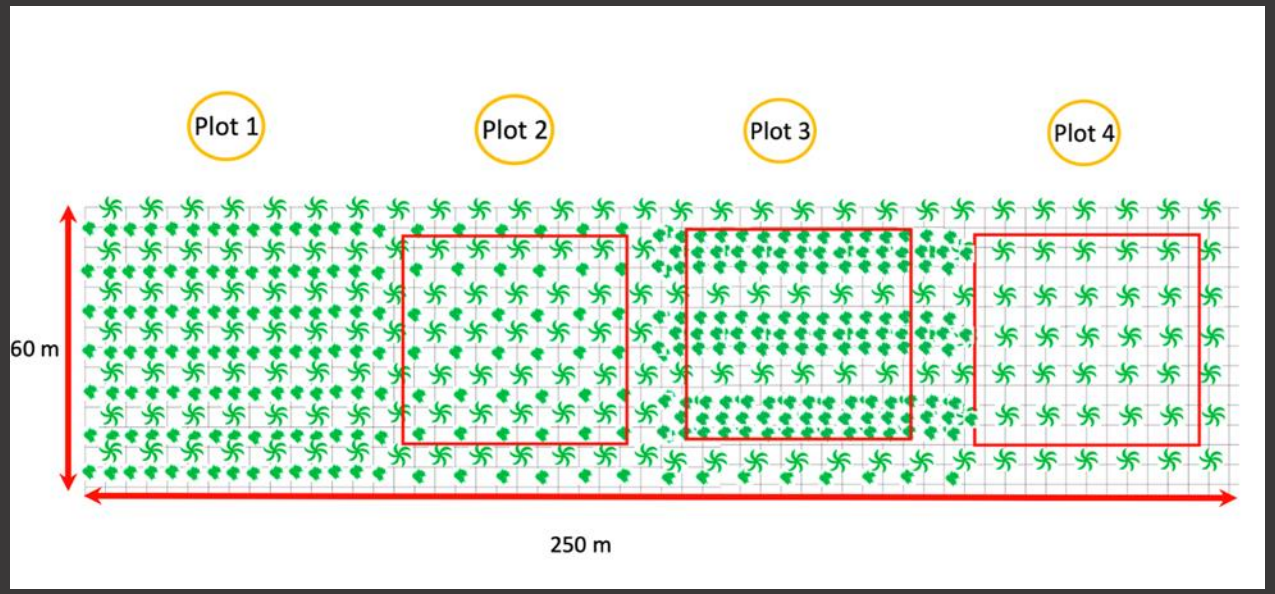
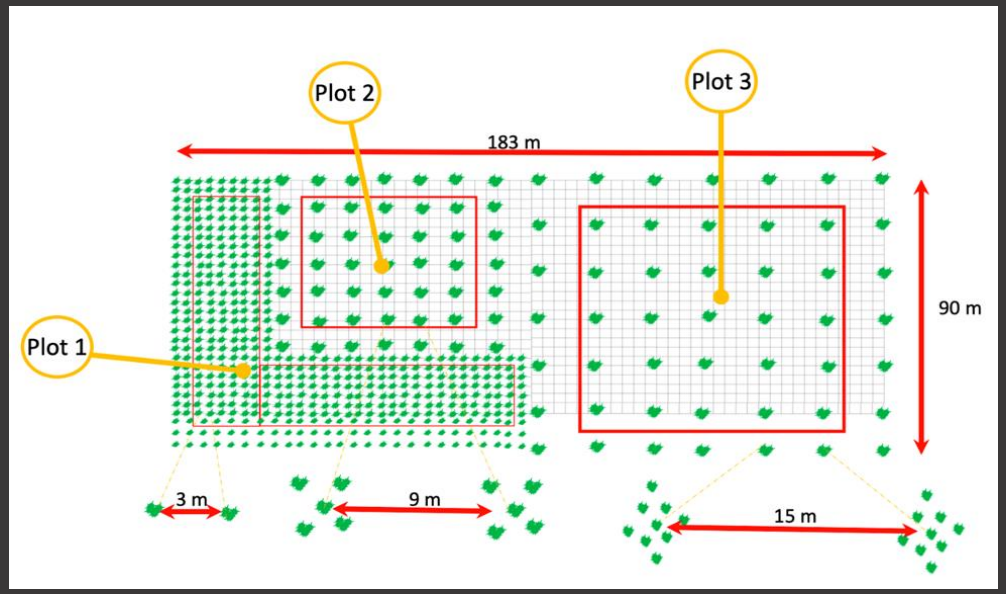


Diagram of a block consisting of 4 plots with different treatments. Plot 1: forest trees are planted in a line every 4.5 m in the inter-row of palms - it is a dense plantation design. Plot 2: forest trees are planted in the inter-rows of palms, every 9 m on the line, staggered in relation to the palms. Plot 3: every other palms rows are removed (or not planted with palms) and planted with three rows of trees every 4.5 m, the rows of forest trees are staggered and 1.5 m apart, which limits competition with palms. Plot 4: control treatment of oil plantation without trees. This block or repetition is composed of four treatments, and it is repeated 5 times.



Block diagram, made up of 3 plots of different types; two types of treatments, the species inside the plot 1 is a treatment and the device is another treatment (device: either in full at 3 X 3 m or in nuclides space of 9 X 9 m or 15 x 15 m). This device composed of 3 plots must be repeated 5 times, i.e. 5 blocks.

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Thank you.

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