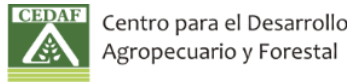
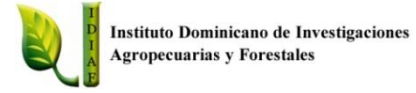


Agroforestry cocoa in the Dominican Republic Biodiversity and profitability

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Commission
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ABIDJAN
NOVEMBER 23, 2022





BIODIVERSITY

It is the complete variety of living organisms that inhabit the planet, the relationships between them and the environment in which they grow and live. Biodiversity, in our case, is a national asset and heritage, its correct management benefits the whole society.

The cocoa agroforest is an excellent livelihood where a wide diversity of living organisms are developed, making it our most important agroforest, and it is no longer simply a productive activity aimed at economic benefit, but a matter of survival for our country and our neighbor Haiti. Therefore, a proper management ensures sustainable use (genes, species and ecosystems), conservation and protection of animal and plant species, habitats and microclimates, as well as water sources, thus contributing to our countries' development.





Habitats



Water sources

Ecotourism landscapes



Key concepts: Agroforestry and agroforestry systems



Credits: O. Deheuvels – CIRAD, UMR ABSys

AGROFORESTRY: land use that meets 3 fundamental conditions (Somarriba, 2003):

1. at least **TWO** plant species interact biologically.
2. at least **ONE** is a **WOODY** perennial species.
3. at least **ONE** plant **GROWN** for agricultural purposes (including pastures).

Ecological and structural complexity gradient

Credits: O. Deheuvels – CIRAD, UMR ABSys



Simple agroforestry cocoa



Cocoa agroforest

A service that PROVIDES multiple products

Farmed biodiversity is the result of choices made by farmers in a given context.

The richness and type of selected plant species will provide a diversity of ecosystem services.

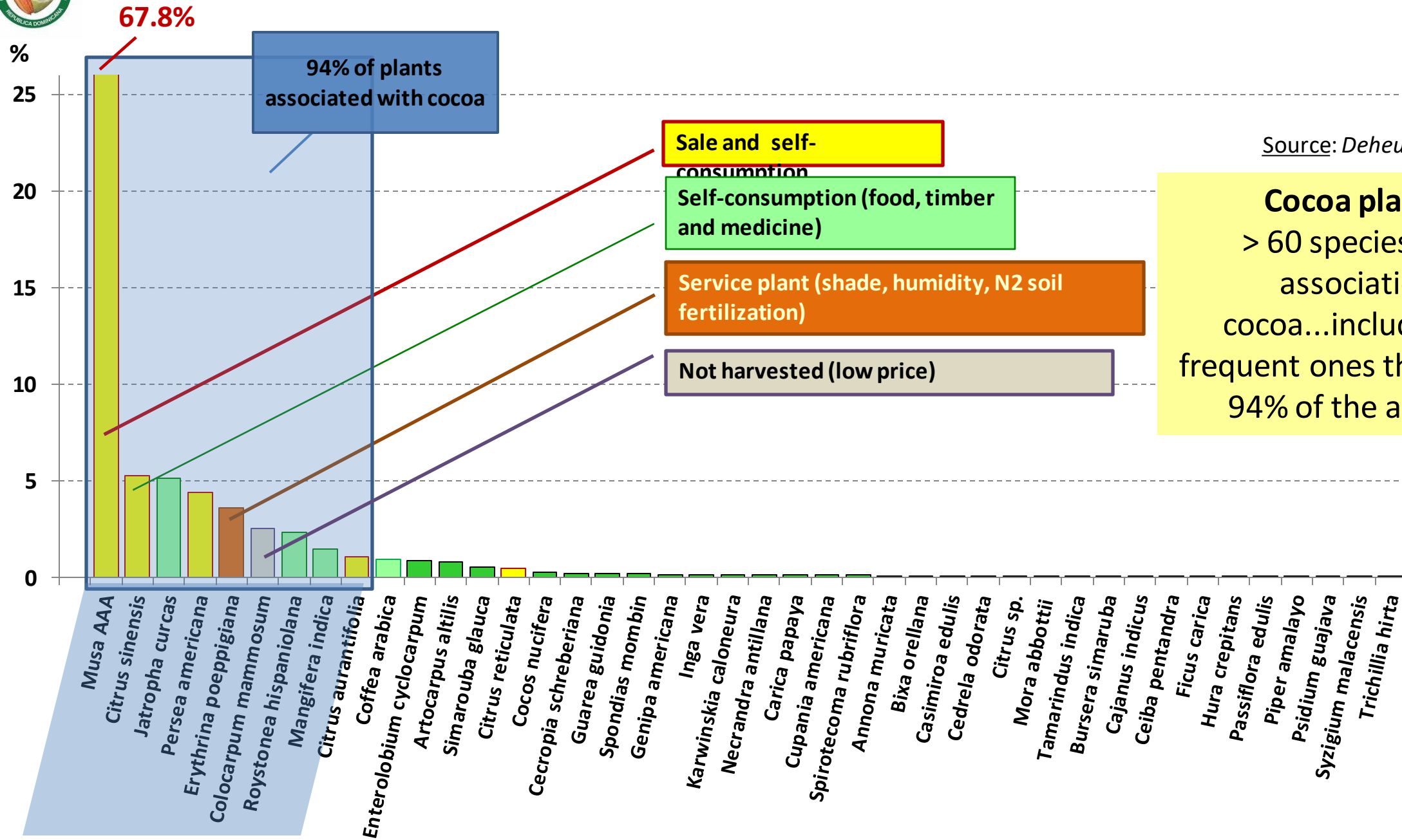


The case of Dominican cocoa



Source:
Deheuvels, 2015

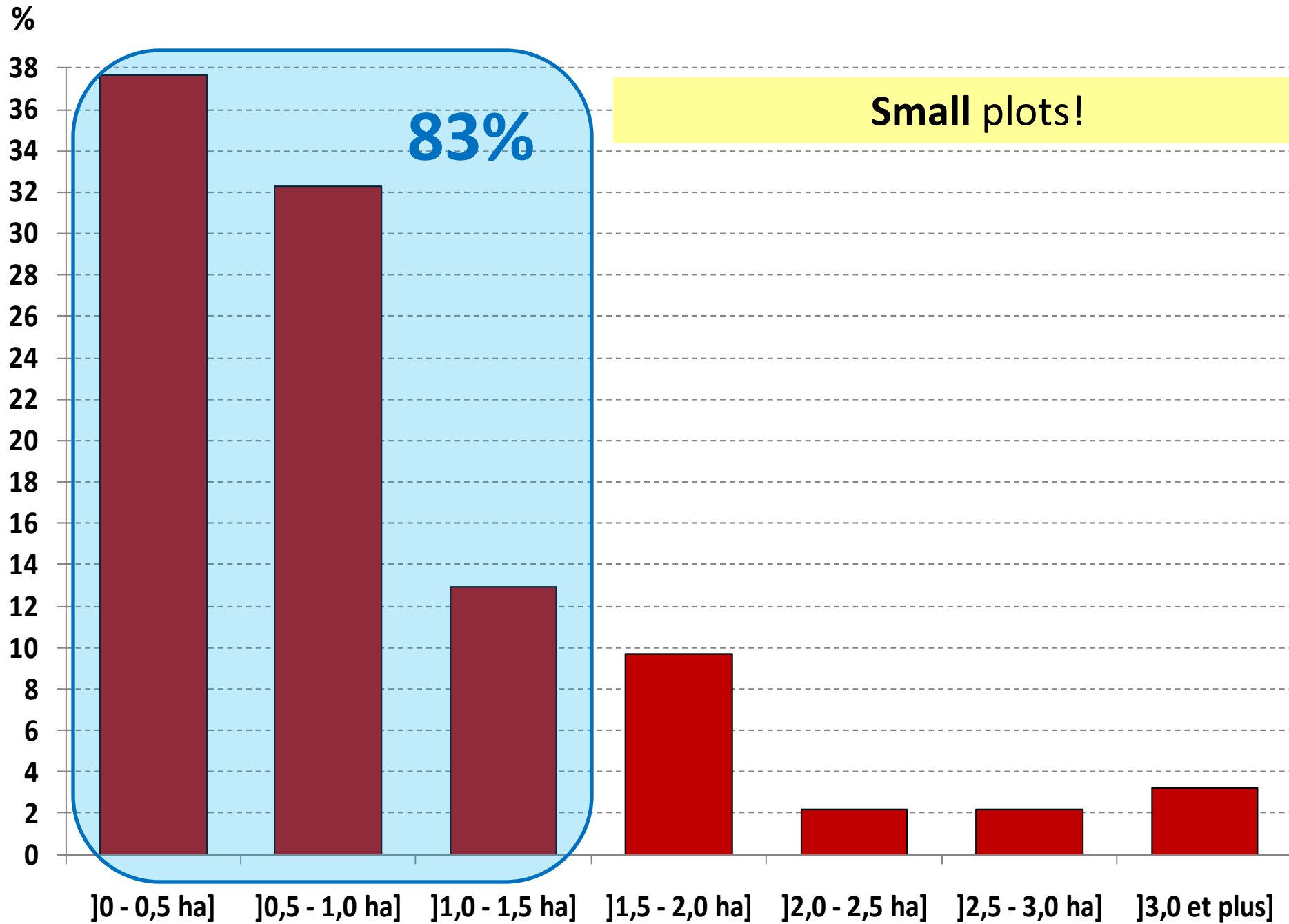
Diagnosis carried out between 2015 and 2017 to characterize cocoa production in three provinces: Duarte (56 families), El Seibo (50 families) and San Cristóbal (42 families), with one cocoa plot recorded per family.



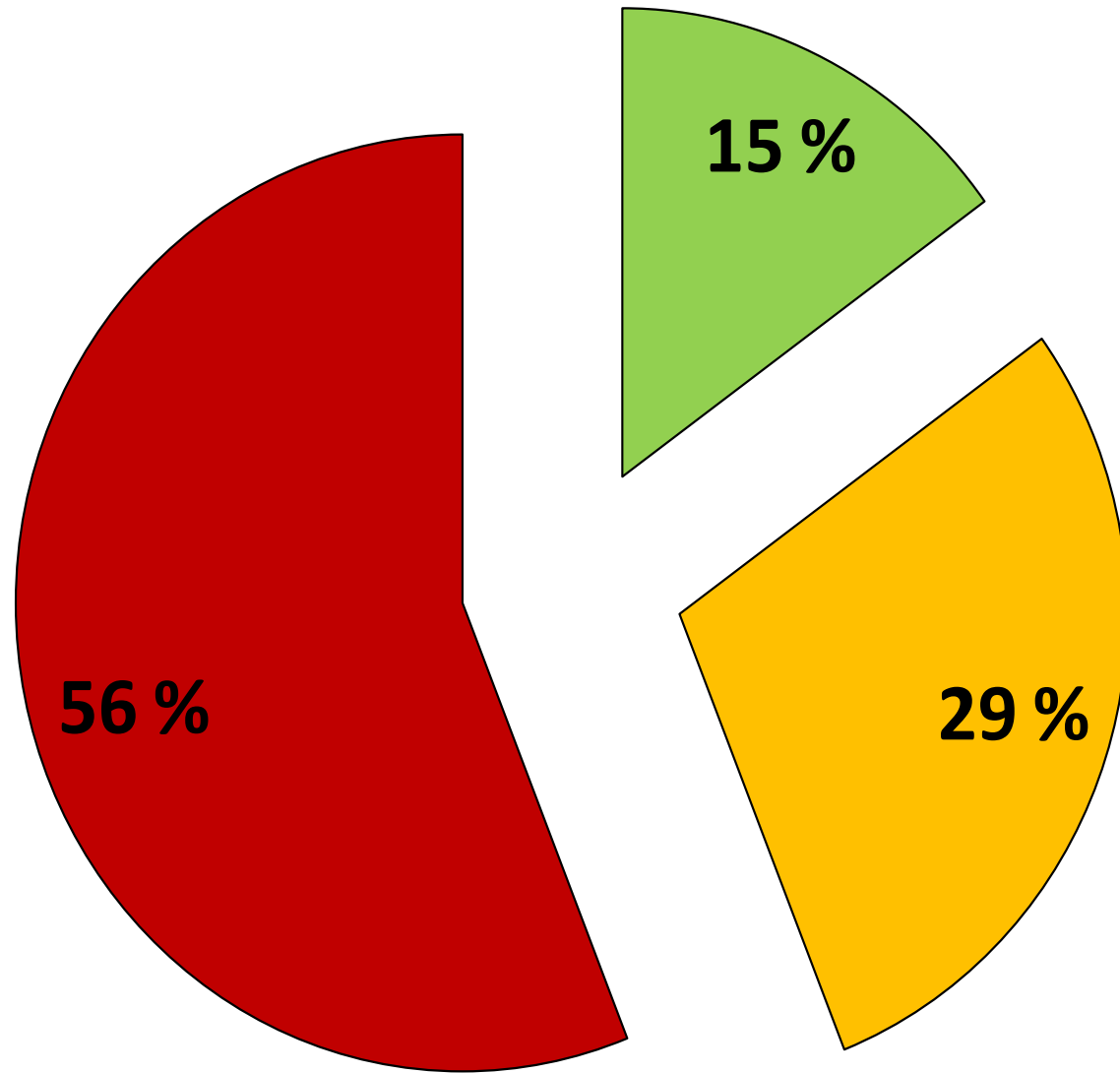
Source: Deheuvels, 2015

Cocoa plantations
 > 60 species grown in association with cocoa...including 9 most frequent ones that account for 94% of the associations

....+ 20 very rare species



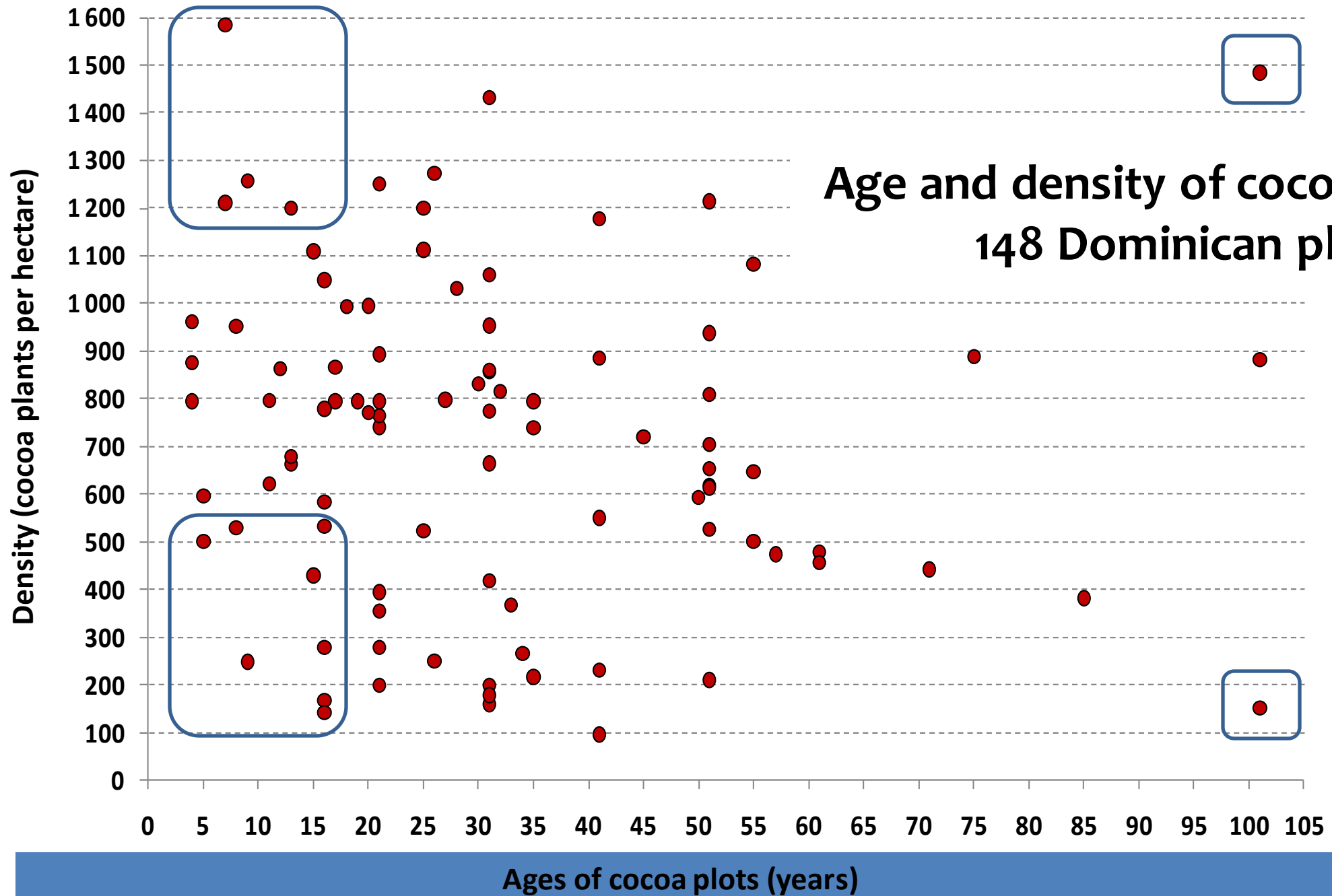
Source: Deheuvels, 2015



- Young (4-13 years)
- Mature (13-25 years)
- Old (25+ years)

Mostly old plots!

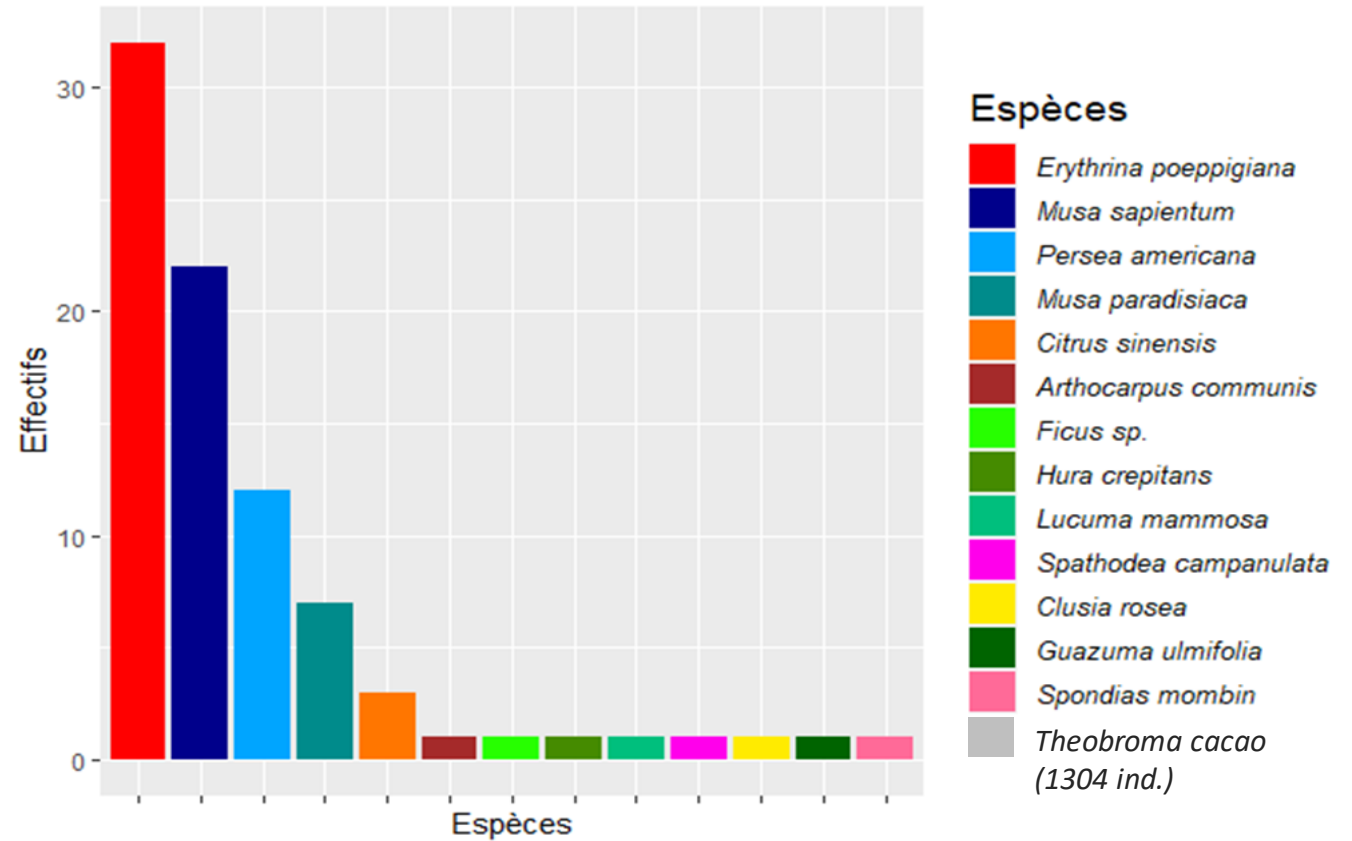
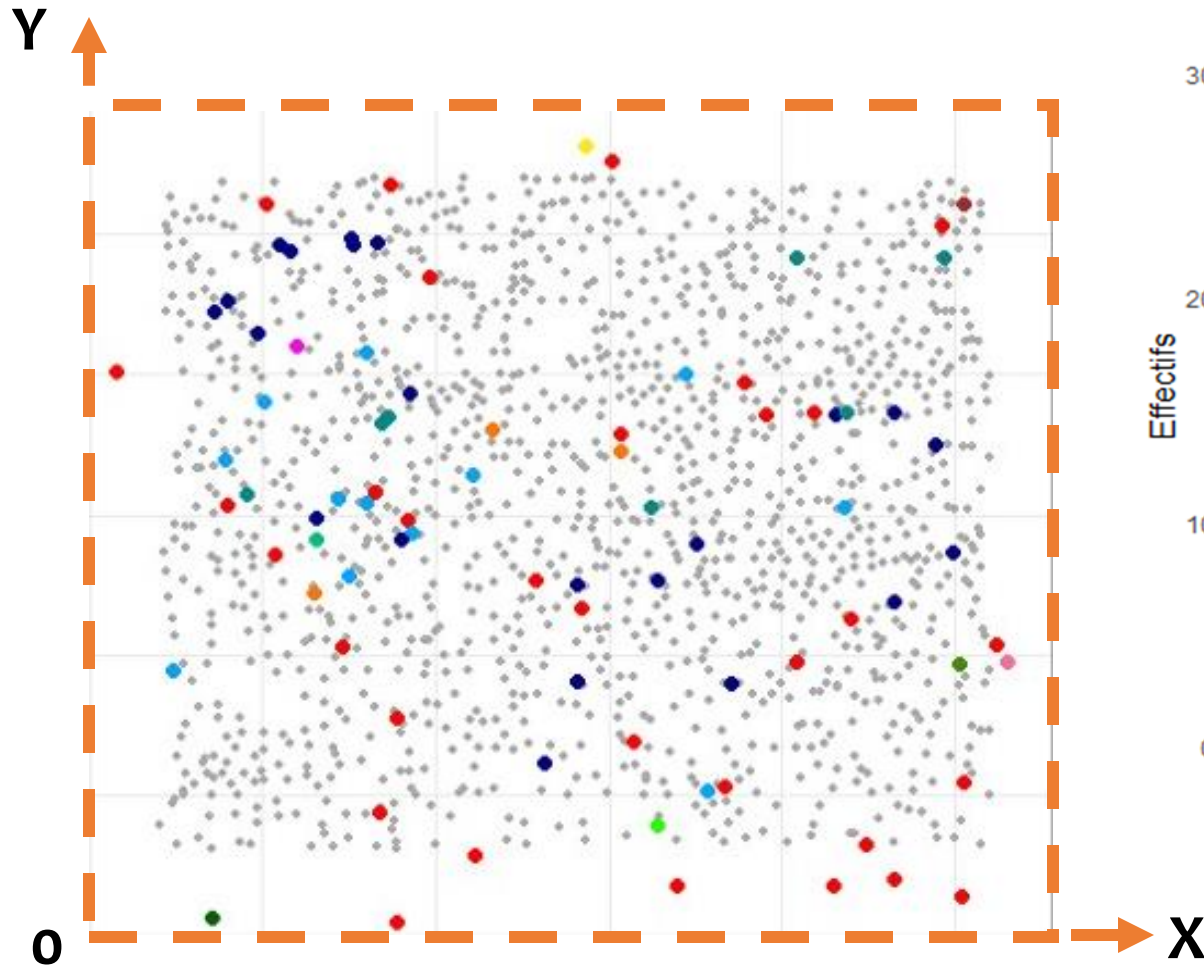
Source: Deheuvels, 2015



Source:
Deheuvels, 2015

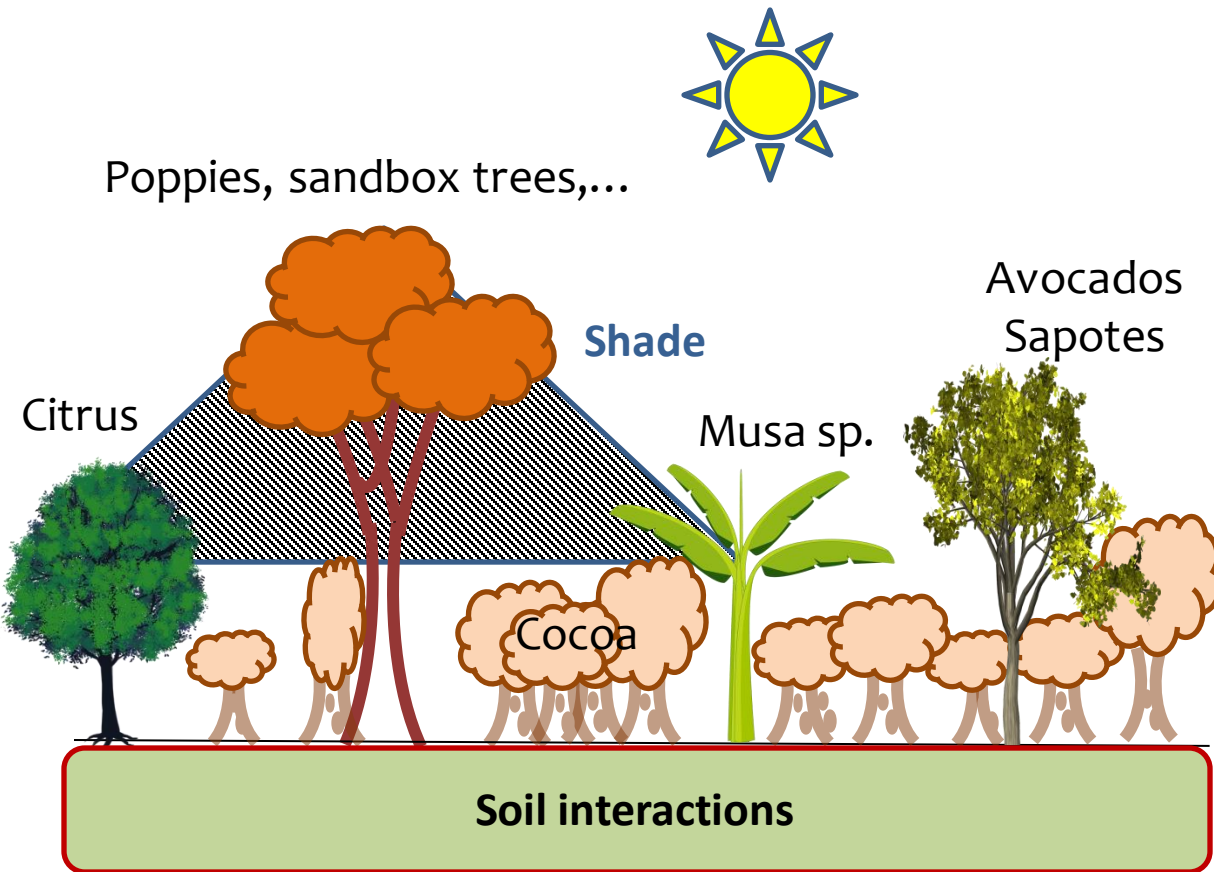
Cartography of a 1.44-hectare plot in the province of Duarte

- 1,304 cocoa plants >1 m (density > 905 cocoa plants/ha),
- 84 associated plants of total size > to cocoa (32 poppies, 29 bananas & plantains, 12 avocados, 3 sweet orange and 8 fruit trees (1 sapote, 1 breadfruit, 1 plum), + 2 parasites (1 ficus, 1 copey), 1 sandbox tree, and 1 tulip tree.



Source: Guichard, Deheuvels & Saj.2022.

Dominican cocoa plantations



Cocoa plants with:

- **Different** ages;
- **Heterogeneous and unknown** genetics (productivity, sensitivity, pollen compatibility...);
- **Random and heterogeneous** spatial distribution;
- **Poor plot management.**

> **60 plant species** associated with:

- **Different** ages
- **improvable** genetics
- **Random and heterogeneous** spatial distribution;
- **No plot management**

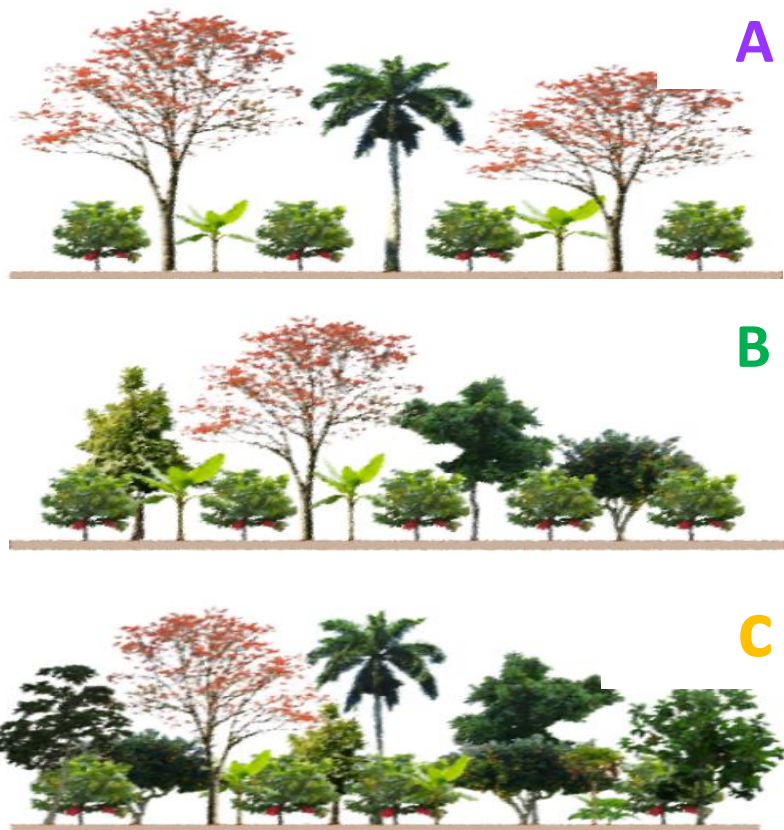
Dominican cocoa plantations

3 broad types (A, B and C) based on:

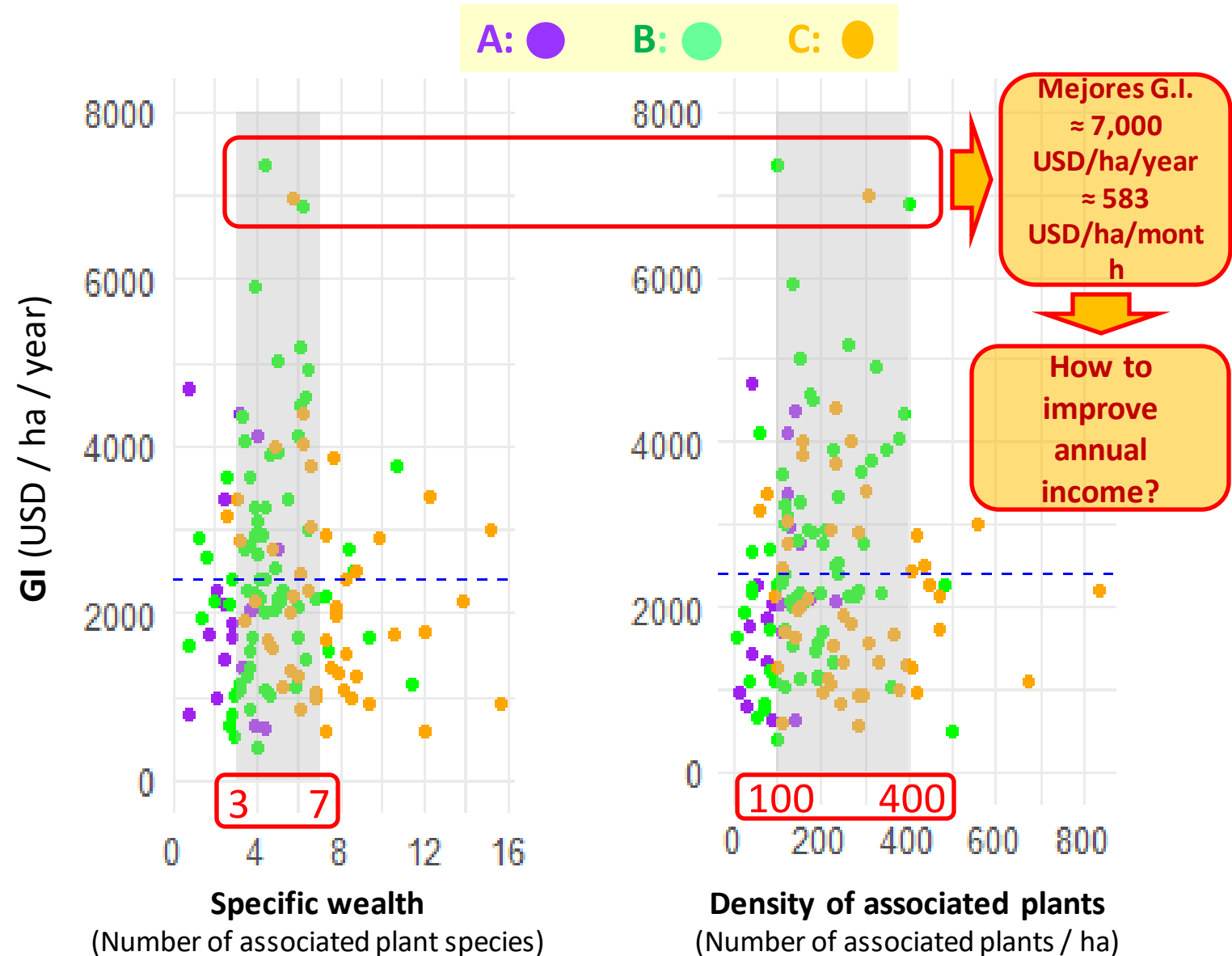
- Management intensity
- Characteristics (structure, functions) of the biodiversity of farmed plants



The case of Dominican cocoa



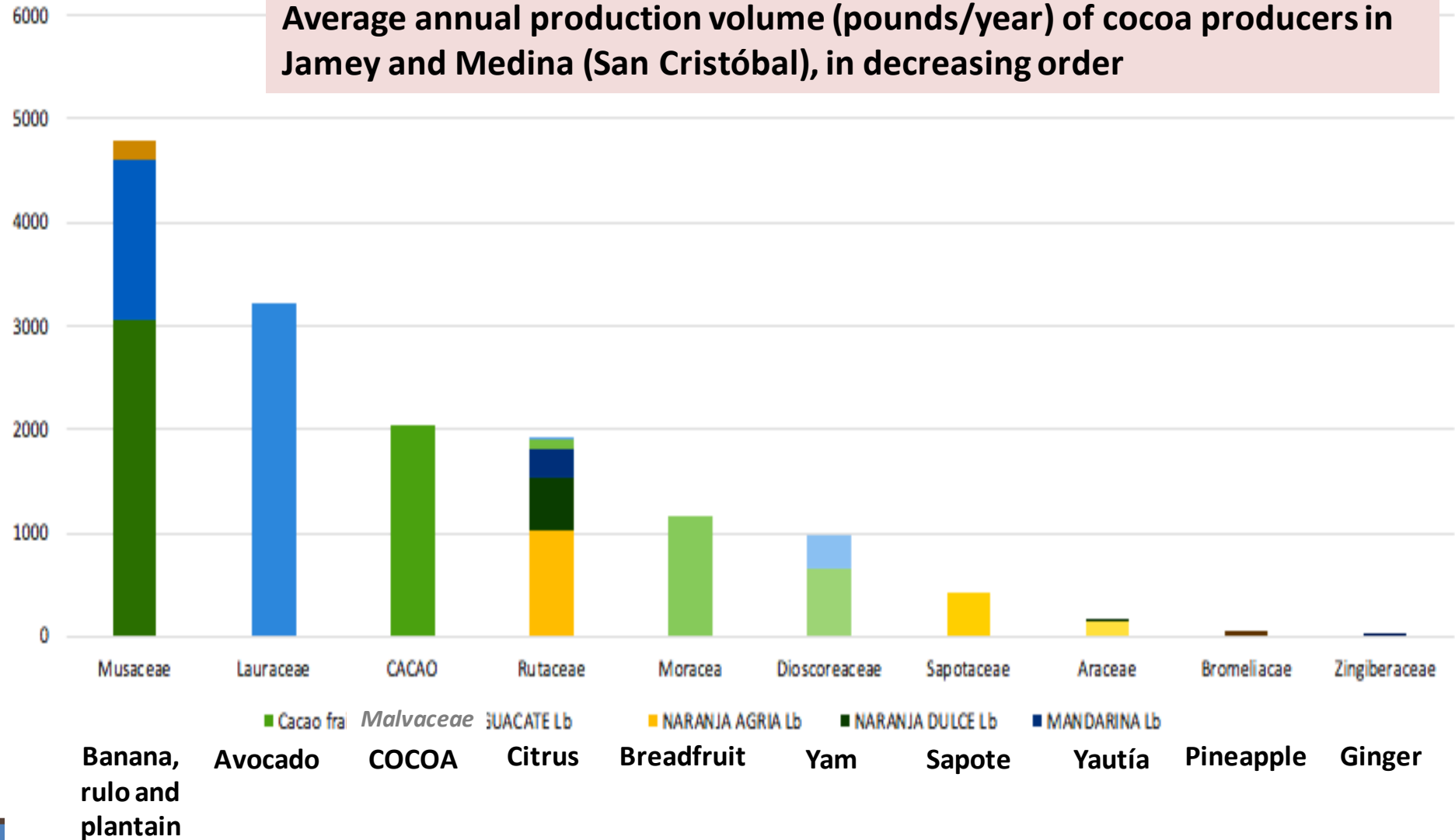
GI: Global Income (= CI + POI + AVC)
CI: Annual income generated by cocoa.
POI: Annual income generated by associated products.
AVC: Annual value of self-consumed products.



Case study: Medina-Jamey

Production moyenne annuelle d'un producteur de la zone en livres.

Average annual production volume (pounds/year) of cocoa producers in Jamey and Medina (San Cristóbal), in decreasing order



Conditions to improve economic sustainability:

➔ Diversity

➔ Quantity

➔ Favorable market

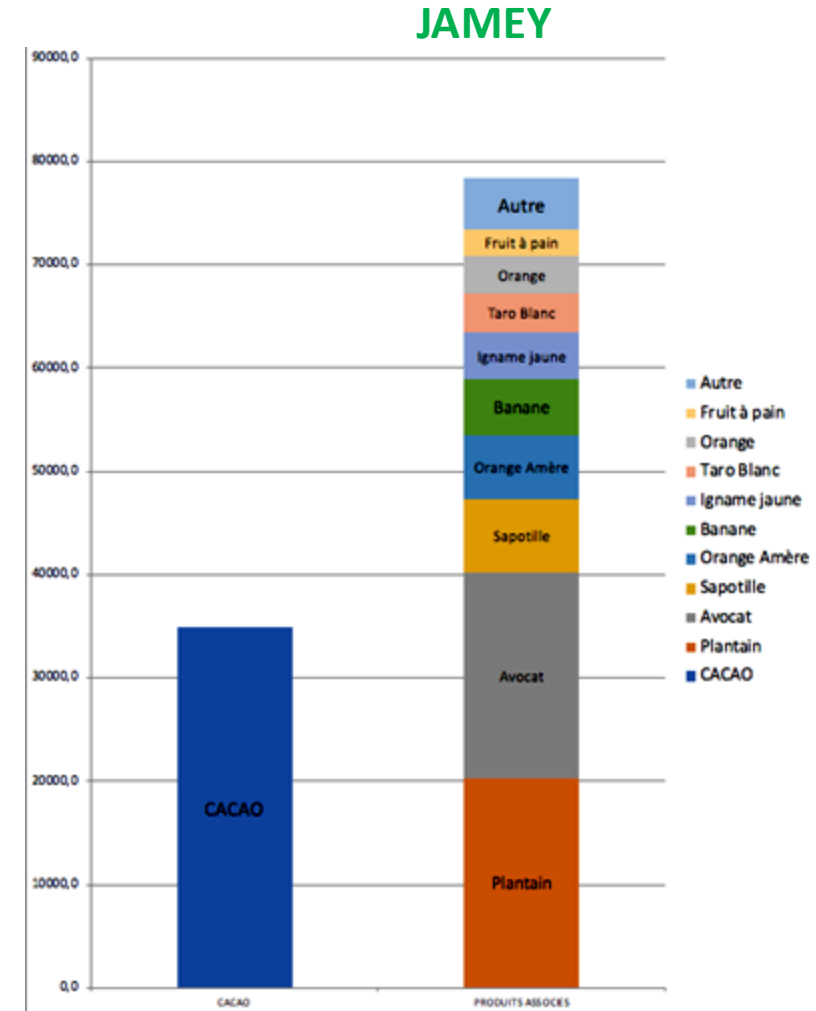
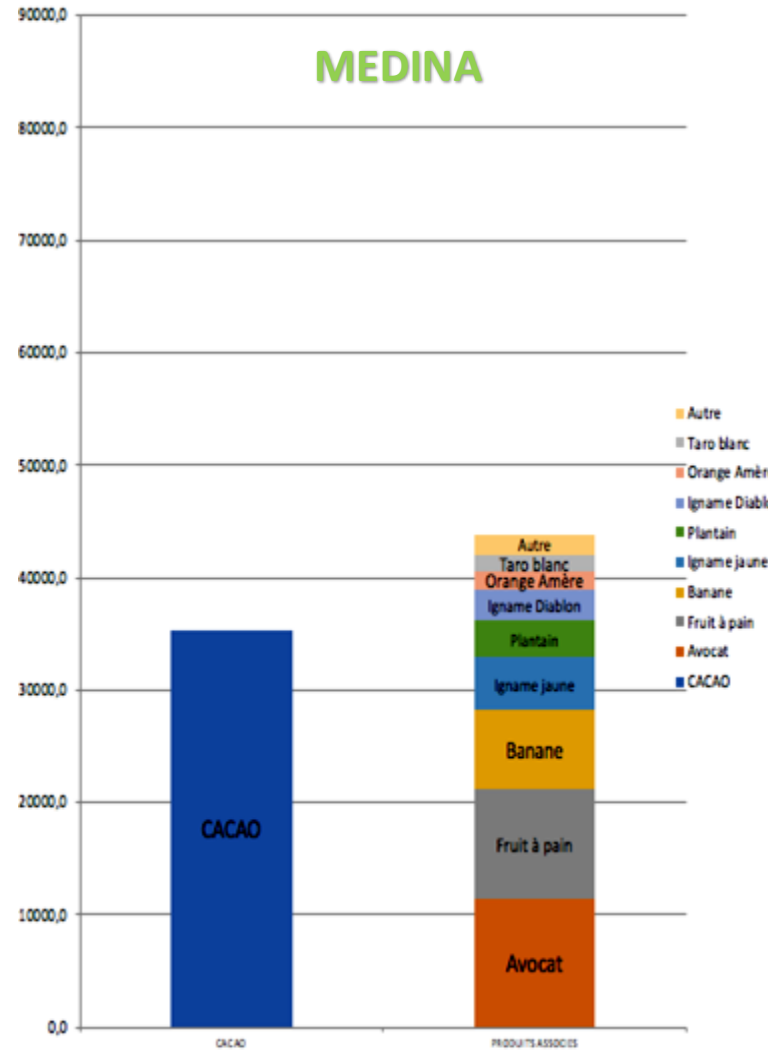
➔ Good monthly distribution

Case study: Medina-Jamey

Estimation of volumes produced by species associated with cocoa

Estimation of sale value of the total production of each species of AFS Cocoa (average market prices and sale hypothesis of 100% of the production).

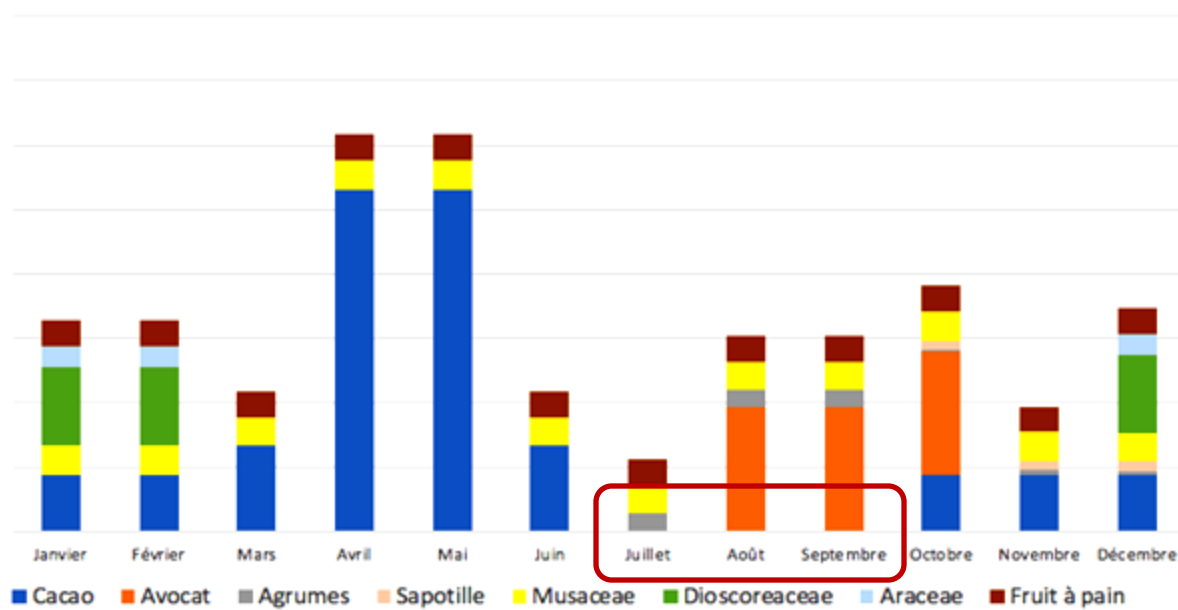
- **Total value obtained from the set of associated products greater** than from cocoa,
- **In the Jamey area, where there is greater diversification,** the total sale value of cocoa-associated products doubles that of cocoa



Case study: Medina-Jamey

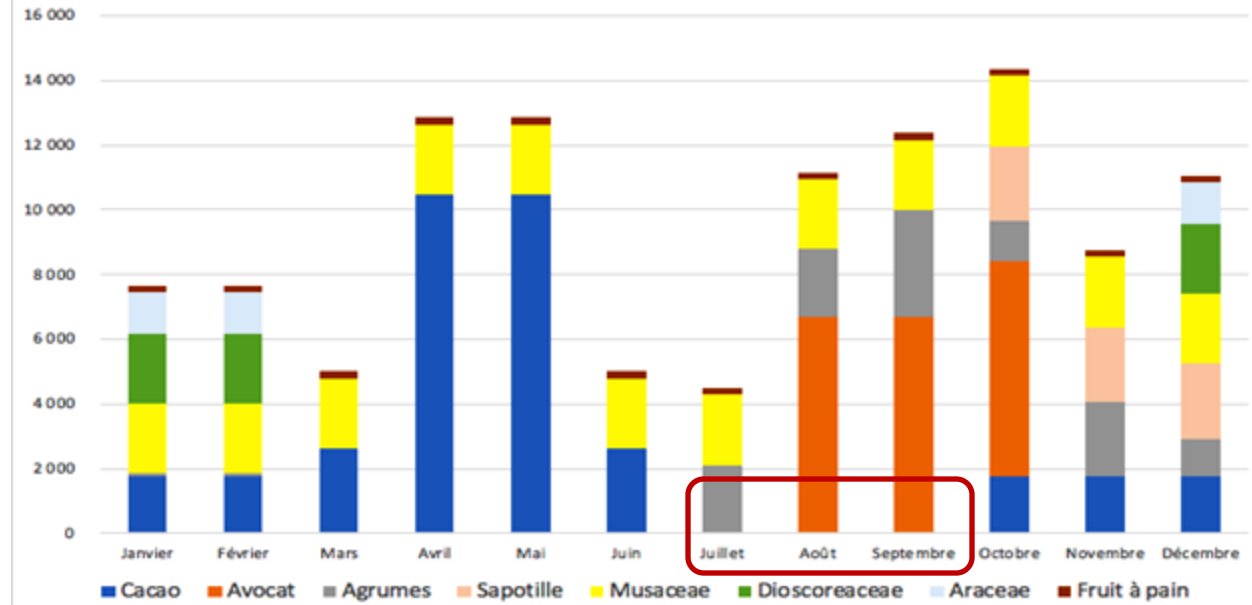
Estimation of volumes produced by species associated with cocoa

Calendrier valorisation agricole Medina



Months without cocoa

Calendrier valorisation agricole Jamey



Months without cocoa

- Greater dependence on cocoa income in **Medina**, where systems are less diversified
- Significant income in **Jamey in times of non-cocoa production**, thanks to the diversification of cocoa **AFS**



Case study: Medina-Jamey

Estimation of volumes produced by species associated with cocoa

Products that are Sold

1. Avocado
2. Bitter orange
3. Sweet orange
4. Tangerines
5. Lemons
6. Banana and Rulo (Jamey)
7. White yautía

Products that are self-consumed

1. Avocado (Medina)
2. Grapefruit
3. Banana
4. Plantain
5. Rulo
6. Breadfruit (Medina)
7. Pineapple
8. Sapote (Medina)
9. Yellow Yam / Diablon
10. Purple yautía
11. Ginger

Unharvested products (= that are lost)

1. Breadfruit (Jamey)
2. Sapote (Jamey)
3. Diablon Yam (Jamey)

How to improve annual income?

1. Choose associated species for their market value.
2. Ensure volumes of critical products (= choose the appropriate number of species and plants per species).
3. Establish a good planting pattern.
4. Train producers in AGROFORESTRY management of the group of species.

“It takes a village to raise a child”
African proverb

"Il faut un village pour élever un enfant"
Proverbe africain



THANK YOU VERY MUCH



Merci beaucoup