



www.cacaodiversity.org A tool to support the co-design of tailor-made cacao agroforestry systems

1. Select existing or new plantation on map

Draw a polygon around the area to indicate location, surface, and border area

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FORM ECOGEOGRAPHICAL ZONES

Where is your cacao farm located?

Do you want to obtain recommendations on agroforestry systems (tree species, planting designs and seed sources)?

Yes No

Site conditions

Click in the box and select the site conditions in the cacao plot (select all relevant conditions). It is not necessary to select a condition if none of these conditions are present.

* compacted soils * flooding risk * poorly drained/heavy clay soils

2. Indicate the site conditions

- a. Indicate the current degradation state of the land (compacted soil, invasive species, etc.)
- b. Indicate the biophysical conditions of the land (soil type, flooding risk, slope soil type etc.)

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Site conditions

Agroforestry system

At which distance are the cacao trees planted?

3 x 3

On which components of an agroforestry system would you like to obtain recommendations?

trees as permanent shade (inside the field)

How important should the trees inside the field be for income generation?

Very important (equally important as cacao)

How much shade cover (%) do you want inside the cacao field?

30

3. Specify the desired type of agroforestry system

- a. Temporary shade species for protecting young cacao: trees or crops;
- b. Positioning of trees: along the borders only, inside the plantation, or both. Also indicate preference for planting in lines (single or multiple) or between cacao trees;
- c. The role of trees for income generation (domestic use, some commercial use, key commercial use);
- d. The desired shade level (default 30%).

4. Specify the main objectives of planting trees together with cacao, from one or more of the following:

- a. **Wood products:** Indicate what kind of wood production (local or commercial use) to prioritize and desired harvest cycle (short, medium, long, or mixed)
- b. **Food products:** Indicate what kind of edible plants to prioritize and their envisaged use: for sale, domestic use, or both
- c. **Other non-timber products:** indicate additional non-timber products to prioritize. Both for traditional and commercial use, including fiber, dyes, medicine, fodder, ornamentals
- d. **Regulating ecosystem services:** indicate priority services including carbon sequestration, erosion control, wind breaks, live fences, enhancing soil fertility and moisture...
- e. **Biodiversity conservation:** indicate how tree planting should contribute to biodiversity conservation, e.g., through prioritizing endangered species or providing food and habitat to fauna

The screenshot shows the Cacao Diversity tool's interface. On the left is a satellite map of a farm area with a blue dot marking the planting location. To the right is a sidebar titled "Cacao Diversity" with the "Alliance Biodiversity & CIAT" logo at the top. The sidebar lists priority categories with their respective weights:

Category	Weight
Wood products	5
Food products	5
Other on-timber products	3
Regulating ecosystem services	2
Biodiversity conservation	1

The screenshot shows the continuation of the Cacao Diversity tool's interface. It includes fields for specifying the maximum number of species to plant (set to 10), selecting a climate change scenario (SSP2.45 selected), and indicating whether to exclude exotic species (Yes selected). Below these are two dropdown menus for additional preferences.

What is the maximum number of species to plant?

Which climate change scenario to take into account? SSP2.45 SSP5.85

Do you want to exclude exotic species? Yes No

Next

Do you want to obtain information about the likely cadmium content in soil and cacao beans in your farm?

Do you want to obtain information on the expected impact of climate change in your farm?

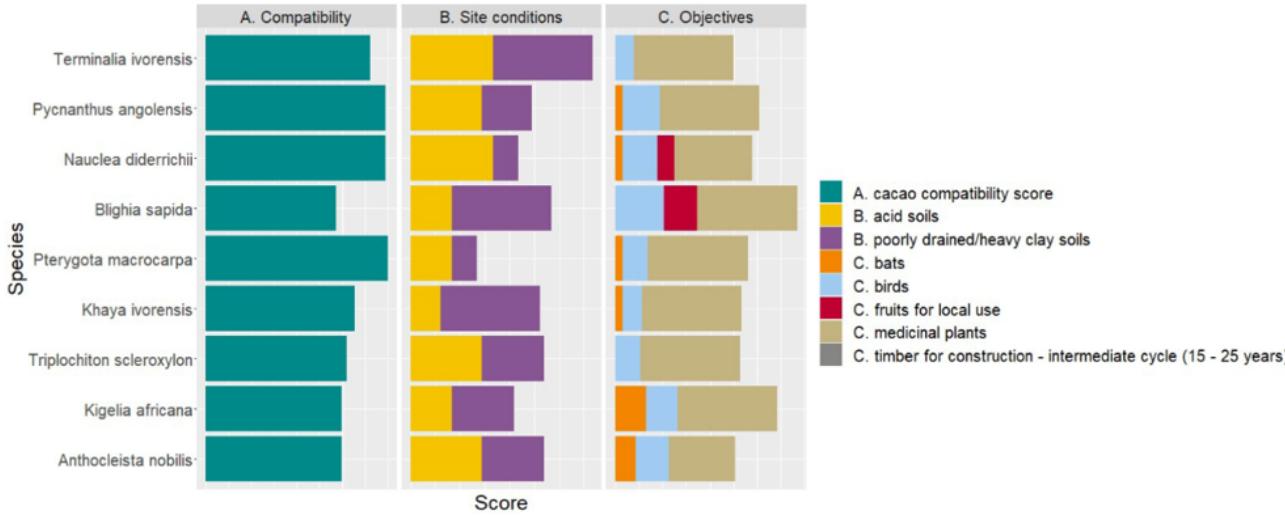
5. Indicate additional preferences

- a. Number of trees species to plant
- b. Exclude or not exotic species
- c. Indicate under which climate change scenario to run the tool (the Paris Agreement as default, or the worst-case scenario)

The tool then generates a report containing 2-3 suggested cacao agroforestry designs that best match the location, site conditions and objectives of the farmer in terms of income generation strategy and local uses of trees. For each of the suggested agroforestry designs the following information is provided:

1. The set of recommended tree species, their planting densities, and spatial arrangements

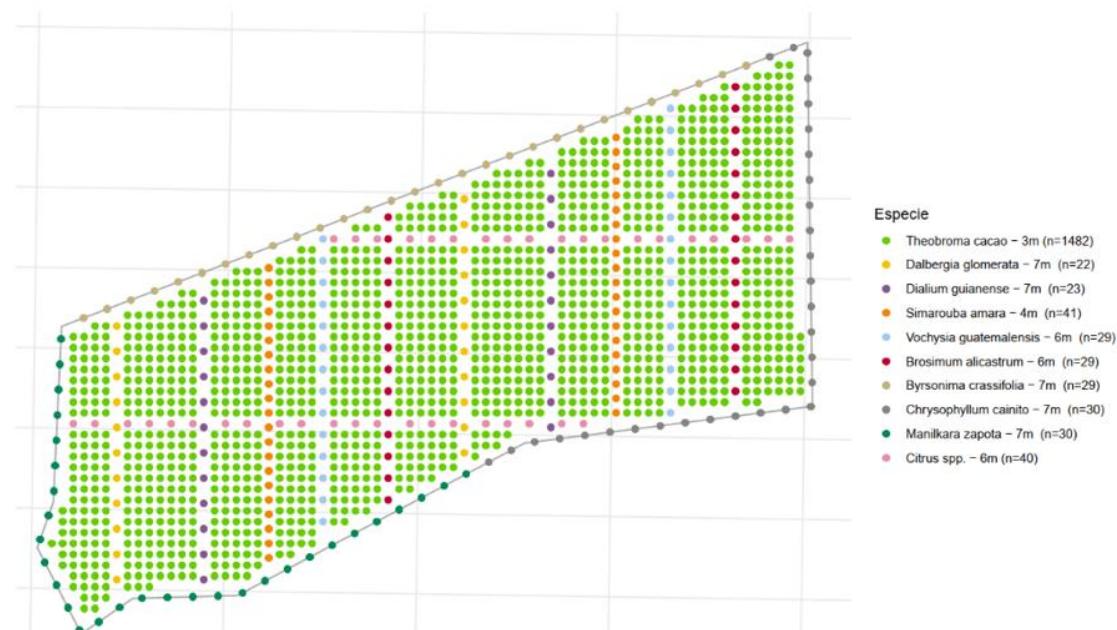
- a. An overview is given of site adaptability of each species, as well as their individual contribution to each of the user-defined tree planting objectives.



- b. The number of individuals needed of each species is provided based on farm size.
- c. Planting location (border, in between cacao, in lines etc.) is based on:

- i. tree growth speed, canopy height, size, and light permeability to ensure the desired shade level is achieved.
- ii. ease of harvesting (e.g., short term rotation timber can damage the cacao trees when planted in between cacao and needs to be avoided)

- d. A blueprint of the planting design is provided, indicating position of the cacao, tree species and planting distances.

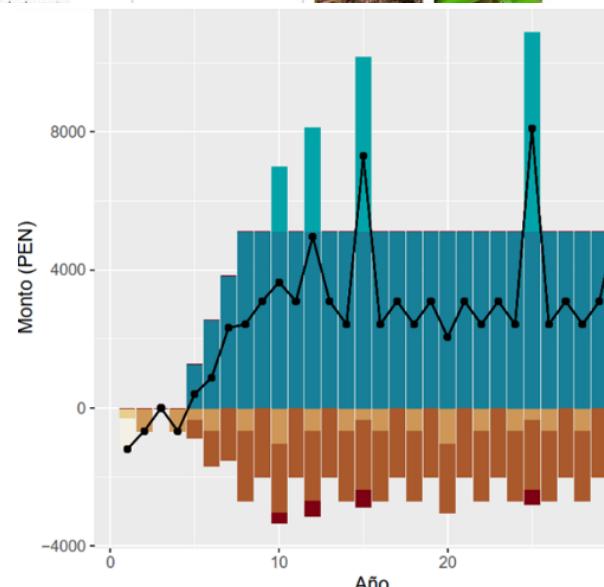


2. Indication of where to source the seed or seedlings from (based on seed zones) and information on seed harvesting, storage, propagation, and tree management.
- Indication of the nearest tree nursery, seed provider or seed trees for each of the species, wherever possible including contact details
 - Illustrated sheets for each of the recommended species regarding seed harvesting storage and propagation, tree management (e.g., pruning) over the life cycle to maximize objectives and uses.



Distribución geográfica
Especie originaria de Centroamérica y el norte de Sudamérica, hoy en día cultivada en muchos países tropicales (Cordero & Boulter, 2003). En los bosques secos del norte de Perú y el sur de Ecuador. Especie cultivada en los paisajes agrícolas.

Descripción botánica
Pórt: Árbol caducifolio de hasta 30 m de altura; fuste cilíndrico en la sección transversal, copa amplia. Corteza: De color marrón grisáceo, gruesa, áspera, a menudo profusamente escamulada, con proyecciones similares a agujones. Hojas: Son de 30-70 cm de longitud, alternas, pinnadas, con un folíolo terminal impar (imparrifoliado), y tienen 5 a 7 folíolos más pequeños que tienen bordes serrados y venas pinnadas de color verde o amarillo. La inflorescencia es una panícula en el extremo de las ramillas y contiene flores masculinas, femeninas y hermafroditas. Fruto: Drupa que tiene forma de huevo o aceituna, de 3-4 cm de longitud. Su color es de un naranja claro apagado o también amarillo.



3. Indication of the anticipated cost-benefit ratio over the life cycle of the plantation (typically 20-30 years)

- Based on locally collected data on farm gate prices paid for commercialization on local, and where relevant national and international markets of different timber and non-timber products
- Adjusted according to the available surface and border areas of the plantation and the corresponding numbers of trees per species.
- Wherever possible contact details are provided of buyers of the different timber and non-timber products.