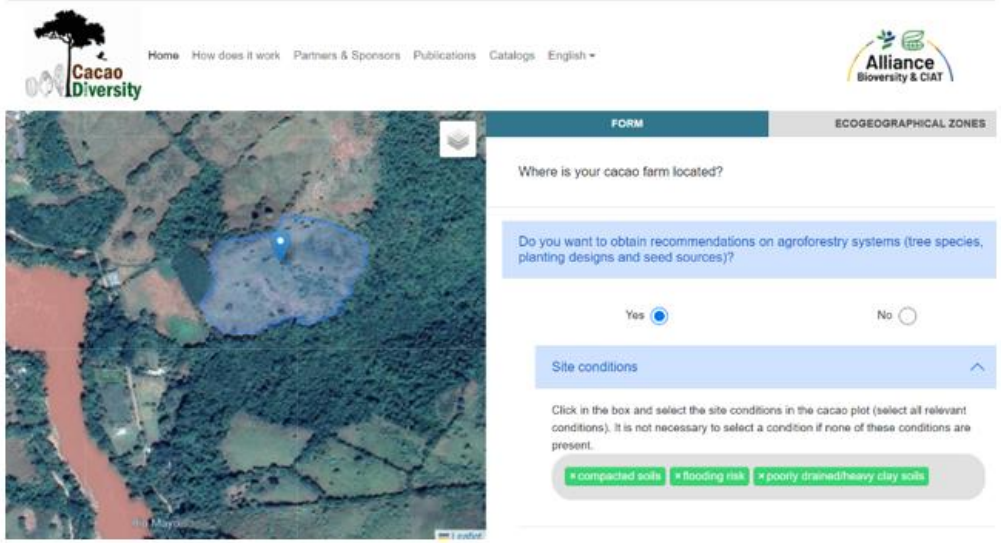
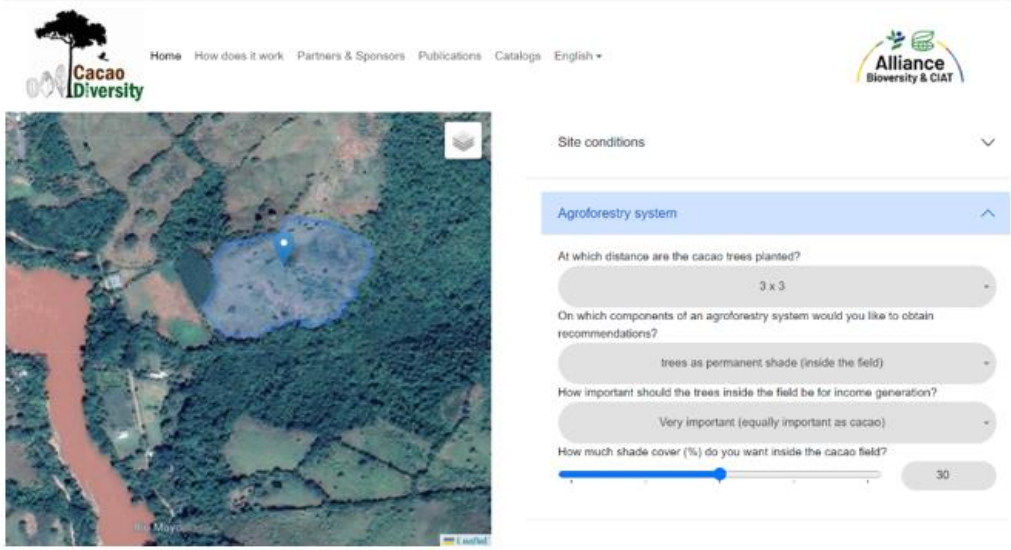
www.cacaodiversity.org A tool to support the co-design of tailor-made cacao agroforestry systems

1. **Select existing or new plantation on map**
   Draw a polygon around the area to indicate location, surface, and border area

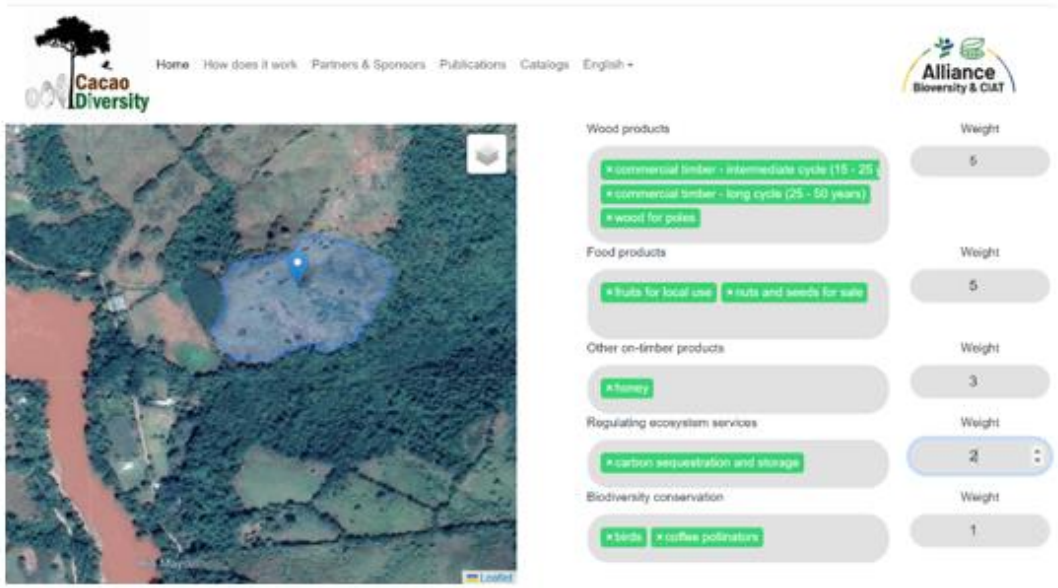
2. **Indicate the site conditions**
   a. Indicate the current degradation state of the land (compacted soil, invasive species, etc.)
   b. Indicate the biophysical conditions of the land (soil type, flooding risk, slope soil type etc.)

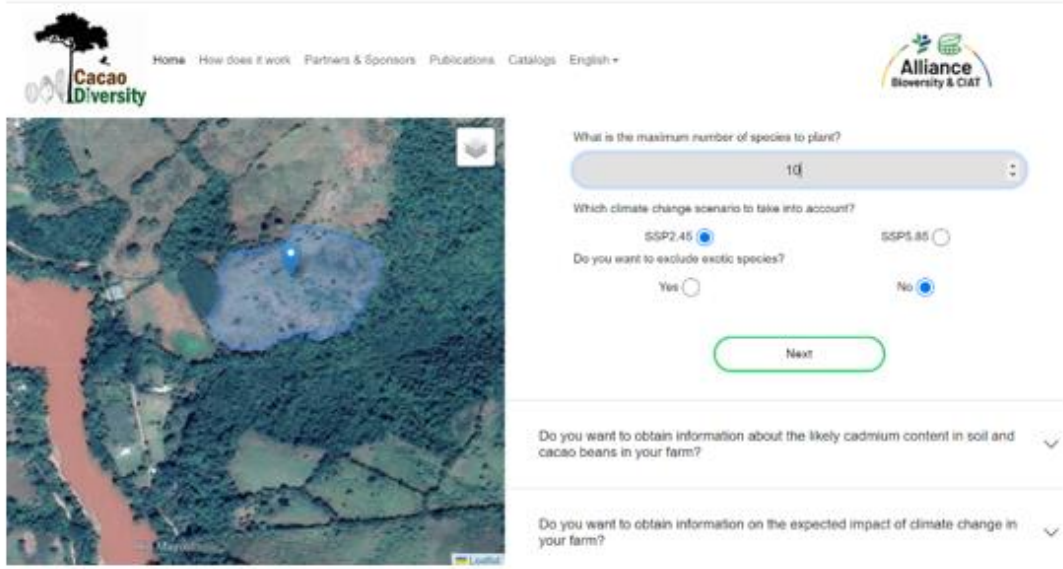
3. **Specify the desired type of agroforestry system**
   a. Temporary shade species for protecting young cacao: trees or crops;
   b. Positioning of trees: along the borders only, inside the plantation, or both. Also indicate preference for planting in lines (single or multiple) or between cacao trees;
   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

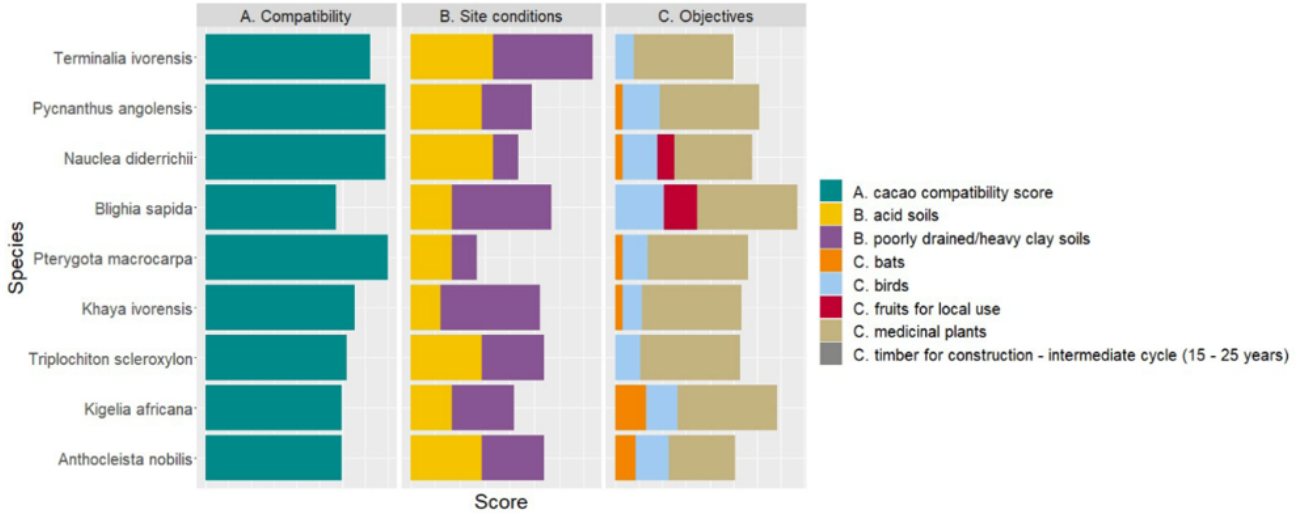


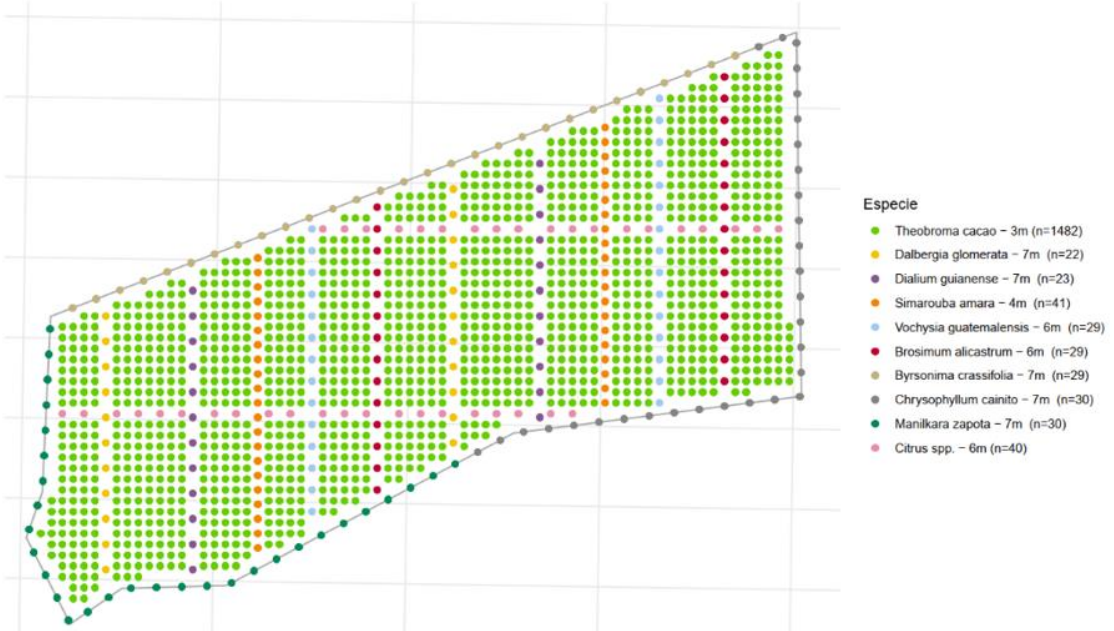


5. **Indicate additional preferences**
   a. Number of trees species to plant
   b. Exclude or not exotic species
   c. Indicate under which climate change scenario to run the tool (the Paris Agreement as default, or the worst-case scenario)

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.**
   a. Indication of the nearest tree nursery, seed provider or seed trees for each of the species, wherever possible including contact details
   b. 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.

3. Indication of the **anticipated cost-benefit ratio over the life cycle of the plantation** (typically 20-30 years)
   a. 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
   b. Adjusted according to the available surface and border areas of the plantation and the corresponding numbers of trees per species.
   c. Wherever possible contact details are provided of buyers of the different timber and non-timber products.