



Tropentag, September 9-11, 2020, virtual conference

“Food and nutrition security and its resilience  
to global crises”

## Diversity of Tree and their Use in Cocoa Agroforestry Systems in Alta Verapaz, Guatemala

CARLOS VILLANUEVA GONZALEZ<sup>1</sup>, BOHDAN LOJKA<sup>2</sup>, CARLOS ERNESTO ARCHILA<sup>3</sup>, JOSÉ  
ALEJANDRO RUIZ-CHUTÁN<sup>4</sup>

<sup>1</sup>*Czech University of Life Sciences Prague/ Rafael Landivar University, Fac. of Tropical Agrisciences, Dept. of Crop Sciences and Agroforestry, Guatemala*

<sup>2</sup>*Czech University of Life Sciences Prague, Fac. of Tropical AgriSciences, Dept. of Crop Sciences and Agroforestry, Czech Republic*

<sup>3</sup>*Rafael Landivar University of Guatemala, Faculty of Agricultural and Environmental Sciences,*

<sup>4</sup>*Czech University of Life Sciences, Fac. of Tropical AgriSciences, Dept. of Crop Sciences and Agroforestry, Guatemala*

### Abstract

The agroforestry systems (AFS) provide a bunch of opportunities for the biodiversity conservation and livelihoods development for local people. We evaluated the tree diversity and their local use in cacao AFS (*Theobroma cacao*), randomly distributed in four Municipalities of Alta Verapaz department in Guatemala: Lanquín, Cahabón, Panzos y Cobán. Fieldwork was carried out over a 10-month period, during April 2019 and February 2020. We measured and evaluated the typology and diversity of trees in 40 cocoa AFS (sampling plots of 50 x 50 m). To valuate the food security and the contribution to well-being, we used classical ethnobotanical methods among the local population, such as structured interviews, focus groups, transect tours in productive plots and carried out the tree inventory. In each AFS, all individuals with DAB (diameter at breast height) > 10 cm were identified and measured. In order to inventory and record the common and Latin name of the species were identified in each sampling plot. In total we found 1,559 trees in an area of 10 hectares, belonging to 63 species. The AFS of the municipality of Lanquin presented the highest levels of diversity, compared to the rest of the AFS evaluated. Cocoa producers benefit directly from the diversity of trees through the provision of firewood, building materials, medicine, food and fodder. These findings reinforce the potential of AFS for biodiversity conservation in an area, but in addition, they are able to reduce food insecurity, especially among highly vulnerable local populations, due to the species diversity within the system and the variability of current and potential uses they possess.

**Keywords:** Agroforestry systems, biodiversity, conservation, livelihoods