Tropentag, September 10-12, 2025, hybrid conference

"Reconcile land system changes
with planetary health"

Pruning: An agronomically efficient and ecological management technique, underused in cocoa cropping and agroforestry

Stéphane Saj[1], Sam Wallner[2], Lucia Descarpontriez[3], Consuelo Campos[3], Joachim Milz[3], Ruben Humerez[4]

[1]*Research Inst. of Organic Agriculture (FiBL), International Cooperation, Switzerland*
[2]*University of Applied Sciences and Arts of Western Switzerland (HES-SO) HEPIA, Switzerland*
[3]*Ecotop Foundation, Bolivia*
[4]*Foundation PIAF- El Ceibo, Bolivia*

Abstract

Pruning is a common horticultural practice used to control tree biomass and architecture, helping farmers manage vegetative and generative growth and direct physiological processes towards specific objectives such as fruit, timber, firewood, biomass production etc... However, pruning remains a largely overlooked topic in tropical agriculture, particularly in the cocoa sector. Pruning rules for cacao are still very basic, despite the potential impact of tree architecture on yields due to cauliflory. Similarly, little attention is given to pruning companion trees in agroforestry systems, even though shading strongly affects cocoa production.

This presentation shares findings from two studies within the SysCom Bolivia long-term trial, aiming to encourage greater consideration of pruning and tree architecture in cocoa and agroforestry systems.

The first study investigated the effects of cropping systems and cocoa varieties on tree architecture and yield. Both factors influenced tree biomass and productivity. Yields per cocoa tree were higher in monocultures than agroforestry (2.8 vs 1.5 kg tree ^{1} year ^{1}) and greater for two local clones compared to an international variety (3.2 vs 1.9 kg tree ^{1} year ^{1}). Independently of these effects, specific architectural profiles were associated with different levels of productivity (ranging from 2.6 to 1.5 kg tree ^{1} year ^{1}). These profiles, based on simple indicators such as branch number and length, tree height, and crown volume, could inform new, field-ready pruning guidelines for grafted cocoa.

The second study assessed the impact of companion tree pruning on cocoa yields, highlighting the importance of pruning before the main flowering season (early wet season). Its effectiveness depended on initial canopy cover and pruning intensity. While full sun systems produced an average of 1300 kg ha ^{1} year^{-1}, agroforestry systems with 31 % and 52 % canopy cover during the wet season yielded 795 and 639 kg ha ^{1} year^{-1}, respectively. Such results suggest pruning is most beneficial in lightly shaded systems, and emphasise the need for income diversification in heavily shaded systems and the development of adequate companion tree pruning strategies if upscaling is desired. They also show that a simple and low-tech technique for monitoring canopy cover, the densitometer, has proved robust and could be of use to many.

Keywords: Agroforestry, canopy cover, cocoa, diameter, linear meters, pruning, tree architecture

Contact Address: Stéphane Saj, Research Inst. of Organic Agriculture (FiBL), International Cooperation, Frick, Switzerland, e-mail: stephane.saj@fibl.org