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Structural diversity of rubber and cocoa systems in Côte d’Ivoire

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Abstract

In Côte d’Ivoire, extensive agriculture, particularly cocoa and rubber cultivation, has contributed significantly to the degradation of forest cover. As these perennial crops play an important role in today’s landscape, the aim of this study was to understand the structural diversity of these systems. To this end, a total of 45 plots of 400 m² were used to inventory the tree species present in the rubber plantations of Tiéviessou (Grand-Lahou) and the cocoa plantations of Goulikao (Oumé), based on a selection of three age categories (7, 15 and 30 years). Adjacent forests were also inventoried. Diameters at breast height (DBH) were measured for associated trees and for the main crops. Parametric and non-parametric tests were used to compare the different means. The results showed that tree species diversity did not vary significantly with plantation age. Rubber plantations hosted 5 associated tree species distributed over 5 stems.ha⁻¹. Cocoa plantations hosted 38 associated tree species distributed over 56.84 stems.ha⁻¹. The trees present in the rubber plantations are less abundant and of larger diameters, in contrast to the forests. The latter have an abundance of individuals belonging to the 5–10, 10–20 and 20–30 cm diameter classes. In cocoa plantations, small- and medium-diameter trees are the most abundant. This result shows that the structural diversity of trees in cocoa plantations is close to that of forest environments. The use of agroforestry would therefore be beneficial for reproducing the structure of natural forests and thus ensuring the health and sustainability of agricultural systems.

Keywords: Agricultural system health, agroforestry, cocoa plantation, rubber plantation, structural diversity