



Ecological sustainability of cocoa production: Role of traditional agroforestry systems on biodiversity conservation and ecosystem services in Cote d'Ivoire

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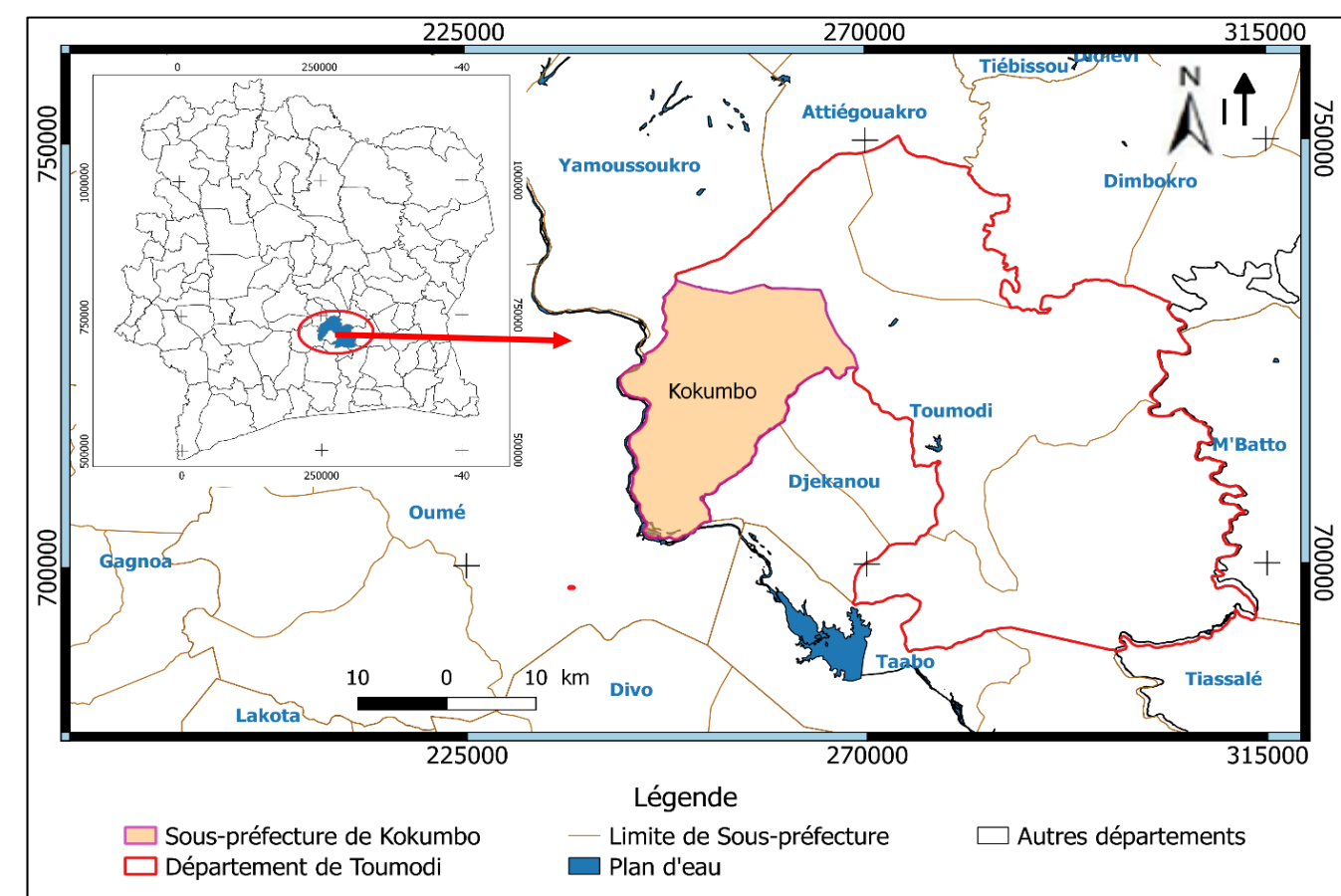
Introduction

In Côte d'Ivoire, as in all West Africa, the cocoa farms from forest conversion result in drastic decline of forest vegetation and its biodiversity.

Facing this unviable situation, agroforestry systems (AF), such as the smallholders' plantations where trees have long been maintained and associated for diverse purposes can offer promising sustainable alternative.

Research question: What is the ecological sustainability of the traditional agroforestry systems in Côte d'Ivoire and what are their role on biodiversity conservation and ecosystem services?

Methods



- Study area: Centre of Côte d'Ivoire.
- Analysis of the practices through a survey of 105 five peasants for recording their utilization of plant species in cocoa plantations and their perceptions.
- Inventory of plant species diversity in 105 plots of 625 m² each.
- Inventory of Ecosystem services from these traditional AF focusing on provisioning services.
- Analysis of the tree species contribution to biodiversity conservation (high conservation value).
- Estimation of the biomass and the carbon stock of the associated trees.

High conservation value species (IUCN redlist) recorded

2 Endangered species

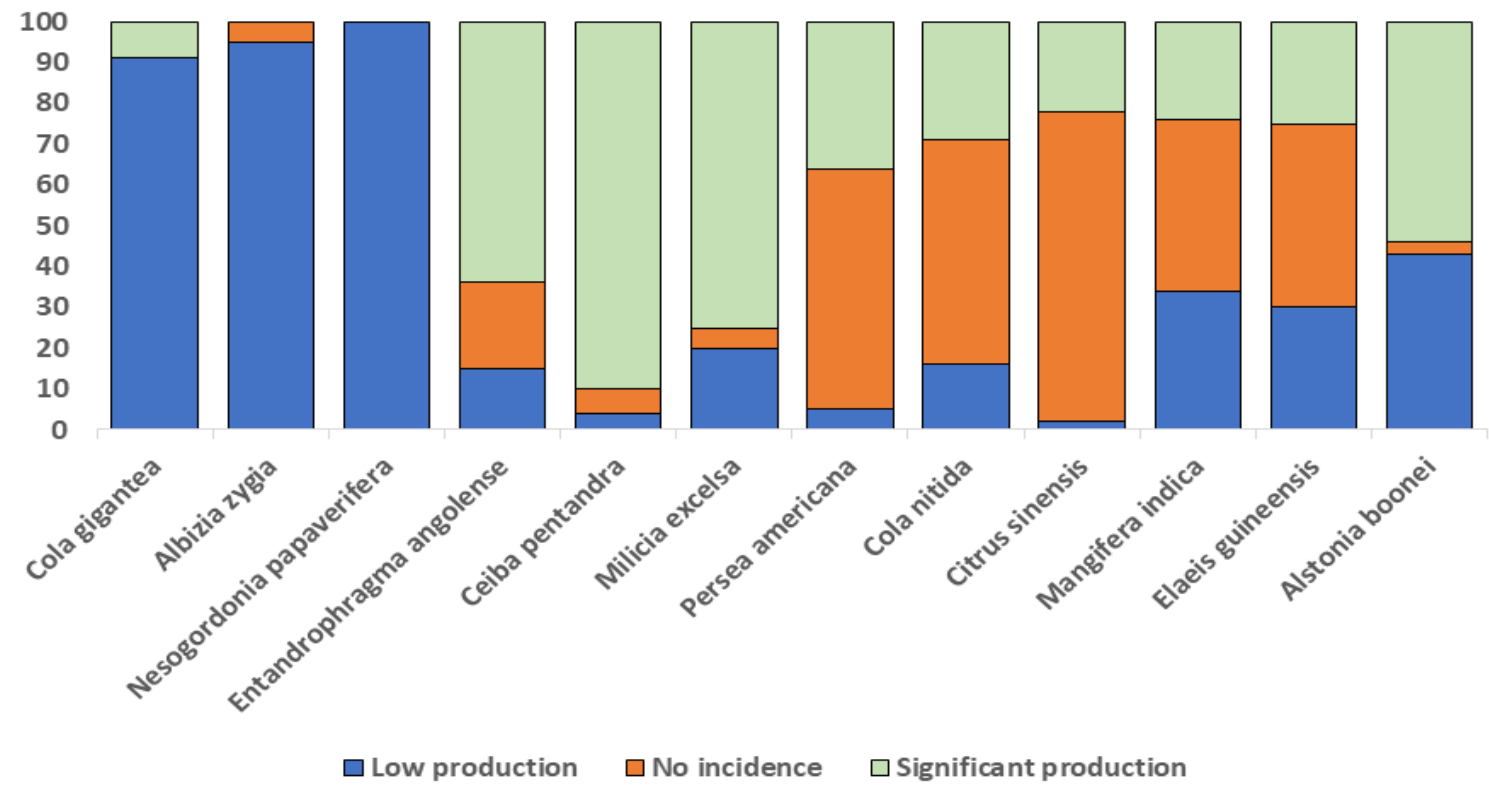
12 Vulnerable species

Omphalocarpum ahia
Tieghemella heckelii

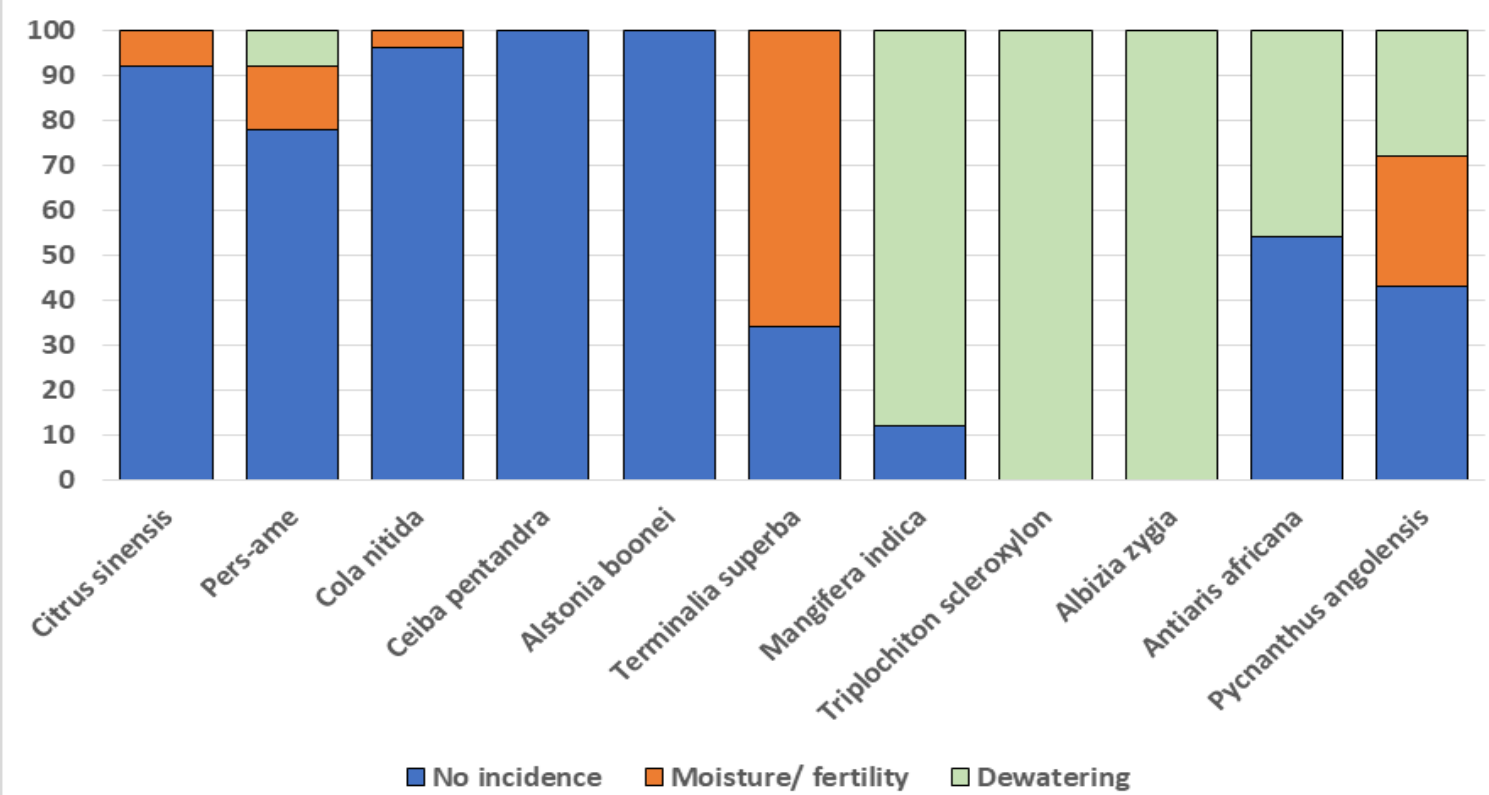
Terminalia ivorensis
Khaya ivorensis
Copaifera salikounda...

Results

Variations in farmers' responses to the question of the impact of associated species on cocoa production



Variations in farmers' responses to the question of the impact of associated species on the soil



Bark from the trunk of *Entandrophragma utile* (Vulnerable) collected for medicinal use



Edible fruit of *Garcinia kola*, a Vulnerable plant (IUCN, 2022)

Estimation of the stored carbon

AF type	Total tree biomass (Tons/hectare)	Stored carbon follows (Tons/hectare)
Simple AF	27.74 ± 8.06	13.87 ± 4.03
Complex AF	156.71 ± 134.22	78.36 ± 67.11
Mixed AF	44.33 ± 43.60	22.17 ± 21.8

Highlight

Agroforestry systems in the Centre of Côte d'Ivoire provide important ecosystem services as well as biodiversity conservation.