



The Role of Agroforestry in Sustainable Intensification of Cocoa Growing Systems Across West Africa: A Review

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Introduction

- ❖ Improving cocoa (*Theobroma cacao*) production has cost West Africa about 2.3 million hectares of forest in the last three decades.
- ❖ Increasing the production area coupled with the quest to reduce deforestation and conserve the environment have opposing goals.
- ❖ Hence, the need for intensified production systems such as cocoa agroforestry (CAFS), that improve productivity and promotes environmental integrity.

Methodology

- ❖ This work reviews the extent of CAFS in four globally significant cocoa-growing countries; Cote d'Ivoire, Ghana, Cameroon, and Nigeria (Fig. 1).
- ❖ Peer-reviewed papers (76) related to farm diversification and shading in cocoa systems, from 1980 to date were reviewed.
- ❖ Literature search was done in Google Scholar, ResearchGate, ScienceDirect, Wiley Online Library and Springer Link, etc.

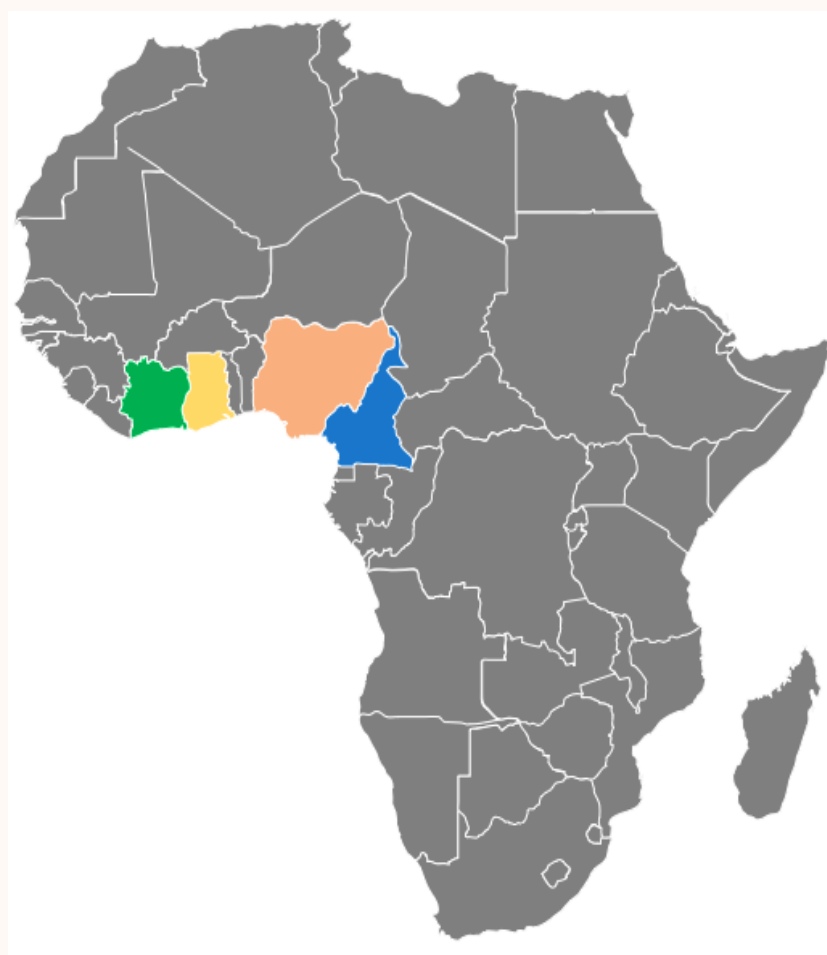


Fig.1: Map of Africa showing the study areas

Results and Discussion

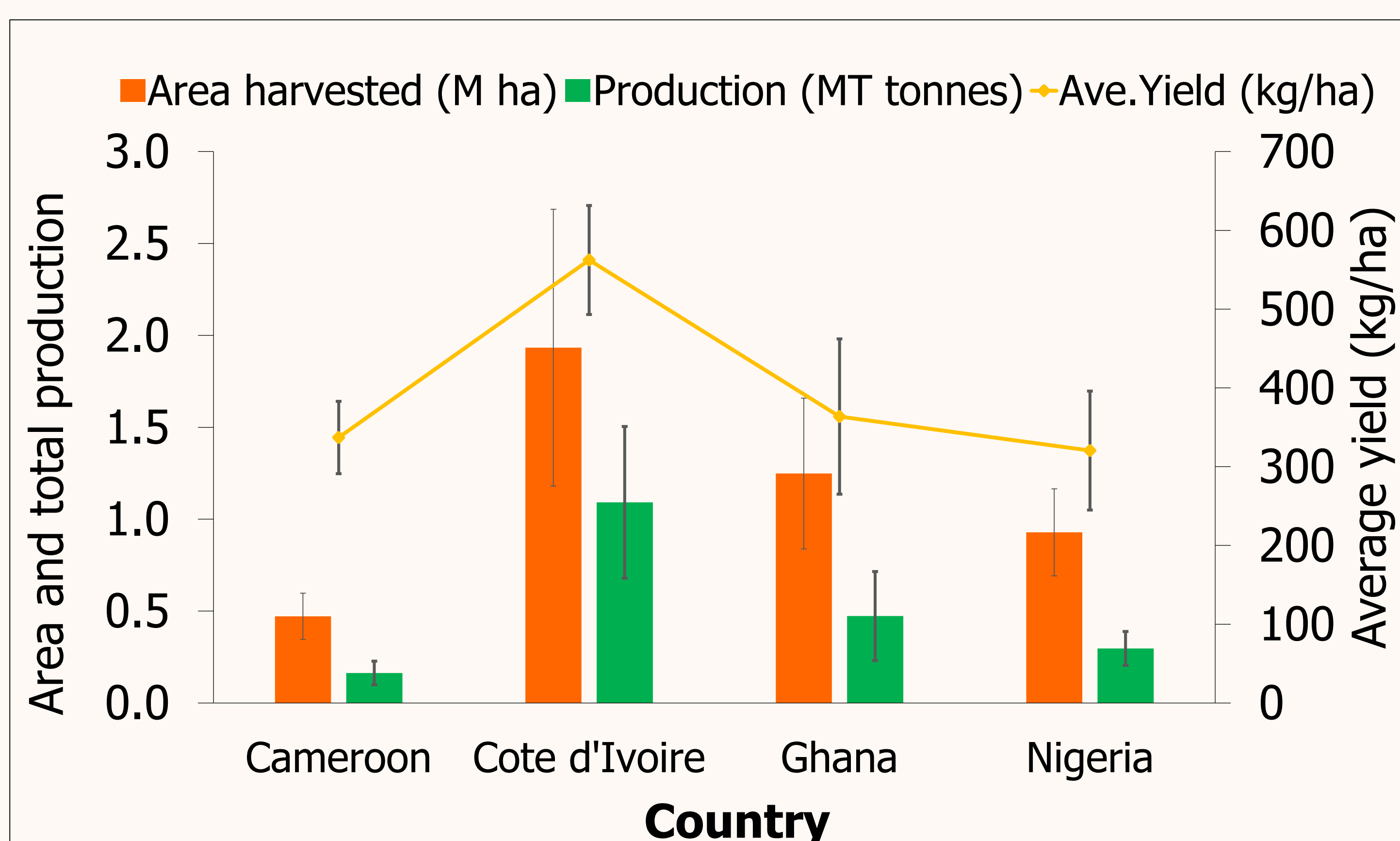


Fig.2: Area under production and yields of cocoa for the years 1980–2017 (FAOSTAT, 2018).

- Cocoa yields in the countries have stagnated over the period ranging between **300–600 kg ha⁻¹** (Fig. 2).
- The increase in production is mainly through extension into forest areas with shifts in cocoa producing areas within the countries (Fig. 2).

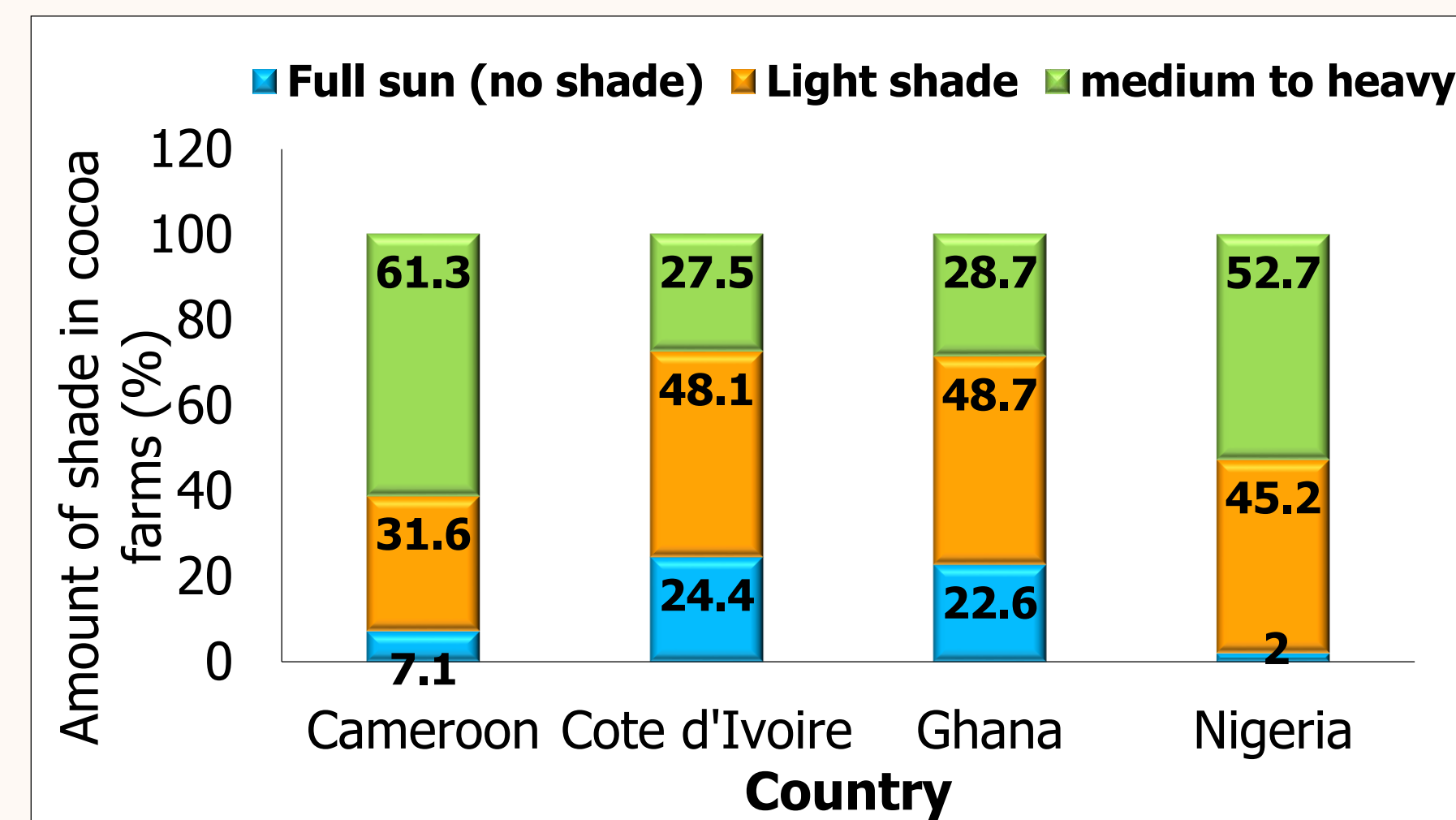


Fig.3: Shade levels in the cocoa belt of West Africa (STCP survey, 2002; Gockowski et al. 2004).

- ❖ 70% of cocoa is cultivated with various levels of shade.
- ❖ medium to heavy shade reflects the availability of some forest resources which could be properly managed for sustainable production.

Benefits of cocoa agroforestry

- Agro nomic**
 - Supports primary production
 - Longer productive lifespan of cocoa
 - Regulatory effect on pest and disease
 - Maintains connectivity between land use
- Enviro nmental**
 - Biodiversity and Forest resource conservation
 - Carbon sequestration
 - Climate change mitigation and adaptation
- Econo mic**
 - Additional income for farmers
 - Increases cash flows and land expectation value
 - Improves farmers' livelihood
- Cultur al**
 - Aesthetic and Recreational
 - Medicinal uses
 - Tourism

Highlights

- ❖ CAFSs range from simple plantations using few associated species to complex systems resembling natural forests
- ❖ The multifunctional role of CAFSs has been established across the countries as either regulating, supporting, provisioning or cultural.
- ❖ CAFSs can optimize the trade-offs between agricultural yield and provisioning of other ecosystem services.
- ❖ There is wider scope for promoting CAFSs with regards to species suitability to match ecological niches, farmer's livelihood needs and provision of ecosystem services.
- ❖ Challenges of small farm holdings, non-availability of tree seedlings, lack of incentives, etc should be addressed.



CocoaSoils