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“Filling gaps and removing traps  
for sustainable resource management”

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

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### Abstract

Cocoa (*Theobroma cacao* L.) is one of the major smallholder cash crops in West Africa, whose productivity has stagnated at around 300-600 kg ha<sup>-1</sup> in the past decades. This has been attributed to poor soil fertility management, poor planting materials, varying degrees of pests and diseases incidence, and climatic pressures such as rises in atmospheric temperatures and rainfall variability. Improving productivity has cost West Africa about 2.3 million hectares of forest in the last three decades. Thus, the need for intensified production systems that improve productivity and at the same time promotes environmental integrity. Sustainable cocoa intensification involves a new vision of the cocoa economy whereby the crop is grown with the objective of increasing productivity while at the same time ensuring sustainability by protecting the environment. This work reviews the extent of cocoa agroforestry systems in Côte d'Ivoire, Ghana, Cameroon and Nigeria from 1980 to date. We considered 76 peer-reviewed articles related to shading and farm diversification in cocoa systems in the four countries. Literature search was done in search engines including Google Scholar, ResearchGate, ScienceDirect, Wiley Online Library and Springer Link. The nature of cocoa agroforestry strategies employed across these countries highlights on agronomic, economic and environmental benefits. Cocoa productivity continues to depend on increase in the production area with the use of agrochemicals, and the quest to reduce deforestation and conserve the environment have opposing goals. To enhance cocoa productivity sustainably, sector players are faced with trade-offs between yield increases in monocultures and environmental conservation in cocoa agroforest systems. Thus, ordinary intensification could decrease environmental resilience, making an adaptation of sustainable cocoa production practices vital. However, there is a need to consider understorey management and the composition of the agroforest structure. The disagreements on the technical characteristics of a cocoa agroforest and the lack of specific training for farmers is also of concern. We, therefore, suggest that cocoa agroforest system needs to take landscape and socio-economic issues into consideration and that extension programs should be tailored to encourage the adoption of this technique for sustainable cocoa production.

**Keywords:** Climate change, cocoa agroforests, cocoa productivity, deforestation, environmental integrity