

## The nexus between cocoa production and deforestation

In Ghana, cocoa contributes substantially to the agricultural foreign earnings and plays a major role in providing income for millions of farmers and households. But its production has environmental impacts, like deforestation. Creating a policy environment that supports sustainable practices in agriculture to leverage the cocoa forests for biodiversity conservation is essential.

The Ministry of Environment, Science and Technology of Ghana estimated in its National Biodiversity Strategy Action Plan (2002) that the country loses about 4% of its GDP every year through biological diversity loss. Yet the potential value of agricultural systems for conserving biodiversity has long been ignored even if the maintenance of biological diversity is strongly determined by agricultural and forestland uses outside formally protected areas. In West Africa, increasing the area under cocoa production poses a threat to areas of high biodiversity. But a carefully planned interface of agriculture and forestry has the potential to conserve forestlands and improve cocoa suitability. In West and Central Africa, recent developments suggest a potential for productivity gains in cocoa farming systems through sustainable agricultural intensification practices such as cocoa agroforestry and Integrated soil fertility management (ISFM).

### Cocoa, an extensive production system

Cocoa is one of the most extensive production systems in the agrarian landscape. It covers about 1,4 million ha of arable land in Ghana; 2,17 million ha in Côte d'Ivoire; 700,000 ha in Nigeria and 427,000 ha in Cameroon. Reported average yield recorded in these countries ranges between 200-700 kg per ha as against a potential yield of about 2,000 kg and more reported on well managed research stations.

This huge yield gap (see graph) has been attributed to aging cocoa trees (over 30 years tree stock), low quality cocoa planting materials, inadequate soil fertility management, prevalence of diseases and pests, old average age of farmers (over 45 years) coupled with an overall lack of knowledge on good agricultural practices. Consequently, decades of shifting cultivation into forest areas have contributed immensely to deforestation and biodiversity loss in the Upper Guinean rainforest. Today less than 20% of it remains in West Africa.

This forest loss has been the price of 73% of the global production of cocoa coupled with indiscriminate surface mining and increasing urbanization in this sub-region.

### The Ghanaian tragedy of deforestation

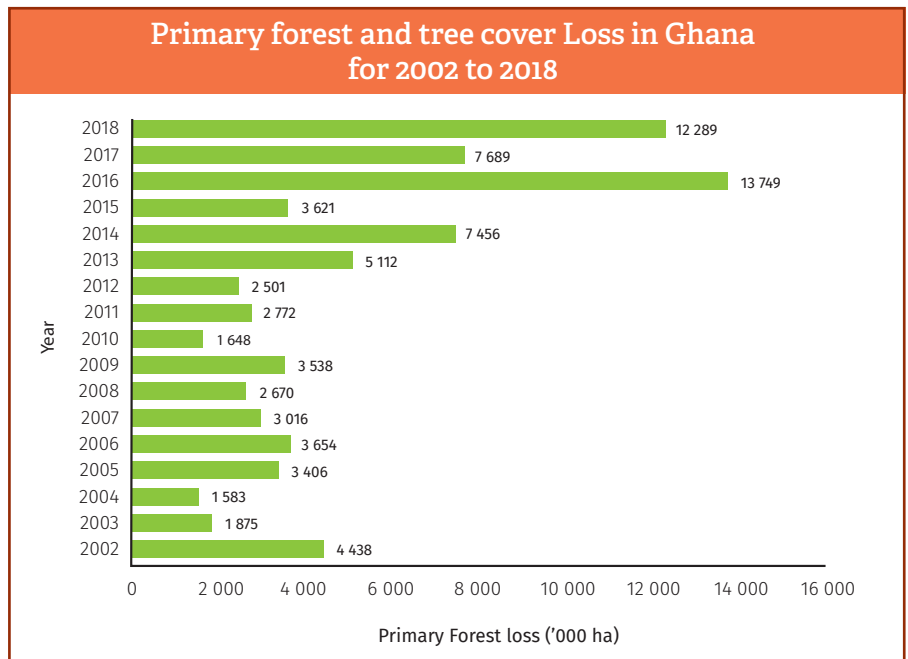
In Ghana, from 1980 to 2010, about half of the forest area was lost, reducing from 8.8 million ha in 1980 to 4.9 million ha in 2010. And the trend continues: primary forest loss was high in 2016 and 2018 and the World Resource Institute report indicates a 60% change in forest loss in 2017-2018 in Ghana. A recent analysis of satellite images in Krokosua Hills, Sui River and Tano Offin - three forest reserves classified Hotspot Intervention Areas (HIAs) under the Ghana Cocoa Forest REDD+ Program - shows extensive deforestation rate of 3.5%, 3.7% and 1.1% respectively from 2010 to 2019. This can be explained by extensification of cocoa cultivation, population explosion, illegal logging and extraction of wood for do-

mestic use, and mineral exploitation leading to deforestation.

In order to conserve the remaining forest remnants while addressing social and economic demands for development and food security, a new paradigm of growth is to be developed for the cocoa sector. According to a study by Asare et al. published in 2018, Ghana distributed through the Cocoa Hi-Tech and CODAPEC 110 million improved hybrid cocoa seedlings, 2.4 million 50-kg bags of granular fertilizer and 1.6 million litres of foliar fertilizer, 1,500 tons of fungicides and 1.7 million litres of insecticides between 2014 to 2016. The sustainability of this growth is questioned and policy reforms are expected.

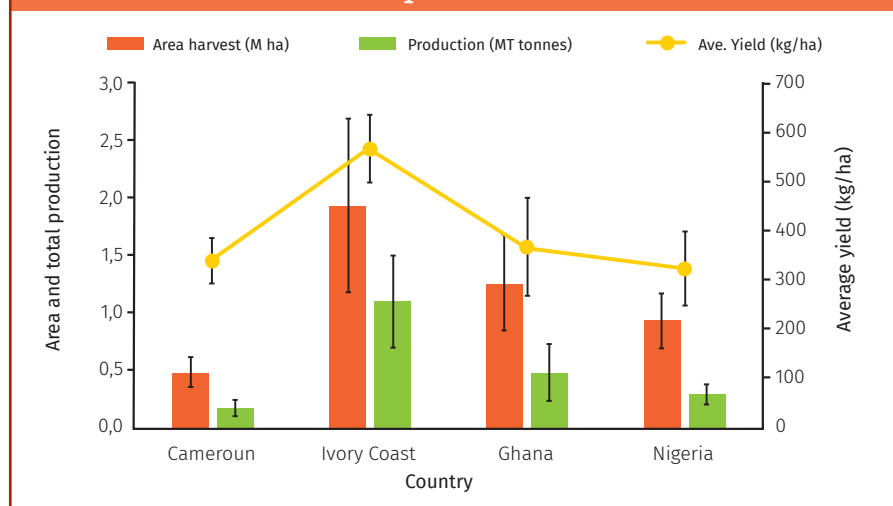
### Improve yields to protect the forest

This tragedy of deforestation calls for an enlightened debate on the enactment of favourable agricultural and forestry policies.



Source: www.rainforests.mongabay.com

## Area under production and yields of cocoa for the years 1980–2017



Source: FAOSTAT, 2018

In Ghana the Timber Resource Management Act, 2002 (Act 617) stipulates that “No timber rights shall be granted in respect of land with private forest plantation and land with any timber grown or owned by any individual or group of individuals”. This Act, even though a strong motivation for timber trees on farms, has done very little to encourage farmers to maintain trees on farms due to its low publicity and weak enforcement.

**IN GHANA ABOUT HALF OF THE FOREST AREA WAS LOST BETWEEN 1980 AND 2010**

Despite the government’s grants for planting materials and inputs, productivity has not improved to the expected level. Therefore, there is a need for a comprehensive approach that packages good agricultural practices and cocoa farm rehabilitation in an integrated, diversified, gender-equitable, profitable, non-predatory and sedentary cocoa farming systems. Sustainable cocoa farms means rational application of recommended pesticides and organic and inorganic fertilizers, use of improved planting materials sourced from a certified vendor, recommended pruning and weeding regimes, and planting at the recommended planting distances. This, when properly maintained through good agricultural practices could realistically improve the yield gap up to 1,200-2,000 kg/ha.

An innovative incentive mechanism that rewards farmers for their environmental stewardship should be found to assure farmers embark on good agricultural practices. The goal is to slow environmental degradation, improve long term yields and returns and so as the livelihood of farmers.

### Diversify cocoa system

A good understanding of cocoa nutrition through a carefully planned integrated soil fertility management agenda can contribute to yield improvement. This coupled with a plant diversification system can help buffer forests from encroachment. In a diversified cocoa system, mixtures of plant species with different growth requirements and production potentials can reduce inter-specific competition and increase yields per unit area in terms of different produce as compared to mono-specific stands. In addition, these systems can serve as buffer between protected areas and other land uses. Plant diversification in the form of cocoa agroforests involves a portfolio of strategies designed to reduce exposure to product and income risks by combining a variety of activities (production, marketing, product transformation, input supply etc.). It allows consistent performance under a wide range of agronomic, environmental and economic conditions.

Socio-economic assessments of the opportunity costs of alternative farming systems to cocoa agroforestry in fragmented forest landscapes was done in Ghana by Asare et al. in 2014. They highlighted the financial importance of diversify cocoa systems in the country. The results showed that while cocoa agroforests can serve as corridors and extensions of forests, timber trees planted within

cocoa agroforests settings can help offset the yield losses in cocoa shade-yield relationships compared to full sun-production systems with an internal rate of return of 51.3% compared to 45% in a cocoa monoculture system. The condition is that farmers are paid premium for environmental and ecosystem services in addition to the on-farm benefits of cocoa agroforestry. This, according to the authors, can lead to widespread adoption of this farming system.

### Food for thought

It is important to reconcile conservation goals with existing policies, extension messages, and on-the-ground practices of agricultural production in order to ensure up to scale impact. The policy terrain of conservation landscapes has a major effect on agroforestry’s potential to contribute to conservation. The implementation of REDD+ by the Ghana Cocoa Board and Forestry Commission, the environmental certification for cocoa by Rainforest Alliance and UTZ, the Cocoa and Forest Initiative (CFI) by the chocolate industry partners under the World Cocoa Foundation (WCF) and the Sustainable Trade Initiative (IDH) make the use of innovative technologies like cocoa agroforestry around protected forest areas feasible and attractive to scores of farmers and policy makers in countries like Ghana. The major challenge is how to harmonize the multiple mandates, rules, practices and needs of the wide range of actors living and working within the landscape. ■

Docteur Richard Asare



Richard Asare is a cocoa agroforester. He coordinates the Global Cocoa Soils Program and the CGIAR’s program on Climate Change, Agriculture and Food Security (CCAFS) that looks at mainstreaming climate smart agriculture in cocoa systems in Ghana.