Katoomba XV

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Sweetening the Deal for Shade-Grown Cocoa: A Preliminary Review of Constraints and Feasibility of 'Cocoa Carbon' in Ghana

Introduction – forests, cocoa and carbon

Ghana has one of the highest deforestation rates in Africa at approximately 2% per annum – it has lost about 85% of its forest cover over the past 100 years. Most of this is due to agriculture – one World Bank study estimated that multiple agricultural uses accounts for six times more destruction than logging, for example. A prime driver of deforestation is clearance for cocoa farming, especially in the Western Region.

Ghana is now the second biggest producer of cocoa after the Ivory Coast, with an annual yield (2007) of 680,000 tonnes. It is estimated that there are about 1.5 million hectares of cocoa in Ghana, some 30% of the population are dependent on cocoa for part or all of their livelihoods, and cocoa exports account for about 40% of total exports.

However, the increase in cocoa production in recent decades has been due to expansion of the land area rather than improved productivity[1]. Most new cocoa planting has been in the Western Region where approximately 80% has been established without shade (or less than 10% canopy cover); in comparison, 50% of cocoa in the Eastern Region is grown with a 30-40% canopy cover.

Recent research[2] reveals a pronounced trade-off between short-term cocoa productivity and ecosystem health as well as biodiversity – this research shows that the higher yielding short cycle hybrid cocoa varieties grown under full sun or minimal shade exhaust soil nutrients (due partly to the loss of the arboreal nutrient cycle) and degrade the ecosystem so that it becomes unsuitable for further cocoa farming or other productive agriculture. This is placing the long-term future of cocoa farming, and its related rural livelihoods in Ghana, in some doubt – a concern which is now being discussed by the major cocoa buyers.

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[1] National cocoa production has increased by 6% p.a. between 1991-2005 and the cocoa area planted by 7%, resulting in about a 1% annual fall in cocoa yields. In the Western Region, output expanded by 7.8% p.a. over this period; in 2005-06 it accounted for 57% of total national output (Gockowski, 2007).

[2] From the "Cocoa Farming and Biodiversity in Ghana" Project, based on a partnership between Cadbury plc, Earthwatch Institute, Nature Conservation Research Centre (NCRC), Cocoa Research Institute of Ghana (CRIG) and the University of Reading.

The 'win-win' potential of cocoa carbon

A higher shade (from 30% canopy cover) cocoa farm with improved cocoa management practices can be viewed as a sustainable agroforestry system which stores significant quantities of carbon on farm as shown by Box 1. Furthermore, by promoting intensification rather than expansion of cocoa areas, improved farming practices can potentially generate carbon benefits off-farm from Reduced Emissions from Deforestation and Degradation (REDD). Carbon benefits there-fore have the potential to enhance the profitability of sustainable cocoa production in Ghana.

It can also be noted that cocoa in Ghana is very much a smallholder crop, with most cocoa farms in the 1-5 hectare range, and that many of the farmers are sharecroppers and migrant farmers. Therefore cocoa carbon also has the potential to generate significant poverty reduction benefits.

At the same time, the smallholder basis of cocoa raises challenges to cost-effective carbon monitoring and verification: simplified methodologies and monitoring protocols will be needed so that thousands of small farmers, each with small carbon volumes, can benefit from carbon markets. Well organised cocoa producer cooperatives like Kuapa Kokoo and Cocoa Abrabopa, however provide an excellent basis for the necessary 'aggregation' mechanisms.

The Ghana Cocoa Carbon Initiative (GCCI)

Based on the inherent attraction of cocoa carbon, the Ghana Cocoa Carbon Initiative (GCCI) has multiple objectives:

- Mitigation of climate change by reducing carbon emissions from deforestation and land degradation, and through enhancement of land-based carbon stocks (carbon sequestration via planted trees or natural regeneration);
- A more sustainable supply of cocoa including the promotion of ecologically-sound cocoa farming practices;
- Enhanced delivery of biodiversity and other ecosystem services;
- Poverty alleviation and improved livelihoods in the cocoa sector; and
- Reduction of pressures on forest reserves.

The Nature Conservation Resource Centre (NCRC) and the Katoomba Group have recently established the West African Katoomba

Box 1. Cocoa Storage in Eastern Region Cocoa Systems and High Forest

Reading University research has found that, including soil carbon and the cocoa trees, shaded cocoa (crown canopy in excess of 30%) was found to store about 159 tonnes C ha^{-1} or 70% of the carbon found in intact high forest (224 tonnes C ha^{-1}), and over double that stored in unshaded (under 10% canopy cover) cocoa (72 tonnes C ha^{-1}). Excluding soil carbon, shaded cocoa stored 107 tonnes C ha^{-1} about two-thirds the carbon in high forest (156 tonnes C ha^{-1}) and almost three times more than unshaded cocoa (38 tonnes C ha^{-1}).

Lower productivity in shaded cocoa farms is an important consideration - although more carbon is stored compared to unshaded cocoa, more land is needed to maintain cocoa production levels. But calculations also show that traditional shaded cocoa farms store more carbon per unit area than an equivalent area of land consisting of a combination of intensively managed cocoa and an area of retained or replanted native forest.

Ecosystem Services Incubator, and are working together to identify and develop the carbon finance potential in the cocoa sector, as well as assessing other carbon finance options involving sustainable charcoal production and community managed protected areas.

The Incubator has therefore commissioned a pre-feasibility economic analysis of the potential of 'carbon cocoa' in Ghana, with the specific objective of developing economic models which will help assess the attractiveness of cocoa carbon for farmers and investors. This is a preliminary study based mainly on secondary data (see below for some preliminary findings). When specific cocoa carbon sites are identified, a full context-specific economic, technical, legal and social feasibility analysis will be undertaken, since this provides essential data for the Project Design Document (PDD). The PDD is the basic technical document which then needs to be validated by an auditor to determine if it meets the required carbon, social and biodiversity standards.[3]

The Incubator aims to develop two cocoa carbon projects over 2010-2011. These will be taken from four potential cocoa carbon options (Box 2) in two main cocoa production areas or 'types': the Western Region Type (WRT) and the Eastern Type (ET), composed mainly of the Ashanti, Eastern and Brong-Ahafo Regions. The WRT is characterised by unshaded shorter cycle cocoa, and the ET by more traditional shaded cocoa farms. Projects will be developed in close partnership with farmer organizations, research institutions and other groups to maximize learning and shared expertise.

Legal and Institutional Constraints – Findings from the "ROSE" Workshop

An early activity of the West Africa Incubator was a "REDD Opportunities Scoping Exercise" (ROSE) workshop of key informants held in July 2009. Distinguishing cocoa carbon as one of the high potential project types, the ROSE workshop identified tree tenure as the main constraint for REDD cocoa carbon since it is acts as a strong disincentive to farmers to keep trees, especially timber trees. The state owns all naturally-occurring trees, while planted trees belong to the person who plants them. Farmers have the right to fell naturally occurring trees for household use or agriculture, but not for economic purposes (selling timber is a criminal offence).

Box 2. REDD and A/R Cocoa Carbon Options

The Incubator is investigating the potential of both the carbon sink option, via afforestation, reforestation (A/R) or natural regeneration of cocoa farms, and the REDD option.

In the Western Region Type, REDD credits could be obtained by dissuading cocoa farmers from expanding their cocoa farms, or from moving to new forest areas, via increasing productivity and profitability on existing cocoa farms. This can be called 'off-farm REDD', This would be via an "improved farming practices" (IFP) package including improved cocoa germplasm, shade trees with higher timber or non-timber forest product (NTFP) values (while recognizing that current tree tenure prevents legal sale of tree products), and better silvicultural and disease control practices. Off-farm REDD credits are also possible in the mosaic (farm-tree) landscapes of the Eastern Type via a similar IFP package if farmers can be persuaded not to plant cocoa in secondary forest areas or on carbon rich farmland, especially if the cocoa would be unshaded.

The A/R option in both areas would be via the introduction of higher shade cocoa through tree planting and/or natural regeneration in food crop fallows or highly degraded cocoa farms, either during the initial cocoa farm establishment or when replanting cocoa. Another option is to plant trees as a separate land use (most likely for timber) next to cocoa farms. It is possible that a project could involve a combination of REDD and A/R, although this would require two PDDs.

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[3]Most likely to be a combination of the Voluntary Carbon Standard (VCS) and the Climate, Community and Biodiversity (CCB) Standards.

Many cocoa farms are in off-reserve timber concession areas, so that at any time concessionaires (loggers) may enter to harvest the trees. Legally they should obtain the farmer's permission before felling a tree and then compensate him/her for any damage caused to the cocoa farm during felling and skidding, but this seems to happen only intermittently. This situation causes perverse incentives. In order to avoid the risk of damage, cocoa farmers sometimes select non-timber shade trees in preference to timber shade trees. They are also known to destroy timber saplings and ring-bark mature timber trees. The general preference among cocoa farmers is to sell timber trees to chainsaw operators who cause minimal damage and give them a share of the timber revenue.

The ROSE workshop concluded that REDD cocoa carbon will only work if farmers obtain increased rights or incentives over trees, and that a promising way forward would be by establishing Community Resource Management Areas (CREMAs) or 'Designated Forests' in off-reserve areas. CREMAs confer increased local control and participation in natural resource (especially wildlife) management, increase the scope for farmer rights over trees, and provide a facilitating platform to sort out land tenure issues. While CREMAs have so far been mainly oriented to wildlife, biodiversity and ecotourism, there is scope to modify the new Wildlife Bill (at a final drafting stage) so that it can accommodate REDD objectives.

Land tenure, by contrast was not considered especially problematic, in spite of the apparent conflicts of interest, mainly in the Western Region, between migrant tenant farmers and 'landowners'. The ROSE participants felt that most land tenure conflicts can be resolved at the community level. Also usufruct rights for cocoa farmers are very strong. The ROSE Workshop also observed that improved inter-institutional coordination, particularly for cocoa grown in forest reserves, and increased involvement of traditional authorities (chieftancies) and District Assemblies, are essential for any REDD initiative to work.

Farmers drying cocoa beans.
Photo: Michael Richards

Pre-feasibility Economic Analysis – Preliminary Findings

The pre-feasibility economic analysis of cocoa carbon commissioned by the Incubator is still under way, but it is possible to identify some early findings. Table 1 presents some interesting cocoa sector data for the two main cocoa production types based on 2007 data, and reveals key differences in farm size, yields and farm income (*Abusa* sharecroppers get less than half the national average per capita income).

For each cocoa production 'type', economic models have been constructed showing returns to cocoa farmers in 'business as usual' cocoa production and with 'improved farming practices' (IFP), including increased shade, as described in Box 2. There is insufficient space here to present the detailed assumptions and results. However some provisional findings are that:

- Due to policy, fiscal and institutional constraints, e.g., lack of credit and high input costs, cocoa farmers currently have low incentives and means to invest in improved cocoa farming methods. High personal discount rates, stemming from high levels of risk, uncertainty and poverty, also disincentivise farm investment.
- In the WRT, 'business as usual' cocoa farming was more profitable and less risky than the IFP model. This implies high opportunity costs for the REDD package to overcome, and that the latter would need to compensate farmers for losses and risks under IFP. However farmer rights to timber would make the IFP model more profitable than 'business as usual', even before adding potential carbon revenue from off-farm REDD credits that could stem from carefully crafted community forest conservation agreements to avoid, for example, forest reserve encroachment.

At current carbon prices, carbon payments alone will probably be insufficient to incentivize higher biomass cocoa farming in Ghana – a key task for the economic analysis will be to identify a break-even carbon price at which REDD or AR options become attractive to farmers or investors.

Table 1. Rounded data for the two cocoa production areas (2007 data)

Variable	***Unit***	***Western Region Type***	***Eastern Type***
Cocoa production	Tonnes	300,000	300,000
Area	Hectares	590,000	810,000
Average yield	Kg ha^{-1}	536	370
No. of farm households	Households	110,000	700,000
Ave cocoa farm size	Hectares	5.4	1.2
Sub-sector gross revenue	US dollars	440 million	420 million
Ave farm gross revenue	US dollars	4,000	610
Share-cropping arrangement	Tenant: landowner share	50:50	67:33
Gross return per landowner	US dollars	2,000	200
Gross cash balance per tenant	US dollars	699	11

Conclusions

The main implication of these preliminary economic results is that carbon finance alone (at current carbon prices) will not likely be the sole or necessarily the primary means for persuading farmers to adopt higher shade cocoa systems. It could however be an enabling factor to encourage improved farming practices and productivity. The models imply that tree tenure reform, combined with policy, fiscal and institutional reforms in the cocoa sector, will be important drivers of 'improved' cocoa farming practices, including increased shade.

Realizing the full potential of "cocoa carbon" will require concurrent progress in policy and legal reforms, as well as building practical experience on the ground. Demonstration activities, working closely with rural communities, farmer organizations and industry, will shed light on practical issues of how to promote improved farming practices, where carbon finance could play a catalytic role, and what impact specific policy reforms could potentially have.

Initially, Afforestation/Reforestation (A/R) may be a more viable strategy than the REDD options because the trees and (presumably) the carbon rights would belong to the tree planter; A/R can either be form increasing shade cover in new or replanted cocoa plantations, or in the form of tree planting (most likely for timber) as a separate land use next to the cocoa crops.

Cocoa Farmer from Ghana
Photo: Michael Richards

More generally, it can be observed that the complex dynamic of cocoa carbon in Ghana calls for landscape-level approaches that integrate strategies for REDD, A/R and agriculture in order to enhance agricultural productivity, community commitments to forest conservation, carbon and other ecosystem services. The key to unlocking such a landscape approach is to give farmers and communities rights and therefore incentives for natural resource management; a possible tool for this in Ghana is through the establishment of Community Resource Management Areas (CREMAs) and/or 'dedicated' community forests in off-reserve areas.

Finally, the economic analysis highlights the need to identify a role for public finance in the promotion of an essential public good - soil quality – in the face of significant market and policy failures. This is apparent in the economic models which show high opportunity costs for Western Region cocoa farmers to shift away from unshaded short cycle and soil-degrading cocoa systems. Given the externalities at stake it seems that market solutions will need to be leveraged with public funds since the prevailing discount rates (reflecting high risk levels) bias land use decisions heavily towards short-term outcomes.

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Ecosystem Marketplace

A global platform for transparent information on ecosystem service payments and markets

the katoomba group

Building capacity for local communities and governments to engage in emerging environmental markets

BBOP

Business and Biodiversity Offsets Program, developing, testing and supporting best practice in voluntary biodiversity offsets

Marine Ecosystem Services Program
MARES

Using innovative financing to promote the conservation of coastal and marine ecosystem services

CHESAPEAKE FUND

Building a market-based program to address water quality (nitrogen) problems in the Chesapeake Bay and beyond

Forest Trade & Finance

Bringing sustainability to trade and financial investments in the global market for forest products