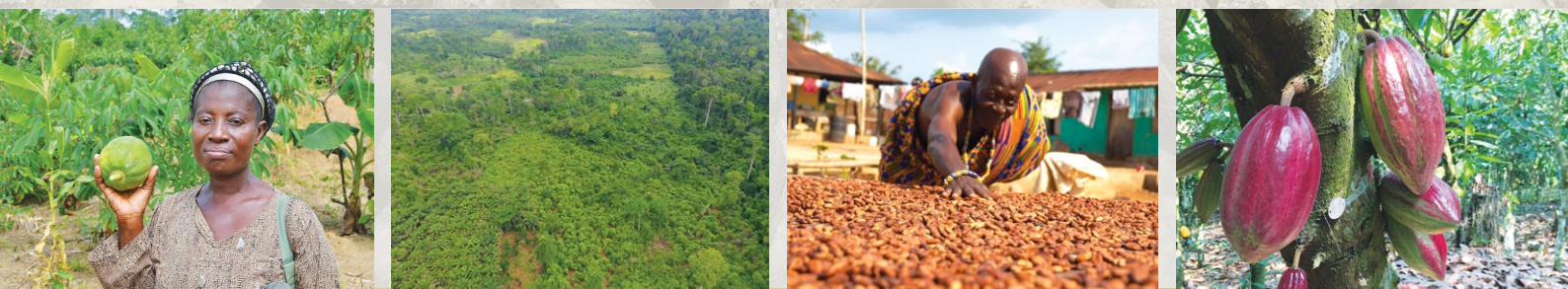




Climate Smart Cocoa

Explaining the Context, Concept and
Defining Key Activities



Accra, June 2019





Table of Contents

Credits	i
Background	1
Introduction	1
Why Climate-Smart Cocoa is Needed?	3
Historical Context of Cocoa Farming in Ghana Leading to Current Situation	5
Climate-Smart Cocoa	9
What is Climate-Smart Agriculture?	9
Why Are Current Efforts Not Climate-Smart?	14
Defining the Climate-Smart Cocoa Approach	16
Conclusions	20
References	21

Credits

This document is the result of many years of concerted efforts using informal and formal processes involving a wide group of stakeholders from the cocoa private sector, civil society and government dating back to 2011.

Over this period, the various participants and stakeholders contemplated how to foster a shift from Ghana's past cocoa production system to a future climate-smart sector. The document summarizes the main conclusions and recommendations that came out of these working groups and meetings, which NCRC led in collaboration with the Climate Change Directorate/National REDD+ Secretariat of the Forestry Commission and the Research and Monitoring Division of Ghana's Cocoa Board.

Many people have provided input and guidance in the thinking and conceptualization that is reflected in this document. In particular, we recognize the

following individuals for providing valuable information, contributions, and insights during the drafting of this document: Vince McAleer (formerly of Armajaro), Dr. Stephen Ampofo (Cocoa Abrabopa Association), Yaw Kwakye (Forestry Commission), Tei Quartey (retired, Ghana Cocoa Board), Vincent Akomeah and Dr. Emmanuel Opoku (Ghana Cocoa Board), Vincent Manu and Sander Muellerman (formerly with World Cocoa Foundation), Gurinder Goindi (formerly with Olam Ghana), Ernest Dwamena (Touton SA), Christian Mensah (Rainforest Alliance), Prof. Ken Norris (formerly Zoological Society of London), Prof. Yadvinder Malhi and Dr. Alexandra Morel (Oxford University).



Background and Context

Introduction

Ghana has been a leading African country showing commitment to reduce emissions from deforestation and forest degradation. Early in its REDD+ readiness process, agriculture and specifically cocoa farming were identified as major drivers of deforestation and forest degradation across the high forest zone. Initial thinking and testing of the potential REDD+ cocoa play underscored the need to address cocoa farming as a major driver of forest degradation, but it raised a number of technical and methodological challenges to developing such a project. As an alternative, NCRC highlighted the opportunity presented by a climate-smart agriculture (CSA) approach and linking this to REDD+.

In 2011, key private sector, public sector and civil society stakeholders came together as a technical working group to explore the potential for climate-smart cocoa (CSC). Cocoa is one of Ghana's major agricultural commodities, but as a leading cause of forest degradation, and ultimately deforestation, it was felt that there was a need to define strategies to reduce the expansion of illegal cocoa farms (as well as food crop farms) into forest reserves, while also maintaining forest patches and increasing tree cover in existing cocoa farms across the landscape. The working group—which was made up of government institutions, major private sector entities (including cocoa buying companies, banks, and insurance agencies) and civil society organizations—began to think critically

.....
2011

key private sector, public sector and civil society stakeholders came together as a technical working group to explore the potential for climate-smart cocoa (CSC)

.....





about the state of cocoa farming in the country, threats to the long term sustainability of the sector, and what a more sustainable future scenario would look like. The key output was a consensus report entitled: “The Case and Pathway toward a Climate-Smart Cocoa Future for Ghana”. This document ultimately triggered a change in thinking about cocoa’s future and its relationship with forests, informing the development of Ghana’s REDD+ strategy, the climate-smart cocoa standard, and the Cocoa Board’s cocoa sector development strategy.

Since then, Ghana has gone on to design the world’s first commodity focused emissions reduction program for the cocoa forest landscape—the Ghana Cocoa Forests REDD+ Programme¹ (GCFRP)—in collaboration with the World Bank’s Forest Carbon Partnership Facility (FCPF) and Carbon Fund. This program is now being implemented in various locations across the cocoa growing zone with strong private sector support. Ghana Cocoa Board also drafted a Climate Smart Cocoa Production Standard in an effort to provide government guidance. Throughout this multi-year process, a number of fundamental questions have repeatedly come up, including:

- What is climate-smart cocoa?
- What are the on-farm activities that fall under climate-smart cocoa?
- What are the landscape activities that need to be implemented as part of climate-smart cocoa?

This document is a summary of the thinking and logic which underpins the concept of CSC, and a clear response to these fundamental questions about CSC and the activities that should be undertaken in a climate-smart cocoa production landscape.



¹ Government of Ghana, 2017

Why Climate-Smart Cocoa Approach is Needed?

In 2011, the CSC technical working group report concluded that the sector was on an unsustainable path due to the following factors²:



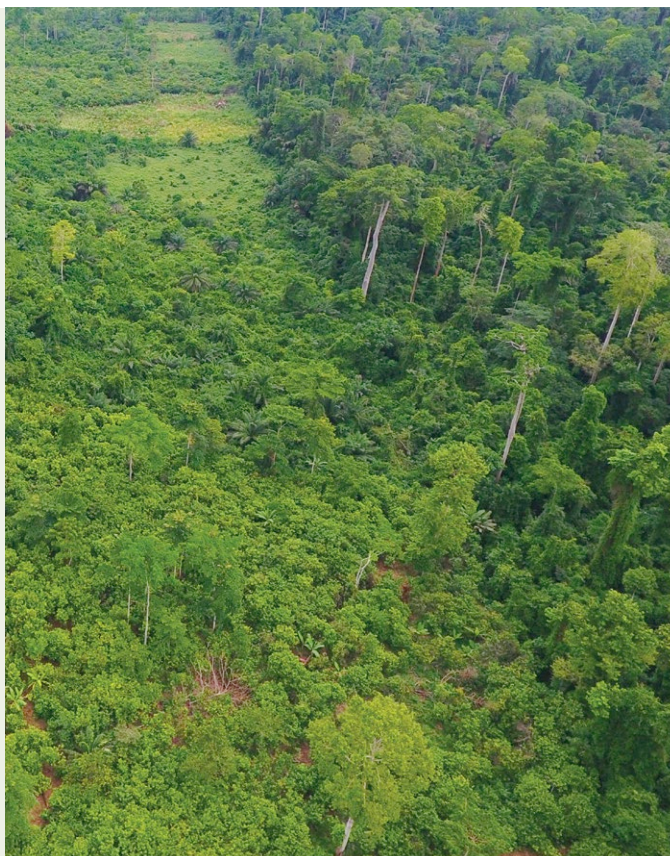
Impending threats from climate change, namely changes in temperature and rainfall patterns;



The singular focus on intensification without thought to how yield increases could promote further expansion and deforestation;



Complete lack of land use planning in cocoa production landscapes.



Climate-smart cocoa would improve climate resilience in the cocoa systems as mulching and shade trees can contribute to better litter decomposition rates.

In an effort to change the “business as usual” scenario and to put the sector on the path to a more sustainable future, the working group recommended the adoption of a climate-smart cocoa (CSC) approach. The model for climate-smart practices, which the group helped to define, reflects a sustainable intensification strategy that combines increased shade cover (30-50%) with the adoption of “best agricultural practices” that lead to significant yield increases. The on-farm CSC model is then couched within a set of landscape governance and planning activities to reduce expansion into forested areas.

Under a CSC production scenario, climate-smart practices would result in higher productivity per unit area as more farmers would gain access to trainings, improved cocoa planting material, and farm inputs like fertilizer. Climate-smart cocoa would improve climate resilience in the cocoa systems as mulching and shade trees can contribute to better litter decomposition rates, reduced farm temperatures and transpiration rates, and better soil moisture retention, which all contribute to drought resistance. The climate-smart scenario would also reduce the degradation and deforestation pressure

² NCRC et al., 2011



on forest reserves, and on forest patches and trees in the off-reserve landscape, leading to the conservation and enhancement of carbon stocks in the landscape. However, keen adoption of landscape governance and enforcement of land-use plans needs to be a core element of climate-smart cocoa activities to prevent situations where increasing productivity will increase deforestation or degradation. The main risk stems from farmers investing income from yield increases into new farms in forested areas or cutting down high carbon stock shade trees as part of cocoa rehabilitation/replanting efforts in over-aged farms. Finally, if farmers and farming communities adopt these farm level and landscape scale practices, then they should qualify for a range of benefits outlined in the GCFRP program, as well as other benefits that company projects might offer.





Historical Context of Cocoa Farming in Ghana Leading to Current Situation

1800s

The challenge with the expansion of cocoa into forests is that it is not a new trend but reflects a long history of cocoa migrations and expansion across Ghana's high forest zone. As far back as **1872**, Tetteh Quarshie is credited with bringing cocoa to the Gold Coast from Fernando Po (now Sao Tome), and cultivating it in the Akwapim Mountains of today's Eastern Region³. By **1910**, cocoa had been so vigorously adopted into the farming and trade systems of the area that for a time Ghana was the world's largest exporter of cocoa beans⁴. The resulting land shortages in Akwapim prompted the spread of cocoa across the Densu River, further into the Eastern Region, and then a devastating outbreak of cocoa swollen shoot virus disease in the **1930s** and **1940s** pushed it farther to the west.

1940s

By the late **1940s**, cocoa cultivation continued westward, following the moist semi-deciduous forest belt into the Ashanti and Brong-Ahafo area of the country. Over this period, outputs in today's Eastern Region fell by 60%, but the country's total production remained relatively stable for the next twenty-five years as losses were offset by gains from expansion and new plantings in the forests of Ashanti and Brong-Ahafo⁵.

1960s

Eventually cocoa became the dominant cash crop of the forest, propelling the construction and extension of roads and railways that were used to bring beans to the port⁶, but also benefitted an emerging timber industry. Many cocoa farmers followed the logging roads that were opening up in the western parts of Brong-Ahafo and other prominent timber areas, and by the early **1960s** cocoa cultivation crossed down into the moist evergreen forests of the Western and Central regions.

³ Cocoa Board 2000

⁴ Hill 1963, Berry 1992

⁵ Berry 1992

⁶ Hill 1963, Berry 1992



1970s

By migrating, cocoa farmers were adapting to a series of environmental, economic, and social changes and disturbances. Localized land shortages, cocoa diseases, market fluctuations, and the increasing number of cocoa producers created an environment that drove farmers to travel to more and more remote forest areas to cultivate cocoa.

During the **1964/1965** growing season production hit a high of 580,000 tons, but then began a twenty-year decline due in part to a low producer price, lack of technical assistance or inputs, aging trees, the absence of a sector development plan, and a production boom in neighboring Côte d'Ivoire that drew labor away from Ghana⁷. By **1976** and **1977** production had fallen to 324,000 tons, and Côte d'Ivoire took over as number one global producer. World Bank reports written during this period suggest that by **1975** cocoa cultivation covered between 1.2-1.8 million ha., and nearly a quarter of Ghana's total population or 2.5 million people were directly involved in cocoa farming. Therefore, it is not surprising that when market conditions improved, farmers responded with a new phase of expansion that spread deeper into Ahafo, Western and Central regions, including the wet evergreen forest zone of Western Region⁸.

Up to this time, expansion into previously uncultivated forest areas was the main way for farmers to adapt to local land shortages, outbreaks of diseases, and changes in cocoa market dynamics. By moving from one forest area to another, farmers were able to tap the "forest rent"⁹ and benefit from the rich forest soils and low labor and maintenance costs. According to Polly Hill, a renowned cocoa socio-economist, "expanding was the process of securing the future"¹⁰. For the migrant farmer, cocoa farms functioned as savings banks or investment mechanisms whereby farmers took the earnings from one farm and put them into obtaining land for a new farm.

1980s

In **1983**, after a severe El Nino that resulted in very poor rainfall, devastating bush fires swept through the country's forest belt, destroying thousands of hectares of cocoa. The sector also suffered under the government's adoption of a structural adjustment program that devalued Ghana's currency and eliminated subsidies on fertilizers and pesticides to farmers, despite raising the farm gate price¹¹. During this period, production fell to a meager 158,000 tons placing Ghana in 12th position internationally. But then production began to increase again following the distribution of new cocoa varieties that were more productive and disease resistant, and the improved cocoa price. The new wave of expansion emerged in the west of the country where issues of disease and soil fertility were not as problematic and from the **mid-'80s** to the early **2000s** national production increased at a rate of 4 per cent per year¹².

In the early days, cocoa was grown by removing the forest understory, thinning the forest canopy, and planting the cocoa seedlings as a new understory cohort; thus, establishing a multi-strata cocoa-agroforest. Many old cocoa farmers attest to conditions having been easier during the time of their parents and grandparents. Whether this is true or not is hard to determine, but certainly cocoa beans

7 World Bank 1975

8 Amanor 1996

9 Ruf and Schroth 2004

10 Hill 1963: p. 180

11 Edwin and Masters 2005

12 Abenyega and Gockowski 2003

2000s

germinated very well in the fertile forest soils and seedlings sprouted and grew with little competition as weeds were not as prevalent in the forest understory.

Ruf (2011) refers to this type of system as a “complex cocoa agroforest”, and notes that it saw a massive expansion in Ghana in the **1940s**, which endured well into the 1980s. This system was distinguished by the large number of forest tree species, of considerable height and girth that made up the multi-strata canopy. In the early years, there was no need for fertilizer given the fertility of the moist-semi deciduous forest soils, and outbreaks of pests and diseases were dealt with through migrations. Forest trees can grow to a considerable height and girth, and to fell such trees during the land preparation process would have been a formidable task. Complex cocoa agroforests prevailed because there was no available technology to facilitate the easy removal of large forest trees. In terms of farm management, weeding was not necessary and it is unlikely that pruning was part of the common practice.

2010s

In response to the availability of new technologies and extension messages, farmers’ practices changed considerably in the late **1990s** and into the **2000s**. Cocoa expansion patterns also switched to target forest reserves as the last “forest frontier” in the country. Complex cocoa agroforests began to be replaced by low shade cocoa farms as farmers gained access to high yielding hybrid varieties which were tolerant of higher levels of sunlight¹³. At the same time, the increasing prevalence of chainsaws, linked to a growing timber industry, facilitated an efficient removal of “excessive” shade¹⁴. Farmers’ who adopted hybrid trees and lower shade levels likely did so in response to strong extension campaigns, which also promoted the use of fertilizers and pesticides that significantly increased yields and national production, which hit an all-time high of approximately one million tons in **2011**. For some farmers, forestry laws that allowed timber companies to log in cocoa farms also influenced farmers to intentionally remove timber species in their cocoa farms so as to avoid damage. As a result of these combined factors, Freud¹⁵ estimate that in the **mid-1990s** 50% of productive farms in Ghana and Cote d’Ivoire had low shade levels and 10-35% of farms had no-shade monocultures resulting in the current situation in the sector.



© Nature Conservation Research Centre

¹³ Ruf and Schroth 2004

¹⁴ Ruf and Konan 2001

¹⁵ Freud et al 1996



Climate-Smart Cocoa

What is Climate-Smart Agriculture?

According to the FAO¹⁶, climate-smart agriculture refers to agriculture that sustainably increases productivity, resilience, reduces or removes GHG emissions, and enhances the achievement of national food security and development goals. The concept gained prominence in 2010 during international climate change negotiations. However, many countries and influential stakeholders felt that agriculture was not adequately captured in the evolving REDD+ space, and thus the issue was formally raised at an international meeting in The Hague in the same year.

CSA offers the opportunity to deliver a sustainable agricultural commodity that provides direct gains on food security (including productivity and diversification) and climate resilience (adaptation) and mitigation¹⁷. Despite the fact that there is no decision or work program dedicated to agriculture under the UN Framework Convention on Climate Change (UNFCCC), the Cancun Agreement (2010) calls for consideration of drivers of deforestation and enhanced adaptation action. Agriculture is relevant under both agenda items. Accounting for about 13.5% of global greenhouse gas (GHG) emissions, the sector also holds significant emission reduction potential (IPCC 2007); making climate-smart agriculture a relevant mitigation and adaptation strategy.

16 FAO 2013b
17 FAO 2010

What is CSA?





The main pillars of a climate-smart agriculture approach include:

Increase in productivity, yield, income

Adaptation

Mitigation

Food security

Economic development



© Nature Conservation Research Centre

Yet efforts that simply check the boxes on these five pillars do not necessarily result in CSA. CSA initiatives need to be linked by a networked approach that provides access to financial, technical, and social resources at scale. A CSA approach should also contain a risk reduction strategy as the current climate risk is fully carried by the farmers and could increase due to changing climate conditions. CSA practices (farm-scale) should be nested within a broader landscape approach in order to deliver impacts at scale, and CSA needs to result in a set of primary impacts that also offer multiple benefits. Depending on the crop or production system, the primary goals as compared to the benefits may play out differently.

CSA initiatives need to be linked by a networked approach that provides access to financial, technical, and social resources at scale.

Outlining Climate-Smart Cocoa in Ghana

As a smallholder crop and a commodity of national and international importance, there is both a demand for a climate-smart approach to cocoa cultivation and a tremendous opportunity to increase the sustainability of the cocoa production landscape. The demand emanates from the very real need for mitigation actions, and the urgency to adapt the cocoa farming system to increase its resilience in the face of climate change. Across Ghana's high forest zone, cocoa continues to be a major driver of deforestation and degradation, and the farming system continues its evident shift away from complex cocoa agroforests to low or no shade systems that will be more susceptible to reductions in rainfall (particularly during the dry season) and increases in temperature, both of which present threats to cocoa¹⁸. At the same time, chocolate companies also recognize a growing consumer demand for climate-smart production systems and products.

¹⁸ Anim-Kwapong and Frimpong 2008

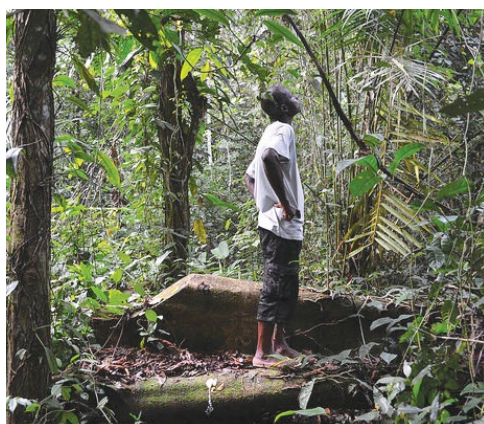
For multiple reasons, responding to this demand needs to be a priority for the country and the cocoa industry; however, it also represents the perfect opportunity to leverage all of the existing projects, to introduce new and innovative measures, and to coordinate actions and monitoring at multiple scales. In doing so, Ghana would effectively create a new type of commodity—a climate-smart cocoa bean grown in a climate-smart landscape that generates yield increases, market premiums, climate benefits, and myriad co-benefits for the producer.

The Cocoa Board already aims to make Ghana, “the number one best quality producer of cocoa in the world”. This strategy, according to the government, necessitates cocoa becoming a sustainable product that takes good care of the environment, gives the farmer the best income for what he or she produces, while also satisfying the requirements of the international market¹⁹. For a sector which has predominantly relied upon an expansionist production strategy and has significantly contributed to the degradation and deforestation of the high forest zone over the past 100 years, this statement represents a major shift in environmental thinking.

National production has increased dramatically over the past decade, but these gains are not equaled by substantial yield increases on-farm. Rather, they have been attributed to modest yield increases in some cocoa producing areas, and to a continuation of expansive production strategies that result in expansive practices and outright encroachment into forest reserves. Thus, there is still considerable scope to increase yields. However, making the shift to a sustainable, climate-smart producing landscape will require significant changes, including extensive coordination and collaboration between the private sector, communities and land owners, and government agencies, many of which have traditionally not collaborated, like the Cocoa Board and the Forestry Commission. The sector will have to shift from its expansive business-as-usual (BAU) scenario in which production gains continue to come at the expense of forests and trees in the landscape, to a desired state in which the majority of farmers have access to resources (agronomic, technical, financial) which foster yield increases, while landscape governance and planning, and adoption of climate-smart practices reduce pressure on forests, offer opportunities for diversification, and lead to more trees on farm.



National production has increased dramatically over the past decade, but these gains are not equaled by substantial yield increases on-farm.



© Nature Conservation Research Centre

¹⁹ Cocoa Board, 2019



The cocoa sector in Ghana is facing challenges associated with yield, sustainable economic development, deforestation, and adaptation to global warming—all core elements of climate-smart agriculture. The only element of a CSA approach that is not typically highlighted is the issue of food security. Yet, food crop production is a crucial component in all cocoa production systems in Ghana. For example, all farmers inter-crop their new cocoa plantings with food crops to generate income, produce food for the home, and grow initial shade for the young cocoa trees. In some areas, migrant farmers who do not have easy access to land use cocoa sharecropping as the only opportunities to grow food crops. In other areas, however, the land has been so extensively converted to cocoa that there is no land left for food crop production and shortages persist.

In Ghana, for CSC to work it cannot focus at the individual farm scale, as is currently the case with certification and other extension efforts. Instead, it becomes the capstone to a bundle of coordinated but diverse actions that can be monitored at a landscape level and collectively result in the production of climate-smart cocoa beans by virtue of being produced from a climate-smart landscape. Given the nature of Ghana's cocoa production system, the challenges facing the sector and the identified pillars of CSA, the main elements of a CSC approach will not be equal.

The CSC approach in Ghana needs to be founded upon:



Mitigation supported by a strong forest monitoring system, including a forest reference level, MRV, and data management system;



Increases in yield founded upon effective extension systems, access to inputs, targeting of appropriate soils, and farmer risk reduction packages which are accessible to the majority of farmers;



Social and economic development that centers on landscape governance, land-use planning and monitoring.

The by-products or benefits that will derive from these foundational activities will include adaptation and food security are described in figure 1.

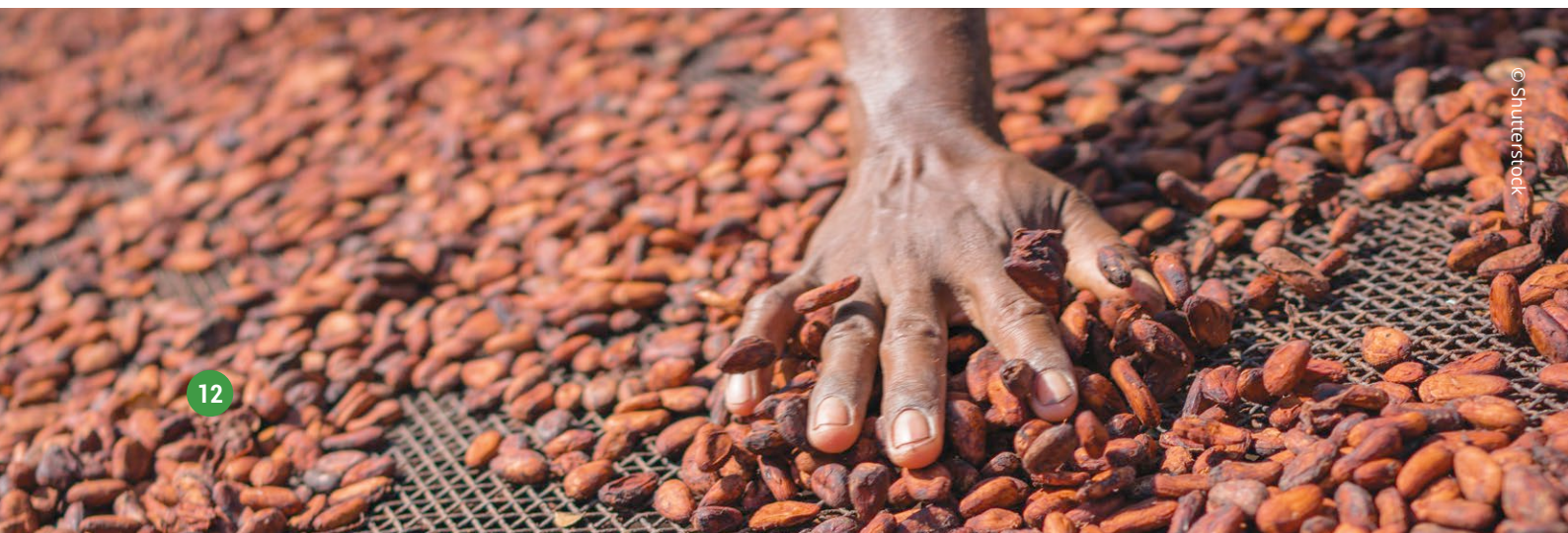
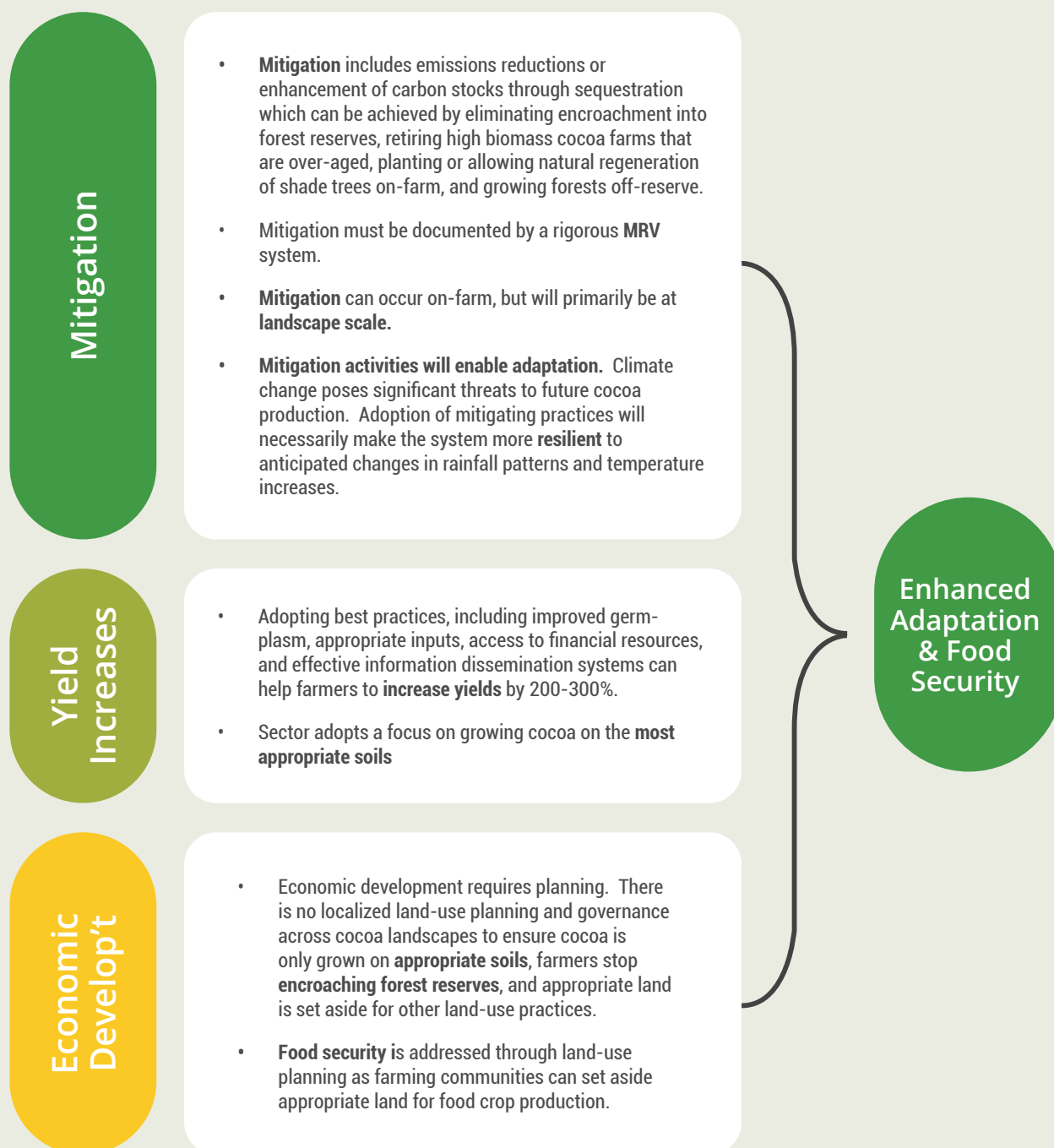


Figure 1: Description of the Main Elements of a Climate-Smart Cocoa Approach





Why Current Cocoa Sectors Efforts Are Not Climate-Smart

Many elements of existing cocoa projects contain pieces of a climate-smart approach, but cocoa production in Ghana is still far removed from being climate-smart for the following reasons:



The goal to increase production through best practices and sustainable sourcing is problematic as the term 'sustainability' is loosely defined, and often reflects corporate social responsibility rather than a desire to secure the sustainability of supply in the face of climate change.



A landscape approach is not a core activity. While many of the elements of a climate-smart approach are present, these activities are neither tied to a landscape approach, nor meaningfully linked to other efforts. Projects have remained inwardly focused on project goals and achievements without engaging other relevant stakeholders.



Limited access to extension, training services, and to inputs. While many initiatives are investing in farms and farmers, these efforts are yet to reach a scale where the majority of cocoa farmers in a landscape benefit.



Absence of sector wide monitoring, data management or forest MRV. Without landscape monitoring and sharing of results on production, adoption of best farming practices, improved livelihoods, deforestation and degradation rates, and estimated carbon emissions claims about CSC impacts cannot be substantiated.



Minimal effort to reduce expansion and understand its links to yield increases. Analysis has shown that since the start of the High-Tech/CODAPEC program, rates of deforestation and degradation have increased in key production landscapes like the Western Region

Even cocoa certification, which is arguably the most coordinated and environmentally rigorous initiative cannot be considered climate-smart as articulated. Since consumers started to drive the commodity production agenda, industry stakeholders in Ghana (and across West Africa) showed a growing interest in certification and the widespread adoption of social and environmental standards. In some instances, it has been implied that certification can foster mitigation, but these assumptions are flawed. Even though farm certification has expanded in Ghana since 2009, there has been an even greater upward trend in deforestation during the same time period. This is because the goals of existing certification schemes have the wrong temporal and geographical scales for CSC and are not focused on addressing deforestation or climate change issues. For example, cocoa certification is focused at the farm scale, not the landscape scale. Consequently, it cannot address performance beyond farm boundaries, carbon benefits are unsubstantiated, losses from deforestation are not monitored, and illegally produced cocoa beans cannot be traced.

Despite these challenges, certification can serve as an important investment, training, and extension system under a climate-smart approach to help foster increases in yields and income, as well as offer additional benefits to farmers. However, any certification effort will need to be couched within a set of landscape-based activities like forest monitoring (MRV), data management, and landscape governance and planning to be able to bring the required mitigation and accountability.



Even though farm certification has expanded in Ghana since 2009, there has been an even greater upward trend in deforestation during the same time period.



Defining the Climate-Smart Cocoa Approach

For cocoa production in Ghana to become climate-smart, there are three key steps which need to take place:

1. Increase average yields substantially,
2. Implement landscape-level natural resource governance and planning,
3. Install monitoring, reporting and verification systems for social, environmental, and economic outcomes.

First, farmers need to substantially increase their yield. Yield increases will be the primary benefit to producers and will serve as the foundation of the climate-smart approach. For this to happen, farmers will need to adopt the core climate-smart cocoa management practices (as outlined in table below). Some of these practices purely focus on increasing yields, while others have a dual effect of increasing yield and producing modest climate benefits. Ironically, many of these practices have been recommended and available (even if only in a limited extent) to producers for over 30 years and yet adoption has been low. The factors limiting adoption are three-fold:

- limited scale or absence of extension and training opportunities;
- cost and risk associated with the adoption of the recommended practices, many of which are capital and labor intensive with no guarantee that yields will increase, especially in the face of poor rainfall years; and
- pervasive in-access to critical economic, financial, and agronomic resources.

Therefore, to enable widespread adoption, recommended climate-smart farm management practices need to be backed up by access to information and trainings, access to credit facilities so they can afford inputs, and access to risk reduction packages so that if producers make the investment into their farms and their yields fail to increase (perhaps due to poor rainfall) then they are guaranteed a minimal return or are covered on their loans. Access to these resources would be conditional upon monitored adoption of practices. These key resources would include the following:

- Fertilizer
- Mulching and/or composting
- Agro-chemicals and/or IPM training and technical advisory service
- Access to improved germplasm and grafting technologies
- Access to appropriate shade tree seedlings or technical advisory service on natural regeneration and enrichment planting
- Access to risk management services including credit facilities, crop insurance and pensions.

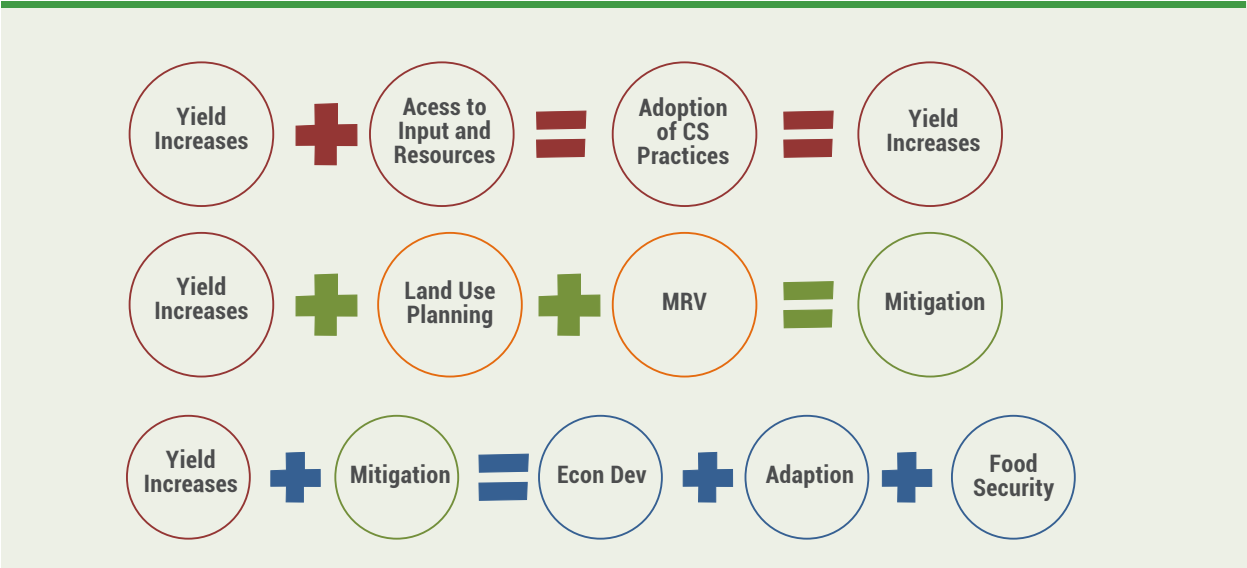
With the exception of cocoa insurance, most pieces of this equation are already in the system, but only at a limited scale and in isolation. The gap is in the scale. Cocoa Board can provide an oversight, monitoring, and coordinating role, but a vast increase in investment by the private sector is necessary to build a dynamic, integrated, widespread extension system that offers the majority of farms and farming families access to extension services, trainings, and farming resources, and in doing so produces measurable impacts. The cocoa sector will also need to build direct relationships with many “adjacent” institutions, like the Forestry Commission, District Assemblies, Traditional Authorities, and community-based organizations.

The above mentioned actions reflect much of what is already happening in Ghana’s cocoa sector, and yet the country is not close to producing climate-smart cocoa given that deforestation and degradation continue unabated. This is because price and yield increases do not reduce expansion and extensive practices.

A climate-smart cocoa program in Ghana is different from the business as usual scenario because it significantly limits landscape level CO₂ emissions that derive from cocoa expansion, encroachment into reserves and protected areas, and reductions in shade levels. Therefore, a second step is land use planning with Traditional Authority (TA) and District Assembly (DA) support. As part of this, communities and TA would make collective agreements to reduce emissions in the landscape. Where encroachment is problematic, for example, communities can negotiate and set agendas to exit the forest reserve and in return qualify for results-based benefits. Therefore, a monitoring, reporting and verification (MRV) system is critical—the third essential step.

Simplified, the formula for climate-smart cocoa is outlined in the figure below, and is followed by the extended table, which describes the bundle of practices and measures, which together would constitute the production of climate-smart cocoa.

Figure 2: Formula for Climate-Smart Cocoa





Climate Smart Cocoa: Explaining the Context, Concept and Defining Key Activities

Key Elements of Climate-Smart Cocoa Approach

Farm and Landscape Activities	Alignment with Cocoa Forest Initiative (CFI)	Contribution to Mitigation	Contribution to Resilience / Adaptation	Contribution to Landscape Planning & Management	Contribution to Productivity and Income Increases
Document and Monitor Land Use Change—monitor deforestation and degradation at landscape level	Forest Protection and Restoration	Critical to have baseline to inform actions and against which to show change in deforestation and/or degradation rates	Informs understanding of landscapes resilience / adaptation capacity	Informs landscape management, including zoning, byelaws, enforcement and benefit sharing.	n/a
Build Landscape Governance Institutions	Community Engagement and Social Inclusion	Responsible for reducing farmers expansion into forest reserves and national parks	Governance supports activities and practices that can enhance resilience and adaptation.	Governance bodies responsible to implement, monitor and enforce by-laws and management plans	Can help coordinate dissemination of CSC to expand scale and adoption.
Farm Preparation Methods—keep mature shade trees, no burning/mild burning, and no weedicide	Sustainable Cocoa Production	Avoid unnecessary loss of mature trees and conserve on-farm biomass	Recommended farm prep. practices maintain soil structure, moisture and fertility to enhance resilience and adaptation.	Landscape by-laws can speak to farm preparation	Maintains ecological services and fertility to benefit production
Shade Tree and Canopy Cover Management—at least 18 mature trees/ha & 30% canopy cover	Sustainable Cocoa Production	Avoid cutting down shade trees and/or plant trees on-farm or manage natural regeneration	Shade trees regulate farm temperature, light and humidity. Critical for resilience and adaptation.	Landscape by-laws should address recommended shade management	Shade tree products can diversify farm incomes (e.g botanicals or timber)
Improved Germplasm (hybrids) or Grafted Cocoa	Sustainable Cocoa Production	n/a	Hybrids and grafted seedlings give disease resilience, and/or adaptation to increased temperature and drought	n/a	Improve cocoa yields
Planting Methods—cocoa seedlings @ 3 meter spacing with initial shade from food crops or trees	Sustainable Cocoa Production	Planting shade trees or managing natural regeneration sequesters carbon.	Recommended planting distance with shade can enhance resilience of young cocoa farms	n/a	Improve yields with correct cocoa tree spacing Diversify farm incomes by planting other crops or tree products
Weeding and Pruning—Manual weeding, no use of weedicide and prune cocoa tree branches	Sustainable Cocoa Production	n/a	Weeding and pruning enhance the health of cocoa trees, making them more resilient. Chemical weedicides damage the ecosystem.	Landscape by-laws can support adoption of CSC practices, and ban the use of chemical weedicides.	Improves yield and income Chemical weedicides reduce production of other products (mushrooms, snails, etc) from the farm

Fertilizer and Soil Management—application of organic or inorganic fertilizer	Sustainable Cocoa Production	Inorganic fertilizers contribute to carbon emissions.	Fertilizer use improves the cocoa farm's resilience and adaptative capacity	Landscape governance bodies support adoption of CSC practices	Improves yield and income
Disease and Pest Control—application of recommended chemicals or IPM	Sustainable Cocoa Production	n/a	Pest and disease control enhance the health of cocoa trees, making them more resilient.	Landscape governance bodies support adoption of CSC practices	Improves yield and income
Harvesting, Fermenting, Drying—recommended best practices	Sustainable Cocoa Production	n/a	n/a	Landscape governance bodies support adoption of CSC best practices	Maintains income
Selling beans	Sustainable Cocoa Production	n/a	n/a	Oversight to ensure fairness in bean weighing and purchasing.	Improves/ increases income through fair weighing of cocoa beans. Provide price differential to farmers from sustainable cocoa landscape
Diversify farm with compatible food crops & forest products	Livelihoods	Maintain shade trees for economic purposes—botanicals or timber	Enhanced economic resilience from diversification	Landscape management plan or by-laws can support diversification	Increases farmer incomes, income sources, and spreads timing of payments
Halt expansion into reserved lands	Forest Protection and Restoration	Avoid deforestation and degradation from farm expansion into forested areas.	Maintain forests in the landscape for ecological benefits	Landscape zoning of conservation areas and by-laws to prohibit expansion. Negotiate exit of illegal farms located inside reserved lands thru grandfathering agreements. Formalization of chainsaw operations in landscape.	For farmers with farms on-reserve, offer land for a new farm outside the forest and cocoa planting packages.
Monitor extension and input package dissemination—monitor access and adoption of input packages, trainings, and financial resources	Sustainable Cocoa Production	n/a	n/a	Link farmers' access to CSC packages to compliance with by-laws and landscape management plans	Monitor yield and income to track impacts
Monitor farmers' adoption of CSC practices	Sustainable Cocoa Production	Monitor on-farm mitigation impacts like number of shade trees or canopy cover	Monitor climate trends	Monitor adoption of practices	Monitor yield and income to track impacts
Certify landscape	Forest Protection and Restoration	Document and verify mitigation impacts	Document and verify farmer well-being trends and impacts	Document functional governance bodies, passage of by-laws and implementation of management plans	Verify CSC claims against landscape standard / CSC standard towards differential bean prices or premiums



Conclusions

Ghana's cocoa sector has experienced decades of interventions and projects aimed at improving production through the integration of trainings, access to improved planting material, use of agro-chemical inputs, implementation of credit schemes, and more recently introduction of socially and environmentally sustainable practices. In many instances, the results have been disappointing due to an outright lack of farmer interest or limited adoption because of extension and input bottlenecks. Where projects have been more successful, they are often limited to only a small proportion of cocoa producers, and today the biggest extension challenge is how to get to scale.



Since

2000

national production has increased substantially and farm yields have seen modest improvement, but intensification goals have primarily been off-set by the continuation of extensive practices.

From a productivity standpoint, the sector has gone through periods of boom and bust as a result of economic and environmental events like changes in market conditions and the incidence of droughts and fire. Since 2000 national production has increased substantially and farm yields have seen modest improvement, but intensification goals have primarily been off-set by the continuation of extensive practices. In fact, throughout cocoa's history in Ghana, what has remained consistent is the loss of forests and tree-cover across the cocoa production landscape.

This document set out to define CSC and practices and measures. While many of these practices overlap with existing recommended practices, on-going efforts largely exist in isolation, without a clear focus on the climate (how climate change poses a threat to cocoa farming, as well as the emissions that come from cocoa production) or how to link recommended practices to yield increases, farm to landscape-level monitoring with verification, and implementation of landscape governance and management planning.

This document argues that by expanding the existing extension network and increasing access to critical farm resources, farmers will have the capacity to adopt the recommended climate-smart practices and increase their yields—one of the underlying pillars of the concept. If yield increases are combined with serious land-use planning and the implementation of a multi-scale MRV/data management system, then mitigation through the adoption of CSC practices can be achieved. When the resulting yield increases and mitigation impacts are taken at a sector level it will also be possible to highlight economic, adaptation and food security benefits, and ultimately the production of a climate-smart cocoa bean.



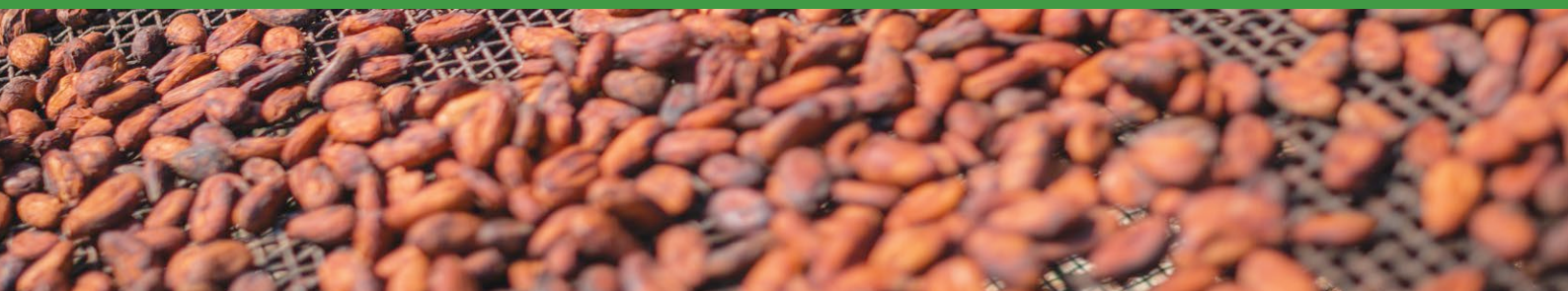
© Nature Conservation Research Centre

References

- Abenyega, O. and J. Gockowski. 2003. Labor practices in the cocoa sector of Ghana with a special focus on the role of children. STCP/ IITA Monograph, International Institute of Tropical Agriculture, Ibadan.
- Amanor, K.S. 1996. Managing trees in the farming system: The perspective of farmers. ed. Ghana Forestry Department, Forest Farming Series. Kumasi, Ghana: Forestry Department Planning Branch.
- Anim-Kwapong, G.J. and E.B. Frimpong, 2008. Climate Change on Cocoa Production. In Ghana Climate Change Impacts, Vulnerability and Adaptation Assessments, Environmental Protection Agency, pp.263-314.
- Asare, R.A. 2010. Cocoa Establishment and Shade Management in Ghana's Ashanti Region: Understanding the Main Factors Driving Farmers' Decision Processes and Practices. Doctoral Dissertation, Yale University Graduate School. May 2010.
- Asare, R. and S. David. 2011. Good agricultural practices for sustainable cocoa production: a guide for farmer trainers. Manual no. 1: Planting, replanting and tree diversification in cocoa systems. Sustainable Tree Crops Programme, International Institute of Tropical Agriculture: Accra, Ghana. July 2011 version.
- Benhin, J.K.A. and E. B. Barbier. 2004. Structural Adjustment Programme, Deforestation and Biodiversity Loss in Ghana. *Environment and Resource Economics* 27:337-366.
- Berry, S. 1992. Hegemony on a Shoestring: Indirect Rule and Access to Resources in Africa. *Africa* (62)3:327-355.
- Cocoa Board. 2000. Ghana Cocoa Board Handbook. 8th edn. Accra: Ghana Cocoa Board.
- Cocoa Board. 2013. About Us. Ghana Cocoa Board 2013. [cited September 6, 2013. Available from <http://www.cocobod.gh/about.php>]
- Cocoa Working Group. 2011. The Case and Pathway toward a Climate-Smart Cocoa Future for Ghana. Unpublished Technical Report. Nature Conservation Research Centre (NCRC) and Forest Trends. Accra, Ghana.
- Edwin, J. and W.A. Masters. 2005. Genetic Improvement and Cocoa Yields in Ghana. *Experimental Agriculture* 41:491-503.
- FAO. 2010. Climate-smart agriculture- policies, practices and financing for food security, adaptation, and mitigation. Rome, Italy. Retrieved from <http://www.climatesmartagriculture.org/72611/en/>
- FAO. 2013b. Climate-Smart Agriculture Sourcebook. Rome, Italy. Available at: <http://www.fao.org/docrep/018/i3325e/i3325e.pdf>
- Fairtrade Labeling Organization International (FLO). 2011. Fairtrade Standard for Cocoa for Small Producer Organizations. Current version 01.05.2011_v1.1.
- Government of Ghana, 2017. Ghana Cocoa Forest REDD+ Programme. National REDD+ Secretariat, Ghana Forestry Commission and Forest Carbon Partnership Facility, World Bank.
- Hanak-Freud, E., P. Petithuguenin, and R. Jacques. 1996. Innovation in West African smallholder cocoa : some conventional and nonconventional measures of success. Nogent-sur-Marne : CIRAD-URPA, 19 p. (Documents de travail en économie des filières, 26) International Symposium on Food Security and Innovations, Stuttgart, Allemagne, 11 March 1996/13 March 1996.
- Hill, P. 1963. The Migrant Cocoa-Farmers of Southern Ghana: A Study in Rural Capitalism. ed. M. Last, *Classics in African Anthropology*. Oxford: James Curry Publishers.
- IPCC AR4. 2007. Climate Change 2007: Synthesis Report. IPCC, ISBN 92-9169-122-4.
- NCRC et al., 2011. The case and pathway towards a climate-smart cocoa future for Ghana. Climate-Smart Cocoa Working Group, Accra.
- Ruf, F. O. 2011. The Myth of Complex Cocoa Agroforests: The Case of Ghana. *Human Ecology*. 39:373-388.
- Ruf, F. and A. Konan. 2001. Les difficultés de la replantation. Quel avenir pour le cacao en Côte d'Ivoire. *Oleagineux Corps Gras Lipides*. 8:6.
- Ruf, F. and G. Schroth. 2004. Chocolate forests and monocultures: A historical review of cocoa growing and its conflicting role in tropical deforestation and forest conservation. In *Agroforestry and biodiversity conservation in tropical landscapes*. ed. G. Schroth, G. A. B. da Fonseca, C. A. Harvey, C. Gascon, H. L. Vasconcelos and A.-M. N. Izac. Washington: Island Press.
- UTZ CERTIFIED. 2009. UTZ Certified Good Inside Code of Conduct. For Cocoa. Version 1.0-April 2009.
- World Bank. 1975. Appraisal of Ashanti Region Cocoa Project Ghana. Report No. 827a-GH. West Africa Regional Office.







Nature Conservation Research Centre (NCRC)

T: +233(0) 302264634

E: info@natureconservationresearchcentre.org

PO Box KN925, Kaneshie-Accra-Ghana

www.natureconservationresearchcentre.org