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1.0 BACKGROUND

1.1 Introduction
Cocoa production is a major economic activity and land use in Ghana and other parts of West Africa. The industry employs about 70% of the labor force in rural areas and is the source of income and livelihood for about 25% of the population, contributing about 7.5% to the Gross Domestic Product (GDP). However, cocoa production systems constitute a significant threat to Ghana’s biodiversity. Forest conversion for agriculture, particularly for cocoa farms is one of the dominant factors contributing to deforestation in Ghana, which is currently progressing at a rate of about 3% per year. At this rate most remaining forest outside of protected areas will be lost within the next one or two decades.

Notwithstanding recent increases in cocoa output, the cocoa industry in Ghana still faces a lot of challenges, which have serious consequences for its socio-economic and environmental status. Farmers lacking training in appropriate farming techniques and devoid of the necessary farm inputs may experience significant declines in farm productivity and profitability within 15 to 20 years of establishing a cocoa farm. They then respond to these declines by abandoning their farms in search for new forest lands resulting in the migration of cocoa farmers to the Western region of Ghana in the late ‘70s. Under such circumstances, the future of Ghana’s cocoa industry and of biodiversity conservation is at risk by the loss of the remaining patches of natural forest. Farmers, in their quest to increase production have also resorted to practices such as complete elimination of shade from their cocoa farms and use of certain inimical chemical inputs. These cultivation practices not only affect biodiversity but also disrupt ecological functions that have the capacity to maintain the ecological integrity of our living environment.

1.2 Project Background
There is consensus amongst stakeholders within the cocoa sector that it is essential that cocoa farmers apply best known practices in cocoa production to ensure productivity and enhance farmer livelihoods. Firstly, this will yield cocoa of the highest physical quality and quantity. Secondly, the cocoa beans produced in this manner will meet the food safety standards advocated by relevant bodies, thus avoiding problems in the utilization and trade of the beans. Finally, through best practices, sustainable cocoa can be produced that comply with economic, social and environmental requirements.
The overall goal of the project is to mainstream biodiversity conservation into cocoa production landscape around the Bia Conservation Area in Southwest Ghana. Cocoa production is a major economic activity and land use in the Guinean Forests of the West Africa hotspot, one of the world’s 25 biologically richest and most endangered terrestrial regions. Forest ecosystems here harbor more than half of all mammal species found in Africa. Cocoa farms constitute a threat to the region’s globally significant biodiversity but also offer an opportunity to conserve it. The scale of the cocoa production sector and the global importance of the biodiversity in cocoa production landscapes justify the project intervention.

The Government of Ghana has recognized the threats to the cocoa industry and the present focus of the national cocoa policy is to increase production in existing plantations by introducing better agronomic practices and rehabilitating old farms. The commitment is also consistent with Ghana’s National Biodiversity Strategy, which places a strong emphasis on conserving the remaining forest cover. With an average yield of only 250-300 kg/hectare in Ghanaian cocoa farms, there is a sizeable potential for increased per-area yields and reduce the need for cocoa expansion.

This project will address barriers to wide-scale sustainable cocoa production at three levels: the market level, the national level, and the local level. At the market level, it will work with cocoa traders to support farmer’s efforts to adopt sustainable practices and increase their understanding of the relationship between biodiversity conservation and productivity. At the national level, the project will promote certification models that provide incentives for biodiversity-conserving and productive agroforestry farm systems. At the local level, it will collaborate with and support farmers to adopt best practices that enhance the ecological integrity of farms and connect forest fragment in the landscape while at the same time improving farm productivity.
2.0 APPROACH

2.1 The STCP Farmer Field School (FFS) Approach

FFS is a participatory training approach that can be considered both as an extension tool and a form of adult education. A farmer field school consists of a group of farmers (20-30) from the same or nearby villages who meet regularly guided by a trained facilitator during the course of a cropping cycle. The purpose of the school is to experiment with new production options.

FFS focuses on building farmers’ capacity to make well-informed crop management decisions through increased knowledge and understanding of the agro-ecosystem. FFS participants make regular field observations and use their findings, combined with their own knowledge and experience, to judge for themselves, what, if any, action needs to be taken.

FFS follow a set curriculum that is determined by the priority constraints identified during needs assessment. FFS curricula do not promote recommendations; farmers are encouraged to experiment on their own farms and make their own decisions based on their observations and knowledge. FFS therefore encourages farmer experimentation as part of discovery learning.

A basis assumption of the FFS approach is that farmers need knowledge of biological processes and agro-ecosystem analysis to be able to make good management decisions. It is by understanding how, for example a disease is transmitted, that farmers will be motivated to do certain practices to avoid disease transmission.

The FFS curriculum developed by STCP on cocoa integrated crop and pest management covers 8 learning topics:

- Black pod disease
- Mirids
- Farm sanitation and cultural practices
- Soil fertility and fertilizer use
- Making decisions about rehabilitating a cocoa farm
- Cocoa quality
- Child labor sensitization
- HIV/AIDS sensitization

There are 4 main steps in implementing farmer field schools:
1. Needs assessment and community sensitization (called “ground working”)

2. Participant selection

3. FFS implementation

4. Graduation

Farmer field schools are conducted on a farm where all activities are carried out during school sessions for a whole cropping season. The FFS farm is divided into two plots: the integrated crop and pest management (ICPM) plot, where new practices are implemented, and the farmer practice (FP) plot, where the normal management practices of farmers in that location are carried out. A third plot may be set up to experiment with new ideas. Throughout the field school, farmers make comparisons between these ICPM and FP plots.

The main elements of each FFS session are:

Agro-ecosystem analysis data collection: In small groups, FFS participants make observations on the crop and other aspects of the agro-ecosystem including disease and pest infestation, the weather, weeds, the soil. They make a drawing to represent the data they collect and analyze their findings. Each group makes recommendations on what action should be taken on the farm to address production constraints.

AESA presentation: Each group makes a presentation to the whole school on their findings. After group presentations, participants discuss the recommendations made by each group and agree on one or two actions to take. These can include learning about a topic to understand it better, doing fieldwork such as harvesting or removing diseased pods, or carrying out a simple experiment.

Implementation of a “special topic”: The special topic is the topic that participants, sometimes with the help of the facilitator, agree to learn more about. In most cases, the facilitator will lead participants through a discovery learning exercise contained in the FFS curriculum.

2.2 The Certification Capacity Enhancement (CCE) Approach

The aim of the CCE Curriculum is to combine the efforts of standard initiatives, governmental extension services and public and private training programs to facilitate access to certification by providing training materials for certification trainers and cocoa producers. Whether the producer
groups aim at multiple (several standards) or individual (one standard) certification – the same curriculum serves all needs as it covers the requirements of all three sustainability standards.

Beyond the preparation of cocoa farmers for certification, the curriculum also aims at enhancing productivity, quality and economic viability of cocoa production to support a sustainable development of the West African cocoa sector.

The training curriculum consists of three parts:

- Certification manual for training of trainers
- Certification guide for farmers (separate document)
- IMS (Internal Management System) training manual (to be developed)

Although there is quite a lot of training material available to train cocoa farmers no comprehensive material existed so far to prepare African small holder cocoa farmers for certification against the three leading voluntary standards in one location. The common goal to facilitate certification access to meet the rapidly growing demand for sustainable cocoa has also led to a closer collaboration between the standard initiatives by contributing to this manual.

The manual also seeks to help increase the productivity of the West African cocoa sector, as certification alone is not a guarantee for sustainability. Only a productive cocoa farm will attract the younger farmer generation to carry on with cocoa production, which must be developed into a viable business.

The CCE manual is intended for professional cocoa extension agents, field supervisors, project officers and trainers who have a degree or diploma in agriculture (or are able to demonstrate their experience and knowledge) and who are involved in training of other trainers and/or farmers. Within the CCE project, this manual will mainly be used by the master trainers.

2.3 The Modified Approach
The modified approach makes use of a combination of the approaches described in the above 2 methodologies. It also attempts to fill in the deficiencies in in each approach by introducing a number of issues that are pertinent in the modern cocoa growing landscape. This modified method is also dynamic and is constantly being reviewed to accommodate current issues and
approaches whilst taking into consideration a cost-effective means of undertaking farmer training activities.

The modified approach includes topics on-

*Community Entry*- Even though this topic is essential for all trainers, it is mostly overlooked and field trainers do not actually go through the whole process. This exercise is important because it:

i. Identify needs and promote community interests.

ii. Promote good leadership and democratic decision making.

iii. Identify specific groups for undertaking specific problems.

iv. Identify all the available resources in the community.

v. Plan the best use of the available resources.

vi. Enable the community to better govern itself

*Human-Wildlife Conflict Management*- Cocoa is usually grown in areas that were once forest therefore there is a tendency for human and wildlife to confront each other. This results in severe consequences that may result in loss of life and property. Over the years, various methods have been developed that examines the causes of these conflicts and prescribes a cocktail of methods that assist farmers and their communities mitigate these conflicts with wildlife.

*Monitoring and Evaluation*- Monitoring of field activities help to track the performance of the project. The Geographic Information System (GIS) approach has been found to be an effect tool for gathering and analyzing field data. GIS is a computer system that collect, stores and manipulates data with the aim of displaying geographically referenced information (data identified by their locations). The output of most GIS systems is the visual representation of the real world on a piece of paper in the form of a map. The ability to identify farms by location and to link each geographic feature with its attribute makes monitoring and evaluation with GIS a very convenient approach. Maps are used to depict and analyze clusters of geographically-dependent phenomena. Maps have moved from hard paper drawn maps to high advanced maps produced using specialized computer software.
3.0 TRAINING FARMERS IN THE BIA CONSERVATION AREA

3.1 Summary
Training activities were undertaken both at communal levels and at the farmer level. This was done to enhance the interest of community members in adopting best practices in cocoa production and also educate them in biodiversity related issues. At the farmer level specific issues with respect to agronomy, ICPM, biodiversity conservation, quality issues, record keeping, and farm data collection were discussed.

3.1.1 Communal Training in Best Practices
Through a series of community meetings involving traditional leaders (called durbar) extensive awareness campaigns were undertaken to continue the education on agroforestry best practices in the communities.

The sensitization process in the communities focused among other things on the importance of trees and the need to incorporate native trees in the cocoa production landscape, shade management as an IPM option and simple technologies that mitigate climate change effects and conserve biodiversity on their farms.

During these sessions the farmers were assisted to evaluate the need to adopt these practices in order to create more wealth for themselves and their families and to protect the ecosystem.
The project team also targeted school children in the communities as a long term solution to the creation of awareness about biodiversity conservation. A series of seminars on the importance of biodiversity was organized to sensitize the school pupils.
3.1.2 Farmer Field Schools

This activity was undertaken using the modified Farmer Field School (FFS) Approach with both classroom and demonstration activities. The project targeted 50 literate and knowledgeable farmers from these communities including 10 female farmers. This activity was targeted at assisting farmers to understand the various methods that are available for the control of pests and diseases on the farms and the effective use of these methods.

Various topics were discussed including the requirements of shade for cocoa cultivation, identification and cultivation of desirable native species for shade on cocoa farms, shade and crop management, the use of approved chemicals for cocoa, personal protective equipment (PPE) usage and how to document these activities in the passbook provided to them.

To ensure that the cocoa produced was of premium quality, the farmers were also taken through several factors that account for the poor quality of cocoa which included pesticide application, poor fermentation and drying methods, wrong timing for the harvesting of pods. The exercise continued in the homes of the farmers where they were able to identify beans that were poor in quality as a result of factors discussed in the field.

These farmer field school trainers have been charged with educating and training farmers in the neighboring communities. These new set of cocoa farmers continue to receive new lessons in cocoa agroforestry with a series of field practices and assistance from extension officers and CA’s field officers.
3.1.3 Field Demonstration and Visitation

As a part of the modified approach towards training farmers, CA employs field visitation and demonstration exercise to give farmers the opportunity to practice what was taught during classroom sessions.

These sessions are organized to coincide with the time of the year that the farmer spends a lot of time in the farm. Also during these sessions, special attention was given to issues of harvesting and post-harvest issues, quality, and human-elephant conflict mitigation management.
3.2 Locations
Depending on the kind of training been organized, a venue is chosen. This has been presented in Table 1 below.

Communal training sessions were organized for all 12 communities instead of a targeted 10 communities. This was done to reduce the traveling time of some of the farmers to training sessions and also to ensure that minimal time is spent but a full impact of the project was attained.

Communities were further aggregated into 3 clusters with each cluster consisting of 4 communities. This was done to ensure that each community was represented in the FFS and that the limited funds available would be able to train them all.

Field demonstration sessions were arranged with farmers who choose a farm of a colleague and assemble there for the demonstration exercise. Unlike demonstration sessions, field visitations are unannounced and it involves all communities.

Table 1. Location of various training sessions organized for farmers from April to September 2013

<table>
<thead>
<tr>
<th>COMMUNAL TRAINING IN BEST PRACTICES</th>
<th>FARMER FIELD SCHOOLS</th>
<th>FIELD DEMONSTRATION AND VISITATION</th>
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| (Communities aggregated into three main groups with each group consisting of 4 communities) | Jericho | (Communities aggregated into three main groups with each group consisting of 4 communities)
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|                                      | New Wenchi             | New Wenchi                       |
|                                      |                        | (All Communities)                |
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|                                      |                        | New Wenchi                       |
|                                      |                        | Adiepena No. 1                   |
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|                                      |                        | Kwaku Dua                        |
|                                      |                        | Kakenabo                         |
|                                      |                        | Nkrabea                          |
|                                      |                        | Benkase                          |
|                                      |                        | Nyame Ndae                       |
|                                      |                        | Abosi                            |
|                                      |                        | Jericho                          |
| TOTAL NUMBER                         | 12                    | 3                                | 12                                |
3.3 Discussion Points
During the baseline collection process in the project area, it was realized that farmers in the area had not had training in modern techniques of cocoa production. Very few you had some knowledge acquired it from other cocoa production projects elsewhere. It was therefore an important exercise to undertake training at the various levels.

Various issues arose from discussions during the training sessions. The most prominent of them are the issues of human-elephant conflict and the use of agrochemical on farms.

New Plantation Establishment- The issue of acquiring proper planting materials for establishing new plantation was discussed during preliminary studies. Due to the bad nature of the roads and distance from the nearest nursery (Sefwi Wiawso) farmers find it difficult to acquire these improved and proper planting materials. Farmers were therefore encouraged to establish local nurseries to supply their own farms and the farms of others within their reach. The field team took the farmers through the basics of establishing a nursery and how to manage it. The farmers were also encouraged to undertake this venture in groups and also at the communal level to stimulate learning and also encourage others to adopt this strategy. CA plans to support communities with the transportation of pods from Sefwi Wiawso for cultivation in the nurseries when established.

Agrochemical Usage- Community members admitted that for the past years they have always relied on the word from chemical dealers to purchase agro-inputs for use on their farms. This has resulted in the use of unauthorized and banned chemicals in the area.

Farmers also added that they experienced various symptoms including burning sensation, itchy eyes, headache, running stomach, etc. after using these chemicals.

Figure 8. Field Staff assists farmers to identify unapproved and banned chemicals
This was confirmed when the team driving through one community (Figure 10) spotted a group of farmers patronizing displayed banned chemical at the market place.

Figure 9. Farmers get ready to discuss with field staff a newly introduced chemical in the area.

Figure 10. The nature by which chemicals are introduced into communities

Community members were taken through the integrated approach of controlling pests and diseases on farms without recourse to only chemical use. Farmers were also taken through the process of reading the label of agro-chemicals to

Figure 11. Farmers undertake campaign to keep their farms clean by collecting chemical containers from their farms
understand the active ingredient, the dosage, required PPE and other precautions for the use of the chemical. Farmers were also advised to seek help from other literate/knowledgeable farmers when deciding on the chemical to use. Lastly, the team took some to explain why some chemicals which the farmers were so adhered to were not good for human health and also for cocoa production.

**Human-elephant conflict** - Farmers had a lot of misconception with respect to the management of elephants who raid farms periodically. The field team took time to explain to the farmers that the elephants stray to their farms not because they want to do so but because we humans have invaded their homes. This is also compounded with the growing of staples which are high energy foods along the boundaries of the forests. These elephants are introduced to this new diet and after some time they stray further away from the park/forest in search of these foods.

Farmers were introduced to techniques that were lost in terms of cost but high tech to keep the elephants at bay. Farmers were found these methods as insurance against crop raiding and especially since the materials they were going to use were locally available.

**Biodiversity Conservation and Ecosystem Protection**

The issue of placing priority on the protection of wildlife species and native trees
species was accepted by the farmers and community members in a whole. Most of them (community members) had taken part in various initiatives by government and other NGOs in the area. Farmers faced a challenge on placing the value of these intangibles and hence their protection. The field team took time to educate farmers on the role these species play in the ecosystem and their farming activities. Participants were also able to link their current farming practices and utilization to the climate change effects.

With this current understanding, farmers were assisted to identify seeds and seedlings of native tree species to cultivate on their farms and also on fields that are fallow. The CA field team will continue to monitor the establishment of nurseries and subsequent transplanting of these seedlings to farms and fallow lands.

**Post-Harvest Practices** - the BIA Conservation Area falls under the area with the highest rainfall in Ghana. This pattern affects the way cocoa farmers process cocoa before selling. Cocoa that is purchased then needs to be further dried by purchasing clerks before forwarding it to the depot. This reduces the quality of the cocoa beans and also its weight drops significantly. Farmers acknowledged that their cocoa was not the best quality for Ghanaian cocoa attributing it to a variety of issues from logistics to natural causes.

The field team took the farmers through the process of harvesting, fermenting and drying cocoa to ensure better quality and guaranteed prices and premiums from the government.

![Figure 14. CA Field staff undertakes quality checks on cocoa beans dried on raised mats](image)
Farmers suggested other means of fermenting and drying cocoa they borrowed from neighboring Cote d’Ivoire. They techniques were discussed and farmers realized the negative effect of these borrowed methods on the quality of their cocoa.

3.4 Participant Feedback
Cocoa farmers within the Bia Conservation Area have not been the priority of private businesses and government as regulator due to a variety of issues that pertain in the area.

First and foremost, this forest reserve and national park have been a high priority for research by institutions in Ghana and therefore agriculture is not encouraged. Projects that have been undertaken in this area have therefore been conflict resolution, sustainable forest management, anti-poaching campaigns and the like. This has resulted in the reduced intervention of agencies and government in assisting local communities with agriculture. This has been compounded by the bad nature of transportation in the area and until recently the large area of coverage by the local government. Nevertheless this area falls within the most productive cocoa growing district in Ghana. Local people have embraced the project with growing interest in adjacent communities that were not covered under this project. Turn-out for meetings is high and others in hamlets sometimes travel over 5km on foot to attend meetings.

Secondly, due to the proximity of the area to Cote d’Ivoire, smuggling of cocoa beans is high. According to the farmers, they do this because there are not enough buying points in their communities. Also these buying points have scales that have been tempered with thereby the farmer loses about 4kg of cocoa with every bag that they sell. The field team also learnt that people engage in this act when cocoa prices are higher in Cote d’Ivoire than in Ghana. Farmers have resolved to sell beans to a designed buyer in their communities in order to benefit from premiums paid and also to contribute to the development of their districts by government.

Lastly, the farmers are excited by the avenue created by CA for the farmers to communicate with each other and share ideas on cocoa production. The establishment of a farmer coop they say will help strengthen their voice to advocate for development within their communities and the district in a whole. They have also decided to device means of generating funds internally to continue the project in an event that CA is not able to generate funds to sustain project activities. They have suggest activities such as selling of cocoa seedlings, timber species seedlings, formation of spraying gangs and introduction of fertilizer distribution schemes for members.
3.5 Lesson Learnt
CA and its collaborators have implemented similar projects in various cocoa growing landscapes and countries within the West African sub-region. With this advantage, field team are able to incorporate lessons learnt in other areas into new area operations to minimize losses and maximize project objectives.

Lessons learnt during the implementation process were quickly evaluated and incorporated in the training plan and documented.

3.6 Next Steps
Community education and public awareness creation will continue in all communities during the lifetime of the project. This will serve as a reminder system for community members to insure their livelihoods by protecting their ecosystem and conserving biodiversity.

According to the training plan, refresher training will be organized for communities and coop leadership as and when needed. Topics to be treated will be plan to coincide with activity been undertaken by the farmers in the cocoa season.

The successful implementation of the training of farmers in best management practices becomes a footstone for the introduction of certification in the area. A certification plan will be developed for the farmers as a guide towards adopting RA certified status. This guide will include topics of record keeping, child labor and fair treatment of workers, chemical storage, and governance issues.

The graduates of the FFS are expected to training at least 50 farmers in their communities. The CA field staff will continue to provide backstopping for these trained facilitators and monitor the number of farmers they are able to train after sometime.
4.0 CONCLUSIONS/ RECOMMENDATIONS

4.1 Conclusions
As the main training program comes to an end, it can be concluded that:

- Farmers in neighbouring communities that have not been covered by the project are increasingly expressing interest in being part of the project. They have expressed this by sending delegations to CA field office to inquire how their communities could be part of the project. Others have also decided to join activities in neighbouring communities.

- Farmers’ awareness of biodiversity conservation and climate change issues is high as evident in communities providing areas to be used to raise native plant species to be incorporated in the cocoa growing landscape. It is expected that when these trees are transplanted to the fields of farmers that is going to create a continuous stretch of secondary forest that will buffer the Bia National Park and connect it to other neighbouring forest reserves.

- The farmer field schools and the resultant increase in awareness in the potential of cocoa to increase households’ incomes has led to a surge in interest in the adoption of best practices in cocoa cultivation.

- There was evidence that the communities are living in harmony with the forest and also lessen human-wildlife conflicts has reduced farmers’ dependence on the forest for food and other materials. Some farmers reported of wild animals’ visitation to their farms.

- When the biodiversity data collection and farm mapping system is fully established by CA, biodiversity on cocoa farms could be easily accessed and quantified. This will also aid in planning of resources including agro-inputs distribution, PPE allocation, and access to financial services to farmers.

4.2 Recommendation
Since the project is generating a lot of public interest in the area, the inclusion of government agencies operating and other private entities in the area will assist the project reach the maximum benefit both for the local people and their environment.

Also the regular engagement of farmers will keep up interest in the project and community ownership.
5.0 REFERENCES

References used as basis for discussion at biodiversity education and awareness creation at communities included but not limited to-

i. The Ghana Forest and Wildlife Policy, 2011

ii. Wild Animals Preservation Act. 1961

Training materials, Manuals and Guides used include:


ii. STCP Training Curriculum

iii. CCE Curriculum

