



World Cocoa Foundation African Cocoa Initiative (ACI) Phase II

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Table of Contents

Acronyms.....	3
Glossary	4
Executive Summary	6
Introduction.....	8
Objective 1 – Increased Availability and Use of Improved Planting Material	9
Outcome 1.1 Increased Production of Quality Planting Material Using New Genetic Material and Technologies.....	10
Key achievements and Milestones.....	10
Development of heat and drought tolerant planting materials in Ghana.....	10
Using the Citizen science approach in Ghana to test clones and hybrids for climate adaptation .	11
Develop and distribute heat and drought tolerant planting materials in Côte d’Ivoire	11
Introduce clonal planting materials to farmers in Cameroon.....	12
Documenting the production capacity of seed gardens in Nigeria.....	13
Support private sector-led seed gardens strategy for Ghana	15
Outcome 1.2 Increased adoption by companies of plant propagation technologies	16
Key achievements and Milestones.....	16
Test and validate plant propagation technologies in Côte d’Ivoire.....	16
Capacity building to introduced clonal planting materials in Cameroon.....	17
Company pilots as a response to the productivity ban in Côte d’Ivoire	17
Develop an early detection tool for the management of the cocoa swollen shoot virus in Ghana and Côte d’Ivoire	19
Develop Integrated soil fertility management strategies for seedling production in Ghana	20
Objective 2 – An Enabled Ecosystem for Financial Services.....	21
Outcome 2.1 Increased availability and use of high-quality financial services by farmers	21
Key achievements and Milestones.....	22
Provide training on digitizing cocoa value chain.....	22
Provide technical assistance on digital financial services to WCF member companies	22
Develop DFS sensitization materials	22
Define merchant points and farmer experience with mobile money	23
BTCA and ACI II of WCF Collaboration.....	23
Objective 3 – Increased Flavor Quality of Cocoa.....	24
Outcome 3.1 Companies Prioritize Cocoa for Flavor Quality and use the Flavor Quality Lab to support their Purchasing Decisions/ Practices	24
Key achievements and Milestones.....	24
Setting up new flavor quality laboratory in Cameroon and Nigeria	24

Support training of flavor quality in Côte d'Ivoire	25
Outcome 3.2 Increased employment of appropriate post-harvest practices by farmers for cocoa that ensures high flavor quality	25
Improve the knowledge and skills of government extension agents and farmers on flavor quality	25
Cross-cutting Research and Learning Activity	25
Cocoa income and household food security study	25
Study and sampling design	26
Active indicators in FTFMS	27
Program Governance: Steering Committee	28
Activity Implementation Locations	29
Annexes	30

Acronyms

ACBG	African Cocoa Breeders' Group
ACI II	African Cocoa Initiative Phase II
AOR	Agreement Officer's Representative
CCC	<i>Conseil du Café-Cacao</i>
CNRA	<i>Centre National de Recherche Agronomique</i>
COP	Chief of Party
CRIG	Cocoa Research Institute of Ghana
CRIN	Cocoa Research Institute of Nigeria
FTF	Feed the Future
FTFMS	Feed the Future Monitoring System
GDA	Global Development Alliance
GDI	Global Development Incubator
GIZ	German International Development Cooperation
ICRAF	World Agroforestry Centre
IITA	International Institute of Tropical Agriculture
IRAD	<i>Institut de Recherche Agronomique pour le Développement</i>
ISF	Initiative for Smallholder Finance
MINADER	Ministry of Agriculture and Rural Development
PMP	Performance Management Plan
R&R	Rehabilitation and renovation
SNV	Netherlands International Development Organization
TWC	Technical Working Committee
USAID	United States Agency for International Development
USAID/BFS	United States Agency for International Development/Bureau for Food Security
WCF	World Cocoa Foundation

Glossary

African Cocoa Breeders' Group (ACBG)

The African Cocoa Breeders Working Group (ACBWG) is made up of breeders from Cameroon, Côte d'Ivoire, Ghana, Nigeria and Togo with representation from the International Institute of Tropical Agriculture (IITA). The ACBWG supports regional collaboration on breeding, given the wide disparities in capacities across the sub-region and the need for improved varieties to meet national rehabilitation goals.

African Cocoa Initiative Phase II (ACI II)

In September 2016, USAID approved a global development alliance program, entitled the African Cocoa Initiative Phase II (ACI II) project, which is purposefully designed to be a direct support to the CocoaAction sustainability platform. ACI II focuses on a limited number of high-value interventions to: 1) increase cocoa production using quality and affordable planting materials and 2) facilitate access to financial services and products in support of the total farm productivity and resilient agri-food systems among smallholder cocoa farmers in West Africa.

Better Than Cash Alliance

A UN-based global partnership of governments, companies, and international organizations that accelerates the transition from cash to digital payments to drive inclusive growth. The Alliance has over 60 members across 30 emerging markets, including companies and business organizations such as Unilever, H&M, Gap Inc and Grupo Bimbo.

Bioversity International (BI)

A research institute of the Consultative Group for International Agricultural Research (CGIAR) Consortium whose focus is on maintaining tree biodiversity. BI facilitates the development of a standard method for measuring and recording plant performance to support the PSP's crop ontology work in Objective 1.

Centre National de Recherche Agronomique (CNRA)

Côte d'Ivoire national research institute for agriculture including cocoa; strong role in cocoa productivity research & breeding; active in ACBWG. Involved as national institute in the supply of improved planting material and to assess heat/drought tolerant candidates.

Cultivating New Frontiers in Agriculture (CNFA)

Is a non-profit international development organization based in Washington, DC. CNFA's mission is to increase and sustain rural incomes in less developed areas of the world by assisting farmers and rural entrepreneurs. CNFA works in Eastern Europe, the Caucasus, South and Central Asia, Africa, the Near and Middle East and the Caribbean to improve agricultural economies by strengthening market linkages; building input supply networks; promoting enterprise growth and development; enabling agribusiness financing and improving processing and marketing. CNFA receives funding from a variety of donors, including USAID, USDA, the Millennium Challenge Corporation, and the Rockefeller Foundation.

CocoaAction (CA)

CocoaAction was launched in 2014 as a voluntary industry-wide strategy that focuses on world's leading cocoa and chocolate companies' sustainability priorities with those of the governments of Côte d'Ivoire and Ghana. CA common action and coordinated activities and investments with other key stakeholders aim to improve learning and knowledge management across the sector.

Conseil Interprofessionnel du Café et du Cacao (CICC)

CICC is the convening body for professional organizations in agriculture, trade, industry and services of the cocoa and coffee sectors in Cameroon. CICC provides a platform for meetings, exchanges, sharing and reflection to highlight the comparative advantages of the sectors. The CICC is part of a

dynamic action, representation, coordination, liaison and information on its members, which comprise all private sector stakeholders in cocoa and coffee in Cameroon.

Cocoa Research Institute of Ghana (CRIG)

CRIG is the national cocoa research institute of Ghana and host organization for current ACI flavor and sensory laboratory. CRIG has a strong role in cocoa productivity research & breeding; is an active member of the African Cocoa Breeders' Group (ACBG); and is involved in the supply of improved planting material to WCF member companies.

Cocoa Research Institute of Nigeria (CRIN)

CRIN is the national cocoa research institute of Nigerian. CRIN plays a key role in cocoa productivity research & breeding and very active in the ACBWG. CRIN will potentially host the third ACI II flavor and sensory laboratory in 2019.

Conseil du Café-Cacao (CCC)

CCC is the National regulatory authority for the cocoa sector in the Côte d'Ivoire. CCC is responsible for the coordination and policy making for cocoa sector in Côte d'Ivoire, including season price setting, farmer training, rural services, and overall sector performance. CCC will work with PSP as the government representative and partner under ACI.

Ghana Cocoa Board (COCOBOD)

COCOBOD is the National regulatory authority for the cocoa sector in Ghana. COCOBOD is responsible for purchasing all cocoa destined for export. COCOBOD represent the government of Ghana interests under ACI.

Institut de Recherche Agronomique pour le Développement (IRAD)

IRAD is the National research institute for Agriculture in Cameroon including cocoa. IRAD support ACI productivity research & breeding strategies. IRAD is a key member of ACBG and facilitate the dissemination and delivery of improved cocoa planting material to end-users in Cameroon. IRAD may also host the third ACI II flavor and sensory laboratory in 2019.

Maximizing Opportunities in Cocoa Activity (MOCA)

MOCA is a USDA-funded project aiming to increase the productivity and efficiency of actors in the cocoa value chain by strengthening the capacity of cooperatives/producer groups, research institutions, input suppliers, and processors of cocoa.

Executive Summary

This report contains details of the activities undertaken and progress towards the achievement of ACI II project results from October 2018 to March 2019.

In September 2016, USAID approved a Global Development Alliance program, entitled the African Cocoa Initiative Phase II (ACI II) project, designed to be a direct support to the CocoaAction sustainability platform. ACI II focuses on interventions to: 1) increase cocoa production using quality and affordable planting materials and 2) facilitate access to financial services and products to support total farm productivity and resilient agri-food systems among smallholder cocoa farmers in West Africa.

In the first half of FY 2019, the cocoa sector in West Africa was dominated by the implementation of new strategies and policies in both Côte d'Ivoire and Ghana, the most prominent of which was the joint Cocoa Swollen Shoot Virus Disease (CSSVD) control program launched in August 2018 and the validation in Ghana of the Cocoa Sector Development Strategy II. Together, the two West African countries produce more than 60% of the world's cocoa.

Under Objective 1, "Increased Production and Use of Quality Cocoa Planting Material", the Institute of Agricultural Research for Development (IRAD) in Cameroon started the multiplication of selected clones and the identification of participating farmers for the introduction of clonal planting material to farmers. In Nigeria, WCF completed an assessment of the planting material production capacity of existing seed and bud-wood gardens. The results of this exercise provide inputs for WCF member companies in Nigeria for the establishment of community nurseries and seed gardens to increase access to improved planting material to farmers. In Côte d'Ivoire and Ghana, the focus was on breeding against heat/drought and establishment of clonal gardens in marginal zones in collaboration with the national Research Institute for Agriculture (CNRA) and the Cocoa Research Institute of Ghana (CRIG).

In November 2018, WCF in partnership with Bioversity International, the Cocoa Research Institute of Ghana (CRIG), the African Cocoa Breeders Group and Kookoopa, started a new activity, co-funded by the Dutch government, to identify heat and drought tolerant materials which may prove innovative for the cocoa sector and farming communities in Ghana. WCF and partners are using a citizen science approach to make available improved planting materials to farmers in a network of central and satellite nurseries and budwood gardens managed by women and youth.

WCF continues to coordinate the requests for seed pods from its member companies to the Seed Production Division (SPD) stations of COCOBOD in Ghana. These seed pods will be used to produce seedlings for farmers. The national ban on productivity enhancing interventions in Côte d'Ivoire is still in force and was discussed in more detail in the FY 2018 annual report. WCF under the ACI II program continue to plan for the eventual lifting of the ban in the hopes that work on clonal planting material could be restarted.

WCF worked with CRIG to expand the coverage of flavor quality training for cocoa extension and quality control staff and farmers in Ghana. WCF also established a second flavor laboratory at CNRA in Abidjan and started to provide laboratory management training to the CNRA team.

Towards Objective 2, "Increased Provision of Financial Services in support of the Cocoa Value Chain", WCF completed digital financial services (DFS) inception and landscape reports and provided technical support to CocoaAction companies willing to digitalize their cocoa supply chain in Ghana. Between October 2018 and March 2019, WCF held consultations with companies that expressed interest in taking advantage of e-payment and mobile money solutions to digitize their payments to cocoa farmers. These consultations, including focus group discussions with farmers and farmer groups provided input for technical assistance to companies that have expressed interest in

piloting digital payments along their value chain. The agreed technical assistance focused on providing training on digital financial services to staff, company purchasing clerks, supporting them to build their ecosystem to digitize payments and sensitizing their farmers on digital financial services.

To improve the flavor quality of cocoa, WCF purchased equipment for the flavor quality laboratories in Côte d'Ivoire and Ghana and issued a competitive call for proposal for the establishment of the third planned flavor lab. During the period, WCF reviewed applications from Cameroon and Nigeria for the establishment of this third flavor quality laboratory. The highlight of activities under this objective during the first half of FY2019 was an exchange visit by farmers and leaders of cooperatives supported by USDA-funded Maximizing Opportunities in Cocoa Activity (MOCA) project, which is implemented by CNFA. During the visit, the farmers, accompanied by CNFA staff as well as officials from the Ivoirian national cocoa regulatory institution Conseil du Café-Cacao, extension agency ANADER and research institute CNRA, learned from their Ghanaian counterparts who have benefited from previous WCF flavor quality activities.

Introduction

The United States Agency for International Development (USAID) issued Cooperative Agreement AID-OAA-A-16-00052 for the African Cocoa Initiative (ACI) Phase II through its Global Development Alliance (GDA) mechanism, in concert with relevant government agencies in participating countries. The \$12,000,000 program (\$5M from USAID and, \$7M in cash and in-kind leverage from WCF members) runs from October 2016 to September 2021. Focus countries are Cameroon, Côte d'Ivoire, Ghana, and Nigeria, with the bulk of the effort going to Côte d'Ivoire and Ghana as the focus countries of the CocoaAction strategy. ACI II follows the successful implementation of the first phase of the WCF African Cocoa Initiative (WCF/ACI) project, from 2011 to 2016.

The program is strongly aligned with WCF's CocoaAction framework. CocoaAction is a voluntary industry-wide strategy that focuses on world's leading cocoa and chocolate companies' sustainability priorities with those of the governments of Côte d'Ivoire and Ghana, and other key stakeholders for common action, coordinated activities and investments, and improved learning and knowledge management across the sector. In 2016, CocoaAction companies agreed on a set of key performance indicators (KPIs) and a common framework for measuring results and have since been reporting on these indicators to test hypotheses and make continuous improvements to the strategy.

The program is also aligned with the new WCF vision of sustainable and thriving cocoa sector – where farmers prosper, cocoa-growing communities are empowered, human rights are respected, and the environment is conserved. WCF is achieving this vision through a stronger “systems approach” that integrates the various individual actions and actors into a holistic framework to drive the step-change needed to reach our shared vision (See Annex 1 for the current version of WCF new strategy).

ACI II's goal is to sustainably increase cocoa productivity among smallholder farmers in West Africa. ACI II objectives: 1) Increasing production and the use of quality cocoa planting material; 2) Increasing the provision of financial services in support of the cocoa value chain; and 3) Improved flavor quality of cocoa.

This semi-annual report covers the period of October 2018 to March 2019.

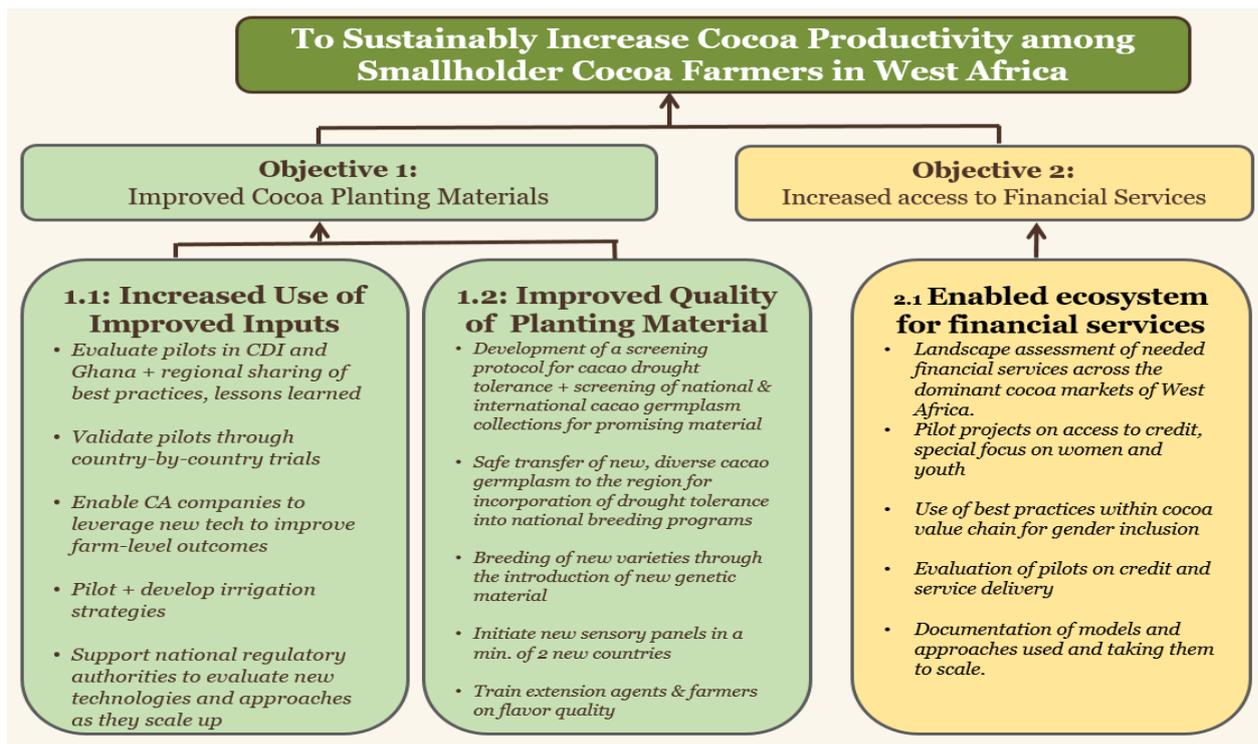


Figure 1 ACI II Results Framework

Objective 1 – Increased Availability and Use of Improved Planting Material

Over the years, cocoa breeding programs internationally, and in West Africa, have produced clones with varying levels of tolerance to the most significant biotic and abiotic stressors of the crop. These breeding efforts have focused on increasing the productivity of cocoa alongside the threat of pathogens and abiotic stressors. Unfortunately, despite the progress made in breeding, many varieties have yet to be approved by Cote D'Ivoire or Ghana and in Cameroon and Nigeria, the materials have yet to really reach farmers. As a result, yields remain low and unpredictable. This low level of yields is due in part to the limited application of good agricultural practices by farmers, the aging tree stock, the recurrent outbreaks of pests and diseases and the use of local varieties to the expense of improved planting materials understood to be either genuine hybrid material or clonal plants.

Over the past decade, drought and heat stress have become the most important limitation to successful establishment and productivity of cocoa plantations in Ghana largely attributable to a rapidly changing climate. These effects are exacerbated by soils of very low water holding capacity arising from farming practices that are incompatible with cocoa production.

Previous investigations have led to identification of cocoa genetic groups that contribute to high seedling survival in the field, early fruiting and stable high yields of mature trees under relatively high incidence of soil water stress. However, it remains unclear whether hybrids developed with CRIG will exhibit the same potential when cultivated in benchmark sites of drought prevalence in the cocoa belt.

Objective 1 aims at translating the gains and progress made in breeding for improved planting materials to farmers. This is achieved through increased production and support to the distribution of improved planting material to smallholder farmers.

Outcome 1.1 Increased Production of Quality Planting Material Using New Genetic Material and Technologies

Côte d'Ivoire and Ghana have requested ACI II support to identify and select cocoa hybrids varieties tolerant to heat and drought. The resulting selected planting materials will be used by farmers in areas with high frequency of drought. These activities implemented by CRIG in Ghana and CNRA in Côte d'Ivoire, is using multilocational trials with the best-performing clones and hybrids. Ghana plans to go a step further to undertake an assessment of the current planting material production and distribution capacity in the country. The expected outcome is a screening protocol for heat and drought tolerant planting materials that will be used in screening national and international cocoa collections and the identification of promising new and safe materials to be transferred and incorporated into the national breeding programs of ACI II countries.

In Cameroon, ACI II is introducing clonal material to the farmers. The objective is to transfer clonal varieties developed under ACI I to farmers' field and to equip the benefiting farmers and field technicians with the tools and skill to enable successful production, distribution and use of clonal planting material.

In Nigeria, ACI II assessed the status of the seed gardens and bud-wood gardens established under ACI I, as well as the existing stock of seed and bud-wood gardens, to determine how much planting material WCF member companies can access from these facilities to support their sustainability programs.

Key achievements and Milestones

Development of heat and drought tolerant planting materials in Ghana

Under ACI II, WCF signed an agreement with CRIG to conduct research over a period of three years on the selection of cocoa varieties with high levels of tolerance to soil water and heat stress. Activities began in September 2018 had the following specific objectives:

- To ascertain the relative growth rates, survival, precocity and yield of new and existing cocoa hybrids during the first 36 months after planting in areas with high frequency of drought stress.
- To determine the level of genotype x environment interaction of selected cocoa hybrids tested at six benchmark sites for growth and yield traits.
- To validate physiological traits known to contribute to plant survival and yield in the field under conditions of soil water stress and high ambient temperatures.

The rationale is that varieties with high yield in favorable environments may carry growth and yield penalties when cultivated in areas with high frequency of drought, and that specific varieties developed with tolerance to drought are needed in such areas. The rationale is premised on the fact that varieties currently recommended in the Seed Gardens were developed through testing in a range of favorable soil and climatic conditions. Current varieties are therefore more adapted to favorable growing areas, accounting for the large losses of seedlings whenever plantings are subjected to extended periods of post-rainy season water stress particularly in the first two years of crop establishment. Moreover, the rapidly changing climate requires that hybrids are well tested for target environments beyond the primary ecologies within which they were developed. Such testing, even in the absence of variety x environment interaction affords greater precision in rating varietal performance due to increased replication.

CRIG is currently evaluating 25 specific hybrids, including two Seed Garden types, at six sites measuring 2.2 ha each. The sites include Akim Tafo, Akumandan, Afosu, Marbang, Manfo and two farmer's sites Owuobegya Whan and Akwesiase -Mensakrom. Hybrids were generated through manual pollinations of clones previously certified as true to type. These clones, developed during ACI I, were selected from those that have shown good combining ability for seedling survival under

abiotic conditions considered marginal for cocoa. Each location has a minimum of 3,000 seedlings per cocoa hybrid variety. Land preparation is completed and temporal shade with plantain and *Gliricidia* has been provided. Basic equipment for monitoring soil moisture and crop response were acquired with the support of ACI II. These include a soil moisture probe with 120 access tubes, a chlorophyll meter, and a chlorophyll fluorimeter. Results on the performance of the 25 hybrids in relation to heat and drought including soil analyses will be reported in the Annual Report.

Using the Citizen science approach in Ghana to test clones and hybrids for climate adaptation

WCF under the ACI II project in collaboration with Bioversity International is using a public-private-civil society partnership to adapt the citizen science “tricot” approach to cocoa variety testing, working with women and men farmers to test cocoa hybrids and clones for climate adaptation in a gradient of agro-ecological zones in Ghana. The approach is to develop and validate processes and guidelines for the production and distribution of selected climatically adapted, stress-tolerant cocoa hybrids and clones in a network of central and satellite nurseries and budwood gardens managed by women and youth to ensure constant varietal renewal depending on the emerging needs of farmers and findings on climate adaptation from on-farm testing. ACI II, Bioversity and partners are designing appropriate dissemination and scaling mechanisms by supporting inclusive business development to ensure the delivery of diverse and adapted genetic materials of cocoa addressing the specific demands of farmers. The approach co-funded by the Dutch government include CRIG, the African Cocoa Breeders Group and Kookoopa. The approach is complementary to ACI II activities that support business development in the management of professional nurseries to produce quality cocoa seedlings, as well as adding value to the production system of cocoa through intercropping and diversification at the farm level. The consortium composed of ACI II, Bioversity International, CRIG, and Kookoopa is providing ample opportunities for collaboration and mutual learning and information exchange across platforms and research programs.

The project will generate new knowledge and capacities as follows:

- New knowledge about how to implement farmer citizen science trials focused on cocoa in Ghana, including validated protocols and concrete experiences, with relevance to other countries and regions and other perennial species, and which may be scaled;
- Capacity of national partners to design, execute and analyze citizen science trials using the tricot approach, including the climatic analysis of trial data;
- New knowledge about the influence of climate-induced stress variables on the establishment and early growth of cocoa seedlings under farmer conditions and genotype-specific responses, enabling the identification of adapted improved planting material;
- Establishment of a network of farmer citizen scientists who contribute to cocoa observational and experimental research in the long-term, including the long-term monitoring of the hybrids and clones present on their farms;
- Capacity of women and youth to manage nurseries and budwood gardens, to produce and distribute climatically adapted, stress-tolerant hybrids and clones, ensuring constant varietal renewal depending on the emerging needs of farmers and the findings on climate adaptation from on-farm testing; and
- To ensure sharing of this knowledge and research results uptake, stakeholder platforms will be put in place at the farmer community-based and national levels.

Develop and distribute heat and drought tolerant planting materials in Côte d’Ivoire

Despite remarkable production performance since the late 1970s, Côte d’Ivoire, like other countries, is suffering the effects of climate change. This phenomenon has brought droughts lasting three to six consecutive months in the main production areas (Dimbokro, Abengourou, Tiébissou, Bouaflé and Daloa), which has seriously affected yields, beans quality and the establishment of new cocoa farms.

As a result, CNRA and the government of Côte d'Ivoire have prioritized heat and drought tolerance within their national breeding program. Since 2004, CNRA established pilot plots under ACI I to evaluate the behavior of about twenty hybrids in drought conditions. ACI II is building on this previous work to confirm the heat/drought tolerance of these hybrids planted in different agro-ecological zones since 2004, as part of the CFC/ICCO/Bioversity project and will also collect samples from old cocoa farms in different marginal areas of the country. In the long term, the project aims to provide cocoa farmers with heat and drought tolerant hybrids and clones with good level of production. ACI II hopes that the first generation of heat/drought tolerant planting materials will be made available to farmers when the ban on productivity enhancing interventions is lifted in Côte d'Ivoire.

The collaboration between ACI II and CNRA aims to:

- Select the most suitable hybrids for different agro-ecological zones in the CFC / ICCO / Bioversity test plots established since 2004;
- Select potentially heat and drought-resistant cocoa trees in old cocoa farms from marginal areas;
- Reproduce on a large scale, the selected planting material and evaluate their behavior in marginal areas and greenhouse-induced moisture deficit; and
- Select hybrids and genotypes adapted to drought in marginal areas and greenhouse-induced moisture deficit.

This activity anticipates generating new heat and drought hybrids and clones according to the following parameters:

- Hybrids adapted to different agro-ecological zones of Cote d'Ivoire;
- Drought-resistant cocoa trees in old cocoa farms in marginal areas are selected and replicated on a large scale;
- Hybrids and clones adapted to heat and drought to be used in marginal zones are identified and scaled; and
- New hybrids and clones adapted to drought and with a good level of production are available for farmers.

Introduce clonal planting materials to farmers in Cameroon

In Cameroon, ACI II is introducing clonal material to the farmers. The objective is to transfer clonal varieties developed under ACI I to farmers' field and to equip the benefiting farmers and field technicians with the tools and skill to enable successful production, distribution and use of clonal planting material. Activities designed in four steps by IRAD are implemented with the technical assistance of the local 'Forever Chocolate' programme of Barry Callebaut, a CocoaAction member. The first steps consisted of improving facilities dedicated to the clonal propagation of cocoa varieties introduced or developed under ACI I, followed by initiating clonal and shade trees propagation, selecting testing sites and introducing the cocoa clonal varieties' concept to the selected farmers as summarized in Table 1. All WCF member companies in Cameroon are encouraged to access budwoods and scions from these clonal gardens for distribution to their farmers.

Table 1. Summary of ACI II activities in Cameroon

Component	Event Title	Specific Tasks	Major Achievements
Capacity Building for Introduction of Clonal Planting Material to Farmers	1. Creation of a functional Clones-based technology Centre (CBTC)	Achieve at 100% the creation of the CBTC	The Clonal-Based Technology Centre (CBTC) achieved at 70%
	3. Select and train Technicians / Farmers Organization	Build the Capacity of IRAD and the selected Farmers Organizations	7 new cocoa technicians recruited and trained in clonal propagations

Establishment of bud-wood gardens for introducing clonal material to farmers	1. Multiply IRAD best clones to create bud-wood garden	Budding/Grafting	About 20 best cocoa clones currently multiplied to create the seed gardens
	2. Establish central bud-wood garden for clonal material at IRAD, Nkolbisson and one each in the target communities.	Clonal Production / Land Preparation / Establishment of temporary shade (plantain) / Establishment of cocoa clones	Land preparation achieved on-station to establish the Budwood gardens
Select and support farmers for the introduction of clonal planting material	1. Select farmer groups for participation in clonal trials	Meetings with farmers groups and Barry Callebaut	100 farmers selected within two farmers organizations of the Barry Callebaut's network selected: MBAGASSUD (60) and Ets NTSAMA (40)
	2. Establish shade on-farm sites using recommended tree species;	Production of Rootstocks / Grafting	16,000 cocoa rootstocks available
		Planting of shade trees in the first 30 on-farm clonal plots	6,000 plantain plantlets acquired 1,000 avocado rootstocks produced (grafting just started) Citrus rootstocks under germinating process
	3. Establish farms for selected farmers using clonal material;	Production of clonal material	5,300 already budded out of the 16,000 cocoa rootstocks (with 60-80% successful budding)
		Planting of clonal Material	30 on-farms plots under land selection and preparation

Documenting the production capacity of seed gardens in Nigeria

During the implementation of the first phase of ACI between 2013 and 2016, WCF supported the establishment of 15 ha seed gardens and 10 ha of bud-wood gardens in Nigeria, which begin producing seed pods in 2018 (Table 2). This was part of the strategy to enhance capacity in the cocoa sector among national institutions and addresses specific gaps in cocoa productivity improvements, including the provision of better planting materials.

The general objective of this task was to assess the status of the seed gardens and bud-wood gardens established under ACI I, as well as the existing stock of seed and bud-wood gardens, to determine how much planting material WCF member companies can access from these facilities to support their sustainability programs.

Specific tasks:

- Review status of seed and bud-wood gardens with members of the cocoa breeding team at CRIN;
- Undertake field verification visits to the various seed and bud-wood garden sites to ascertain the actual status of the seed and bud-wood gardens firsthand;
- Confirm planting material needs for CLP matching grantee – Tulip Cocoa in the context of the surrounding communities/State;
- Make detailed cost estimates for the establishment of nurseries and seed gardens to support Tulip Cocoa's sustainability; and
- Make recommendations to matching planting material availability with Tulip Cocoa's anticipated needs

Key outcomes

ACI I supported the establishment of a total of 25 hectares of seed garden and budwood garden in Nigeria (Figure 1). The underlying concept of this program was to safeguard and secure these elite materials at CRIN and Ondo Tree Crops Unit to preserve the unique organoleptic characteristics and traits intrinsic to the Nigerian origin for chocolate manufacturers to source for their recipe.

From the findings of this study, all sites selected were properly selected, delineated and planted with plantain shade crops. Planting of budded and grafted cocoa rootstocks was done on all sites except CRIN Ajassor, Ondo State Tree Crops Unit sites at Owena and Ile-Oluji. However, there was a significant loss of budded/grafted clones due to death of scions, massive take over by rootstocks seedlings and limited post-planting management and field maintenance. Some recommendations have been made to remedy the situation and ensure successful establishment of seed gardens in line with project objectives.

In addition, an assessment of national seed garden production capacity was carried out. Analysis of data collected showed that CRIN has an average total capacity of producing 190,228 pods (with a range of 135,568 to 227,626 pods) annually from all its four stations including the Ibadan headquarters. It was estimated that CRIN production capacity can support the raising of 5.7 to 6.7 million seedlings annually to plant up to 5,560 hectares of cocoa plantation annually. In addition, the Ondo State Tree Crops Unit has the capacity to produce about 10 million seedlings from seed gardens to plant an estimated 8,500 hectares annually.

In summary, it is possible to produce enough hybrid pods to plant more than 15,000 hectares annually in Nigeria. However, current demand of 15 million for hybrid seeds of newly released CRIN Tc 1 – 8 far outweighs the ability to produce enough to meet needs which makes the expansion of seed garden capacity imperative in Nigeria.

Recommendations

In view of the observations made on the field, the following actions are recommended to remedy the situation and suggested for future actions:

1. Nursery activities

- The vegetative propagation methods used in the nursery should be reviewed. Of the two methods currently used, only BUDDING is recommended for seed and budwood garden establishment. The institute may introduce rooted cuttings in addition;
- Top-grafting method should be discontinued henceforth for seed garden establishment and germplasm conservation efforts; and
- As part of the routine in budding, the rootstock shoot should be decapitated once the scion union has been successfully established and produced good number of matured leaves for self-sustenance. This will allow the scion to fully be established and prevent competition from the main rootstock shoot.

2. Field activities:

- All surviving planted rootstocks should be closely evaluated for the survival or death of the scion of budded clones to ascertain the integrity of surviving stands.
- All surviving stands that are rootstocks and therefore offtype should be removed immediately. This will keep the field clean of unintended materials when the field will be re-established with selected clones; and
- As much as possible, field maintenance by CRIN management should be encouraged. Given the closure of project, all seed and budwood garden locations should be properly handed over to CRIN for continued management if not already done so.

3. Project funding support solicitation:

Given ACI II commitment to provide plant materials to support member companies and national institutions, there is the need to have a clear management plan and strategy with CRIN or to push ACI II investment and effort to support private seed gardens rather than the national seed gardens.

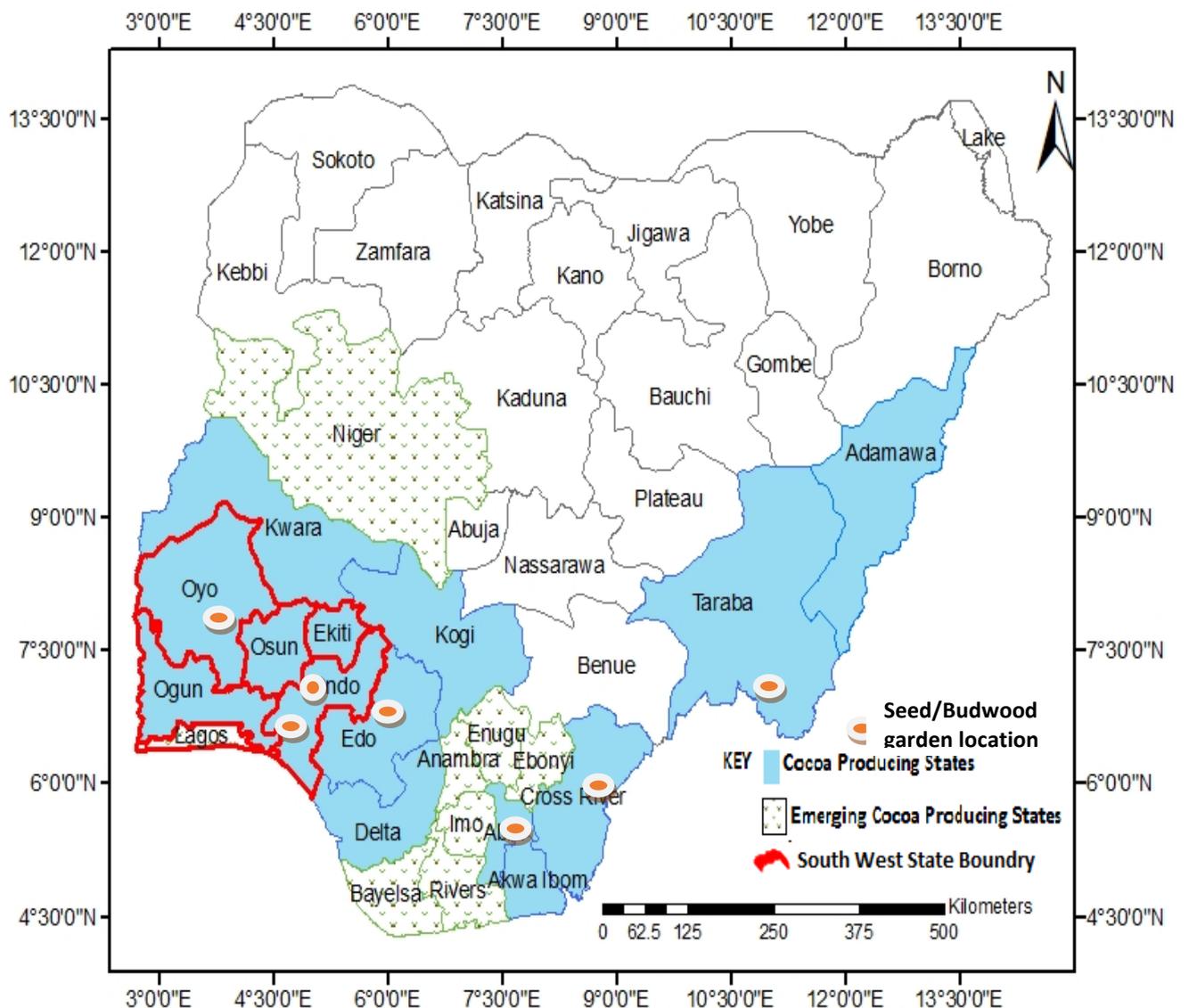


Figure 1: Map showing locations of seed and budwood gardens established by WCF/ACI Phase I

Support private sector-led seed gardens strategy for Ghana

In Ghana, hybrid seed pods are produced and distributed to WCF member organizations by the SPD, a pre-harvest division of COCOBOD. SPD has established seed gardens across the cocoa growing regions of the country. SPD Cocoa Stations continue to play the role of sole producer and distributor of hybrid cocoa seed pods to WCF member organization. SPD has 27 cocoa stations located strategically in all seven cocoa growing regions. For two consecutive seasons, SPD was not able to meet the demands of WCF Members for cocoa seed pods. In the 2016/17 cocoa season only 106,000 pods were allocated compared with the total request for over 430,000 pods. In 2017/18, SPD approved and allocated all the requested seed pods by companies (615,000) but was able to deliver only 370,000 based on beneficiary WCF company reports. In 2018/19, however, SPD has approved and allocated all the requests from WCF. However, SPD has faced challenges in managing all the seed gardens in the seven cocoa growing regions. The gardens have experienced reductions in seed production due to lack of manpower, poor maintenance practices and low amounts and uneven distribution of rainfall during the major and minor seasons. The gardens also experienced severe

prolonged drought during the dry season that adversely affected the establishment of young plants, flowering and fruit set as well as lower pod yield of trees.

As part of our effort to support Cocobod in meeting their Cocoa Sector Development Strategy II (CSDS II) reform priorities, WCF is in the early stages of discussing the possibility of privately managed seed production and plant propagation units and to assist the government in implementing their stated reform priorities around improved germplasm. While this might greatly increase the efficiency of the national seed production efforts, it would require commensurate investments in assessing national capacity to deliver improved seeds, reforming the pricing and ‘free-distribution’ of seedling restrictions that prevent people from selling cocoa seeds or cocoa seedlings. The eventual objective of this effort would be to enable the private sector to manage professionalized seed gardens from the business perspective and make seed pods available throughout the year.

To further develop the technical understanding of this strategy, WCF anticipates producing in the coming year a business model/case for seed garden; and the investment requirements and costing analysis for supporting national production, including a revenue and distribution model, profit and loss statement, internal rate of return, and net present value analysis; which would form the basis for a broader discussion with Cocobod and the private sector on how to implement the CSDS II reforms.

Outcome 1.2 Increased adoption by companies of plant propagation technologies

CocoaAction companies have been supporting improved methods for cocoa planting material production and propagation over the years. In Côte d’Ivoire, Nestlé established the laboratory for somatic embryogenesis and subsequently orthotropic shoots while Mars made significant progress with grafting. In Ghana, Mondelez has supported Tree Global to pilot commercial nurseries that produce and supply superior cocoa seedlings to farmers. Under Outcome 1.2 of ACI II, WCF is working with these companies for widespread adoption of these improved technologies to get more and high-quality planting material to farmers.

Key achievements and Milestones

Test and validate plant propagation technologies in Côte d’Ivoire

In Côte d’Ivoire, less than 30% of cocoa farms are planted with improved planting materials, resulting in low yields and more land clearing for cocoa, including from forest reserves. In 2015, the industry committed to support and facilitate government of Côte d’Ivoire access to improved planting materials. The commitment was agreed in a MoU signed between le Conseil Café-Cacao and WCF-CocoaAction. In 2016, a called “CocoaAction Pilot” was established to test under farmer conditions different propagation technologies developed by Nestlé and ICRAF/Mars using clones recommended by CNRA. The technologies included somatic embryogenesis (SE) and orthotropic shoots (OS) developed by Nestlé, and grafted seedlings (Grafting) provided by ICRAF/Mars. The Pilot involved 15 demonstration plots with the propagation technologies established in five locations representative of the cocoa producing regions of Côte d’Ivoire: Abengourou in the Eastern region, Bouaflé in the Central region, Divo/Gagnoa in the Central West region and San Pedro and Soubré in the South Western region. In February 2016, the pilot started by planting banana/plantain suckers on all plots for temporary shade. In June 2016, SE and Grafted plots were installed followed by OS plots in 2017. In December 2017, the technical committee made of le Conseil Café-Cacao, the Centre national de la recherche agronomique (CNRA), the Fonds interprofessionnel pour la recherche et le conseil Agricole (FIRCA), the Agence nationale d’appui au développement rural (ANADER), WCF and CocoaAction companies conducted an evaluation of the Pilot. The evaluation criteria included effect of heat and drought on the technologies, nutrient requirement, occurrence of the ‘swollen shoot’ infection and farmer appreciation of the technologies (SE, OS and grafted seedlings) in comparison to commonly used hybrids.

Key outcomes

- Technical validation of the SE technology in 2018;
- Further evaluations were recommended for grafting and OS to define the best density for Grafting and the optimal crown height for OS
- OS and grafted plants were less affected by heat and drought and SE plants were the most susceptible to drought
- Participating farmers reported a preference for grafted and SE plants because they produce early flower and many pods.

Recommendation and next steps

From a research perspective, ACI II is working to identify the right rootstock for grafted and SE plants to facilitate scaling with farmers. ACI II is also working with the Cocoa Soil Initiatives to identify the best type of fertilizer and nutrient for the grafted and SE plants. Once the productivity ban is lifted, ACI II will also further the flavor quality assessment of the clones to prevent any flavor drift or shift when these planting materials are adopted and used by farmers.

Capacity building to introduced clonal planting materials in Cameroon

WCF with the support of ACI II is equipping farmers and field technicians from IRAD and Barry Callebaut with the tools and skill to enable clonal planting material propagation and multiplication safely and successfully. WCF has established a Clonal-Based Technology Center (CBTC) to promote clonal propagation and to disseminate clonal varieties. The CBTC stands on a 400 m² surface area and consists of a training facility, propagators; an acclimatization area and a water supply system (borehole). The propagators are covering a surface of 130 m², containing six 10m long propagators. They are used to keep the newly budded rootstocks and to stimulate plant growth. The acclimatization area is used to accommodate the successful cocoa budded/grafted transferred from the propagators. The water supply system consists of a borehole and a water tank to enable irrigation of grafted cocoa plants and rootstocks and the training facilities dedicated to the training of trainers (ToT) sessions with farmers groups and field technicians. Training modules aims to reinforce the technical skills of 10 field technicians from IRAD and farmer groups on clonal propagation technologies and on the on-farm management of clones. Following these trainings, farmers are now establishing community-based budwood gardens in their respective communities. So far, 100 cocoa farmers from Barry Callebaut were trained and WCF with ACI II support aim to train 2,000 farmers on clonal propagation techniques by June 2021.

Company pilots as a response to the productivity ban in Côte d'Ivoire

Less than 30% of cocoa farms in Côte d'Ivoire use improved planting material, resulting in low yields and extensive land use including forest reserves. To address this gap, WCF and its member companies have implemented a limited on-farm pilot program (see description of clonal pilots above) to test plant propagation technologies developed by Mars/ICRAF and Nestlé using clones developed by CNRA under ACI I. These technologies include somatic embryogenesis, orthotropic shoots, and grafting, and after this initial pilot, additional research is still needed to fine-tune orthotropic shoots and grafting technologies. In March-April 2018, the Ivorian government abruptly announced plans to halt all distribution of planting materials and all productivity-enhancing interventions. Le Conseil suspended the distribution and use of planting materials over the 2018/2019 campaign and restricted their use to research activities. Le Conseil requested that WCF report on all company research activities on planting materials during this phase of expanded company pilots. In April 2018, WCF presented a comprehensive overview of company pilots and related requests by individual companies to use hybrids and clonal planting materials in their on-farm company trials. Except for one individual company's request, the expanded company trials were approved—totaling approximately 1,074 ha of on-farm trials to use clonal and hybrid planting materials with the Mars pilots (e.g. 900 ha) part of an existing agreement with le Conseil. WCF with the support of CocoaAction and ACI II is taking on the responsibility of overall coordinator of the company pilots, providing a single point of information and oversight of the company pilots. This include monitoring the company expanded pilots and report to le Conseil and the WCF group of companies involved in the pilots; organizing field visits;

developing and managing the open knowledge-sharing platform; convene sharing and learning meetings; and liaise with le Conseil on behalf of implementing companies to review progress on pilots.

Company expanded pilots involve the collection and analysis of additional valuable agronomic and flavor quality (to be done by the ACI II flavor laboratory at CNRA Bingerville) information and the production of data. ACI II anticipates that findings will provide evidence for adoption by le Conseil of clonal propagation technologies and will also document the adaptation of these clones to climatic changes and resistance to CSSV.

Table 2 lists the ongoing approved company pilots by le Conseil. These pilots will focus on specific issues such as agroforestry, soil nutrition, flavor quality of clonal materials and farm management.

Table 2. Existing and le Conseil approved pilots

Type of pilot	Pilot description	Location	Size (ha)	Partners
Clonal propagation pilots	Existing CocoaAction pilot on clonal propagation (SE, OS and grafting)	San Pedro, Soubré, Bouaflé, Gagnoa/Divo, Abengourou	7.5 ha	2 WCF member companies CNRA, ANADER, ICRAF
	Finalize farm management practices on SE and OS cocoa plants	Divo/Zambakro	3 ha	1 WCF member company CNRA
Agroforestry pilots	Evaluate different agroforestry models under farmer conditions	Tiassalé	12 ha	3 WCF member companies CNRA
	Agroforestry pilots in cocoa farmer farms	Tiassalé	10 ha	2 WCF member companies CNRA
	Scaling Agroforestry practices to combat deforestation	All cocoa growing regions	120	1 WCF member company ICRAF, ECOTIERRA
	Diversification and smart agroforestry practices in rehabilitated CSSVD infected in 3 main cocoa producing regions	Soubre, Sinfra, Vavoua	600 ha	1 WCF member company ANADER, CNRA, ICRAF
Cocoa Soil Nutrition pilots	Evaluate nutrient efficiency (N, P, K) on cocoa physiology and yield parameters	Maféré	2,3 Ha	1 WCF member company ANADER, CNRA
	Nutrient replenishment pilots in cocoa farms in collaboration with the CocoaSoils initiative.	Tiassalé	2 Ha	1 WCF member company IDH, Cocoa Soil consortium, CNRA
Rehabilitation and farm management pilots	Rehabilitation of CSSVD infected farms	Soubre, Sinfra, Vavoua	600 ha	1 WCF member company ANADER, CNRA, ICRAF
	Rehabilitation of overaged cocoa farms in the Nawa region	Nawa	300 ha	1 WCF member company ANADER, CNRA, ICRAF
	Pruning and shade management pilots	Tiassalé	2 ha	1 WCF member company Wageningen U., CNRA

	Rehabilitation and farm regeneration pilots in association with food crop diversification	Abengourou - Haut Sassandra - bas Sassandra - Gagnoa	15 ha	1 WCF member company CNRA
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Develop an early detection tool for the management of the cocoa swollen shoot virus in Ghana and Côte d'Ivoire

With over two million smallholder farmers and 10 million people in West and Central Africa relying on cocoa as their main source of income or part of their livelihoods, a healthy and sustainable cocoa industry means opportunity for economic growth and poverty alleviation in the region. A major threat to this vision is the devastating Cocoa Swollen Shoot Virus (CSSV), spreading rapidly in Côte d'Ivoire, Ghana, Nigeria, and Togo. ACI II and CocoaAction of WCF has developed an early detection tool which has the potential to safeguard the livelihoods of millions of farmers in the region.

ACI II and the industry-wide CocoaAction strategy in collaboration with public and private partners, have developed an *early detection tool* that will soon be deployed in Côte d'Ivoire. This early detection tool combines real-time polymerase chain reaction (PCR) and DNA-based genetic testing (a plant is declared diseased if the DNA of the virus is present). A handheld PCR device is used to screen samples in the field, and only a few samples are sent to a specialized laboratory for DNA testing. This process requires a robust sampling protocol for farms and nurseries to ensure proper analysis of the disease presence and its spread (Figure 2). Discussion are underway with various institutions in Cote D'Ivoire about what might be an acceptable process going forward to deploy the tool on a commercial or semi-commercial basis.

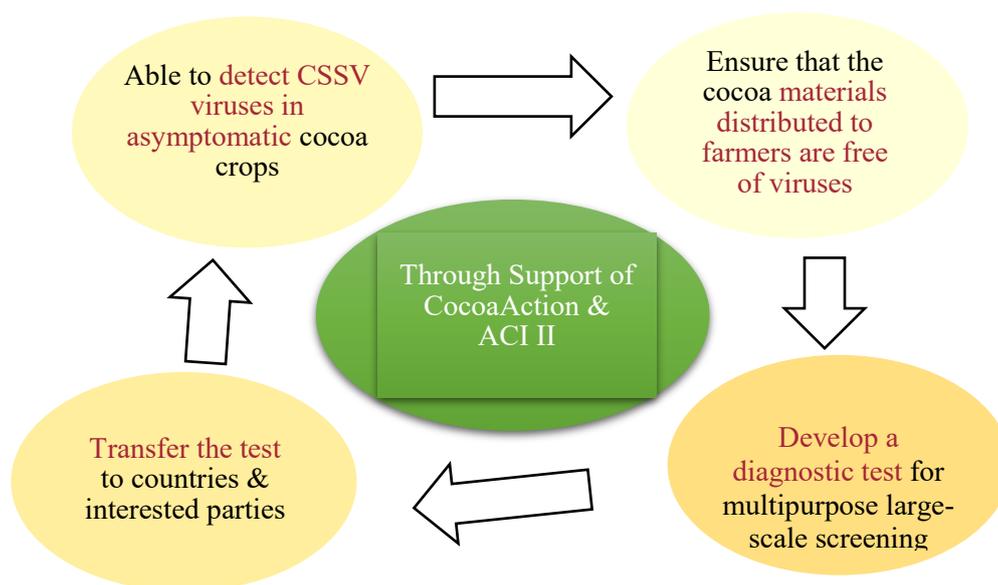


Figure 2. Steps in using the early detection tool against CSSVD



Figure 3. Host plants in cocoa farms serving as reservoir for mealybugs. Ants as you see on the left picture usually shelter mealybugs and help them to move from one plant to another

When a cocoa tree is infected, it takes a while for symptoms (swelling of shoots and red ban vein on young leaves or flushes) to manifest and three years for the tree to completely die. As a result, farmers may inadvertently spread the disease by sharing infected planting materials or through grafting and transferring infected germplasm. This is the main cause of the rapid spread of the virus in Côte d’Ivoire, Ghana, Nigeria and Togo. The only known cure is cutting and destroying infected trees.

On August 23, 2018, the governments of Côte d’Ivoire and Ghana announced a concerted, joint control effort to combat CSSVD. They described the threat posed by CSSVD as “comparable to natural disasters like tsunamis and earthquakes” and urged producers to allow their farms to be treated (<https://www.worldcocoafoundation.org/blog/early-detection-can-eradicate-cocoa-disease-in-west-africa/>).

The virus has already infected 16.5% of Ghana’s cocoa areas (more than 300,000 ha) and the government is planning on investing an estimated US\$33 million to replace 22,850 ha of infected cocoa farms across the country over the next two years. The government of Côte d’Ivoire will cut more than 100,000 ha of infected cocoa farms in the next three years, which will cost an estimated US\$ 19 million.

The World Cocoa Foundation (WCF) believes that the key to CSSVD eradication is early detection, both in planting material, before seedlings reach farms, and on existing trees, before symptoms occur. This should be part of an integrated approach to identification, management, cutting out of infected farms, replanting, and diversification.

Develop Integrated soil fertility management strategies for seedling production in Ghana

Objective: To demonstrate the value of, and the business case for, enhancing soil fertility in cocoa farms for sustainable cocoa production, while preserving natural resources and improving the knowledge, skills and resilience of cocoa farmers. A collaboration between ACI II, Climate Smart Cocoa (CSC) and the Cocoa Livelihood Program (CLP), involving the International Fertilizer Development Centre (IFDC).

Main Activities:

- Promotion of biofertilizer in raising cocoa seedlings for rehabilitation of old farms;
- Promotion of compost and biochar to improve soil health on mature cocoa plantation;
- Delivery of training manuals for the production and use of Trichoderma and for the production and use of cocoa residue-based compost;
- Organization of training of trainers for CLP and CSC companies;
- Learning from demonstration plots in various climatic impact zones; and
- Technology demonstration report incl. CBA and investment proposal.

Process

Support provided to CLP company, Touton, KookoPa, Hershey/Ecom, and Barry Callebaut/Nyonkopa to set up professional nurseries for seedling production using TeB which includes the organic materials, cocoa pods, sawdust as soilless media with Trichoderma.

Next steps

- Continuation of the nursery set up for the second phase of the trials with Hershey/Ecom at Kona (90% completed) and with Barry Callebaut/Nyonkopa at Juaso (20% completed);
- Coordinate with IFDC to design a data template for the other parameters in conformity to the KPI's;
- Monitoring and performance Assessment of the pilot project (at all the nursery sites);
- facilitate the participatory evaluation of the effect of compost, biochar and TeB on seedling production and the performance of the seedlings;
- Capacity building and training on the production of biochar, compost and Trichoderma and management of cocoa seedlings from planting to fruiting; and
- CBA and investment proposal.

Objective 2 – An Enabled Ecosystem for Financial Services

Recognizing how digital payments can be a game-changer for farmers, ACI II, WCF and the Better Than Cash Alliance are working in partnership to support the growth of digital payments in the cocoa value chain to promote inclusive growth, boost productivity and improve the livelihoods of smallholder cocoa farmers, especially women.

WCF is a member of the Better Than Cash Alliance, a UN-based global partnership of governments, companies, and international organizations that accelerates the transition from cash to digital payments to drive inclusive growth. The Alliance has over 60 members across 30 emerging markets, including companies and business organizations such as Unilever, H&M, Gap Inc and Grupo Bimbo.

The objectives of this initiative are:

- **Learn:** Better understand the opportunities and challenges of introducing digital payments to cocoa farmers;
- **Disseminate:** Share the learnings and best practices knowledge; and
- **Support:** Support WCF members with neutral and responsible DFS-related technical assistance.

Outcome 2.1 Increased availability and use of high-quality financial services by farmers

Between October 2018 and March 2019, WCF under ACI II undertook a survey to help establish a baseline for farmer understanding and use of DFS; identify farmer points of expenditure to target digitization efforts; develop and conduct trainings for farmers and purchasing agents.

ACI II activities falls into company specific and pre-competitive categories. The company specific activities are focused on technical assistance as requested by WCF member companies and provided by the WCF DFS technical expert consultant. The pre-competitive activities are those that are to the benefit of the industry overall, providing access to all WCF members to content, activities and engagements that bring them closer to initiating or scaling digitization initiatives in their supply chains.

Key achievements and Milestones

Provide training on digitizing cocoa value chain

A DFS workshop was organized on the 22nd of November 2018 to introduce company members to digitized payments in the cocoa value chain. This was to ensure that there is clarity within cocoa companies on the process and implications of going digital and mitigation strategies for any challenges and as well expose the participants to the materials that would be used to educate other stakeholders (including farmers) on digital financial services.

Participants were also introduced to various digital financial services products by way of presentations, Financial Aggregators (NFORTICS and IT Consortium), Issuers of digital credit (Jumo Ghana), digital pensions and digital health insurance (Peoples' Pensions Trust and Mirco Ensure). WCF company members that benefited from the workshop included; Kookoopa, Kuapa Kokoo Limited, ECOM, The Hershey Company, Touton, Cargill, OLAM, Cocoanect, Tree Global. In attendance to the training was a representative for the Better Than Cash Alliance (BTCA).

At a meeting in Ghana of our locally represented companies, a request was made by WCF members for another round of presentations from Mobile Network Operators for them to understand the technical and commercial parameters because of digitized payments.

In pursuance to this request, a training was hosted at the World Bank Ghana office where presentations were made by MTN, Vodafone, AirtelTigo and NFORTICS on the 28th of February 2019. The presentation stressed company pricing, network coverage, agent availability and technical assistance. WCF company members that benefited from the training at the World Bank included OLAM, ECOM, The Hershey Company, Cocoa Merchant Limited and Nestle. Contacts of the companies that presented their products to the Huddle were shared for individual WCF members follow up.

Provide technical assistance on digital financial services to WCF member companies

With regards to the provision of technical assistance to companies that have expressed interest in piloting digital payments along their value chain, two-member companies of WCF have had an agreed scope of work signed with the activities at various level of implementation. The agreed activities in the statement of work for two WCF member companies including;

- Training of staff, PCs on DFS;
- Ecosystem buildout to support digitize payments;
- Farmer sensitization of Digital Financial Services; and
- Development of Request for Proposal (RFP) to support DFS provider selection for the member company.

However, the statement of work for another member company is currently under review, this would include:

- Review existing training content and channels to identify opportunities for embedding DFS content;
- Development of digital financial services content and upload to CocoaLink (both voice and app platforms) – Farmerline; and
- General assistance and trouble shooting.

Develop DFS sensitization materials

In the quest to ensure that farmers are sensitized on the opportunities that DFS presents in ensuring financial inclusion, a voice sensitization notes in the format Instant Voice Response (IVR). The voice sensitization notes developed had three modules which was to address the introduction to Digital Financial Services, how to use digital financial services and the digital financial service products that smallholder farmers can have access to. The sensitization tool will be shared with company members on a pre-competitive basis and the Ghana COCOBOD to be a part of their extension educational materials.

A total of 588 farmers with a male and female disaggregation of 369 and 219 respectively had a direct sensitization from ACI II. A selected 1000 farmers will be receiving voice call from Viamo. The voice sensitization notes have been endorsed by the Ghana COCOBOD for dissemination (Annex 2).

To ensure that the impact of the sensitization can be measured, a baseline survey is being conducted by Viamo through voice call to a sample size of 375 smallholder farmers.

Define merchant points and farmer experience with mobile money

This ACI II activity was to ensure that farmers who will be receiving digital payments will have a use case for their digital cash, there has been the need to identify farmer expenditure points. This will ensure a collaboration with the Mobile Network Operators to digitize identified points.

A follow up was made with shops identified from the extracts of the expenditure points of farmers from the DFS survey in the Amansie Central Districts in the Ashanti Region and Agona Amenfi and AsankragwaAsankrangwaa Districts in the Western Region. The activity was undertaken in 13 communities across the two regions involving 74 identified shops. A total number of 23 shops expressed willingness to receive digital payments.

Questionnaire was developed to collect data on farmers experience with mobile money, experience with mobile money agents, farmers expenditure and experience with digital payments. This is in the objective of working closely with MNOs to be able to digitize farmers expenditure points so that there can be a use case for the digital payments that farmers receive after the sales of their cocoa beans. A sample size of 350 farmers responded to the questionnaire which involved 150 and 200 farmers of Kuapa Kokoo and Cocoanect respectively (Annex 3).

The dataset was analyzed to capture the following areas of interest;

- Respondents general information
- Experience with Mobile Money
- Experience with Mobile Money agents in communities
- Information on income thus, receiving payments
- Information on expenses thus, making payments and
- A conclusion on mobile money

BTCA and ACI II of WCF Collaboration

The first phase of the DFS implementation collaboration between ACI II of WCF and BTCA has ended. Companies that are receiving the Technical Assistance have confirmed the receipt of the TA by way of documenting what activities has been achieved and what is yet to be undertaken. In view of this, the BTCA has extended the funding period for another phase of the pilot which will run until March 2020. This process is to document the various processes involved in digitized payments. These documents will be available for the public good. Some of the tools developed which will be available to companies on a pre-competitive basis include;

- DFS sensitization materials (Voice, posters, videos etc.)
- DFS survey questionnaire
- DFS analysis and PPT template
- Request for proposal (RFP) documents to guide companies in vendor selection
- Blogs on the DFS implementation process etc.

Objective 3 – Increased Flavor Quality of Cocoa

Outcome 3.1 Companies Prioritize Cocoa for Flavor Quality and use the Flavor Quality Lab to support their Purchasing Decisions/ Practices

WCF with the support of ACII aims to improve productivity of cocoa as a means of improving farmer livelihood, the emphasis is on higher yields, disease tolerance/resistance and more recently, tolerance to abiotic stress like heat and prolonged drought. WCF is working to ensure that flavor quality, which is the reason chocolate makers include cocoa from specific origins in their recipes, is not lost in the pursuit of those other desirable traits. ACI II achieves this through the cocoa flavor quality laboratory that provides the tools to enable national cocoa research institutes to integrate flavor characteristic into their cocoa breeding programs. The flavor laboratory also makes liquor from cocoa beans to for the training of cocoa extension staff and subsequently cocoa farmers on the effects of harvest and post-harvest practices on flavor development.

During the first phase of ACI, from 2011 to 2016, WCF supported the establishment of a flavor quality laboratory at the Cocoa Research Institute of Ghana (CRIG). WCF has supported the transitioning of the laboratory to CRIG, which has been operating the lab without WCF support since December 2016. WCF has also supported the establishment of a second flavor quality laboratory at and the *Centre National de Recherche Agronomique* in Côte d’Ivoire and plans to establish a final, third laboratory in either Cameroon or Nigeria in 2019.

Key achievements and Milestones

Setting up new flavor quality laboratory in Cameroon and Nigeria

CNRA completed all required civil works for the flavor quality laboratory in Abidjan. WCF also purchased equipment for the Ghana laboratory. Both flavor laboratories of Ghana and Côte d’Ivoire are staffed with a fully trained team to manage the equipment an operation of the laboratory.

WCF with the support of ACI II published a request for proposal from the government and cocoa research institutions of Cameroon and Nigeria to establish and operate a third flavor quality laboratory either in Cameroon or Nigeria. WCF anticipate that the laboratory will be operated with WCF support from January 2019 to June 2021, after which interested applicants will need to demonstrate an ability and willingness to take over the management of the laboratory. The RFP was evaluated by 5 experts from CocoaAction workstream 1 group on flavor quality based on the following criteria:

1. A presentation of bidding institution
2. Objectives for hosting flavor quality laboratory
3. Demonstration of technical capacity to manage and run a laboratory.
4. Demonstration of availability of resources and/or industry linkages to facilitate the establishment and operation of the flavor laboratory (including letters of support, in annex, where available
5. Annexes
 - a. Logical framework for flavor laboratory (objectives, activities, and monitoring plan)
 - b. Details of the physical layout and proposed location for the laboratory
 - c. Overview of the management and staffing plan for the laboratory
 - d. List of in kind and financial contributions of the hosting institution to the laboratory
 - e. Demonstration of support—
 - i. Letters of commitment from the hosting institution
 - ii. Letters of support from other lab stakeholders such as local WCF member companies and/or local farmer groups and/or local processors and chocolate makers
 - iii. Other

Cameroon and Nigeria presented strong application in response to the request for proposals that WCF published in November 2019. Proposals were required to include availability of financial resources, physical space and personnel for the laboratory, and expressions of interest from industry partners

indicating their specific support for the flavor quality laboratory in either country. Initial reviews of the proposals indicate that both countries make a compelling case for a flavor laboratory. WCF is reviewing the budget for ACI II and engaging in consultations to evaluate the feasibility of two laboratories instead of one. ACI II will reach a decision on the laboratory by the end of May 2019 after consultations with ACI II Steering Committee members.

Support training of flavor quality in Côte d'Ivoire

To mark the National Cocoa and Chocolate Day (JNCC) in Côte d'Ivoire, ACI II organized a flavor panel session during the NJCC on flavor quality on October 1, 2019. During a tasting session, participants learned to appreciate the difference between good and bad flavor quality cocoa. Following this event, the Conseil du Café-Cacao solicited WCF's assistance for a flavor quality conference to be held in Abidjan in June 2019.

ACI II commenced discussions with CNFA for collaboration to train more farmers in Côte d'Ivoire. This collaboration, under ACI II and MOCA projects respectively for the two institutions, will enable WCF to reach 20,000 additional farmers in Côte d'Ivoire beyond the numbers that training via ANADER extension agents will reach. As a first step in this collaboration, ACI II helped CNFA to organize an exchange visit to Ghana for Ivoirian farmers. The visit, which took place from March 7-10, 2019 helped the Ivoirian farmers, cooperative leaders, cocoa research scientists and regulatory officials learn from Ghanaian farmers the best post-harvest handling techniques for ensuring flavor quality cocoa. During a visit to CRIG, participants tested cocoa liquor samples and learned firsthand the effects of various harvest and post-harvest practices on flavor quality.

Outcome 3.2 Increased employment of appropriate post-harvest practices by farmers for cocoa that ensures high flavor quality

Improve the knowledge and skills of government extension agents and farmers on flavor quality

ACI II has drawn up long-term flavor quality work plans with both CNRA and CRIG. The knowledge gained by the Ivoirian lab team will be transferred to farmers through ANADER extension agents and CNFA staff implementing the MOCA project. Also, the collaboration with CNFA will allow ACI II to verify that farmers are applying the lessons they acquire from the trainings. This will be achieved through the market linkage aspect of the MOCA project, where chocolatiers will give an indication of the improved flavor quality of beans produced by participating farmers by sourcing from these farmers in future.

Cross-cutting Research and Learning Activity

Cocoa income and household food security study

ACI II is supporting WCF's vision of a cocoa sector where farmers prosper, communities are empowered, human rights are protected, and the environment is preserved. In delivering on these strategic priorities, ACI II engaged a consultant to conduct an assessment on the contribution of cocoa to nutrition and food security, with the main goal of increasing sustainable cocoa productivity among smallholder cocoa farmers in West Africa. This study was one of the main recommendations of USAID's final evaluation of the first phase of ACI.

The study focuses on the multiple dimensions of food security (availability, accessibility, utilization, stability) including controls for household demographics and wealth indicators. The main objective of the assignment is to conduct a comprehensive study on the contribution of cocoa production to nutrition, food security and the livelihood of cocoa farmers. The preliminary results of this study are anticipated in 3 months.

The consultants have already provided a comprehensive literature review and conceptual pathways between cocoa production, nutrition and food security (Figure 5).

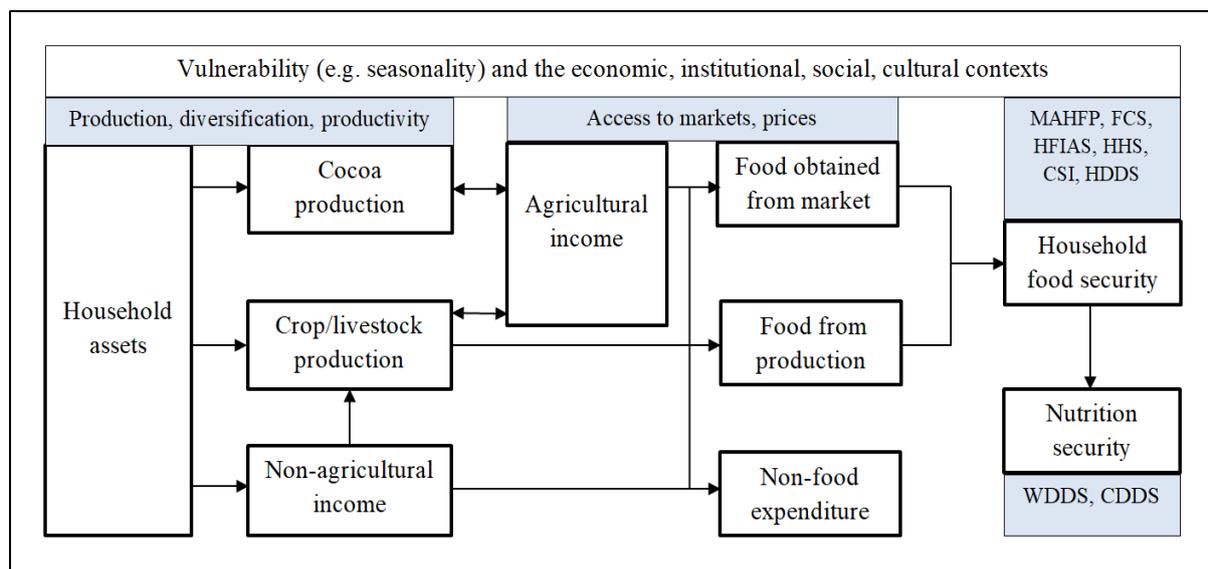


Figure 5. Conceptual pathway between cocoa production, nutrition and food security¹

Study and sampling design

The consultants have conducted a pre-survey statistical power analysis and determined an optimal sample size of 400 households for the study with a power effect of 85%. Using the Optimal Design in STATA, the consultants will conduct field survey data collection while taking into consideration region, community, farmer groups under various cocoa companies and gender of cocoa farmers. ACI II will collect data in Cameroon and Côte d'Ivoire to complement the data collected in Ghana.

From the field survey design, data will be collected from the four regions that have the highest concentration of cocoa farmers (Western North; Western South, Ashanti and Brong Ahafo). For each region, data will be collected using a two-step stratified random sampling approach. First, a community list will be obtained from the directorate of Ministry of Food and Agriculture (MoFA) in each region and categorized into ten strata: those participating in various cocoa farmer groups under WCF member companies.

Table 5 summary of indicators for the study.

	Variable	Indicators (metrics)	Source
<i>Food Security</i>	Availability	Months of Adequate Household Food Provisioning or Supply	Food Frequency Survey
	Access	Household Food Insecurity Access Scale Household Hunger Scale Reduced Coping Strategies Index	Food Frequency Survey

¹ MAHFP - Months of Adequate Household Food Provisioning; FCS - Food Consumption Score; HFIAS - Household Food Insecurity Access Scale; HHS - Household Hunger Scale; CSI - Coping Strategies Index; HDDS - Household Dietary Diversity Score; WDDS - Women's Dietary Diversity Score; CDDS - Child Dietary Diversity Score

	Utilization	Diet Diversity Scores (HDDS, WDDS, CDDS) Food Variety Score Anthropometric scores: Height-for-age Weight-for-height Weight-for-age	Food Frequency Survey Anthropometric survey
	Stability	Months of food self-provisioning capacity Variability of food prices	Household Survey
Confounding Factors	Cash Crop Production	Quantity of Cash Crops Produced (kg) Percent of Total Land for Cash Crops (%)	Household Survey
	Household Demographics	Female Headed Households (% of Total) Household Head Education Level Dependency Ratio	Household Survey
	Wealth	Total Land Used for Agriculture (ha) Asset Index	Household Survey
	Cocoa revenue/income	Total cocoa revenue/income from households	Household Survey

Active indicators in FTFMS

The following ACI II indicators have been revised FY2019

EG.3-1: Number of households benefiting directly from USG interventions [IM-level]

This indicator is being dropped and has been replaced with EG.3-2 Number of individuals participating in USG food security programs [IM-level] to count number of individuals instead of households to get a better understanding of the breadth of our food security work. For out years, 2019 and beyond please, delete the targets here and set the targets and then eventually report actuals using EG 3-2

EG.3-6, -7, -8: Farmer's gross margin per hectare, per animal, or per cage obtained with USG assistance [IM-level]

Transition to the new indicator EG.3-10, -11, -12 Yield of targeted agricultural commodities among program participants with USG assistance [IM-level]

EG.3.2-1: Number of individuals who have received USG-supported short-term agricultural sector productivity or food security training [IM-level]

Reminder: Except for results reported in FY18 and FY19 for IMs previously reporting on the indicator, this is no longer required nor collected centrally.

EG.3.2-3: Number of micro, small, and medium enterprises (MSMEs), including farmers, receiving agricultural-related credit as a result of USG assistance [IM-level]

This indicator has been replaced by EG.3.2-27 Value of agriculture-related financing accessed as a result of USG assistance [IM-level]. Please transition to this indicator to avoid double counting. It should be fairly easy since nothing is reported yet.

EG.3.2-17: Number of farmers and others who have applied improved technologies or management practices with USG assistance [IM-level]

Replaced by EG.3.2-24 Number of individuals in the agriculture system who have applied improved management practices or technologies with USG assistance [IM-level] Please delete outyear targets under this indicator, add the new indicator and put the outyear targets under the new indicator.

EG.3.2-18: Number of hectares of land under improved technologies or management practices with USG assistance [IM-level]

Replace with EG.3.2-25 Number of hectares under improved management practices or technologies with USG assistance [IM-level] Out year targets should be deleted and added under this new indicator. Also, the baseline should likely be zero. It looks like FY17 actuals were used at the baseline here.

Program Governance: Steering Committee

The Technical Working Committee (TWC) is the primary governance structure of CocoaAction and acts as a committee to the World Cocoa Foundation (WCF) board of directors. TWC is made up of one senior technical representative from each participating CocoaAction company. TWC has been expanded to serve as the ACI II Project Steering Committee in which USAID and representatives of non-CocoaAction companies, are also represented. The Chief of Party represents the implementing team and the AOR represents USAID at TWC Meetings. There was one TWC meeting in January 2019 during which topics like clonal planting material strategy for Ghana, Material, Implementation of the CSSVD laboratory and company expanded pilots were discussed. During this meeting, TWC endorsed to financially support the company pilot proposal with strong recommendation of WCF to engage with le Conseil in Côte d'Ivoire to report based on the company approved pilot matrix. TWC members requested WCF to circulate the results and final report from the CocoaAction pilots in Côte d'Ivoire to all members.

The TWC approves the annual productivity workplan of CocoaAction and the Workstreams (WS) act as communities of practice for different technical representatives to support the implementation of the work. WCF organizes biweekly scientific and operational calls around breeding, integrated soil fertility management (IFSM), CSSVD and DFS. These calls were reorganized around two strategic groups to better reflect productivity elements and needs. The Science discussion to elaborate and provide scientific recommendations on the best strategy to propagate elite planting materials (i.e. with merged parameters relevant to SE/OS, grafting as well as CSS, heat/drought and flavor) including the soil management strategy associated; The Implementation/Delivery discussion to contextualize the science-based recommendations (e.g. customized recommendations) to meet farmer's needs with the aim to optimize cocoa plant (i.e. selected elite clones) /soil interactions, manage soil fertility and shade, and minimize fertilizer inputs and pesticide applications. Both discussions are complementary to facilitating the successful establishment of cocoa tree (e.g. elite clones) and optimize productivity. Members of delivery discussion include people with good understanding of the local reality, agronomy and policies related to cocoa rehabilitation. WCF staff members facilitate regular calls with this two groups to ensure adequate oversight and coordination within individual company programs. It is through this mechanism that ACI II develops and presents the annual productivity work plans for review and validation by these experts, prior to transmission to the Steering Committee and USAID for approval. The work streams also coordinate implementation meetings to appraise various activities and work of contractors and sub-grantees.

Project Management Unit: As the principal execution arm of the project, this team, based primarily in Ghana, is charged with the day to day oversight and execution of ACI II workplans for productivity and financial inclusion, as well as data collection, knowledge management and learning. The PMU organized a Project Activities Inception Meeting in Ghana on March 26 - 27, 2019. There were no changes in the PMU during the period under review.

Activity Implementation Locations

Country	Sub-objective	Activity	Period
Cameroon	Increased Use of Improved planting material	Training farmers and cooperatives on clonal planting material propagation	Q3 FY2019 onward
Cameroon	Increased Use of Improved planting material	Establishment of community bud-wood garden to support introduction of clonal planting material to farmers	Q4 FY2019 to Q3 2021
Côte d'Ivoire	Improved Quality of Planting Material	Establishment of bud-wood gardens for potential heat and drought tolerant planting material	Q4 FY2019 onward
Côte d'Ivoire	Improved Quality of Planting Material	Identification of potential heat and drought tolerant planting material	Q3 FY2019 onward
Côte d'Ivoire	Improved Quality of Planting Material	Observation of impact of irrigation on seed pod production in seed gardens	Q3 FY2019 onward
Côte d'Ivoire	Improved Quality of Planting Material	Flavor quality analysis and training sessions at flavor laboratory in Abidjan	Q4 FY2018 onward
Ghana	Increased Use of Improved planting material	Support for distribution of seed pods to CocoaAction companies	Q2 FY2017 onward
Ghana	Improved Quality of Planting Material	Trails to identify potential heat and drought tolerant planting material	Q4 2018 onward
Ghana	Improved Quality of Planting Material	Expanded flavor quality trainings in Ghana	Q3 FY2018 onward
Ghana	Enabled Ecosystem for Financial Services	Mobile Platform for Financial Services	Q3 FY2018 onward
Nigeria	Improved Quality of Planting Material	Assessment of established in-country planting material production capacity	Q2 FY2019 onward