World Cocoa Foundation
African Cocoa Initiative Phase II (ACI II)

Cooperative Agreement AID-OAA-A-16-00052

Annual Report

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<th>Definition</th>
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<td>ACBG</td>
<td>African Cocoa Breeders’ Group</td>
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<tr>
<td>ACI II</td>
<td>African Cocoa Initiative Phase II</td>
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<tr>
<td>AOR</td>
<td>Agreement Officer’s Representative</td>
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<tr>
<td>CCC</td>
<td>Conseil du Café-Cacao</td>
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<tr>
<td>CNRA</td>
<td>Centre National de Recherche Agronomique</td>
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<tr>
<td>COCOBOD</td>
<td>Ghana Cocoa Board</td>
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<tr>
<td>COP</td>
<td>Chief of Party</td>
</tr>
<tr>
<td>CRIG</td>
<td>Cocoa Research Institute of Ghana</td>
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<tr>
<td>CRIN</td>
<td>Cocoa Research Institute of Nigeria</td>
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<td>DFS</td>
<td>Digital Financial Services</td>
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<tr>
<td>FMARD</td>
<td>Federal Ministry of Agriculture and Rural Development</td>
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<td>FTF</td>
<td>Feed the Future</td>
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<td>FTFMS</td>
<td>Feed the Future Monitoring System</td>
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<td>GAP</td>
<td>Good Agricultural Practices</td>
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<tr>
<td>GDA</td>
<td>Global Development Alliance</td>
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<td>GDI</td>
<td>Global Development Incubator</td>
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<td>GIZ</td>
<td>German International Development Cooperation</td>
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<td>ICRAF</td>
<td>World Agroforestry Centre</td>
</tr>
<tr>
<td>IITA</td>
<td>International Institute of Tropical Agriculture</td>
</tr>
<tr>
<td>IRAD</td>
<td>L’Institut de Recherche Agricole pour le Développement</td>
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<tr>
<td>ISF</td>
<td>Initiative for Smallholder Finance</td>
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<tr>
<td>MINADER</td>
<td>Ministry of Agriculture and Rural Development</td>
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<td>PMP</td>
<td>Performance Management Plan</td>
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<tr>
<td>R&amp;R</td>
<td>Rehabilitation and renovation</td>
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<td>SNV</td>
<td>Netherlands International Development Organization</td>
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<tr>
<td>SPD</td>
<td>Seed Production Division of Ghana Cocoa Board</td>
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<tr>
<td>ToT</td>
<td>Training of Trainers</td>
</tr>
<tr>
<td>TWC</td>
<td>Technical Working Committee</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>USAID/BFS</td>
<td>United States Agency for International Development/Bureau for Food Security</td>
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<tr>
<td>USG</td>
<td>United States Government</td>
</tr>
<tr>
<td>VSLA</td>
<td>Village Savings and Loan Associations</td>
</tr>
<tr>
<td>WCF</td>
<td>World Cocoa Foundation</td>
</tr>
<tr>
<td>WCF/ACI</td>
<td>World Cocoa Foundation African Cocoa Initiative, the first phase of ACI II</td>
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</table>
**Glossary**

**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 production and use of quality cocoa planting material; 2) Facilitate an enabled ecosystem for financial services; 3) Improve access to Village Savings and Loan Associations in Côte d’Ivoire; and 4) Improve the flavor quality of cocoa in support of total farm productivity and resilient agri-food systems among smallholder cocoa farmers in West Africa.

**Centre National de Recherche Agronomique (CNRA)**
Côte d’Ivoire’s national research institute for agriculture including cocoa. Plays a strong role in cocoa productivity research and breeding. Involved as a national institute in the supply of improved planting material and the assessment of heat/drought tolerant planting material. CNRA hosts the second ACI II flavor laboratory.

**CocoaAction (CA)**
CocoaAction was launched in 2014 as a voluntary industry-wide strategy that focuses on aligning the world’s leading cocoa and chocolate companies’ sustainability priorities with those of the governments of Côte d’Ivoire and Ghana. CA’s common action coordinated activities and investments with other key stakeholders aimed to improve learning and knowledge management across the sector. CA ended in 2019.

**Cocoa Research Institute of Ghana (CRIG)**
CRIG is the national cocoa research institute of Ghana and host organization for the first ACI flavor and sensory laboratory. CRIG has a strong role in cocoa productivity research and 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 and breeding and is active in the ACBG. CRIN hosts the third ACI II flavor laboratory.

**Conseil du Café-Cacao (CCC)**
CCC is the National regulatory authority for the cocoa sector in the Côte d’Ivoire. CCC is responsible for coordination and policy making, including season price setting, farmer training, rural services, and sector performance. CCC works with ACI II as the government representative and partner.

**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 represents the Government of Ghana’s interests under ACI II.

**L’Institut de Recherche Agricole pour le Développement (IRAD)**
IRAD is the national research institute for agriculture in Cameroon, including cocoa. IRAD supports cocoa productivity research and breeding strategies. IRAD is a key member of ACBG and facilitates the dissemination and delivery of improved cocoa planting material to end-users in Cameroon. IRAD hosts the fourth ACI II flavor laboratory.

**Village Savings and Loan Associations (VSLA)**
A VSLA is a self-managed microfinance initiative that provides communities with access to savings, credit, and other capacity building services. Association members are self-selected and self-governed. They meet on a weekly basis to deposit their savings.
Executive Summary

In September 2016, USAID approved a Global Development Alliance program, entitled the African Cocoa Initiative Phase II (ACI II) project implemented by the World Cocoa Foundation (WCF), designed as a direct support to the CocoaAction’s sustainability platform. In June 2019, USAID amended the agreement for ACI II to include new activities on Village Savings and Loan Associations (VSLA) in Côte d’Ivoire and extend the end date of the program from September 30, 2021, to May 31, 2022. ACI II’s objectives are: 1) increased production and use of quality cocoa planting material; 2) an enabled ecosystem for financial services; 3) VSLAs in Côte d’Ivoire; and 4) improved flavor quality of cocoa. All these actions support farm productivity and resilient agri-food systems among smallholder cocoa farmers in West Africa.

Under Objective 1, Increased Production and Use of Quality Cocoa Planting Material, the Cocoa Research Institute of Ghana (CRIG) confirmed results from 2019 and 2020 that showed clear differences in stem diameter and early establishment between the various hybrids. Data collection on flowering intensity and pod count, indicators of precocity, will continue till March 2022 to enable the selection of productive cocoa hybrids for areas with high frequencies of drought. The L’Institut de Recherche Agricole pour le Développement (IRAD) in Cameroon trained 100 lead farmers in cocoa grafting techniques to enable them to use clonal material from the community budwood gardens to create new farms. In Côte d’Ivoire, Centre National de Recherche Agronomique (CNRA) undertook maintenance and replacement operations to improve the density of all six budwood garden plots. In all, 2,592 clones had been planted and 368 dead plants replaced. The plots have a low average mortality rate (15%), which is attributed to good agronomic practices (mulching, irrigation, pest, and disease control) carried out in the field.

Towards Objective 2, An Enabled Ecosystem for Financial Services, WCF commissioned a study to assess the cost of digitization in the cocoa value chain in Ghana. This study revealed significant (USD 15.5 M) cost savings, to the cocoa value chain in Ghana, from the use of digital payments over cash. It also sets out the key opportunities and advantages in shifting to digital payments throughout the supply chain, based on which the study recommends concerted sensitization and education on digital financial services, regulation to encourage digital payments, efforts to reduce transaction fees, and improved cellular network infrastructure in cocoa producing areas.

For Objective 3, Village Savings and Loan Associations in Côte d’Ivoire, 171 new VSLAs were set up with most members registered being women under 30 years. Thus, all the expected groups have been created. The 4,200 members of the 497 groups created mobilized savings of USD 791,179 of which USD 35,642 was granted as loans to members.

Under Objective 4, Improved Flavor Quality of Cocoa, more than 120,000 farmers received training in harvest and post-harvest techniques for improved cocoa flavor quality. Ghana Cocoa Board (COCOBOD) commenced construction of a new flavor laboratory and training center at CRIG. COCOBOD is now the main funder of this project, which WCF member, Ezaki Glico/TCHO initiated with an investment of $170,000. Following the training of their flavor lab teams, Cameroon’s IRAD, Côte d’Ivoire’s CNRA, and Nigeria’s CRIN undertook the harvest, fermentation, drying and preparation of liquor from their stock of hybrid and clones introduced to farmers over the years. These liquor samples were distributed to WCF company flavor quality experts and used in a second live regional tasting session in June 2021 for all four labs.

This report contains details of the activities undertaken and progress towards the achievement of ACI II project results from October 2020 to September 2021.

1 CocoaAction was launched in 2014 and implemented until 2019 as a voluntary industry wide strategy that focuses on aligning the world’s leading cocoa and chocolate companies’ sustainability priorities with those of the governments of Côte d’Ivoire and Ghana. CA coordinated activities and investments with other key stakeholders and aimed to improve learning and knowledge management across the sector.
Table of Indicators

<table>
<thead>
<tr>
<th>FTF Indicator #</th>
<th>Indicator</th>
<th>Life of Project: FY2017-FY2021</th>
<th>Year 5- FY2021</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Target</td>
<td>Achieved</td>
</tr>
<tr>
<td>EG.3.2-24</td>
<td>Number of individuals in the agriculture system who have applied improved</td>
<td>100,000</td>
<td>263,167</td>
</tr>
<tr>
<td></td>
<td>management practices or technologies with USG assistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG.3.2-25</td>
<td>Number of hectares under improved technologies or management practices</td>
<td>200,000</td>
<td>197,667</td>
</tr>
<tr>
<td></td>
<td>with USG assistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG.3.2-27</td>
<td>Value of agriculture-related financing accessed because of USG assistance</td>
<td>$500,000</td>
<td>$ 11,236</td>
</tr>
<tr>
<td>EG.3-10-11-12</td>
<td>Yield of targeted agricultural commodities among program participants with</td>
<td>700 kg/ha</td>
<td>590 kg/ha</td>
</tr>
<tr>
<td></td>
<td>USG assistance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG.3-2</td>
<td>Number of individuals participating in USG food security programs</td>
<td>150,000</td>
<td>342,979</td>
</tr>
<tr>
<td>EG.4.2-7</td>
<td>Number of individuals participating in USG-assisted group-based savings,</td>
<td>20,925</td>
<td>11,489</td>
</tr>
<tr>
<td></td>
<td>micro-finance, or lending</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GNDR-2</td>
<td>Percentage of female participants in USG-assisted programs designed to</td>
<td>90%</td>
<td>88%</td>
</tr>
<tr>
<td></td>
<td>increase access to productive economic resources</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

^2 The superior performance on this indicator (EG.3.2-24) in FY2021 is attributed to the improved coordination of the supply seed pods from Seed Production Division (SPD) stations closer to companies' areas of operations and the relaxation of COVID-19 related restrictions on movement. This greatly improved the supply and distribution of pods and seedlings to farmers on time, which meant more farmers benefitted this year than anticipated.

^3 For EG.3.2-25, although there are a significant number of people who have applied good management and technologies, the reported figure is the verified number of hectares based on the number of improved hybrid cocoa seedlings raised and distributed to farmers in FY2021.

^4 Although matured VSLA groups had been linked to formal financial institutions, the low value of finance (USD 11,236) accessed for indicator (EG.3.2-27) in FY2021 is attributed to the lack of confidence by members to save with financial institutions and the long saving periods (6 months on average) required by financial institutions before clients can access credit. During the same period, VSLAs disbursed credit worth USD 35,642 to members.

^5 For indicator EG.3-10-11-12, due to COVID-19, data collection for FY2020 was skipped due to COVID-19 related restrictions on movement. For FY2021 the cohort for the yield data was not the same as for FY2019, the last year for which data was collected for this indicator. This difference accounts for the variation in this result of 740 kg/ha in FY2019.

^6 The over-achievement for indicator (EG.3-2) is attributed to the integration of cocoa flavor quality training into the extension activities of the Cocoa Health and Extension Division (CHED) of the Ghana Cocoa Board which can reach out to, and train, more farmers, unlike in the other implementing countries where the research institutions (CRIN, Nigeria; IRAD, Cameroon; and CNRA, Cote d’Ivoire) conduct the training for farmers themselves.

^7 The lower number of participants and percentage of female participants for indicator EG.4.2-7 and GNDR-2 in FY2021 is attributed to the dropout of 27 Village Savings and Loan Associations (VSLA) and some members who had traveled out of their communities and did not come back. Also, most of the female members by choice decided to include their spouses (male counterparts) in the VSLA groups, therefore decreasing the overall proportion of women reported for GNDR-2.
Introduction

The United States Agency for International Development (USAID) issued the 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) was to run from October 2016 to September 2021.

In June 2019, USAID approved a modification to the GDA for ACI II to include a new activity on VSLA Schemes. This VSLA activity is in line with USAID’s Private Sector Engagement Policy and the Women’s Global Development and Prosperity Initiative (W-GDP). The modification added $1,039,000 to USAID’s funding for ACI II and extended the period of performance by eight (8) months from September 29, 2021, to May 31, 2022.

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 aligned with the WCF vision of a sustainable and thriving cocoa sector, where farmers prosper, communities are empowered, and the planet is healthy. 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 change needed to reach our shared vision.

Initially, the program was strongly aligned with WCF’s CocoaAction framework. CocoaAction was a voluntary industry-wide strategy that focused on aligning the 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. CocoaAction ended in 2019.

ACI II’s goal is to sustainably increase cocoa productivity among smallholder farmers in West Africa. ACI II objectives are: 1) Increased production and use of quality cocoa planting material; 2) An enabled ecosystem for financial services; 3) Improving access to Village Savings and Loan Associations in Côte d’Ivoire; and 4) Improving the flavor quality of cocoa.

ACI II is also documenting the relationship between cocoa production and food and nutrition security at the cocoa-based household level.

Figure 1: Updated ACI II Results Framework
Objective 1 – Increased Production and Use of Improved Cocoa Planting Material

Over the past years, cocoa breeding programs internationally and in West Africa have produced new clones and hybrids 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 tolerance to pathogens and abiotic stressors. Despite the progress made in breeding, many improved varieties have yet to be approved for distribution to farmers, contributing partially to persistently low and unpredictable yields of cocoa in the region. Other factors that account for low yields include the limited application of good agricultural practices (GAPs) by farmers, the aging tree stock, recurrent outbreaks of pests and diseases and the use of local (farmer-selected) varieties at the expense of improved planting materials, either genuine hybrid material or clonal plants.

Over the past decade, drought and heat stress have become the most important limitations to the successful establishment and productivity of cocoa farms in West Africa, especially in Ghana. The protracted dry season during the 2015/2016 cocoa season is a prime example of this occurrence, which is largely attributable to a rapidly changing climate. These effects are intensified by soils of low water holding capacity arising from farming practices that are incompatible with cocoa production. Earlier studies into the existence of heat and drought tolerant cocoa varieties discovered cocoa genetic groups that contribute to high seedling survival in the field, early fruiting, and high stable yields of mature trees under relatively high soil water stress. Nevertheless, it remains unclear whether the hybrids currently under development will exhibit the same potential when cultivated in benchmark sites of drought prevalence in the cocoa belt.

Objective 1 seeks to consolidate the gains and progress made in breeding for the provision of improved planting materials to farmers. This is achieved through the identification of heat and drought tolerant varieties as well as the increased production and distribution of improved planting material (in the form of hybrid seed pods, hybrid seedlings and clones) to smallholder farmers.

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

Addressing the challenges of heat and drought stress, ACI II supports Côte d’Ivoire and Ghana to identify tolerant varieties, which farmers can use in areas with high frequency of drought and heat stress during the dry seasons. These activities, implemented by CRIG in Ghana and CNRA in Côte d’Ivoire, are using multilocational trials with the best-performing clones and hybrids. The anticipated outcome is a screening protocol for heat and drought tolerant cocoa planting material that will be used in screening national and international cocoa collections and for the identification of promising new and safe material for potential transfer to, and incorporation into, the national breeding programs of ACI II implementing countries.

Beginning in September 2018, ACI II supported CRIG to conduct research to select cocoa varieties with high levels of tolerance to soil water (a proxy for drought) and heat stress. The aim is 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.
- Determine the level of genotype x environment interaction of selected cocoa hybrids tested at six benchmark sites for growth and yield traits.
- Validate physiological traits known to contribute to plant survival and yield in the field under conditions of soil water stress and high ambient temperatures.

Complementary to this research, WCF in collaboration with The Alliance of Bioversity International and CIAT, is using a public-private-civil society partnership to adapt the citizen science “tricot” approach (where farmers select the best performing planting material based on performance on their farms) to cocoa variety testing. In this project, WCF and Bioversity are working with farmers to test cocoa hybrids for climate adaptation across agroecological zones in Ghana. Expected outcomes include:
• 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.
• Increased 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 may 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.
• Increased 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.
• Sharing of this knowledge and research results in the uptake through stakeholder platforms established at the farmer community and national levels.

From 2010 to 2014, CNRA established pilot plots to evaluate the behavior of about 20 hybrids in drought conditions. ACI II, is building on this previous work to confirm the heat/drought tolerance of these hybrids planted in different agroecological zones. The project improves cocoa farmers’ access to heat and drought tolerant hybrids and clones which have good levels of productivity. In the long term, by establishing budwood gardens to host the identified heat/drought tolerant material, ACI II expects that heat/drought tolerant planting materials will be made available to farmers when the extant ban on productivity enhancing interventions, including the distribution of planting material to farmers, is lifted in Cote d’Ivoire.

**Key Achievements and Milestones**

**Development of heat and drought tolerant planting material in Ghana**
The third set of data collected in FY2021 from CRIG trial sites further confirms the results reported in 2019 and 2020, which showed clear differences in stem diameter and early establishment between the various hybrids. The FY2021 data also confirms that flower intensity was strongly correlated with the number of pods for three of the potentially drought tolerant hybrids identified in the earlier results. This notwithstanding, the precocity (flowering intensity and the number of pods per tree) data collection is ongoing and further data is required to support meaningful conclusions. Data collection on precocity will continue till March 2022 to enable the selection of a productive (heat and drought tolerant) cocoa hybrid varieties for marginal areas with high frequencies of drought.

**Using the “citizen science” approach in Ghana to test clones and hybrids for climate adaptation**
WCF, in collaboration with Bioversity International, is using a public-private civil society partnership to adapt the citizen science “tricot” approach (where farmers select the best performing planting material based on performance on their farms) to cocoa variety testing. In this project, WCF and Bioversity are working with farmers to test cocoa hybrids and clones under field conditions. The conventional trials are now established in Sefwi Bopa, Akantansu and Wass A Frankes. Data has been collected from 69 farms of farmers involved in Tricot trials covering variables like stem girth and height to assess establishment and growth.

At a district learning platform event held in June 2021 in the Ashanti Region of Ghana, farmers shared lessons on crop and tree nurseries, and how to explore opportunities for rural women and youth. These are a few takeaways:
• All beneficiary communities are conversant with their own private nurseries, and commercial nurseries.
• Individual nurseries are mainly vegetables and cocoa.
• Commercial nurseries are all cocoa, with two adding oil palm.
• Farmers’ source of cocoa seeds/seedlings is mainly from the government, LBCs, Kokoo Pa, commercial nurseries, and old farms.
• Farmers usually mix cocoa planted at stake and seedlings as seedlings replaced dead trees planted at stake.
• The need to use seeds or seedlings depends on the crop, soil type, weather conditions, time of planting, and the farmer.
• Most crop seeds/seedlings are available in the community or nearby communities except tree crop seeds/seedlings.
• There is an opportunity with outside seedlings sellers, but variety cannot be trusted and there is high mortality.

Develop and distribute heat and drought tolerant planting materials in Côte d’Ivoire
CNRA undertook maintenance activities and planting operations to improve the density of the budwood garden, on all six established plots at Soubré. By September 2021, 2,592 plants had been planted and 368 replaced. The average mortality rate for all six blocks was 15%. This relatively low mortality rate is attributed to good agronomic practices (mulching, irrigation, pest, and disease control) applied in the field. It is worth noting that most of the cloned plants showed signs of early flowering indicating that there is a possibility of finding potentially drought resistant cloned plants with superior productive characteristics. The table 1 below summarizes the status of plantings in the budwood garden at Soubré.

Table 1: Status of replaced plants of budwood garden for heat/drought tolerant clones

<table>
<thead>
<tr>
<th>Blocks</th>
<th>Number of Plants</th>
<th>Number of Plants Replaced</th>
<th>Average Mortality Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>360</td>
<td>61</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>360</td>
<td>67</td>
<td>18</td>
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<td>20</td>
</tr>
<tr>
<td>6</td>
<td>576</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>2,592</td>
<td>368</td>
<td>15</td>
</tr>
</tbody>
</table>

Observation of the impact of irrigation on pod production in seed gardens
Environmental factors and persistent droughts have raised the importance of irrigation in the production of cocoa as more intensive production areas have become unproductive. This is more pronounced in seed gardens that supply planting materials in the form of hybrid seed pods from which farmers establish new farms or replace old or diseased trees. However, owing to the substantial cost involved in the installation and maintenance of irrigation infrastructure, a clear business case must be made to justify the costs. ACI II is supporting CNRA to document the impact of irrigation on seed pod production in seed gardens at CNRA stations at Divo and Soubré to make the business case for irrigation. The irrigation system is established in two of the seed gardens established during WCF/ACI between 2014 and 2016.

This activity compares irrigated and non-irrigated seed gardens in three fields of the same age growing under similar conditions over a 36-month (2018 to 2021) period to document the impact of irrigation on the quantity and quality of seed pod produced in these seed gardens. Parameters under consideration include the number of pods formed after pollination, the number of matured pods and the quality of beans in matured pods. At the Divo station, the comparison is between 300 irrigated trees and 300 non-irrigated trees all planted in 2014. At Soubré, the comparison is between 300 irrigated trees and 300 non-irrigated trees planted in 2014 on the one hand, and 480 irrigated trees and 520 non-irrigated trees planted in 2019.

Between October 2020 and September 2021, CNRA replicated the pod harvests from the plots under observation. This third set of results from the observation, as presented in Table 2, continues to show clear differences in all bean quality parameters (Pod size, number of normal beans per pod and average bean weight) for 500 pods harvested from irrigated and non-irrigated plots.
Table 2: Results of observations of the impact of irrigation after harvesting at Divo and Soubré

<table>
<thead>
<tr>
<th>Plot Type</th>
<th>Divo</th>
<th>Soubre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Pods</td>
<td>Pod Size (mm³)</td>
</tr>
<tr>
<td>Irrigated</td>
<td>500</td>
<td>683</td>
</tr>
<tr>
<td>Non-irrigated</td>
<td>500</td>
<td>608</td>
</tr>
</tbody>
</table>

The results obtained in Table 2 illustrate the positive impact of irrigation on pod size, number of beans and bean weight compared to non-irrigated plots at Divo and Soubré. The results will be further confirmed with the final set of data at the end of the project in March 2022.

Outcome 1.2 Increased adoption and use of improved planting material

WCF has been coordinating and facilitating the supply of improved hybrid cocoa from member companies to the Seed Production Division (SPD) stations of COCOBOD in Ghana. This was achieved by providing pod request templates to member companies to specify the quantity of pods required to produce hybrid seedlings for their farmers based on their operational districts in the cocoa growing regions. The request was aggregated and submitted to SPD, which allocates the quantity of hybrid pods requested across their stations for collection by member companies in the cocoa growing districts. Member companies are notified through emails and phone calls of the SPD stations assigned to them for collection of their cocoa seed pods.

In Cameroon, ACI II continued to support IRAD in the work of introducing clonal material to farmers. This involves the transfer of previously developed clonal varieties under WCF/ACI to farmers’ fields and the training of the beneficiary farmers in the appropriate methods and technique for the handling, propagation, production, and maintenance of clonal planting material. This activity is also equipping beneficiary farmers and field technicians with the tools and skills to successfully produce, distribute, and use clonal planting material in farm conditions. Activities are designed to take advantage of existing capacity that WCF member company sustainability programs have built at the farm level over the years.

Key Achievements and Milestones

Distribution of improved hybrid seed pods and seedlings

Between October 2020 and March 2021, companies requested 846,607 hybrid cocoa seed pods that could produce an estimated 22,395,910 hybrid seedlings. Of this request, companies have received 316,695 of the improved hybrid cocoa seed pods from SPD. From these pods, companies raised and distributed almost 7 million seedlings which helped about 53,836 (17,829 women and 4,354 under 30 years old) farmers in 1,741 communities to plant an estimated 5,942 hectares of farmland. The distribution of improved planting material and the associated training in nursery management, combined with other good agricultural practices, help farmers replace their ageing tree stock and established new farms with high yielding varieties.

The allocation and distribution of pods was remarkably improved (from the 272,125 pods distributed in the 2019/20 season) because of the proximity of SPD stations to member companies and the relaxed covid travel restrictions. This enhanced the on time pick-up and distribution of pods. However, diseased and pest infested, rotten and damaged pods were one of the marginal challenges as some of the SPD stations do not give ample time to prepare for the pod collection, hence some of the pods are spoiled in the process. WCF will continue

9 The number of hectares planted with the improved seedlings is estimated at 1,111 plants per hectare, proportionate with the number of seedlings farmers planted as not all plantings were for the establishment of new farms.
to work with member companies on the means to decentralize the production and distribution of cocoa seed pods and seedlings in Ghana and in the other ACI II focus countries.

Introducing clonal planting materials to farmers in Cameroon

IRAD completed a full range of activities for clonal propagation of improved cocoa varieties and distribution to farmers in FY2021. These activities include production and propagation of shade trees, vegetative propagation of cocoa trees for budwood garden establishment and introduction of cocoa clonal varieties to selected farmers. As of September 30, 2021, 90 plots of 0.25 hectares each were successfully established and maintained within two of the target communities of Mbangasud and Ntsama. Each established plots includes hybrid cocoa seedlings, temporary and permanent shade trees and grafted plants established for budwood gardens. Table 3 provides a summary of the status of activities as of September 30, 2021.

Table 3: Summary of activities for introduction of cocoa clonal planting material to farmers in Cameroon

<table>
<thead>
<tr>
<th>Component</th>
<th>Activity</th>
<th>Specific Tasks</th>
<th>Major Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity building for introduction of clonal planting material to farmers</td>
<td>Selection and training of technicians and members of farmers organizations</td>
<td>Build the capacity of IRAD and the members of the selected farmers organizations</td>
<td>-10 trained cocoa technicians fully operational at the IRAD training center. -100 trained farmers from the 2 cooperatives.</td>
</tr>
<tr>
<td>Establishment of budwood gardens for introducing clonal material to farmers</td>
<td>1. Multiplication of IRAD best clones to create bud-wood garden 2. Establishment of central budwood garden for clonal material at IRAD Nkolbisson and one in each of the target communities.</td>
<td>Budding Grafting -Clone production -Land Preparation -Establish temporary shade (plantain) -Establish cocoa clones</td>
<td>Three budwood gardens with IRAD’s elite clones</td>
</tr>
<tr>
<td>Selection and support to farmers for the introduction of clonal planting material</td>
<td>1. Selection of farmer groups for participation in clonal trials</td>
<td>Meetings with farmers groups</td>
<td>90 farmers selected within two farmers organizations of the Barry Callebaut’s network: MBAGASSUD and Ets NTSAMA</td>
</tr>
<tr>
<td></td>
<td>2. Establishment of shade on-farm sites using recommended agroforestry tree species</td>
<td>Produce rootstocks Grafting</td>
<td>-More than 2,000 plants of agroforestry tree species distributed to farmers in 2021. -8,000 plantain PIF plantlets delivered to farmers to serve as temporal shade.</td>
</tr>
<tr>
<td></td>
<td>3. Establishment of farms for selected farmers using clonal material</td>
<td>Planting of clonal material</td>
<td>90 on-farms plots of 0.25ha each successfully established in both sites.</td>
</tr>
</tbody>
</table>

In FY2022, ACI II will support IRAD to document the learnings (on grafting, farm and budwood garden establishment using clonal planting material and farm maintenance) from this pioneering work in Cameroon in the form of how-to manuals for farmers and extension personnel. Beyond the life of ACI II, companies and communities can refer to these manuals for the establishment of cocoa farms using clonal planting material, which would be available from the new budwood gardens at IRAD or withing the participating communities.
Objective 2 – An Enabled Ecosystem for Financial Services

Access to affordable financial services is critical for poverty reduction and economic growth. Countries with deeper, more developed financial systems have higher economic growth and larger reductions in poverty and income inequality. Access to, and use of, basic financial services can improve incomes, increase resilience, and improve lives. A considerable 65% of adults in the developing world (World Bank, 2020) lack access to the most basic transaction accounts that would allow them to send and receive payments safely and easily, much less the savings, insurance, and credit services that would help them expand their businesses, mitigate risks and plan.

Under the ACI II program, WCF and the UN-based Better Than Cash Alliance (BTCA) have worked 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. ACI II achieves this through: technical assistance to WCF member companies; support to improve farmer access to financial services; and the establishment of a pre-competitive platform for interaction and exchange between and among DFS partners. In Ghana, ACI II of WCF and BTCA are working to promote and support digitization by large cocoa buyers, licensed buying companies (LBC) and other agribusiness intermediaries based on the assumption that there are hidden costs behind cash transactions in the cocoa sector. The objectives of this initiative are:

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

Outcome 2.1 The Costs of Digitizing Payments along the Cocoa Supply Chain in Ghana

Digital Financial Services (DFS), powered by fintech, have the potential to lower costs by maximizing economies of scale, to increase the speed, security, and transparency of transactions and to allow for more tailored financial services that serve the poor. The COVID-19 pandemic has amplified the benefits of expanding DFS, because it significantly reduces the need for physical contact in financial transactions. DFS—particularly using mobile money—permit remote payments and transactions, enabling the social distancing recommended to reduce the risk of contagion.

While the benefits of DFS are well documented, they introduce risks to users and to the broader financial system. For users, data privacy concerns arise from the data trails created by DFS which can expose them to unauthorized disclosure, misuse of personal data, and discrimination.

In 2021, WCF commissioned the “Cost of Digitization Study” to facilitate decision making by industry stakeholders on cash relative to digital payments. The study provides a clear and evidence-based analysis comparing cash to digital transactions, using detailed activity-based costing along the supply chain. This study is a counterpoint to the previous “Cost of Cash Study”, which WCF conducted with BTCA, which set out the many pitfalls of cash payments, including significant risk to personal safety, much higher costs and lower productivity and transparency, among many others. It also set out the key opportunities and advantages in shifting to digital payments throughout the supply chain and confirmed that cash remains the primary payment method used to purchase cocoa in Ghana.

Key Achievements and Milestones

**Cost of Digitization Study**

To facilitate decision making by industry stakeholders on cash relative to digital payments, WCF undertook the Cost of Digitization Study (Annex 1) to provide a clear and evidence-based analysis of each of the two payment systems, using detailed activity based-costing along the supply chain. The study reached 311
farmers (including 43 PCs), 10 LBCs (including 2 brands) and 3 digital payment service providers. Farmer and PC respondents were 60% and 40% for male and female respectively. Interviews were conducted for LBC, brand and DFS provider data while a mix of interview and questionnaires were employed for farmer and PC data.

The spread for DFS experience indicated that 42% had bank accounts, 7% owned cards (Ezwich or ATM cards) while 51% had mobile money accounts. Eight (8 or 53%) of the 15 communities reached had mobile money agents present while the 7 other communities must travel a distance between 1 to 4 miles or 20 minutes to 1.5 hours to reach an agent. Twenty (20 or 6.4%) of 311 farmers and PCs presently use a mix of cash and banking payment systems, while 93.6% use solely cash for trading cocoa beans. A considerable number (138, 44%) of farmers are willing to migrate from cash to digital payment systems for cocoa transactions; this proportion spirals to 190 (60%) if transaction fees are waived.

The study revealed that the total value of costs associated with cash payments (USD21.3M) significantly outweighs the cost of digitizing payments (USD5.8M); implying a cost savings for digital payments of USD15.5M over cash payments. This bodes well for the future of digital payments which looks set to unseat the cash system, though challenges abound for this transition. The major challenges of DFS deployment were illiteracy, the burden of transaction fees, poor cellular network connectivity, an unsupportive ecosystem, and huge initial set-up and sensitization costs.

The study recommends concerted sensitization and education on DFS, regulation to make digital payments mandatory, efforts to reduce transaction fees, and improved cellular network infrastructure in cocoa areas. In FY2022, WCF will disseminate the report first among member companies, the to other cocoa sector stakeholders, including COCOBOD, which is implementing the Cocoa Management System (CMS) to digitize the cocoa sector in the country. Working together (e.g., including DFS in the sensitization drive for CMS), COCOBOD and companies can accelerate the rate of digitization of the sector.

Farmer and Staff Sensitization on Digital Payments
WCF, in partnership with the Beyond Beans Foundation, included farmers in their supply chain sensitization content on DFS. The content was developed in three modules: an introduction to Digital Financial Services, how to use digital financial services, and digital financial service products. 14 field officers of Beyond Beans and Cocoa Merchant Limited/Federated Commodities received training in digital financial services.

A total of 324 farmers (221 men and 103 women, representing 68.2% and 31.8% respectively) were trained. The activity ensured the buy-in and willingness of farmers to accept the payment of premiums digitally directly to their individual mobile money wallets irrespective of the mobile network operator. Farmer concerns were mostly on the security threats and fraud related to digital payments, and withdrawal charges. However, the confidence of farmers in ensuring the safety of mobile accounts was improved after they were educated on the dos and don’ts of handling their Personal Identification Numbers (PIN) and the strict measures of mobile network operators (MNO) to protect client’s money. Participants also alluded to the fact that the benefits associated with the receipt of funds and transacting digitally outweigh the cost of cash withdrawals.

As indicated in the preceding section, ACI II will focus on the dissemination of the Cost of Digitization Study, which identifies sensitization of stakeholders as a key recommendation. Coupled with COCOBOD’s ongoing efforts to digitize the cocoa sector, this should ensure well beyond the life of ACI II.

Financial Product Co-creation
As part of the ways to ensure financial inclusion, WCF through the management of the financial inclusion working group activities has established relationships between member companies and Blue Marble Microinsurance to co-develop a microinsurance product to mitigate the risk of farmers. Seven companies (Olam, Cargill, Beyond Beans, Mondelez, Mars, Barry Callebaut and Touton) and in-country leads (Ghana and Cote d’Ivoire) were engaged.
Upon interaction with companies the risks identified include deficit of rainfall and correlation with pests; high temperature; excess rainfall correlated with black pod disease, pests and rot; and other pests and diseases, such as CSSVD. Even though the process is in its inception phase, the anticipated approach will be developing a crop agnostic cover, as farmers have a variety of income generating activities, not just cocoa, and possibly the potential to bundle insurance with input loans. The insurance premium can be made through a group fund against weather shocks, leveraging VSLAs and cooperatives, or through certifications such as Fairtrade, Rainfall Alliance and companies’ quality premiums.

The distribution channels that can be used for this anticipated product is through the cooperatives in Côte d’Ivoire and VSLAs/Farmer Unions or Licensed Buying Companies in Ghana. The next steps to implement this model will be to communicate with the sustainability heads of the various WCF member companies to incorporate it into their sustainability programs if feasible.

VSLA Linkage Technical Working Group

Upon publishing the VSLA Linkage-Ghana Landscape Analysis report, WCF constituted the VSLA Linkage Technical Working Group (VSLA_TWG) in consultation with the member companies as part of industry efforts to promote financial inclusion and expand farmers/women’s access to financial services through VSLAs. The VSLA_TWG is an offshoot of the Financial Inclusion Working Group which convenes company representatives on delivering the WCF Financial Inclusion Roadmap. Specifically, the VSLA_TWG convenings will facilitate learning, streamline the practice of VSLA with emphasis on VSLA linkage and coordinate the delivery of VSLA Linkage pathway recommendations from the Ghana VSLA linkage landscape analysis. The VSLA_TWG is composed of nominated representatives of the following WCF member companies implementing VSLAs: Barry Callebaut, Beyond Beans, Cargill, Hershey, Kuapa Kooko, Mondelez, Nestle, Olam, Sucden and Touton.

Digital Payments

In the year under review the total volume of digital transaction undertaken by Beyond Beans Foundation amounted to USD 14,900.62 ≈ GH$ 91,519.60. This payment involved two LBCs (Cocoa Merchant Limited and Federated Commodities) and three brands (Mars, Ferrero and Nestlé). These payments are commitments of premium payments under companies’ sustainability programs. A total of 486 farmers with a female and male disaggregation of 106 and 380 respectively, constituting a female-male ratio of 22%:78%. The average amount paid per farmers is USD 30.66 ≈ GH$ 188. This payment was done through the direct to telco model. It involved working with all the MNOs in Ghana, MTN, Vodafone and AirtelTigo, to verify the ownership or otherwise of the mobile wallet holder. It is expected that digital payments within the cocoa sector will increase as more companies take advantage of the cost savings of digitizing their supply chains, as indicated in the Cost of Digitization study.

DFS Landscape Analysis in Côte d’Ivoire

A consultant has been recruited in partnership with Better Than Cash Alliance to undertake a landscape analysis in Côte d’Ivoire of the DFS ecosystem of the cocoa supply and value chain. This will replicate the work done in Ghana regarding the DFS landscape analysis and provision of technical assistance to companies to pilot digitized payments in their supply chain. Currently, the consultant has mapped out all the stakeholders in the cocoa supply chain, which include brands, transporters, exporters, cooperatives, government agencies, financial services providers, MNOs etc. Interviews are being conducted to ascertain the type of transactions that exist between actors in the cocoa supply chain and the pilots that may have been implemented in the past. The final report is due in the first quarter of FY2022.
Objective 3 – Village Savings and Loans Associations (VSLA) in Côte d’Ivoire

Village Savings and Loan Associations (VSLA) are community-based women's associations/organizations with an average of 25 members each. VSLA members regularly contribute to a savings fund based on an unanimously agreed amount and, from the funds saved, grant each other loans. The repayment of the loans is made with an interest rate that increases the amount available in the fund. At the end of each cycle, members share the total amount of the fund between themselves. Each member therefore recovers his or her contributed savings with an additional gain, through the interest.

The objective of the VSLA Program in Côte d’Ivoire is to increase the capacity of impoverished cocoa growing households, and especially their female members, to manage their financial resources and withstand shocks to their livelihoods by providing access to three basic financial services – savings, credit, and enhanced household income. This VSLA activity, which is in line with USAID’s Private Sector Engagement Policy and the Women’s Global Development and Prosperity Initiative (W-GDP), is developing and strengthening savings and credit in communities where Barry Callebaut, Blommer, Cargill, Hershey, Mars, Mondelēz, Nestlé, and Olam source cocoa in Côte d’Ivoire.

Within this program, this project aims to create 387 new VSLAs and link 634 VSLAs to formal finance institutions to have the opportunity to place their group savings and access larger loans. This program will be reaching out to at least 20,925 members. Activities will be accompanied by the creation of Gender Committees in charge of organizing couple dialogue sessions, and awareness-raising sessions on gender issues. The aim of this component of the project is to reduce the risk of beneficiaries becoming victims of gender-based violence as a result of the VSLA.

Key Achievements and Milestones

Creating new VSLAs

VSLAs have been implemented since October 2019; for this reporting period, no incidents related to Covid-19 were reported. Meetings were held in strict compliance with health protection measures (hand washing and social distancing). Saving meetings frequency is still regular. 171 new VSLAs were set up with 80% of members registered being women in this reporting period. Unfortunately, 27 VSLAs dropped out due to a lack of cohesion within the group. Some spontaneous groups filled the gap by joining the project because of the results and benefits observed in neighboring communities and among some members.

In all, the 497 groups created by September 2021 mobilized savings of USD 791,179, of which USD 35,642 was granted as loans to members. A majority of these loans (67%) were invested in trade to generate more income and for agricultural purposes in cocoa (14%) and food crops (7%). There was also a slight increase in the use of credits for education compared to the last reporting period (from 2% to 5%).

Linking established VSLAs to formal financial institutions

An analysis of mature VSLA groups was conducted to assess their performance and readiness for linkage to formal financial services. To facilitate account opening, VSLA awareness sessions for account opening and training sessions for the members on financial products are still being carried out.

Implementing partners linked 238 existing VSLAs to help them better manage funds and access credit for larger-scale business initiatives. VSLAs registered a saving of USD 14,504 in these institutions. Also, a credit of USD 11,236 has been granted to 32 women. Most of the loans granted have been invested in Trade and Education. From newly created VSLAs, 61 have been linked in this reporting period. No savings from the newly created VSLAs have been registered.
VSLA trainings
VSLAs have provided a platform for members to have access to literacy training, which was proposed for members in need. This approach comprised the selection of participants (voluntarily) in various VSLA groups of the same community to set up the literacy center. Starting in September 2020, only 24 opened centers delivered training in this reporting period. Training covered courses distributed according to the level of training and in this period reached 1,011 adult participants (243 men and 768 women).

Other VSLA training included Skillful Parenting Education and Family Business Management Training. These trainings aim to strengthen positive parenting practices, empowering mothers and fathers to meet the challenges of raising children. They also aim to put cocoa-farming households on the path to sustainable prosperity by exploring tools such as: Exploring our Home and Managing Income from Major Sources.

Gender, child health, and nutrition
Activities related to Gender are the facilitation of couple dialogues, setting up of gender committees, and training of voluntary coaches, men champions, and gender committees. It is expected that after the training they will disseminate the knowledge received throughout their communities to drive behavioral change and reduce gender inequalities. They will also serve as advisory, assistance, and conflict resolution bodies for households, and raise local awareness to reduce gender disparities and increase women's participation in household decision-making. 317 new gender committees have been registered in this reporting period. These gender committees have been trained on couple’s dialogue methodology to enhance their understanding of the conditions and techniques for conducting couple dialogue sessions.

Objective 4 – Increased Flavor Quality of Cocoa

Outcome 4.1 Flavor Quality Assessment Capacity is Available in West Africa to support Purchasing Decisions and Practices

ACI II has worked diligently to ensure that flavor quality, which is the key reason chocolate producers include cocoa from specific origins in their recipes, is not abandoned for other pursuits such as higher yields and disease resistance during breeding. The cocoa flavor quality laboratories provide the necessary tools to support national cocoa research institutes to integrate flavor characteristics into their cocoa breeding programs. The flavor laboratories also make liquor from cocoa beans for the training of cocoa extension staff and cocoa farmers on the effects of harvest and post-harvest practices on flavor improvement.

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 supported the transitioning of the laboratory to CRIG, which operated the lab without WCF support from December 2016 to March 2018. In April 2018, a new MOU was signed between WCF and CRIG to implement activities under ACI II, which includes WCF providing larger scale equipment, and in February 2020, WCF member Ezaki Glico cut the sod for the construction of a new flavor laboratory and Centre of Excellence at CRIG. WCF has also supported the establishment of a second flavor quality laboratory at the Centre National de Recherche Agronomique (CNRA) in Côte d’Ivoire in 2019. The third flavor and quality lab became operational in September 2020 at the Institute of Agricultural research for Development (IRAD) in Cameroon. WCF supported the establishment of the fourth flavor and quality laboratory at Cocoa Research Institute of Nigeria (CRIN) in Nigeria. These laboratories have provided the four countries with the ability to train cocoa extension staff and farmers on appropriate harvest and post-harvest techniques to ensure that traditional flavor quality is maintained.

ACI II engaged a consultant, Dorine Kassi, who is working directly with staff of CRIG, CNRA, and CRIN to bring the flavor labs up to international standards and to document the standard operating procedures (SOP) for the operations of the labs and equipment, fermentation and drying, tasting sessions and trainings. As a first assignment, Ms. Kassi documented the standard operating procedures (SOP) for flavor quality
laboratory management and operations, which have been adapted and included in standard manuals and are fully in use in all four countries.

Key Achievements and Milestones

New flavor quality laboratory in Cameroon.
Equally, the Flavour and Quality (FQ) Laboratory (Annex 2) of IRAD became operational and functional in September 2020 and has begun upgrading the capacity of the FQ Laboratory & Sensory Panel and the assessment of flavor potential of the local germplasm. The bulk of the activities were focused on upgrading of the capacity of the FQ Lab and the sensory panel. The breeding for flavor potential, as well as the building capacity, both depend on the improvement of the skills of the staff running the FQ Lab. Therefore, all the related breeding and farmers extension activities will be implemented between October 2021 and March 2022.

New flavor quality laboratory in Nigeria
Following the establishment of a fully furnished flavor laboratory (Annex 3), equipped lab and a new 30KVA standby generator at CRIN in Nigeria, the lab has become fully functional. The follow up activities undertaken include development of a lab processing manual with Standard Operating Procedures (SOPs) for Cocoa Flavor Assessments; the FQ Lab manual and SOPs have been developed and are currently in use at the lab.

Training of Flavor Quality Laboratory Team: Training of FQ Lab team (FQ Lab Researchers, Technicians and Panelists) at CRIN was conducted from June 20, 2021, to July 01, 2021. A total of 30 personnel, 18 males and 12 females, were trained on the impact of good practices on cocoa flavor. The lab team was trained on the processing of liquor from cocoa beans, while the panelists were trained in cocoa flavor sensory analysis by the WCF FQL Consultant.

Controlled reference samples: This activity is on-going. It involves the preparation of reference samples (under fermented, over fermented, Black pod, dirty) to be used for training farmers in cocoa cooperatives on good practices for enhancing cocoa flavor.

Outcome 4.2 Increased use of appropriate post-harvest practices by farmers that ensures high flavor quality of cocoa

With the sustained low price of cocoa on the global market over the years, farmers could earn more by producing and selling better quality beans as cooperatives that supply niche chocolatiers have been doing. In FY2021, ACI II oversaw the implementation of long-term flavor quality work plans developed in FY2019 in collaboration with CNRA and CRIG to train cocoa farmers to produce beans with improved flavor quality. Similarly, ACI II facilitated discussions between cooperatives and the lab teams at CRIN and IRAD to provide flavor quality trainings to their farmers as the newly established flavor laboratories get up to speed in both countries. ACI II will follow up on these activities in FY2022 with engagements between the laboratories, extension delivery staff and farmers in all four countries.

Key Achievements and Milestones

Supporting training on flavor quality in Côte d’Ivoire
WCF through ACI II has been providing laboratory management training after the establishment of the CNRA laboratory in 2019. Between the period of October 2020 and September 2021, the lab team organized trainings for farmers, cooperatives, researchers, and the technical team of CNRA to improve their knowledge, skills and adoption of good post-harvest management practices that ensure high flavor quality.
Sensory evaluation training was also conducted for the tasting panel of the FQ laboratory to build their capacity.

The lab team undertook fermentation, drying, and liquor preparation from their stock of hybrid and clones introduced to farmers over the years. These liquor samples were distributed to WCF company flavor quality experts for use in a second live regional tasting session analysis. This regional tasting, which was held in June 2021 and attended by representatives of labs from Cameroon, Nigeria and Côte d’Ivoire, helped to verify results of the CNRA team, evaluate lab performance (in terms of liquor preparation and sensory evaluation) and assess the function of the CNRA lab.

**Expanding capacity of flavor quality laboratory in Ghana**

In February 2020, WCF member TCHO provided initial funding of almost USD 170,000 for a new flavor laboratory and training center at CRIG. Subsequently, COCOBOD modified the design for the center, which delayed the commencement of construction. Tendering for the updated design was completed, and a contractor was selected in September 2020 for construction work to start at the site. Work has started on the site.

The project is progressing remarkably well on the new design, valued at more than USD 350,000 for which COCOBOD is the main funder. Ezaki Glico is pleased with the management of the project and with the supervision of the contractors and attention to detail. Currently the project is at 35% completion with the goal of reaching 50% completion by January 2022. Although rainy days have been slowing some work down, the project is running on schedule.

**Impact of COVID-19 on ACI II activities**

COVID-19 affected field implementation of ACI II activities, especially between March and August 2020, when strict restrictions on movement were in force in Cameroon, Côte d’Ivoire, Ghana, and Nigeria. The impact was most significant for the establishment of VSLAs in Côte d’Ivoire, where 104 members of functioning VSLAs dropped out due to travel restrictions. COVID-19 related national and international travel restrictions also greatly restricted the initiation of flavor quality laboratory activities in Cameroon and Nigeria and retarded implementation in Côte d’Ivoire.

**Mitigation measures**

WCF plans to request an extension of the project end date from May 31, 2022 to September 30, 2022 to enable ACI II to complete a full year of activities for the flavor quality laboratories in the field in Cameroon and Nigeria.

**Annexes**

1. The Cost of digitization study
2. Cameroon Flavor Lab Visit Report
3. Nigeria Flavor Lab Establishment Story
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# GLOSSARY

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<th>Description</th>
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<tr>
<td>ADBI</td>
<td>Asian Development Bank Institute</td>
</tr>
<tr>
<td>AML/CTF</td>
<td>Anti-Money Laundering/ Counter Terrorism Financing</td>
</tr>
<tr>
<td>BOG</td>
<td>Bank of Ghana</td>
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<tr>
<td>BTCA</td>
<td>Better Than Cash Alliance</td>
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<tr>
<td>CGAP</td>
<td>Consultative Group to Assist the Poor</td>
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<tr>
<td>DFS</td>
<td>Digital Financial Services</td>
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<tr>
<td>GhIPSS</td>
<td>Ghana Interbank Payment and Settlement Systems</td>
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<tr>
<td>LBC</td>
<td>Licensed Buying Company</td>
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<td>MOF</td>
<td>Ministry of Finance</td>
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<tr>
<td>NFIDS</td>
<td>National Financial Inclusion and Development Strategy</td>
</tr>
<tr>
<td>NPS</td>
<td>National Payments Strategy</td>
</tr>
<tr>
<td>PIN</td>
<td>Personal Identification Number</td>
</tr>
<tr>
<td>UNCDF</td>
<td>United Nations Capital Development Fund</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>VC</td>
<td>Value Chain</td>
</tr>
<tr>
<td>WCF</td>
<td>World Cocoa Foundation</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

In 2019, World Cocoa Foundation and Better Than Cash Alliance commissioned a study to assess the hidden cost of cash (Cost of Cash Study). To facilitate decision making by industry stakeholders on cash relative to digital payments, the present study sought to provide a clear and evidence-based analysis of each of the two payment systems, using detailed activity-based-costing along the supply chain. The study reached 311 farmers (including 43 PCs), 10 LBCs (including 2 brands) and 3 digital payment service providers. Farmer and PC respondents were 60% and 40% for male and female respectively. Interviews were conducted for LBC, brand and DFS provider data while a mix of interview and questionnaires were employed for farmer and PC data.

Farmers’ DFS experience indicated that 42% had bank accounts, 7% owned cards (ezwich or ATM cards) while 51% had mobile money accounts. Eight (8 or 53%) of the 15 communities reached had mobile money agents present while the 7 other communities have to travel a distance between 1 to 4 miles, or 20 minutes to 1.5 hours, to reach an agent. Twenty (20 or 6.4%) of 311 farmers and PCs presently use a mix of cash and banking payment systems while 93.6% use solely cash for trading cocoa beans. A considerable number (138 or 44%) of farmers are willing to migrate from cash to digital payment systems for cocoa transactions; this proportion spirals to 190 (60%) if transaction fees are waived.

The total value of costs associated with cash payments (USD21.3M) significantly outweighs that of digital payments (USD5.8M); implying a cost savings for digital payments of USD15.5M over cash payments. This bodes well for the future of digital payments, which look set to unseat the deep-seated cash system, though challenges abound for this transition. The major challenges of DFS deployment were illiteracy, the burden of transaction fees, poor cellular network connectivity, an unsupportive ecosystem, and huge initial set-up and sensitization costs.

The study recommends concerted sensitization and education on DFS, regulation to make digital payments mandatory, efforts to reduce transaction fees, and improved cellular network infrastructure in cocoa areas.
INTRODUCTION
Access to affordable financial services is critical for poverty reduction and economic growth. Countries with deeper, more developed financial systems have higher economic growth and larger reductions in poverty and income inequality. Access to and use of basic financial services can improve incomes, increase resilience, and improve lives.

A considerable 65% of adults in the developing world (World Bank, 2020) lack access to the most basic transaction account that would allow them to send and receive payments safely and easily, much less the savings, insurance, and credit services that would help them expand their businesses, mitigate risks and plan for the future.

Digital financial services (DFS), powered by fintech, have the potential to lower costs by maximizing economies of scale, to increase the speed, security and transparency of transactions and to allow for more tailored financial services that serve the poor.

The dynamic and ever-changing Covid-19 pandemic has amplified the benefits of expanding DFS, because it significantly reduces the need for physical contact in financial transactions. DFS - particularly through the use of mobile money - permit remote payments and transactions, enabling the social distancing recommended to reduce contagion.

While the benefits of DFS are well documented, they introduce risks to users and to the broader financial system. For users, data privacy concerns arise from the data trails created by DFS which can expose them to unauthorized disclosure, misuse of personal data, and discrimination (Please refer to the appendix for a detailed review on DFS).

In 2019, WCF with BTCA commissioned a study to assess the hidden cost of cash (Cost of Cash Study). This study sets out the many pitfalls of cash payments, including significant risk to personal safety, much higher costs and lower productivity and transparency, among many others. It also sets out the key opportunities and advantages in shifting to digital payments throughout the supply chain. The Costs of Cash study confirms that cash remains the primary payment method used to purchase cocoa in Ghana. To facilitate decision making by industry stakeholders on cash
relative to digital payments, the present study has been commissioned to provide a clear and evidence-based analysis of each of the two scenarios, using detailed activity-based-costing along the supply chain.

METHODS

Sampling

The cocoa value chain was divided country-wide into 7 zones and 58 towns. The study employed purposive sampling to reach 311 farmers (including 43 PCs) in 5 districts and 15 communities in the Ashanti, Eastern, and Ahafo Regions. Ten (10) licensed buying companies (including 2 brands) and 3 digital payment service providers were reached.

Data type

Primary data were collected on farmers, LBCs and PCs; while secondary data were employed for firm-level, industry-level and country-level variables.

Data Collection Instruments

Interviews were conducted for LBC, brand and DFS provider data while a mix of interview and questionnaires were employed for farmer and PC data. Separate interview guides and questionnaires were prepared for each group (Please refer to appendix for templates).

Data Presentation and Analysis

Qualitative and quantitative approaches of analysing data were employed. Microsoft excel was used mainly for quantitative analysis while IBM’s Statistical Package for Social Sciences (IBM SPSS) was used for descriptive analysis.

Costing

The following describes the cost elements factored into the assessment of digitization costs and how they were measured.
Cost of IT infrastructure (set-up costs): This was measured as the costs incurred by LBCs in setting up software or hardware infrastructure for digital payment or transactional platforms where applicable.

On-boarding fee (platform registration costs): This was measured as the costs incurred by any actor along the value chain in joining a particular digital payment platform for the first time where applicable.

Subscription fee: This was measured as the periodic and renewable service charge paid for usage of a given DFS where applicable. This could be weekly, monthly, quarterly or annually.

Transaction fee: This was measured as the costs incurred per transaction while using a DFS platform. This included bank, mobile money and eZwich charges.

Sensitization and education costs: This was measured as the costs incurred in sensitizing and educating value chain actors (farmers, PCs, field officers, transactional support clerks, data entry personnel, or IT assistants) on the use of DFS.

Cybercrime: This was measured by using probabilities to estimate how much can be potentially lost to cyber theft and fraud. Estimates on cyber fraud in the entire DFS universe in Ghana was used as a proxy to extrapolate this cost.

Salaries for human support systems: This was measured as the amount paid to persons who are employed to man digital payment systems either as transactional support clerks, data entry personnel, or IT assistants, especially for LBCs.

Comparative Analysis

Data from the Costs of Cash Study were validated to form a basis for the costs of cash, while estimations from the present study formed a basis for the costs of digitization. To validate the data, figures for the variables used in the Costs of Cash Study were verified for any available recent updates in these figures. Value link analysis were used to compute the unit costs of digitizing payments for an LBC, farmer and processor. Inferences which have major implications for the future of payment systems in the cocoa value chain were made while the ultimate conclusion was drawn on cash versus digital payments.
RESULTS

Descriptive Analysis

The study reached 311 farmers (including 43 PCs) in 5 districts and 15 communities in the Ashanti, Eastern, and Ahafo Regions; together with 10 LBCs (including 2 brands) and 3 digital payment service providers. The interviewed companies are Cargill, Federated Commodities, Eliho, Adikanfo, Kuapa Kooko, Olam, Cocoa Merchant, Nyonkopa (Barry Callebaut), Mondelez and Nestle.

FIGURE 2: SAMPLED RESPONDENTS

Farmer and PC respondents were 60% and 40% for male and female respectively. It was found that 28% of these have a minimum of primary level education with 72% uneducated. This poses a major barrier to the DFS drive given that DFS deployment in different geographies have been successful on the back of literacy and numeracy. Majority (261, 84%) owned phones, a development which could imply hope for any form of phone-based digitization. The spread for DFS experience indicated that 42% had bank accounts, 7% owned cards (ezwich or ATM cards) while 51% had mobile money accounts. Eight (8 or 53%) of the 15 communities reached have mobile money agents present while the 7 other communities have to travel a distance to get access to an agent. The distance for such detours range between 1 to 4 miles, or 20 minutes to 1.5 hours.

The dominant reasons established for those (58%) who did not have bank accounts were low incomes, illiteracy, unfriendly bank customer service, and delays in using banking services. Farmers (49%) who did not have mobile money accounts mainly cited reasons as cybercrime or mobile money fraud, lack of identity card for mobile money registration, lack of phone, and low
income. Twenty (20 or 6.4%) of 311 farmers and PCs presently use a mix of cash and banking payment systems while 93.6% use solely cash for trading cocoa beans. Interestingly, 17 out of these 20 bank users are PCs; indicating a bias for digitization more among PCs than farmers. It is also worth noting that 40 of the 43 PCs interviewed indicated a strong preference for DFS in lieu of cash.

One LBC is fully digitized to farmer level while another LBC is 70% digitized to PC level. All other interviewed companies are either partially digitized up to PC level or presently engaged in the piloting of some form of digitized payments. Annual transaction volumes and values for interviewed LBCs ranged between 4068MT – 160,000MT and USD7M – 274M for the most recent cocoa annual season. These 10 LBCs have a combined farmer base of 524,484 and a combined PC base of 12,294.

**Willingness to use DFS for Cocoa Transactions**

A considerable number (138 or 44%) of farmers are willing to migrate from cash to digital payment systems for cocoa transactions. Significantly, this proportion grows to 190 (60%) from 138 (44%) if transaction fees are waived. This is a testament of the high sensitivity of farmers to transaction fees as well as evidence of the extent to which transaction fees demotivate farmers from patronizing digital payment services.

**Digitization Efforts of LBCs**

Most digitization efforts of LBCs have ended at the PC level for various reasons. While some LBCs deem digitization beyond the PC as unrealistic, others consider it as a resource intensive venture whose returns are not worth the investment. A third school of thought among interviewed companies is that farmers are psychologically unprepared for the transition to digital payment systems. One LBC is fully digitized to farmer level while another is 70% digitized to PC level. The success factors for these digitally advanced LBCs has been the long-term cost savings of digitization and the fact that there has been a significant reduction in robbery and murder cases among PCs since they went digital. The reach of pilot programs for digital payment systems among interviewed companies range from 2 districts to 12 districts.
The study established that the major partnerships formed by LBCs in their digitization drive has been with firms offering cocoa ancillary or support services, banks, fintechs, telcos, brands and in a few cases, fellow LBCs.

**Challenges of DFS Deployment and Promotion**

From a PC and farmer perspective, the following are the challenges of DFS deployment. To start with, illiteracy is a major hindrance to DFS promotion because most digital payment systems require some level of literacy to ensure smooth usage and operation. Given that 72% of respondents were uneducated, DFS promotion may be greatly hampered. However, it is worth the distinction that a majority (34 or 79%) of interviewed PCs are educated to the senior high school level; thereby making illiteracy more of a farmer than a PC problem.

Secondly, transaction fees were established as another major hindrance to DFS promotion in the cocoa sector (Please refer to discussion section for fee details). This is due mainly to the short-term focus of farmers on transaction costs as opposed to the long-term focus on benefits. Moreover, the unstable cellular network of operating telcos in cocoa growing areas hamper the use of phones and other digital devices for DFS. Furthermore, low interest on savings, bank delays, and distant mobile money agents also hinder DFS promotion. Other challenges include the low capital base of mobile money agents who cannot undertake high value transactions, cybercrime or mobile money fraud, lack of IDs for DFS registration and suspicion among farmers of possible diversion of cocoa trade funds where they are routed through the PC digitally.

From the perspective of brands, processors and LBCs, the resistance to change from cash to digital payments by farmers and PCs is a major threat to the future of DFS in the cocoa sector. Farmers are expected to resist this transition because of the addictive and convenient use of cash over the years; while PCs will conditionally oppose the DFS drive if they have reason to suspect that the transition will dilute their relevance and influence in the cocoa supply chain. Transaction fees were also deemed a challenge to DFS promotion by companies; thus, who bears the final burden of transaction fees persists as an inadequately answered question. While some companies believe LBCs should bear the transaction costs, others believe the LBC realises a margin too thin to be committed to other expenses such as transaction fees. The most dominant response has been that the LBC should bear the transaction costs (mostly bank charges) at their end of the chain while farmers and PCs (mostly mobile money charges) also assume theirs at their end of the chain. Most
interviewed LBCs hold the view that assuming the transaction costs which accrue to farmers and PCs will render their operations unprofitable.

Poor cellular network connectivity was also cited by some companies as a major hindrance to DFS deployment. An improved network is touted as a panacea to boost DFS in cocoa areas where the network has previously been poor and unstable. Additionally, an unsupportive ecosystem has been seen as the bane of DFS penetration in the cocoa sector. Some interviewed companies believe that LBCs, farmers and PCs who have gone digital are mostly isolated because cash is used invariably in all other spheres of endeavour they transact or engage in. Finally, the huge initial set-up and sensitization costs involved in going digital with payments has hindered some LBCs from piloting digital payments or going full scale after pilot.

**DISCUSSION**

The ensuing details the costs of digitizing payments in the cocoa sector at the value link (unit) level and at the sectorial level. The cost matrix in Figure 3 shows the various cost elements considered in the computations.

*Value Link (Unit) Analysis*

The established value links for digitizing the financial chain of the cocoa sector are LBCs, PCs and farmers. The study established the costs to each value link as follows.

*Costs to LBC*

An LBC that seeks to digitize payment systems is presented with 2 major options; an in-house system and a third party hosted system. The study found one LBC that uses an in-house system to run digital payments.
The major advantages of the in-house system are direct control exercised by the LBC over the payment process, access to real time payments data and reduced transaction costs; while the third party hosted system has the advantages of cheaper initial set-up costs relative to the costs incurred in procuring the in-house system and low maintenance fees. The two cost structures are presented in Table 3.

Table 3 provides a cost structure for an LBC considering either an in-house system or a third party hosted system. Knowledge of the number of farmers a given LBC deals with, annual transaction values, and the number of IT personnel to support digitization of payments, completes the computations in Table 3.
TABLE 3: LBC COSTS OF DIGITIZING PAYMENTS

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>Unit</th>
<th>Unit Cost GHS</th>
<th>Cost Item</th>
<th>Unit</th>
<th>Unit Cost GHS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure</strong></td>
<td>Hard and Software</td>
<td>585,000</td>
<td><strong>Infrastructure</strong></td>
<td>Hard and Software</td>
<td>0</td>
</tr>
<tr>
<td><strong>Onboarding (set-up)</strong></td>
<td>Initial set-up</td>
<td>0</td>
<td><strong>Onboarding (set-up)</strong></td>
<td>Initial set-up</td>
<td>1000</td>
</tr>
<tr>
<td><strong>Transaction fee (%)</strong></td>
<td>Transaction value</td>
<td>0.5%</td>
<td><strong>Transaction fee (%)</strong></td>
<td>Transaction value</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Subscription/maintenance</strong></td>
<td>Annual or periodic</td>
<td>87,750</td>
<td><strong>Subscription/maintenance</strong></td>
<td>Annual or periodic</td>
<td>0</td>
</tr>
<tr>
<td><strong>Sensitization</strong></td>
<td>Cost per farmer</td>
<td>10</td>
<td><strong>Sensitization</strong></td>
<td>Cost per farmer</td>
<td>10</td>
</tr>
<tr>
<td><strong>Cyber Crime (%)</strong></td>
<td>Transaction value</td>
<td>5%</td>
<td><strong>Cyber Crime (%)</strong></td>
<td>Transaction value</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Human support systems</strong></td>
<td>Annual salary per IT</td>
<td>48,000</td>
<td><strong>Human support systems</strong></td>
<td>Annual salary per IT</td>
<td>48,000</td>
</tr>
</tbody>
</table>

Based on data from an LBC that presently uses an in-house system, set-up for in-house infrastructure costs USD100,000 (GHS585,000) while annual maintenance fee costs USD15,000 (GHS87,750). It is also worth noting that transaction charges on in-house systems are lower relative to third party systems.

A poll of 3 DFS providers established an average cybercrime risk exposure of 5% for every 100 transactions. This is used to estimate the proportion of transaction value at risk of cybercrime or mobile money fraud. Sensitization and education costs is estimated at GHS10 per farmer based on data from an LBC that is 100% digitized to farmer level. The salary of an IT personnel is pegged at an annual GHS48,000, or a monthly GHS4,000, based on a poll of salaries among 8 IT personnel in similar industries.
**Costs to PC and Farmer**

A PC who intends to digitise is confronted with two major costs; transaction fees and the risk of cybercrime. These are shown in Table 4.

**TABLE 4: PC AND FARMER COSTS OF DIGITIZING PAYMENTS**

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>Unit</th>
<th>Unit Cost GHS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure</strong></td>
<td>Hard and Software</td>
<td>0</td>
</tr>
<tr>
<td><strong>Onboarding (set-up)</strong></td>
<td>Initial set-up</td>
<td>0</td>
</tr>
<tr>
<td><strong>Transaction fee (%)</strong></td>
<td>Transaction value</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Subscription/maintenance</strong></td>
<td>Annual or periodic</td>
<td>0</td>
</tr>
<tr>
<td><strong>Sensitization</strong></td>
<td>Cost per farmer</td>
<td>0</td>
</tr>
<tr>
<td><strong>Cyber Crime (%)</strong></td>
<td>Transaction value</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Human support systems</strong></td>
<td>Annual salary per IT personnel</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4 details the costs which accrue to PCs and farmers in their bid to digitize payments in their cocoa trade. While they do not bear the burden of digital infrastructure and its associated costs; they are mainly confronted with transaction costs and exposure to cybercrime or mobile money fraud.

**Sectorial Analysis**

The ensuing is a presentation of sector-wide costs of digitizing payments. Estimations are intended to cover the entire financial chain of the cocoa value chain. Table 5 and 6 shows the overall costs of digitizing payments in the cocoa sector and the underlying assumptions respectively.
Table 5 estimates the total costs of digitizing payments in the cocoa sector. The 7 cost elements computed returns a total cost of USD5.3M (GHS31.1M). The cost of infrastructure is sourced from an LBC that uses an in-house system. Onboarding costs are estimated at GHS7 per farmer based on mobile money set-up costs. Farmer population in the cocoa sector is pegged at 800,000 while total annual transaction value within the sector is estimated at USD12M or GHS655.2M (WCF/BCTA, 2020a). Transaction fees are computed using assumed transaction value weights of 60%, 35% and 5% spread across banking, mobile money and cards (ezwich and ATMs) respectively. Annual maintenance costs were based on data from an LBC with an in-house system while sensitization cost per farmer is sourced from a fully digitized LBC. Cybercrime probability estimates were based on extrapolations from 3 DFS providers while human support costs were estimated from a salary poll of 8 IT personnel from similar industries; holding an assumption of 2 IT personnel each for the 23 presently active LBCs. Forex rates (GHS/USD) were sourced from the BOG interbank forex rates.

### TABLE 5: COSTS OF DIGITIZING PAYMENTS IN THE COCOA SECTOR

<table>
<thead>
<tr>
<th>Costs</th>
<th>GHS</th>
<th>USD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure</strong></td>
<td>3,510,000</td>
<td>600,000</td>
</tr>
<tr>
<td><strong>Onboarding (set-up)</strong></td>
<td>5,600,000</td>
<td>957,265</td>
</tr>
<tr>
<td><strong>Transaction fee</strong></td>
<td>3,161,340</td>
<td>540,400</td>
</tr>
<tr>
<td><strong>Subscription/maintenance</strong></td>
<td>87,750</td>
<td>15,000</td>
</tr>
<tr>
<td><strong>Sensitization</strong></td>
<td>8,000,000</td>
<td>1,367,521</td>
</tr>
<tr>
<td><strong>Cyber Crime</strong></td>
<td>11,466,000</td>
<td>1,960,000</td>
</tr>
<tr>
<td><strong>Human support systems</strong></td>
<td>2,208,000</td>
<td>377,436</td>
</tr>
<tr>
<td><strong>Total CD</strong></td>
<td>34,033,090</td>
<td>5,817,622</td>
</tr>
</tbody>
</table>
### TABLE 6: UNDERLYING ASSUMPTIONS

<table>
<thead>
<tr>
<th>Items</th>
<th>GHS</th>
<th>USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active LBCs</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Farmers</td>
<td>800,000</td>
<td></td>
</tr>
<tr>
<td>Transaction value</td>
<td>655,200,000</td>
<td>$112,000,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bank  Momo  Ezwich</td>
</tr>
<tr>
<td>Transaction type (weights)</td>
<td>60%</td>
<td>35%  5%</td>
</tr>
<tr>
<td>Transaction fee</td>
<td>0.2%</td>
<td>1%  0.25%</td>
</tr>
<tr>
<td>Sensitization costs per farmer (GHS)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Fx (GHS/USD)</td>
<td>5.85</td>
<td></td>
</tr>
<tr>
<td>Onboarding costs per farmer (GHS)</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>IT personnel per LBC</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Annual cost per IT personnel (GHS)</td>
<td>48,000</td>
<td></td>
</tr>
<tr>
<td>Cybercrime rate per 100 transactions</td>
<td>5%</td>
<td></td>
</tr>
</tbody>
</table>

**Comparative Analysis (Cash vs Digital Payments)**

The study will be incomplete without a final analysis to compare the costs of cash payments with the costs of digitizing payments within the cocoa supply chain. The costs of cash payments presented as a comparable in Table 7 is based on data from the *Costs of Cash Study* (WCF/BTCA, 2020a).
Conspicuously from Table 7, while the costs associated with the use of cash payments contains fewer elements than digital payments; the total value of costs associated with cash (USD21.3M) significantly outweighs that of digital payments (USD5.8M). This bodes well for the future of digital payments which looks set to unseat the deep-seated cash system, though challenges abound for this transition.

**CONCLUSION**

The study establishes the costs inherent in digitizing payments along the cocoa supply chain at the unit and sectorial levels. From the sectorial perspective, digital payments have significant cost savings (USD15.5M) over cash payments.

**RECOMMENDATIONS**

The present study sought to assess the costs associated with digital payments. Emanating from the study are the following recommendations:

- Given the cost-savings outlined above, Sensitization and education on DFS should be encouraged and needs to be concerted, intentional and intensive to achieve significant
results. While the private sector (LBCs) has undertaken considerable solo, and sometimes collaborative, efforts in this regard; a push from cocoa sector regulators and actors such as the telcos might be the missing piece needed to complement ongoing efforts.

- A more decisive piece of regulation to make digital payments mandatory could contribute to the creation of the needed ecosystem for DFS to thrive in the cocoa sector. While digital payments remain an option and an alternative to cash, actors may be aware of the benefits of digital payments but continually choose cash payments. This would isolate the few actors who subscribe to digital payments, a development which makes such actors unattractive and uncompetitive relative to their cash-wielding peers.

- A conscious effort by cocoa sector regulators to engage DFS providers purposely to either waive or reduce digital transaction fees, as a special concession for cocoa transactions, would be a major boost for the digitization drive in the cocoa sector. Even at reduced transaction fees, DFS providers would still earn significant revenues from the huge transaction values and volumes in the cocoa sector.

- DFS providers (telcos) should be encouraged to provide the needed infrastructure to boost cellular network in rural Ghana, which forms the greater part of the cocoa areas in Ghana. This could improve the use of mobile money services in these areas.
REFERENCES


APPENDIX

A. REVIEW ON DFS

DFS AS A CONTEXTUALLY DISRUPTIVE INNOVATION

A disruptive technology is an innovation which significantly alters the way consumers, industries, or businesses operate. A disruptive technology usually sweeps away the systems or habits it replaces because it has attributes which are distinctly superior. Challenges abound in the introduction and grounding of disruptive technologies. These challenges include the general resistance to change by the market players who could potentially benefit from the technology, the costs of the infrastructure which supports the operation of the technology and the costs of using the technology, the regulatory bottlenecks which hampers take-off and smooth market or industry operations of the technology, and the lack of education and sensitization about the technology which establishes myths and unfounded perceptions about the technology.

The cocoa value chain (VC) in Ghana has been historically dominated by cash-based financial and transactional systems. Cash is the primary payment method used to purchase cocoa, with over 90% of farmer-level transactions conducted using cash annually (WCF/BTCA, 2020a). The cash-based model has dominated the cocoa sector in Ghana for over 4 decades, creating a deep-seated aversion for change to digital systems especially among cocoa farmers. Not only the dominance of cash-based payments but also the infrastructural and transactional costs of digital payments, inadequate sensitization and education on the demystification, use, and benefits of digital payment systems has contributed to the delays in full-scale patronage.

DFS AS AN AGRICULTURAL DEVELOPMENT TOOL

Agro-based economies are one of the key beneficiaries of a digitized financial system (CGAP/UNCDF, 2018). Infusing digital payments into the fibre of agricultural value chains will increase turnover of trade and transactions, improve payment turnaround time, reduce transactional risk, improves documentation and contractual evidence of trade and financial transactions, enhance access to credit, improve record keeping and data collection.
THE COFFEE DIGITAL REVOLUTION IN UGANDA

Coffee is an important cash crop for Uganda. It accounts for 20% of the country’s export earnings and is a source of income for 2.8 million farmers (14% of the adult population). In 2015, the United Nations Capital Development Fund’s (UNCDF’s) Mobile Money for the Poor (MM4P) team partnered with Kyagalanyi Coffee Limited (KCL), one of the largest coffee exporters in the country, to digitize payments to KCL’s 6,000 certified farmers over the next two years (2016 and 2017). Three coffee cycles later, KCL has yet to achieve 50% digital payment adoption across its farmers. Yet, KCL, MM4P, and MTN Uganda consider this project a big success because lessons learned from the project led MM4P, MTN, and other mobile network operators to invest in
digitizing multiple agriculture value chains in the country, which, in turn, has led to financial inclusion for numerous rural, low-income populations. MM4P learned that agriculture value chains are a long-term investment and may not necessarily fit typical project cycles. For example, a two-to-three-year time frame is not likely to be long enough to digitize an agriculture value chain, especially if the value chain being targeted is in a rural and underserved area. It also learned that appropriate partnerships are critical components of the investment.

Initially, there were only two partners—MTN and KCL. By the end of 2016, MM4P management realized that multiple partners were needed to make the initiative seamless. Today there are seven partners, including payment aggregator Yo! Uganda, solar company Fenix International, consulting firm Vital Wave, agent network manager Potbell Limited, and design firm IDEO.org Uganda. It accounts for 20% of the country’s export earnings and is a source of income for 2.8 million farmers (14% of the adult population).

DFS REGULATION AND POLICY IN GHANA

Ghana became the first country, in May 2020, to launch a DFS policy after years of background consultation and engagement (CGAP, 2020). This underscored, in principle, a governmental commitment to promote digitization in the economy at large. The 6 areas of action established by the policy are;

- enhancing the governance of the DFS ecosystem;
- creating an enabling regulatory framework that supports innovation, competition, and financial inclusion;
➢ building the capacity of the Ghanaian authorities to monitor the financial sector on market conduct, competition, data protection, and leveraging new technologies and architectures for data sharing.

➢ developing a purpose-built market infrastructure for DFS and strengthen existing payment platforms where feasible.

➢ prioritizing the digitization of payment use cases such as small-value informal pensions, government payments, remittances, merchant payments, and utility payments, leveraging technologies to improve design, delivery and monitoring.

➢ supporting the growth of FinTech firms by creating incentives that encourage investments and the launch of new business models and products.

The DFS policy (2020-2023) also envisions that by 2023:

➢ All Ghanaians have access to a large and broad range of quality and affordable digital financial services – including payment, credit, savings, insurance, and investment – that meet their needs;

➢ Businesses and Government have achieved greater transparency and efficiency to contribute to the economic growth of the nation;

➢ Payment flows have been digitized and formalized, thereby shrinking the informal economy, increasing Government revenues, and making monetary policies more effective (MOF, 2020).

The National Financial Inclusion and Development Strategy (NFIDS) (2017-2023), which is complemented by the DFS Policy (2020-2023), has the overall objective to increase financial inclusion from 58% to 75% (formal accounts per findex data) by 2023. The NFIDS articulates five priority areas for financial sector development: Financial stability; Access, quality, and usage of financial services; Financial infrastructure; Financial consumer protection; and Financial literacy and capability (MOF, 2020).

Additionally, the National Payment Systems Strategic Plan (2019-2024), which builds on the National Payments Strategy (NPS) (2014-2019), has the following strategic pillars:

➢ Develop and implement clear and comprehensive regulatory and governance framework;
➢ Promote free, competitive and orderly development of the payment system space that encourages innovation;
➢ Promote a safe and efficient payment system that fosters confidence and encourages usage;
➢ Deepen financial inclusion;
➢ Promote financial technologies;
➢ Promote interoperability of payment systems;
➢ Foster consumer trust; and
➢ Participate in the integration of regional payment systems (BOG, 2019).

It is worth noting that the National Payments Strategy (NPS) (2014-2019) achieved the following:

➢ Establishment of a Payment Systems Advisory Committee which advises the Bank on payment system issues;
➢ Implementation of GhIPSS Instant Pay (GIP) which allows payments to be sent across financial institutions electronically from one bank account to another;
➢ Introduction of gh-Link card which interconnects financial institutions and systems of third party providers; and
➢ Migration of payment cards to EMV chip and PIN standards (BOG, 2019).

The Bank of Ghana, in February 2021, launched a regulatory and innovation sandbox pilot in collaboration with EMTECH Service LLC. This is in line with its commitment to evolve an enabling and inclusive regulatory environment that promotes FinTechs and supports innovation. A regulatory and innovation sandbox is a supportive and controlled policy environment that enables firms to test innovative products, services and business models under the supervision of a regulator.

The Bank of Ghana, in August 2021, also partnered with Giesecke+Devrient (G+D) to pilot a general purpose Central Bank Digital Currency (retail CBDC). G+D is providing the technology and developing the solution adapted to Ghana’s requirements, which will be tested in a trial phase with banks, payment service providers, merchants, consumers and other relevant stakeholders.

Data from Bank of Ghana and GhIPSS and the Better Than Cash Alliance (BTCA) (2017) diagnostic of a set of digitization indicators summarizes Ghana’s efforts towards digitization in Table 1 and 2 respectively.
SITUATIONAL ASSESSMENT OF DFS IN THE COCOA VC IN GHANA

Value chain actors, especially LBCs and processors have used DFS in an often fragmented and ad hoc manner. Some (eg. Cocoa Merchant Ghana Limited) have piloted the digital initiative while others (eg. Cargill) have gone full-scale with digitization. Regulators and policy makers are yet to take a front seat in agricultural payments digitization though they have done much in the digitization of the economy in general. Effective role play will be key to successful full-scale digitization of the cocoa financial chain.

It is worth noting that most digitized payments in the cocoa financial chain are bank-based and the strides made thus far presently puts farmer-level cash transactions marginally below 90%. Bank transfers along the financial chain are usually done up to the PC-level.

THE STAKEHOLDER MATRIX FOR DIGITIZATION IN THE COCOA VALUE CHAIN

DFS is more effective when all stakeholders in the cocoa value chain are engaged and conscious of their role in driving DFS, and the benefits of DFS. The financial chain within the value chain includes all actors involved in payments and receipts. The ensuing is a comprehensive but not exhaustive categorization of actors in the financial chain:

- Primary value links: farmers, purchasing clerks, aggregators
- Secondary value links: licensed buying companies, processors
- Ancillary Services: input vendors, fumigation services
- Financial Services: Fintechs, financial service providers

Strategic partnerships are key in agriculture value chain digitization - it is hard to go it alone - (CGAP/UNCDF, 2018)
## TABLE 1: INDICATORS FOR OVERALL ECOSYSTEM DEVELOPMENT

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INDICATORS</th>
<th>2016</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIGITIZATION OF PAYMENTS</strong></td>
<td>Currency outside banks to M1 ratio</td>
<td>39.96%(^{10})</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Total volume of mobile money transactions (millions)</td>
<td>100.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total number of POS terminals in circulation</td>
<td>6,500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total volume of POS transactions (millions)</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total volume of issued credit and debit cards (millions)</td>
<td>5.455</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total volume of credit and debit card transactions (millions)</td>
<td>46.6</td>
<td></td>
</tr>
<tr>
<td><strong>DIGITIZATION OF PAYMENTS</strong></td>
<td>Number of registered mobile banking users (millions)</td>
<td>2.176</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total volume of mobile banking transactions (millions)</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of registered internet banking users (millions)</td>
<td>9.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total volume of internet banking transactions (millions)</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td><strong>INFRASTRUCTURE</strong></td>
<td>National biometric IDs issued to adult population (%)</td>
<td>&lt;1%</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Number of digital transactions on GEPP (absolute volume)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of transactions through national switch (million)</td>
<td>2.067</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value of transactions through national switch (GHS million)</td>
<td>447,041,343</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number of FSPs connecting to national switch</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Bank of Ghana and GhIPSS data*
TABLE 2: INDICATORS FROM COUNTRY DIAGNOSTIC

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>INDICATORS</th>
<th>2016</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digitization of Payments</td>
<td>Digital payments as a % of overall payments (volume)</td>
<td>1%</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Digital payments as a % of overall payments (value)</td>
<td>37%</td>
<td>42%</td>
</tr>
<tr>
<td></td>
<td>Digital Government payments made as a % of all Government payments made (volume)</td>
<td>23%</td>
<td>42%</td>
</tr>
<tr>
<td></td>
<td>Digital Government payments made as a % of all Government payments made (value)</td>
<td>86%</td>
<td>69.5%</td>
</tr>
<tr>
<td></td>
<td>Digital business payments as a % of all business payments (volume)</td>
<td>28%</td>
<td>33.5%</td>
</tr>
<tr>
<td></td>
<td>Digital business payments as a % of all business payments (value)</td>
<td>35%</td>
<td>39%</td>
</tr>
<tr>
<td></td>
<td>Digital individual payments as a % of all individual payments (volume)</td>
<td>0.4%</td>
<td>5.3%</td>
</tr>
<tr>
<td></td>
<td>Digital individual payments as a % of all individual payments (value)</td>
<td>29%</td>
<td>34%</td>
</tr>
</tbody>
</table>

**Source: 2017 BTCA country diagnostic**

**CHALLENGES OF DFS DEPLOYMENT AND PATRONAGE**

DFS deployment and penetration is not without challenges; and these challenges are well documented. Many are still accustomed to the cash payments they have been using their entire lives. Cash is still dominant within their comfort zones, and learning a new payment method or changing their way of paying for things might seem pointless and valueless to them. Others consider their mobile phones as insecure and not as reliable for payments as cash or other methods (ADBI, 2018). Payment services providers and merchants need to educate users, earn their trust, help them become familiar with the mobile payment experience, and make them feel rest assured that security is a prime concern.
The costs of DFS infrastructure and transactions have also been established as a disincentive to DFS deployment and patronage (USAID, 2019). The mistrust of smallholder farmers particularly towards the formal financial system cannot also be overlooked (USAID, 2016).

RELEVANT PREVIOUS STUDIES

The World Cocoa Foundation (WCF) and the Better Than Cash Alliance (BTCA), in July 2020, published two (2) studies:

- The Hidden Costs of Cash to Ghana’s Cocoa Sector (Costs of Cash Study)
- Digitizing Payments in Ghana’s Cocoa Supply Chain: Four Building Blocks for Responsible and Scalable Digitization (Digitizing Payments Study).
These studies provide the much-needed point of departure for the present study. The Costs of Cash Study sets in context the multi-faceted costs associated with the use of cash payments within the cocoa financial chain. The study established that approximately USD21.5 million is put at risk, equivalent to 19% of LBC revenues per year. About USD4 million of this is incurred by LBCs through cash payment delays, and accountant salaries and bad debt; while about USD17.3 million is incurred by purchasing clerks through theft and unnecessary transport costs (WCF/BTCA, 2020a).

The Digitizing Payments Study also sets out four (4) building blocks to guide LBCs in their transitions to digital payment and to help them achieve scalable and responsible digitization. These blocks are enumerated as follows:

- ➢ Know your smallholder farmers;
- ➢ Build the internal and external value proposition for digitization;
- ➢ Enable farmers to spend funds and access services digitally by building a robust digital payments acceptance ecosystem and;
- ➢ Sensitize company staff and farmers on the value of digital payments (WCF/BTCA, 2020b).
B. INTERVIEW GUIDE TEMPLATES

Interview Guide for LBCs

This study aims at establishing the costs of digitizing payments within the cocoa financial chain. This would aid the comparison between the costs associated with cash payments and the costs associated with digital payments. This interview would be anonymized for confidentiality and privacy. Your participation and cooperation is much appreciated.

1. Number of PCs and farmers you transact with
2. Average periodic volume and value of business transactions (weekly, monthly, quarterly or annually)
3. Perspectives on the state of Digital Financial Services in:
   - the cocoa sector
4. Past and ongoing DFS efforts in your financial operations as an LBC (including partnerships)
5. Costs incurred through these past and ongoing efforts (eg. digital infrastructure, bank charges, mobile money charges, sensitization campaigns, staff training, maintenance etc.) – citing per unit costs where applicable
6. Digital platforms already used or intended to be used (bank transfers, mobile money, online transfers, cards such as e-zwich etc.)
7. Specific future plans to digitize more of your financial operations as an LBC
8. Role identification for DFS to be successful at full scale (what are you ready to do and not do; who bears what responsibility and what costs?)
   - Cost of IT infrastructure (set-up costs)
   - On-boarding fee (platform registration costs)
   - Subscription fee
   - Transaction fee
   - Cash-out fee
   - Sensitization and education costs
   - Cyber crime
   - Salaries for human support systems
9. Challenges of DFS deployment or usage
10. Future outlook for DFS in the cocoa value chain (next 3, 5, and 10 years)
Interview Guide for PCs and Aggregators

This study aims at establishing the costs of digitizing payments within the cocoa financial chain. This would aid the comparison between the costs associated with cash payments and the costs associated with digital payments. This interview would be anonymized for confidentiality and privacy. Your participation and cooperation is much appreciated.

1. Number of years in the business
2. Perspectives on the state of DFS in:
   - the cocoa sector
3. Number of farmers and LBCs you transact with
4. Average periodic (weekly, monthly, quarterly) value of business transactions
5. Digital platforms already used or intended to be used (bank transfers, mobile money, online transfers etc.)
6. Past and ongoing DFS efforts in your financial operations as a PC
7. Costs incurred through these past and ongoing efforts (eg. digital infrastructure, bank charges, mobile money charges, sensitization campaigns etc.) – citing per unit costs where applicable
8. Specific future plans to digitize more of your financial operations as a PC
9. Role identification for DFS to be successful at full scale (what are you ready to do and not do; who bears what responsibility and what costs?)
   - Cost of IT infrastructure (set-up costs)
   - On-boarding fee (platform registration costs)
   - Subscription fee
   - Transaction fee
   - Cash-out fee
   - Sensitization and education costs
   - Cyber crime
   - Salaries for human support systems
10. Challenges of DFS deployment or usage
11. Willingness or otherwise to continue or start DFS usage with reasons
12. Future outlook for DFS in the cocoa value chain (next 3,5, and 10 years)
Interview Guide for Farmers

This study aims at establishing the costs of digitizing payments within the cocoa financial chain. This would aid the comparison between the costs associated with cash payments and the costs associated with digital payments. This interview would be anonymized for confidentiality and privacy. Your participation and cooperation is much appreciated.

A. General Information
1. District/Region ........................................
2. Community ..............................................
3. Gender
   a. Male b. Female
4. Farm size .............................................
5. Age
   a. 16-30 b. 31-45 c. 46-60 d. >60
6. Level of education
   a. No education b. Primary c. JHS d. SHS e. Tertiary
7. Do you have a phone of your own?
   a. Yes b. No
8. If no, do you have access to a phone?
   a. Yes b. No
9. What is your phone number?..........................
10. What network do you use?
    a. MTN b. Vodafone c. Airtel-Tigo d. Other

B. DFS Experience
11. Which of the following do you have (bank account, ATM card, mobile money)?
12. If you do not have any, why?
13. If you particularly do not use mobile money, why?

Questions 14 - 26 are for users of mobile money
14. How often do you transact with mobile money per week?
   a. once  b. twice  c. thrice  d. more than thrice  e. other

15. When undertaking a transaction, do you do it yourself or you are assisted by an agent?
   a. Self  b. Assisted by agent

16. Which of the following mobile money services/products have you heard of?

17. Which of the following services have you used your mobile money for before?
   a. Deposit/ send/ withdraw money  b. Airtime top up  c. pay school fees  d. Pay utility bills  e. buy
      inputs  f. Loans  g. Pensions products  h. Insurance  i. investment  j. None

18. Do you save on your mobile wallet?
   a. Yes  b. No

19. How do you save your money?
   a. Bank account  b. Village savings and loans  c. Mobile money account  d. At home  e. No savings

20. Do you know of mobile money agents in your community?
   a. Yes  b. No

21. How long does it take you to get to the nearest agent?
   a. Less than 30 mins  b. 30 mins to 1 hour  c. More than 1 hour

22. Have you had any challenges using mobile money? a. Yes  b. No

23. Name challenges if any

24. What different costs are associated with your mobile money usage?
   a. On-boarding fee (platform registration costs)
   b. Subscription fee
   c. Transaction fee
   d. Cash-out fee
   e. Sensitization and education costs (paying to know how to use the service)
   f. Cyber crime

25. How much do you pay for each of the costs selected in Q24?

   ..........................................................................................................................
   ..........................................................................................................................
26. Has any of the costs selected in Q24 deterred you from using mobile money before? Which costs if any? ...........................................................................................................
...........................................................................................................

27. By which method(s) have you received payment for your cocoa beans sold?
   a. Mobile money b. E-Zwich c. Cash d. bank e. other .................................

28. Which of the following accounts for your top 4 areas of expenditure?
   a. Seeds and seedlings b. Herbicides/pesticides c. Fertilizer d. Veterinary/medicine
   e. Payment for workers f. Land purchase/rental g. Electronic equipment h. Food i. Clothes
   j. Airtime k. Educational expenses l. Health expenses m. Building materials

29. For each of the 4 expenditures selected in Q28, indicate how it was paid for.
   ...........................................................................................................
   ...........................................................................................................

30. What is the advantage of cash over digital payments? ..............................
   ...........................................................................................................
   ...........................................................................................................

31. What is the advantage of digital payments over cash? ..............................
   ...........................................................................................................
   ...........................................................................................................

32. Do you intend to continue or start using digital payments?  a. Yes b. No
Interview Guide for Regulators and Policy Makers

This study aims at establishing the costs of digitizing payments within the cocoa financial chain. This would aid the comparison between the costs associated with cash payments and the costs associated with digital payments. This interview would be anonymized for confidentiality and privacy. Your participation and cooperation is much appreciated.

1. Perspectives on the state of DFS in:
   - the country
   - agriculture and
   - the cocoa sector

2. Past efforts on DFS in Agriculture and Cocoa sector (Regulation, policy etc.)

3. Specific future support to the cocoa value chain for DFS penetration

4. Role identification for DFS to be successful at full scale (what is the regulator ready to do and not do; who bears what responsibility and what costs?)
   - Cost of IT infrastructure (set-up costs)
   - On-boarding fee (platform registration costs)
   - Subscription fee
   - Transaction fee
   - Cash-out fee
   - Sensitization and education costs
   - Cyber crime
   - Salaries for human support systems

5. Future outlook for DFS in the cocoa value chain (next 3,5, and 10 years)
Interview Guide for Processors and Brands

*This study aims at establishing the costs of digitizing payments within the cocoa financial chain. This would aid the comparison between the costs associated with cash payments and the costs associated with digital payments. This interview would be anonymized for confidentiality and privacy. Your participation and cooperation is much appreciated.*

1. Number of PCs and farmers you transact with
2. Average periodic volume and value of business transactions (weekly, monthly, quarterly or annually)
3. Perspectives on the state of Digital Financial Services in:
   - the cocoa sector
4. Past and ongoing DFS efforts in your financial operations as a processor (including partnerships)
5. Costs incurred through these past and ongoing efforts (eg. digital infrastructure, bank charges, mobile money charges, sensitization campaigns etc.) – citing per unit costs where applicable
6. Digital platforms already used or intended to be used (bank transfers, mobile money, online transfers etc.)
7. Specific future plans to digitize more of your financial operations as a processor
8. Role identification for DFS to be successful at full scale (what are you ready to do and not do; who bears what responsibility and what costs?)
   - Cost of IT infrastructure (set-up costs)
   - On-boarding fee (platform registration costs)
   - Subscription fee
   - Transaction fee
   - Cash-out fee
   - Sensitization and education costs
   - Cyber crime
   - Salaries for human support systems
9. Challenges of DFS deployment or usage
10. Future outlook for DFS in the cocoa value chain (next 3, 5, and 10 years)
Interview Guide for Fintechs

*This study aims at establishing the costs of digitizing payments within the cocoa financial chain. This would aid the comparison between the costs associated with cash payments and the costs associated with digital payments. This interview would be anonymized for confidentiality and privacy. Your participation and cooperation is much appreciated.*

1. Past experience with DFS in the agricultural sector if any (especially cocoa) (including partnerships)
2. Based on an exposition of the operations of the cocoa sector and its financial chain by the interviewer, an assessment of the following costs where applicable:
   - Cost of IT infrastructure (set-up costs)
   - On-boarding fee (platform registration costs)
   - Subscription fee
   - Transaction fee
   - Cash-out fee
   - Sensitization and education costs
   - Cyber crime (average periodic incident rate and values involved, probability of occurrence)
   - Salaries for human support systems
3. Average periodic volume and value of transactions (weekly, monthly, quarterly or annually)
4. Perspectives on the state of Digital Financial Services in:
   - the country
   - the agric sector
   - the cocoa value chain
5. Past and ongoing DFS promotional efforts
6. Costs incurred through these promotional efforts (eg. digital infrastructure, sensitization campaigns etc.)
7. Specific future plans for innovation
8. Role identification for DFS to be successful at full scale (what are you ready to do and not do; who bears what responsibility and what costs?)
9. Challenges of DFS deployment
10. Future outlook for DFS (next 3, 5, and 10 years)
REPORT

Monitoring and Evaluation Mission of Dr Hervé BISSELEUA, Director of Agricultural Productivity, Chief of Party of the African Cocoa Initiative Phase II Programme, World Cocoa Foundation

Visit carried out from 05 to 06 July 2021 at IRAD, Nkolbisson, Yaoundé, Cameroon
Introduction
As part of the monitoring of the activities of the FQLab, Dr. Hervé BISSELEUA, visited from July 5-6, 2021. The objectives of the mission were to assess the skills of the staff and the tasting panel after the training provided by Ms. Dorine KASSI. The work of the first day focused on the presentation of the activities of the FQLab followed by exchanges. Those of the second day were dedicated to the participation of the evaluator in the activities of the laboratory.

I. Presentation of the activities of the FQLab
I.1. Presentation
The working session was chaired by Dr Bruno EFOMBAGN and began with an individual presentation of the visitor and then the participants. Then the Head of the Technical Platform (CPT) Mrs. Abeline Mbesso and her team presented the weekly activities of the FQLab as well as the responsibilities of each member.

From this presentation, it emerges that the FQLab is managed by a coordinator who acts as a liaison between the laboratory and the cocoa producers and a CPT who organizes the daily activities, with six employees responsible for the physical analysis, liquor preparation and tasting stations at the rate of two people per post. This distribution is justified by the concern for efficiency. Indeed, the FQLab is anxious to respond to its mission continuously without being slowed down by an involuntary unavailability of its staff (through illness, for example).

Activities at the FQLab are planned weekly by all staff to avoid bottlenecks, as staff are also part of the panel. The laboratory received 59 samples, 37 underwent physical analysis for 26 liqueurs produced and 21 tasted. It should be noted that, in addition to these 21
samples, the panel tasted the 8 samples from Côte d'Ivoire as part of the ring test. The physical analysis operations are performed as described by the SOP and take place every day of the week. As for the preparation of liqueurs, it is done on average twice a week, on Wednesdays and Fridays, with a production of three liqueurs a day. As for the tasting station, it consists of a panel of 13 tasters trained by Dorine KASSI in May 2021. Tastings take place on Tuesday and Thursday at 10 am.

1.2. Constraints

When carrying out the activities in the various positions, the technical team faced some difficulties worth highlighting. These include:

- Slowing down of operations at the physical analysis and preparation stations of liqueurs. Indeed, both stations use a scale but the laboratory has only one scale;
- Disruption of the oven because of the great difference between the roasting and melting temperatures of the liqueurs to be tasted;
- Use of a single roaster. Indeed, the cocoatown roaster being graduated in temperature level of 5 °C; it does not allow temperature adjustments and is therefore unused;
- The non-permanence of the tasting panel;
- The inadequacy of the reference samples.

These constraints translate into the need for equipment and training, namely:

- A precision scale;
- A moisture meter;
- Two ovens;
- Reference samples;
- Training in equipment maintenance and statistical analysis.

II. Activities

On the second day, the focus was on the implementation of operations in the various posts.

- Physical analysis station

![Physical analyses of cocoa beans](image1)

- Liquor preparation station

![Liquor preparation station](image2)
Activities at this position started at 9am. With a panel of 12 people and five samples to taste. The advice that has been given to the panelists to improve their perceptions is to open up to nature; take walks in cocoa farms and even in nurseries and especially get acquainted with these flavors by consuming them regularly.

Figure 4: Liquor Production

Figure 5: a) Preparation of samples to be tasted, b) Tasting of liqueurs by the panel

Conclusion

At the end of these two days of work, it appears that the activities at the FQLab are effective. Of the 59 samples received from producers, 26 have already been processed into liqueurs and 21 have already been tasted. Eight of the panel’s 13 tasters are yielding encouraging results. However, there are areas requiring improvement, in particular regarding equipment (oven, scale, moisture meter) as well as training in statistical analysis of the data obtained and the maintenance of equipment.
Festus Olakunle Olasupo (PhD), a cocoa geneticist and breeder at the Cocoa Research Institute of Nigeria (CRIN) Ibadan, Nigeria, developed an interest in cocoa flavor quality improvement after he visited TCHO and Guittard Chocolate companies in California, USA, during his Borlaug Fellowship program in 2014.

In late 2018, the World Cocoa Foundation / African Cocoa Initiative Phase II (ACI II) advertised the plan to give a grant for the establishment of the third Flavor Quality Laboratory (FQL) in Cameroon or Nigeria. The grant was to support the hosting country (Institution) by supplying the equipment and fund the trainings and activities of the laboratory for two years while the host will provide adequate laboratory space. The proposal developed and submitted eventually met the requirement of WCF and the FQL establishment was approved for CRIN Nigeria. To lead the FQL project in Nigeria to this point, Olasupo organized some meetings of cocoa stakeholders in Nigeria with WCF and CRIN management to carry them along with the vision.

The ACI II played a key role in the establishment of the lab by purchasing and shipping all the equipment needed to CRIN, while CRIN management ensured the laboratory met the required standard. The laboratory is now well-furnished, equipped and a new 30KVA power generator has been procured and dedicated to the FQL to solve the problem of inadequate power supply.

To keep the laboratory functioning, a training program was organized by the ACI II for capacity building of the FQL team and panelists at CRIN. This was conducted from June 21 to July 02, 2021, by the WCF FQL training consultant, Dorine Kassi. Stakeholders in the Nigeria cocoa industry were also invited to a meeting with ACI II Chief of Party, Herve Daghela Bisseleua and CRIN Executive Director, Patrick Adebola during the training. Nigeria FQL at CRIN, Ibadan is now in full operation.
Cross-section of participants at the cocoa stakeholders’ meeting with Nene Akwetekodjo (WCF/ACI II Project Coordinator) and CRIN ED on May 16,
A 30KVA sound-proof generator dedicated to the FQL

FQL Reception
Sample Preparatory Room

Tasting / Flavor Analysis Room
Panelists Training Section on Tasting and Flavor Determination

CRIN Panelists during Cocoa Liquor Flavor Analysis
WCF/ACI Chief of Party with stakeholders on a visit to CRIN FQL

Cocoa Stakeholders with CRIN ED during the visit to CRIN FQL
Participants at the Cocoa Stakeholders’ meeting with WCF/ACI Chief of Party and CRIN ED on 01/07/2021

Dorine Kassi with ACI II COP, Dr. Muyiwa and Dr. Olasupo of CRIN