



The CocoaSoils Programme, a public-private consortium (with funding from the Norwegian Government - NORAD) has been created to address the issues of decline in productivity in cocoa and improve the livelihoods of smallholder cocoa farmers while avoiding deforestation. The program has two main arms: Research for Development (R4D) and Partnership for Delivery (P4D). The R4D focuses on developing the protocols, establishing trials as well as data collection and management, while the P4D focuses on disseminating the recommendations from these trials in order to empower farmers and improve their livelihoods. In this edition of the Gazette, we focus on updates of some activities undertaken in the second quarter of 2020.

## Updates from the Satellite Trials

The Satellite Trials under the CocoaSoils program is a second set of trials that is being established in existing cocoa plantations and aimed at creating the link between the Core Trials and actual plantations. The Satellite Trials are managed by farmers to test different fertilizer combinations and shade interactions to examine the effects on yield under field conditions. The implementation of the Satellite Trials is currently underway in Cameroon, Cote d'Ivoire, Ghana and Nigeria, at varying levels. This article is a summary update of activities in the field in the different countries from May to July 2020.

### Cameroon:

Site Validation, Delineation and Characterization: A total of 64 plantations selected by Olam-Cameroon have been validated. Plot delineation, initial site characterization, tree density and shade calculations,

## OVERVIEW:

- Updates from the Satellite Trials
- Updates from the Core Trials
- Validation of the CocoaSoils training manuals: A successful start
- Mapping suitability for cocoa agroforestry in côte d'Ivoire to assess its potential to contribute to the country's target of restoring forest cover to 20% of land area by 2030
- Profiles - Eric Yao

soil sampling and fertilizer application have been carried out in July. Smartphones were distributed to technicians to facilitate data collection and upload to the Open Data Kit (ODK) server.

Training of Technicians: The training of technicians was held in Ntui between the 18th and the 20th of June 2020. 16 technicians have been trained to understand and implement the protocols of the Satellite Trials. 11 technicians have been assigned to Ntui, with 44 plantations, four technicians to Ayos, with 16 plantations and one technician to Makenene, with four plantations. The theory and field practices were conducted in one selected pilot site located about 3km from the town of Ntui. The detailed steps for data collection with the ODK was also presented to technicians.

See [here](#) for the full report.



Facilitators addressing participants  
(Photo credit: IITA - Cameroon)



A cross-section of participants  
(Photo credit: IITA - Cameroon)



Plot delineation  
(Photo credit: IITA - Cameroon)

Photo Updates: Below are some photos from field activities in Cameroon



Fertilizer being weighed  
(Photo credit: IITA - Cameroon)



Fertilizer on site, ready for application  
(Photo credit: IITA - Cameroon)



Plot delineation  
(Photo credit: IITA - Cameroon)

## Côte D'Ivoire

Site Validation, Delineation and Characterization: A total of 64 Olam plantations and 48 Cargill plantations have been validated in Cote d'Ivoire. Plot delineation, initial site characterization and fertilizer application are ongoing for a total of 41 Olam plantations which have been delineated. Physical validation of 40 plantations for Mondelez has been carried out. A large quantity of fertilizer being used on the plantations was provided by Yara-Cote d'Ivoire. A total of 45 smartphones have been procured and distributed to technicians for data collection. To facilitate communication among technicians, coordinators and facilitators of the Satellite Trials, WhatsApp groups have been formed per private partner.

Training of technicians: In the week of 8-14 June 2020, 21 Olam technicians (18 males, 3 females) were trained at the ANADER Training Centre in Gagnoa. In the week of 6-10 July, 20 technicians from Mondelez and Cargill were also trained. These 3-day training workshops were conducted in 2 stages: a theoretical phase and a practical phase in order to allow the technicians to be operational once on the field.

See [here](#) for the full report.



A cross-section of participants  
(Photo credit: IITA - Cote d'Ivoire)



Participants discussing with facilitators  
(Photo credit: IITA - Cote d'Ivoire)



Fertilizer application  
(Photo credit: IITA - Cote d'Ivoire)

Photo Updates: Below are some photos from field activities in Cote d'Ivoire

## Ghana

Site Validation, Delineation and Characterization: A total of 131 plantations have been validated and currently being managed by 41 technicians from four partners. Kuapa Kokoo has 61 plantations, which is being managed by 22 technicians, OLAM has 20 plantations, which is being managed by six technicians, Mondelez has 20 plantations, which is being managed by four technicians and Rockwinds/TransRoyal has 30 plantations, managed by nine technicians. In terms of plot delineation and initial site characterization, a total of 91 plantations have been delineated with fertilizer applied to 56 plantations. Below is a break down per partner.

Partner	Plots Delineated	Fertilizer Application	Remarks
Olam	17/20	9 plantations	Three farms have applied fertilizer, and hence would not be used for the trial.
Rockwinds/TransRoyal	20/30	10 plantations	
Mondelez	20/20	19 plantations	
Kuapa Kokoo	34/61	18 plantations	

Most of the data collection from the plot delineation have been uploaded onto the ODK server. For ease of communication, a WhatsApp group has been created for the technicians of each of the partner organizations to receive continuous updates from field activities and discuss technical issues that may come up.

Photo Updates: Below are some photos from field activities in Ghana

## Olam-Ghana



Technician taking measurements, using the 3-4-5 method  
(Photo credit: OLAM - Cote d'Ivoire)



Tagging of trees  
(Photo credit: OLAM - Cote d'Ivoire)



Fertilizer ready to be moved and used on the field  
(Photo credit: OLAM - Cote d'Ivoire)



Measuring 10m before applying fertilizer  
(Photo credit: IITA - Accra)



Fertilizer application  
(Photo credit: IITA - Accra)



Tree tagging  
(Photo credit: IITA - Accra)



Agro-inputs received on site  
(Photo credit: IITA - Accra)



Tree tagging  
(Photo credit: IITA - Accra)

### Kuapa Kokoo



Agro-inputs received on site  
(Photo credit: IITA - Accra)

### Rockwinds / TransRoyal - Ghana



Plot delineation  
(Photo credit: IITA - Accra)



Tree tagging  
(Photo credit: IITA - Accra)



Plot delineation  
(Photo credit: IITA - Accra)

## IITA IBADAN - NIGERIA

The year 2020 started with unusual and low rainfall. By the end of April, we had received 88 mm of rain and until the time of reporting the total is 155 mm, way below the usual amounts. Accordingly, activities, such as replacing the dead and damaged cocoa trees have been delayed. The rain permitted sucker growth of the plantain to a level that competition for water was becoming a threat.



Fertilizer being mixed for application  
(Photo credit: IITA - Accra)



Fertilizer application  
(Photo credit: IITA - Accra)



A typical situation of plantain sucker overcrowding after the start of first rains. (Photo credit: IITA - Ibadan)

It was also observed that plantain leaves touching the cocoa canopy appeared to cause abrasions on flushing leaves and in some cases the loss of entire leaves. Throughout the month of May, the crew removed suckers from the plantain trees to reduce competition and prevent physical damages. The reduced sucker density caused more light to reach the soil surface and thus promoted weed growth.



Weed infestation after plantain sucker removal (Photo credit: IITA - Ibadan)

## Updates from the Core Trials

Generally, all the Core Trial sites are being well managed using the protocols. Work on the ontology is in progress, and the first draft of the report has been shared with partners.

A semi-automated workflow has been established to generate site-specific field maps of the final, randomized design for each Core Trial, using the geographic plot coordinates provided by the Core Trial managers. These field maps show the layout of the experimental plots, indicating the treatments assigned to each plot, the plot identifier as well as a checkbox for marking the completion of fertilizer application on the plot in question. An associated ODK tool is available and supplies plot and treatment information when a tree barcode is scanned. These tools will be provided for the Core Trial managers for revision.

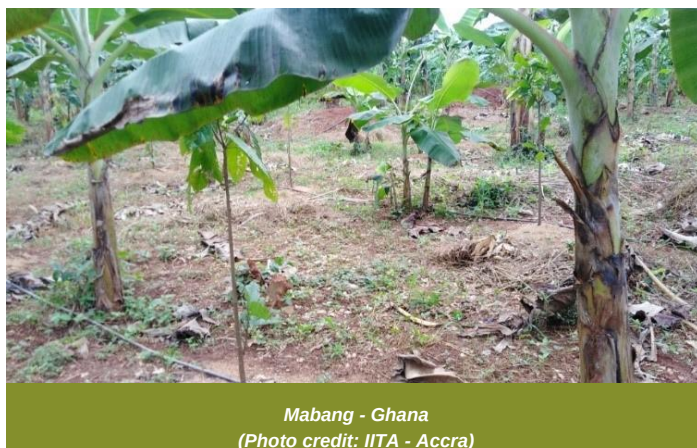
An early cocoa tree evaluation protocol has been developed and is available in the OneDrive folder. The evaluation comes together with an ODK form which is already available in the system. In addition to this, a plantain evaluation protocol has been also developed and its form is also available in the system.

Below are some updates from individual Core Trial sites

Thus, weed control was a major activity in the second half of May. This was combined with the re-shaping of the ridges running across the slope between the cocoa trees and the plantain to prevent surface runoff to collect and cause erosion. So far these relatively small ridges of about 15 to 20 cm in height, have been very effective in retaining rainwater within the plots and within the area allocated to a cocoa plant.

## CRIG MABANG - GHANA

The major activities carried out at the site include the replacement of dead cocoa seedlings and plantain suckers, weed control, and plantain evaluation. Dead cocoa seedlings were replaced in April, as soon as the soil established good moisture content. Termiticide was applied to treat a termite infestation in the field. Total Rainfall at the site was 938.1 mm by the end of June 2020 and the first rainfall in March resulted in the development of plantain peepers into suckers. The overcrowded plantain suckers were removed in May to prevent competition for nutrient and water, as well as enhance air circulation. Weed control has been carried out from mid-April till date. Due to the rapid regrowth of weeds on the field, the line brushing method of weed control has been adapted. The evaluation of plantain is ongoing.



## MONDELEZ – GHANA

Mondelez has agreed to adopt a Core Trial in Ghana. In view of this, a letter has been submitted to the Cocoa Research Institute of Ghana (CRIG). CRIG has agreed and provided a plot of land for the trials in the Western region of Ghana. Follow-ups will be undertaken to ensure the successful installation of the Core Trial.

## CNRA DIVO – COTE D'IVOIRE

Planting of cocoa was done from 19-20 May 2020 on the

2ha plot. Currently, the plants are developing well although some plant replacements were done. The irrigation system has been completely installed and functions normally although the borehole is far from the site. The weather station has also been installed at the site. Weeding on the site was undertaken for both the plantain and cocoa and plantain is still being harvested on the site and being weighed.

The data results of the 74 soil samples sent to Ibadan, Nigeria to be analysed (44 samples for 0-30cm, 20 samples for 30-60cm, 10 samples for 60-90cm) have been received.



## BARRY CALLEBAUT TIASSALE – COTE D'IVOIRE

Fertilizer for planting has been received from CNRA and soil analysis results have been received from Ibadan

Nigeria. Seedlings have been established in the nursery and almost ready for planting. Plans are underway to improve the pumping infrastructure that is installed, to enhance the efficiency of the irrigation system. Maize data has been entered and ready to be uploaded. The field is ready for planting and looking forward to a good survival rate when seedlings are planted.

#### NESTLE ABOISSO – COTE D'IVOIRE

The planting of cocoa is scheduled for September 2020. The irrigation system has been installed and functioning correctly. There are plans to increase water storage by getting more water storage tanks. The plantain data has been submitted to the ODK server and the results from soil analysis are still pending.

#### CRIN OWENA – NIGERIA

Most of the cocoa seedlings were lost during the dry season due to water stress. Clonal seedlings which were produced and raised in the nursery at the CRIN Headquarters, Ibadan to replace dead plants in June 2020. The seedlings were not enough to replace the dead ones. Therefore, more clonal cocoa seedlings are being raised presently to be planted in September 2020. The drip irrigation pipes have been installed but yet to be connected to the water source due to the challenge with the borehole.



Owena Core trial site showing installed irrigation pipes  
(Photo credit: CRIN - Owena)



Technicians working on the borehole at Owena Core-trial site  
(Photo credit: CRIN - Owena)

#### IITA MBALMAYO – CAMEROON

A 4-hectare piece of land has been selected for CocoaSoils' project at Mbalmayo, in the Central Region of Cameroon for the establishment of Core Trial. The site was delineated, and field preparation activities have been carried out since the end of July. Seedling maintenance has been conducted regularly in order to keep the seedlings healthy



Field Preparation at Mabalmayo  
(Photo credit IITA - Cameroon)



Cocoa nursery at IITA Cameroon  
(Photo credit IITA - Cameroon)

#### IRAD EBOLOWA – CAMEROON

The following activities took place in May 2020. In accordance with the recommendations of the protocol, fertilizer application has been undertaken, and cocoa seedlings used for planting were selected according to the prescribed instructions including having at least 12 mature leaves.



(Photo credit IRAD- Cameroon)

However, it should be noted that following a short period of drought that occurred after the planting, some losses were recorded and dead plants will be replaced with the young plants in the nursery.



(Photo credit IRAD- Cameroon)

The weather station has been installed and currently operational. The operating personnel have been trained in the use of this device with the installation of the software. For the setup of the irrigation system, the preliminary geophysical work has been carried out and three potentially aquifer zones have been identified. The most suitable areas F1 and F2 are inside the field, which could complicate the piping installation system if these areas were ever selected. The third favorable aquifer zone is at the left border of the entrance to the field. This area is close to an energy source (electric current) and has sufficient space all around for the layout of the cubitainers to contain the irrigation water.



Weather station installed  
(Photo credit IRAD- Cameroon)



(Photo credit IRAD- Cameroon)

these areas were ever selected. The third favorable aquifer zone is at the left border of the entrance to the field. This area is close to an energy source (electric current) and has sufficient space all around for the layout of the cubitainers to contain the irrigation water.

*Contribution by: Core Trial Managers and Research Assistants*

## Validation of the CocoaSoils training manuals: A successful start

Improving productivity of cocoa while avoiding deforestation is the main objective of the CocoaSoils program. This is being undertaken using Integrated Soils Fertility Management (ISFM) through research activities on-site and with farmers in four countries: Cameroon, Côte d'Ivoire, Ghana and Nigeria. However, it is worth noting that the research results will have no effect if there is not an effective strategy for disseminating said results as well as training farmers and major stakeholders including state institutions and private sector companies. It is within this framework that the Partnership for Delivery (P4D) component of the program, has as its mission to develop a training manual for use by extension workers and technicians from our private sector partners. This Training Manual will be followed by a simplified handbook for farmers and is intended to support the farmer on a daily basis in his quest for best management practices for improving productivity.

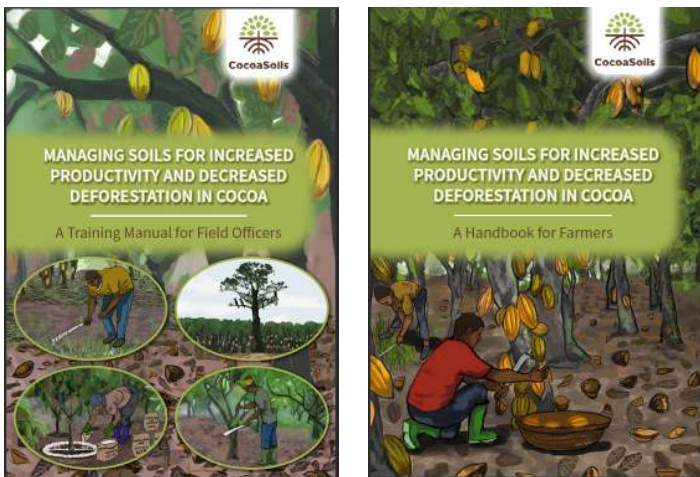
After design and content development, the validation of the manual was scheduled to take place in six steps:

- Scientific validation
- Extension validation
- Private sector validation
- Country test of the validated draft document
- Government validation & adoption
- Promotion and dissemination

The design and development of the Manual took place in April 2020. The Training Manual for extension agents has three (3) main sections: (i) the duality of productivity and deforestation sets the scene, (ii) good agricultural practices and (iii) management of soil fertility. The resulting manual was shared with members of the CocoaSoils team who gave their contributions. It was then submitted and received validation from the various national scientific committees in Cameroon, Côte d'Ivoire, Ghana and Nigeria through exchanges via videoconference and by e-mail. In Cameroon, the

validation was led by a team of researchers from IRAD and IITA, in Côte d'Ivoire by researchers from CNRA, in Ghana by researchers from CRIG and COCOBOD and finally in Nigeria by CRIN researchers. This step is the most important because it guarantees the reliability of knowledge about cocoa at the current stage of research in the four countries.

Due to the Covid-19 pandemic, the meetings that had initially been planned to be held physically were all done virtually. As of July 15, 2020, the green light has been given to initiate the validation process at the level of the Partnership for Delivery (P4D) Committees of each country. This step is of great importance, and will ensure the alignment of the contents of the manual with existing policies in each country and guarantee the institutional credibility of the Manual and its acceptance by stakeholders in each country.



To conclude, the validation process is well under way despite the constraints of Covid-19 and highlights the determination of the project team to move forward, as well as the remarkable commitment of private partners and other actors in the process of dissemination and adoption of new knowledge, particularly in the management of soil fertility in cocoa farming.

*Contribution by: Jean-Paul Nlend-Nkott  
[J.Nlend-Nkott@cgiar.org](mailto:J.Nlend-Nkott@cgiar.org)*

## Mapping suitability for cocoa agroforestry in Côte d'Ivoire to assess its potential to contribute to the country's target of restoring forest cover to 20% of land area by 2030

*A summary*

In acknowledging the close linkages between deforestation and cocoa expansion in recent decades, the National REDD+ Strategy places a strong emphasis on moving towards zero-deforestation agriculture, in partnership with supply chain organizations and the private sector.

In the case of cocoa, this includes contributing to restoring forest cover to 20% of land area by 2030. Agroforestry has been identified as a solution to effectively contribute to the long-term sustainability of the cocoa sector and the national effort to restore the Ivorian forest cover.

The National REDD+ Strategy plans to rehabilitate 1 million hectares of cocoa plantations in degraded classified forests through this system by 2030. Côte d'Ivoire also aims to promote agroforestry in cocoa plantations, aiming to increase non-cocoa tree density to at least 50 trees/hectare to secure timber and fuelwood supply and diversify farmers' incomes while supporting food security, increasing carbon stocks and resilience to climate change. This will further reduce cocoa-driven deforestation by 2030.

Beyond the need to address the financial, technical and legal constraints to the adoption of agroforestry practices at different levels, there is the need to understand how far agroforestry can contribute to achieving national forest restoration targets, and the locations where cocoa agroforestry can achieve carbon and non-carbon benefits simultaneously. This means considering which areas are most suitable for current and future cocoa production, their current status and options for increasing or restoring tree cover.

UNEP-WCMC in collaboration with UNEP, the Secrétariat Exécutif Permanent REDD+ of Côte d'Ivoire and Centre Suisse de Recherches Scientifiques en Côte d'Ivoire previously developed spatial analyses to identify areas where forest conservation and restoration could provide benefits such as biodiversity conservation, soil erosion control and climate change mitigation. The CocoaSoils program will now build on this work and on analyses conducted under the program, including the mapping and characterising of environmental conditions for cocoa growing in West Africa by CIAT, to spatially explore the potential role of cocoa agroforestry as a forest restoration option and for what benefits. Furthermore, a stakeholder identification has been initiated and they will be consulted on definitions and criteria (forests, agroforestry etc), data availability and outputs.

*Contribution by: Marieke Sassen  
[Marieke.Sassen@unep-wcmc.org](mailto:Marieke.Sassen@unep-wcmc.org)*

# Profiles



## Eric Yao

Eric Yao is an Agronomy engineer specialized in Soil Sciences from Institut National Polytechnique Houphouët-Boigny, Yamoussoukro. With several years of work experience in rural areas, agricultural research, agricultural extension, training, innovation, technologies transfer and project management, He has the ability to work pro-actively and independent, with good analytical ability. Having a strong experience in agroforestry and in the cocoa sector, he has offered his expertise to prominent international organizations including, (World Agroforestry Center, World Cocoa Foundation, International Institute of Tropical Agriculture) and multi-national companies (BAYER, Ecotierra). In addition, he is familiar with carrying out studies and writing technical reports.

Contribution by: Eric Yao  
[e.yao@cgiar.org](mailto:e.yao@cgiar.org)

## CocoaSoils Discussion Forum

What are your burning questions about enhancing cocoa production, maintenance of soil fertility, the challenges facing smallholder cocoa farmers, etc?

The CocoaSoils team has access to a very wide range of scientific and business expertise through the many partner institutions and companies who are collaborating. Please pose your questions to the coordinator at [R.Asare@cgiar.org](mailto:R.Asare@cgiar.org) and we are open to a discussion in the next edition of our newsletter.

## Upcoming Activities

Validation of the P4D Training Manual in Ghana

Venue: Hill View Hotel, Abokobi Accra

Date: 20 - 21, August 2020

*The COCOASOILS GAZETTE is a quarterly Newsletter of the CocoaSoils Program, produced by IITA in collaboration with IDH and*

*Wageningen University and Research.*

*Editing and Layout: Selom Akande*

*Communications Officer for CocoaSoils*

*Website: [www.cocoasoils.org](http://www.cocoasoils.org)*

*Do you have a story to share? Send it to: [Sa.Akande@cgiar.org](mailto:Sa.Akande@cgiar.org)*

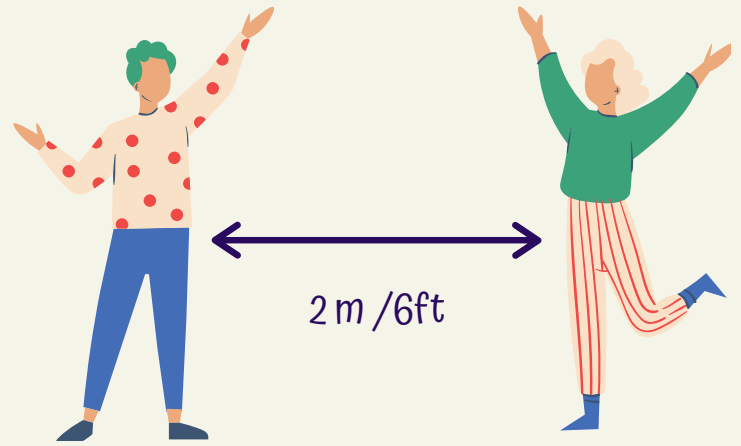


# STOP THE SPREAD



## WASH YOUR HANDS FREQUENTLY

Regularly and thoroughly clean your hands with an alcohol-based hand sanitizer or wash them with soap and water.



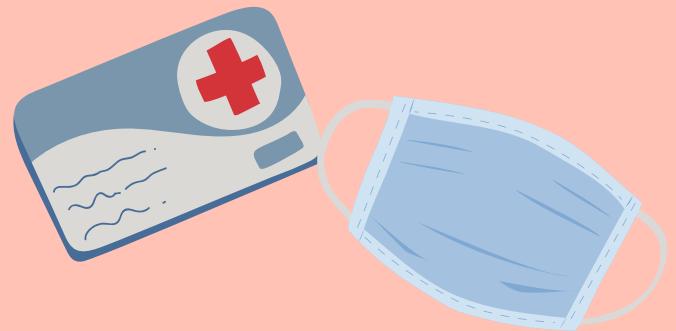
## MAINTAIN PHYSICAL DISTANCING

Maintain at least a 2 metre (6 feet) distance between yourself and anyone who is coughing or sneezing.



## AVOID TOUCHING EYES, NOSE AND MOUTH

Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose or mouth.



## IF YOU HAVE A FEVER, COUGH AND DIFFICULTY BREATHING, SEEK MEDICAL CARE EARLY

Stay home if you feel unwell. If you have a fever, cough and difficulty breathing, seek medical attention and call in advance.