



*The CocoaSoils Program (a Norwegian Government-NORAD funded initiative), a public-private consortium 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.*

## Disseminating ISFM recommendations through existing networks

The CocoaSoils program is constructed on two important pillars. The first pillar is the Research for Development (R4D) pillar. In this component the program aims to gain more knowledge about cocoa agronomy and nutrient management. This leads to Integrated Soil Fertility Management (ISFM) recommendations. These recommendations will be used in the second pillar of the program: Partnership for Delivery (P4D). In this component, the recommendations are expected to reach at least 90,000 cocoa farmers in West Africa. At this stage of the program, a baseline study is carried out to map the farmers that the program will reach. After this mapping, the recommendations will be disseminated within the networks to test the results.

Because the CocoaSoils program is made up of a consortium of about 18 partners, including private sector companies, a huge network of cocoa farmers in West Africa is already connected to the program. A number of

## OVERVIEW:

- Disseminating ISFM recommendations through existing networks
- Latest project on policy for commodity trading and sustainable supply chain
- Agro-ecological zoning of cocoa growing areas
- Field and Plot mapping
- Maize Heat maps
- Developing a cocoa ontology
- Public Consultation - Authorship guidelines
- Maiden baseline coordinators' meeting - Enumerators training in Ghana
- Maiden Annual Forum - 2019
- Feature - Urcil Kenfack Essougong

private sector companies that are already part of the CocoaSoils consortium could play a vital role in this by opening up (parts of) their farmers' networks. Using these existing dissemination networks of the CocoaSoils partners is needed for achieving the target of reaching 90,000 farmers. At the same time, it benefits the companies because their networks will have access to training materials and increases in their cocoa yields.

This shows the importance of a well-connected consortium where every party has its own role to play and contribution to make to the program, in order for all partners to benefit from this cooperation.

## Latest project on policy for commodity trading and sustainable supply chain

UNEP-WCMC, one of the CocoaSoils partners, has just secured a large project to influence commodity trade related policy and practice towards more sustainable supply chains, for people and natural resources. The project involves over 50 partners from all over the world covering industry, trade agencies, academia, governments and civil society. Wageningen University and the Congo Basin Institute (co-led by Bernard Vanlauwe, IITA) together will be leading the case study on cocoa.



An analysis of the biodiversity and socio-economic impacts of cocoa trade along a gradient of production intensity and social/environmental impact from West Africa (building on work in CocoaSoils) into the Congo Basin, will be undertaken, seeking to inform more sustainable future cocoa intensification and expansion. News piece with more detail on the overall project – <https://www.unep-wcmc.org/news/project-announced-to-make-trade-a-force-for-good>



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## Agro-ecological zoning of cocoa growing areas

Agro-climatic and agro-ecological zoning of crops is a very useful way to understand the diversity of environmental conditions in which the crop is grown.

Agro-climatic zones refer exclusively to climate, whereas agro-ecological zones include other environmental variables such as soil characteristics. These zones delineate areas with homogeneous climate or agro-ecologies and therefore indicate similar limitations and management recommendation needs.

Within the CocoaSoils project, the agro-ecological zoning is used for selecting cocoa farmers to be part of the baseline survey and satellite trials, which ensures that much of the diversity of environmental conditions is well represented.

Agro-ecological zones are usually developed on national, regional, continental or global scales. The defined zones will likely be different depending on the scale of interest and objective. For CocoaSoils, The International Center for Tropical Agriculture (CIAT) has developed agro-climatic and agro-ecological zones taking into consideration only the cocoa growing areas of West Africa and Cameroon. This has resulted in a zoning which likely differs from existing agro-ecological zones due to its exclusive focus on cocoa. Seven distinct agro-climatic zones have been identified, namely :

- A cool and humid zone (e.g. Cameroon).
- A hot zone with high maximum temperature of warmest month and with a strong dry season (northern Côte d'Ivoire and Ghana).
- A hot zone with high minimum and low maximum temperature of warmest and coldest month, respectively, and a humid dry season (southern Côte d'Ivoire and Ghana)
- A cool zone with high maximum and low minimum temperature of warmest and coldest month, respectively, and a humid dry season (southern Côte d'Ivoire and Ghana)
- A hot zone with high minimum temperature of coldest month, high annual precipitation yet strong dry season (eastern Nigeria).
- A zone with attributes of several of the above described clusters and finally
- A marginal zone with strong limitations for cocoa growing, either due to temperature or water related stresses.

A recently published soil nutrient map was used to identify distinct areas with similar soil nutrient characteristics. The distribution of the soil nutrients were highly controlled by climate and particularly by precipitation. According to the identified clusters for the cocoa growing areas, the soils of Côte d'Ivoire and Ghana are the least fertile, while soils in Nigeria and

Cameroon are more fertile yet with high levels of aluminium. Nigeria has higher iron levels, while Cameroon is characterized by high copper levels

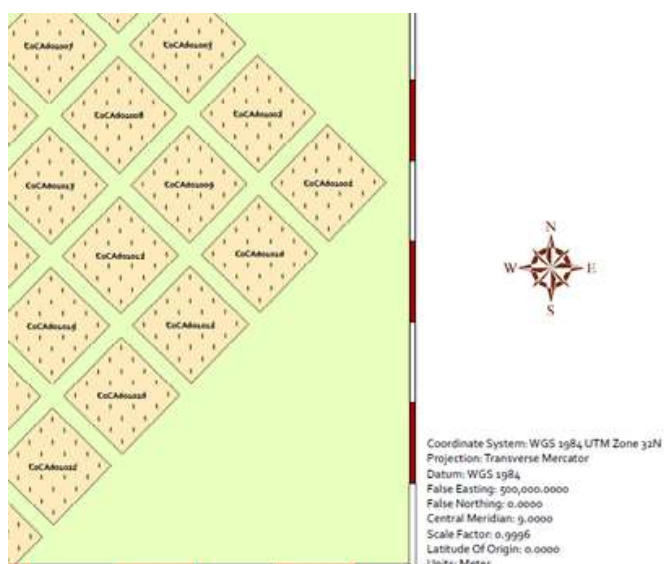
Finally, 35 agro-ecological zones were derived by combining the agro-climatic zones with the soil nutrient clusters. The maps can be viewed [here](#). Any feedback, particularly from local partners of Côte d'Ivoire, Ghana, Nigeria and Cameroon is highly appreciated.

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## Field and Plot mapping

In the last months, the WENR data team has been occupied with reviewing the spatial data from the Core Trials. Most of the trial managers have already captured the field and plot coordinates. These coordinates have been processed in a GIS programme to map the field and plot boundaries. In the 15 x 15 m plots, the varying GPS accuracies sometimes led to very crooked boundary lines, so the programme has created virtual plot boundaries instead for each trial site. These virtual plots will be exactly 15 x 15 meters, and they are planted with virtual trees at 3 x 3 meter intervals, resulting in 25 trees per plot.

Each plot and tree, in every trial site, will have an automated, consistent and uniquely generated identifier. The uniquely generated plot IDs and tree IDs will be translated into barcodes that will be printed and tagged on each corresponding tree and plot in each core trial site. These barcodes will be stored in the ODK forms for seamless and errorless data collection.



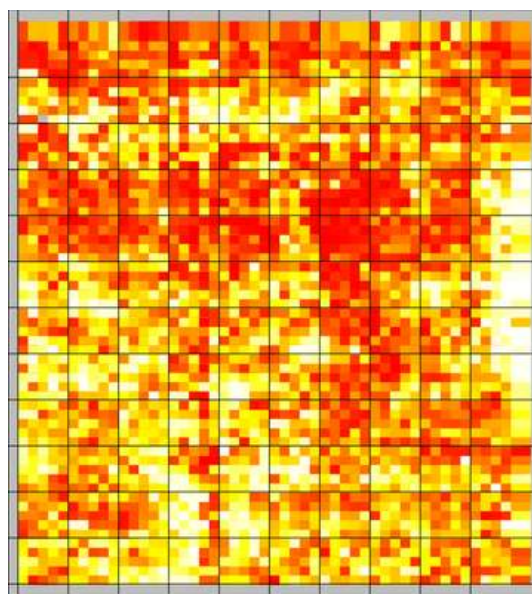
In addition to generating plot maps and tree IDs, the WENR team is creating the digital elevation models (DEM) and slope maps for all core trial sites. At a later stage, satellite trial fields will follow a similar procedure.

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## Maize Heat Maps

In some Core Trials, the maize has already been harvested, either at plot level or at field level. This article showcases the Core Trial field of IITA Nigeria, because it is a good example of the power of maize as a uniformity crop to show soil fertility gradients. The field had a strict row column layout in which each plot and subplot had a specific row and column coordinate. This therefore, made it possible to represent the entire field as a regular grid. This grid was plotted as a heat map with colours representing the value of total biomass at each subplot coordinate. The map shows colours ranging from red (low biomass) to white (high biomass). Each coloured square represents a subplot, laid out within a 3x3 grid. The black lines indicate the plot boundaries.

The map shows that there are areas of high fertility shown as white patches while areas with poorer soil fertility are shown as red patches. This information from the maize harvest will be useful in defining the blocking structure of the fertility trial.



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# Maiden baseline coordinators' meeting

## Training of enumerators for baseline survey

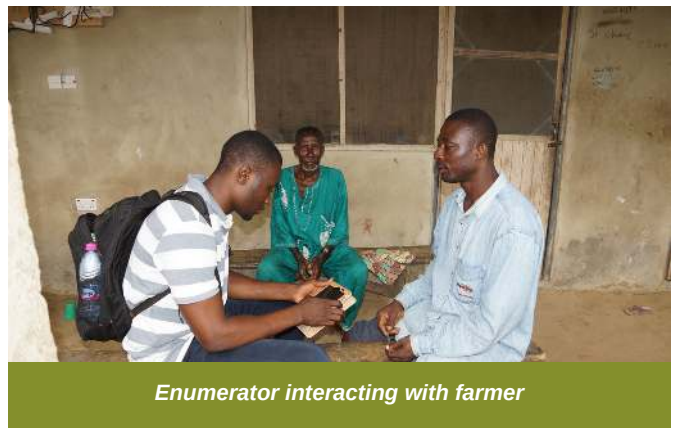
The Monitoring and Evaluation Unit of the CocoaSoils Program has organized its maiden coordinators' meeting and training of enumerators for Ghana, at the Cocoa Research Institute of Ghana in Tafo.



The objectives of this training workshop were to establish a common understanding of the baseline survey tool, data collection requirements and protocols, ensure a hands-on-learning experience of survey processes, learning points through practical demonstrations, understanding of quality control measures, agree on the methodology of the baseline tool to be used across the four countries in West Africa, and supervisor-enumerator coordination.



The meeting and training brought together M&E specialists, socio-economists, technical personnel and extension staff from the Cocoa Research Institute of Ghana (CRIG), PhD students and young graduates among others. This was followed by a pre-test of the survey tool in Obodanase, a cocoa growing village in the Eastern region of Ghana.



## Maiden Annual Forum - 2019

The maiden annual Forum for the CocoaSoils program has been held at the Hill View Guest Center in Teiman, Accra, Ghana on January 24, 2019. The forum followed a three-day Science Committee meeting in which the research and project partners came together to assess the project implementation, assure transparent and accessible dissemination of research outcomes, and provide inputs into the research of the different partners.

The forum brought together program coordinators, representatives from national and international research institutes, government representatives, non-program industry companies, farmer organizations, in-country cocoa authorities, farmers and the media among others.

The annual forum aims at building a common understanding of the CocoaSoils program by sharing the outline and progress so far, and engaging partners to further strengthen agronomic research in West and Central Africa. The program which is funded by the Norwegian Agency for Development Cooperation (NORAD) is poised to translate the results from the research into practice by highlighting public-private partnerships as an important part of the program. The forum was a platform not only to speak to the audience on the outputs of the program but also to gain inputs from various experts to improve the program.

Mr. Daniel van Gilst, the representative from NORAD took the opportunity to explain the global impact that the program will make with the results and implementation of the research. He further explained that "the problem of poor soil management is an important one because too many people are affected by cocoa and too many households depend on cocoa.

Dr. Emmanuel Agyemang Dwomoh, the Deputy Chief Executive of the Ghana COCOBOD who was also in attendance, emphasized in a speech that "*the Ghana COCOBOD is committed to the success of all the activities within the program and hopes that the research component will filter down to the farmers and positively affect cocoa production in Ghana*".

The forum was characterised by presentations from various experts within the CocoaSoils program and as a side attraction, a marketplace poster exhibition, where various trial managers and students on the project, exhibited their research and progress.



*Dr. Emmanuel Agyemang Dwomoh addressing conference participants*



*Dr. Emmanuel Agyemang Dwomoh interacting with Dr. Olayiwola Olubamiwa (Chief Executive of Cocoa Research of Nigeria) and other dignitaries at the conference*



*Opening by Dr. Bernard Vanlauwe (IITA), Mr. Daniel van Gilst (NORAD), Dr. Emmanuel Agyemang Dwomoh (COCOBOD), and Dr. H.K. Dzahini-Obiatye (CRIG) (from left to right)*



*Mr. Daniel Van Gilst of NORAD interacting with scientists during the poster exhibition*

# Urcil Kenfack Essougong - Ph. D. Student on CocoaSoils

Urcil Kenfack Essougong, is a PhD student at Plant Production Systems (PPS), and Knowledge Technology and Innovation (KTI) groups at Wageningen University and Research (WUR). He has an International Master of Science in Rural Development from Ghent University (Belgium) and a degree as an agronomic engineer in agricultural economics and rural sociology from Dschang University (Cameroon). He has previously worked as a consultant and a monitoring & evaluation officer for national NGOs and the World Agroforestry Centre in Cameroon; contributing to the implementation of rural development projects, and research activities.

Under the CocoaSoils Program, his research aims to understand the factors driving cocoa farmers' behaviour, the adoption of Integrated Soil Fertility Management (ISFM), and farmers' needs in terms of Decision Support Tools (DSTs). Moving towards sustainable cocoa intensification implies a change in current cocoa farming practices. To induce this change, understanding the



Urcil Kenfack Essougong, PhD student on the CocoaSoils Program

factors that affect current farmers behaviour is essential. Likewise, it is of utmost importance that the program develops DSTs that address prospective end-users' needs and take into account their realities. So, as an entry point, his research will look into cocoa farmers diversity in relation to soil fertility management. Then attention will be paid to the effectiveness of ongoing interventions in the cocoa sector and lessons drawn to improve CocoaSoils' intervention. Furthermore, farmers and extension agents' needs, expectations and preferences in terms of DSTs will be investigated. Finally, he will focus on understanding the determinants of ISFM adoption, and how it is affected by the use of DSTs.

He will be based in Cameroon and will enjoy the collaboration between Wageningen University and Research (WUR), The International Institute for Tropical Agriculture (IITA), and the Institute for Agricultural Research and Development (IRAD). His fieldworks will include surveys, focus group discussions (FGDs), field observation and a series of in-depth interview with cocoa farmers, extension agents and key informants.

The research findings will :

- Inform the design of appropriate DSTs for sustainable cocoa intensification.
- Increase the understanding of the institutional arrangement necessary for their implementation.
- Help to identify possible synergies among different stakeholder promoting sustainable cocoa intensification.
- Increase the understanding of the diversity of farmers motivations and aspirations behind specific behaviour, the patterns of multiple components technologies adoption.
- Inform policies for a better targeting and tailoring of supports to farmers.

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## Upcoming Events

### The CocoaSoils Enumerators' Training

Nigeria: 8 - 10 April, 2019

Cameroon: 10 - 12 April, 2019

Côte d'Ivoire: 15 - 17 April, 2019

### P4D Committee Meeting - Côte d'Ivoire

Date: 25 April 2019

Venue: Abidjan, Côte d'Ivoire

### The CocoaSoils Annual Forum

Date: 20 - 24 January 2020

Venue: Yaoundé, Cameroon

## 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.

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