

# JANUARY - DECEMBER 2019









A Norad



# CONTENTS

Acro	onym	s and Abbreviations	5
1	Кеу	messages and challenges	ł
2	Pro	gress narrative	5
2.1	l Int	c troduction	5
2.2	2 Pr	oject coordination	1
2	2.2.1	Project coordination team established	7
2	2.2.2	Project management and administration functional	)
2	2.2.3	Convening mechanisms in place12	L
2	2.2.4	Appropriate MEL tools and processes12	2
2.3	Ke	ey impacts and outcomes of CocoaSoils14	ŧ
2.4	R4	D-related outputs1!	5
2	2.4.1	Output 1.1. A set of integrated soil fertility management options generated1	5
2	2.4.2	Output 1.2. Documented evidence for understanding the physiological basis of cocoa nutrient	
ι	iptak	e and use20	)
2	2.4.3	Output 1.3. A decision support system developed for intensifying cocoa production22	<u>)</u>
2	2.4.4	Output 1.4: Recommendation domains and impact of sustainable intensification on forest	
r	oressu	ure identified24	1
2	2.4.5	Output 1.5: Sustainability assessment tools developed and validated to support the sustainable	
C	levelo	opment of cocoa production in relation to biodiversity and the ecosystem services at the	
la	andso	ape level29	)
2	2.4.6	Output 1.6. Operational open knowledge and data sharing portal for the storage, management,	
a	ind di	ssemination of cocoa intensification research results	5
2	2.4.7	Output 1.7. A new cadre of PhD and MSc-holding cocoa scientists with knowledge in new cocoa	
i	ntens	ification options (including Output 1.2 results)	3
2.5	6 P4	D-related outputs	)
2	2.5.1	Output 2.1: Agreements with private and/or governmental scaling partners developed and	
S	ignec	to disseminate new recommendations/knowledge through their existing structures/ frameworks	5
(	H.E p	rotocol or ILO protocol)	)
2	2.5.2	Output 2.2: Appropriate extension tools assembled and revised for integration in partner-led	_
S	caling	g of new recommendations/tools	3
2	2.5.3	Output 2.3: Appropriate training-of-trainer manuals developed for use in the training sessions	•
T	or ex	44 Output 2.4. En secondation estimation in successful de la secondition de la secondition de la secondition de la	ł
2		Output 2.4. Engagement in policy action in support of sustainable cocoa intensification ensuring	; 7
đ	IVOIUa	ance of deforestation and child labor in applying new recommendations4.	/
3	Fina	ancial status	)
APP	ENDI	X 1 – Status of Project Results with Mitigation plans50	)
APP	ENDI	X 2 - Financial Report	3



# Tables

Table 1: Status of milestones under project coordination team established.	7
Table 2: Project staff	8
Table 3: Staff of National Research Institutes.	9
Table 4: Status of milestones under project management and administration functional	9
Table 5: Status of milestones under convening mechanisms in place.	11
Table 6: Status of milestones under appropriate ME&L tools and processes.	12
Table 7: Sample frame per partner across the countries for baseline implementation	14
Table 8: Status of milestones for output 1.1.	15
Table 9: Locations, institutions, and focal persons hosting Core Trials	17
Table 10: Status of milestones for output 1.2.	21
Table 11: Status of milestones for output 1.3.	23
Table 12: Status of milestones for output 1.4	24
Table 13: Status of milestones for output 1.5	29
Table 14: Status of milestones for output 1.6	36
Table 15: Status of milestones for output 1.7.	38
Table 16: Status of milestones for output 2.1.	41
Table 17: Signed Consortium members	41
Table 18: Partners and countries where Satellite Trial sites are located.	42
Table 19: Status of milestones for output 2.2.	43
Table 20: Status of milestones for Output 2.3	45
Table 21: Number of extension agents identified per partner	46
Table 22: Status of milestones for output 2.4.	47

# Figures

Figure 1: Core Trial locations in Africa.	
Figure 2. Core Trial locations in South America and Asia	
Figure 3: Core Trial field in COCI001 – Divo, Côte d'Ivoire	19
Figure 4: Core Trial CONI001 – Owena, Nigeria. a) Clonal cocoa seedlings being raised in the	nursery
at CRIN Headquarters. b) Cocoa seedlings under plantain as a shade crop	19
Figure 5: Statistics related to deforestation within cocoa-growing areas of the four Co	coaSoils
countries	27
Figure 6: Map depicting deforestation events and extents according to the year of occurr	ence for
an exemplary forest in Ghana	27
Figure 7: Land-cover classification for Ghana	28
Figure 8: Areas of high biodiversity importance that have been projected to be under differe	nt levels
of risk from cocoa-related land-use change by 2050 (Schroth et al. 2016)	31
Figure 9: Steps to support planning for sustainable cocoa development, balancing pro	duction,
forests, biodiversity, and ecosystem services	33
Figure 10: Budget and expenditure for 2018 and 2019	49



# Acronyms and Abbreviations

AEZ	Agroecological zones
ARTCI	Autorité de régulation de télécommunication de Côte d'Ivoire
BMP	Best Management practices
CCAFS	Climate Change, Agriculture, and Food Security
CFI	Cocoa Forest Initiative
CIAT	International Centre for Tropical Agriculture
CNRA	Centre National de Recherche Agronomique
CRIG	Cocoa Research Institute of Ghana
CRIN	Cocoa Research Institute of Nigeria
CSA	Climate Smart Agriculture
СТ	Core Trials
ICRAF	World Agroforestry Centre
IDH	The Sustainable Trade Initiative
IITA	International Institute of Tropical Agriculture
IRAD	Institut de recherche agricole pour le développement
ISFM	Integrated Soil Fertility Management
MEL	Monitoring, Evaluation and Learning
NARS	National Agricultural Research systems
NGO	Non-governmental Organization
NORAD	Norwegian Agency for Development Cooperation
ODK	Open Data Kit
P4D	Partnership for Delivery
R4D	Research for Development
SQM	Sociedad Quimica y Minera de Chile S. A.
ST	Satellite Trials
UNEP-WCMC	United Nations Environmental Program – World Conservation Monitoring Centre
UN-REDD	United Nations Programme on Reducing Emissions from Deforestation and
	Forest Degradation
WCF	World Cocoa Foundation
WENR	Wageningen Environmental Research
WUR	Wageningen University and Research



# **1** Key messages and challenges

The CocoaSoils programme has become a center of focus for activities around the intensification of cocoa production in West and Central Africa. The unique character of the broad public-private partnership – strongly embedded in national organizations – continues to attract new partners from the private sector. In particular, the large trading companies, (e.g., Olam, Cargill) are taking an increasingly active role in relation to activities on the ground in West and Central Africa through the Satellite Trials. The approach to open-data sharing is also attracting strong interest from other programmes focused on cocoa, with a call for open sharing of data on the socio-economic status of cocoa households in addition to sharing the technical data. In this executive summary we highlight progress on the Research for Development (R4D) and Partnership for Development (P4D) which are further detailed in the body of the report.

#### R4D component - progress

A total of eight Core Trial (CT) sites were established and managed across the four target countries in Africa (as well as one trial in Ecuador and one in Indonesia) based on agreed protocols. Maize data are currently being submitted on the data portal to guide the blocking of the trials.

Baseline maps have been produced on the natural capital and ecosystem functions of target areas. An initial assessment of the biodiversity impacts of the different cocoa systems has been undertaken. Areas most at risk from cocoa production in terms of biodiversity loss have been identified. In addition to that, the mapping of the implications of future forest scenarios for ecosystems services has been completed. To acquire more country-specific spatial data on current cocoa versus forest being developed by existing initiatives in the region, the team postponed this activity to enable access and discussions with existing initiatives to improve the analyses.

The experimental design of the Satellite Trials has been finalized. Preliminary site selection has been done using the baseline data for Cameroon, Côte d'Ivoire, Ghana, and Nigeria. Validation of the selected sites using the agreed protocol criteria was completed in Ghana. Pre-selection of sites for validation in Côte d'Ivoire, Cameroon, and Nigeria has been completed. A review of recommendations on fertilizer and best management practices (BMP) (including ISFM recommendations) has been compiled across the four countries and formed the basis for the development of the BMP and fertilizer treatments in the Satellite Trial protocol.

A prototype of a decision support application (Climate Smart Cocoa (CSC) implementer) is available and the farmer segmentation component is being reviewed before it is validated by the Research Committee. The application is a mobile tool that combines the farmer segmentation tool (FST) and Stepwise investment pathways (SIP) in BMP for improved productivity. The tool also maps the farmers' clusters and the CSC packages for easy use by the end-users, e.g., extension workers from both private and public sector companies.

The Open Data Kit (ODK) server has been developed and is used as the only data capture application for the project. All data from the Core Trials and baseline survey have been submitted through the ODK platform. A cocoa-specific ontology for the proper management of data collection and storage has been developed. In addition to the ODK, CIAT used the Kobocollect tool to collect baseline data for monitoring shade cover.

All PhD students have finalized their approved proposals and have started work in the field. Also, MSc students have been recruited, one in Ghana and three in Nigeria.

#### R4D component - challenges

In terms of challenges, there was a delay in the implementation of the baseline survey which affected the early selection of the Satellite Trial sites. Negotiation of arrangements for exclusivity and non-



competitiveness took longer than anticipated as partners argued that sharing information on their dissemination channels and farmers' networks has the tendency to expose their competitive edge. To address this challenge, individual meetings with partners have been scheduled to discuss and agree on the process for the validation of the selected sites in Côte d'Ivoire, Cameroon, and Nigeria. This will then pave the way for validation, plot delineation, initial site characterization, and implementation of BMP with partners by Q2, 2020.

The development and population of the decision support application was delayed by the departure of the scientist responsible for this activity in IITA. A new scientist was recruited and assumed duty in November 2019. IITA engaged software engineers (Council for Scientific and Industrial Research of Ghana) with content from the CGIAR program Climate Change Agricultural and Food Security (CCAFS) in Ghana to develop the initial platform for validation by the Research Committee by Q1, 2020.

The recruitment of the MSc candidates was delayed by the long selection process in the NARS. To hasten the process, timelines have been communicated and agreed with the partners and Directors of the various Institutes. The Institutes have agreed to IITA supporting the selection process to be completed by Q2, 2020.

#### P4D component - progress

The Cooperation Agreement has been signed by 18 partners. Also, a legal process for new Consortium members has been developed and signed by Transroyal (Rockwinds). Participation Statements have been drafted for scaling partners and discussions are ongoing for the remaining partners with dissemination networks mapped across all four countries.

Current producer associations working with the project have been mapped and documented. The training needs of producer groups in Cameroon, Côte d'Ivoire, Ghana, and Nigeria have been assessed through the baseline survey and information gained on awareness and use of levels of ISFM-related practices (which identifies the knowledge gaps of the surveyed farmers). Partner extension networks have been mapped and 305 extension agents have been identified in Cameroon, Ghana, and Nigeria. Feedback from partners in Côte d'Ivoire is awaited.

A training manual on ISFM and BMP has been drafted with inputs from Cameroon, Ghana, and Nigeria, and is awaiting validation by the P4D Committees. One training session with extension agents has been conducted in Cameroon with the initial compiled training manual. Training sessions in Côte d'Ivoire, Ghana, and Nigeria will be held in Q1, 2020. Training of households by the extension agents will begin in Q1, 2020 through training sessions already planned by the scaling partners.

#### P4D component - challenges

In terms of challenges, there were delays with dissemination partners in assessing their dissemination networks, capacity needs assessment, and required extension agents. This was due to legal processes for agreements to access partners' information on dissemination channels and farmers' locations. Developing and signing of the Consortium agreements was delayed until Q1, 2019 as these required several discussions with partners. With this fully executed, further implementation plans are being directly developed with all the scaling partners for the P4D component by Q1, 2020.

There have been general delays in finalizing the extension tools due to the negotiations and agreements required with partners across the countries in assembling the various manuals available for review. Collection of manuals has been completed, with the exception of that from Côte d'Ivoire. This is ongoing as there was the need to finalize discussions regarding the baseline with the partners. However, this activity will be completed by Q1, 2020.



#### **Project coordination - progress**

The project continues to be led by IITA in relation to coordination, by WUR for research, and by IDH for partnership management. Thirteen project staff have been recruited with specific terms of reference and contracts. A Systems Agronomist, based in Ghana, was recruited and assumed duty on 1 November 2019.

All contractual reports (progress on financial and technical reports for 2019 and workplan for 2020) were submitted on the agreed dates. The project shared its first insights and learnings with the wider public including the Research Committee members, other participants from the larger research community, and private sector companies (mainly active in Ghana) through its maiden forum held in January 2019 in Accra, Ghana.

Under Monitoring, Evaluation, and Learning (MEL), the implementation of the baseline has been completed in Cameroon, Côte d'Ivoire, Ghana, and Nigeria with all received data assembled on the project data aggregate platform. Data analysis is ongoing for the four countries. A preliminary report has been submitted for Cameroon, Ghana, and Nigeria. A revised report will be submitted in Q2, 2020. Data collection tools to document results from P4D activities have been developed, based on the various dissemination channels used by partners and other project activities, such as trainings.

With regard to communication, a project website was launched, social media platforms were created, and three newsletters were published. With the use of MailChimp email services, monthly updates were sent to all partners.

#### Project coordination - challenges

In terms of challenges, the contract of the P4D specialist was terminated and a replacement has been recruited. A consultant was hired in the interim to develop a P4D strategy. A Systems Agronomist based in Ghana was recruited and assumed duty on 1 November 2019. The Satellite Trials Coordinator based in Côte d'Ivoire left for personal reasons. His duties have been shared between IITA and WUR until a replacement is recruited. Also, the driver assigned to the Ghana team has been replaced, while the positions of Research Assistant and driver for Côte d'Ivoire have been filled.

# 2 Progress narrative

### 2.1 Introduction

The CocoaSoils Annual Report 2019 presents the workplan for 2020 as well as the project's achievements against the 2019 workplan. Results and progress were evaluated against the 2019 targets for outcomes and outputs as well as the set milestones for coordination-related activities, the Research for Development (R4D) and Partnership for Delivery (P4D) components. Delays experienced are explained and mitigation plans presented with timelines. Progress against specific outcomes and outputs is presented in APPENDIX 1 – Status of Project Results with Mitigation plans; the milestones are evaluated under the respective outputs in the report itself.

In 2019, the program organized its maiden Annual Forum, completed the data collection for the baseline survey across the four countries, finalized protocols to guide the Core and Satellite Trials, activated the P4D component by setting up P4D Committees across the four countries, and initiated the development of the extension materials for our scaling partners. All PhD proposals were finalized, and MSc students were recruited, one in Ghana and three in Nigeria. Three newsletters were published and the project website was launched.



# 2.2 Project coordination

#### 2.2.1 Project coordination team established

Under this heading, achievement of the following milestones was expected at the time of reporting: (1) interviews based on specific terms of reference organized, (2) negotiations and signing of contracts completed, (3) list of required capital items assembled, (4) capital items procured and delivered.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Table 1: Status of milestones under project coordination team established.

Activities and milestones		2018				20	19			20	20		2021				2022			
	Q 1	Q 2	Q 3	Q 4																
					Coor	din	atio	n-re	late	d										
Project coordination team established																				
Recruitment of project staff																				
Milestone: Interviews based on specific terms of reference organized																				
Milestone: Negotiations and signing of contracts completed																				
Procurement of capital equ	ipm	ent																		
Milestone: List of required capital items assembled																				
Milestone: Capital items procured and delivered																				

**Progress on milestones:** Thirteen project staff have been recruited with specific terms of reference and contracts. The project implementation office (PIO) houses the Project Coordinator, Project Officer, Communications Officer, Research Assistant, a driver, and the MEL Specialist on a part-time basis. The P4D Specialist's contract was terminated and a replacement has been recruited. A consultant was hired in the interim to develop a P4D strategy. A Systems Agronomist, based in Ghana, was recruited and assumed duty on 1 November 2019. Also, the driver assigned to the Ghana team has been replaced and positions for the Research Assistant and driver for Côte d'Ivoire have been filled. A Research Assistant associated with the CCAFS cocoa project has been assigned on a part-time basis to assist the MEL team. The Satellite Trials Coordinator, based in Côte d'Ivoire, has left for personal reasons. His duties have been shared between IITA and WUR until a replacement is recruited. Refer to



 Table 2 for details of staff recruitment under CocoaSoils, with their positions.



#### Table 2: Project staff.

INSTITUTION	NAME	POSITION/ EXPERTISE	LOCATION
IITA	Bernard Vanlauwe	Director	Kenya
IITA	Richard Asare	Project Co-Coordinator - Research	Ghana
IITA	Theresa Ampadu Boakye	Project Co-Coordinator - MEL	Kenya
IITA	Leonard Rusinamhodzi	R4D Coordinator	Ghana
IITA	Janet Owusu-Asabre	Project Officer	Ghana
IITA	Abigail Tettey	Research Assistant	Ghana
IITA	Selom Akande	Communications Officer	Ghana
IITA	Rich Kofi Kofituo	MEL Assistant	Ghana
IITA	Sai Adjah	Driver	Ghana
IITA	Jean-Paul Nlend-Nkott	P4D Coordinator	Côte d'Ivoire
IITA	Kouassi Boris	Research Assistant	Côte d'Ivoire
ΙΙΤΑ	Beugre Serge	Driver	Côte d'Ivoire
IITA	Cargele Masso	Country Head	Cameroon
ΙΙΤΑ	Syndhia Mathe	Social Scientist	Cameroon
IITA	Nathalie Ewane	Research Assistant	Cameroon
ΙΙΤΑ	Adoph Kemga	Research Assistant	Cameroon
IITA	Stefan Hauser	Country Head (Nigeria)	Nigeria
WUR - CSA	Paulina Ansaa Asante	PhD Student	Ghana
WUR - CSA	Lucette Adet	PhD Student	Côte d'Ivoire
WUR - CSA	Danaë Rozendaal	PhD student supervision	Netherlands
WUR - PPS	Ken Giller	Director (Science)	Netherlands
WUR - PPS	Lotte Woittiez	Core Trials Coordinator	Netherlands
WUR - PPS	Ekatherina Vasquez	Research Assistant - Protocols	Netherlands
WUR - PPS	Joost Heerwaarden	Researcher – Statistics and	Netherlands
		experimental design	
WUR - PPS	Urcil Kenfack	PhD student	Cameroon
WUR - PPS	Deo-Gratias Hougni	PhD student	Nigeria
WUR - WEnR	Ulan Turdukulov	Data manager	Netherlands
WUR - WEnR	Rob Knapen	Data portal manager	Netherlands
WUR - WEnR	Abidemi Elesho	Databases, spatial analysis	Netherlands
IDH	Jonas Mva Mva	Director (Partnerships)	Netherlands
IDH	Mark De Waard	Program officer (Cocoa IDH)	Netherlands
IDH	Elvis Ngwa	Senior Program Officer Cocoa and	Cameroon
		Landscapes	
IDH	Cyril Ugwu	Regional Coordinator West Africa	Nigeria
IDH	Dayo Ogundijo	Program Officer IDH	Nigeria
CIAT	Eric Rahn	Researcher	Vietnam
CIAT	Peter Laderach	Researcher	Vietnam
CIAT	Louis Reymondin	Lead of digital agriculture and remote sensing	Vietnam
CIAT	Thibaud Vantalon	Remote sensing Postdoc	Vietnam
UNEP-WCMC	Marieke Sassen	Senior technical specialist -	United Kingdom
		Biodiversity and agriculture	Ŭ
UNEP-WCMC	Andy Arnell	Senior GIS officer - Spatial analysis	United Kingdom



INSTITUTION	NAME	POSITION/ EXPERTISE	LOCATION
UNEP-WCMC	Arnout van Soesbergen	Senior ecosystem services scientist.	United Kingdom
UNEP-WCMC	Samantha Hill	Senior technical specialist.	United Kingdom
UNEP-WCMC	Philip Bubb	Senior programme officer.	United Kingdom
UNEP-WCMC	Abigail Burns	Programme officer	United Kingdom
UNEP-WCMC	Xavier DeLamo	Programme officer	United Kingdom
ICRAF	Phillipe Vaast	Researcher	Vietnam

#### Table 3: Staff of National Research Institutes.

INSTITUTION	NAME	POSITION/ EXPERTISE	LOCATION
CNRA	Jacques Alain Kotaix	Core Trials Coordinator	Côte d'Ivoire
CNRA	Adolphe Mahyao	Social Scientist	Côte d'Ivoire
CRIG	Amos Quaye	Core Trials Coordinator	Ghana
CRIG	Frederick Amon-Armah	Social Scientist	Ghana
CRIN	Moses Ogunlade	Core Trials Coordinator	Nigeria
CRIN	Kayode Oluyole	Social Scientist	Nigeria
IRAD	Didier Begoude	Core Trials Coordinator	Cameroon
IRAD	Precillia Tata Ngome	Social Scientist	Cameroon

On capital equipment and based on the agreed procurement list of required capital items, the PIO procured the needed items in 2019 including a Toyota Prado vehicle for the Côte d'Ivoire office.

#### 2.2.2 Project management and administration functional

Under this heading, achievement of the following milestones was expected at the time of reporting: (1) timely reports by the application and its partners submitted, (2) annual planning and evaluation meetings organized, (3) effective communication using various tools facilitated, and (4) three Quarterly Newsletters produced. Below are the outputs of the activities undertaken.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Activities and milestones		2018				20	19			20	20			20	21		2022			
	Q	Q	Q	Q D	Q 4	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q			
	1	2	3	4	1	2	3	4	T	2	3	4	T	2	3	4	T	2	3	4
Coordination-related																				
Project management and administration functional																				
Agreement on a reporting framework																				
Milestone: A reporting framework established																				
Milestone: Timely reports by the application and its partners submitted																				
Agreement on a meeting ar	nd co	omm	nuni	catio	on st	rate	gy													

Table 4: Status of milestones under project management and administration functional



Activities and milestones	2018					20	19			20	20			20	21		2022			
	Q 1	Q 2	Q 3	Q 4																
Milestone: Annual planning and evaluation meetings organized																				
Milestone: Effective communication using various tools facilitated																				
Milestone: 3-monthly newsletter produced																				

**Progress on milestones:** All contractual reports (progress on financial and technical reports for 2019 and workplan for 2020) were submitted on the agreed dates. In addition, all contractual reports have been submitted by partners for the current Annual Report. The reporting framework established in 2018 was reviewed for reporting. See <u>here</u> for sample.

The project shared its first insights and learnings with the wider public including the Research Committee members, other participants from the larger research community, and private sector companies (mainly active in Ghana) through its maiden Annual Forum held in January 2019 in Accra, Ghana (<u>Report</u>). The Research Committee meeting (<u>Technical report</u>) was held in the same week as the Forum and offered partners and other stakeholders the platform for discussing project implementation processes including protocols for trial establishment, procedure for dissemination through partners' channels, and general roles and responsibilities.

With regard to communication, IDH collaborated closely with the coordination team for alignment on marketing the program, especially through the development of pitch presentations for potential new partners. This included the overall CocoaSoils program overview, benefits for becoming a partner, and the description of partners' different roles. In addition to this, various tools and platforms have been developed and implemented to support both internal and external communication. The project launched its new website, being hosted by IITA. Between August and December 2019, the site received a total of 1,528 users, 1,625 sessions and 3,549 pageviews. The top countries for users visiting the website were from the USA, Netherlands, Ghana, United Kingdom and Cameroon, and 69% of users are English-speaking. See here for detailed analytics on the website turnout overview in terms of audience, location of users, and user acquisition during this period. Three newsletters, which have been widely circulated among partners and other stakeholders, has been published. Between April and November 2019, a total of 886 successful deliveries were made and had an average readership of 45.4%. See here for detailed analytics on readership for 2019. With the use of MailChimp email services, monthly updates were sent to all partners, including the NARS and private sector companies. A total of 585 successful deliveries were made with a 44% readership. See here for detailed analytics on readership from February to November 2019. A Twitter platform has also been created and is already in use by private sector partners and the project for circulating updates. The Twitter platform currently has 46 followers.

Communication with farmers was carried out using existing channels of the private sector companies who work directly with the farmers. For example, in carrying out the baseline survey and the validation exercises for the Satellite Trial implementation, the field technicians from the private sector companies introduced the baseline enumerators and the site validation team to the communities and sampled farmers to carry out the



exercises. To make information and updates easily accessible within the various countries, country leads have been appointed, to be in constant contact with the team at Wageningen University. The country leads relay the information to both the NARS and private sector partners in the countries. Therefore, building strong collaboration between the project country leads and the NARS focal persons working together on specific activities and having regular updates at the country level.

In addition to the above, the program has developed other means of reaching out to new partners and other stakeholders. The CocoaSoils program was also represented at the Fourth World Agroforestry Congress in Montpellier, France from 20 to 22 May 2019, and at the World Cocoa Foundation (WCF) Partnership Meeting in Berlin from 21 to 24 October 2019. A side meeting was organized with Sustainability Heads and major key stakeholders from the private sector companies to discuss topics from the Satellite Trials to the mapping of ecosystems services under the CocoaSoils framework (<u>Report</u>).

#### Challenges and proposed changes in milestone timelines:

The challenge in organizing the Annual Forum next year is in attracting more of the private and public sectors to provide a better basis for scaling the program's recommendations. Therefore, IDH will leverage its experience in convening in the preparation for the 2020 Forum by ensuring the participation of more relevant public and private sector partners. Additionally, IDH will also focus more on the P4D-related program in the Forum to ensure that this component is better highlighted.

#### Workplan for 2020

Activity: Agreement on a reporting framework

• Milestone: Submit Timely reports by the applicant and its partners by Q3, 2020 and Q2, 2021

Activity: Agreement on meetings and communication strategy

- Milestone: Organize annual planning and evaluation meetings by Q1, 2021
- Milestone: Facilitate effective communication using various tools by Q4, 2020
- Milestone: Produce three monthly newsletters by Q4, 2020

#### 2.2.3 Convening mechanisms in place

Achievement of the following milestone was expected at the time of reporting: (1) regular meetings with industry partners facilitated.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Activities and milestones		20	18			20	19			20	20			20	21		2022			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
	Coordination-related																			
Convening mechanisms in place																				
Organization of regular meetings with the industry																				
Milestone: Meeting schedules agreed upon	Milestone: Meeting schedules agreed upon																			
Milestone: Regular meetings with industry partners facilitated																				

#### Table 5: Status of milestones under convening mechanisms in place.



**Progress on milestones:** Throughout the year, meetings were organized with private sector members of the CocoaSoils Consortium. These meetings resulted in the project gaining access to the operational areas and dissemination networks of about six private companies across the four project countries to disseminate the project's recommendations and implement the baseline study. This was facilitated by developing a template which companies completed by indicating their farmers' locations and networks. The meetings that followed made it possible for the private sector partners to address or clarify issues where needed. However, due to the recurrence of pertinent topics and questions which cut across all partners, IDH convened the whole group of private sector partners in a general recurring monthly meeting. Agenda points from the partners were requested ahead of time, in order for the relevant CocoaSoils' experts to be invited to join the meeting. See here for sample agenda and minutes of meetings.

For non-Consortium private sector partners (Cargill, Carmeuse, Cémoi, Cocoanect, Kennemer Foods, Olam, Rockwinds (Transroyal), Kuapa Kooko, Sucden, Sociedad Quimica y Minera de Chile S.A. (SQM), and Tulip Cocoa), IDH and IITA organized and facilitated informative meetings. These included a pitch presentation of the overall CocoaSoils program, the benefits of becoming a partner, and a description of partners' different roles. A joint conference call was organized with members of WCF to discuss issues of member partners on CocoaSoils and ongoing work being conducted by the Foundation.

#### Challenges and proposed changes in milestone timelines:

The challenge posed by having many similar questions from individual partner meetings which were too technical for IDH was resolved by convening the partners on a call in which experts were invited to participate. The first group call was initiated in November 2019 so the effectiveness of this structure will be assessed in 2020.

#### Workplan for 2020

Activity: Organization of regular meetings with the industry

• Milestone: Facilitate regular meetings with the industry partners by Q4, 2020

#### 2.2.4 Appropriate MEL tools and processes

Achievement of the following milestones was expected by the time of reporting: (1) users of the MEL framework trained, (2) MEL framework continuously updated, (3) learning from the MEL framework fed back into other activities, (4) baseline study documented for the four target countries (refer to **APPENDIX 1** – **Status of Project Results with Mitigation plans** for milestone-specific details).

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Activities and milestones	2018				2019					20	20			20	21		2022			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Coordination-related																				
Appropriate ME&L tools ar	Appropriate ME&L tools and processes																			
Development of a participa	tory	ME	&L f	ram	ewo	rk														
Milestone: Key outcome and impact indicators identified																				

#### Table 6: Status of milestones under appropriate ME&L tools and processes.



Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4																
Milestone: ME&L tools and processes agreed upon																				
Facilitation of the use of the	e ME	E&L	fram	new	ork k	oy al	ll pro	ojec	t pai	rtne	rs									
Milestone: Users of the ME&L framework trained						x	х	x	х	x										
Milestone: ME&L framework continuously updated																				
Milestone: Learning from the ME&L framework fed back into other activities																				
Implementation of baseline	anc	d en	d-lin	es s	tudi	es														
Milestone: Baseline study documented for the four target countries							x	x												
Milestone: End-line study documented for the four target countries																				

**Progress on milestones:** Data collection tools to document results from P4D activities have been developed, based on the various dissemination channels used by partners and other project activities such as trainings. In 2019, the developed tools were reviewed by the MEL team based on feedback from initial P4D trainings held in Cameroon. Details of the P4D trainings conducted in Cameroon in 2019 were captured using the MEL tool and data are available on the ODK aggregate platform. Key P4D staff in Cameroon were trained using the tool. The MEL staff of partner organizations will be trained in the use of the framework (including the data collection tools) at the beginning of the dissemination activities with partners on the field. Trainings will be conducted in Q2, 2020.

The MEL plan has been updated with discussions and feedback from the maiden Research Committee meeting in January 2019, including adjusted timelines for MEL activities. Feedback from the analysis of the baseline study on levels of awareness and use of ISFM-related management practices is being reviewed as a major input in the P4D-related trainings. Similarly, feedback on the management practices of the various cocoa plots surveyed was used as an entry point for the selection of the appropriate sites for the Satellite Trials.

Implementation of the baseline has been completed in Cameroon, Côte d'Ivoire, Ghana and Nigeria with a total sample of 3,280 cocoa farmers (22% female) across different agroecological zones. All data have been assembled on the ODK aggregate platform and a draft baseline report for three countries (Cameroon, Ghana, and Nigeria) including baseline figures for the impact indicators – income, yield, labor types, previous land use – has been submitted to NORAD for review. Data cleaning and final analysis will be carried out in Q1. 2020. In all, six private sector companies participated in the baseline with three of them operating across

more than two countries (Table 7). The implementation team included seven staff from partner organizations (NARS) and was supported by the IITA/CocoaSoils staff at country levels. The team selected and trained 60 Enumerators across the four implementing countries.

Country	Company Name	Operational Area (Region/State/District)	Baseline sample frame/partner
Cameroon	Olam	Sud-Ouest, Centre	1,487
Ghana	Kuapa Kokoo	Ashanti, Ahafo, Bono East, Western North, Western, Central	69,092
	Mondelez	Eastern, Ashanti	1,105
	Cargill	Western, Western North	6,583
	Transroyal (Rockwinds)	Central, Ashanti, Eastern	4,572
Nigeria	Olam	Ondo, Osun, Cross River	18,625
Côte d'Ivoire	Cargill, Mondelez	Agneby-Tissa	97,480
	Mars	Soubre, Buyo, Gueyo	272
Total			199,423

#### Table 7: Sample frame per partner across the countries for baseline implementation.

\*Baseline sample frame is the total number/list of farmers submitted by partners out of which sample size was drawn.

From the analysis of the baseline data, cocoa farms in Cameroon produced, on average, 408 kg/ha, Côte d'Ivoire produced 404 kg/ha, Ghana 401 kg/ha, and Nigeria 294 kg/ha. These data exclude outliers. These results suggest yields more than 70% below the potential 1200 kg/ha.

**Challenges and proposed changes in milestone timelines:** The delay of the partner extension network trainings affected the timelines of the ME&L trainings. The trainings will be conducted alongside the P4D trainings in Q2, 2020.

#### Workplan for 2020

Activity: Facilitation of the use of the ME&L framework by all project partners

- Milestone: Train Users of the ME&L framework by Q2, 2020
- Milestone: ME&L framework continuously updated by Q4, 2020
- Milestone: Learning from the ME&L framework fed back into other activities by Q4, 2020

#### 2.3 Key impacts and outcomes of CocoaSoils

The ultimate change expected as impact from the implementation of the CocoaSoils initiative is the intensification of cocoa production which in turn will increase productivity on existing cultivated land, increase incomes of smallholder cocoa farmers, and help to reduce pressure on forests. The baseline figures for the impact indicators have been obtained through the baseline study. See <u>here</u> for presentation. To achieve this, three key outcome results are expected as a precondition. Refer to <u>APPENDIX 1 – Status of</u> **Project Results with Mitigation plans** for current status of indicators under impact and outcomes.

# *I.* Outcome 1: New cocoa ISFM-related research products are used by private and public stakeholder partners

This outcome is related to the development of the research products and their ultimate use by the extension networks of both private and public organizations. Various outputs contribute to the achievement of this outcome: (1.1.) A set of integrated soil fertility management options generated, (1.2.) Documented evidence for understanding the physiological basis of cocoa nutrient uptake and use, (1.3.) A decision support system developed for intensifying cocoa production, (1.4) Recommendation domains and forest dynamics, (1.5) Sustainability assessment tools, (1.6.)



Operational open knowledge and data sharing portal for the storage, management, and dissemination of cocoa intensification research results, and (1.7) A new cadre of cocoa scientists with PhD and MSc-holding cocoa scientists with knowledge on new cocoa intensification.

II. Outcome 2: Recommendations generated through research products are used by target households

Smallholder farmers are expected under this outcome to acquire knowledge and use the intensification recommendations for cocoa production. The main outputs include the following: (2.1) Agreements with private and/or governmental scaling partners, (2.2) Appropriate extension tools for integration in partner-led scaling, and (2.3) Appropriate training-of-trainers manuals for use in the training sessions for extension agents. Other outputs are as follows: (2.4) Engagement in policy action in support of cocoa intensification. Outputs 1.4 and 1.5 under R4D are also contribute to the achievement of this outcome, directly linked to outcome 2.3. Therefore, the status of these outputs is presented under P4D. More details in relation to the outputs are discussed below.

III. Outcome 3: Decision-makers (public and private) are using tools and knowledge to avoid increased deforestation and child labor while promoting cocoa intensification

Under this outcome, policymakers and other organizations (including the private sector) are expected to integrate intensification recommendations in (country) policies and support the use of feedback from applying tools developed for sustainability assessment and deforestation monitoring. This outcome is related to the "sustainability" dimension of the project's impact through reducing the risk of deforestation. The main output related to this outcome is (2.4) Engagement in policy action in support of cocoa intensification. However, outputs 1.4 and 1.5 (as indicated above) also contribute to the achievement of this outcome. Below are the details of the outputs related to this outcome.

#### 2.4 R4D-related outputs

#### 2.4.1 Output 1.1. A set of integrated soil fertility management options generated

The target for this output in 2019 is to generate a draft set of ISFM recommendations. Achievement of the following milestones was expected at the time of reporting (Table 8). Refer to APPENDIX 1 – Status of **Project Results with Mitigation plans** for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		R4C	) (Re	esea	rch-	for-	Dev	elop	mei	nt)-r	elat	ed								
Output 1.1. A set of integra	ated	soil	fert	ility	ma	nag	eme	ent o	ptic	ons										
Activity 1.1.1. Agreement o	n th	e de	sign	of t	he C	Core	and	l Sat	ellit	e Tri	ials									
Milestone 1.1.1.1. Literature on cocoa agronomy reviewed																				

#### Table 8: Status of milestones for output 1.1.



Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Milestone 1.1.1.2. The design of the Core and Satellite Trials finalized				x	х	x	х	x	х											
Activity 1.1.2. Implementat	ion d	of th	e Co	ore a	and	Sate	llite	Tria	ls											
Milestone 1.1.2.1. Sites selected, pending contributions from the industry				x	x	x	х	x	x	x										
Milestone 1.1.2.2. Trials installed following the approved protocols					х	x	x	x	x	x										
Milestone 1.1.2.3. Trials managed following agreed practices																				
Activity 1.1.3. Data collection	on ar	nd a	naly	sis c	on th	ne tr	ial d	ata												
Milestone 1.1.3.1. Data collection protocols finalized				x	x	x	x	x	x											
Milestone 1.1.3.2. Trial data collected																				
Milestone 1.1.3.3. Collected data analysed																				
Activity 1.1.4. Development	tofa	a set	ofs	site-	spec	cific	ISFN	/l re	com	mer	ndat	ions								
Milestone 1.1.4.1. A prototype ISFM decision support tool developed																				
Milestone 1.1.4.2. Version 1 of an ISFM decision support tool developed																				
Milestone 1.1.4.3. Version 2 of an ISFM decision support tool developed																				

**Progress on milestones:** All the eight Core Trials with an additional two in Ecuador and Indonesia (Table 9) have been established and being managed based on agreed protocols (e.g., Figure 1 - 4). Protocols already developed in 2018 and 2019 (i.e., field mapping and preparation, soil sampling, maize data, nursery, planting material, barcode, and fertilizer application) are in regular use, and data are currently being submitted through the data portal for analysis. In Q1 and Q2, 2019, protocols for field planting and establishment of



Core Trials and fertilizer application were developed and shared in an online <u>repository</u>. The protocols for the mature phase, (i.e., measurements and management of the Core Trials) were finalized in Q4, 2019 and are now under final minor modifications. <u>Digital elevation maps</u> have been developed to assist in the analysis of the spatial variability of maize yields and topography to determine appropriate block size and orientation of Core Trials.

An overview of the data to be collected under the Core Trials for the period between field preparation and post-planting establishment is available in the <u>repository</u>. The data are being collected using ODK coupled with barcode identification tags on both plots and trees. A barcoding system and <u>barcode</u> protocol have been developed, and barcodes have been assigned at field and plot level for all sites for which plot assignments and coordinates are available. Data collection (GPS coordinates for constructing maps, and maize harvesting results) started in 2019.

Country	Location	Implementing Partner	Focal Person
Cameroon	Bokito	IITA	Cargele Masso
Cameroon	Nkoemvone	IRAD	Didier Begoude
Côte d'Ivoire	Aboisso	Nestlé	Arthur Tapi
Côte d'Ivoire	Divo	CNRA	Emmanuel Kassin
Côte d'Ivoire	Tiassale	Barry Callebaut	Alexandre Kaminski
Ghana	Mabang	CRIG	Amos Quaye
Nigeria	Owena	CRIN	Moses Ogunlade
Nigeria	Ibadan	IITA	Stefan Hauser
Ecuador	Guayaquil	MARS*	Eduardo Chavez
Indonesia	Jember, East Java	Mondelez*	Nicholas Cryer

#### Table 9: Locations, institutions, and focal persons hosting Core Trials<sup>1</sup>.

 $<sup>^{1}\,\</sup>mathrm{Trials}$  in Ecuador and Indonesia are not supported by the NORAD funding











Figure 3: Core Trial field in COCI001 – Divo, Côte d'Ivoire.



Figure 4: Core Trial CONI001 – Owena, Nigeria. a) Clonal cocoa seedlings being raised in the nursery at CRIN Headquarters. b) Cocoa seedlings under plantain as a shade crop.

For Satellite Trials, the initial experimental design has been discussed; a protocol has been put together by a team including the NARS and private sector partners and is available at the online protocol repository. A maximum of 16 factor combinations (i.e. 2 Soils  $\times$  2 AEZ  $\times$  2 management  $\times$  2 shade level = 16) with eight



replicates will result in 128 plantations. If a country has one major AEZ and one major soil, the total needed is 32 plantations. The revised <u>Implementation Protocol</u> provides more elaborate details on these numbers. Lastly, it is important to note that the 32 sites are the minimum number of plantations. In some situations, the companies proposed a large number of plantations, which (i) increases the number of replicates and thus the statistical power and (ii) creates a larger number of farmers that will form the core for creating the anticipated impact on cocoa yields and income.

The protocol is currently under review and will be finalized by Q1 2020. Preliminary site selection has been done for Cameroon, Côte d'Ivoire, Ghana and Nigeria, and the list of <u>proposed locations</u> was submitted to partners. Validation of the selected sites using the agreed set of criteria has been completed in Ghana. A <u>review</u> of fertilizer recommendations and BMP (including ISFM recommendations) has been compiled across the four countries in a single document for use for the first generation of Satellite Trials.

**Challenges and proposed changes in milestone timelines:** The delay in installing the Satellite Trials was due to the non-availability of partner technicians to participate in the validation, delineation, and initial site characterization. This is because the period coincided with the main harvesting season and other key activities for partner organizations, such as farm auditing.

Consequently, individual meetings with partners were scheduled to discuss and agree on the process for the validation of the selected sites in Côte d'Ivoire, Cameroon, and Nigeria. Hence, validation, plot delineation, initial site characterization, and BMP implementation with partners will be done by Q2, 2020.

This delay, also gave the partners the opportunity to increase the number of plantations to host the Satellite Trial. In as much as this will increase the budget initially proposed for the Satellite Trials, it would also provide good data to help us answer our hypotheses.

#### Work plan for 2020

Activity 1.1.1. Agreement on the design of the Core and Satellite Trials

• Milestone 1.1.1.2. Finalize the design of the Satellite Trials by Q1 2020

Activity 1.1.2. Implementation of the Core and Satellite Trials

- Milestone 1.1.2.1. Select and validate Satellite Trials sites, pending contributions from the industry by Q2, 2020
- Milestone 1.1.2.2. Install Satellite Trials per the selected sites following the approved protocols across the four countries by Q2, 2020
- Milestone 1.1.2.3. Manage Core and Satellite Trials following agreed practices and protocols by Q4, 2020

Activity 1.1.3. Data collection and analysis of the trial data

- Milestone 1.1.3.1. Finalize data collection protocols by Q1, 2020
- Milestone 1.1.3.2. Collect Core and Satellite Trial data according to the data collection protocols by Q4, 2020
- Milestone 1.1.3.3. Analyse Core and Satellite Trials data by Q4, 2020

Activity 1.1.4. Development of a set of site-specific ISFM recommendations

• Milestone 1.1.4.1. Develop prototype ISFM to fit into the decision support tool by Q4, 2020

# 2.4.2 Output 1.2. Documented evidence for understanding the physiological basis of cocoa nutrient uptake and use

As the target for this output for 2019 indicates, no papers on cocoa physiology are expected to be produced. Achievement of the following milestones was expected at the time of reporting (Table 10). Refer to APPENDIX 1 – Status of Project Results with Mitigation plans for current status of the targets.



Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Table 10: Status of milestones for output 1.2.

Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
		R4E	) D (Re	esea	rch-	for-	Dev	elop	l me	nt)-ı	relat	ted								
Output 1.2. Understanding	the	phy	/siol	ogic	al b	asis	of c	000	a nu	trie	nt u	ptal	ke al	nd u	se					
Activity 1.2.1. Identification	of f	acto	ors d	leter	min	ing	high	i yie	ld/q	ualit	ty in	a ra	nge	of						
genotypes/environments			1	1	8	1	1	_			_			1	1	1	1	1	1	1
Milestone 1.2.1.1.			x	x	x	x	x	x												
Protocols developed																				
Milestone 1.2.1.2.									x	х	х	x								
Protocols implemented																				
Milestone 1.2.1.3. Data															×					
analysed and fed back													X	X	X	X				
Activity 1.2.2 Assessment of	fint	tora	ctio	ns h	otw	aan	wat	or li	ght	nut	rion	t ctr		200	arc	wth	offi	icion		<u> </u>
Activity 1.2.2. Assessment of					etwo	en	wat	er, n	igiit,	nut	.nen		atus,		igic		em	luer	icy	1
Milestone 1.2.2.1.			x	x	x	x	x	x	x											
Protocols developed				^	<u>^</u>	<u> </u>	<u>^</u>	Ľ.												
Milestone 1.2.2.2.											x	x	x	x	x	x	x	x	x	x
Protocols implemented											$\hat{}$	^	^	^	^	^	^	^	^	^
Milestone 1.2.2.3. Data																				
analysed and fed back																				
into other activities																				
Activity 1.2.3. Development	t of f	folia	r no	rms	for	coco	ba													
Milestone 1.2.3.1.			<	×	v	v														
Protocols developed			X	X	X	X														
Milestone 1.2.3.2.																				
Protocols implemented																				
Milestone 1.2.3.3. Data																				
analysed and fed back																				
into other activities																				
Activity 1.2.4. Assessment of	of in	tera	ctio	ns b	etw	een	pota	assiu	ım n	utri	tion	and	l dro	ugh	t str	ess				
Milestone 1.2.4.1.																				
Protocols developed			X	X	Х															
Milestone 1.2.4.2.																				
Protocols implemented															х	х	х			
Milestone 1.2.4.3. Data																				
analysed and fed back																				
into other activities																				



**Progress on milestones:** Data analysis from a laboratory experiment was conducted to examine leaching of nutrients from cocoa pods. A physical characterization of 110 cocoa plantations was carried out to analyse the contribution of 'super-trees' to the overall yield. A preliminary analysis of cocoa farm characterization in Ondo State in Nigeria was also carried out. After the first appraisal, including several field trips, adjustments were made to the original plans for field experimentation to begin in Q2, 2020.

A protocol has also been developed for testing cocoa physiology and nutrient uptake and use to study the relationships between potassium and drought stress in cocoa. The results were presented as a <u>poster</u> in the January ,2019 CocoaSoils Forum in Ghana and as an oral presentation at the International Symposium on Soil and Plant Analysis (ISSPA) Conference in June, 2019.

In addition, two MSc students from Wageningen University have collected data for the development of foliar norms for cocoa. Protocols for experimentation and sampling have been developed, and the collection of field data started in 2019.

**Challenges and proposed changes in milestone timelines:** In identifying factors that determine high yield/quality in a range of genotypes/environments, the main challenge was the delayed application of fertilizer which was dependent on the locations of partner sites in Nigeria.

Other challenges were related to the delay in importation of research equipment (strict regulations for shipping between Europe and Côte d'Ivoire), to training in the use of equipment, and problems with the equipment repairs.

#### Workplan for 2020

Activity 1.2.1. Identification of factors determining high yield/quality in a range of genotypes/environments

- Milestone 1.2.1.2. Implement protocols by Q4, 2020
- Milestone 1.2.1.3. Analyse data collected on the yield and/quality in a range of genotypes/environments. Integrate results (analysed data) into other activities by Q4, 2020
  - Model development: Running CASE2 (Python version of CASE2), Simulation of water limited-yields with CASE2 - Yield gap analysis, Extend CASE2 to include effects of CO<sub>2</sub> fertilization on cocoa yields (Adapt Photosynthesis model in CASE2) by Q4, 2020
  - Climate change effects on cocoa yield: Climate scenario with CASE3 by Q4, 2020

Activity 1.2.2. Assessment of interactions between water, light, nutrient status, and growth efficiency

- Milestone 1.2.2.1. Develop protocols by Q1, 2020
- Milestone 1.2.2.2. Implement the protocols on yield/quality range of genotypes/environment by Q4, 2020
- Milestone 1.2.2.3. Data analysed and fed back into other activities by Q4, 2020

Activity 1.2.3. Development of foliar norms for cocoa

- Milestone 1.2.3.2. Implement the protocols on foliar norms by Q4, 2020
- Milestone 1.2.3.3. Analyse data collected on foliar norms. Integrate results (analysed data) into other activities by Q4, 2020

Activity 1.2.4. Assessment of interactions between potassium nutrition and drought stress

- Milestone 1.2.4.2. Implement protocols for assessment of interactions between potassium nutrition and drought stress by Q4, 2020
  - o Establish experimental settings and fertilizer trials by Q4, 2020

#### 2.4.3 Output 1.3. A decision support system developed for intensifying cocoa production

As a target for this output for 2019, the project will adapt tools for farmer segmentation and Stepwise intensification for cocoa producing areas. Achievement of the following milestones was expected at the time



of reporting (Table 11). Refer to **APPENDIX 1 – Status of Project Results with Mitigation plans** for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Table 11:	Status of	milestones	for	output 1.3.

Activities and milestones		20	18			20	19			20	20			20	21			20	22	
milestones	0	0	0	0	0					0	0			0	0	0	0	0	0	
	Q 1	Q 2	2	Q 4	Q 1	2 2	<u></u> 2	Q 4		2	् य २	Q 4	Q   1	2	<u></u> 2	Q ₄	Q 1	2	् प्र	Q 4
	-	-		-	Ļ.	_		Ļ	-	<u> </u>			1	-	Ŭ	-	-	-	3	_
		K4L	) (Re	esea	rcn-	tor-	Dev	elop	me	nt)-r	elat	ed								
Output 1.3. A decision supp	oort	syst	tem	for	inte	nsif	ying	сос	oa p	orod	ucti	on								
Activity 1.3.1. Development	ofa	a de	cisio	n su	ippc	ort fr	ame	ewo	rk fo	or co	coa	inte	ensif	icati	on					
Milestone 1.3.1.1.																				
Prototype decision							v	v	v											
support framework							^	<b>^</b>	^											
developed																				
Milestone 1.3.1.2.																				
Decision support tool									X	X										
populated																				
Milestone 1.3.1.3. Version																				
1 of a decision support											X									
tool available																				
Activity 1.3.2. Validation of	the	deci	sion	n sup	por	t fra	me	worł	< wit	h ta	rget	use	er gr	oups	5					
Milestone 1.3.2.1.																				
Feedback on version 1																				
assembled																				
Milestone 1.3.2.2. Version																				
2 available and evaluated																				
Milestone 1.3.2.3. Final																				
version delivered for																				
scaling																				
Activity 1.3.3. Production an	nd m	nulti	plica	atior	n of	a ha	ndb	ook	on	coco	a in	tens	ifica	tion	)					
Milestone 1.3.3.1. Draft																				
concept available																				
Milestone 1.3.3.2. First																				
draft available and																				
validated																				
Milestone 1.3.3.3.																				
Handbook multiplied and																				1
available to the cocoa																				1
community																				1



**Progress on milestones:** A prototype of a decision support application (Climate smart cocoa (CSC) implementer) is available and the farmer segmentation component is being reviewed before it is validated by the Research Committee. The application is a mobile tool that combines the farmer segmentation tool (FST) and Stepwise investment pathways (SIP) in BMP for improved productivity. The tool also maps the farmers' clusters and the CSC packages for easy use by the end-users, e.g., extension workers from both private and public companies.

**Challenges and proposed changes in milestone timelines:** The delay in the development and population of the decision support framework was due to the referral of the farmer segmentation component of the prototype to the Annual Forum meeting in January, 2020. This is to acquire more country-specific spatial data on current developments of cocoa versus forest by existing initiatives in the region. The team postponed this activity to improve the analyses by enabling access to and discussions with existing initiatives.

#### Workplan for 2020

Activity 1.3.1. Development of a decision support framework for cocoa intensification

- Milestone 1.3.1.1. Develop prototype decision support framework for Stepwise application of ISFM components by Q1, 2020
- Milestone 1.3.1.2. Populate the decision support tool across the four countries by Q2, 2020
- Milestone 1.3.1.3. Make available to partners Version 1 of the decision support tool across the countries by Q3, 2020

Activity 1.3.2. Validation of the decision support framework with target user groups

• Milestone 1.3.2.1. Assemble feedback on Version 1 by Q4, 2020

Activity 1.3.3. Production and multiplication of a handbook on cocoa intensification

- Milestone 1.3.3.1. Develop draft concept for production and multiplication of a handbook by Q3, 2020
- Milestone 1.3.3.2. Validate and make available the first draft of the handbook by Q4, 2020
- 2.4.4 Output 1.4: Recommendation domains and impact of sustainable intensification on forest pressure identified

With regard to the target in 2019 for Output 1.4, sites for Satellite Trials are to be identified but no recommendations from the trials are expected to be available. Achievement of the following milestones was expected at the time of reporting (Table 12). Refer to APPENDIX 1 – Status of Project Results with Mitigation plans for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

	00.10				••															
Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		R4C	) (Re	esea	rch-	for-	Dev	elop	mei	nt)-r	elat	ed								
Output 1.4. Identification of	of re	com	mei	ndat	tion	don	nain	s an	d im	npac	t of	sus	taina	able	inte	ensi	ficat	ion	on	
forest pressure																				
Activity 1.4.1. Identification	of r	epre	esen	tati	ve tr	rial s	ites	und	er c	urre	ent a	nd f	utur	e cli	imat	es				

#### Table 12: Status of milestones for output 1.4.



Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4																
Milestone 1.4.1.1. Historical climate data compiled																				
Milestone 1.4.1.2. Future climates for the target regions down-scaled																				
Milestone 1.4.1.3. Agro- ecological zones for site selection assessed					х	x	x	x												
Activity 1.4.2. Scale indicato	ors a	nd r	eco	mme	enda	atior	ns of	ftria	ls to	o spa	atial	don	nain	S						
Milestone 1.4.2.1. Spatial proxies of key CSA packages and indicators identified																				
Milestone 1.4.2.2. Scaling spatial domains mapped																				
Milestone 1.4.2.3. Suitability of domains discussed/validated with stakeholders																				
Activity 1.4.3. Ex-ante asses	sme	nt c	осо	a int	ensi	fica	tion	рас	kage	es ar	nd ir	nterv	/ent	ions	on	сосс	ba si	uitab	oility	
Milestone 1.4.3.1. Adaptation potential of CSA packages quantified																				
Milestone 1.4.3.2. Cocoa suitability models based on 3.1 re-run																				
Milestone 1.4.3.3. Intensification potential for each intervention spatially quantified																				
Activity 1.4.4. Quantificatio	n of	the	imp	act	of in	tens	sifica	atior	n sce	enar	ios c	on fo	orest	t pro	otect	tion,	/def	ores	tatio	on
Milestone 1.4.4.1. Historical deforestation baseline built using Terra-																				
Milestone 1.4.4.2. Cocoa intensification with deforestation scenarios combined																				



Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4																
Milestone 1.4.4.3. Impact of different intensification scenarios on forest protection/deforestation assessed																				

**Progress on milestones:** Assessment of Agro-Ecological zones has been completed and mapped for the four countries. The AEZ maps have been produced for them and used in the final selection of Satellite Trial sites. See <u>here</u> for links to maps. Identifying spatial proxies of key CSA packages and mapping the scaling of spatial domains rely on observed relationships between key CSA packages and available climate and soil data on the spatial scale of the cocoa growing area. A mixed-effects model is being used to understand the main climatic and edaphic drivers of yield, taking different management practices into account as much as possible. Unfortunately, not all secondary yield data have documented associated management practices but the majority have information on cocoa age and the variety (traditional or hybrid). In the next step, the yield gap will be estimated for the different agroecological zones using three different approaches.

- I. Actual and attainable yields, where attainable, are the highest yields achieved by farmers per agroecological zone
- II. The actual yields will be compared with yields from experimental farms where BMP have been applied under controlled conditions. However, these might not be available for all agroecological zones.
- III. The actual yields are compared with those theoretically potential (i.e., not limited by water and nutrients nor reduced by biotic factors such as pests and diseases) and water-limited yields (i.e., the same as the potential but limited by water).

The theoretically potential and water-limited yields will be estimated using the cocoa crop model CASE2. This will provide insights on the potential yield increase for each zone and the management practices most effective in reaching that yield.

In addition to establishing the Terra-i baseline (250m resolution), a solid baseline of forest extent and deforestation rates prior to the commencement of the project was developed using 30m Landsat images. The primary humid tropical forests data set by Turubanova et al. (2018) was used for 2001 as a baseline forest extent. This forest data set was processed for the cocoa growing area of the four targeted countries.

The primary humid tropical forest is defined here as having no detectable signs of human-caused alteration or fragmentation, as delineated in the intact forest landscape method (Potapov et al. 2017). The loss of forest cover from 2001 to 2018 was then processed. Figure 5 shows that the annual deforestation rate was highest in Côte d'Ivoire (1.54%), followed by Ghana (0.45%), Cameroon (0.11%), and Nigeria (0. 01%). When an individual forest is analysed separately, these deforestation rates can be higher or lower than the average values. Complete forest loss was highest in Cameroon (776 ha), followed by Côte d'Ivoire (642 ha), Ghana (179 ha), and Nigeria (7 ha). The amount of primary forest remaining is highest in Cameroon (693,900 ha), followed by Nigeria (74,834 ha), Ghana (38,736 ha), and Côte d'Ivoire (36,467 ha).

Caution is required when these values are compared with other studies from the literature, such as those presented here that reflect only the forests within the cocoa growing area and are based on the forest definition from the intact forest landscape method as described above. Once the Satellite Trials are



confirmed, the forest areas of specified proximity to these trials will be selected to monitor deforestation rates only for those specific forests. This will require an additional baseline, as the rates of deforestation for individual forests will be different from those that include all forests of the cocoa growing area. See a map of individual forests in Figure 6: Map depicting deforestation events and extents according to the year of occurrence for an exemplary forest in Ghana.



Figure 5: Statistics related to deforestation within cocoa-growing areas of the four CocoaSoils countries.



Figure 6: Map depicting deforestation events and extents according to the year of occurrence for an exemplary forest in Ghana.



In order to identify the drivers of deforestation, a high-resolution land-cover classification system was piloted, relating observation data (i.e., GPS data of observed land cover such as cocoa, forest, rubber plantations, etc.,) with indices derived from 10-meter resolution Sentinel 1 and 2 data and comparing different machine learning algorithms (i.e., random forest and convolutional neural network). This work was part of the MSc thesis of Anne-Juul Welsink supervised by Louis Reymondin and Thibaud Vantalon from CIAT. See Figure 7 as an exemplary result.



#### Figure 7: Land-cover classification for Ghana.

#### Challenges and proposed changes in milestone timelines:

Due to the delays in GPS points for site selection of Satellite Trials, activities on informing site selection have consequently been also delayed.

Getting access to cocoa yield and management data has been challenging and has required more time than expected. Nevertheless, data analysis is ongoing and other activities are within the timeframe. The data collected on the Satellite Trials will bring further valuable information to achieve recommendations providing higher confidence and value to the different decision-makers.

Another challenge in identifying the drivers of deforestation for training the model, (i.e., classifying cocoa and forest land-cover), is getting enough high-quality GPS points of confounding land-cover classes (i.e., non-cocoa tree crops and other heterogeneous farming systems with many trees that resemble cocoa farms from space). Although identifying drivers of deforestation was not part of the original workplan, this component was added as it brings a lot of value to the project. It is intended to identify ways of collecting more GPS data on these confounding land-cover classes, but it is not of the highest priority. A mobile app to collect GPS, and relevant metadata for cocoa and forest land-cover classes has been developed and can also be used for the other land-cover classes.

For the cocoa crop modelling work, additional collaborations are needed with partners in Indonesia and Colombia. However, delays in accessing the agreed data have not yet enabled much progress. It is envisaged that access to the relevant data will be obtained in 2020.

#### Work plan for 2020



Activity 1.4.2. Scale indicators and recommendations of trials to spatial domains

- Milestone 1.4.2.1. Identify spatial proxies of key CSA packages and indicators by Q4, 2020
- Milestone 1.4.2.2. Map scaling spatial domains in the partner operational areas by Q4, 2020
- Milestone 1.4.2.3. Validate suitability of domains with stakeholders by Q4, 2020

Activity 1.4.3. Ex-ante assessment of cocoa intensification packages and interventions on cocoa suitability

- Milestone 1.4.3.1. Quantify the adaptation potential of CSA packages by Q4, 2020
- Milestone 1.4.3.2. Re-run cocoa suitability models based on 3.1 by Q4, 2020
- Milestone 1.4.3.3. Quantify intensification potential for each intervention spatially by Q4, 2020
- 2.4.5 Output 1.5: Sustainability assessment tools developed and validated to support the sustainable development of cocoa production in relation to biodiversity and the ecosystem services at the landscape level

As target for this output for 2019 the project will produce draft zero of sustainability assessment. Achievement of the following milestones was expected at the time of reporting (Table 13). Refer to **APPENDIX 1 – Status of Project Results with Mitigation plans** for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		R4D	) (Re	esea	rch-	for-	Dev	elop	mer	nt)-r	elat	ed								
Output 1.5. Sustainability as	sses	sme	ent t	:ool	S															
Activity 1.5.1. Assessment of	f cliı	mate	e sm	art	сосо	ba so	cena	rios	and	imp	bacts	s on	biod	dive	rsity	anc	l ecc	osyst	em	
services																				
Milestone 1.5.1.1.						1														
Baseline of natural capital																				
and ecosystem functions																				
produced																				
Milestone 1.5.1.2.																				
Implications for																				
biodiversity and							x	x	x	x										
ecosystem services of							~	~	~	~										
potential shifts in cocoa																				
suitability areas mapped																				
Milestone 1.5.1.3.																				
Potential impacts on																				
biodiversity and								x												
ecosystem services of								~												
intensification scenarios																				
assessed																				
Activity 1.5.2. Assessment of	f lar	ndsc	ape	vulr	nera	bility	y an	d po	tent	tial o	co-b	enef	its c	of cli	mat	e sn	nart	coco	ba	

Table 13: Status of milestones for output 1.5.



Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Milestone 1.5.2.1. Areas of vulnerability for natural capital and ecosystem services under shifting suitability ranges identified									x	x	x	x								
Milestone 1.5.2.2. Area where climate smart cocoa may help mitigate such impacts identified and mapped																				
Milestone 1.5.2.3. Guidance materials produced							x	x	х	х	x	x								
Activity 1.5.3. Review of pot supported by sustainable co	tent ocoa	ial s inte	yner ensif	gies icat	am ion	ong	indu	ustry	/ and	d na	tion	al co	omm	nitm	ents	reg	ardi	ng fo	ores	ts
Milestone 1.5.3.1. Synergies and trade-offs among industry and national commitments supported by intensification scenarios reviewed																				
Activity 1.5.4. Validation of	resu	ilts a	and s	stak	ehol	der	eng	ager	nen	t		1	r							
Milestone 1.5.4.1. Two multi-stakeholder workshops organized							x			x										
Milestone 1.5.4.2. Policy brief on workshop recommendations finalized						x		x	х		x									

**Progress on milestones:** The work carried out in 2019 was presented at the second Annual CocoaSoils Science Meeting and during the Public Forum in January, 2020, using presentations and posters. See here for <u>presentation</u> and <u>posters</u>.

There are potential implications for biodiversity and ecosystem services of shifts in cocoa suitability areas due to climate change. At the national level, these implications were assessed, based on the gradients for climate change impact on cocoa developed by Schroth et al. (2016). The implications of shifting suitability classes will be analysed in terms of risk to biodiversity and ecosystem services, highlighting areas most at risk due to high suitability for cocoa in the future, and splitting such areas into impact zones described in Schroth et al. (2016), (e.g., intensification, expansion, less suitable, and diversification zones). These highlights will



aid in identifying areas where the choice of different cocoa-growing strategies or conservation interventions may be relevant.

In 2019, the first drafts were produced for biodiversity (see Figure 8) and will be presented at the annual CocoaSoils meeting in January, 2020. Further analysis of the implications of these findings will be carried out in 2020 as a contribution to mapping the implications for biodiversity and ecosystem services of potential shifts in cocoa suitability and also to provide materials for guidance.

Impacts of a shift in cocoa suitability on ecosystem services have been assessed using a land-use change model to project likely locations of conversion to cocoa and implications for ecosystem services.





# Figure 8: Areas of high biodiversity importance that have been projected to be under different levels of risk from cocoa-related land-use change by 2050 (Schroth et al. 2016)

At the landscape to site scale level, adaptation and testing of an existing approach were initially planned to assess ecosystem services supply concerning demand under different management practices in two trial sites. This was to help to plan practices to improve supply. However, through a review of the assessment and planning tools of other existing ecosystem services, it was realized that more value could be created by



developing some guidance on which of these tools could be used in planning for ecosystem services within cocoa landscapes instead of applying one of them in two sites. Therefore, the potential for such a toolkit of existing tools was explored. The toolkit could potentially achieve the following.

- Help users to plan to improve the supply of desired ecosystem services in cocoa landscapes from the national to the site level
- Be a step-by-step workflow which guides users in their choice of existing tools for each step
- Help different types of users to select tools for the appropriate spatial scale and resources

Field assessments will still take place, applying appropriate tools from the toolkit in at least two Satellite Trial sites. These sites will be identified with the CocoaSoils team coordinating work there and field assessments will take place in 2021.

Based on spatial data for cocoa occurrence acquired in 2019 from an area in Côte d'Ivoire (source: <u>Vivideconomics</u>), the model outputs are being used to map the potential implication of two simple scenarios: transforming all cocoa either to full sun or to agroforestry systems. This work will be taken further as planned in 2020. (see Table 13)

At the national scale, areas of particular vulnerability within the cocoa zone have been identified because of potential shifts in cocoa producing under a changing climate, e.g., showing potential risk to protected areas or others of high biodiversity, or those at increased risk of soil erosion from cocoa expansion.

These analyses seek to understand the vulnerability of biodiversity and ecosystem services in the cocoa zone under climate change due to deforestation and shifts in cocoa suitability areas. They use recent rates of deforestation based on Terra-I spatial deforestation data and project these forward to 2050 using a land-use change model (QUICKLUC 2.0) within areas currently suitable for cocoa (Schroth et al. 2016). Analysis of ecosystem services started in 2018 and has been taken forward in 2019 to include biodiversity. The analysis shows potential risks to protected or other areas of high biodiversity or those at increased risk of soil erosion from cocoa expansion. The risk for important ecosystem functions has been identified.

In 2020, exploration will continue to determine how the scenarios of future climate change might lead to different scenarios of changes in land use and the implications for biodiversity and ecosystem services. This will include scenarios of intensification and adaptation of cocoa as well as the potential transformation to other land-use systems.

Two papers will be submitted in 2020 for review on the initial results of this work.

- Scientific paper on the risks to biodiversity from potential future cocoa expansion in the West African cocoa zone
- Scientific paper on "Generalized biodiversity responses to cocoa agroforestry"

On the level of landscape to site-scale a student from WUR studied the impacts of shading on cocoa productivity and disease prevalence in a site in Ghana. The thesis of this study will be finalized in March, 2020.

All guidance materials that have been developed aim at balancing trade-offs and synergies with forests, biodiversity, and ecosystems in planning for sustainable cocoa production for the future. Their objective is to help in identifying the best areas in which to intensify cocoa production (and avoid deforestation) with what type of systems (e.g., climate smart cocoa).

At the national level, a draft set of planning steps to help national or supply chain stakeholders to understand risks and plan for opportunities arising from the interaction between increases in cocoa production has been developed in collaboration with CIAT, using different strategies (e.g., intensification, climate smart cocoa, expansion), in climate change, forests, biodiversity, and ecosystem services (Figure 9). These steps integrate the R4D components of the project, as well as part of the P4D, in support of Outcomes 1-3.



The toolkit developed for the landscape to site-scale largely follows these steps but at a more ground-level stage (see Figure 9).



Figure 9: Steps to support planning for sustainable cocoa development, balancing production, forests, biodiversity, and ecosystem services.

From the change in initial focus, alluded to above, on the scale level of landscape to site-scale, to develop a toolkit rather than apply one particular method in a few sites, some activities under this milestone have been brought forward (see Table 13).



In 2019, a first draft outline for the toolkit was produced and sent out with a short questionnaire within the UNEP-WCMC and CocoaSoils network to solicit feedback on its purpose, potential users, and structure. Based on responses, the toolkit is currently being reframed and elaborated, and a wireframe is being produced for its structure. A complete version will be sent out for review by mid-2020.

Box I: Planning Steps for toolkit development
For each step, the toolkit will provide guidance as well as a list of relevant tools and publications

Establish the planning process and team
Map stakeholders
Agree on the planning process with stakeholders
Identify the demand for ecosystem services and reduced dis-services
Identify and assess the flow of ecosystem services and dis-services
Identify which farm and landscape elements supply the ecosystem services and dis-services
Consider the likely impact of future climate change and other pressures on flows of ecosystem services and dis-services
Plan how to promote desired ecosystem functioning and services

In 2019, existing and potential synergies within the private sector were reviewed with regard to their zerodeforestation commitments, national-level goals and targets, and other relevant initiatives on forests and biodiversity, with reference to the cocoa sector in West and Central Africa. This work was supported by a student from WUR, working on environmental policy. His <u>report</u> and <u>presentation</u> were shared within the CocoaSoils network. The work will inform the analysis of the implications of different intensification scenarios to support these commitments during the course of the project.

The review also informed a news article on the UN-REDD Programme website, called "<u>Integrating REDD+ and</u> private sector cocoa initiatives in Côte d'Ivoire: creating incentives for the private sector while meeting national forest policies".

Presentations were made by the CocoaSoils focal person with UNEP-WCMC, at various multi-stakeholder events. These included the following.

- The Global Land Project (GLF) Open Science meeting, 24-26 April, 2019, in Bern, bringing together researchers and stakeholders from civil society, government, and the private sector to discuss how land systems can form the basis for sustainable transformations. <u>See presentation here</u>
- A side event at the WCF partnership meeting, 23-24 October, 2019 in Berlin. Presentation on collaboration with CIAT focused on the draft set of national steps in scale support to spatial planning. <u>See presentation here</u>
- An invited presentation at the "Cadre de dialogue: chaînes de valeur durables pour les paysages forestiers et agroforestiers de Côte d'Ivoire", 12-13 November, 2019, in Abidjan, organized by UN Environment, the EU REDD facility (EFI), and the United Nations Forum on Forests. <u>See report here</u>

The increased understanding of this output's context has led to the engagement with various stakeholders on the use of the data generated under it to support commitments to industry and national priorities concerning deforestation/reforestation in the target countries:

- Through UN-REDD: support Côte d'Ivoire's national target of restoring forest cover to 20% of land area by 2030, including through cocoa agroforestry
- Include data on biodiversity on the data platform of the Ivorian government and other key stakeholders to meet the country's zero-deforestation commitments



A follow-up on this in 2020 will contribute to Milestone 1.5.4.1, ultimately feeding into Output 2.4 and Outcome 3. See further description in 2020 workplan.

#### Challenges and proposed changes in milestone timelines:

Challenges here are basically the changes in timelines for further data acquisition and analysis as follows.

Activities to acquire additional country-specific spatial data. will continue into 2020 towards the mapping of implications for biodiversity and ecosystem services from potential shifts in cocoa suitability areas and the identification of areas of vulnerability for natural capital and ecosystem services under shifting ranges of suitability. Also, with rapid developments in remote sensing, new data are continually being made available and we aim to use them to improve our analysis. The validation of work on climate change impacts by CIAT I also still needs to be completed.

Some activities that were planned for 2020-2022 have already started in 2019 towards the assessment of potential impacts on biodiversity and ecosystem services of intensification scenarios.

Work towards the production of guidance materials that was planned for 2021-2022 has already started, and a first draft of various outputs has been produced. This will continue in 2020.

The review of potential synergies among industry and national commitments regarding forests supported by sustainable cocoa intensification has progressed less rapidly than initially planned, and this was also reflected in the budget expenditure. It was important to consider current developments and how to incorporate these in our activities before proceeding.

At the national scale, some of the analysis has been spread over a more extended period of time than initially planned (see Table 13). This change in timelines was caused by the understanding that other initiatives in the region would produce spatial data that would help validate and improve the analyses. Therefore, it was deemed appropriate to wait to access these data. In addition, new data are continually being made available, and we aim to improve our analysis accordingly where possible.

#### Workplan for 2020

Activity 1.5.1. Assessment of climate smart cocoa scenarios and impacts on biodiversity and ecosystems

- Milestone 1.5.1.2. Map implications for biodiversity and ecosystem services of potential shifts in cocoa suitability areas by Q2, 2020
- Milestone 1.5.1.3. Assess potential impacts on biodiversity and ecosystem services of intensification scenarios by Q2, 2020

Activity 1.5.2. Assessment of landscape vulnerability and potential co-benefits of climate smart cocoa

- Milestone 1.5.2.1. Identify areas of vulnerability for natural capital and ecosystem services under shifting suitability ranges by Q4, 2020
- Milestone 1.5.2.2. Identify areas where climate smart cocoa may help mitigate such impacts by Q4, 2020
- Milestone 1.5.2.3. Work towards producing guidance materials has already started and will continue by Q2, 2020

Activity 1.5.3. Review of potential synergies among industry and national commitments regarding forests supported by sustainable cocoa intensification

• Milestone 1.5.3.1. Review synergies and trade-offs among industry and national commitments supported by intensification scenarios by Q4, 2020

Activity 1.5.4. Validation of results and stakeholder engagement

- Milestone 1.5.4.1. Organize multi-stakeholder workshops by Q3, 2020
- Milestone 1.5.4.2. Finalize scientific papers submitted and policy briefs on workshop recommendations in Q2 and Q4, 2020



# 2.4.6 Output 1.6. Operational open knowledge and data sharing portal for the storage, management, and dissemination of cocoa intensification research results

As target for this output in 2019 the project will adapt tools for farmer segmentation and Step-wise intensification for cocoa-producing areas. Achievement of the following milestones was expected at the time of reporting (Table 14). Refer to **APPENDIX 1 – Status of Project Results with Mitigation plans** for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Activities and milestones		20	18			20	19			20	20			20	21			20	22	
milestones	0		0	0			_					-	0				0			
	Q 1	Q 2	Q a	Q ₄	1 1	2	Q 2	Q 4		2	Q a	Q ₄	1 1	2	Q 2	Q ⊿	Q 1	Q 2	Q 2	Q ₄
	-			-	<u> </u>	2	<u> </u>		-	-			-	-	3	-	-	-	<u> </u>	_
		R4D	) (Re	esea	rch-	tor-	Dev	elop	me	nt)-r	elat	ed								
Output 1.6. Operational op	en k	knov	vled	ge a	and	data	sha	aring	g po	rtal										
Activity 1.6.1. Development requirements analysis	t of o	data	сар	ture	e, str	uctu	ıre,	and	put	olica	tion	me	char	nism	s, ar	nd u	ser			
Milestone 1.6.1.1. Data																				
structure for all functions			Х	X	X	X	X	X												
in AgroSTAC implemented																				
Milestone 1.6.1.2. Overall																				
architecture and			x	х	х	x	х	X												
Milestone 1.6.1.3 Data																				
Capture app developed				X	X	X	Х	X												
Milestone 1.6.1.4. User																				
requirements analysis				x	х	х	x	x												
completed																				
Activity 1.6.2. Development	c of o	outw	vard	faci	ing p	parts	oft	the	kno	wled	ge a	ind	data	-sha	ring	g por	tal			
Milestone 1.6.2.1. Public																				
facing portal and data																				
visualization platform,																				
Milestone 1.6.2.2 Public																				
facing portal and data																				
visualization platform.																Х				
beta release available																				
Milestone 1.6.2.3. Public																				
facing portal and data																				
visualization platform,																				
final release available																				
Activity 1.6.3. Development	t of a	cons	orti	um-	dedi	cate	ed pa	arts	of t	he k	now	led	ge a	nd d	ata-	shar	ing	port	al	

#### Table 14: Status of milestones for output 1.6.



Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4																
Milestone 1.6.3.1. Scientific analysis facility and data publication facility, prototype 1 developed									x	x										
Milestone 1.6.3.2. Scientific analysis facility and data publication facility, beta release available												x								
Milestone 1.6.3.3. Scientific analysis facility and data publication facility, final release available																x	x			
Activity 1.6.4. Maintenance portal	, use	er te	stin	g, aı	nd ta	arge	ted	imp	rove	emei	nts c	of kn	iowl	edg	e an	d da	ita-s	hari	ng	
Milestone 1.6.4.1. Data and knowledge sharing portal maintained																				
Milestone 1.6.4.2. Testing and targeted improvements used																				

**Progress on milestones:** The Open Data Kit (ODK) server has been developed and is used as the sole data capture application for the project. All data from the baseline survey were collected and submitted through the ODK platform.

In Q1 and Q2, 2019, substantial effort was dedicated to the development of a cocoa-specific ontology essential for the proper collection, management, and storage of data. The team finalized the first draft in December, 2019, and will discuss with stakeholders during the Annual Forum in January, 2020, with the aim of standardizing and formalizing all agronomic measurements.

The data team from Wageningen Environmental Research (WEnR) developed the database structure and implemented a content management system coupled with an ODK server. In 2019, the system was developed further and ODK will be the only application used for data capture. The data portal interface for the CocoaSoils public website was finalized in Q4, 2019. The approach is summarized <u>here</u>. A research assistant, Ekatherina Vasquez, based in WUR, was hired in Q2, 2019, to aid in the development of data definitions, research protocols, and data management tools. The team has assisted in the development of a collection form in ODK for all Satellite Trials data, which is being hosted over the ODK server. An interactive ODK Data Collection manual has been developed. A universal <u>OneDrive</u> has also been created to facilitate data exchange among partners and stakeholders.



*Challenges and proposed changes in milestone timelines:* The CocoaSoils ontology is a work in progress, and the report and the ontology itself will be ready by Q2, 2020, after stakeholder engagements.

#### Workplan for 2020

Activity 1.6.2. Development of outward facing parts of the knowledge and data-sharing portal

- Milestone 1.6.2.1. Develop a Prototype 1 of the Public facing portal and data visualization platform by Q3, 2020
  - Install the ecosystem of open software (Geo-server, GeoNetwork) in OpenShift container platform by Q3, 2020.

Activity 1.6.3. Development of Consortium-dedicated parts of the knowledge and data-sharing portal

- Milestone 1.6.3.1. Develop a scientific analysis facility and data publication facility, prototype 1, by Q2, 2020
- Milestone 1.6.3.2. Make available the scientific analysis and data publication facilities, beta release by Q4, 2020

Activity 1.6.4. Maintenance, user testing, and targeted improvements of knowledge and data-sharing portal

• Milestone 1.6.4.2. Use the testing and targeted improvements to develop the data portal further by Q4, 2020

# 2.4.7 Output 1.7. A new cadre of PhD and MSc-holding cocoa scientists with knowledge in new cocoa intensification options (including Output 1.2 results)

There is no target for the above output for 2019, i.e., no PhD and MSc theses were delivered in 2019. Achievement of the following milestones was expected at the time of reporting (Table 15). Refer to **APPENDIX 1 – Status of Project Results with Mitigation plans** for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
		R4D	) (Re	esea	rch-	for-	Dev	elop	me	nt)-ı	relat	ed								
Output 1.7. A new cadre o	f Ph	D ar	nd IV	ISc-	hold	ling	coco	ba so	cien	tists	;									
Activity 1.7.1. Identification	n of I	PhD	and	MS	c to	pics														
Milestone 1.7.1.1.																				
Agreements with																				
universities hosting the																				
students finalized																				
Milestone 1.7.1.2.																				
Research proposals				Х	Х	Х	Х	Х	Х											
approved																				
Activity 1.7.2. Implementat	ion	of tł	ne P	hD a	nd I	MSc	pro	ject	S		-		-				-			
Milestone 1.7.2.1. Best																				
candidates identified																				

#### Table 15: Status of milestones for output 1.7.



Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4																
Milestone 1.7.2.2. Regular discussions with the Supervisory Committees held																				
Activity 1.7.3. Submission a	nd a	ppr	ova	l of t	the F	۷hD	and	MS	c th	eses										
Milestone 1.7.3.1. Papers in relation to thesis chapters drafted and reviewed																				
Milestone 1.7.3.2. Theses submitted																				
Milestone 1.7.3.3. Theses defended																				

**Progress on milestones:** All the PhD students have finalized their proposals which have been approved by the graduate schools and all have started work in the field. For each student, a team of supervisors was formed, including at least one full professor from WUR, a daily supervisor from WUR, a scientist from the four Research Institutes in the partner countries in Africa, and a Scientist from IITA, ICRAF, or CIAT. Three MSc students have been recruited in Nigeria and one in Ghana. The recruitment of the MSc candidates was delayed by the lengthy selection process by the NARS. To hasten the selection process, timelines have been communicated to partners, and Directors of the various Institutes are being engaged and have agreed with IITA to support in the selection process.

Below is a summary of activities of the PhD students;

Deo-Gratias Hougni, the PhD student, working on ISFM in Nigeria, conducted laboratory experiments on potential leaching from decomposing cocoa pod husks. The results in 2019 were presented in a <u>poster</u> at the January CocoaSoils Forum in Ghana. In 2019, he also carried out a physical characterization of 110 cocoa plantations and started analysing the contribution of 'super-trees' to the overall yield. He also ran a preliminary analysis of cocoa farm characterization in Ondo State. After the first appraisal, including several field trips, adjustments were made to the original plans for field experimentation.

Lucette Adet, stationed in Côte d'Ivoire and working on cocoa physiology, is developing and testing protocols for a study of the relationships between potassium and drought stress in cocoa. The results were presented as a <u>poster</u> in the January, 2019, CocoaSoils Forum in Ghana, and as an oral presentation at the International Symposium on Soil and Plant Analysis (ISSPA) Conference in June, 2019.

Paulina Ansaa-Asante, the PhD student stationed in Ghana at the Cocoa Research Institute of Ghana (CRIG), is working with various public and private Research Institutes to collect relevant data on cocoa farming practices, yield, climate, and soil. She is currently working on the required improvements to the cocoa crop model and has familiarized herself with the cocoa model Case II, which was translated to the programming language Python in Q4, 2018. This model will allow researchers to calculate the potential yield of cocoa under different climatic conditions. She also presented a <u>poster</u> at the forum in 2019.



Urcil Kenfack, the PhD student, based in Cameroon, carried out a pilot <u>study</u> in Cameroon as part of his MSc thesis which set out to characterize the use of ISFM by smallholder farmers and their perception of the role of ISFM in cocoa productivity in Q2 and Q3, 2018. His initial fieldwork started in 2019 and was presented as a <u>poster</u> at the annual forum in 2019. He started working on his first manuscript In December, 2019, as follows: "Perceptions that drive farmers' agricultural practices: understanding cocoa farmers' soil fertility management practices in Cocoa agroforestry in Cameroon".

A set of criteria for the recruitment of MSc students originating from the four countries was developed and shared during the Annual Forum. One MSc student in Ghana and three in Nigeria have been recruited.

An MSc student from WUR started his work at the end of September, 2019. The student compared the different deep learning approaches developed by CIAT, focusing on the Ashanti region in Ghana. This work will result in a high accuracy map depicting forest and cocoa-growing areas and possibly other land-use categories and will be further used by Paulina Ansaa-Asante as one of the chapters of her thesis. In addition, two MSc students from WUR have collected data for the development of foliar norms for cocoa. One of these would be used by Lucette Adet in her work on cocoa physiology.

**Challenges and proposed changes in milestone timelines:** The long selection process in the NARS delayed the recruitment of the MSc candidates. To hasten the selection process, timelines have been communicated and agreed with the partners and Directors of the various Institutes that have agreed for IITA to support in the selection process in order to complete it.

There was another challenge in obtaining long-term historical records on cocoa farms in Ghana. Further contacts have been made with Institutions where this data might be available.

#### Workplan for 2020

Activity 1.7.1. Identification of PhD and MSc topics

• Milestone 1.7.1.2. Approve research proposals

Activity 1.7.2. Implementation of the PhD and MSc projects

- Milestone 1.7.2.1. Identify best MSc candidates in Cameroon, Côte d'Ivoire, and Nigeria by Q4, 2020
- Milestone 1.7.2.2. Hold regular discussions with the Supervisory Committees of all students across the countries by Q4, 2020

Activity 1.7.3. Submission and approval of the PhD and MSc theses

• Milestone 1.7.3.1. Write and submit the manuscripts of PhD theses' chapters by Q4, 2020

#### 2.5 P4D-related outputs

The P4D component ensures the transfer of the research products to end-users through existing initiatives for dissemination to partners. The main outcomes of the P4D component are to ensure the research products and tools are used by target households and policymakers.

# 2.5.1 Output 2.1: Agreements with private and/or governmental scaling partners developed and signed to disseminate new recommendations/knowledge through their existing structures/ frameworks (H.E protocol or ILO protocol)

As the target for this output in 2019, the project will develop and sign at least two agreements with scaling partners (Table 16). Refer to APPENDIX 1 – Status of Project Results with Mitigation plans for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

#### Table 16: Status of milestones for output 2.1.



Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4																
	Ī	P4D	(Pa	rtn	ersh	ips	for	De	ive	ry)-ı	rela	ted							-	
Output 2.1. Agreements wi	ith p	riva	te a	nd/	or g	over	'nme	enta	l sca	aling	g pai	rtne	rs							
Activity 2.1.1. Identification	of r	elev	ant	diss	emii	natio	on n	etw	orks											
Milestone 2.1.1.1. Potential scaling partners/initiatives mapped Milestone 2.1.1.2. Preliminary agreements with scaling partners established	fagr	eem	x x	X	X X	x x	X	x x	x	X	min			two	rks					
Milestone 2.1.2.1. Agreements with scaling partners formalized Milestone 2.1.2.2. Agreements updated (as relevant/needed)					x	x	x	x	X	x	x	x								

**Progress on milestones:** The legal framework of the CocoaSoils Consortium is captured through the <u>Cooperation Agreement</u>, which is currently fully executed as a working document with all the 18 partners as signatories and a new member, Rockwinds (Transroyal). Additionally, a legal process was developed for new Consortium members for scaling. The scaling partners identified/mapped were required to sign a Participation Statement. This became active after written approval from all other Consortium members for the new member to join. This allowed us to continue site selection of the Satellite Trials sites and the identifying of extension agents for training workshops to minimize delays in the timelines. Table 17 shows the list of signed Consortium partners.

Table 17: Signed	Consortium	members.
------------------	------------	----------

Consortium partners		
IITA	Barry Callebaut	Mondelez
Wageningen University	Mars	YARA
IDH	CRIG	ICL
UNEP-WCMC	CRIN	Nestle
CIAT	CNRA	WCF
ICRAF	IRAD	Rockwinds (Transroyal)
Scaling partners		
Olam	Cargill	Rockwinds (Transroyal)
Kuapa Kooko	Mondelez	Sucden



At the beginning of 2019, IDH and IITA identified private sector partners who wanted to leverage their extension networks for disseminating developed recommendations. The CocoaSoils Consortium members were first identified and meetings were scheduled. IDH facilitated this process by scheduling meetings and developing a template for companies to fill to make it easier to indicate their farmers' locations and networks. To reach the desired target of number of farmers and sites needed for the Satellite Trials other private sector partners were identified. This resulted in the signing of a Participation Statement with Cargill Cocoa & Chocolate, Rockwinds (Transroyal), OLAM, and Kuapa Kooko which makes them formal partners of the CocoaSoils program. Separate workplans were agreed with the project for each partner. Cargill and OLAM have large extension networks in the focus countries of CocoaSoils and are therefore essential in the process of reaching the desired target of farmers and Satellite Trial sites per country. Table 18 shows the list of partners and the locations of their farmers' networks.

Partner	Country
Olam	Cameroon
	Côte d'Ivoire
	Ghana
	Nigeria
Cargill	Côte d'Ivoire
	Ghana
Mondelez	Côte d'Ivoire
	Ghana
Kuapa Kooko	Ghana
Rockwinds (Transroyal)	Ghana
Sucden	Nigeria

Table 18: Partners and countries where Satellite Trial sites are loca	ated.
---	-------

**Challenges and proposed changes in milestone timelines:** In identifying the dissemination networks of private sector partners, IDH and IITA reached out to the Consortium members. All partners except one agreed to leverage their extension networks since most had minimal dissemination networks because they did not buy directly from the farmers. This initially led to delays, but by integrating new partners (Cargill, OLAM, Rockwinds, Kuapa Kooko), a good number of farmer locations was shared by the new partners later in the year. There were more scaling partners in Ghana and Côte d'Ivoire than in Cameroon and Nigeria. To reach our desired target and spread of farmers in the various countries (especially in Cameroon and Nigeria), more scaling partners need to join the Consortium.

Preliminary agreements with scaling partners will continue to be established for new partners while a more elaborate process of formalizing the Consortium Agreement is completed.

#### Workplan for 2020

Activity 2.1.1. Identification of relevant dissemination networks

- Milestone 2.1.1.2. Preliminary agreements with scaling partners established by Q2, 2020
  - Finalize ongoing negotiation agreements with SUCDEN
  - Finalize scaling workplans with Olam in Nigeria and Cameroon, and with Kuapa Kooko
  - Develop preliminary agreements with other scaling partners including TULIP and Olatunde International in Nigeria

Activity 2.1.2. Facilitation of agreements with partners having dissemination networks

- Milestone 2.1.2.1. Agreements with scaling partners formalized by Q4, 2020
- Milestone 2.1.2.2. Update agreements (if necessary) with scaling partners (as relevant/needed) across the countries by Q4, 2020



#### 2.5.2 Output 2.2: Appropriate extension tools assembled and revised for integration in partnerled scaling of new recommendations/tools

The target for this output for 2019 is a Version 1 of adapted extension tools available, based on secondary ISFM-related information (Table 19). Refer to **APPENDIX 1 – Status of Project Results with Mitigation plans** for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Table 19:	Status of	<sup>-</sup> milestones	for	output	2.2.
-----------	-----------	-------------------------	-----	--------	------

Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
	I	P4D	(Pa	rtne	ersh	ips	for	Del	ive	r <b>y)-ı</b>	rela	ted								
Output 2.2. Appropriate ex	tens	sion	too	s fo	r int	egra	atio	n in	part	ner	-led	scal	ling							
Activity 2.2.1. Assessment o	of co	соа	proc	duce	ers' d	сара	city	nee	ds											
Milestone 2.2.1.1. Producer associations identified					x	x	x													
Milestone 2.2.1.2. Training needs assessed					x	x	x													
Activity 2.2.2. Production of	fext	ensi	on t	ools					-				-				-			
Milestone 2.2.2.1. Draft version of the extension tools produced					x	x	x	x	x	x										
Milestone 2.2.2.2. Extension tools validated with cocoa producers' associations					x	x	x	x	x	х										
Milestone 2.2.2.3. Extension tools multiplied										х	х									
Activity 2.2.3. Facilitation of	fee	dba	ck se	essic	ons v	with	diss	emi	nati	on p	artr	ners	on t	he e	exte	nsio	n to	ols		
Milestone 2.2.3.1. Feedback session schedule organized									х	х										
Milestone 2.2.3.2. Feedback received and analysed																				

**Progress on milestones:** Current producers' associations working with the project have been mapped and documented, contributing to the completion of the baseline survey. In addition, the training needs in Cameroon, Côte d'Ivoire, Ghana, and Nigeria have been assessed, complemented with the baseline information on levels of awareness and use of ISFM-related practices. Knowledge gaps in terms of awareness



and appropriate use of the practices have been analysed as part of the baseline report. Existing extension tools, with a focus on ISFM and BMPs have been collected in the four countries.

The collection of existing tools and extension methods focused not only on private partners' materials but also involved all the national public cocoa institutions. A variety of methods, tools, and approaches was discovered across different countries and within the same countries. The ISFM approach was found to be sometimes referred to in existing documents shared by partners but not often implemented at farmer-level.

The compilation of the extension materials related to ISFM and methods for its dissemination, and training needs were validated by the P4D Committees in the four countries; this paved the way for the development of the first draft of the extension manual to be completed in Q2, 2020.

Facilitation of feedback sessions with dissemination partners on the extension tools is an integral part of the development of the first draft of the extension manual which has begun in Cameroon and Nigeria.

**Challenges and proposed changes in milestone timelines:** During the collection of materials, it was discovered that several methodologies and extension tools are used, in terms of channels of communication, formats, and design. Although in some cases, an agreed manual may be developed by the national partners this is not made adaptable for use by the private sector partners. This situation varies from country to country.

It was also realized that the context (environment) for cocoa production differs from one area to another, within the same country, and from one country to another. This leads to a variety of adapted practices with regard to agriculture. In addition to this, the role of national authorities in policy guidance varies in the countries. Consequently, a country-specific manual is required, making the development process longer than anticipated.

#### Workplan for 2020

Activity 2.2.2. Production of extension tools

- Milestone 2.2.2.1. Produce draft version of the extension tools by Q2, 2020
- Milestone 2.2.2.2. Validate extension tools with cocoa producer associations by Q2, 2020
- Milestone 2.2.2.3. Multiply the extension tools produced by Q3, 2020

Activity 2.2.3. Facilitation of feedback sessions with dissemination partners on the extension tools

- Milestone 2.2.3.1. Organize a schedule for feedback sessions by Q2, 2020
- Milestone 2.2.3.2. Analyse feedback received across the countries and integrate this into the extension tools by Q4, 2020

# 2.5.3 Output 2.3: Appropriate training-of-trainer manuals developed for use in the training sessions for extension agents

The targets for this output for 2019 are Version 1 of adapted extension tools available, at least 10 sessions of training-of-trainers organized, at least 250 extension agents trained (gender disaggregated), at least 30,000 cocoa farmers trained on new recommendations and the child labor concept. Achievement of the following milestones was expected at the time of reporting (Table 20). Refer to APPENDIX 1 – Status of **Project Results with Mitigation plans** for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.



#### Table 20: Status of milestones for Output 2.3.

Activities and milestones		20	18			20	19			20	20			20	21			20	22	
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
		P4D	(Pa	rtn	ersh	nips	for	De	live	ry)-ı	rela	ted		<u></u>						
Output 2.3. Appropriate training-of-trainers manuals for use in the training sessions for extension																				
Activity 2.3.1. Identification	ofe	exte	nsio	n ag	gents	s for	eng	gagir	ng in	trai	ining	g-of-	trai	ners	' act	iviti	es			
Milestone 2.3.1.1. Functioning of participating dissemination networks mapped					x	x	x													
Milestone 2.3.1.2. Extension agents identified					х	x	x	x	х	x										
Milestone 2.3.1.3. Training needs assessed					x	х	х	x	x											
Activity 2.3.2. Implementat	ion d	of tr	ainiı	ng-o	of-tra	aine	rs' se	essio	ons											
Milestone 2.3.2.1. Training schedule organized					х	x	x	x	x	x										
Milestone 2.3.2.2. Training sessions held																				
Activity 2.3.3. Collection of eventual modification of th	feec e ap	lbac proa	k or ach	the	e effe	ectiv	/ene	SS O	fthe	e tra	inin	g-of	-tra	iner	s ses	sior	ns ar	nd		
Milestone 2.3.3.1. Collection of feedback on the effectiveness of the training																				
Milestone 2.3.3.2. Continuous improvement of the training modules and processes																				

**Progress on milestones:** Face-to-face meetings have been held with all scaling partners and key stakeholders, with dissemination networks mapped across all four countries. A total of 305 extension agents have been identified for training in Cameroon, Ghana, and Nigeria. Table 21Table 21 shows the number of extension agents per partner organization per country. Additional extension agents for Mars and Cargill will be identified in Côte d'Ivoire by Q1, 2020. With the current mapping, the extension agents are directly linked to the farmers' groups of the scaling partners through different dissemination networks and approaches. Depending on the dissemination approach, extension agents reach over 500 farmers (an example is the use of the Tele Agric platform by Kuapa Kokoo, which is manned by a few extension agents but reaches many of the Kuapa Kokoo farmers). With these different approaches, the 90,000-household target will be reached by



the extension agents identified. Training of households by the extension agents will begin in Q1, 2020, through already planned training sessions with the scaling partners. Kuapa Kokoo in Ghana and Olam in Cameroon have already agreed to have training sessions for households in Q1, 2020.

Country	Institution	Number of Extension Agents
Cameroon	OLAM	80
Côte d'Ivoire	Mars, Cargill	[A final list will be ready by Q1, 2020]
Ghana	Kuapa Kooko, OLAM, Mondelez, Transroyal (Rockwinds)	150
Nigeria	OLAM, SUCDEN	75

#### Table 21: Number of extension agents identified per partner.

An <u>assessment</u> of the training needs has been conducted across the four countries and an adapted methodology will be developed for two training sessions for extension agents to be conducted in Cameroon, Ghana, and Nigeria by Q4, 2019.

One training session was organized in Cameroon in 2019 with 25 extension agents from Olam. The training was held from 9 to 12 December, 2019, in Ntui, one of the main hubs of cocoa production in Cameroon. Training was based on the validated extension materials compiled in Cameroon, with improved recommendations on ISFM, child labor, and forest conservation. See here for training report and manual used.

Training of technicians for other partners will continue in 2020 using the completed version of the extension manual. The training of farmers has been scheduled for 2020 in the various countries, according to the agricultural and farmers' training calendars.

**Challenges and proposed changes in milestone timelines**: Access to training manuals of scaling partners was held back by delays in the signing of scaling partners' agreements. Feedback on the effectiveness of the training and continuous improvement of the modules will be done once the trainings have been conducted.

As of Q4, 2019, only one partner had its training schedule open for extension agents to be trained. To reach our expected target in 2020, the project is negotiating training schedules with scaling partners.

#### Workplan 2020

Activity 2.3.1. Identification of extension agents for engaging in training-of-trainers activities

- Milestone 2.3.1.2. Identify extension agents by Q2, 2020
- Milestone 2.3.2.2. Assess training needs of partner extension agents to be engaged in the training of trainers' sessions in Côte d'Ivoire by Q1, 2020

Activity 2.3.2. Implementation of training-of-trainers sessions

- Milestone 2.3.2.1. Organize training schedules with all scaling partners for the training of trainers sessions by Q2, 2020
- Milestone 2.3.2.2. Hold training sessions with 150 scaling partner extension agents in Côte d'Ivoire and Nigeria by Q4, 2020

Activity 2.3.3. Collection of feedback on the effectiveness of the training-of-trainers sessions and eventual modification of the approach

- Milestone 2.3.3.1. Collect and document feedback on the effectiveness of the trainings held by Q4, 2020
- Milestone 2.3.3.2. Improve the training modules and processes based on the feedback collected by Q4, 2020



# 2.5.4 Output 2.4: Engagement in policy action in support of sustainable cocoa intensification ensuring avoidance of deforestation and child labor in applying new recommendations

For 2019, no targets were expected. However, achievement of the following milestones was expected at the time of reporting (Table 22). Refer to APPENDIX 1 – Status of Project Results with Mitigation plans for current status of the targets.

Columns with an 'X' indicate new timelines for the milestone. Columns in grey indicate the original timeline for the milestone according to the implementation plan in the proposal.

Activities and milestones	2018 2019 2020 2021 20							20	22											
	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	P4D (Partnerships-for-Delivery)-related																			
Output 2.4. Engagement in policy action in support of the sustainable intensification of cocoa																				
Activity 2.4.1. Identif	icati	on o	f rel	evan	t an	d sp	ecifio	: pol	icy b	riefs	5									
Milestone 2.4.1.1.																				
Cocoa-related																				
policy environment						X	X	Х	X	X	Х									
documented for																				
target countries																				
Milestone 2.4.1.2.																				
Policy briefs									Х	X	X	X								
formulated																				
Activity 2.4.2. Engage	emei	nt wi	ith re	eleva	ant p	olicy	/mak	kers	-	-	-									
Milestone 2.4.2.1.																				
Relevant policy-																				
related processes					X	X	X	X	X	Х	Х									
identified and																				
activated																				
Milestone 2.4.2.2.																				
Interactions with																				
policymakers held																				
in relation to																				
products																				
developed under																				
Outputs 1.3, 1.4,																				
and 1.5																				

Table	22:	Status	of	milest	ones	for	output	2.4	
IUNIC		otutus	<b>U</b> .		01100		output		۰

**Progress on milestones:** Four in-country P4D Committees were set up to engage key stakeholders in the cocoa industry across the countries (including policymakers), with roles and responsibilities defined for each participating Institution. These platforms set the pace for policy engagement. Targets are expected from 2020. The P4D Committees in Cameroon and Nigeria were established and are being facilitated by IDH. This was based on the amendment of the Partnership Agreement between IITA and IDH on 1 April, 2019, to organize and establish P4D Committees in both countries. P4D Committees in Côte d'Ivoire, and Ghana are being managed by IITA. See <u>reports</u> of P4D Committee meetings held in Cameroon and Nigeria.



P4D Committees are key in creating a link between the R4D and P4D components of the program. Therefore, their establishment is an important achievement. The P4D Committees are expected to develop a more operational workplan and create workable processes to carry out their core tasks. This includes providing guidance and feedback on the program implementation in the various countries, validating recommendations of the Research Committee and promoting their dissemination. This process started in Q4, 2019, and will continue in 2020.

Additionally, CocoaSoils continues to present practical solutions for issues being raised in deforestation-free initiatives and programs such as the Cocoa & Forests Initiative in Ghana and Côte d'Ivoire and the upcoming Roadmap to Deforestation-free Cocoa in Cameroon to integrate the program's recommendations in related interventions.

The increased understanding of the development of the sustainability tools through a series of presentations at stakeholder platforms has led to engagement with various stakeholders. This has been in the form of using data generated under the project to support commitments to industry and national priorities concerning deforestation/reforestation in the target countries. The following are examples of the use of the data.

- Through UN-REDD: support Côte d'Ivoire's national target of restoring forest cover to 20% of land area by 2030, including through cocoa agroforestry
- Include data on biodiversity on the data platform of the lvorian government and other key stakeholders to meet the country's zero-deforestation commitments

**Challenges and proposed changes in milestone timelines:** The formulated policy briefs were scheduled for 2019 but are dependent on recommendations that are developed through the program and the establishment of the P4D Committees. Their establishment creates an environment to document cocoarrelated policies and formulate and validate policy briefs. These will be further developed in 2020 when concrete recommendations are produced by the program. The program will further convene the P4D Committees across the four countries, facilitate the development of policy briefs, and activate relevant policy-related processes through them.

#### Workplan for 2020

Activity 2.4.1. Identification of relevant and specific policy briefs

- Milestone 2.4.1.1. Document Cocoa-related policy environment for the target countries by Q3, 2020
- Milestone 2.4.1.2. Formulate policy briefs for further discussions with policymakers by Q4, 2020

Activity 2.4.2. Engagement with relevant policymakers

- Milestone 2.4.2.1. Identify and activate relevant policy-related processes for further dialogue by Q3, 2020
- Milestone 2.4.2.2. Hold interactions with policymakers in relation to products developed under Outputs 1.3, 1.4, and 1.5 (sustainability and impact domains) by Q4, 2020



# **3** Financial status

The financial year under review saw the implementation of 2019 activities in addition to delayed activities in 2018 especially the planned maiden forum, baseline survey, commencement of Satellite Trials, mapping of the partner dissemination channels and the setup of all P4D in-country committees. There was, therefore, an increased spending as compared to the project's commencement year of 2018. A total of \$2,511,250 was spent in 2019, leading to a two- year cumulative expenditure of \$4,019,337 out of \$5,270,810. This leaves a surplus of \$1,251,473 with IITA and its partners. The burn rate for the year under review was 78% as compared to 44% in 2018.

An overall deviation of 22% from the 2019 expenditure as against the 2019 budget was as a result of key activities delayed in 2019 and as such deferred to 2020. These activities included Coordination related activities (20% deviation) including printing materials and procurement of supplies for forum 2019, the purchase of capital equipment and Training of Trainers on the MEL platform.

The R4D related activities also saw a deviation of 16% deviation. Since activities such as the validation of partners' sites for the implementation of the Satellite Trials, crop physiology related activities and soil analysis for some Core Trial sites were deferred to 2020.

The P4D related activities also recorded a deviation of 41%. Activities which could not be expended on included the annual meetings of the P4D in-country committees, the production of the extension manual and the training of the Extension agents. These activities have been deferred to Q1 of 2020. The deviation also included funds payable to ICRAF – Cote d'Ivoire for rent, office supplies, communication and procurement of vehicle which ICRAF had pre-financed for the project as part of the project's Hosting Agreement with them. It is noteworthy, however, that the timelines are embedded in the proposed workplan for 2020.



Figure 10: Budget and expenditure for 2018 and 2019

Project results	2019 Targets	Status as of December 2019	Delays experienced and reasons	Mitigation plans to recover
			why	delays
Project impact				
Impact 1. Smallholder cocoa farmers benefit from sustainably increased cocoa productivity and income generated through cocoa production	<ul> <li>→ No change in cocoa yield</li> <li>→ No change in income generated through cocoa production</li> <li>→ No households achieve the yield and income increases</li> <li>→ No visible increases in deforestation compared to control sites</li> <li>→ No evidence for child labor obtained</li> <li>→ No change in carbon stock, water and biodiversity indexes in cocoa zones of Côte d'Ivoire and Ghana</li> </ul>	Baseline figures for yield, income and labor types have been established for Cameroon, Côte d'Ivoire, Ghana, and Nigeria. Baseline maps for deforestation and carbon stocks have been established for the four countries.	-	
Project outcomes	L			I
Outcome 1 New cocoa ISFM -related research products are used by private and public stakeholder partners	<ul> <li>→ At least one research product (validated and used by private and/or public stakeholders</li> <li>→ At least 100 extension agents are using the new research products</li> </ul>	Official country-level cocoa manuals from the four countries and specific dissemination partners' manuals have been assembled. A first draft of the reviewed report of official cocoa manuals based on ISFM and BMP has been completed for all four countries. Validation of the BMP in Cameroon, Ghana and Nigeria was completed. Initial content	The project experienced delays in identifying the partner extension networks and the various dissemination approaches. This was due because new dissemination partners joined mid-way in 2019 and needed to be involved in the process. Extension training has been delayed due to signing of scaling partner agreements.	The use of the products by extension agents will start in Q1, 2020 during farmer trainings across the countries.

# **APPENDIX 1 – Status of Project Results with Mitigation plans**



Project results	2019 Targets	Status as of December 2019	Delays experienced and reasons	Mitigation plans to recover
			why	delays
		was used for training in		
		Cameroon.		
		The framework for the Stepwise		
		app has been developed, and is		
		awaiting validation by the		
		Research Committee in early		
		2020 for the farmer		
		segmentation component.		
Outcome 2.	$\rightarrow$ At least 10,000 cocoa farmers	Dissemination networks of	This outcome will be realized in	Integration of farmers' trainings
Recommendations	using the new	partners have been identified	2020 due to the delay in the	on reviewed ISFM components is
generated through	recommendations/new	across the four countries.	training of extension agents in	planned in the partner farmers'
research products are	knowledge		2019.	trainings starting early 2020. This
used by target	$\rightarrow$ At least three existing (old)	Numbers of farmers reached by		will ensure that farmers have
households	recommendations are being used	the various dissemination		access to this knowledge and
		partners have been identified		apply it as the season starts.
		during the baseline		
		implementation.		
Outcome 3. Decision-	$\rightarrow$ No information available on	A wireframe of the toolkit has	-	-
makers (public and	land-use patterns and ecosystem	been produced and is being		
private) are using tools	services using new tools	populated after which it will be		
and knowledge to avoid	$\rightarrow$ No policy document of the	tested by Q1, 2020.		
increased deforestation	target countries has integrated			
and child labor while	new tools	Initial steps in developing the		
promoting cocoa	→ No public or private sector	toolkit have been taken through		
Intensification	organization is using new tools	contacts with other relevant		
	and knowledge to promote	initiatives.		
	All public and private costs	A rouiou of potential supersize		
	- All public and private sector	among industry and national		
		anong muusu y anu national		
	enforcing the HE and U.O.	guais and communents		
	protocols on child labor from	Control Africa, as well as data		
	protocols on child labor-free	Central Africa, as well as data		



Project results	2019 Targets	Status as of December 2019	Delays experienced and reasons why	Mitigation plans to recover delays
	production to promote new recommendations/ knowledge	and knowledge gaps has been conducted. Two scientific papers are being developed on the risks to biodiversity from potential future cocoa expansion in the West African cocoa zone and the "Generalized biodiversity responses to cocoa agroforestry". New partners have confirmed their affirmation to the HE and ILO protocols on child labor.		
Project results				
Project Outputs				
Output 1.1. A set of integrated soil fertility management options	→ A draft set of ISFM recommendations generated	All the eight Core Trials are being managed, based on agreed protocols. A barcoding system and barcode protocol for Core Trials sites have been developed, and barcodes have been assigned at levels of field and plot for all sites. Official cocoa manuals reviewed and BMP recommendations compiled for the four countries into an implementation and management protocol for use. Preliminary site selection for the	The delay in installing the Satellite Trials was caused by the non-availability of partners' technicians to participate in the validation, delineation, and initial site characterization. This is because the period coincided with the main harvesting season and other key, such as farm auditing for partner organizations.	Individual meetings with partners were held to discuss and agree on the process and dates for the validation of the selected sites in Côte d'Ivoire, Cameroon, and Nigeria. Hence, validation, plot delineation, initial site characterization, and BMP implementation with partners will be done by Q2, 2020.
		Preliminary site selection for the four research countries has been		



Project results	2019 Targets	Status as of December 2019	Delays experienced and reasons	Mitigation plans to recover
			wny	delays
		done and the list has been		
		submitted to partners.		
		Site validation has started for Ghana.		
Output 1.2.	$\rightarrow$ No papers on cocoa	Data analysis has been	There was delay in the	With the completion of the
Understanding the	physiology	conducted from a laboratory	application of fertilizer which was	baseline survey, sites have been
physiological basis of		experiment to examine leaching	dependent on partner site	selected and fertilizer application
cocoa nutrient uptake		of nutrients from cocoa pods.	locations in Nigeria from the	will be done in Q2, 2020.
and use			baseline.	
		A physical characterization of 110		
		cocoa plantations was carried	There was a delay in the	An agreement was reached
		out to analyze the contribution	importation of research	between WUR and Nestlé to
		of 'super-trees' to the overall	equipment (strict regulations for	facilitate the process.
		yield.	shipping between Europe and	
			Côte d'Ivoire), training in the use	
		A protocol for testing cocoa	of equipment, and; problems	
		physiology and nutrient uptake	with equipment repairs.	
		and use has also been developed.		
		Two MCs students from		
		Wagapingan University have		
		collected data in 2018 for the		
		development of foliar norms for		
		cocoa		
Output 1.3. A decision	$\rightarrow$ Draft 1 of segmentation and	A prototype of the Stepwise tool	The delay in the development	The team postponed this activity
support system for	stepwise investment tools	is available and the farmer	and population of the decision	to the Annual Forum Meeting in
intensifying cocoa	available for validation	segmentation component is	support framework was due to	January 2020 to enable access to
production		being reviewed, before it is	the referral of the farmer	and discussions with existing
		validated by the Research	segmentation component to the	initiatives to improve the
		Committee.	Research Committee for review.	analyses.



Project results	2019 Targets	Status as of December 2019	Delays experienced and reasons	Mitigation plans to recover
Output 1.4. Recommendation domains and impact of sustainable intensification on forest pressure identified	<ul> <li>→ Terra-I baseline established</li> <li>→ No recommendations available</li> </ul>	Assessment of Agro-Ecological zones has been completed and maps produced for the final selection of Satellite Trials sites. Deep learning approaches to identify cocoa plots using high resolution Sentinel imagery is being refined. A high-resolution land-cover classification system was piloted, relating observational data with indices derived from 10-meter resolution Sentinel 1 and 2 data and comparing different machine learning algorithms.	More time than expected is required in getting access to cocoa yield and management data. The delay in identifying drivers of deforestation is caused by difficulty in getting enough high- quality GPS points of confounding land-cover classes for training the model.	A mobile app to collect GPS, and relevant metadata for cocoa and forest land-cover classes has been developed and can also be used for the other land-cover classes.
<u>Output 1.5.</u> Sustainability assessment tools developed and validated to support the sustainable development of cocoa production in relation to biodiversity and ecosystem services at the landscape level	→ Draft of sustainability assessment tools available	The first drafts of sustainability tools for biodiversity have been produced. Impacts of a shift in cocoa suitability on ecosystem services have been assessed with use of a land-use change model. Data and methods have been determined, baseline maps have been produced, initial assessment of biodiversity impacts of different cocoa systems has been conducted. Areas most at risk from cocoa production in terms of biodiversity loss have been	The development of the sustainability tools was delayed (from Q2, 2019, to Q2, 2020,) due to the change in the initial plan, to develop a toolkit rather than apply one particular method in a few sites.	A short questionnaire has been sent out within the UNEP-WCMC and CocoaSoils network to solicit feedback on its purpose, potential users, and structure. Based on responses, the toolkit is currently being reframed and elaborated, while a wireframe is being produced for its structure. A complete version will be sent out for review by mid-2020.



Project results	2019 Targets	Status as of December 2019	Delays experienced and reasons why	Mitigation plans to recover delays
		<ul> <li>identified and implications of future deforestation scenarios for ecosystem services have been mapped.</li> <li>All guidance materials aimed at balancing trade-offs and synergies with forests, biodiversity, and ecosystems in planning for sustainable cocoa production for the future have been developed.</li> </ul>		
Output 1.6. Operational open knowledge and data sharing portal for the storage, management, and dissemination of cocoa intensification research results	<ul> <li>→ Final version of a portal available</li> <li>→ No datasets submitted</li> </ul>	<ul> <li>The Open Data Kit (ODK) server has been developed and is the only app currently used for data capture in the project.</li> <li>A cocoa-specific ontology for proper data collection management and storage has been developed.</li> <li>The data portal interface for the CocoaSoils public website was finalized in Q4, 2019.</li> <li>A universal OneDrive has also been created to facilitate data exchange among partners and stakeholders.</li> </ul>	The ontology is a work in progress because it was not initially part of the workplan.	Stakeholders' engagement is being solicited to complete the report and the ontology by Q2, 2020.



Project results	2019 Targets	Status as of December 2019	Delays experienced and reasons why	Mitigation plans to recover delays
Output 1.7. A new cadre of PhD and MSc-holding cocoa scientists with knowledge on new cocoa intensification options	→ None	All PhD students are in the field and their thesis proposals have been approved. MSc students have been recruited, one in Ghana and three in Nigeria. Cameroon and Côte d'Ivoire will be selected by Q4, 2020.	The recruitment of MSc students was delayed by a long selection process by the NARS.	The NARS have agreed to IITA supporting the process to complete the selection.
Output 2.1. Agreements with private and/or governmental scaling partners developed and signed to disseminate new recommendations/knowl edge through their existing structures/frameworks (HE Protocol or ILO Protocol)	→ At least four agreements with scaling partners developed and signed	The Cooperation Agreement is fully executed as a working document with a new member Rockwinds (Transroyal) joining the cooperation. Olam, Cargill and Kuapa Kokoo shared their data for the baseline survey and are in the final stages of signing the agreement. New scaling partners identified/mapped were required to sign a Participation Statement.	Out of the Consortium members only one agreed to leverage their extension networks since most partners had minimal dissemination networks because they did not buy directly from the farmers.	By integrating new partners, a good a number of farmers' locations was shared.
Output 2.2. Appropriate extension tools assembled and revised for integration in partner- led scaling of new recommendations/tools	→ Version 1 of adapted extension tools available, based on secondary ISFM-related information	Version 1 of the tool with a focus on ISFM and BMP has been developed with inputs from the four countries and validated by the P4D Committees.	The difference in the context for cocoa production across the different countries and within countries led the development process to take longer than anticipated.	A country-specific manual is required to make the BMP adaptable in the various countries. The P4D Committees are validating the draft version to incorporate country-specific requirements.
Output 2.3. Appropriate training-of-trainers manuals developed for	→ Version 1 of adapted extension tools available	A draft version of the manual has been developed pending	Access to training manuals of scaling partners was delayed,	Face-to-face meetings with different scaling partners will be held to hasten the process.



Project results	2019 Targets	Status as of December 2019	Delays experienced and reasons why	Mitigation plans to recover delays
use in the training sessions for extension agents	<ul> <li>→ At least 10 training-of-trainers</li> <li>sessions organized</li> <li>→ At least 250 extension agents</li> <li>trained (gender disaggregated)</li> <li>→ At least 30,000 cocoa farmers</li> <li>trained on new</li> </ul>	validation by the P4D Committees. Dissemination networks and approaches by partners have been identified across the	due to delays in the signing of scaling partner agreements. Only one partner had its training schedule opened for Extension Agents to be trained.	The project is negotiating training schedules with scaling partners. Farmer trainings will be aligned to partner farmer training
	recommendations and child labor concept.	countries. A total of 305 extension agents in all four countries have been identified through the project's dissemination partners. The needs assessments have been completed with one training completed in Cameroon.	Training of other partners' extension agents and farmers will begin in Q1, 2020.	sessions to ensure all farmers targeted by partners are also reached with the ISFM content.
Output 2.4. Engagement in policy action in support of sustainable cocoa intensification ensuring avoidance of deforestation and child labor in applying new recommendations	<ul> <li>→ No policy briefs</li> <li>→ No extra interactions with policymakers</li> <li>→ No private and public stakeholders</li> <li>have been exposed and/or trained in the use of such tools</li> </ul>	Four in-country P4D Committees have been set up with roles and responsibilities defined for each participating institution including policy engagement. Engagement of country-level stakeholders including policymakers.	No delays	-



# **APPENDIX 2 - Financial Report**